

# Panasonic

# 2014

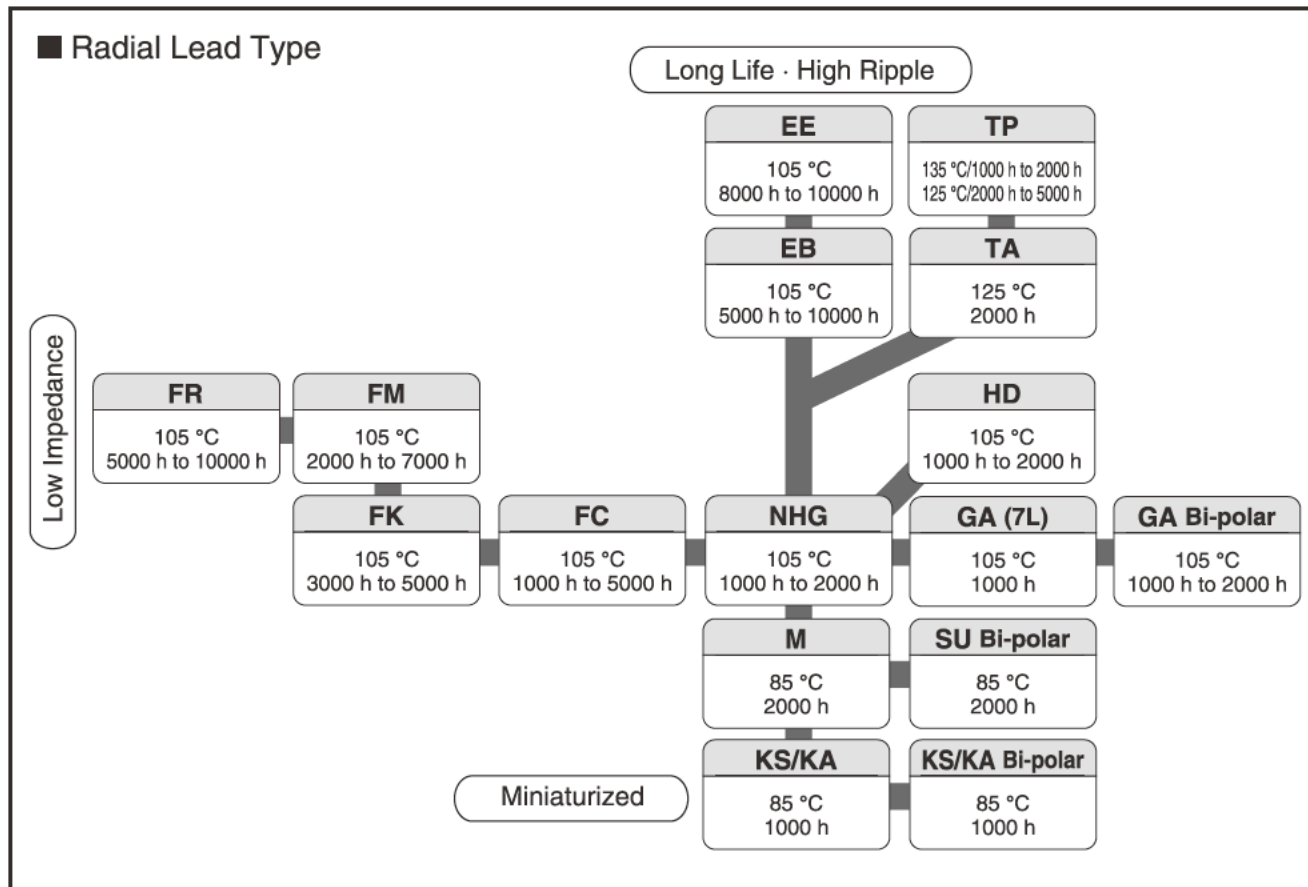
CATALOG

Electrolytic Capacitors  
(Radial Lead Type Aluminum Electrolytic Capacitors)





Small can type Aluminum Electrolytic Capacitors



### Radial Lead Type

Series: **FC** Type: **A**



#### ■ Features

- Endurance : 105 °C 1000 h to 5000 h
- Low impedance
- AEC-Q200 qualified\*
- RoHS directive compliant

#### ■ Specifications

|                                                                             |                                                                                                                                                                                                                                                                                                                                                                             |                                    |      |      |      |      |      |      |      |                 |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------|------|------|------|------|------|------|-----------------|
| Category Temp. Range                                                        | -55 °C to +105 °C                                                                                                                                                                                                                                                                                                                                                           |                                    |      |      |      |      |      |      |      |                 |
| Rated W.V. Range                                                            | 6.3 V.DC to 100 V.DC                                                                                                                                                                                                                                                                                                                                                        |                                    |      |      |      |      |      |      |      |                 |
| Nominal Cap. Range                                                          | 2.2 μF to 15000 μF                                                                                                                                                                                                                                                                                                                                                          |                                    |      |      |      |      |      |      |      |                 |
| Capacitance Tolerance                                                       | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                                                                                                                       |                                    |      |      |      |      |      |      |      |                 |
| DC Leakage Current                                                          | $I \leq 0.01 CV$ or 3 (μA) After 2 minutes (Whichever is greater)                                                                                                                                                                                                                                                                                                           |                                    |      |      |      |      |      |      |      |                 |
| tan δ                                                                       | W.V. (V)                                                                                                                                                                                                                                                                                                                                                                    | 6.3                                | 10   | 16   | 25   | 35   | 50   | 63   | 100  | (120 Hz/+20 °C) |
|                                                                             | tan δ                                                                                                                                                                                                                                                                                                                                                                       | 0.22                               | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.07 |                 |
| For capacitance value $\geq 1000 \mu\text{F}$ , add 0.02 per every 1000 μF. |                                                                                                                                                                                                                                                                                                                                                                             |                                    |      |      |      |      |      |      |      |                 |
| Endurance                                                                   | After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.<br>Duration : φ4 to φ6.3: 1000 hours, φ8: 2000 hours, φ10: 3000 hours, φ12.5 to φ18: 5000 hours |                                    |      |      |      |      |      |      |      |                 |
|                                                                             | Capacitance change                                                                                                                                                                                                                                                                                                                                                          | ±20 % of initial measured value    |      |      |      |      |      |      |      |                 |
|                                                                             | tan δ                                                                                                                                                                                                                                                                                                                                                                       | ≤ 200 % of initial specified value |      |      |      |      |      |      |      |                 |
|                                                                             | DC leakage current                                                                                                                                                                                                                                                                                                                                                          | ≤ initial specified value          |      |      |      |      |      |      |      |                 |
| Shelf Life                                                                  | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                                                                                                                 |                                    |      |      |      |      |      |      |      |                 |

#### ■ Frequency correction factor for ripple current

| W.V.(V.DC) | Cap (μF)      | Frequency (Hz) |      |      |      |       |
|------------|---------------|----------------|------|------|------|-------|
|            |               | 60             | 120  | 1 k  | 10 k | 100 k |
| 6.3 to 100 | 2.2 to 330    | 0.55           | 0.65 | 0.85 | 0.90 | 1.00  |
|            | 390 to 1000   | 0.70           | 0.75 | 0.90 | 0.95 | 1.00  |
|            | 1200 to 2200  | 0.75           | 0.80 | 0.90 | 0.95 | 1.00  |
|            | 2700 to 15000 | 0.80           | 0.85 | 0.95 | 1.00 | 1.00  |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)

\*L≤16 : L±1.0 (\*φ8×15, φ16×15, φ18×15 : L±1.5)  
L≥20 : L±2.0

|               | L≥11 |     |     |     |     |          |          |     | L=7 |      |      |
|---------------|------|-----|-----|-----|-----|----------|----------|-----|-----|------|------|
| Body Dia. φD  | 4    | 5   | 6.3 | 8   | 10  | 12.5     | 16       | 18  | 4   | 5    | 6.3  |
| Body Length L |      |     |     |     |     | 15 to 25 | 30 to 40 |     |     |      |      |
| Lead Dia. φd  | 0.45 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6      | 0.8      | 0.8 | 0.8 | 0.45 | 0.45 |
| Lead space F  | 1.5  | 2.0 | 2.5 | 3.5 | 5.0 | 5.0      | 5.0      | 7.5 | 7.5 | 1.5  | 2.0  |

\* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

### ■ Case size/ Impedance/ Ripple Current

| W.V(V.DC)<br>Case size<br>( $\phi$ D×L) | 6.3 V to 35 V                       |        |                                               | 50 V                                |        |                                               | 63 V                                |        |                                               | 100 V                               |        |                                               |
|-----------------------------------------|-------------------------------------|--------|-----------------------------------------------|-------------------------------------|--------|-----------------------------------------------|-------------------------------------|--------|-----------------------------------------------|-------------------------------------|--------|-----------------------------------------------|
|                                         | Impedance<br>( $\Omega$ )/(100 kHz) |        | Ripple<br>Current<br>(mA r.m.s)<br>(/100 kHz) | Impedance<br>( $\Omega$ )/(100 kHz) |        | Ripple<br>Current<br>(mA r.m.s)<br>(/100 kHz) | Impedance<br>( $\Omega$ )/(100 kHz) |        | Ripple<br>Current<br>(mA r.m.s)<br>(/100 kHz) | Impedance<br>( $\Omega$ )/(100 kHz) |        | Ripple<br>Current<br>(mA r.m.s)<br>(/100 kHz) |
|                                         | 20 °C                               | -10 °C |                                               | 20 °C                               | -10 °C |                                               | 20 °C                               | -10 °C |                                               | 20 °C                               | -10 °C |                                               |
| 4 × 7                                   | 2.00                                | 5.00   | 65                                            |                                     |        |                                               |                                     |        |                                               |                                     |        |                                               |
| 5 × 7                                   | 0.950                               | 2.40   | 120                                           |                                     |        |                                               |                                     |        |                                               |                                     |        |                                               |
| 6.3 × 7                                 | 0.450                               | 1.20   | 200                                           |                                     |        |                                               |                                     |        |                                               |                                     |        |                                               |
| 4 × 11                                  | 1.30                                | 2.60   | 120                                           | 2.50                                | 5.00   | 90                                            | 3.50                                | 7.00   | 80                                            |                                     |        |                                               |
| 5 × 11                                  | 0.800                               | 1.60   | 175                                           | *                                   | *      | *                                             | 2.00                                | 4.00   | 145                                           | 4.10                                | 8.20   | 80                                            |
| 5 × 15                                  | 0.500                               | 1.00   | 235                                           | 0.900                               | 1.80   | 215                                           | 1.30                                | 2.60   | 200                                           | 2.80                                | 5.60   | 90                                            |
| 6.3 × 11.2                              | 0.350                               | 0.700  | 290                                           | 0.600                               | 1.20   | 260                                           | 1.00                                | 2.00   | 240                                           | 1.80                                | 3.60   | 114                                           |
| 6.3 × 15                                | 0.250                               | 0.500  | 400                                           | 0.400                               | 0.800  | 360                                           | 0.700                               | 1.40   | 330                                           | 1.10                                | 2.20   | 155                                           |
| 8 × 11.5                                | 0.117                               | 0.234  | 555                                           | 0.234                               | 0.468  | 485                                           | 0.342                               | 0.684  | 405                                           | 0.680                               | 1.36   | 260                                           |
| 8 × 15                                  | 0.085                               | 0.170  | 730                                           | 0.155                               | 0.310  | 635                                           | 0.230                               | 0.460  | 535                                           | 0.450                               | 0.900  | 340                                           |
| 8 × 20                                  | 0.065                               | 0.130  | 995                                           | 0.120                               | 0.240  | 860                                           | 0.178                               | 0.356  | 690                                           | 0.330                               | 0.660  | 455                                           |
| 10 × 12.5                               | 0.090                               | 0.180  | 755                                           | 0.162                               | 0.324  | 615                                           | 0.256                               | 0.512  | 535                                           | 0.530                               | 1.06   | 306                                           |
| 10 × 16                                 | 0.068                               | 0.136  | 1050                                          | 0.119                               | 0.238  | 850                                           | 0.194                               | 0.388  | 600                                           | 0.360                               | 0.720  | 400                                           |
| 10 × 20                                 | 0.052                               | 0.104  | 1220                                          | 0.090                               | 0.180  | 1030                                          | 0.147                               | 0.294  | 885                                           | 0.240                               | 0.480  | 463                                           |
| 10 × 25                                 | 0.045                               | 0.090  | 1440                                          | 0.082                               | 0.164  | 1200                                          | 0.130                               | 0.260  | 1050                                          | 0.210                               | 0.420  | 599                                           |
| 10 × 30                                 | 0.035                               | 0.070  | 1815                                          | 0.060                               | 0.120  | 1610                                          | 0.090                               | 0.180  | 1300                                          | 0.150                               | 0.300  | 698                                           |
| 12.5 × 15                               | 0.065                               | 0.130  | 1205                                          | 0.110                               | 0.220  | 1150                                          | 0.150                               | 0.300  | 1020                                          | 0.230                               | 0.460  | 511                                           |
| 12.5 × 20                               | 0.038                               | 0.076  | 1655                                          | 0.063                               | 0.126  | 1480                                          | 0.085                               | 0.170  | 1285                                          | 0.180                               | 0.360  | 671                                           |
| 12.5 × 25                               | 0.030                               | 0.060  | 1945                                          | 0.050                               | 0.100  | 1832                                          | 0.070                               | 0.140  | 1720                                          | 0.110                               | 0.220  | 807                                           |
| 12.5 × 30                               | 0.025                               | 0.050  | 2310                                          | 0.040                               | 0.080  | 2215                                          | 0.055                               | 0.110  | 2090                                          | 0.098                               | 0.196  | 937                                           |
| 12.5 × 35                               | 0.022                               | 0.044  | 2510                                          | 0.034                               | 0.068  | 2285                                          | 0.047                               | 0.094  | 2265                                          | 0.087                               | 0.174  | 1040                                          |
| 12.5 × 40                               | 0.018                               | 0.036  | 2655                                          | 0.030                               | 0.060  | 2590                                          | 0.042                               | 0.084  | 2560                                          | 0.072                               | 0.144  | 1130                                          |
| 16 × 15                                 | 0.043                               | 0.086  | 1690                                          | 0.080                               | 0.160  | 1610                                          | 0.090                               | 0.180  | 1410                                          | 0.140                               | 0.280  | 793                                           |
| 16 × 20                                 | 0.029                               | 0.058  | 2205                                          | 0.048                               | 0.096  | 1835                                          | 0.059                               | 0.118  | 1765                                          | 0.110                               | 0.220  | 995                                           |
| 16 × 25                                 | 0.022                               | 0.044  | 2555                                          | 0.034                               | 0.068  | 2235                                          | 0.050                               | 0.100  | 2160                                          | 0.089                               | 0.178  | 1170                                          |
| 16 × 31.5                               | 0.018                               | 0.036  | 3010                                          | 0.028                               | 0.056  | 2700                                          | 0.043                               | 0.086  | 2670                                          | 0.062                               | 0.124  | 1520                                          |
| 16 × 35.5                               | 0.016                               | 0.032  | 3150                                          | 0.025                               | 0.050  | 2790                                          | 0.036                               | 0.072  | 2770                                          | 0.053                               | 0.106  | 1730                                          |
| 16 × 40                                 | 0.015                               | 0.030  | 3360                                          | 0.023                               | 0.046  | 2845                                          | 0.030                               | 0.060  | 2825                                          | 0.047                               | 0.094  | 1920                                          |
| 18 × 15                                 | 0.038                               | 0.076  | 2000                                          | 0.068                               | 0.136  | 1900                                          | 0.086                               | 0.172  | 1690                                          | 0.120                               | 0.240  | 917                                           |
| 18 × 20                                 | 0.028                               | 0.056  | 2490                                          | 0.042                               | 0.084  | 2420                                          | 0.055                               | 0.110  | 2290                                          | 0.080                               | 0.160  | 1230                                          |
| 18 × 25                                 | 0.020                               | 0.040  | 2740                                          | 0.029                               | 0.058  | 2610                                          | 0.043                               | 0.086  | 2585                                          | 0.070                               | 0.140  | 1420                                          |
| 18 × 31.5                               | 0.016                               | 0.032  | 3635                                          | 0.025                               | 0.050  | 3000                                          | 0.032                               | 0.064  | 2950                                          | 0.062                               | 0.124  | 1600                                          |
| 18 × 35.5                               | 0.015                               | 0.030  | 3680                                          | 0.023                               | 0.046  | 3100                                          | 0.030                               | 0.060  | 3095                                          | 0.041                               | 0.082  | 1770                                          |
| 18 × 40                                 | 0.014                               | 0.028  | 3735                                          | -                                   | -      | -                                             | 0.025                               | 0.050  | 3205                                          | 0.036                               | 0.072  | 2300                                          |

\*

| Case size<br>( $\phi$ D×L) | Capacitance<br>( $\mu$ F) | Impedance ( $\Omega$ )/(100 kHz) |        | Ripple Current<br>(mA r.m.s)(100 kHz) |
|----------------------------|---------------------------|----------------------------------|--------|---------------------------------------|
|                            |                           | 20 °C                            | -10 °C |                                       |
| 5 × 11                     | 1.0                       | 2.40                             | 4.80   | 20                                    |
|                            | 2.2                       | 1.80                             | 3.60   | 45                                    |
|                            | 3.3                       | 1.30                             | 2.60   | 65                                    |
|                            | 4.7                       | 1.30                             | 2.60   | 95                                    |
|                            | 10                        | 1.30                             | 2.60   | 125                                   |
|                            | 12                        | 1.30                             | 2.60   | 135                                   |
|                            | 15                        | 1.30                             | 2.60   | 145                                   |
|                            | 18                        | 1.30                             | 2.60   | 155                                   |
|                            | 22                        | 1.30                             | 2.60   | 155                                   |

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Should a safety concern arise regarding this product, please be sure to contact us immediately.

### Standard Products

Endurance : 105 °C  $\phi$ 4 to  $\phi$ 6.3=1000 h,  $\phi$ 8=2000 h,  $\phi$ 10=3000 h,  $\phi$ 12.5 to  $\phi$ 18=5000 h

| W.V.<br>(V) | Cap.<br>( $\pm$ 20 %)<br>( $\mu$ F) | Case size    |                | Specification                                           |                                                    |                      | Lead Length       |                  |                      | Part No.       | Min. Packaging Qty      |                 |                      |
|-------------|-------------------------------------|--------------|----------------|---------------------------------------------------------|----------------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------|-------------------------|-----------------|----------------------|
|             |                                     | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>( $\Omega$ ) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                | Straight Leads<br>(pcs) | Taping<br>(pcs) |                      |
|             |                                     |              |                |                                                         |                                                    |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |                |                         |                 | Taping<br>*H<br>(mm) |
| 6.3         | 27                                  | 4            | 7              | 65                                                      | 2.000                                              | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5            | EEAFC0J270( )           | 200             | 2000                 |
|             | 56                                  | 5            | 7              | 120                                                     | 0.950                                              | 1000                 | 0.45              | 2.0              | 5.0                  | 2.5            | EEAFC0J560( )           | 200             | 2000                 |
|             | 68                                  | 4            | 11             | 120                                                     | 1.300                                              | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5            | EEUFC0J680( )***        | 200             | 2000                 |
|             | 100                                 | 5            | 11             | 175                                                     | 0.800                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5            | EEUFC0J101( )           | 200             | 2000                 |
|             | 120                                 | 6.3          | 7              | 200                                                     | 0.450                                              | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5            | EEAFC0J121( )           | 200             | 2000                 |
|             | 150                                 | 5            | 15             | 235                                                     | 0.500                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5            | EEUFC0J151( )***        | 200             | 2000                 |
|             | 220                                 | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5            | EEUFC0J221( )           | 200             | 2000                 |
|             | 270                                 | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5            | EEUFC0J271( )           | 200             | 2000                 |
|             | 330                                 | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5            | EEUFC0J331S( )          | 200             | 2000                 |
|             |                                     | 6.3          | 15             | 400                                                     | 0.250                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5            | EEUFC0J331( )***        | 200             | 2000                 |
|             | 390                                 | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                | EEUFC0J391( )           | 200             | 1000                 |
|             | 470                                 | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                | EEUFC0J471( )           | 200             | 1000                 |
|             | 560                                 | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                | EEUFC0J561( )           | 200             | 1000                 |
|             | 820                                 | 8            | 15             | 730                                                     | 0.085                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                | EEUFC0J821L( )          | 200             | 1000                 |
|             |                                     | 10           | 12.5           | 755                                                     | 0.090                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                | EEUFC0J821( )           | 200             | 500                  |
|             | 1000                                | 10           | 12.5           | 755                                                     | 0.090                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                | EEUFC0J102( )           | 200             | 500                  |
|             | 1200                                | 8            | 20             | 995                                                     | 0.065                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                | EEUFC0J122L( )          | 200             | 1000                 |
|             |                                     | 10           | 16             | 1050                                                    | 0.068                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                | EEUFC0J122( )           | 200             | 500                  |
|             | 1500                                | 10           | 20             | 1220                                                    | 0.052                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                | EEUFC0J152( )           | 200             | 500                  |
|             |                                     | 12.5         | 15             | 1205                                                    | 0.065                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                | EEUFC0J152S( )          | 200             | 500                  |
|             | 1800                                | 10           | 25             | 1440                                                    | 0.045                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                | EEUFC0J182( )           | 200             | 500                  |
|             | 2200                                | 10           | 25             | 1440                                                    | 0.045                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                | EEUFC0J222( )           | 200             | 500                  |
|             |                                     | 16           | 15             | 1690                                                    | 0.043                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                | EEUFC0J222S( )          | 100             | 250                  |
|             | 2700                                | 10           | 30             | 1815                                                    | 0.035                                              | 3000                 | 0.60              | 5.0              |                      |                | EEUFC0J272L             | 100             |                      |
|             |                                     | 12.5         | 20             | 1655                                                    | 0.038                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                | EEUFC0J272( )           | 200             | 500                  |
|             |                                     | 16           | 15             | 1690                                                    | 0.043                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                | EEUFC0J272S( )          | 100             | 250                  |
|             | 3300                                | 12.5         | 20             | 1655                                                    | 0.038                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                | EEUFC0J332( )           | 200             | 500                  |
|             |                                     | 18           | 15             | 2000                                                    | 0.038                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                | EEUFC0J332S( )          | 100             | 250                  |
|             | 3900                                | 12.5         | 25             | 1945                                                    | 0.030                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                | EEUFC0J392( )           | 200             | 500                  |
|             | 4700                                | 12.5         | 30             | 2310                                                    | 0.025                                              | 5000                 | 0.80              | 5.0              |                      |                | EEUFC0J472              | 100             |                      |
| 16          |                                     | 20           | 2205           | 0.029                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC0J472S( ) | 100                     | 250             |                      |
| 5600        | 12.5                                | 35           | 2510           | 0.022                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC0J562L    | 100                     |                 |                      |
|             | 16                                  | 20           | 2205           | 0.029                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC0J562( )  | 100                     | 250             |                      |
| 6800        | 12.5                                | 40           | 2655           | 0.018                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC0J682L    | 100                     |                 |                      |
|             | 16                                  | 25           | 2555           | 0.022                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC0J682( )  | 100                     | 250             |                      |
|             | 18                                  | 20           | 2490           | 0.028                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC0J682S( ) | 100                     | 250             |                      |
| 8200        | 16                                  | 31.5         | 3010           | 0.018                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC0J822     | 100                     |                 |                      |
| 10000       | 16                                  | 35.5         | 3150           | 0.016                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC0J103     | 100                     |                 |                      |
|             | 18                                  | 25           | 2740           | 0.020                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC0J103S( ) | 100                     | 250             |                      |
| 12000       | 16                                  | 40           | 3360           | 0.015                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC0J123L    | 100                     |                 |                      |
|             | 18                                  | 31.5         | 3635           | 0.016                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC0J123     | 50                      |                 |                      |
| 15000       | 18                                  | 35.5         | 3680           | 0.015                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC0J153     | 50                      |                 |                      |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 30/Jun/2015

### Standard Products

Endurance : 105 °C  $\phi$ 4 to  $\phi$ 6.3=1000 h,  $\phi$ 8=2000 h,  $\phi$ 10=3000 h,  $\phi$ 12.5 to  $\phi$ 18=5000 h

| W.V.<br>(V) | Cap.<br>( $\pm$ 20 %)<br>( $\mu$ F) | Case size    |                | Specification                                           |                                                    |                      | Lead Length       |                  |                      |                      | Part No.         | Min. Packaging Qty      |                 |
|-------------|-------------------------------------|--------------|----------------|---------------------------------------------------------|----------------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|------------------|-------------------------|-----------------|
|             |                                     | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>( $\Omega$ ) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                  | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                     |              |                |                                                         |                                                    |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                  |                         |                 |
| 10          | 22                                  | 4            | 7              | 65                                                      | 2.000                                              | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5                  | EEAFC1A220( )    | 200                     | 2000            |
|             | 39                                  | 5            | 7              | 120                                                     | 0.950                                              | 1000                 | 0.45              | 2.0              | 5.0                  | 2.5                  | EEAFC1A390( )    | 200                     | 2000            |
|             | 47                                  | 4            | 11             | 120                                                     | 1.300                                              | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5                  | EEUFC1A470( )*** | 200                     | 2000            |
|             | 82                                  | 5            | 11             | 175                                                     | 0.800                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1A820( )    | 200                     | 2000            |
|             |                                     | 6.3          | 7              | 200                                                     | 0.450                                              | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5                  | EEAFC1A820( )    | 200                     | 2000            |
|             | 100                                 | 5            | 11             | 175                                                     | 0.800                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1A101S( )   | 200                     | 2000            |
|             |                                     | 5            | 15             | 235                                                     | 0.500                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1A101( )*** | 200                     | 2000            |
|             | 150                                 | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1A151( )    | 200                     | 2000            |
|             | 180                                 | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1A181( )    | 200                     | 2000            |
|             | 220                                 | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1A221S( )   | 200                     | 2000            |
|             |                                     | 6.3          | 15             | 400                                                     | 0.250                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1A221( )*** | 200                     | 2000            |
|             | 330                                 | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1A331( )    | 200                     | 1000            |
|             | 390                                 | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1A391( )    | 200                     | 1000            |
|             | 470                                 | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1A471( )    | 200                     | 1000            |
|             | 560                                 | 10           | 12.5           | 755                                                     | 0.090                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1A561( )    | 200                     | 500             |
|             | 680                                 | 8            | 15             | 730                                                     | 0.085                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1A681L( )   | 200                     | 1000            |
|             |                                     | 10           | 12.5           | 755                                                     | 0.090                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1A681( )    | 200                     | 500             |
|             | 820                                 | 10           | 16             | 1050                                                    | 0.068                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1A821( )    | 200                     | 500             |
|             | 1000                                | 8            | 20             | 995                                                     | 0.065                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1A102L( )   | 200                     | 1000            |
|             |                                     | 10           | 16             | 1050                                                    | 0.068                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1A102( )    | 200                     | 500             |
|             | 1200                                | 10           | 20             | 1220                                                    | 0.052                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1A122( )    | 200                     | 500             |
|             |                                     | 12.5         | 15             | 1205                                                    | 0.065                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1A122S( )   | 200                     | 500             |
|             | 1500                                | 10           | 25             | 1440                                                    | 0.045                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1A152( )    | 200                     | 500             |
|             | 1800                                | 12.5         | 20             | 1655                                                    | 0.038                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1A182( )    | 200                     | 500             |
|             |                                     | 16           | 15             | 1690                                                    | 0.043                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1A182S( )   | 100                     | 250             |
|             | 2200                                | 10           | 30             | 1815                                                    | 0.035                                              | 3000                 | 0.60              | 5.0              |                      |                      | EEUFC1A222L      | 100                     |                 |
|             |                                     | 12.5         | 20             | 1655                                                    | 0.038                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1A222( )    | 200                     | 500             |
|             | 2700                                | 12.5         | 25             | 1945                                                    | 0.030                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1A272( )    | 200                     | 500             |
|             |                                     | 18           | 15             | 2000                                                    | 0.038                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1A272S( )   | 100                     | 250             |
|             | 3300                                | 12.5         | 30             | 2310                                                    | 0.025                                              | 5000                 | 0.80              | 5.0              |                      |                      | EEUFC1A332       | 100                     |                 |
| 16          |                                     | 20           | 2205           | 0.029                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1A332S( )       | 100              | 250                     |                 |
| 3900        | 12.5                                | 35           | 2510           | 0.022                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1A392L          | 100              |                         |                 |
|             | 16                                  | 20           | 2205           | 0.029                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1A392( )        | 100              | 250                     |                 |
| 4700        | 12.5                                | 40           | 2655           | 0.018                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1A472L          | 100              |                         |                 |
|             | 16                                  | 25           | 2555           | 0.022                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1A472( )        | 100              | 250                     |                 |
| 5600        | 16                                  | 25           | 2555           | 0.022                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1A562( )        | 100              | 250                     |                 |
|             | 18                                  | 20           | 2490           | 0.028                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1A562S( )       | 100              | 250                     |                 |
| 6800        | 16                                  | 31.5         | 3010           | 0.018                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1A682           | 100              |                         |                 |
|             | 18                                  | 25           | 2740           | 0.020                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1A682S( )       | 100              | 250                     |                 |
| 8200        | 16                                  | 35.5         | 3150           | 0.016                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1A822L          | 100              |                         |                 |
|             | 18                                  | 31.5         | 3635           | 0.016                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1A822           | 50               |                         |                 |
| 10000       | 18                                  | 35.5         | 3680           | 0.015                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1A103           | 50               |                         |                 |
| 12000       | 18                                  | 40           | 3735           | 0.014                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1A123           | 50               |                         |                 |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.  
· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 30/Jun/2015

### Standard Products

Endurance : 105 °C  $\phi 4$  to  $\phi 6.3=1000$  h,  $\phi 8=2000$  h,  $\phi 10=3000$  h,  $\phi 12.5$  to  $\phi 18=5000$  h

| W.V.<br>(V) | Cap.<br>( $\pm 20\%$ )<br>( $\mu\text{F}$ ) | Case size    |                | Specification                                           |                                                    |                      | Lead Length       |                  |                      |                      | Part No.         | Min. Packaging Qty      |                 |
|-------------|---------------------------------------------|--------------|----------------|---------------------------------------------------------|----------------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|------------------|-------------------------|-----------------|
|             |                                             | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>( $\Omega$ ) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                  | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                             |              |                |                                                         |                                                    |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                  |                         |                 |
| 16          | 15                                          | 4            | 7              | 65                                                      | 2.000                                              | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5                  | EEAFC1C150( )    | 200                     | 2000            |
|             | 27                                          | 5            | 7              | 120                                                     | 0.950                                              | 1000                 | 0.45              | 2.0              | 5.0                  | 2.5                  | EEAFC1C270( )    | 200                     | 2000            |
|             | 39                                          | 4            | 11             | 120                                                     | 1.30                                               | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5                  | EEUFC1C390( )*** | 200                     | 2000            |
|             | 47                                          | 5            | 11             | 175                                                     | 0.800                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1C470( )    | 200                     | 2000            |
|             | 56                                          | 5            | 11             | 175                                                     | 0.800                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1C560( )    | 200                     | 2000            |
|             |                                             | 6.3          | 7              | 200                                                     | 0.450                                              | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5                  | EEAFC1C560( )    | 200                     | 2000            |
|             | 68                                          | 5            | 11             | 175                                                     | 0.800                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1C680( )    | 200                     | 2000            |
|             | 82                                          | 5            | 15             | 235                                                     | 0.500                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1C820( )*** | 200                     | 2000            |
|             | 100                                         | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1C101( )    | 200                     | 2000            |
|             | 120                                         | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1C121( )    | 200                     | 2000            |
|             | 180                                         | 6.3          | 15             | 400                                                     | 0.250                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1C181( )*** | 200                     | 2000            |
|             | 220                                         | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1C221( )    | 200                     | 1000            |
|             | 270                                         | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1C271( )    | 200                     | 1000            |
|             | 330                                         | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1C331( )    | 200                     | 1000            |
|             | 390                                         | 10           | 12.5           | 755                                                     | 0.090                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C391( )    | 200                     | 500             |
|             | 470                                         | 8            | 15             | 730                                                     | 0.085                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1C471L( )   | 200                     | 1000            |
|             |                                             | 10           | 12.5           | 755                                                     | 0.090                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C471( )    | 200                     | 500             |
|             | 560                                         | 10           | 16             | 1050                                                    | 0.068                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C561( )    | 200                     | 500             |
|             | 680                                         | 8            | 20             | 995                                                     | 0.065                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1C681L( )   | 200                     | 1000            |
|             |                                             | 10           | 16             | 1050                                                    | 0.068                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C681( )    | 200                     | 500             |
|             | 820                                         | 10           | 20             | 1220                                                    | 0.052                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C821( )    | 200                     | 500             |
|             |                                             | 12.5         | 15             | 1205                                                    | 0.065                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C821S( )   | 200                     | 500             |
|             | 1000                                        | 10           | 20             | 1220                                                    | 0.052                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C102S( )   | 200                     | 500             |
|             |                                             | 10           | 25             | 1440                                                    | 0.045                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C102( )    | 200                     | 500             |
|             | 1200                                        | 10           | 25             | 1440                                                    | 0.045                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C122( )    | 200                     | 500             |
|             |                                             | 16           | 15             | 1690                                                    | 0.043                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1C122S( )   | 100                     | 250             |
|             | 1500                                        | 10           | 30             | 1815                                                    | 0.035                                              | 3000                 | 0.60              | 5.0              |                      |                      | EEUFC1C152L      | 100                     |                 |
|             |                                             | 12.5         | 20             | 1655                                                    | 0.038                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C152( )    | 200                     | 500             |
|             | 16                                          | 16           | 15             | 1690                                                    | 0.043                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1C152S( )   | 100                     | 250             |
|             | 1800                                        | 12.5         | 25             | 1945                                                    | 0.030                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C182( )    | 200                     | 500             |
|             |                                             | 18           | 15             | 2000                                                    | 0.038                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1C182S( )   | 100                     | 250             |
|             | 2200                                        | 12.5         | 25             | 1945                                                    | 0.030                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1C222( )    | 200                     | 500             |
| 16          |                                             | 20           | 2205           | 0.029                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1C222S( )       | 100              | 250                     |                 |
| 2700        | 12.5                                        | 30           | 2310           | 0.025                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1C272L          | 100              |                         |                 |
|             | 16                                          | 20           | 2205           | 0.029                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1C272( )        | 100              | 250                     |                 |
| 3300        | 12.5                                        | 35           | 2510           | 0.022                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1C332           | 100              |                         |                 |
|             | 18                                          | 20           | 2490           | 0.028                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1C332S( )       | 100              | 250                     |                 |
| 3900        | 16                                          | 25           | 2555           | 0.022                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1C392( )        | 100              | 250                     |                 |
|             | 18                                          | 20           | 2490           | 0.028                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1C392S( )       | 100              | 250                     |                 |
| 4700        | 16                                          | 31.5         | 3010           | 0.018                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1C472           | 100              |                         |                 |
|             | 18                                          | 25           | 2740           | 0.020                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1C472S( )       | 100              | 250                     |                 |
| 5600        | 16                                          | 35.5         | 3150           | 0.016                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1C562L          | 100              |                         |                 |
|             | 18                                          | 31.5         | 3635           | 0.016                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1C562           | 50               |                         |                 |
| 6800        | 16                                          | 40           | 3360           | 0.015                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1C682           | 100              |                         |                 |
| 8200        | 18                                          | 35.5         | 3680           | 0.015                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1C822           | 50               |                         |                 |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 30/Jun/2015



### Standard Products

Endurance : 105 °C  $\phi$ 4 to  $\phi$ 6.3=1000 h,  $\phi$ 8=2000 h,  $\phi$ 10=3000 h,  $\phi$ 12.5 to  $\phi$ 18=5000 h

| W.V.<br>(V) | Cap.<br>( $\pm$ 20 %)<br>( $\mu$ F) | Case size    |                | Specification                                           |                                                    |                      | Lead Length       |                  |                      |                      | Part No.         | Min. Packaging Qty      |                 |
|-------------|-------------------------------------|--------------|----------------|---------------------------------------------------------|----------------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|------------------|-------------------------|-----------------|
|             |                                     | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>( $\Omega$ ) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                  | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                     |              |                |                                                         |                                                    |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                  |                         |                 |
| 25          | 10                                  | 4            | 7              | 65                                                      | 2.000                                              | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5                  | EEAFC1E100( )    | 200                     | 2000            |
|             | 22                                  | 5            | 7              | 120                                                     | 0.950                                              | 1000                 | 0.45              | 2.0              | 5.0                  | 2.5                  | EEAFC1E220( )    | 200                     | 2000            |
|             | 27                                  | 4            | 11             | 120                                                     | 1.30                                               | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5                  | EEUFC1E270( )*** | 200                     | 2000            |
|             | 39                                  | 5            | 11             | 175                                                     | 0.800                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1E390( )    | 200                     | 2000            |
|             |                                     | 6.3          | 7              | 200                                                     | 0.450                                              | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5                  | EEAFC1E390( )    | 200                     | 2000            |
|             | 47                                  | 5            | 11             | 175                                                     | 0.800                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1E470( )    | 200                     | 2000            |
|             | 56                                  | 5            | 15             | 235                                                     | 0.500                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1E560( )*** | 200                     | 2000            |
|             | 82                                  | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1E820( )    | 200                     | 2000            |
|             | 100                                 | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1E101S( )   | 200                     | 2000            |
|             | 120                                 | 6.3          | 15             | 400                                                     | 0.250                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1E121( )*** | 200                     | 2000            |
|             | 180                                 | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1E181( )    | 200                     | 1000            |
|             | 220                                 | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1E221( )    | 200                     | 1000            |
|             | 270                                 | 10           | 12.5           | 755                                                     | 0.090                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E271( )    | 200                     | 500             |
|             | 330                                 | 8            | 15             | 730                                                     | 0.085                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1E331L( )   | 200                     | 1000            |
|             |                                     | 10           | 12.5           | 755                                                     | 0.090                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E331( )    | 200                     | 500             |
|             | 390                                 | 10           | 16             | 1050                                                    | 0.068                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E391( )    | 200                     | 500             |
|             | 470                                 | 8            | 20             | 995                                                     | 0.065                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1E471L( )   | 200                     | 1000            |
|             |                                     | 10           | 16             | 1050                                                    | 0.068                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E471( )    | 200                     | 500             |
|             | 560                                 | 10           | 20             | 1220                                                    | 0.052                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E561( )    | 200                     | 500             |
|             |                                     | 12.5         | 15             | 1205                                                    | 0.065                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E561S( )   | 200                     | 500             |
|             | 680                                 | 10           | 20             | 1220                                                    | 0.052                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E681( )    | 200                     | 500             |
|             | 820                                 | 10           | 25             | 1440                                                    | 0.045                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E821( )    | 200                     | 500             |
|             |                                     | 12.5         | 20             | 1655                                                    | 0.038                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E821S( )   | 200                     | 500             |
|             | 1000                                | 10           | 30             | 1815                                                    | 0.035                                              | 3000                 | 0.60              | 5.0              |                      |                      | EEUFC1E102L      | 100                     |                 |
|             |                                     | 12.5         | 20             | 1655                                                    | 0.038                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E102( )    | 200                     | 500             |
|             |                                     | 16           | 15             | 1690                                                    | 0.043                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1E102S( )   | 100                     | 250             |
|             | 1200                                | 12.5         | 25             | 1945                                                    | 0.030                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E122( )    | 200                     | 500             |
|             |                                     | 18           | 15             | 2000                                                    | 0.038                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1E122S( )   | 100                     | 250             |
|             | 1500                                | 12.5         | 25             | 1945                                                    | 0.030                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1E152( )    | 200                     | 500             |
|             |                                     | 16           | 20             | 2205                                                    | 0.029                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1E152S( )   | 100                     | 250             |
| 1800        | 12.5                                | 30           | 2310           | 0.025                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1E182L          | 100              |                         |                 |
|             | 16                                  | 20           | 2205           | 0.029                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1E182( )        | 100              | 250                     |                 |
| 2200        | 12.5                                | 35           | 2510           | 0.022                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1E222           | 100              |                         |                 |
|             | 18                                  | 20           | 2490           | 0.028                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1E222S( )       | 100              | 250                     |                 |
| 2700        | 16                                  | 25           | 2555           | 0.022                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1E272( )        | 100              | 250                     |                 |
| 3300        | 16                                  | 31.5         | 3010           | 0.018                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1E332           | 100              |                         |                 |
|             | 18                                  | 25           | 2740           | 0.020                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1E332S( )       | 100              | 250                     |                 |
| 3900        | 16                                  | 35.5         | 3150           | 0.016                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1E392L          | 100              |                         |                 |
|             | 18                                  | 31.5         | 3635           | 0.016                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1E392           | 50               |                         |                 |
| 4700        | 18                                  | 35.5         | 3680           | 0.015                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1E472           | 50               |                         |                 |
| 5600        | 18                                  | 40           | 3735           | 0.014                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1E562           | 50               |                         |                 |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 30/Jun/2015

### Standard Products

Endurance : 105 °C  $\phi$ 4 to  $\phi$ 6.3=1000 h,  $\phi$ 8=2000 h,  $\phi$ 10=3000 h,  $\phi$ 12.5 to  $\phi$ 18=5000 h

| W.V.<br>(V) | Cap.<br>( $\pm$ 20 %)<br>( $\mu$ F) | Case size    |                | Specification                                           |                                                    |                      | Lead Length       |                  |                      |                      | Part No.         | Min. Packaging Qty      |                 |
|-------------|-------------------------------------|--------------|----------------|---------------------------------------------------------|----------------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|------------------|-------------------------|-----------------|
|             |                                     | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>( $\Omega$ ) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                  | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                     |              |                |                                                         |                                                    |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                  |                         |                 |
| 35          | 6.8                                 | 4            | 7              | 65                                                      | 2.000                                              | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5                  | EEAFC1V6R8( )    | 200                     | 2000            |
|             | 12                                  | 5            | 7              | 120                                                     | 0.950                                              | 1000                 | 0.45              | 2.0              | 5.0                  | 2.5                  | EEAFC1V120( )    | 200                     | 2000            |
|             | 18                                  | 4            | 11             | 120                                                     | 1.300                                              | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5                  | EEUFC1V180( )*** | 200                     | 2000            |
|             | 22                                  | 5            | 11             | 175                                                     | 0.800                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1V220( )    | 200                     | 2000            |
|             | 27                                  | 5            | 11             | 175                                                     | 0.800                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1V270( )    | 200                     | 2000            |
|             |                                     | 6.3          | 7              | 200                                                     | 0.450                                              | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5                  | EEAFC1V270( )    | 200                     | 2000            |
|             | 33                                  | 5            | 11             | 175                                                     | 0.080                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1V330( )    | 200                     | 2000            |
|             | 39                                  | 5            | 15             | 235                                                     | 0.500                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1V390( )*** | 200                     | 2000            |
|             | 47                                  | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1V470( )    | 200                     | 2000            |
|             | 56                                  | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1V560( )    | 200                     | 2000            |
|             | 68                                  | 6.3          | 11.2           | 290                                                     | 0.350                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1V680( )    | 200                     | 2000            |
|             | 82                                  | 6.3          | 15             | 400                                                     | 0.250                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1V820( )*** | 200                     | 2000            |
|             | 100                                 | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1V101( )    | 200                     | 1000            |
|             | 120                                 | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1V121( )    | 200                     | 1000            |
|             | 150                                 | 8            | 11.5           | 555                                                     | 0.117                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1V151( )    | 200                     | 1000            |
|             | 180                                 | 10           | 12.5           | 755                                                     | 0.090                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V181( )    | 200                     | 500             |
|             | 220                                 | 8            | 15             | 730                                                     | 0.085                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1V221L( )   | 200                     | 1000            |
|             |                                     | 10           | 12.5           | 755                                                     | 0.090                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V221( )    | 200                     | 500             |
|             | 270                                 | 10           | 16             | 1050                                                    | 0.068                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V271( )    | 200                     | 500             |
|             | 330                                 | 8            | 20             | 995                                                     | 0.065                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1V331L( )   | 200                     | 1000            |
|             |                                     | 10           | 16             | 1050                                                    | 0.068                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V331( )    | 200                     | 500             |
|             | 390                                 | 10           | 20             | 1220                                                    | 0.052                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V391( )    | 200                     | 500             |
|             |                                     | 12.5         | 15             | 1205                                                    | 0.065                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V391S( )   | 200                     | 500             |
|             | 470                                 | 10           | 20             | 1220                                                    | 0.052                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V471( )    | 200                     | 500             |
|             | 560                                 | 10           | 25             | 1440                                                    | 0.045                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V561( )    | 200                     | 500             |
|             |                                     | 12.5         | 20             | 1655                                                    | 0.038                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V561S( )   | 200                     | 500             |
|             | 680                                 | 10           | 30             | 1815                                                    | 0.035                                              | 3000                 | 0.60              | 5.0              |                      |                      | EEUFC1V681L      | 100                     |                 |
|             |                                     | 12.5         | 20             | 1655                                                    | 0.038                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V681( )    | 200                     | 500             |
|             |                                     | 16           | 15             | 1690                                                    | 0.043                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1V681S( )   | 100                     | 250             |
|             | 820                                 | 12.5         | 25             | 1945                                                    | 0.030                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V821L( )   | 200                     | 500             |
|             |                                     | 18           | 15             | 2000                                                    | 0.038                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1V821( )    | 100                     | 250             |
|             | 1000                                | 12.5         | 25             | 1945                                                    | 0.030                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1V102( )    | 200                     | 500             |
|             |                                     | 16           | 20             | 2205                                                    | 0.029                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1V102S( )   | 100                     | 250             |
| 1200        | 12.5                                | 30           | 2310           | 0.025                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1V122L          | 100              |                         |                 |
|             | 16                                  | 20           | 2205           | 0.029                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1V122( )        | 100              | 250                     |                 |
| 1500        | 12.5                                | 35           | 2510           | 0.022                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1V152L          | 100              |                         |                 |
|             | 16                                  | 25           | 2555           | 0.022                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1V152( )        | 100              | 250                     |                 |
|             | 18                                  | 20           | 2490           | 0.028                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1V152S( )       | 100              | 250                     |                 |
| 1800        | 12.5                                | 40           | 2655           | 0.018                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1V182L          | 100              |                         |                 |
|             | 16                                  | 25           | 2555           | 0.022                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1V182( )        | 100              | 250                     |                 |
|             | 18                                  | 20           | 2490           | 0.028                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1V182S( )       | 100              | 250                     |                 |
| 2200        | 16                                  | 31.5         | 3010           | 0.018                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1V222           | 100              |                         |                 |
|             | 18                                  | 25           | 2740           | 0.020                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1V222S( )       | 100              | 250                     |                 |
| 2700        | 16                                  | 35.5         | 3150           | 0.016                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1V272L          | 100              |                         |                 |
|             | 18                                  | 31.5         | 3635           | 0.016                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1V272           | 50               |                         |                 |
| 3300        | 18                                  | 35.5         | 3680           | 0.015                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1V332           | 50               |                         |                 |
| 3900        | 18                                  | 40           | 3735           | 0.014                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1V392           | 50               |                         |                 |

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· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 30/Jun/2015

### Standard Products

Endurance : 105 °C  $\phi$ 4 to  $\phi$ 6.3=1000 h,  $\phi$ 8=2000 h,  $\phi$ 10=3000 h,  $\phi$ 12.5 to  $\phi$ 18=5000 h

| W.V.<br>(V) | Cap.<br>( $\pm$ 20 %)<br>( $\mu$ F) | Case size    |                | Specification                                           |                                                    |                      | Lead Length       |                  |                      |                      | Part No.         | Min. Packaging Qty      |                 |
|-------------|-------------------------------------|--------------|----------------|---------------------------------------------------------|----------------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|------------------|-------------------------|-----------------|
|             |                                     | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>( $\Omega$ ) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                  | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                     |              |                |                                                         |                                                    |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                  |                         |                 |
| 50          | 1.0                                 | 5            | 11             | 20                                                      | 2.400                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1H1R0( )**  | 200                     | 2000            |
|             | 2.2                                 | 5            | 11             | 45                                                      | 1.800                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1H2R2( )    | 200                     | 2000            |
|             | 3.3                                 | 5            | 11             | 65                                                      | 1.300                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1H3R3( )    | 200                     | 2000            |
|             | 4.7                                 | 5            | 11             | 95                                                      | 1.300                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1H4R7( )    | 200                     | 2000            |
|             | 10                                  | 4            | 11             | 90                                                      | 2.500                                              | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5                  | EEUFC1H100( )*** | 200                     | 2000            |
|             |                                     | 5            | 11             | 125                                                     | 1.300                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1H100L( )   | 200                     | 2000            |
|             | 12                                  | 5            | 11             | 135                                                     | 1.300                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1H120( )    | 200                     | 2000            |
|             | 15                                  | 5            | 11             | 145                                                     | 1.300                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1H150( )    | 200                     | 2000            |
|             | 18                                  | 5            | 11             | 155                                                     | 1.300                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1H180( )    | 200                     | 2000            |
|             | 22                                  | 5            | 11             | 155                                                     | 1.300                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1H220( )    | 200                     | 2000            |
|             | 27                                  | 5            | 15             | 215                                                     | 0.900                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1H270( )*** | 200                     | 2000            |
|             | 33                                  | 6.3          | 11.2           | 260                                                     | 0.600                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1H330( )    | 200                     | 2000            |
|             | 39                                  | 6.3          | 11.2           | 260                                                     | 0.600                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1H390( )    | 200                     | 2000            |
|             | 47                                  | 6.3          | 11.2           | 260                                                     | 0.600                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1H470( )    | 200                     | 2000            |
|             | 56                                  | 6.3          | 15             | 360                                                     | 0.400                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1H560( )*** | 200                     | 2000            |
|             | 68                                  | 8            | 11.5           | 485                                                     | 0.234                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1H680( )    | 200                     | 1000            |
|             | 82                                  | 8            | 11.5           | 485                                                     | 0.234                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1H820( )    | 200                     | 1000            |
|             | 100                                 | 10           | 12.5           | 615                                                     | 0.162                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1H101( )    | 200                     | 500             |
|             | 120                                 | 8            | 15             | 635                                                     | 0.155                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1H121L( )   | 200                     | 1000            |
|             |                                     | 10           | 12.5           | 615                                                     | 0.162                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1H121( )    | 200                     | 500             |
|             | 150                                 | 10           | 16             | 850                                                     | 0.119                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1H151( )    | 200                     | 500             |
|             | 180                                 | 8            | 20             | 860                                                     | 0.120                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1H181L( )   | 200                     | 1000            |
|             |                                     | 10           | 16             | 850                                                     | 0.119                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1H181( )    | 200                     | 500             |
|             | 220                                 | 10           | 20             | 1030                                                    | 0.090                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1H221( )    | 200                     | 500             |
|             |                                     | 12.5         | 15             | 1150                                                    | 0.110                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1H221S( )   | 200                     | 500             |
|             | 270                                 | 10           | 25             | 1200                                                    | 0.082                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1H271( )    | 200                     | 500             |
|             | 330                                 | 10           | 30             | 1610                                                    | 0.060                                              | 3000                 | 0.60              | 5.0              |                      |                      | EEUFC1H331L      | 100                     |                 |
|             |                                     | 12.5         | 20             | 1480                                                    | 0.063                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1H331( )    | 200                     | 500             |
|             | 390                                 | 12.5         | 20             | 1480                                                    | 0.063                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1H391( )    | 200                     | 500             |
|             |                                     | 16           | 15             | 1610                                                    | 0.080                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1H391S( )   | 100                     | 250             |
| 470         | 10                                  | 30           | 1610           | 0.060                                                   | 3000                                               | 0.60                 | 5.0               |                  |                      | EEUFC1H471L          | 100              |                         |                 |
|             | 12.5                                | 25           | 1832           | 0.050                                                   | 5000                                               | 0.60                 | 5.0               | 5.0              |                      | EEUFC1H471( )        | 200              | 500                     |                 |
| 560         | 12.5                                | 25           | 1832           | 0.050                                                   | 5000                                               | 0.60                 | 5.0               | 5.0              |                      | EEUFC1H561( )        | 200              | 500                     |                 |
|             | 18                                  | 15           | 1900           | 0.068                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1H561S( )       | 100              | 250                     |                 |
| 680         | 12.5                                | 30           | 2215           | 0.040                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1H681L          | 100              |                         |                 |
|             | 16                                  | 20           | 1835           | 0.048                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1H681( )        | 100              | 250                     |                 |
| 820         | 12.5                                | 35           | 2285           | 0.034                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1H821L          | 100              |                         |                 |
|             | 18                                  | 20           | 2420           | 0.042                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1H821( )        | 100              | 250                     |                 |
| 1000        | 12.5                                | 40           | 2590           | 0.030                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1H102L          | 100              |                         |                 |
|             | 16                                  | 25           | 2235           | 0.034                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1H102( )        | 100              | 250                     |                 |
| 1200        | 16                                  | 31.5         | 2700           | 0.028                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1H122           | 100              |                         |                 |
|             | 18                                  | 25           | 2610           | 0.029                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1H122S( )       | 100              | 250                     |                 |
| 1500        | 16                                  | 35.5         | 2790           | 0.025                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1H152L          | 100              |                         |                 |
| 1800        | 16                                  | 40           | 2845           | 0.023                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1H182L          | 100              |                         |                 |
|             | 18                                  | 31.5         | 3000           | 0.025                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1H182           | 50               |                         |                 |
| 2200        | 18                                  | 35.5         | 3100           | 0.023                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1H222           | 50               |                         |                 |

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· Please refer to the page of "Taping Dimensions".

\*\* Please kindly accept last shipment : 31/Mar/2015

\*\*\* Please kindly accept last shipment : 30/Jun/2015

### Standard Products

Endurance : 105 °C  $\phi$ 4 to  $\phi$ 6.3=1000 h,  $\phi$ 8=2000 h,  $\phi$ 10=3000 h,  $\phi$ 12.5 to  $\phi$ 18=5000 h

| W.V.<br>(V) | Cap.<br>( $\pm$ 20 %)<br>( $\mu$ F) | Case size    |                | Specification                                           |                                                    |                      | Lead Length       |                  |                      |                      | Part No.         | Min. Packaging Q'ty     |                 |
|-------------|-------------------------------------|--------------|----------------|---------------------------------------------------------|----------------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|------------------|-------------------------|-----------------|
|             |                                     | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>( $\Omega$ ) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                  | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                     |              |                |                                                         |                                                    |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                  |                         |                 |
| 63          | 6.8                                 | 4            | 11             | 80                                                      | 3.500                                              | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5                  | EEUFC1J6R8( )*** | 200                     | 2000            |
|             | 12                                  | 5            | 11             | 145                                                     | 2.000                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1J120( )    | 200                     | 2000            |
|             | 18                                  | 5            | 15             | 200                                                     | 1.300                                              | 1000                 | 0.50              | 2.0              | 5.0                  | 2.5                  | EEUFC1J180( )*** | 200                     | 2000            |
|             | 22                                  | 6.3          | 11.2           | 240                                                     | 1.000                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1J220( )    | 200                     | 2000            |
|             | 33                                  | 6.3          | 11.2           | 240                                                     | 1.000                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1J330( )    | 200                     | 2000            |
|             | 39                                  | 6.3          | 15             | 330                                                     | 0.700                                              | 1000                 | 0.50              | 2.5              | 5.0                  | 2.5                  | EEUFC1J390( )*** | 200                     | 2000            |
|             | 47                                  | 8            | 11.5           | 405                                                     | 0.342                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1J470( )    | 200                     | 1000            |
|             | 56                                  | 8            | 11.5           | 405                                                     | 0.342                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1J560( )    | 200                     | 1000            |
|             | 68                                  | 8            | 11.5           | 405                                                     | 0.342                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1J680( )    | 200                     | 1000            |
|             | 82                                  | 10           | 12.5           | 535                                                     | 0.256                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1J820( )    | 200                     | 500             |
|             | 100                                 | 8            | 15             | 535                                                     | 0.230                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1J101L( )   | 200                     | 1000            |
|             |                                     | 10           | 12.5           | 535                                                     | 0.256                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1J101( )    | 200                     | 500             |
|             | 120                                 | 10           | 16             | 600                                                     | 0.194                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1J121( )    | 200                     | 500             |
|             | 150                                 | 8            | 20             | 690                                                     | 0.178                                              | 2000                 | 0.60              | 3.5              | 5.0                  |                      | EEUFC1J151( )    | 200                     | 1000            |
|             | 180                                 | 10           | 20             | 885                                                     | 0.147                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1J181( )    | 200                     | 500             |
|             |                                     | 12.5         | 15             | 1020                                                    | 0.150                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1J181S( )   | 200                     | 500             |
|             | 220                                 | 10           | 20             | 885                                                     | 0.147                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1J221X( )   | 200                     | 500             |
|             |                                     | 10           | 25             | 1050                                                    | 0.130                                              | 3000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1J221( )    | 200                     | 500             |
|             |                                     | 12.5         | 20             | 1285                                                    | 0.085                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1J221S( )   | 200                     | 500             |
|             | 270                                 | 16           | 15             | 1410                                                    | 0.090                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1J271( )    | 100                     | 250             |
|             | 330                                 | 10           | 30             | 1300                                                    | 0.090                                              | 3000                 | 0.60              | 5.0              |                      |                      | EEUFC1J331L      | 100                     |                 |
|             |                                     | 12.5         | 20             | 1285                                                    | 0.085                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1J331( )    | 200                     | 500             |
|             | 390                                 | 12.5         | 25             | 1720                                                    | 0.070                                              | 5000                 | 0.60              | 5.0              | 5.0                  |                      | EEUFC1J391( )    | 200                     | 500             |
|             |                                     | 18           | 15             | 1690                                                    | 0.086                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1J391S( )   | 100                     | 250             |
|             | 470                                 | 12.5         | 30             | 2090                                                    | 0.055                                              | 5000                 | 0.80              | 5.0              |                      |                      | EEUFC1J471L      | 100                     |                 |
|             |                                     | 16           | 20             | 1765                                                    | 0.059                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1J471( )    | 100                     | 250             |
|             | 560                                 | 16           | 25             | 2160                                                    | 0.050                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1J561( )    | 100                     | 250             |
|             | 680                                 | 12.5         | 35             | 2265                                                    | 0.047                                              | 5000                 | 0.80              | 5.0              |                      |                      | EEUFC1J681L      | 100                     |                 |
|             |                                     | 16           | 25             | 2160                                                    | 0.050                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1J681( )    | 100                     | 250             |
|             |                                     | 18           | 20             | 2290                                                    | 0.055                                              | 5000                 | 0.80              | 7.5              | 7.5                  |                      | EEUFC1J681S( )   | 100                     | 250             |
| 820         | 12.5                                | 40           | 2560           | 0.042                                                   | 5000                                               | 0.80                 | 5.0               |                  |                      | EEUFC1J821L          | 100              |                         |                 |
|             | 16                                  | 31.5         | 2670           | 0.043                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1J821           | 100              |                         |                 |
|             | 18                                  | 25           | 2585           | 0.043                                                   | 5000                                               | 0.80                 | 7.5               | 7.5              |                      | EEUFC1J821S( )       | 100              | 250                     |                 |
| 1000        | 16                                  | 31.5         | 2670           | 0.043                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1J102U          | 100              |                         |                 |
|             | 16                                  | 35.5         | 2770           | 0.036                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1J102           | 100              |                         |                 |
| 1200        | 16                                  | 40           | 2825           | 0.030                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1J122L          | 100              |                         |                 |
|             | 18                                  | 31.5         | 2950           | 0.032                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1J122           | 50               |                         |                 |
| 1500        | 18                                  | 35.5         | 3095           | 0.030                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1J152           | 50               |                         |                 |
| 1800        | 18                                  | 40           | 3205           | 0.025                                                   | 5000                                               | 0.80                 | 7.5               |                  |                      | EEUFC1J182           | 50               |                         |                 |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.  
 · Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 30/Jun/2015

### Standard Products

Endurance : 105 °C  $\phi$ 4 to  $\phi$ 6.3=1000 h,  $\phi$ 8=2000 h,  $\phi$ 10=3000 h,  $\phi$ 12.5 to  $\phi$ 18=5000 h

| W.V.<br>(V) | Cap.<br>( $\pm$ 20 %)<br>( $\mu$ F) | Case size    |                | Specification                                           |                                                    |                      | Lead Length       |                  |                      |                      | Part No.         | Min. Packaging Qty      |                 |
|-------------|-------------------------------------|--------------|----------------|---------------------------------------------------------|----------------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|------------------|-------------------------|-----------------|
|             |                                     | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>( $\Omega$ ) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                  | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                     |              |                |                                                         |                                                    |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                  |                         |                 |
| 100         | 5.6                                 | 5            | 11             | 80                                                      | 4.10                                               | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFC2A5R6( )    | 200                     | 2000            |
|             | 8.2                                 | 5            | 15             | 90                                                      | 2.80                                               | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFC2A8R2( )*** | 200                     | 2000            |
|             | 12                                  | 6.3          | 11.2           | 114                                                     | 1.80                                               | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUFC2A120( )    | 200                     | 2000            |
|             | 18                                  | 6.3          | 15             | 155                                                     | 1.10                                               | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUFC2A180( )*** | 200                     | 2000            |
|             | 22                                  | 8            | 11.5           | 260                                                     | 0.680                                              | 2000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFC2A220( )    | 200                     | 1000            |
|             | 33                                  | 8            | 15             | 340                                                     | 0.450                                              | 2000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFC2A330L( )   | 200                     | 1000            |
|             |                                     | 10           | 12.5           | 306                                                     | 0.530                                              | 3000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFC2A330( )    | 200                     | 500             |
|             | 39                                  | 8            | 20             | 455                                                     | 0.330                                              | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFC2A390L( )   | 200                     | 1000            |
|             |                                     | 10           | 16             | 400                                                     | 0.360                                              | 3000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFC2A390( )    | 200                     | 500             |
|             | 56                                  | 10           | 20             | 463                                                     | 0.240                                              | 3000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFC2A560( )    | 200                     | 500             |
|             | 68                                  | 10           | 25             | 599                                                     | 0.210                                              | 3000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFC2A680L( )   | 200                     | 500             |
|             |                                     | 12.5         | 15             | 511                                                     | 0.230                                              | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFC2A680( )    | 200                     | 500             |
|             | 100                                 | 10           | 30             | 698                                                     | 0.150                                              | 3000                 | 0.6               | 5.0              |                      |                      | EEUFC2A101L      | 100                     |                 |
|             |                                     | 12.5         | 20             | 671                                                     | 0.180                                              | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFC2A101( )    | 200                     | 500             |
|             | 120                                 | 16           | 15             | 793                                                     | 0.140                                              | 5000                 | 0.8               | 7.5              | 7.5                  |                      | EEUFC2A121S( )   | 100                     | 250             |
|             | 150                                 | 12.5         | 25             | 807                                                     | 0.110                                              | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFC2A151( )    | 200                     | 500             |
|             |                                     | 18           | 15             | 917                                                     | 0.120                                              | 5000                 | 0.8               | 7.5              | 7.5                  |                      | EEUFC2A151S( )   | 100                     | 250             |
|             | 180                                 | 12.5         | 30             | 937                                                     | 0.098                                              | 5000                 | 0.8               | 5.0              |                      |                      | EEUFC2A181L      | 100                     |                 |
|             |                                     | 16           | 20             | 995                                                     | 0.110                                              | 5000                 | 0.8               | 7.5              | 7.5                  |                      | EEUFC2A181( )    | 100                     | 250             |
|             | 220                                 | 12.5         | 35             | 1040                                                    | 0.087                                              | 5000                 | 0.8               | 5.0              |                      |                      | EEUFC2A221L      | 100                     |                 |
|             |                                     | 16           | 25             | 1170                                                    | 0.089                                              | 5000                 | 0.8               | 7.5              | 7.5                  |                      | EEUFC2A221( )    | 100                     | 250             |
|             | 270                                 | 12.5         | 40             | 1130                                                    | 0.072                                              | 5000                 | 0.8               | 5.0              |                      |                      | EEUFC2A271L      | 100                     |                 |
|             |                                     | 18           | 20             | 1230                                                    | 0.080                                              | 5000                 | 0.8               | 7.5              | 7.5                  |                      | EEUFC2A271S( )   | 100                     | 250             |
|             | 330                                 | 16           | 31.5           | 1520                                                    | 0.062                                              | 5000                 | 0.8               | 7.5              |                      |                      | EEUFC2A331       | 100                     |                 |
| 18          |                                     | 25           | 1420           | 0.070                                                   | 5000                                               | 0.8                  | 7.5               | 7.5              |                      | EEUFC2A331S( )       | 100              | 250                     |                 |
| 390         | 16                                  | 35.5         | 1730           | 0.053                                                   | 5000                                               | 0.8                  | 7.5               |                  |                      | EEUFC2A391L          | 100              |                         |                 |
|             | 18                                  | 31.5         | 1600           | 0.062                                                   | 5000                                               | 0.8                  | 7.5               |                  |                      | EEUFC2A391           | 50               |                         |                 |
| 470         | 16                                  | 40           | 1920           | 0.047                                                   | 5000                                               | 0.8                  | 7.5               |                  |                      | EEUFC2A471           | 100              |                         |                 |
| 560         | 18                                  | 35.5         | 1770           | 0.041                                                   | 5000                                               | 0.8                  | 7.5               |                  |                      | EEUFC2A561           | 50               |                         |                 |
| 680         | 18                                  | 40           | 2300           | 0.036                                                   | 5000                                               | 0.8                  | 7.5               |                  |                      | EEUFC2A681           | 50               |                         |                 |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.  
· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 30/Jun/2015

### Radial Lead Type

Series: **FK** Type: **A**

#### ■ Features

- Low impedance (10 % to 30 % less than FC Series)  
Miniaturization (30 % to 40 % less than FC Series)
- Endurance : 3000 h to 5000 h at +105 °C
- AEC-Q200 qualified\*
- RoHS directive compliant



#### ■ Specifications

|                                                       |                                                                                                                                                                                                                                                                                                                                                         |                                    |      |      |      |      |                 |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------|------|------|------|-----------------|
| Category Temp. Range                                  | -55 °C to +105 °C                                                                                                                                                                                                                                                                                                                                       |                                    |      |      |      |      |                 |
| Rated W.V. Range                                      | 6.3 V.DC to 35 V.DC                                                                                                                                                                                                                                                                                                                                     |                                    |      |      |      |      |                 |
| Nominal Cap. Range                                    | 180 μF to 12000 μF                                                                                                                                                                                                                                                                                                                                      |                                    |      |      |      |      |                 |
| Capacitance Tolerance                                 | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                                                                                                   |                                    |      |      |      |      |                 |
| DC Leakage Current                                    | $I \leq 0.01 CV$ (μA) After 2 minutes                                                                                                                                                                                                                                                                                                                   |                                    |      |      |      |      |                 |
| tan δ                                                 | W.V.                                                                                                                                                                                                                                                                                                                                                    | 6.3                                | 10   | 16   | 25   | 35   | (120 Hz/+20 °C) |
|                                                       | tan δ                                                                                                                                                                                                                                                                                                                                                   | 0.22                               | 0.19 | 0.16 | 0.14 | 0.12 |                 |
| Add 0.02 per 1000 μF for products of 1000 μF or more. |                                                                                                                                                                                                                                                                                                                                                         |                                    |      |      |      |      |                 |
| Endurance                                             | After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified bellow.<br>Duration : φ8: 3000 hours , φ10: 4000 hours , φ12.5 to φ18: 5000 hours |                                    |      |      |      |      |                 |
|                                                       | Capacitance change                                                                                                                                                                                                                                                                                                                                      | ±20 % of initial measured value    |      |      |      |      |                 |
|                                                       | tan δ                                                                                                                                                                                                                                                                                                                                                   | ≤ 200 % of initial specified value |      |      |      |      |                 |
|                                                       | DC leakage current                                                                                                                                                                                                                                                                                                                                      | ≤ initial specified value          |      |      |      |      |                 |
| Shelf Life                                            | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                                                                                             |                                    |      |      |      |      |                 |

#### ■ Frequency correction factor for ripple current

| W.V.(V.DC) | Cap (μF)      | Frequency (Hz) |      |      |      |       |
|------------|---------------|----------------|------|------|------|-------|
|            |               | 60             | 120  | 1 k  | 10 k | 100 k |
| 6.3 to 35  | 180 to 330    | 0.60           | 0.70 | 0.85 | 0.95 | 1.00  |
|            | 390 to 1000   | 0.65           | 0.75 | 0.90 | 0.98 | 1.00  |
|            | 1200 to 12000 | 0.75           | 0.80 | 0.95 | 1.00 | 1.00  |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)

|               | φ8  | φ10 | φ12.5      | φ16      | φ18 |
|---------------|-----|-----|------------|----------|-----|
| Body Dia. φD  | 8   | 10  | 12.5       | 16       | 18  |
| Body Length L | —   | —   | 12.5 to 25 | 30 to 40 | —   |
| Lead Dia. φd  | 0.6 | 0.6 | 0.6        | 0.8      | 0.8 |
| Lead space F  | 3.5 | 5.0 | 5.0        | 5.0      | 7.5 |

\* L≤16 : L±1.5  
L≥20 : L±2.0

\* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 May. 2014

### ■ Case size/Impedance/Ripple current

| Case size<br>( $\phi$ D×L) | Impedance<br>( $\Omega$ )/(100 kHz) |        | Ripple Current<br>(mA r.m.s.)/(100 kHz) |
|----------------------------|-------------------------------------|--------|-----------------------------------------|
|                            | +20 °C                              | -10 °C | +105 °C                                 |
| 8 × 11.5                   | 0.090                               | 0.180  | 630                                     |
| 8 × 15                     | 0.062                               | 0.124  | 860                                     |
| 8 × 20                     | 0.044                               | 0.088  | 1220                                    |
| 10 × 12.5                  | 0.063                               | 0.126  | 900                                     |
| 10 × 16                    | 0.049                               | 0.098  | 1240                                    |
| 10 × 20                    | 0.035                               | 0.070  | 1490                                    |
| 10 × 25                    | 0.033                               | 0.066  | 1680                                    |
| 10 × 30                    | 0.025                               | 0.050  | 2140                                    |
| 12.5 × 15                  | 0.048                               | 0.096  | 1400                                    |
| 12.5 × 20                  | 0.029                               | 0.058  | 1890                                    |
| 12.5 × 25                  | 0.022                               | 0.044  | 2280                                    |
| 12.5 × 30                  | 0.018                               | 0.036  | 2720                                    |
| 12.5 × 35                  | 0.016                               | 0.032  | 2940                                    |
| 12.5 × 40                  | 0.014                               | 0.028  | 3010                                    |
| 16 × 15                    | 0.038                               | 0.076  | 1800                                    |
| 16 × 20                    | 0.026                               | 0.052  | 2330                                    |
| 16 × 25                    | 0.019                               | 0.038  | 2760                                    |
| 18 × 15                    | 0.036                               | 0.072  | 2060                                    |
| 18 × 20                    | 0.025                               | 0.050  | 2640                                    |
| 18 × 25                    | 0.018                               | 0.036  | 2850                                    |

### ■ Standard Products

Endurance : 105 °C  $\phi$ 8=3000 h,  $\phi$ 10=4000 h,  $\phi$ 12.5 to  $\phi$ 18=5000 h

| W.V.  | Cap.<br>(±20 %) | Case size |        | Specification                                           |                                                    |                      | Lead Length |            |                | Part No.       | Min. Packaging Q'ty     |                 |
|-------|-----------------|-----------|--------|---------------------------------------------------------|----------------------------------------------------|----------------------|-------------|------------|----------------|----------------|-------------------------|-----------------|
|       |                 | Dia.      | Length | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>( $\Omega$ ) | Endurance<br>(hours) | Lead Dia.   | Lead Space |                |                | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|       |                 |           |        |                                                         |                                                    |                      |             | Straight   | Taping<br>*B   |                |                         |                 |
| (V)   | ( $\mu$ F)      | (mm)      | (mm)   | (mA r.m.s.)                                             | ( $\Omega$ )                                       | (hours)              | (mm)        | (mm)       | (mm)           |                | (pcs)                   | (pcs)           |
| 6.3   | 680             | 8         | 11.5   | 630                                                     | 0.090                                              | 3000                 | 0.6         | 3.5        | 5.0            | EEUFK0J681( )  | 200                     | 1000            |
|       | 1000            | 8         | 15     | 860                                                     | 0.062                                              | 3000                 | 0.6         | 3.5        | 5.0            | EEUFK0J102L( ) | 200                     | 1000            |
|       |                 | 10        | 12.5   | 900                                                     | 0.063                                              | 4000                 | 0.6         | 5.0        | 5.0            | EEUFK0J102( )  | 200                     | 500             |
|       | 1500            | 8         | 20     | 1220                                                    | 0.044                                              | 3000                 | 0.6         | 3.5        | 5.0            | EEUFK0J152L( ) | 200                     | 1000            |
|       |                 | 10        | 16     | 1240                                                    | 0.049                                              | 4000                 | 0.6         | 5.0        | 5.0            | EEUFK0J152( )  | 200                     | 500             |
|       | 1800            | 12.5      | 15     | 1400                                                    | 0.048                                              | 5000                 | 0.6         | 5.0        | 5.0            | EEUFK0J182S( ) | 200                     | 500             |
|       | 2200            | 10        | 20     | 1490                                                    | 0.035                                              | 4000                 | 0.6         | 5.0        | 5.0            | EEUFK0J222( )  | 200                     | 500             |
|       |                 | 10        | 25     | 1680                                                    | 0.033                                              | 4000                 | 0.6         | 5.0        | 5.0            | EEUFK0J222L( ) | 200                     | 500             |
|       | 3300            | 10        | 30     | 2140                                                    | 0.025                                              | 4000                 | 0.6         | 5.0        |                | EEUFK0J332L    | 100                     |                 |
|       |                 | 12.5      | 20     | 1890                                                    | 0.029                                              | 5000                 | 0.6         | 5.0        | 5.0            | EEUFK0J332( )  | 200                     | 500             |
|       |                 | 16        | 15     | 1800                                                    | 0.038                                              | 5000                 | 0.8         | 7.5        | 7.5            | EEUFK0J332S( ) | 100                     | 250             |
|       | 4700            | 12.5      | 25     | 2280                                                    | 0.022                                              | 5000                 | 0.6         | 5.0        | 5.0            | EEUFK0J472( )  | 200                     | 500             |
|       |                 | 18        | 15     | 2060                                                    | 0.036                                              | 5000                 | 0.8         | 7.5        | 7.5            | EEUFK0J472S( ) | 100                     | 250             |
|       | 5600            | 12.5      | 30     | 2720                                                    | 0.018                                              | 5000                 | 0.8         | 5.0        |                | EEUFK0J562L    | 100                     |                 |
|       |                 | 16        | 20     | 2330                                                    | 0.026                                              | 5000                 | 0.8         | 7.5        | 7.5            | EEUFK0J562S( ) | 100                     | 250             |
|       | 6800            | 12.5      | 35     | 2940                                                    | 0.016                                              | 5000                 | 0.8         | 5.0        |                | EEUFK0J682L    | 100                     |                 |
|       | 8200            | 12.5      | 40     | 3010                                                    | 0.014                                              | 5000                 | 0.8         | 5.0        |                | EEUFK0J822L    | 100                     |                 |
|       |                 | 16        | 25     | 2760                                                    | 0.019                                              | 5000                 | 0.8         | 7.5        | 7.5            | EEUFK0J822( )  | 100                     | 250             |
| 18    |                 | 20        | 2640   | 0.025                                                   | 5000                                               | 0.8                  | 7.5         | 7.5        | EEUFK0J822S( ) | 100            | 250                     |                 |
| 12000 | 18              | 25        | 2850   | 0.018                                                   | 5000                                               | 0.8                  | 7.5         | 7.5        | EEUFK0J123S( ) | 100            | 250                     |                 |
| 10    | 560             | 8         | 11.5   | 630                                                     | 0.090                                              | 3000                 | 0.6         | 3.5        | 5.0            | EEUFK1A561( )  | 200                     | 1000            |
|       | 820             | 8         | 15     | 860                                                     | 0.062                                              | 3000                 | 0.6         | 3.5        | 5.0            | EEUFK1A821L( ) | 200                     | 1000            |
|       |                 | 10        | 12.5   | 900                                                     | 0.063                                              | 4000                 | 0.6         | 5.0        | 5.0            | EEUFK1A821( )  | 200                     | 500             |
|       | 1200            | 8         | 20     | 1220                                                    | 0.044                                              | 3000                 | 0.6         | 3.5        | 5.0            | EEUFK1A122L( ) | 200                     | 1000            |
|       |                 | 10        | 16     | 1240                                                    | 0.049                                              | 4000                 | 0.6         | 5.0        | 5.0            | EEUFK1A122( )  | 200                     | 500             |
|       | 1500            | 12.5      | 15     | 1400                                                    | 0.048                                              | 5000                 | 0.6         | 5.0        | 5.0            | EEUFK1A152S( ) | 200                     | 500             |
|       | 1800            | 10        | 20     | 1490                                                    | 0.035                                              | 4000                 | 0.6         | 5.0        | 5.0            | EEUFK1A182( )  | 200                     | 500             |
|       |                 | 10        | 25     | 1680                                                    | 0.033                                              | 4000                 | 0.6         | 5.0        | 5.0            | EEUFK1A182L( ) | 200                     | 500             |
|       | 2700            | 10        | 30     | 2140                                                    | 0.025                                              | 4000                 | 0.6         | 5.0        |                | EEUFK1A272L    | 100                     |                 |
|       |                 | 12.5      | 20     | 1890                                                    | 0.029                                              | 5000                 | 0.6         | 5.0        | 5.0            | EEUFK1A272( )  | 200                     | 500             |
|       |                 | 16        | 15     | 1800                                                    | 0.038                                              | 5000                 | 0.8         | 7.5        | 7.5            | EEUFK1A272S( ) | 100                     | 250             |
|       | 3900            | 12.5      | 25     | 2280                                                    | 0.022                                              | 5000                 | 0.6         | 5.0        | 5.0            | EEUFK1A392( )  | 200                     | 500             |
|       |                 | 18        | 15     | 2060                                                    | 0.036                                              | 5000                 | 0.8         | 7.5        | 7.5            | EEUFK1A392S( ) | 100                     | 250             |
|       | 4700            | 12.5      | 30     | 2720                                                    | 0.018                                              | 5000                 | 0.8         | 5.0        |                | EEUFK1A472L    | 100                     |                 |
|       |                 | 16        | 20     | 2330                                                    | 0.026                                              | 5000                 | 0.8         | 7.5        | 7.5            | EEUFK1A472S( ) | 100                     | 250             |
|       | 5600            | 12.5      | 35     | 2940                                                    | 0.016                                              | 5000                 | 0.8         | 5.0        |                | EEUFK1A562L    | 100                     |                 |
|       | 6800            | 12.5      | 40     | 3010                                                    | 0.014                                              | 5000                 | 0.8         | 5.0        |                | EEUFK1A682L    | 100                     |                 |
|       |                 | 16        | 25     | 2760                                                    | 0.019                                              | 5000                 | 0.8         | 7.5        | 7.5            | EEUFK1A682( )  | 100                     | 250             |
| 18    |                 | 20        | 2640   | 0.025                                                   | 5000                                               | 0.8                  | 7.5         | 7.5        | EEUFK1A682S( ) | 100            | 250                     |                 |
| 8200  | 18              | 25        | 2850   | 0.018                                                   | 5000                                               | 0.8                  | 7.5         | 7.5        | EEUFK1A822S( ) | 100            | 250                     |                 |

- When requesting taped product, please put the letter "B" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".



### Standard Products

Endurance : 105 °C  $\phi 8=3000$  h,  $\phi 10=4000$  h,  $\phi 12.5$  to  $\phi 18=5000$  h

| W.V.<br>(V) | Cap.<br>( $\pm 20\%$ )<br>( $\mu\text{F}$ ) | Case size    |                | Specification                                           |                                                    |                      | Lead Length       |                  |                      | Part No.       | Min. Packaging Q'ty     |                 |
|-------------|---------------------------------------------|--------------|----------------|---------------------------------------------------------|----------------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------|-------------------------|-----------------|
|             |                                             | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>( $\Omega$ ) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                             |              |                |                                                         |                                                    |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |                |                         |                 |
| 16          | 390                                         | 8            | 11.5           | 630                                                     | 0.090                                              | 3000                 | 0.6               | 3.5              | 5.0                  | EEUFK1C391( )  | 200                     | 1000            |
|             | 680                                         | 8            | 15             | 860                                                     | 0.062                                              | 3000                 | 0.6               | 3.5              | 5.0                  | EEUFK1C681L( ) | 200                     | 1000            |
|             |                                             | 10           | 12.5           | 900                                                     | 0.063                                              | 4000                 | 0.6               | 5.0              | 5.0                  | EEUFK1C681( )  | 200                     | 500             |
|             | 820                                         | 8            | 20             | 1220                                                    | 0.044                                              | 3000                 | 0.6               | 3.5              | 5.0                  | EEUFK1C821L( ) | 200                     | 1000            |
|             | 1000                                        | 10           | 16             | 1240                                                    | 0.049                                              | 4000                 | 0.6               | 5.0              | 5.0                  | EEUFK1C102( )  | 200                     | 500             |
|             | 1200                                        | 10           | 20             | 1490                                                    | 0.035                                              | 4000                 | 0.6               | 5.0              | 5.0                  | EEUFK1C122( )  | 200                     | 500             |
|             |                                             | 12.5         | 15             | 1400                                                    | 0.048                                              | 5000                 | 0.6               | 5.0              | 5.0                  | EEUFK1C122S( ) | 200                     | 500             |
|             | 1500                                        | 10           | 25             | 1680                                                    | 0.033                                              | 4000                 | 0.6               | 5.0              | 5.0                  | EEUFK1C152L( ) | 200                     | 500             |
|             | 2200                                        | 10           | 30             | 2140                                                    | 0.025                                              | 4000                 | 0.6               | 5.0              |                      | EEUFK1C222L    | 100                     |                 |
|             |                                             | 12.5         | 20             | 1890                                                    | 0.029                                              | 5000                 | 0.6               | 5.0              | 5.0                  | EEUFK1C222( )  | 200                     | 500             |
|             |                                             | 16           | 15             | 1800                                                    | 0.038                                              | 5000                 | 0.8               | 7.5              | 7.5                  | EEUFK1C222S( ) | 100                     | 250             |
|             | 2700                                        | 12.5         | 25             | 2280                                                    | 0.022                                              | 5000                 | 0.6               | 5.0              | 5.0                  | EEUFK1C272( )  | 200                     | 500             |
|             |                                             | 18           | 15             | 2060                                                    | 0.036                                              | 5000                 | 0.8               | 7.5              | 7.5                  | EEUFK1C272S( ) | 100                     | 250             |
|             | 3300                                        | 12.5         | 30             | 2720                                                    | 0.018                                              | 5000                 | 0.8               | 5.0              |                      | EEUFK1C332L    | 100                     |                 |
|             | 3900                                        | 12.5         | 35             | 2940                                                    | 0.016                                              | 5000                 | 0.8               | 5.0              |                      | EEUFK1C392L    | 100                     |                 |
|             |                                             | 16           | 20             | 2330                                                    | 0.026                                              | 5000                 | 0.8               | 7.5              | 7.5                  | EEUFK1C392S( ) | 100                     | 250             |
|             | 4700                                        | 12.5         | 40             | 3010                                                    | 0.014                                              | 5000                 | 0.8               | 5.0              |                      | EEUFK1C472L    | 100                     |                 |
|             |                                             | 18           | 20             | 2640                                                    | 0.025                                              | 5000                 | 0.8               | 7.5              | 7.5                  | EEUFK1C472S( ) | 100                     | 250             |
| 5600        | 16                                          | 25           | 2760           | 0.019                                                   | 5000                                               | 0.8                  | 7.5               | 7.5              | EEUFK1C562( )        | 100            | 250                     |                 |
| 6800        | 18                                          | 25           | 2850           | 0.018                                                   | 5000                                               | 0.8                  | 7.5               | 7.5              | EEUFK1C682S( )       | 100            | 250                     |                 |
| 25          | 270                                         | 8            | 11.5           | 630                                                     | 0.090                                              | 3000                 | 0.6               | 3.5              | 5.0                  | EEUFK1E271( )  | 200                     | 1000            |
|             | 390                                         | 8            | 15             | 860                                                     | 0.062                                              | 3000                 | 0.6               | 3.5              | 5.0                  | EEUFK1E391L( ) | 200                     | 1000            |
|             | 470                                         | 10           | 12.5           | 900                                                     | 0.063                                              | 4000                 | 0.6               | 5.0              | 5.0                  | EEUFK1E471( )  | 200                     | 500             |
|             | 560                                         | 8            | 20             | 1220                                                    | 0.044                                              | 3000                 | 0.6               | 3.5              | 5.0                  | EEUFK1E561L( ) | 200                     | 1000            |
|             |                                             | 10           | 16             | 1240                                                    | 0.049                                              | 4000                 | 0.6               | 5.0              | 5.0                  | EEUFK1E561( )  | 200                     | 500             |
|             | 820                                         | 10           | 20             | 1490                                                    | 0.035                                              | 4000                 | 0.6               | 5.0              | 5.0                  | EEUFK1E821( )  | 200                     | 500             |
|             |                                             | 12.5         | 15             | 1400                                                    | 0.048                                              | 5000                 | 0.6               | 5.0              | 5.0                  | EEUFK1E821S( ) | 200                     | 500             |
|             | 1000                                        | 10           | 25             | 1680                                                    | 0.033                                              | 4000                 | 0.6               | 5.0              | 5.0                  | EEUFK1E102L( ) | 200                     | 500             |
|             | 1200                                        | 12.5         | 20             | 1890                                                    | 0.029                                              | 5000                 | 0.6               | 5.0              | 5.0                  | EEUFK1E122( )  | 200                     | 500             |
|             | 1500                                        | 10           | 30             | 2140                                                    | 0.025                                              | 4000                 | 0.6               | 5.0              |                      | EEUFK1E152L    | 100                     |                 |
|             |                                             | 16           | 15             | 1800                                                    | 0.038                                              | 5000                 | 0.8               | 7.5              | 7.5                  | EEUFK1E152S( ) | 100                     | 250             |
|             | 1800                                        | 12.5         | 25             | 2280                                                    | 0.022                                              | 5000                 | 0.6               | 5.0              | 5.0                  | EEUFK1E182( )  | 200                     | 500             |
|             |                                             | 18           | 15             | 2060                                                    | 0.036                                              | 5000                 | 0.8               | 7.5              | 7.5                  | EEUFK1E182S( ) | 100                     | 250             |
|             | 2200                                        | 12.5         | 30             | 2720                                                    | 0.018                                              | 5000                 | 0.8               | 5.0              |                      | EEUFK1E222L    | 100                     |                 |
|             |                                             | 16           | 20             | 2330                                                    | 0.026                                              | 5000                 | 0.8               | 7.5              | 7.5                  | EEUFK1E222S( ) | 100                     | 250             |
|             | 2700                                        | 12.5         | 35             | 2940                                                    | 0.016                                              | 5000                 | 0.8               | 5.0              |                      | EEUFK1E272L    | 100                     |                 |
|             | 3300                                        | 12.5         | 40             | 3010                                                    | 0.014                                              | 5000                 | 0.8               | 5.0              |                      | EEUFK1E332L    | 100                     |                 |
|             |                                             | 16           | 25             | 2760                                                    | 0.019                                              | 5000                 | 0.8               | 7.5              | 7.5                  | EEUFK1E332( )  | 100                     | 250             |
| 18          |                                             | 20           | 2640           | 0.025                                                   | 5000                                               | 0.8                  | 7.5               | 7.5              | EEUFK1E332S( )       | 100            | 250                     |                 |
| 4700        | 18                                          | 25           | 2850           | 0.018                                                   | 5000                                               | 0.8                  | 7.5               | 7.5              | EEUFK1E472S( )       | 100            | 250                     |                 |

- When requesting taped product, please put the letter "B" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".

### ■ Standard Products

Endurance : 105 °C φ8=3000 h, φ10=4000 h, φ12.5 to φ18=5000 h

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                              |                                                |                           | Lead Length          |                  |                      | Part No.       | Min. Packaging Q'ty        |                 |
|-------------|-------------------------|--------------|----------------|------------------------------------------------------------|------------------------------------------------|---------------------------|----------------------|------------------|----------------------|----------------|----------------------------|-----------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple<br>Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Imped-<br>ance<br>(100 kHz)<br>(+20 °C)<br>(Ω) | Endur-<br>ance<br>(hours) | Lead<br>Dia.<br>(mm) | Lead Space       |                      |                | Straight<br>Leads<br>(pcs) | Taping<br>(pcs) |
|             |                         |              |                |                                                            |                                                |                           |                      | Straight<br>(mm) | Taping<br>*B<br>(mm) |                |                            |                 |
| 35          | 180                     | 8            | 11.5           | 630                                                        | 0.090                                          | 3000                      | 0.6                  | 3.5              | 5.0                  | EEUFK1V181( )  | 200                        | 1000            |
|             | 270                     | 8            | 15             | 860                                                        | 0.062                                          | 3000                      | 0.6                  | 3.5              | 5.0                  | EEUFK1V271L( ) | 200                        | 1000            |
|             |                         | 10           | 12.5           | 900                                                        | 0.063                                          | 4000                      | 0.6                  | 5.0              | 5.0                  | EEUFK1V271( )  | 200                        | 500             |
|             | 390                     | 8            | 20             | 1220                                                       | 0.044                                          | 3000                      | 0.6                  | 3.5              | 5.0                  | EEUFK1V391L( ) | 200                        | 1000            |
|             |                         | 10           | 16             | 1240                                                       | 0.049                                          | 4000                      | 0.6                  | 5.0              | 5.0                  | EEUFK1V391( )  | 200                        | 500             |
|             | 560                     | 10           | 20             | 1490                                                       | 0.035                                          | 4000                      | 0.6                  | 5.0              | 5.0                  | EEUFK1V561( )  | 200                        | 500             |
|             |                         | 12.5         | 15             | 1400                                                       | 0.048                                          | 5000                      | 0.6                  | 5.0              | 5.0                  | EEUFK1V561S( ) | 200                        | 500             |
|             | 680                     | 10           | 25             | 1680                                                       | 0.033                                          | 4000                      | 0.6                  | 5.0              | 5.0                  | EEUFK1V681L( ) | 200                        | 500             |
|             | 820                     | 12.5         | 20             | 1890                                                       | 0.029                                          | 5000                      | 0.6                  | 5.0              | 5.0                  | EEUFK1V821( )  | 200                        | 500             |
|             | 1000                    | 10           | 30             | 2140                                                       | 0.025                                          | 4000                      | 0.6                  | 5.0              |                      | EEUFK1V102L    | 100                        |                 |
|             |                         | 16           | 15             | 1800                                                       | 0.038                                          | 5000                      | 0.8                  | 7.5              | 7.5                  | EEUFK1V102S( ) | 100                        | 250             |
|             | 1200                    | 12.5         | 25             | 2280                                                       | 0.022                                          | 5000                      | 0.6                  | 5.0              | 5.0                  | EEUFK1V122( )  | 200                        | 500             |
|             |                         | 18           | 15             | 2060                                                       | 0.036                                          | 5000                      | 0.8                  | 7.5              | 7.5                  | EEUFK1V122S( ) | 100                        | 250             |
|             | 1500                    | 12.5         | 30             | 2720                                                       | 0.018                                          | 5000                      | 0.8                  | 5.0              |                      | EEUFK1V152L    | 100                        |                 |
|             | 1800                    | 12.5         | 35             | 2940                                                       | 0.016                                          | 5000                      | 0.8                  | 5.0              |                      | EEUFK1V182L    | 100                        |                 |
|             |                         | 16           | 20             | 2330                                                       | 0.026                                          | 5000                      | 0.8                  | 7.5              | 7.5                  | EEUFK1V182S( ) | 100                        | 250             |
|             | 2200                    | 12.5         | 40             | 3010                                                       | 0.014                                          | 5000                      | 0.8                  | 5.0              |                      | EEUFK1V222L    | 100                        |                 |
|             |                         | 16           | 25             | 2760                                                       | 0.019                                          | 5000                      | 0.8                  | 7.5              | 7.5                  | EEUFK1V222( )  | 100                        | 250             |
|             |                         | 18           | 20             | 2640                                                       | 0.025                                          | 5000                      | 0.8                  | 7.5              | 7.5                  | EEUFK1V222S( ) | 100                        | 250             |
|             | 3300                    | 18           | 25             | 2850                                                       | 0.018                                          | 5000                      | 0.8                  | 7.5              | 7.5                  | EEUFK1V332S( ) | 100                        | 250             |

- When requesting taped product, please put the letter "B" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".

### Radial Lead Type

Series: **FM** Type: **A**



#### ■ Features

- Low impedance (40 % to 70 % less than FC Series)
- Endurance : 2000 h to 7000 h at +105 °C
- RoHS directive compliant

#### ■ Attention

Not applicable for automotive

#### ■ Specifications

|                                                       |                                                                                                                                                                                                                                                                              |                                                         |      |      |      |      |      |                        |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------|------|------|------|------|------------------------|
| Category Temp. Range                                  | -40 °C to +105 °C                                                                                                                                                                                                                                                            |                                                         |      |      |      |      |      |                        |
| Rated W.V. Range                                      | 6.3 V.DC to 50 V.DC                                                                                                                                                                                                                                                          |                                                         |      |      |      |      |      |                        |
| Nominal Cap. Range                                    | 22 μF to 6800 μF                                                                                                                                                                                                                                                             |                                                         |      |      |      |      |      |                        |
| Capacitance Tolerance                                 | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                        |                                                         |      |      |      |      |      |                        |
| DC Leakage Current                                    | I ≤ 0.01 CV (μA) After 2 minutes                                                                                                                                                                                                                                             |                                                         |      |      |      |      |      |                        |
| tan δ                                                 | W.V.                                                                                                                                                                                                                                                                         | 6.3                                                     | 10   | 16   | 25   | 35   | 50   | (max.) (120 Hz/+20 °C) |
|                                                       | tan δ                                                                                                                                                                                                                                                                        | 0.22                                                    | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 |                        |
| Add 0.02 per 1000 μF for products of 1000 μF or more. |                                                                                                                                                                                                                                                                              |                                                         |      |      |      |      |      |                        |
| Endurance                                             | After following life test with DC voltage and +105 °C±2 °C ripple current value applied. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below. |                                                         |      |      |      |      |      |                        |
|                                                       | Duration                                                                                                                                                                                                                                                                     |                                                         |      |      |      |      |      |                        |
|                                                       | φ5 to φ6.3 : 2000 hours, φ8×11.5 to φ8×15: 3000 hours<br>φ8×20 to φ10×16 : 4000 hours, φ10×20 to φ12.5×20/ φ16×20: 5000 hours<br>φ12.5×25 to φ12.5×35/ φ16×25 : 7000 hours                                                                                                   |                                                         |      |      |      |      |      |                        |
|                                                       | Capacitance change                                                                                                                                                                                                                                                           | ±25 % of initial measured value (6.3 V to 10 V : ±30 %) |      |      |      |      |      |                        |
|                                                       | tan δ                                                                                                                                                                                                                                                                        | ≤ 200 % of initial specified value                      |      |      |      |      |      |                        |
|                                                       | DC leakage current                                                                                                                                                                                                                                                           | ≤ initial specified value                               |      |      |      |      |      |                        |
| Shelf Life                                            | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                  |                                                         |      |      |      |      |      |                        |

#### ■ Frequency correction factor for ripple current

| W.V.(V.DC) | Cap (μF)     | Frequency (Hz) |      |      |      |       |
|------------|--------------|----------------|------|------|------|-------|
|            |              | 60             | 120  | 1 k  | 10 k | 100 k |
| 6.3 to 50  | 22 to 33     | 0.45           | 0.55 | 0.75 | 0.90 | 1.00  |
|            | 47 to 330    | 0.60           | 0.70 | 0.85 | 0.95 | 1.00  |
|            | 390 to 1000  | 0.65           | 0.75 | 0.90 | 0.98 | 1.00  |
|            | 1200 to 6800 | 0.75           | 0.80 | 0.95 | 1.00 | 1.00  |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)

|               |     |     |     |     |            |          |
|---------------|-----|-----|-----|-----|------------|----------|
| Body Dia. φD  | 5   | 6.3 | 8   | 10  | 12.5       | 16       |
| Body Length L | —   | —   | —   | —   | 12.5 to 25 | 30 to 40 |
| Lead Dia. φd  | 0.5 | 0.5 | 0.6 | 0.6 | 0.6        | 0.8      |
| Lead space F  | 2.0 | 2.5 | 3.5 | 5.0 | 5.0        | 7.5      |

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 May, 2014

### ■ Case size/Impedance/Ripple current

| W.V.(V.DC)<br><br>Case size<br>( $\phi$ D×L) | 6.3 V to 35 V                     |        |                                       | 50 V                              |        |                                       |
|----------------------------------------------|-----------------------------------|--------|---------------------------------------|-----------------------------------|--------|---------------------------------------|
|                                              | Impedance<br>( $\Omega$ /100 kHz) |        | Ripple Current<br>(mA r.m.s./100 kHz) | Impedance<br>( $\Omega$ /100 kHz) |        | Ripple Current<br>(mA r.m.s./100 kHz) |
|                                              | +20 °C                            | -10 °C | +105 °C                               | +20 °C                            | -10 °C | +105 °C                               |
| 5 × 11                                       | 0.300                             | 1.000  | 280                                   | 0.340                             | 1.130  | 250                                   |
| 6.3 × 11.2                                   | 0.130                             | 0.430  | 455                                   | 0.140                             | 0.460  | 405                                   |
| 8 × 11.5                                     | 0.056                             | 0.168  | 950                                   | 0.061                             | 0.183  | 870                                   |
| 8 × 15                                       | 0.041                             | 0.123  | 1240                                  | 0.045                             | 0.135  | 1140                                  |
| 8 × 20                                       | 0.030                             | 0.090  | 1560                                  | 0.033                             | 0.099  | 1430                                  |
| 10 × 12.5                                    | 0.038                             | 0.114  | 1290                                  | 0.042                             | 0.126  | 1170                                  |
| 10 × 16                                      | 0.026                             | 0.078  | 1790                                  | 0.030                             | 0.090  | 1650                                  |
| 10 × 20                                      | 0.019                             | 0.057  | 2180                                  | 0.023                             | 0.069  | 1890                                  |
| 10 × 25                                      | 0.018                             | 0.054  | 2470                                  | 0.022                             | 0.066  | 2150                                  |
| 12.5 × 20                                    | 0.018                             | 0.045  | 2600                                  | 0.022                             | 0.055  | 2260                                  |
| 12.5 × 25                                    | 0.015                             | 0.038  | 3190                                  | 0.018                             | 0.045  | 2660                                  |
| 12.5 × 30                                    | 0.013                             | 0.033  | 3630                                  | 0.016                             | 0.040  | 3160                                  |
| 12.5 × 35                                    | 0.012                             | 0.030  | 3750                                  | 0.014                             | 0.035  | 3270                                  |
| 16 × 20                                      | 0.017                             | 0.043  | 3300                                  | 0.019                             | 0.048  | 2870                                  |
| 16 × 25                                      | 0.014                             | 0.035  | 3820                                  | 0.016                             | 0.040  | 3320                                  |

### Standard Products

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                           |                                           |                      | Lead Length       |                  |                      |                      | Part No.       | Min. Packaging Qty |                 |
|-------------|-------------------------|--------------|----------------|---------------------------------------------------------|-------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|----------------|--------------------|-----------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>(Ω) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                | Long Lead<br>(pcs) | Taping<br>(pcs) |
|             |                         |              |                |                                                         |                                           |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                |                    |                 |
| 6.3         | 150                     | 5            | 11             | 280                                                     | 0.300                                     | 2000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFM0J151( )  | 200                | 2000            |
|             | 330                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUFM0J331( )  | 200                | 2000            |
|             | 560                     | 8            | 11.5           | 950                                                     | 0.056                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM0J561( )  | 200                | 1000            |
|             | 820                     | 8            | 15             | 1240                                                    | 0.041                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM0J821L( ) | 200                | 1000            |
|             | 1000                    | 10           | 12.5           | 1290                                                    | 0.038                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM0J102( )  | 200                | 500             |
|             | 1200                    | 8            | 20             | 1560                                                    | 0.030                                     | 4000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM0J122L( ) | 200                | 1000            |
|             |                         | 10           | 16             | 1790                                                    | 0.026                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM0J122( )  | 200                | 500             |
|             | 1500                    | 10           | 20             | 2180                                                    | 0.019                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM0J152( )  | 200                | 500             |
|             | 2200                    | 10           | 25             | 2470                                                    | 0.018                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM0J222L( ) | 200                | 500             |
|             | 3300                    | 12.5         | 20             | 2600                                                    | 0.018                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM0J332( )  | 200                | 500             |
|             | 3900                    | 12.5         | 25             | 3190                                                    | 0.015                                     | 7000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM0J392( )  | 200                | 500             |
|             | 4700                    | 12.5         | 30             | 3630                                                    | 0.013                                     | 7000                 | 0.8               | 5.0              |                      |                      | EEUFM0J472L    | 100                |                 |
|             | 5600                    | 12.5         | 35             | 3750                                                    | 0.012                                     | 7000                 | 0.8               | 5.0              |                      |                      | EEUFM0J562L    | 100                |                 |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 5000                 | 0.8               | 7.5              | 7.5                  |                      | EEUFM0J562S( ) | 100                | 250             |
| 6800        | 16                      | 25           | 3820           | 0.014                                                   | 7000                                      | 0.8                  | 7.5               | 7.5              |                      | EEUFM0J682( )        | 100            | 250                |                 |
| 10          | 100                     | 5            | 11             | 280                                                     | 0.300                                     | 2000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFM1A101( )  | 200                | 2000            |
|             | 220                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUFM1A221( )  | 200                | 2000            |
|             | 470                     | 8            | 11.5           | 950                                                     | 0.056                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1A471( )  | 200                | 1000            |
|             | 680                     | 8            | 15             | 1240                                                    | 0.041                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1A681L( ) | 200                | 1000            |
|             |                         | 10           | 12.5           | 1290                                                    | 0.038                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1A681( )  | 200                | 500             |
|             | 1000                    | 8            | 20             | 1560                                                    | 0.030                                     | 4000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1A102L( ) | 200                | 1000            |
|             |                         | 10           | 16             | 1790                                                    | 0.026                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1A102( )  | 200                | 500             |
|             | 1200                    | 10           | 20             | 2180                                                    | 0.019                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1A122( )  | 200                | 500             |
|             | 1500                    | 10           | 25             | 2470                                                    | 0.018                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1A152L( ) | 200                | 500             |
|             | 2200                    | 12.5         | 20             | 2600                                                    | 0.018                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1A222( )  | 200                | 500             |
|             | 3300                    | 12.5         | 25             | 3190                                                    | 0.015                                     | 7000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1A332( )  | 200                | 500             |
|             | 3900                    | 12.5         | 30             | 3630                                                    | 0.013                                     | 7000                 | 0.8               | 5.0              |                      |                      | EEUFM1A392L    | 100                |                 |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 5000                 | 0.8               | 7.5              | 7.5                  |                      | EEUFM1A392S( ) | 100                | 250             |
|             | 4700                    | 12.5         | 35             | 3750                                                    | 0.012                                     | 7000                 | 0.8               | 5.0              |                      |                      | EEUFM1A472L    | 100                |                 |
| 5600        | 16                      | 25           | 3820           | 0.014                                                   | 7000                                      | 0.8                  | 7.5               | 7.5              |                      | EEUFM1A562( )        | 100            | 250                |                 |
| 16          | 68                      | 5            | 11             | 280                                                     | 0.300                                     | 2000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFM1C680( )  | 200                | 2000            |
|             | 120                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUFM1C121( )  | 200                | 2000            |
|             | 330                     | 8            | 11.5           | 950                                                     | 0.056                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1C331( )  | 200                | 1000            |
|             | 470                     | 8            | 15             | 1240                                                    | 0.041                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1C471L( ) | 200                | 1000            |
|             |                         | 10           | 12.5           | 1290                                                    | 0.038                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1C471( )  | 200                | 500             |
|             | 680                     | 8            | 20             | 1560                                                    | 0.030                                     | 4000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1C681L( ) | 200                | 1000            |
|             |                         | 10           | 16             | 1790                                                    | 0.026                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1C681( )  | 200                | 500             |
|             | 1000                    | 10           | 20             | 2180                                                    | 0.019                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1C102( )  | 200                | 500             |
|             | 1200                    | 10           | 25             | 2470                                                    | 0.018                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1C122L( ) | 200                | 500             |
|             | 1500                    | 12.5         | 20             | 2600                                                    | 0.018                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1C152( )  | 200                | 500             |
|             | 2200                    | 12.5         | 25             | 3190                                                    | 0.015                                     | 7000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1C222( )  | 200                | 500             |
|             | 2700                    | 12.5         | 30             | 3630                                                    | 0.013                                     | 7000                 | 0.8               | 5.0              |                      |                      | EEUFM1C272L    | 100                |                 |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 5000                 | 0.8               | 7.5              | 7.5                  |                      | EEUFM1C272S( ) | 100                | 250             |
|             | 3300                    | 12.5         | 35             | 3750                                                    | 0.012                                     | 7000                 | 0.8               | 5.0              |                      |                      | EEUFM1C332L    | 100                |                 |
| 3900        | 16                      | 25           | 3820           | 0.014                                                   | 7000                                      | 0.8                  | 7.5               | 7.5              |                      | EEUFM1C392( )        | 100            | 250                |                 |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.  
 · Please refer to the page of "Taping Dimensions".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
 Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 May, 2014

### Standard Products

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                           |                                           |                      | Lead Length       |                  |                      |                      | Part No.       | Min. Packaging Qty |                 |
|-------------|-------------------------|--------------|----------------|---------------------------------------------------------|-------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|----------------|--------------------|-----------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>(Ω) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                | Long Lead<br>(pcs) | Taping<br>(pcs) |
|             |                         |              |                |                                                         |                                           |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                |                    |                 |
| 25          | 47                      | 5            | 11             | 280                                                     | 0.300                                     | 2000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFM1E470( )  | 200                | 2000            |
|             | 100                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUFM1E101( )  | 200                | 2000            |
|             | 220                     | 8            | 11.5           | 950                                                     | 0.056                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1E221( )  | 200                | 1000            |
|             | 330                     | 8            | 15             | 1240                                                    | 0.041                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1E331L( ) | 200                | 1000            |
|             |                         | 10           | 12.5           | 1290                                                    | 0.038                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1E331( )  | 200                | 500             |
|             | 470                     | 8            | 20             | 1560                                                    | 0.030                                     | 4000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1E471L( ) | 200                | 1000            |
|             |                         | 10           | 16             | 1790                                                    | 0.026                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1E471( )  | 200                | 500             |
|             | 680                     | 10           | 20             | 2180                                                    | 0.019                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1E681( )  | 200                | 500             |
|             | 820                     | 10           | 25             | 2470                                                    | 0.018                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1E821L( ) | 200                | 500             |
|             | 1000                    | 12.5         | 20             | 2600                                                    | 0.018                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1E102( )  | 200                | 500             |
|             | 1500                    | 12.5         | 25             | 3190                                                    | 0.015                                     | 7000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1E152( )  | 200                | 500             |
|             | 1800                    | 12.5         | 30             | 3630                                                    | 0.013                                     | 7000                 | 0.8               | 5.0              |                      |                      | EEUFM1E182L    | 100                |                 |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 5000                 | 0.8               | 7.5              | 7.5                  |                      | EEUFM1E182S( ) | 100                | 250             |
| 2200        | 12.5                    | 35           | 3750           | 0.012                                                   | 7000                                      | 0.8                  | 5.0               |                  |                      | EEUFM1E222L          | 100            |                    |                 |
| 2700        | 16                      | 25           | 3820           | 0.014                                                   | 7000                                      | 0.8                  | 7.5               | 7.5              |                      | EEUFM1E272( )        | 100            | 250                |                 |
| 35          | 33                      | 5            | 11             | 280                                                     | 0.300                                     | 2000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFM1V330( )  | 200                | 2000            |
|             | 68                      | 6.3          | 11.2           | 455                                                     | 0.130                                     | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUFM1V680( )  | 200                | 2000            |
|             | 150                     | 8            | 11.5           | 950                                                     | 0.056                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1V151( )  | 200                | 1000            |
|             | 220                     | 8            | 15             | 1240                                                    | 0.041                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1V221L( ) | 200                | 1000            |
|             |                         | 10           | 12.5           | 1290                                                    | 0.038                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1V221( )  | 200                | 500             |
|             | 330                     | 8            | 20             | 1560                                                    | 0.030                                     | 4000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1V331L( ) | 200                | 1000            |
|             |                         | 10           | 16             | 1790                                                    | 0.026                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1V331( )  | 200                | 500             |
|             | 470                     | 10           | 20             | 2180                                                    | 0.019                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1V471( )  | 200                | 500             |
|             | 560                     | 10           | 25             | 2470                                                    | 0.018                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1V561L( ) | 200                | 500             |
|             | 680                     | 12.5         | 20             | 2600                                                    | 0.018                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1V681( )  | 200                | 500             |
|             | 1000                    | 12.5         | 25             | 3190                                                    | 0.015                                     | 7000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1V102( )  | 200                | 500             |
|             | 1200                    | 12.5         | 30             | 3630                                                    | 0.013                                     | 7000                 | 0.8               | 5.0              |                      |                      | EEUFM1V122L    | 100                |                 |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 5000                 | 0.8               | 7.5              | 7.5                  |                      | EEUFM1V122S( ) | 100                | 250             |
| 1500        | 12.5                    | 35           | 3750           | 0.012                                                   | 7000                                      | 0.8                  | 5.0               |                  |                      | EEUFM1V152L          | 100            |                    |                 |
| 1800        | 16                      | 25           | 3820           | 0.014                                                   | 7000                                      | 0.8                  | 7.5               | 7.5              |                      | EEUFM1V182( )        | 100            | 250                |                 |
| 50          | 22                      | 5            | 11             | 250                                                     | 0.340                                     | 2000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFM1H220( )  | 200                | 2000            |
|             | 56                      | 6.3          | 11.2           | 405                                                     | 0.140                                     | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUFM1H560( )  | 200                | 2000            |
|             | 100                     | 8            | 11.5           | 870                                                     | 0.061                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1H101( )  | 200                | 1000            |
|             | 120                     | 8            | 15             | 1140                                                    | 0.045                                     | 3000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1H121L( ) | 200                | 1000            |
|             | 150                     | 10           | 12.5           | 1170                                                    | 0.042                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1H151( )  | 200                | 500             |
|             | 180                     | 8            | 20             | 1430                                                    | 0.033                                     | 4000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFM1H181L( ) | 200                | 1000            |
|             | 220                     | 10           | 16             | 1650                                                    | 0.030                                     | 4000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1H221( )  | 200                | 500             |
|             | 270                     | 10           | 20             | 1890                                                    | 0.023                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1H271( )  | 200                | 500             |
|             | 330                     | 10           | 25             | 2150                                                    | 0.022                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1H331L( ) | 200                | 500             |
|             | 470                     | 12.5         | 20             | 2260                                                    | 0.022                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1H471( )  | 200                | 500             |
|             | 560                     | 12.5         | 25             | 2660                                                    | 0.018                                     | 7000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFM1H561( )  | 200                | 500             |
|             | 680                     | 12.5         | 30             | 3160                                                    | 0.016                                     | 7000                 | 0.8               | 5.0              |                      |                      | EEUFM1H681L    | 100                |                 |
|             | 820                     | 12.5         | 35             | 3270                                                    | 0.014                                     | 7000                 | 0.8               | 5.0              |                      |                      | EEUFM1H821L    | 100                |                 |
| 16          |                         | 20           | 2870           | 0.019                                                   | 5000                                      | 0.8                  | 7.5               | 7.5              |                      | EEUFM1H821S( )       | 100            | 250                |                 |
| 1000        | 16                      | 25           | 3320           | 0.016                                                   | 7000                                      | 0.8                  | 7.5               | 7.5              |                      | EEUFM1H102( )        | 100            | 250                |                 |

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01 May, 2014

### Radial Lead Type

Series: **FR** Type: **A**

#### ■ Features

- Low ESR (Same as FM Series)
- Endurance : 5000 h to 10000 h at +105 °C
- RoHS directive compliant

#### ■ Country of origin

Malaysia



#### ■ Attention

Not applicable for automotive

#### ■ Specifications

|                                                       |                                                                                                                                                                                                                                                                              |      |      |      |      |      |      |      |      |                 |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|-----------------|
| Category Temp. Range                                  | -40 °C to +105 °C                                                                                                                                                                                                                                                            |      |      |      |      |      |      |      |      |                 |
| Rated W.V. Range                                      | 6.3 V.DC to 100 V.DC                                                                                                                                                                                                                                                         |      |      |      |      |      |      |      |      |                 |
| Nominal Cap. Range                                    | 4.7 μF to 8200 μF                                                                                                                                                                                                                                                            |      |      |      |      |      |      |      |      |                 |
| Capacitance Tolerance                                 | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |                 |
| DC Leakage Current                                    | I ≤ 0.01 CV (μA) After 2 minutes                                                                                                                                                                                                                                             |      |      |      |      |      |      |      |      |                 |
| tan δ                                                 | W.V.                                                                                                                                                                                                                                                                         | 6.3  | 10   | 16   | 25   | 35   | 50   | 63   | 100  | (120 Hz/+20 °C) |
|                                                       | tan δ                                                                                                                                                                                                                                                                        | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 |                 |
| Add 0.02 per 1000 μF for products of 1000 μF or more. |                                                                                                                                                                                                                                                                              |      |      |      |      |      |      |      |      |                 |
| Endurance                                             | After following life test with DC voltage and +105 °C±2 °C ripple current value applied. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below. |      |      |      |      |      |      |      |      |                 |
|                                                       | Duration                                                                                                                                                                                                                                                                     |      |      |      |      |      |      |      |      |                 |
|                                                       | φ5×11/ φ6.3×11.2 : 5000 hours                                                                                                                                                                                                                                                |      |      |      |      |      |      |      |      |                 |
|                                                       | φ8×11.5/ φ10×12.5 : 6000 hours (* Only EEUFR1V331U (φ10×12.5) 5000 hours)                                                                                                                                                                                                    |      |      |      |      |      |      |      |      |                 |
|                                                       | φ8×15/ φ10×16 : 8000 hours, φ8×20 : 9000 hours<br>φ10×20 to φ10×25/ φ12.5×20 to φ12.5×35/ φ16×20 to φ16×25 : 10000 hours                                                                                                                                                     |      |      |      |      |      |      |      |      |                 |
| Capacitance change                                    | ±25 % of initial measured value (6.3 V to 10 V : ±30 %)                                                                                                                                                                                                                      |      |      |      |      |      |      |      |      |                 |
| tan δ                                                 | ≤ 200 % of initial specified value                                                                                                                                                                                                                                           |      |      |      |      |      |      |      |      |                 |
| DC leakage current                                    | ≤ initial specified value                                                                                                                                                                                                                                                    |      |      |      |      |      |      |      |      |                 |
| Shelf Life                                            | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                  |      |      |      |      |      |      |      |      |                 |

#### ■ Frequency correction factor for ripple current

| W.V.(V.DC) | Cap (μF)     | Frequency (Hz) |      |      |      |       |
|------------|--------------|----------------|------|------|------|-------|
|            |              | 60             | 120  | 1 k  | 10 k | 100 k |
| 6.3 to 100 | 4.7 to 33    | 0.45           | 0.55 | 0.75 | 0.90 | 1.00  |
|            | 47 to 330    | 0.60           | 0.70 | 0.85 | 0.95 | 1.00  |
|            | 390 to 1000  | 0.65           | 0.75 | 0.90 | 0.98 | 1.00  |
|            | 1200 to 8200 | 0.75           | 0.80 | 0.95 | 1.00 | 1.00  |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)

Technical drawing showing side and top views of the capacitor. Dimensions include: Sleeve, Pressure relief φ6.3±, φd±0.05, L\*, 14 min., 3 min., φD±0.5, F±0.5, φD±0.5, φ10±.

|               |     |     |     |     |            |          |
|---------------|-----|-----|-----|-----|------------|----------|
| Body Dia. φD  | 5   | 6.3 | 8   | 10  | 12.5       | 16       |
| Body Length L | —   | —   | —   | —   | 12.5 to 25 | 30 to 35 |
| Lead Dia. φd  | 0.5 | 0.5 | 0.6 | 0.6 | 0.6        | 0.8      |
| Lead space F  | 2.0 | 2.5 | 3.5 | 5.0 | 5.0        | 7.5      |

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

06 Nov. 2014

■ Case size/Impedance/Ripple current

| W.V.(V.DC)<br>Case size<br>( $\phi$ D×L) | 6.3 V to 35 V                     |        |                                       | 50 V                              |        |                                       |
|------------------------------------------|-----------------------------------|--------|---------------------------------------|-----------------------------------|--------|---------------------------------------|
|                                          | Impedance<br>( $\Omega$ /100 kHz) |        | Ripple Current<br>(mA r.m.s./100 kHz) | Impedance<br>( $\Omega$ /100 kHz) |        | Ripple Current<br>(mA r.m.s./100 kHz) |
|                                          | +20 °C                            | -10 °C | +105 °C                               | +20 °C                            | -10 °C | +105 °C                               |
| 5 × 11                                   | 0.300                             | 1.000  | 280                                   | 0.340                             | 1.130  | 250                                   |
| 6.3 × 11.2                               | 0.130                             | 0.430  | 455                                   | 0.140                             | 0.460  | 405                                   |
| 8 × 11.5                                 | 0.056                             | 0.168  | 950                                   | 0.061                             | 0.183  | 870                                   |
| 8 × 15                                   | 0.041                             | 0.123  | 1240                                  | 0.045                             | 0.135  | 1140                                  |
| 8 × 20                                   | 0.030                             | 0.090  | 1560                                  | 0.033                             | 0.099  | 1430                                  |
| 10 × 12.5                                | 0.043                             | 0.114  | 1290                                  | 0.042                             | 0.126  | 1170                                  |
| 10 × 16                                  | 0.028                             | 0.078  | 1790                                  | 0.030                             | 0.090  | 1650                                  |
| 10 × 20                                  | 0.020                             | 0.057  | 2180                                  | 0.023                             | 0.069  | 1890                                  |
| 10 × 25                                  | 0.018                             | 0.054  | 2470                                  | 0.022                             | 0.066  | 2150                                  |
| 12.5 × 20                                | 0.018                             | 0.045  | 2600                                  | 0.022                             | 0.055  | 2260                                  |
| 12.5 × 25                                | 0.015                             | 0.038  | 3190                                  | 0.018                             | 0.045  | 2660                                  |
| 12.5 × 30                                | 0.013                             | 0.033  | 3630                                  | 0.016                             | 0.040  | 3160                                  |
| 12.5 × 35                                | 0.012                             | 0.030  | 3750                                  | 0.014                             | 0.035  | 3270                                  |
| 16 × 20                                  | 0.017                             | 0.043  | 3300                                  | 0.019                             | 0.048  | 2870                                  |
| 16 × 25                                  | 0.014                             | 0.035  | 3820                                  | 0.016                             | 0.040  | 3320                                  |

| W.V.(V.DC)<br>Case size<br>( $\phi$ D×L) | 63 V                              |        |                                       |
|------------------------------------------|-----------------------------------|--------|---------------------------------------|
|                                          | Impedance<br>( $\Omega$ /100 kHz) |        | Ripple Current<br>(mA r.m.s./100 kHz) |
|                                          | +20 °C                            | -10 °C | +105 °C                               |
| 5 × 11                                   | 0.510                             | 2.040  | 175                                   |
| 6.3 × 11.2                               | 0.210                             | 0.840  | 284                                   |
| 8 × 11.5                                 | 0.092                             | 0.368  | 566                                   |
| 8 × 15                                   | 0.068                             | 0.272  | 741                                   |
| 8 × 20                                   | 0.050                             | 0.200  | 930                                   |
| 10 × 12.5                                | 0.063                             | 0.252  | 761                                   |
| 10 × 16                                  | 0.045                             | 0.180  | 1073                                  |
| 10 × 20                                  | 0.035                             | 0.140  | 1229                                  |
| 10 × 25                                  | 0.033                             | 0.132  | 1500                                  |
| 12.5 × 20                                | 0.033                             | 0.125  | 1582                                  |
| 12.5 × 25                                | 0.027                             | 0.092  | 1995                                  |
| 12.5 × 30                                | 0.024                             | 0.082  | 2528                                  |
| 12.5 × 35                                | 0.021                             | 0.071  | 2780                                  |
| 16 × 20                                  | 0.029                             | 0.093  | 2153                                  |
| 16 × 25                                  | 0.024                             | 0.074  | 2988                                  |

| W.V.(V.DC)<br>Case size<br>( $\phi$ D×L) | 100 V                             |        |                                       |
|------------------------------------------|-----------------------------------|--------|---------------------------------------|
|                                          | Impedance<br>( $\Omega$ /100 kHz) |        | Ripple Current<br>(mA r.m.s./100 kHz) |
|                                          | +20 °C                            | -10 °C | +105 °C                               |
| 10 × 20                                  | 0.084                             | 0.336  | 1500                                  |

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.



### ■ Standard Products

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                           |                                           |                      | Lead Length       |                  |                      | Part No.      | Min. Packaging Q'ty     |                 |                      |
|-------------|-------------------------|--------------|----------------|---------------------------------------------------------|-------------------------------------------|----------------------|-------------------|------------------|----------------------|---------------|-------------------------|-----------------|----------------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>(Ω) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |               | Straight Leads<br>(pcs) | Taping<br>(pcs) |                      |
|             |                         |              |                |                                                         |                                           |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |               |                         |                 | Taping<br>*H<br>(mm) |
| 6.3         | 150                     | 5            | 11             | 280                                                     | 0.300                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5           | EEUFR0J151( )           | 200             | 2000                 |
|             | 220                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5           | EEUFR0J221( )           | 200             | 2000                 |
|             | 330                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5           | EEUFR0J331( )           | 200             | 2000                 |
|             | 470                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5           | EEUFR0J471( )           | 200             | 2000                 |
|             | 820                     | 8            | 11.5           | 950                                                     | 0.056                                     | 6000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR0J821( )           | 200             | 1000                 |
|             | 1000                    | 8            | 11.5           | 950                                                     | 0.056                                     | 6000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR0J102( )           | 200             | 1000                 |
|             | 1200                    | 8            | 15             | 1240                                                    | 0.041                                     | 8000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR0J122L( )          | 200             | 1000                 |
|             |                         | 10           | 12.5           | 1290                                                    | 0.043                                     | 6000                 | 0.6               | 5.0              | 5.0                  |               | EEUFR0J122( )           | 200             | 500                  |
|             | 1500                    | 8            | 20             | 1560                                                    | 0.030                                     | 9000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR0J152L( )          | 200             | 1000                 |
|             | 1800                    | 10           | 16             | 1790                                                    | 0.028                                     | 8000                 | 0.6               | 5.0              | 5.0                  |               | EEUFR0J182( )           | 200             | 500                  |
|             | 2200                    | 10           | 20             | 2180                                                    | 0.020                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR0J222( )           | 200             | 500                  |
|             | 2700                    | 10           | 25             | 2470                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR0J272L( )          | 200             | 500                  |
|             | 3300                    | 10           | 25             | 2470                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR0J332L( )          | 200             | 500                  |
|             | 3900                    | 12.5         | 20             | 2600                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR0J392( )           | 200             | 500                  |
|             | 4700                    | 12.5         | 25             | 3190                                                    | 0.015                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR0J472( )           | 200             | 500                  |
|             | 5600                    | 12.5         | 30             | 3630                                                    | 0.013                                     | 10000                | 0.8               | 5.0              |                      |               | EEUFR0J562L             | 100             |                      |
|             | 6800                    | 12.5         | 35             | 3750                                                    | 0.012                                     | 10000                | 0.8               | 5.0              |                      |               | EEUFR0J682L             | 100             |                      |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 10000                | 0.8               | 7.5              | 7.5                  |               | EEUFR0J682S( )          | 100             | 250                  |
| 8200        | 16                      | 25           | 3820           | 0.014                                                   | 10000                                     | 0.8                  | 7.5               | 7.5              |                      | EEUFR0J822( ) | 100                     | 250             |                      |
| 10          | 100                     | 5            | 11             | 280                                                     | 0.300                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5           | EEUFR1A101( )           | 200             | 2000                 |
|             | 150                     | 5            | 11             | 280                                                     | 0.300                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5           | EEUFR1A151( )           | 200             | 2000                 |
|             | 220                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5           | EEUFR1A221( )           | 200             | 2000                 |
|             | 270                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5           | EEUFR1A271( )           | 200             | 2000                 |
|             | 470                     | 8            | 11.5           | 950                                                     | 0.056                                     | 6000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1A471( )           | 200             | 1000                 |
|             | 680                     | 8            | 11.5           | 950                                                     | 0.056                                     | 6000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1A681( )           | 200             | 1000                 |
|             | 820                     | 10           | 12.5           | 1290                                                    | 0.043                                     | 6000                 | 0.6               | 5.0              | 5.0                  |               | EEUFR1A821( )           | 200             | 500                  |
|             | 1000                    | 10           | 16             | 1790                                                    | 0.028                                     | 8000                 | 0.6               | 5.0              | 5.0                  |               | EEUFR1A102( )           | 200             | 500                  |
|             |                         | 8            | 15             | 1240                                                    | 0.041                                     | 8000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1A102L( )          | 200             | 1000                 |
|             | 1500                    | 8            | 20             | 1560                                                    | 0.030                                     | 9000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1A152L( )          | 200             | 1000                 |
|             |                         | 10           | 16             | 1790                                                    | 0.028                                     | 8000                 | 0.6               | 5.0              | 5.0                  |               | EEUFR1A152( )           | 200             | 500                  |
|             | 1800                    | 10           | 20             | 2180                                                    | 0.020                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1A182( )           | 200             | 500                  |
|             | 2200                    | 10           | 25             | 2470                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1A222L( )          | 200             | 500                  |
|             | 3300                    | 12.5         | 20             | 2600                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1A332( )           | 200             | 500                  |
|             | 3900                    | 12.5         | 25             | 3190                                                    | 0.015                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1A392( )           | 200             | 500                  |
|             | 4700                    | 12.5         | 30             | 3630                                                    | 0.013                                     | 10000                | 0.8               | 5.0              |                      |               | EEUFR1A472L             | 100             |                      |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 10000                | 0.8               | 7.5              | 7.5                  |               | EEUFR1A472S( )          | 100             | 250                  |
|             | 5600                    | 12.5         | 35             | 3750                                                    | 0.012                                     | 10000                | 0.8               | 5.0              |                      |               | EEUFR1A562L             | 100             |                      |
| 6800        | 12.5                    | 35           | 3750           | 0.012                                                   | 10000                                     | 0.8                  | 5.0               |                  |                      | EEUFR1A682L   | 100                     |                 |                      |
|             | 16                      | 25           | 3820           | 0.014                                                   | 10000                                     | 0.8                  | 7.5               | 7.5              |                      | EEUFR1A682( ) | 100                     | 250             |                      |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.  
 · Please refer to the page of "Taping Dimensions".

### Standard Products

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                           |                                           |                      | Lead Length       |                  |                      | Part No.      | Min. Packaging Q'ty     |                 |                      |
|-------------|-------------------------|--------------|----------------|---------------------------------------------------------|-------------------------------------------|----------------------|-------------------|------------------|----------------------|---------------|-------------------------|-----------------|----------------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>(Ω) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |               | Straight Leads<br>(pcs) | Taping<br>(pcs) |                      |
|             |                         |              |                |                                                         |                                           |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |               |                         |                 | Taping<br>*H<br>(mm) |
| 16          | 68                      | 5            | 11             | 280                                                     | 0.300                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5           | EEUFR1C680( )           | 200             | 2000                 |
|             | 100                     | 5            | 11             | 280                                                     | 0.300                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5           | EEUFR1C101( )           | 200             | 2000                 |
|             | 120                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5           | EEUFR1C121( )           | 200             | 2000                 |
|             | 220                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5           | EEUFR1C221( )           | 200             | 2000                 |
|             | 470                     | 8            | 11.5           | 950                                                     | 0.056                                     | 6000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1C471( )           | 200             | 1000                 |
|             | 680                     | 8            | 15             | 1240                                                    | 0.041                                     | 8000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1C681L( )          | 200             | 1000                 |
|             |                         | 10           | 12.5           | 1290                                                    | 0.043                                     | 6000                 | 0.6               | 5.0              | 5.0                  |               | EEUFR1C681( )           | 200             | 500                  |
|             | 1000                    | 8            | 20             | 1560                                                    | 0.030                                     | 9000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1C102L( )          | 200             | 1000                 |
|             |                         | 10           | 16             | 1790                                                    | 0.028                                     | 8000                 | 0.6               | 5.0              | 5.0                  |               | EEUFR1C102( )           | 200             | 500                  |
|             | 1500                    | 10           | 20             | 2180                                                    | 0.020                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1C152( )           | 200             | 500                  |
|             |                         | 10           | 25             | 2470                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1C152L( )          | 200             | 500                  |
|             | 1800                    | 10           | 25             | 2470                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1C182L( )          | 200             | 500                  |
|             | 2200                    | 12.5         | 20             | 2600                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1C222( )           | 200             | 500                  |
|             | 2700                    | 12.5         | 25             | 3190                                                    | 0.015                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1C272( )           | 200             | 500                  |
|             | 3300                    | 12.5         | 30             | 3630                                                    | 0.013                                     | 10000                | 0.8               | 5.0              |                      |               | EEUFR1C332L             | 100             |                      |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 10000                | 0.8               | 7.5              | 7.5                  |               | EEUFR1C332S( )          | 100             | 250                  |
|             | 3900                    | 12.5         | 35             | 3750                                                    | 0.012                                     | 10000                | 0.8               | 5.0              |                      |               | EEUFR1C392L             | 100             |                      |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 10000                | 0.8               | 7.5              | 7.5                  |               | EEUFR1C392S( )          | 100             | 250                  |
|             | 4700                    | 12.5         | 35             | 3750                                                    | 0.012                                     | 10000                | 0.8               | 5.0              |                      |               | EEUFR1C472L             | 100             |                      |
|             |                         | 16           | 25             | 3820                                                    | 0.014                                     | 10000                | 0.8               | 7.5              | 7.5                  |               | EEUFR1C472( )           | 100             | 250                  |
| 5600        | 16                      | 25           | 3820           | 0.014                                                   | 10000                                     | 0.8                  | 7.5               | 7.5              |                      | EEUFR1C562( ) | 100                     | 250             |                      |
| 25          | 47                      | 5            | 11             | 280                                                     | 0.300                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5           | EEUFR1E470( )           | 200             | 2000                 |
|             | 68                      | 5            | 11             | 280                                                     | 0.300                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5           | EEUFR1E680( )           | 200             | 2000                 |
|             | 100                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5           | EEUFR1E101( )           | 200             | 2000                 |
|             | 150                     | 6.3          | 11.2           | 455                                                     | 0.130                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5           | EEUFR1E151( )           | 200             | 2000                 |
|             | 220                     | 8            | 11.5           | 950                                                     | 0.056                                     | 6000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1E221( )           | 200             | 1000                 |
|             | 330                     | 8            | 11.5           | 950                                                     | 0.056                                     | 6000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1E331( )           | 200             | 1000                 |
|             | 390                     | 8            | 15             | 1240                                                    | 0.041                                     | 8000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1E391L( )          | 200             | 1000                 |
|             | 470                     | 8            | 15             | 1240                                                    | 0.041                                     | 8000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1E471Y( )          | 200             | 1000                 |
|             |                         | 8            | 20             | 1560                                                    | 0.030                                     | 9000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1E471L( )          | 200             | 1000                 |
|             |                         | 10           | 12.5           | 1290                                                    | 0.043                                     | 6000                 | 0.6               | 5.0              | 5.0                  |               | EEUFR1E471( )           | 200             | 500                  |
|             | 560                     | 8            | 20             | 1560                                                    | 0.030                                     | 9000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1E561L( )          | 200             | 1000                 |
|             | 680                     | 8            | 20             | 1560                                                    | 0.030                                     | 9000                 | 0.6               | 3.5              | 5.0                  |               | EEUFR1E681L( )          | 200             | 1000                 |
|             |                         | 10           | 16             | 1790                                                    | 0.028                                     | 8000                 | 0.6               | 5.0              | 5.0                  |               | EEUFR1E681( )           | 200             | 500                  |
|             | 820                     | 10           | 20             | 2180                                                    | 0.020                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1E821( )           | 200             | 500                  |
|             | 1000                    | 10           | 20             | 2180                                                    | 0.020                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1E102( )           | 200             | 500                  |
|             |                         | 10           | 25             | 2470                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1E102L( )          | 200             | 500                  |
|             | 1200                    | 10           | 25             | 2470                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1E122L( )          | 200             | 500                  |
|             | 1500                    | 12.5         | 20             | 2600                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1E152( )           | 200             | 500                  |
|             | 1800                    | 12.5         | 25             | 3190                                                    | 0.015                                     | 10000                | 0.6               | 5.0              | 5.0                  |               | EEUFR1E182( )           | 200             | 500                  |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 10000                | 0.8               | 7.5              | 7.5                  |               | EEUFR1E182S( )          | 100             | 250                  |
|             | 2200                    | 12.5         | 30             | 3630                                                    | 0.013                                     | 10000                | 0.8               | 5.0              |                      |               | EEUFR1E222L             | 100             |                      |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 10000                | 0.8               | 7.5              | 7.5                  |               | EEUFR1E222S( )          | 100             | 250                  |
|             | 2700                    | 12.5         | 35             | 3750                                                    | 0.012                                     | 10000                | 0.8               | 5.0              |                      |               | EEUFR1E272L             | 100             |                      |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 10000                | 0.8               | 7.5              | 7.5                  |               | EEUFR1E272S( )          | 100             | 250                  |
|             | 3300                    | 16           | 25             | 3820                                                    | 0.014                                     | 10000                | 0.8               | 7.5              | 7.5                  |               | EEUFR1E332( )           | 100             | 250                  |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.  
 · Please refer to the page of "Taping Dimensions".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
 Should a safety concern arise regarding this product, please be sure to contact us immediately.

### Standard Products

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                           |                                           |                      | Lead Length       |                  |                      |                      | Part No.       | Min. Packaging Qty      |                 |
|-------------|-------------------------|--------------|----------------|---------------------------------------------------------|-------------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|----------------|-------------------------|-----------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>(Ω) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                         |              |                |                                                         |                                           |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                |                         |                 |
| 35          | 33                      | 5            | 11             | 280                                                     | 0.300                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFR1V330( )  | 200                     | 2000            |
|             | 68                      | 6.3          | 11.2           | 455                                                     | 0.130                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUFR1V680( )  | 200                     | 2000            |
|             | 100                     | 8            | 11.5           | 950                                                     | 0.056                                     | 6000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1V101( )  | 200                     | 1000            |
|             | 180                     | 8            | 11.5           | 950                                                     | 0.056                                     | 6000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1V181( )  | 200                     | 1000            |
|             | 220                     | 8            | 11.5           | 950                                                     | 0.056                                     | 6000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1V221( )  | 200                     | 1000            |
|             | 270                     | 8            | 15             | 1240                                                    | 0.041                                     | 8000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1V271L( ) | 200                     | 1000            |
|             |                         | 10           | 12.5           | 1290                                                    | 0.043                                     | 6000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFR1V271( )  | 200                     | 500             |
|             | 330                     | 10           | 12.5           | 1330                                                    | 0.043                                     | 5000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFR1V331U( ) | 200                     | 500             |
|             | 390                     | 8            | 20             | 1560                                                    | 0.030                                     | 9000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1V391L( ) | 200                     | 1000            |
|             | 470                     | 8            | 20             | 1560                                                    | 0.030                                     | 9000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1V471L( ) | 200                     | 1000            |
|             |                         | 10           | 16             | 1790                                                    | 0.028                                     | 8000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFR1V471( )  | 200                     | 500             |
|             | 560                     | 10           | 20             | 2180                                                    | 0.020                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1V561( )  | 200                     | 500             |
|             | 680                     | 10           | 20             | 2180                                                    | 0.020                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1V681( )  | 200                     | 500             |
|             |                         | 10           | 25             | 2470                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1V681L( ) | 200                     | 500             |
|             | 820                     | 10           | 25             | 2470                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1V821L( ) | 200                     | 500             |
|             | 1000                    | 12.5         | 20             | 2600                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1V102( )  | 200                     | 500             |
|             | 1200                    | 12.5         | 25             | 3190                                                    | 0.015                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1V122( )  | 200                     | 500             |
|             | 1500                    | 12.5         | 30             | 3630                                                    | 0.013                                     | 10000                | 0.8               | 5.0              |                      |                      | EEUFR1V152L    | 100                     |                 |
|             |                         | 16           | 20             | 3300                                                    | 0.017                                     | 10000                | 0.8               | 7.5              | 7.5                  |                      | EEUFR1V152S( ) | 100                     | 250             |
|             | 1800                    | 12.5         | 35             | 3750                                                    | 0.012                                     | 10000                | 0.8               | 5.0              |                      |                      | EEUFR1V182L    | 100                     |                 |
|             | 16                      | 25           | 3820           | 0.014                                                   | 10000                                     | 0.8                  | 7.5               | 7.5              |                      | EEUFR1V182( )        | 100            | 250                     |                 |
| 2200        | 12.5                    | 35           | 3750           | 0.012                                                   | 10000                                     | 0.8                  | 5.0               |                  |                      | EEUFR1V222L          | 100            |                         |                 |
|             | 16                      | 25           | 3820           | 0.014                                                   | 10000                                     | 0.8                  | 7.5               | 7.5              |                      | EEUFR1V222( )        | 100            | 250                     |                 |
| 50          | 4.7                     | 5            | 11             | 185                                                     | 0.620                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFR1H4R7( )  | 200                     | 2000            |
|             | 10                      | 5            | 11             | 250                                                     | 0.340                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFR1H100( )  | 200                     | 2000            |
|             | 22                      | 5            | 11             | 250                                                     | 0.340                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFR1H220( )  | 200                     | 2000            |
|             | 47                      | 6.3          | 11.2           | 405                                                     | 0.140                                     | 5000                 | 0.5               | 2.5              | 5.0                  |                      | EEUFR1H470( )  | 200                     | 2000            |
|             | 56                      | 6.3          | 11.2           | 405                                                     | 0.140                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUFR1H560( )  | 200                     | 2000            |
|             | 100                     | 8            | 11.5           | 870                                                     | 0.061                                     | 6000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1H101( )  | 200                     | 1000            |
|             | 120                     | 8            | 15             | 1140                                                    | 0.045                                     | 8000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1H121L( ) | 200                     | 1000            |
|             | 150                     | 10           | 12.5           | 1170                                                    | 0.042                                     | 6000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFR1H151( )  | 200                     | 500             |
|             | 180                     | 8            | 20             | 1430                                                    | 0.033                                     | 9000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1H181L( ) | 200                     | 1000            |
|             | 220                     | 10           | 16             | 1650                                                    | 0.030                                     | 8000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFR1H221( )  | 200                     | 500             |
|             | 270                     | 10           | 20             | 1890                                                    | 0.023                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1H271( )  | 200                     | 500             |
|             | 330                     | 10           | 25             | 2150                                                    | 0.022                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1H331L( ) | 200                     | 500             |
|             | 470                     | 12.5         | 20             | 2260                                                    | 0.022                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1H471( )  | 200                     | 500             |
|             | 560                     | 12.5         | 25             | 2660                                                    | 0.018                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1H561( )  | 200                     | 500             |
|             | 680                     | 12.5         | 30             | 3160                                                    | 0.016                                     | 10000                | 0.8               | 5.0              |                      |                      | EEUFR1H681L    | 100                     |                 |
|             | 820                     | 12.5         | 35             | 3270                                                    | 0.014                                     | 10000                | 0.8               | 5.0              |                      |                      | EEUFR1H821L    | 100                     |                 |
|             |                         | 16           | 20             | 2870                                                    | 0.019                                     | 10000                | 0.8               | 7.5              | 7.5                  |                      | EEUFR1H821S( ) | 100                     | 250             |
| 1000        | 16                      | 25           | 3320           | 0.016                                                   | 10000                                     | 0.8                  | 7.5               | 7.5              |                      | EEUFR1H102( )        | 100            | 250                     |                 |
| 63          | 18                      | 5            | 11             | 175                                                     | 0.510                                     | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUFR1J180( )  | 200                     | 2000            |
|             | 47                      | 6.3          | 11.2           | 284                                                     | 0.210                                     | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUFR1J470( )  | 200                     | 2000            |
|             | 82                      | 8            | 11.5           | 566                                                     | 0.092                                     | 6000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1J820( )  | 200                     | 1000            |
|             | 100                     | 8            | 15             | 741                                                     | 0.068                                     | 8000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1J101L( ) | 200                     | 1000            |
|             |                         | 10           | 12.5           | 761                                                     | 0.063                                     | 6000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFR1J101( )  | 200                     | 500             |
|             | 120                     | 8            | 20             | 930                                                     | 0.050                                     | 9000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1J121L( ) | 200                     | 1000            |
|             |                         | 10           | 16             | 1073                                                    | 0.045                                     | 8000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFR1J121( )  | 200                     | 500             |
|             | 150                     | 8            | 20             | 930                                                     | 0.050                                     | 9000                 | 0.6               | 3.5              | 5.0                  |                      | EEUFR1J151L( ) | 200                     | 1000            |
|             |                         | 10           | 16             | 1073                                                    | 0.045                                     | 8000                 | 0.6               | 5.0              | 5.0                  |                      | EEUFR1J151( )  | 200                     | 500             |
|             | 180                     | 10           | 20             | 1229                                                    | 0.035                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1J181( )  | 200                     | 500             |
|             | 220                     | 10           | 25             | 1500                                                    | 0.033                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1J221L( ) | 200                     | 500             |
|             |                         | 10           | 20             | 1229                                                    | 0.035                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1J271U( ) | 200                     | 500             |
|             | 270                     | 10           | 25             | 1500                                                    | 0.033                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1J271L( ) | 200                     | 500             |
|             |                         | 12.5         | 20             | 1582                                                    | 0.033                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1J271( )  | 200                     | 500             |
|             | 330                     | 12.5         | 20             | 1582                                                    | 0.033                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1J331( )  | 200                     | 500             |
|             | 390                     | 12.5         | 25             | 1995                                                    | 0.027                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1J391( )  | 200                     | 500             |
|             | 470                     | 12.5         | 25             | 1995                                                    | 0.027                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR1J471( )  | 200                     | 500             |
| 560         | 12.5                    | 30           | 2528           | 0.024                                                   | 10000                                     | 0.8                  | 5.0               |                  |                      | EEUFR1J561L          | 100            |                         |                 |
|             | 16                      | 20           | 2153           | 0.029                                                   | 10000                                     | 0.8                  | 7.5               | 7.5              |                      | EEUFR1J561S( )       | 100            | 250                     |                 |
| 680         | 12.5                    | 35           | 2780           | 0.021                                                   | 10000                                     | 0.8                  | 5.0               |                  |                      | EEUFR1J681L          | 100            |                         |                 |
| 820         | 16                      | 25           | 2988           | 0.024                                                   | 10000                                     | 0.8                  | 7.5               | 7.5              |                      | EEUFR1J821( )        | 100            | 250                     |                 |
| 100         | 100                     | 10           | 20             | 1500                                                    | 0.084                                     | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUFR2A101( )  | 200                     | 500             |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.  
 · Please refer to the page of "Taping Dimensions".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
 Should a safety concern arise regarding this product, please be sure to contact us immediately.

### Radial Lead Type

Series: **EB** Type: **A**



#### ■ Features

- Endurance : +105 °C 5000 h to 10000 h
- High ripple high frequency (High Voltage)
- RoHS directive compliant

#### ■ Specifications

|                       |                                                                                                                                                                                                                                                                              |                                    |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Category Temp. Range  | -40 °C to +105 °C                                                                                                                                                                                                                                                            | -25 °C to +105 °C                  |
| Rated W.V. Range      | 10 V.DC to 63 V.DC                                                                                                                                                                                                                                                           | 160 V.DC to 450 V.DC               |
| Nominal Cap. Range    | 2.2 μF to 3300 μF                                                                                                                                                                                                                                                            | 10 μF to 330 μF                    |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                        |                                    |
| DC Leakage Current    | I ≤ 0.01 CV or 3 (μA)<br>After 2 minutes application of rated working voltage at +20 °C (Whichever is greater)                                                                                                                                                               |                                    |
| tan δ                 | Please see the attached standard products list                                                                                                                                                                                                                               |                                    |
| Endurance             | After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below. |                                    |
|                       | (10 to 63 V.DC)<br>Duration : φ5×11 to φ8×11.5 : 5000 hours φ8×15 to φ12.5×25 : 10000 hours                                                                                                                                                                                  |                                    |
|                       | Capacitance change                                                                                                                                                                                                                                                           | ±30 % of initial measured value    |
|                       | tan δ                                                                                                                                                                                                                                                                        | ≤ 300 % of initial specified value |
|                       | DC leakage current                                                                                                                                                                                                                                                           | ≤ initial specified value          |
|                       | (160 to 450 V.DC)<br>Duration : 5000 hours                                                                                                                                                                                                                                   |                                    |
|                       | Capacitance change                                                                                                                                                                                                                                                           | ±20 % of initial measured value    |
|                       | DC leakage current                                                                                                                                                                                                                                                           | ≤ initial specified value          |
| Shelf Life            | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                  |                                    |

#### ■ Frequency correction factor for ripple current (10 ~ 63 V.DC)

| Capacitance<br>(μF) | Frequency (Hz) |      |      |      |       |
|---------------------|----------------|------|------|------|-------|
|                     | 60             | 120  | 1 k  | 10 k | 100 k |
| 2.2 to 10           | 0.75           | 1.00 | 1.40 | 1.55 | 1.65  |
| 22 to 470           | 0.85           | 1.00 | 1.20 | 1.25 | 1.30  |
| 1000 to 3300        | 0.95           | 1.00 | 1.05 | 1.10 | 1.15  |

| W. V.<br>(V. DC) | Frequency (Hz) |      |             |              |
|------------------|----------------|------|-------------|--------------|
|                  | 120            | 1 k  | 10 k to 30k | 30 k to 100k |
| 160 to 250       | 0.55           | 0.85 | 0.90        | 1.00         |
| 350 to 450       | 0.50           | 0.80 | 0.90        | 1.00         |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

03 Jun. 2014

### Standard Products

Endurance : 105 °C  $\phi 5 \times 11$  to  $\phi 8 \times 11.5 = 5000$  h,  $\phi 5 \times 15$  to  $\phi 6.3 \times 15 = 7000$  h,  $\phi 8 \times 15$  to  $\phi 12.5 \times 25 = 10000$  h

| W.V.<br>(V) | Cap.<br>( $\pm 20\%$ )<br>( $\mu\text{F}$ ) | Case size    |                | Specification                                          |                                       |                      | Lead Length       |                  |                      |                      | Part No.         | Min. Packaging Qty      |                 |      |
|-------------|---------------------------------------------|--------------|----------------|--------------------------------------------------------|---------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|------------------|-------------------------|-----------------|------|
|             |                                             | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+105 °C)<br>(mA r.m.s.) | $\tan \delta$<br>(120 Hz)<br>(+20 °C) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                  | Straight Leads<br>(pcs) | Taping<br>(pcs) |      |
|             |                                             |              |                |                                                        |                                       |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                  |                         |                 |      |
| 10          | 100                                         | 5            | 15             | 105                                                    | 0.30                                  | 7000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1A101( )*** | 200                     | 2000            |      |
|             |                                             | 5            | 11             | 66                                                     | 0.30                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1A101S( )   | 200                     | 2000            |      |
|             | 220                                         | 6.3          | 15             | 152                                                    | 0.30                                  | 7000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUEB1A221( )*** | 200                     | 2000            |      |
|             |                                             | 6.3          | 11.2           | 100                                                    | 0.30                                  | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUEB1A221S( )   | 200                     | 2000            |      |
|             | 470                                         | 8            | 15             | 278                                                    | 0.30                                  | 10000                | 0.6               | 3.5              | 5.0                  |                      | EEUEB1A471( )    | 200                     | 1000            |      |
|             |                                             | 8            | 11.5           | 180                                                    | 0.30                                  | 5000                 | 0.6               | 3.5              | 5.0                  |                      | EEUEB1A471S( )   | 200                     | 1000            |      |
| 16          | 2200                                        | 12.5         | 20             | 540                                                    | 0.32                                  | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUEB1A222( )    | 200                     | 500             |      |
|             |                                             | 12.5         | 25             | 802                                                    | 0.34                                  | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUEB1A332( )    | 200                     | 500             |      |
|             | 1000                                        | 10           | 20             | 430                                                    | 0.25                                  | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUEB1C102( )    | 200                     | 500             |      |
|             |                                             | 12.5         | 25             | 706                                                    | 0.27                                  | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUEB1C222( )    | 200                     | 500             |      |
|             | 25                                          | 47           | 5              | 15                                                     | 78                                    | 0.22                 | 7000              | 0.5              | 2.0                  | 5.0                  | 2.5              | EEUEB1E470( )***        | 200             | 2000 |
|             |                                             |              | 5              | 11                                                     | 55                                    | 0.22                 | 5000              | 0.5              | 2.0                  | 5.0                  | 2.5              | EEUEB1E470S( )          | 200             | 2000 |
| 100         |                                             | 6.3          | 15             | 135                                                    | 0.22                                  | 7000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUEB1E101( )*** | 200                     | 2000            |      |
|             |                                             | 6.3          | 11.2           | 95                                                     | 0.22                                  | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUEB1E101S( )   | 200                     | 2000            |      |
| 220         |                                             | 8            | 11.5           | 125                                                    | 0.22                                  | 5000                 | 0.6               | 3.5              | 5.0                  |                      | EEUEB1E221S( )   | 200                     | 1000            |      |
| 330         |                                             | 8            | 15             | 255                                                    | 0.22                                  | 10000                | 0.6               | 3.5              | 5.0                  |                      | EEUEB1E331( )    | 200                     | 1000            |      |
| 35          | 470                                         | 10           | 16             | 321                                                    | 0.22                                  | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUEB1E471( )    | 200                     | 500             |      |
|             |                                             | 12.5         | 20             | 498                                                    | 0.22                                  | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUEB1E102( )    | 200                     | 500             |      |
|             | 1000                                        | 5            | 15             | 66                                                     | 0.18                                  | 7000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1V330( )*** | 200                     | 2000            |      |
|             |                                             | 5            | 11             | 46                                                     | 0.18                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1V330S( )   | 200                     | 2000            |      |
|             | 220                                         | 8            | 15             | 197                                                    | 0.18                                  | 10000                | 0.6               | 3.5              | 5.0                  |                      | EEUEB1V221( )    | 200                     | 1000            |      |
|             | 330                                         | 10           | 16             | 278                                                    | 0.18                                  | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUEB1V331( )    | 200                     | 500             |      |
| 50          | 470                                         | 10           | 20             | 349                                                    | 0.18                                  | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUEB1V471( )    | 200                     | 500             |      |
|             |                                             | 12.5         | 25             | 586                                                    | 0.18                                  | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUEB1V102( )    | 200                     | 500             |      |
|             | 0.47                                        | 5            | 11             | 4                                                      | 0.15                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1HR47S( )** | 200                     | 2000            |      |
|             |                                             | 1            | 5              | 11                                                     | 8                                     | 0.15                 | 5000              | 0.5              | 2.0                  | 5.0                  | 2.5              | EEUEB1H1R0S( )**        | 200             | 2000 |
|             | 2.2                                         | 5            | 11             | 15                                                     | 0.15                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1H2R2S( )   | 200                     | 2000            |      |
|             | 3.3                                         | 5            | 11             | 18                                                     | 0.15                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1H3R3S( )   | 200                     | 2000            |      |
|             | 4.7                                         | 5            | 11             | 18                                                     | 0.15                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1H4R7S( )   | 200                     | 2000            |      |
|             | 10                                          | 5            | 11             | 27                                                     | 0.15                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1H100S( )   | 200                     | 2000            |      |
|             | 22                                          | 5            | 15             | 55                                                     | 0.15                                  | 7000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1H220( )*** | 200                     | 2000            |      |
|             |                                             | 5            | 11             | 39                                                     | 0.15                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1H220S( )   | 200                     | 2000            |      |
|             | 47                                          | 6.3          | 15             | 87                                                     | 0.15                                  | 7000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUEB1H470( )*** | 200                     | 2000            |      |
|             |                                             | 6.3          | 11.2           | 61                                                     | 0.15                                  | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUEB1H470S( )   | 200                     | 2000            |      |
|             | 100                                         | 8            | 11.5           | 99                                                     | 0.15                                  | 5000                 | 0.6               | 3.5              | 5.0                  |                      | EEUEB1H101S( )   | 200                     | 1000            |      |
|             | 220                                         | 10           | 16             | 234                                                    | 0.15                                  | 10000                | 0.6               | 5.0              | 5.0                  |                      | EEUEB1H221( )    | 200                     | 500             |      |
| 330         | 10                                          | 20           | 293            | 0.15                                                   | 10000                                 | 0.6                  | 5.0               | 5.0              |                      | EEUEB1H331( )        | 200              | 500                     |                 |      |
| 470         | 12.5                                        | 20           | 370            | 0.15                                                   | 10000                                 | 0.6                  | 5.0               | 5.0              |                      | EEUEB1H471( )        | 200              | 500                     |                 |      |
| 63          | 0.47                                        | 5            | 15             | 6                                                      | 0.12                                  | 7000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1JR47( )**  | 200                     | 2000            |      |
|             |                                             | 5            | 11             | 4.5                                                    | 0.12                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1JR47S( )** | 200                     | 2000            |      |
|             | 1                                           | 5            | 15             | 12                                                     | 0.12                                  | 7000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1J1R0( )**  | 200                     | 2000            |      |
|             |                                             | 5            | 11             | 9                                                      | 0.12                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1J1R0S( )** | 200                     | 2000            |      |
|             | 2.2                                         | 5            | 11             | 16.5                                                   | 0.12                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1J2R2S( )   | 200                     | 2000            |      |
|             | 3.3                                         | 5            | 15             | 30                                                     | 0.12                                  | 7000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1J3R3( )*** | 200                     | 2000            |      |
|             |                                             | 5            | 11             | 20                                                     | 0.12                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1J3R3S( )   | 200                     | 2000            |      |
|             | 4.7                                         | 5            | 15             | 30                                                     | 0.12                                  | 7000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1J4R7( )*** | 200                     | 2000            |      |
|             |                                             | 5            | 11             | 23                                                     | 0.12                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1J4R7S( )   | 200                     | 2000            |      |
|             | 10                                          | 5            | 15             | 46                                                     | 0.12                                  | 7000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1J100( )*** | 200                     | 2000            |      |
|             |                                             | 5            | 11             | 30                                                     | 0.12                                  | 5000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUEB1J100S( )   | 200                     | 2000            |      |
|             | 22                                          | 6.3          | 15             | 55                                                     | 0.12                                  | 7000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUEB1J220( )*** | 200                     | 2000            |      |
|             |                                             | 6.3          | 11.2           | 40                                                     | 0.12                                  | 5000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUEB1J220S( )   | 200                     | 2000            |      |
|             | 33                                          | 6.3          | 15             | 71                                                     | 0.12                                  | 7000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUEB1J330( )*** | 200                     | 2000            |      |
| 6.3         |                                             | 11.2         | 50             | 0.12                                                   | 5000                                  | 0.5                  | 2.5               | 5.0              | 2.5                  | EEUEB1J330S( )       | 200              | 2000                    |                 |      |
| 47          | 8                                           | 15           | 94             | 0.12                                                   | 10000                                 | 0.6                  | 3.5               | 5.0              |                      | EEUEB1J470( )        | 200              | 1000                    |                 |      |
|             | 8                                           | 11.5         | 80             | 0.12                                                   | 5000                                  | 0.6                  | 3.5               | 5.0              |                      | EEUEB1J470S( )       | 200              | 1000                    |                 |      |
| 100         | 8                                           | 15           | 180            | 0.12                                                   | 10000                                 | 0.6                  | 3.5               | 5.0              |                      | EEUEB1J101( )        | 200              | 1000                    |                 |      |
| 220         | 10                                          | 20           | 292            | 0.12                                                   | 10000                                 | 0.6                  | 5.0               | 5.0              |                      | EEUEB1J221( )        | 200              | 500                     |                 |      |
| 330         | 12.5                                        | 20           | 381            | 0.12                                                   | 10000                                 | 0.6                  | 5.0               | 5.0              |                      | EEUEB1J331( )        | 200              | 500                     |                 |      |
| 470         | 12.5                                        | 25           | 454            | 0.12                                                   | 10000                                 | 0.6                  | 5.0               | 5.0              |                      | EEUEB1J471( )        | 200              | 500                     |                 |      |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping Dimensions".

\*\* Please kindly accept last shipment : 31/Mar/2015

\*\*\* Please kindly accept last shipment : 30/Jun/2015

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.

### Standard Products

Endurance : 105 °C 5000 h

| W.V. | Cap.<br>(±20 %) | Case size |        | Specification                                           |                               |                      | Lead Length |            |                | Part No.       | Min. Packaging Q'ty |        |     |
|------|-----------------|-----------|--------|---------------------------------------------------------|-------------------------------|----------------------|-------------|------------|----------------|----------------|---------------------|--------|-----|
|      |                 | Dia.      | Length | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Endurance<br>(hours) | Lead Dia.   | Lead Space |                |                | Straight Leads      | Taping |     |
|      |                 |           |        |                                                         |                               |                      |             | Straight   | Taping<br>*B   |                |                     |        |     |
| (V)  | (μF)            | (mm)      | (mm)   |                                                         |                               |                      | (mm)        | (mm)       | (mm)           | (pcs)          | (pcs)               |        |     |
| 160  | 22              | 10        | 20     | 470                                                     | 0.15                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2C220( )  | 200                 | 500    |     |
|      | 33              | 10        | 20     | 470                                                     | 0.15                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2C330( )  | 200                 | 500    |     |
|      | 47              | 12.5      | 20     | 600                                                     | 0.15                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2C470( )  | 200                 | 500    |     |
|      | 68              | 12.5      | 25     | 750                                                     | 0.15                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2C680( )  | 200                 | 500    |     |
|      |                 | 16        | 20     | 750                                                     | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2C680S( ) | 100                 | 250    |     |
|      | 100             | 16        | 25     | 1060                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2C101( )  | 100                 | 250    |     |
|      |                 | 18        | 20     | 1060                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2C101S( ) | 100                 | 250    |     |
|      | 150             | 16        | 31.5   | 1280                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | –              | EEUEB2C151     | 100                 | –      |     |
|      |                 | 18        | 25     | 1280                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2C151S( ) | 100                 | 250    |     |
|      | 220             | 16        | 31.5   | 1280                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | –              | EEUEB2C221     | 100                 | –      |     |
| 18   |                 | 25        | 1280   | 0.15                                                    | 5000                          | 0.8                  | 7.5         | 7.5        | EEUEB2C221S( ) | 100            | 250                 |        |     |
| 330  | 18              | 31.5      | 1690   | 0.15                                                    | 5000                          | 0.8                  | 7.5         | –          | EEUEB2C331     | 50             | –                   |        |     |
| 200  | 22              | 10        | 20     | 470                                                     | 0.15                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2D220( )  | 200                 | 500    |     |
|      | 33              | 12.5      | 20     | 600                                                     | 0.15                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2D330( )  | 200                 | 500    |     |
|      | 47              | 12.5      | 20     | 600                                                     | 0.15                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2D470( )  | 200                 | 500    |     |
|      | 68              | 12.5      | 25     | 750                                                     | 0.15                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2D680( )  | 200                 | 500    |     |
|      |                 | 16        | 20     | 750                                                     | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2D680S( ) | 100                 | 250    |     |
|      | 100             | 16        | 25     | 1060                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2D101( )  | 100                 | 250    |     |
|      |                 | 18        | 20     | 1060                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2D101S( ) | 100                 | 250    |     |
|      | 150             | 16        | 31.5   | 1280                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | –              | EEUEB2D151     | 100                 | –      |     |
|      |                 | 18        | 25     | 1280                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2D151S( ) | 100                 | 250    |     |
|      | 220             | 18        | 31.5   | 1690                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | –              | EEUEB2D221     | 50                  | –      |     |
| 250  | 22              | 12.5      | 20     | 560                                                     | 0.15                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2E220( )  | 200                 | 500    |     |
|      | 33              | 12.5      | 20     | 560                                                     | 0.15                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2E330( )  | 200                 | 500    |     |
|      | 47              | 12.5      | 25     | 710                                                     | 0.15                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2E470( )  | 200                 | 500    |     |
|      |                 | 16        | 20     | 710                                                     | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2E470S( ) | 100                 | 250    |     |
|      | 68              | 16        | 25     | 990                                                     | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2E680( )  | 100                 | 250    |     |
|      |                 | 18        | 20     | 990                                                     | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2E680S( ) | 100                 | 250    |     |
|      | 100             | 16        | 31.5   | 1200                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | –              | EEUEB2E101     | 100                 | –      |     |
|      |                 | 18        | 25     | 1200                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2E101S( ) | 100                 | 250    |     |
|      | 150             | 18        | 31.5   | 1470                                                    | 0.15                          | 5000                 | 0.8         | 7.5        | –              | EEUEB2E151     | 50                  | –      |     |
|      | 350             | 10        | 10     | 20                                                      | 270                           | 0.20                 | 5000        | 0.6        | 5.0            | 5.0            | EEUEB2V100( )       | 200    | 500 |
| 22   |                 | 12.5      | 20     | 350                                                     | 0.20                          | 5000                 | 0.6         | 5.0        | 5.0            | EEUEB2V220( )  | 200                 | 500    |     |
| 33   |                 | 16        | 20     | 480                                                     | 0.20                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2V330S( ) | 100                 | 250    |     |
|      |                 | 16        | 25     | 640                                                     | 0.20                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2V470( )  | 100                 | 250    |     |
| 47   |                 | 18        | 20     | 640                                                     | 0.20                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2V470S( ) | 100                 | 250    |     |
|      |                 | 16        | 31.5   | 780                                                     | 0.20                          | 5000                 | 0.8         | 7.5        | –              | EEUEB2V680     | 100                 | –      |     |
| 68   |                 | 18        | 25     | 780                                                     | 0.20                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2V680S( ) | 100                 | 250    |     |
|      |                 | 100       | 18     | 31.5                                                    | 970                           | 0.20                 | 5000        | 0.8        | 7.5            | –              | EEUEB2V101          | 50     | –   |
| 400  |                 | 10        | 10     | 20                                                      | 250                           | 0.24                 | 5000        | 0.6        | 5.0            | 5.0            | EEUEB2G100( )       | 200    | 500 |
|      |                 | 22        | 12.5   | 25                                                      | 410                           | 0.24                 | 5000        | 0.6        | 5.0            | 5.0            | EEUEB2G220( )       | 200    | 500 |
|      | 16              |           | 20     | 410                                                     | 0.24                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2G220S( ) | 100                 | 250    |     |
|      | 33              | 16        | 25     | 600                                                     | 0.24                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2G330( )  | 100                 | 250    |     |
|      |                 | 18        | 20     | 600                                                     | 0.24                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2G330S( ) | 100                 | 250    |     |
|      | 47              | 16        | 31.5   | 730                                                     | 0.24                          | 5000                 | 0.8         | 7.5        | –              | EEUEB2G470     | 100                 | –      |     |
|      |                 | 18        | 25     | 730                                                     | 0.24                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2G470S( ) | 100                 | 250    |     |
|      | 450             | 10        | 12.5   | 20                                                      | 310                           | 0.24                 | 5000        | 0.6        | 5.0            | 5.0            | EEUEB2W100( )       | 200    | 500 |
|      |                 | 22        | 16     | 25                                                      | 560                           | 0.24                 | 5000        | 0.8        | 7.5            | 7.5            | EEUEB2W220( )       | 100    | 250 |
|      |                 |           | 18     | 20                                                      | 560                           | 0.24                 | 5000        | 0.8        | 7.5            | 7.5            | EEUEB2W220S( )      | 100    | 250 |
| 33   |                 | 16        | 31.5   | 680                                                     | 0.24                          | 5000                 | 0.8         | 7.5        | –              | EEUEB2W330( )  | 100                 | –      |     |
|      |                 | 18        | 25     | 680                                                     | 0.24                          | 5000                 | 0.8         | 7.5        | 7.5            | EEUEB2W330S( ) | 100                 | 250    |     |
| 47   |                 | 18        | 31.5   | 850                                                     | 0.24                          | 5000                 | 0.8         | 7.5        | –              | EEUEB2W470     | 50                  | –      |     |

- When requesting taped product, please put the letter "B" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".

### Radial Lead Type

Series: **EE** Type: **A**

#### ■ Features

- High ripple current (at high frequency):  
40 % higher than ED Series
- Endurance: 105 °C 8000 h to 10000 h
- RoHS directive compliant



#### ■ Specifications

|                       |                                                                                                                                                                                                                                                                                                                                            |                                    |      |      |      |      |      |                 |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------|------|------|------|------|-----------------|
| Category Temp. Range  | -25 °C to + 105 °C                                                                                                                                                                                                                                                                                                                         |                                    |      |      |      |      |      |                 |
| Rated W.V. Range      | 160 V .DC to 450 V .DC                                                                                                                                                                                                                                                                                                                     |                                    |      |      |      |      |      |                 |
| Nominal Cap. Range    | 10 μF to 330 μF                                                                                                                                                                                                                                                                                                                            |                                    |      |      |      |      |      |                 |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                                                                                      |                                    |      |      |      |      |      |                 |
| DC Leakage Current    | $I \leq 0.06 CV + 10$ (μA) After 2 minutes                                                                                                                                                                                                                                                                                                 |                                    |      |      |      |      |      |                 |
| tan δ                 | W.V.                                                                                                                                                                                                                                                                                                                                       | 160                                | 200  | 250  | 350  | 400  | 450  | (120 Hz/+20 °C) |
|                       | tan δ                                                                                                                                                                                                                                                                                                                                      | 0.15                               | 0.15 | 0.15 | 0.20 | 0.24 | 0.24 |                 |
| Endurance             | After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.<br>Duration<br>φ10 : 8000 hours<br>φ12.5 to φ18 : 10000 hours |                                    |      |      |      |      |      |                 |
|                       | Capacitance change                                                                                                                                                                                                                                                                                                                         | ±20 % of initial measured value    |      |      |      |      |      |                 |
|                       | tan δ                                                                                                                                                                                                                                                                                                                                      | ≤ 200 % of initial specified value |      |      |      |      |      |                 |
|                       | DC leakage current                                                                                                                                                                                                                                                                                                                         | ≤ initial specified value          |      |      |      |      |      |                 |
| Shelf Life            | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                                                                                |                                    |      |      |      |      |      |                 |

#### ■ Frequency correction factor for ripple current

| W. V.<br>(V. DC) | Cap.<br>(μF) | Frequency (Hz) |       |       |       |        |         |
|------------------|--------------|----------------|-------|-------|-------|--------|---------|
|                  |              | 60 ≤           | 120 ≤ | 300 ≤ | 1 k ≤ | 10 k ≤ | 100 k ≤ |
| 160 to 450       | 10 to 82     | 0.25           | 0.35  | 0.50  | 0.65  | 0.90   | 1.00    |
|                  | 100 to 330   | 0.30           | 0.40  | 0.55  | 0.70  | 0.90   | 1.00    |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)

|              |     |      |     |     |
|--------------|-----|------|-----|-----|
| Body Dia. φD | 10  | 12.5 | 16  | 18  |
| Lead Dia. φd | 0.6 | 0.6  | 0.8 | 0.8 |
| Lead space F | 5.0 | 5.0  | 7.5 | 7.5 |

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May, 2014

### ■ Case size/Ripple current

| Cap.<br>( $\mu$ F) | 160 V                               |                                      |              | 200 V                               |                                      |              |
|--------------------|-------------------------------------|--------------------------------------|--------------|-------------------------------------|--------------------------------------|--------------|
|                    | Case size<br>( $\phi$ D $\times$ L) | Ripple current<br>(mA r.m.s.) 105 °C |              | Case size<br>( $\phi$ D $\times$ L) | Ripple current<br>(mA r.m.s.) 105 °C |              |
|                    |                                     | 120 Hz                               | 100 kHz      |                                     | 120 Hz                               | 100 kHz      |
| 22                 | 10 $\times$ 20                      | 245                                  | 700          | 10 $\times$ 20                      | 300                                  | 850          |
| 33                 | 10 $\times$ 20                      | 280                                  | 810          | 10 $\times$ 20                      | 320                                  | 920          |
| 47                 | 10 $\times$ 20                      | 370                                  | 1065         | 12.5 $\times$ 20                    | 385                                  | 1100         |
| 68                 | 12.5 $\times$ 20                    | 470                                  | 1350         | 12.5 $\times$ 25<br>16 $\times$ 20S | 465<br>465                           | 1330<br>1330 |
| 82                 | 12.5 $\times$ 25                    | 520                                  | 1480         | 16 $\times$ 20S                     | 510                                  | 1460         |
| 100                | 12.5 $\times$ 25<br>16 $\times$ 20S | 660<br>680                           | 1660<br>1700 | 16 $\times$ 25<br>18 $\times$ 20S   | 690<br>670                           | 1730<br>1665 |
| 150                | 16 $\times$ 25<br>18 $\times$ 20S   | 755<br>730                           | 1890<br>1820 | 16 $\times$ 25                      | 740                                  | 1860         |
| 220                | 16 $\times$ 31.5<br>18 $\times$ 25S | 910<br>780                           | 2280<br>1950 | 18 $\times$ 31.5                    | 1175                                 | 2600         |
| 330                | 18 $\times$ 31.5                    | 1040                                 | 2600         | 18 $\times$ 40                      | 1250                                 | 3120         |

| Cap.<br>( $\mu$ F) | 250 V                               |                                      |              | 350 V                               |                                      |              |
|--------------------|-------------------------------------|--------------------------------------|--------------|-------------------------------------|--------------------------------------|--------------|
|                    | Case size<br>( $\phi$ D $\times$ L) | Ripple current<br>(mA r.m.s.) 105 °C |              | Case size<br>( $\phi$ D $\times$ L) | Ripple current<br>(mA r.m.s.) 105 °C |              |
|                    |                                     | 120 Hz                               | 100 kHz      |                                     | 120 Hz                               | 100 kHz      |
| 15                 |                                     |                                      |              | 10 $\times$ 20                      | 170                                  | 480          |
| 22                 | 10 $\times$ 20                      | 275                                  | 785          | 12.5 $\times$ 20                    | 230                                  | 660          |
| 33                 | 12.5 $\times$ 20                    | 350                                  | 995          | 12.5 $\times$ 25<br>16 $\times$ 20S | 275<br>315                           | 790<br>900   |
| 47                 | 12.5 $\times$ 25<br>16 $\times$ 20S | 450<br>490                           | 1290<br>1400 | 16 $\times$ 25<br>18 $\times$ 20S   | 375<br>375                           | 1070<br>1070 |
| 68                 | 16 $\times$ 20S                     | 490                                  | 1400         | 16 $\times$ 31.5<br>18 $\times$ 25S | 535<br>465                           | 1530<br>1330 |
| 82                 | 16 $\times$ 25<br>18 $\times$ 20S   | 590<br>590                           | 1680<br>1680 | 18 $\times$ 25S                     | 535                                  | 1530         |
| 100                | 16 $\times$ 31.5<br>18 $\times$ 25S | 840<br>840                           | 2100<br>2100 | 18 $\times$ 31.5                    | 640                                  | 1600         |
| 150                | 18 $\times$ 31.5                    | 1010                                 | 2520         |                                     |                                      |              |
| 220                | 18 $\times$ 40                      | 1175                                 | 2940         |                                     |                                      |              |

| Cap.<br>( $\mu$ F) | 400 V                               |                                      |              | 450 V                               |                                      |              |
|--------------------|-------------------------------------|--------------------------------------|--------------|-------------------------------------|--------------------------------------|--------------|
|                    | Case size<br>( $\phi$ D $\times$ L) | Ripple current<br>(mA r.m.s.) 105 °C |              | Case size<br>( $\phi$ D $\times$ L) | Ripple current<br>(mA r.m.s.) 105 °C |              |
|                    |                                     | 120 Hz                               | 100 kHz      |                                     | 120 Hz                               | 100 kHz      |
| 10                 | 10 $\times$ 20                      | 150                                  | 430          | 10 $\times$ 20U<br>12.5 $\times$ 20 | 115<br>170                           | 330<br>490   |
| 15                 | 12.5 $\times$ 20                    | 205                                  | 590          | 12.5 $\times$ 25                    | 270                                  | 780          |
| 22                 | 12.5 $\times$ 25<br>16 $\times$ 20S | 265<br>300                           | 760<br>860   | 16 $\times$ 20S                     | 330                                  | 945          |
| 33                 | 16 $\times$ 20S                     | 355                                  | 1020         | 16 $\times$ 25<br>18 $\times$ 20S   | 350<br>350                           | 1000<br>1000 |
| 47                 | 16 $\times$ 25<br>18 $\times$ 20S   | 410<br>410                           | 1180<br>1180 | 16 $\times$ 31.5<br>18 $\times$ 25S | 420<br>420                           | 1200<br>1200 |
| 56                 |                                     |                                      |              | 18 $\times$ 31.5                    | 480                                  | 1380         |
| 68                 | 18 $\times$ 25                      | 515                                  | 1470         | 18 $\times$ 40                      | 630                                  | 1800         |
| 82                 | 18 $\times$ 31.5                    | 575                                  | 1645         |                                     |                                      |              |
| 100                | 18 $\times$ 40                      | 825                                  | 2060         |                                     |                                      |              |

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.



### Standard Products

Endurance : 105 °C  $\phi$ 10=8000 h,  $\phi$ 12.5 to  $\phi$ 18=10000 h

| W.V. | Cap.<br>( $\pm 20\%$ ) | Case size |        | Specification                                           |                                      |                      | Lead Length |            |              | Part No.       | Min. Packaging Q'ty     |                 |     |
|------|------------------------|-----------|--------|---------------------------------------------------------|--------------------------------------|----------------------|-------------|------------|--------------|----------------|-------------------------|-----------------|-----|
|      |                        | Dia.      | Length | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | tan $\delta$<br>(120 Hz)<br>(+20 °C) | Endurance<br>(hours) | Lead Dia.   | Lead Space |              |                | Straight Leads<br>(pcs) | Taping<br>(pcs) |     |
|      |                        |           |        |                                                         |                                      |                      |             | Straight   | Taping<br>*B |                |                         |                 |     |
| (V)  | ( $\mu$ F)             | (mm)      | (mm)   | (mA r.m.s.)                                             | (120 Hz)<br>(+20 °C)                 | (hours)              | (mm)        | (mm)       | (mm)         |                | (pcs)                   | (pcs)           |     |
| 160  | 22                     | 10        | 20     | 700                                                     | 0.15                                 | 8000                 | 0.6         | 5.0        | 5.0          | EEUEE2C220( )  | 200                     | 500             |     |
|      | 33                     | 10        | 20     | 810                                                     | 0.15                                 | 8000                 | 0.6         | 5.0        | 5.0          | EEUEE2C330( )  | 200                     | 500             |     |
|      | 47                     | 10        | 20     | 1065                                                    | 0.15                                 | 8000                 | 0.6         | 5.0        | 5.0          | EEUEE2C470( )  | 200                     | 500             |     |
|      | 68                     | 12.5      | 20     | 1350                                                    | 0.15                                 | 10000                | 0.6         | 5.0        | 5.0          | EEUEE2C680( )  | 200                     | 500             |     |
|      | 82                     | 12.5      | 25     | 1480                                                    | 0.15                                 | 10000                | 0.6         | 5.0        | 5.0          | EEUEE2C820( )  | 200                     | 500             |     |
|      | 100                    | 100       | 12.5   | 25                                                      | 1660                                 | 0.15                 | 10000       | 0.6        | 5.0          | 5.0            | EEUEE2C101( )           | 200             | 500 |
|      |                        |           | 16     | 20                                                      | 1700                                 | 0.15                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2C101S( )          | 100             | 250 |
|      | 150                    | 150       | 16     | 25                                                      | 1890                                 | 0.15                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2C151( )           | 100             | 250 |
|      |                        |           | 18     | 20                                                      | 1820                                 | 0.15                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2C151S( )          | 100             | 250 |
|      | 220                    | 220       | 16     | 31.5                                                    | 2280                                 | 0.15                 | 10000       | 0.8        | 7.5          |                | EEUEE2C221              | 100             |     |
| 18   |                        |           | 25     | 1950                                                    | 0.15                                 | 10000                | 0.8         | 7.5        | 7.5          | EEUEE2C221S( ) | 100                     | 250             |     |
| 330  | 330                    | 18        | 31.5   | 2600                                                    | 0.15                                 | 10000                | 0.8         | 7.5        |              | EEUEE2C331     | 50                      |                 |     |
| 200  | 22                     | 10        | 20     | 850                                                     | 0.15                                 | 8000                 | 0.6         | 5.0        | 5.0          | EEUEE2D220( )  | 200                     | 500             |     |
|      | 33                     | 10        | 20     | 920                                                     | 0.15                                 | 8000                 | 0.6         | 5.0        | 5.0          | EEUEE2D330( )  | 200                     | 500             |     |
|      | 47                     | 12.5      | 20     | 1100                                                    | 0.15                                 | 10000                | 0.6         | 5.0        | 5.0          | EEUEE2D470( )  | 200                     | 500             |     |
|      | 68                     | 68        | 12.5   | 25                                                      | 1330                                 | 0.15                 | 10000       | 0.6        | 5.0          | 5.0            | EEUEE2D680( )           | 200             | 500 |
|      |                        |           | 16     | 20                                                      | 1330                                 | 0.15                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2D680S( )          | 100             | 250 |
|      | 82                     | 16        | 20     | 1460                                                    | 0.15                                 | 10000                | 0.8         | 7.5        | 7.5          | EEUEE2D820S( ) | 100                     | 250             |     |
|      | 100                    | 100       | 16     | 25                                                      | 1730                                 | 0.15                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2D101( )           | 100             | 250 |
|      |                        |           | 18     | 20                                                      | 1665                                 | 0.15                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2D101S( )          | 100             | 250 |
|      | 150                    | 150       | 16     | 25                                                      | 1860                                 | 0.15                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2D151( )           | 100             | 250 |
|      | 220                    | 220       | 18     | 31.5                                                    | 2600                                 | 0.15                 | 10000       | 0.8        | 7.5          |                | EEUEE2D221              | 50              |     |
| 330  | 330                    | 18        | 40     | 3120                                                    | 0.15                                 | 10000                | 0.8         | 7.5        |              | EEUEE2D331     | 50                      |                 |     |
| 250  | 22                     | 10        | 20     | 785                                                     | 0.15                                 | 8000                 | 0.6         | 5.0        | 5.0          | EEUEE2E220( )  | 200                     | 500             |     |
|      | 33                     | 12.5      | 20     | 995                                                     | 0.15                                 | 10000                | 0.6         | 5.0        | 5.0          | EEUEE2E330( )  | 200                     | 500             |     |
|      | 47                     | 47        | 12.5   | 25                                                      | 1290                                 | 0.15                 | 10000       | 0.6        | 5.0          | 5.0            | EEUEE2E470( )           | 200             | 500 |
|      |                        |           | 16     | 20                                                      | 1400                                 | 0.15                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2E470S( )          | 100             | 250 |
|      | 68                     | 16        | 20     | 1400                                                    | 0.15                                 | 10000                | 0.8         | 7.5        | 7.5          | EEUEE2E680S( ) | 100                     | 250             |     |
|      | 82                     | 82        | 16     | 25                                                      | 1680                                 | 0.15                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2E820( )           | 100             | 250 |
|      |                        |           | 18     | 20                                                      | 1680                                 | 0.15                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2E820S( )          | 100             | 250 |
|      | 100                    | 100       | 16     | 31.5                                                    | 2100                                 | 0.15                 | 10000       | 0.8        | 7.5          |                | EEUEE2E101              | 100             |     |
|      |                        |           | 18     | 25                                                      | 2100                                 | 0.15                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2E101S( )          | 100             | 250 |
|      | 150                    | 150       | 18     | 31.5                                                    | 2520                                 | 0.15                 | 10000       | 0.8        | 7.5          |                | EEUEE2E151              | 50              |     |
| 220  | 220                    | 18        | 40     | 2940                                                    | 0.15                                 | 10000                | 0.8         | 7.5        |              | EEUEE2E221     | 50                      |                 |     |
| 350  | 15                     | 10        | 20     | 480                                                     | 0.20                                 | 8000                 | 0.6         | 5.0        | 5.0          | EEUEE2V150( )  | 200                     | 500             |     |
|      | 22                     | 12.5      | 20     | 660                                                     | 0.20                                 | 10000                | 0.6         | 5.0        | 5.0          | EEUEE2V220( )  | 200                     | 500             |     |
|      | 33                     | 33        | 12.5   | 25                                                      | 790                                  | 0.20                 | 10000       | 0.6        | 5.0          | 5.0            | EEUEE2V330( )           | 200             | 500 |
|      |                        |           | 16     | 20                                                      | 900                                  | 0.20                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2V330S( )          | 100             | 250 |
|      | 47                     | 47        | 16     | 25                                                      | 1070                                 | 0.20                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2V470( )           | 100             | 250 |
|      |                        |           | 18     | 20                                                      | 1070                                 | 0.20                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2V470S( )          | 100             | 250 |
|      | 68                     | 68        | 16     | 31.5                                                    | 1530                                 | 0.20                 | 10000       | 0.8        | 7.5          |                | EEUEE2V680              | 100             |     |
|      |                        |           | 18     | 25                                                      | 1330                                 | 0.20                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2V680S( )          | 100             | 250 |
|      | 82                     | 82        | 18     | 25                                                      | 1530                                 | 0.20                 | 10000       | 0.8        | 7.5          | 7.5            | EEUEE2V820S( )          | 100             | 250 |
|      | 100                    | 100       | 18     | 31.5                                                    | 1600                                 | 0.20                 | 10000       | 0.8        | 7.5          |                | EEUEE2V101              | 50              |     |

· When requesting taped product, please put the letter "B" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm.  
 · Please refer to the page of "Taping Dimensions".

### ■ Standard Products

Endurance : 105 °C  $\phi$ 10=8000 h,  $\phi$ 12.5 to  $\phi$ 18=10000 h

| W.V.<br>(V) | Cap.<br>( $\pm$ 20 %)<br>( $\mu$ F) | Case size    |                | Specification                                           |                                      |                      | Lead Length       |                  |                      | Part No.       | Min. Packaging Q'ty     |                 |
|-------------|-------------------------------------|--------------|----------------|---------------------------------------------------------|--------------------------------------|----------------------|-------------------|------------------|----------------------|----------------|-------------------------|-----------------|
|             |                                     | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+105 °C)<br>(mA r.m.s.) | tan $\delta$<br>(120 Hz)<br>(+20 °C) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                     |              |                |                                                         |                                      |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |                |                         |                 |
| 400         | 10                                  | 10           | 20             | 430                                                     | 0.24                                 | 8000                 | 0.6               | 5.0              | 5.0                  | EEUEE2G100( )  | 200                     | 500             |
|             | 15                                  | 12.5         | 20             | 590                                                     | 0.24                                 | 10000                | 0.6               | 5.0              | 5.0                  | EEUEE2G150( )  | 200                     | 500             |
|             | 22                                  | 12.5         | 25             | 760                                                     | 0.24                                 | 10000                | 0.6               | 5.0              | 5.0                  | EEUEE2G220( )  | 200                     | 500             |
|             |                                     | 16           | 20             | 860                                                     | 0.24                                 | 10000                | 0.8               | 7.5              | 7.5                  | EEUEE2G220S( ) | 100                     | 250             |
|             | 33                                  | 16           | 20             | 1020                                                    | 0.24                                 | 10000                | 0.8               | 7.5              | 7.5                  | EEUEE2G330S( ) | 100                     | 250             |
|             | 47                                  | 16           | 25             | 1180                                                    | 0.24                                 | 10000                | 0.8               | 7.5              | 7.5                  | EEUEE2G470( )  | 100                     | 250             |
|             |                                     | 18           | 20             | 1180                                                    | 0.24                                 | 10000                | 0.8               | 7.5              | 7.5                  | EEUEE2G470S( ) | 100                     | 250             |
|             | 68                                  | 18           | 25             | 1470                                                    | 0.24                                 | 10000                | 0.8               | 7.5              | 7.5                  | EEUEE2G680( )  | 100                     | 250             |
|             | 82                                  | 18           | 31.5           | 1645                                                    | 0.24                                 | 10000                | 0.8               | 7.5              |                      | EEUEE2G820     | 50                      |                 |
| 100         | 18                                  | 40           | 2060           | 0.24                                                    | 10000                                | 0.8                  | 7.5               |                  | EEUEE2G101           | 50             |                         |                 |
| 450         | 10                                  | 10           | 20             | 330                                                     | 0.24                                 | 8000                 | 0.6               | 5.0              | 5.0                  | EEUEE2W100U( ) | 200                     | 500             |
|             |                                     | 12.5         | 20             | 490                                                     | 0.24                                 | 10000                | 0.6               | 5.0              | 5.0                  | EEUEE2W100( )  | 200                     | 500             |
|             | 15                                  | 12.5         | 25             | 780                                                     | 0.24                                 | 10000                | 0.6               | 5.0              | 5.0                  | EEUEE2W150( )  | 200                     | 500             |
|             | 22                                  | 16           | 20             | 945                                                     | 0.24                                 | 10000                | 0.8               | 7.5              | 7.5                  | EEUEE2W220S( ) | 100                     | 250             |
|             | 33                                  | 16           | 25             | 1000                                                    | 0.24                                 | 10000                | 0.8               | 7.5              | 7.5                  | EEUEE2W330( )  | 100                     | 250             |
|             |                                     | 18           | 20             | 1000                                                    | 0.24                                 | 10000                | 0.8               | 7.5              | 7.5                  | EEUEE2W330S( ) | 100                     | 250             |
|             | 47                                  | 16           | 31.5           | 1200                                                    | 0.24                                 | 10000                | 0.8               | 7.5              |                      | EEUEE2W470     | 100                     |                 |
|             |                                     | 18           | 25             | 1200                                                    | 0.24                                 | 10000                | 0.8               | 7.5              | 7.5                  | EEUEE2W470S( ) | 100                     | 250             |
|             | 56                                  | 18           | 31.5           | 1380                                                    | 0.24                                 | 10000                | 0.8               | 7.5              |                      | EEUEE2W560     | 50                      |                 |
| 68          | 18                                  | 40           | 1800           | 0.24                                                    | 10000                                | 0.8                  | 7.5               |                  | EEUEE2W680           | 50             |                         |                 |

- When requesting taped product, please put the letter "B" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".

### Radial Lead Type

Series: **TA** Type: **A**



#### ■ Features

- Endurance: 125 °C 2000 h
- Heat cycle: 1000 cycle -40 °C to +125 °C
- AEC-Q200 qualified\*
- RoHS directive compliant

#### ■ Specifications

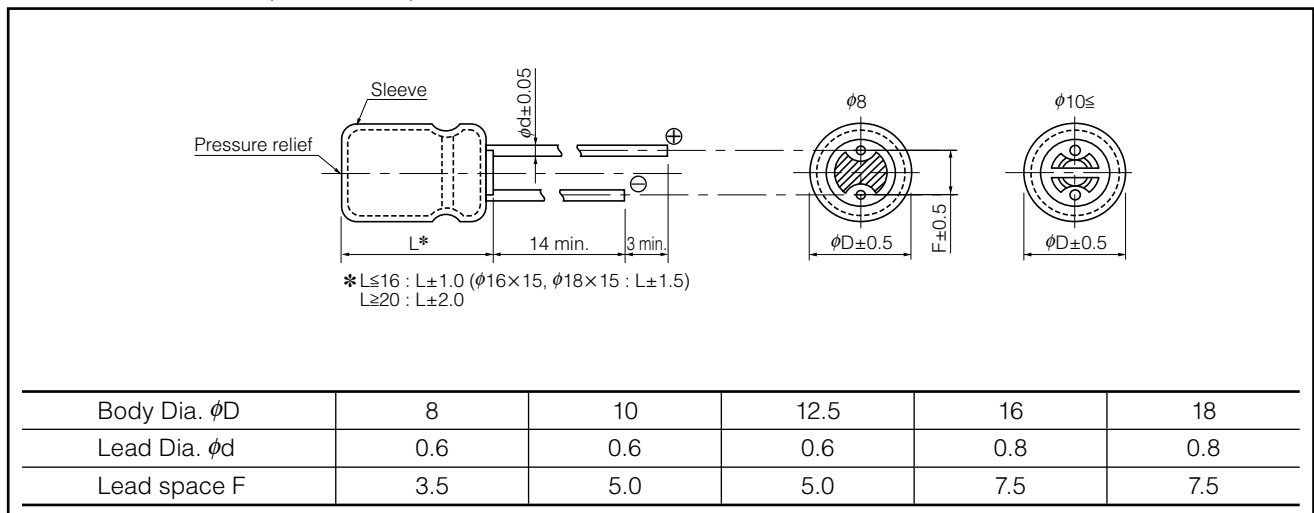
|                                                                             |                                                                                                                                                                                                                                                                                               |                                    |      |      |      |      |      |                  |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------|------|------|------|------|------------------|
| Category Temp. Range                                                        | -40 °C to + 125 °C                                                                                                                                                                                                                                                                            |                                    |      |      |      |      |      |                  |
| Rated W.V. Range                                                            | 10 V .DC to 63 V .DC                                                                                                                                                                                                                                                                          |                                    |      |      |      |      |      |                  |
| Nominal Cap. Range                                                          | 2.2 μF to 4700 μF                                                                                                                                                                                                                                                                             |                                    |      |      |      |      |      |                  |
| Capacitance Tolerance                                                       | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                                         |                                    |      |      |      |      |      |                  |
| DC Leakage Current                                                          | $I \leq 0.01 CV$ or 3 (μA) After 2 minutes (Whichever is greater)                                                                                                                                                                                                                             |                                    |      |      |      |      |      |                  |
| tan δ                                                                       | W.V.(V)                                                                                                                                                                                                                                                                                       | 10                                 | 16   | 25   | 35   | 50   | 63   | (120Hz / +20 °C) |
|                                                                             | tan δ                                                                                                                                                                                                                                                                                         | 0.20                               | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 |                  |
| For capacitance value $\geq 1000 \mu\text{F}$ , add 0.02 per every 1000 μF. |                                                                                                                                                                                                                                                                                               |                                    |      |      |      |      |      |                  |
| Endurance                                                                   | After following life test with DC voltage and +125 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), for 2000 hours, when the capacitors are restored to 20 °C, the capacitors, shall meet the limits specified below. |                                    |      |      |      |      |      |                  |
|                                                                             | Capacitance change                                                                                                                                                                                                                                                                            | ±30% of initial measured value     |      |      |      |      |      |                  |
|                                                                             | tan δ                                                                                                                                                                                                                                                                                         | ≤ 300 % of initial specified value |      |      |      |      |      |                  |
|                                                                             | DC leakage current                                                                                                                                                                                                                                                                            | ≤ initial specified value          |      |      |      |      |      |                  |
| Shelf Life                                                                  | After storage for 1000 hours at +125 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                                   |                                    |      |      |      |      |      |                  |

#### ■ Frequency correction factor for ripple current

| W.V.<br>(V.DC) | Cap. (μF)    | Frequency (Hz) |      |      |      |       |
|----------------|--------------|----------------|------|------|------|-------|
|                |              | 60             | 120  | 1 k  | 10 k | 100 k |
| 10 to 63       | 1 to 330     | 0.55           | 0.65 | 0.85 | 0.90 | 1.00  |
|                | 470 to 1000  | 0.70           | 0.75 | 0.90 | 0.95 | 1.00  |
|                | 2200 to 4700 | 0.75           | 0.80 | 0.90 | 0.95 | 1.00  |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)



\* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

### Standard Products

Endurance : 125 °C 2000 h

| W.V. | Cap.<br>(±20 %) | Case size |        | Specification                                           |                                           | Lead Length       |                  |                      | Part No.       | Min. Packaging Q'ty     |                 |     |
|------|-----------------|-----------|--------|---------------------------------------------------------|-------------------------------------------|-------------------|------------------|----------------------|----------------|-------------------------|-----------------|-----|
|      |                 | Dia.      | Length | Ripple Current<br>(100 kHz)<br>(+125 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>(Ω) | Lead Dia.<br>(mm) | Lead Space       |                      |                | Straight Leads<br>(pcs) | Taping<br>(pcs) |     |
|      |                 |           |        |                                                         |                                           |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |                |                         |                 |     |
| (V)  | (μF)            | (mm)      | (mm)   | (mA r.m.s.)                                             | (Ω)                                       | (mm)              | (mm)             | (mm)                 |                | (pcs)                   | (pcs)           |     |
| 10   | 330             | 8         | 11.5   | 500                                                     | 0.130                                     | 0.6               | 3.5              | 5.0                  | EEUTA1A331( )  | 200                     | 1000            |     |
|      | 470             | 10        | 12.5   | 680                                                     | 0.100                                     | 0.6               | 5.0              | 5.0                  | EEUTA1A471( )  | 200                     | 500             |     |
|      | 1000            | 10        | 20     | 1100                                                    | 0.057                                     | 0.6               | 5.0              | 5.0                  | EEUTA1A102( )  | 200                     | 500             |     |
|      |                 |           | 12.5   | 15                                                      | 1085                                      | 0.070             | 0.6              | 5.0                  | 5.0            | EEUTA1A102S( )          | 200             | 500 |
|      | 2200            | 12.5      | 25     | 1750                                                    | 0.033                                     | 0.6               | 5.0              | 5.0                  | EEUTA1A222L( ) | 200                     | 500             |     |
|      |                 |           | 16     | 20                                                      | 1985                                      | 0.032             | 0.8              | 7.5                  | 7.5            | EEUTA1A222( )           | 100             | 250 |
|      |                 |           | 18     | 15                                                      | 1800                                      | 0.042             | 0.8              | 7.5                  | 7.5            | EEUTA1A222S( )          | 100             | 250 |
|      | 3300            | 16        | 25     | 2300                                                    | 0.024                                     | 0.8               | 7.5              | 7.5                  | EEUTA1A332( )  | 100                     | 250             |     |
|      |                 |           | 18     | 20                                                      | 2250                                      | 0.031             | 0.8              | 7.5                  | 7.5            | EEUTA1A332S( )          | 100             | 250 |
|      | 4700            | 16        | 31.5   | 2710                                                    | 0.020                                     | 0.8               | 7.5              |                      | EEUTA1A472     | 100                     |                 |     |
| 18   |                 |           | 25     | 2470                                                    | 0.022                                     | 0.8               | 7.5              | 7.5                  | EEUTA1A472S( ) | 100                     | 250             |     |
| 16   | 220             | 8         | 11.5   | 500                                                     | 0.130                                     | 0.6               | 3.5              | 5.0                  | EEUTA1C221( )  | 200                     | 1000            |     |
|      | 330             | 10        | 12.5   | 680                                                     | 0.100                                     | 0.6               | 5.0              | 5.0                  | EEUTA1C331( )  | 200                     | 500             |     |
|      | 470             | 10        | 16     | 945                                                     | 0.075                                     | 0.6               | 5.0              | 5.0                  | EEUTA1C471( )  | 200                     | 500             |     |
|      | 1000            | 12.5      | 20     | 1490                                                    | 0.042                                     | 0.6               | 5.0              | 5.0                  | EEUTA1C102( )  | 200                     | 500             |     |
|      |                 |           | 16     | 15                                                      | 1520                                      | 0.047             | 0.8              | 7.5                  | 7.5            | EEUTA1C102S( )          | 100             | 250 |
|      | 2200            | 16        | 25     | 2300                                                    | 0.024                                     | 0.8               | 7.5              | 7.5                  | EEUTA1C222( )  | 100                     | 250             |     |
|      |                 |           | 18     | 20                                                      | 2250                                      | 0.031             | 0.8              | 7.5                  | 7.5            | EEUTA1C222S( )          | 100             | 250 |
|      | 3300            | 16        | 31.5   | 2710                                                    | 0.020                                     | 0.8               | 7.5              |                      | EEUTA1C332     | 100                     |                 |     |
|      |                 |           | 18     | 25                                                      | 2470                                      | 0.022             | 0.8              | 7.5                  | 7.5            | EEUTA1C332S( )          | 100             | 250 |
|      | 4700            | 18        | 31.5   | 3270                                                    | 0.018                                     | 0.8               | 7.5              |                      | EEUTA1C472     | 50                      |                 |     |
| 25   | 100             | 8         | 11.5   | 500                                                     | 0.130                                     | 0.6               | 3.5              | 5.0                  | EEUTA1E101( )  | 200                     | 1000            |     |
|      | 220             | 10        | 12.5   | 680                                                     | 0.100                                     | 0.6               | 5.0              | 5.0                  | EEUTA1E221( )  | 200                     | 500             |     |
|      | 330             | 10        | 16     | 945                                                     | 0.075                                     | 0.6               | 5.0              | 5.0                  | EEUTA1E331( )  | 200                     | 500             |     |
|      | 470             | 10        | 20     | 1100                                                    | 0.057                                     | 0.6               | 5.0              | 5.0                  | EEUTA1E471( )  | 200                     | 500             |     |
|      |                 |           | 12.5   | 15                                                      | 1085                                      | 0.070             | 0.6              | 5.0                  | 5.0            | EEUTA1E471S( )          | 200             | 500 |
|      | 1000            | 12.5      | 25     | 1750                                                    | 0.033                                     | 0.6               | 5.0              | 5.0                  | EEUTA1E102L( ) | 200                     | 500             |     |
|      |                 |           | 16     | 20                                                      | 1985                                      | 0.032             | 0.8              | 7.5                  | 7.5            | EEUTA1E102( )           | 100             | 250 |
|      |                 |           | 18     | 15                                                      | 1800                                      | 0.042             | 0.8              | 7.5                  | 7.5            | EEUTA1E102S( )          | 100             | 250 |
|      | 2200            | 16        | 31.5   | 2710                                                    | 0.020                                     | 0.8               | 7.5              |                      | EEUTA1E222     | 100                     |                 |     |
|      |                 |           | 18     | 25                                                      | 2470                                      | 0.022             | 0.8              | 7.5                  | 7.5            | EEUTA1E222S( )          | 100             | 250 |
| 3300 | 18              | 35.5      | 3310   | 0.017                                                   | 0.8                                       | 7.5               |                  | EEUTA1E332           | 50             |                         |                 |     |
| 35   | 100             | 10        | 12.5   | 555                                                     | 0.180                                     | 0.6               | 5.0              | 5.0                  | EEUTA1V101( )  | 200                     | 500             |     |
|      | 220             | 10        | 16     | 765                                                     | 0.130                                     | 0.6               | 5.0              | 5.0                  | EEUTA1V221( )  | 200                     | 500             |     |
|      | 330             | 10        | 20     | 930                                                     | 0.100                                     | 0.6               | 5.0              | 5.0                  | EEUTA1V331( )  | 200                     | 500             |     |
|      | 470             | 12.5      | 20     | 1330                                                    | 0.070                                     | 0.6               | 5.0              | 5.0                  | EEUTA1V471( )  | 200                     | 500             |     |
|      |                 |           | 16     | 15                                                      | 1450                                      | 0.088             | 0.8              | 7.5                  | 7.5            | EEUTA1V471S( )          | 100             | 250 |
|      | 1000            | 16        | 25     | 2010                                                    | 0.037                                     | 0.8               | 7.5              | 7.5                  | EEUTA1V102( )  | 100                     | 250             |     |
|      |                 |           | 18     | 20                                                      | 2180                                      | 0.046             | 0.8              | 7.5                  | 7.5            | EEUTA1V102S( )          | 100             | 250 |
|      | 2200            | 18        | 35.5   | 2790                                                    | 0.025                                     | 0.8               | 7.5              |                      | EEUTA1V222     | 50                      |                 |     |

- When requesting taped product, please put the letter "B" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".

### Standard Products

Endurance : 125 °C 2000 h

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                           |                                           | Lead Length       |                  |                      | Part No.         | Min. Packaging Q'ty     |                 |
|-------------|-------------------------|--------------|----------------|---------------------------------------------------------|-------------------------------------------|-------------------|------------------|----------------------|------------------|-------------------------|-----------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(100 kHz)<br>(+125 °C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C)<br>(Ω) | Lead Dia.<br>(mm) | Lead Space       |                      |                  | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                         |              |                |                                                         |                                           |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |                  |                         |                 |
| 50          | 1                       | 8            | 11.5           | 35                                                      | 2.00                                      | 0.6               | 3.5              | 5.0                  | EEUTA1H1R0( )*** | 200                     | 1000            |
|             | 10                      | 8            | 11.5           | 180                                                     | 0.950                                     | 0.6               | 3.5              | 5.0                  | EEUTA1H100( )    | 200                     | 1000            |
|             | 22                      | 8            | 11.5           | 250                                                     | 0.650                                     | 0.6               | 3.5              | 5.0                  | EEUTA1H220( )    | 200                     | 1000            |
|             | 33                      | 8            | 11.5           | 300                                                     | 0.450                                     | 0.6               | 3.5              | 5.0                  | EEUTA1H330( )    | 200                     | 1000            |
|             | 47                      | 8            | 11.5           | 440                                                     | 0.350                                     | 0.6               | 3.5              | 5.0                  | EEUTA1H470S( )   | 200                     | 1000            |
|             | 100                     | 10           | 12.5           | 555                                                     | 0.180                                     | 0.6               | 5.0              | 5.0                  | EEUTA1H101( )    | 200                     | 500             |
|             | 220                     | 10           | 20             | 930                                                     | 0.100                                     | 0.6               | 5.0              | 5.0                  | EEUTA1H221( )    | 200                     | 500             |
|             | 330                     | 12.5         | 20             | 1330                                                    | 0.070                                     | 0.6               | 5.0              | 5.0                  | EEUTA1H331( )    | 200                     | 500             |
|             |                         | 16           | 15             | 1450                                                    | 0.088                                     | 0.8               | 7.5              | 7.5                  | EEUTA1H331S( )   | 100                     | 250             |
|             | 470                     | 12.5         | 25             | 1650                                                    | 0.055                                     | 0.6               | 5.0              | 5.0                  | EEUTA1H471L( )   | 200                     | 500             |
|             |                         | 16           | 20             | 1650                                                    | 0.053                                     | 0.8               | 7.5              | 7.5                  | EEUTA1H471( )    | 100                     | 250             |
|             |                         | 18           | 15             | 1710                                                    | 0.075                                     | 0.8               | 7.5              | 7.5                  | EEUTA1H471S( )   | 100                     | 250             |
|             | 1000                    | 16           | 31.5           | 2430                                                    | 0.031                                     | 0.8               | 7.5              |                      | EEUTA1H102       | 100                     |                 |
|             |                         | 18           | 25             | 2350                                                    | 0.032                                     | 0.8               | 7.5              | 7.5                  | EEUTA1H102S( )   | 100                     | 250             |
| 63          | 22                      | 8            | 11.5           | 310                                                     | 0.470                                     | 0.6               | 3.5              | 5.0                  | EEUTA1J220( )    | 200                     | 1000            |
|             | 33                      | 10           | 12.5           | 410                                                     | 0.360                                     | 0.6               | 5.0              | 5.0                  | EEUTA1J330( )    | 200                     | 500             |
|             | 47                      | 10           | 16             | 460                                                     | 0.270                                     | 0.6               | 5.0              | 5.0                  | EEUTA1J470( )    | 200                     | 500             |
|             | 100                     | 10           | 20             | 680                                                     | 0.205                                     | 0.6               | 5.0              | 5.0                  | EEUTA1J101( )    | 200                     | 500             |
|             | 220                     | 12.5         | 25             | 1325                                                    | 0.100                                     | 0.6               | 5.0              | 5.0                  | EEUTA1J221L( )   | 200                     | 500             |
|             |                         | 16           | 20             | 1360                                                    | 0.085                                     | 0.8               | 7.5              | 7.5                  | EEUTA1J221( )    | 100                     | 250             |
|             |                         | 18           | 15             | 1300                                                    | 0.120                                     | 0.8               | 7.5              | 7.5                  | EEUTA1J221S( )   | 100                     | 250             |
|             | 330                     | 16           | 25             | 1660                                                    | 0.070                                     | 0.8               | 7.5              | 7.5                  | EEUTA1J331( )    | 100                     | 250             |
|             |                         | 18           | 20             | 1760                                                    | 0.077                                     | 0.8               | 7.5              | 7.5                  | EEUTA1J331S( )   | 100                     | 250             |
|             | 470                     | 16           | 31.5           | 2055                                                    | 0.060                                     | 0.8               | 7.5              |                      | EEUTA1J471       | 100                     |                 |
|             |                         | 18           | 25             | 1990                                                    | 0.060                                     | 0.8               | 7.5              | 7.5                  | EEUTA1J471S( )   | 100                     | 250             |

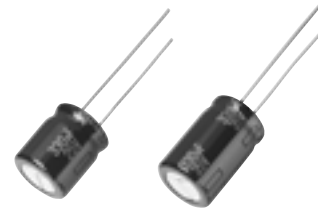
· When requesting taped product, please put the letter "B" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm.

· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 31/Mar/2015

### Radial Lead Type

Series: **TP** Type: **A**



#### ■ Features

- Endurance: 125 °C 2000 h to 5000 h or 135 °C 1000 h to 2000 h
- Smaller than series TA
- High ripple current (at high frequency) : 20 to 40% higher than TA series
- AEC-Q200 qualified\*
- RoHS directive compliant

#### ■ Specifications

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                            |                                    |      |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------|
| Category Temp. Range                                                              | -40 °C to + 135 °C                                                                                                                                                                                                                                                                                                                                                         |                                    |      |
| Rated W.V. Range                                                                  | 25 V .DC to 35 V .DC                                                                                                                                                                                                                                                                                                                                                       |                                    |      |
| Nominal Cap. Range                                                                | 100 μF to 5100 μF                                                                                                                                                                                                                                                                                                                                                          |                                    |      |
| Capacitance Tolerance                                                             | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                                                                                                                      |                                    |      |
| DC Leakage Current                                                                | I ≤ 0.01 CV After 2 minutes                                                                                                                                                                                                                                                                                                                                                |                                    |      |
| tan δ                                                                             | W.V.(V)                                                                                                                                                                                                                                                                                                                                                                    | 25                                 | 35   |
|                                                                                   | tan δ                                                                                                                                                                                                                                                                                                                                                                      | 0.14                               | 0.12 |
| (120Hz / +20 °C)<br>For capacitance value ≥ 1000 μF , add 0.02 per every 1000 μF. |                                                                                                                                                                                                                                                                                                                                                                            |                                    |      |
| Endurance 1                                                                       | After following life test with DC voltage and +125 °C±2 °C ripple current value applied. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.<br>Duration<br>φ8 : 2000 hours, φ10 : 3000 hours, φ12.5 : 4000 hours, φ16 to φ18 : 5000 hours |                                    |      |
|                                                                                   | Capacitance change                                                                                                                                                                                                                                                                                                                                                         | ±30% of initial measured value     |      |
|                                                                                   | tan δ                                                                                                                                                                                                                                                                                                                                                                      | ≤ 300 % of initial specified value |      |
|                                                                                   | DC leakage current                                                                                                                                                                                                                                                                                                                                                         | ≤ initial specified value          |      |
| Endurance 2                                                                       | After following life test with DC voltage and +135 °C±2 °C ripple current value applied. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.<br>Duration<br>φ8 : 1000 hours, φ10 to φ18 : 2000 hours                                       |                                    |      |
|                                                                                   | Capacitance change                                                                                                                                                                                                                                                                                                                                                         | ±30% of initial measured value     |      |
|                                                                                   | tan δ                                                                                                                                                                                                                                                                                                                                                                      | ≤ 300 % of initial specified value |      |
|                                                                                   | DC leakage current                                                                                                                                                                                                                                                                                                                                                         | ≤ initial specified value          |      |
| Shelf Life 1                                                                      | After storage for 1000 hours at +125 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                                                                                                                |                                    |      |
| Shelf Life 2                                                                      | After storage for 1000 hours at +135 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                                                                                                                |                                    |      |

#### ■ Frequency correction factor for ripple current

| W.V.<br>(V.DC) | Cap. (μF)   | Frequency (Hz) |      |      |      |       |
|----------------|-------------|----------------|------|------|------|-------|
|                |             | 60             | 120  | 1 k  | 10 k | 100 k |
| 25 to 35       | to 330      | 0.55           | 0.65 | 0.85 | 0.90 | 1.00  |
|                | 390 to 1000 | 0.70           | 0.75 | 0.90 | 0.95 | 1.00  |
|                | 1200 to     | 0.75           | 0.80 | 0.90 | 0.95 | 1.00  |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)

|              |     |     |      |     |     |
|--------------|-----|-----|------|-----|-----|
| Body Dia. φD | 8   | 10  | 12.5 | 16  | 18  |
| Lead Dia. φd | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |
| Lead space F | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |

\* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May, 2014

■ Standard Products

| W.V. | Cap.<br>(±20 %) | Case size |        | Specification                                           |                                                         |                                       |                                |                               |                               | Lead Length |            |                 | Part No.<br>* : Substandard<br>(E24series numbers) | Min. Packaging Q'ty |        |
|------|-----------------|-----------|--------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------------------|-------------------------------|-------------------------------|-------------|------------|-----------------|----------------------------------------------------|---------------------|--------|
|      |                 | Dia.      | Length | Ripple Current<br>(100 kHz)<br>(+125 °C)<br>(mA r.m.s.) | Ripple Current<br>(100 kHz)<br>(+135 °C)<br>(mA r.m.s.) | E.S.R<br>(100 kHz)<br>(+20 °C)<br>(Ω) | tan δ<br>(120 kHz)<br>(+20 °C) | 125 °C<br>Enduance<br>(hours) | 135 °C<br>Enduance<br>(hours) | Lead Dia.   | Lead Space |                 |                                                    | Straight Leads      | Taping |
|      |                 |           |        |                                                         |                                                         |                                       |                                |                               |                               |             | Straight   | Taping<br>*B    |                                                    |                     |        |
| (V)  | (μF)            | (mm)      | (mm)   |                                                         |                                                         |                                       |                                |                               |                               | (mm)        | (mm)       |                 |                                                    |                     |        |
| 25   | 220             | 10        | 12.5   | 580                                                     | 500                                                     | 0.190                                 | 0.14                           | 3000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1E221( )                                      | 200                 | 500    |
|      | 330             | 10        | 16     | 1100                                                    | 945                                                     | 0.130                                 | 0.14                           | 3000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1E331( )                                      | 200                 | 500    |
|      | 470             | 8         | 20     | 1060                                                    | 760                                                     | 0.067                                 | 0.14                           | 2000                          | 1000                          | 0.6         | 3.5        | 5.0             | EEUTP1E471L( )                                     | 200                 | 1000   |
|      |                 | 10        | 16     | 1100                                                    | 945                                                     | 0.130                                 | 0.14                           | 3000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1E471( )                                      | 200                 | 500    |
|      | 510             | 10        | 16     | 1100                                                    | 945                                                     | 0.130                                 | 0.14                           | 3000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1E511( )*                                     | 200                 | 500    |
|      | 820             | 10        | 20     | 1540                                                    | 1100                                                    | 0.052                                 | 0.14                           | 3000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1E821( )                                      | 200                 | 500    |
|      | 1000            | 12.5      | 20     | 1860                                                    | 1490                                                    | 0.038                                 | 0.14                           | 4000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1E102( )                                      | 200                 | 500    |
|      | 1200            | 12.5      | 20     | 1860                                                    | 1490                                                    | 0.038                                 | 0.14                           | 4000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1E122( )                                      | 200                 | 500    |
|      | 1800            | 12.5      | 25     | 2180                                                    | 1750                                                    | 0.030                                 | 0.14                           | 4000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1E182( )                                      | 200                 | 500    |
|      |                 | 16        | 20     | 2380                                                    | 1985                                                    | 0.029                                 | 0.14                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1E182S( )                                     | 100                 | 250    |
|      | 2000            | 16        | 20     | 2380                                                    | 1985                                                    | 0.029                                 | 0.16                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1E202S( )*                                    | 100                 | 250    |
|      | 2200            | 16        | 25     | 2760                                                    | 2300                                                    | 0.022                                 | 0.16                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1E222( )                                      | 100                 | 250    |
|      |                 | 18        | 20     | 2700                                                    | 2250                                                    | 0.028                                 | 0.16                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1E222S( )                                     | 100                 | 250    |
|      | 2700            | 16        | 25     | 2760                                                    | 2300                                                    | 0.022                                 | 0.16                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1E272( )                                      | 100                 | 250    |
|      |                 | 18        | 20     | 2700                                                    | 2250                                                    | 0.028                                 | 0.16                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1E272S( )                                     | 100                 | 250    |
|      | 3300            | 16        | 31.5   | 3250                                                    | 2710                                                    | 0.018                                 | 0.18                           | 5000                          | 2000                          | 0.8         | 7.5        |                 | EEUTP1E332                                         | 100                 |        |
|      |                 | 18        | 25     | 2960                                                    | 2470                                                    | 0.020                                 | 0.18                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1E332S( )                                     | 100                 | 250    |
|      | 3900            | 16        | 31.5   | 3250                                                    | 2710                                                    | 0.018                                 | 0.18                           | 5000                          | 2000                          | 0.8         | 7.5        |                 | EEUTP1E392                                         | 100                 |        |
|      |                 | 18        | 25     | 2960                                                    | 2470                                                    | 0.020                                 | 0.18                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1E392S( )                                     | 100                 | 250    |
|      | 4700            | 18        | 31.5   | 3480                                                    | 2900                                                    | 0.016                                 | 0.20                           | 5000                          | 2000                          | 0.8         | 7.5        |                 | EEUTP1E472                                         | 50                  |        |
| 5100 | 18              | 31.5      | 3480   | 2900                                                    | 0.016                                                   | 0.22                                  | 5000                           | 2000                          | 0.8                           | 7.5         |            | EEUTP1E512*     | 50                                                 |                     |        |
| 35   | 100             | 10        | 12.5   | 580                                                     | 500                                                     | 0.190                                 | 0.12                           | 3000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1V101( )                                      | 200                 | 500    |
|      | 120             | 10        | 12.5   | 580                                                     | 500                                                     | 0.190                                 | 0.12                           | 3000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1V121( )                                      | 200                 | 500    |
|      | 220             | 8         | 20     | 1060                                                    | 760                                                     | 0.067                                 | 0.12                           | 2000                          | 1000                          | 0.6         | 3.5        | 5.0             | EEUTP1V221L( )                                     | 200                 | 1000   |
|      |                 | 10        | 16     | 1100                                                    | 945                                                     | 0.130                                 | 0.12                           | 3000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1V221( )                                      | 200                 | 500    |
|      | 270             | 8         | 20     | 1060                                                    | 760                                                     | 0.067                                 | 0.12                           | 2000                          | 1000                          | 0.6         | 3.5        | 5.0             | EEUTP1V271L( )                                     | 200                 | 1000   |
|      |                 | 10        | 16     | 1100                                                    | 945                                                     | 0.130                                 | 0.12                           | 3000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1V271( )                                      | 200                 | 500    |
|      | 330             | 10        | 20     | 1540                                                    | 1100                                                    | 0.052                                 | 0.12                           | 3000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1V331( )                                      | 200                 | 500    |
|      | 390             | 10        | 20     | 1540                                                    | 1100                                                    | 0.052                                 | 0.12                           | 3000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1V391( )                                      | 200                 | 500    |
|      | 470             | 12.5      | 20     | 1860                                                    | 1490                                                    | 0.038                                 | 0.12                           | 4000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1V471( )                                      | 200                 | 500    |
|      | 560             | 12.5      | 20     | 1860                                                    | 1490                                                    | 0.038                                 | 0.12                           | 4000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1V561( )                                      | 200                 | 500    |
|      | 620             | 12.5      | 20     | 1860                                                    | 1490                                                    | 0.038                                 | 0.12                           | 4000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1V621( )*                                     | 200                 | 500    |
|      | 820             | 12.5      | 25     | 2180                                                    | 1750                                                    | 0.030                                 | 0.12                           | 4000                          | 2000                          | 0.6         | 5.0        | 5.0             | EEUTP1V821( )                                      | 200                 | 500    |
|      | 1000            | 16        | 20     | 2380                                                    | 1985                                                    | 0.029                                 | 0.12                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1V102( )                                      | 100                 | 250    |
|      | 1200            | 16        | 20     | 2380                                                    | 1985                                                    | 0.029                                 | 0.12                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1V122( )                                      | 100                 | 250    |
|      | 1500            | 16        | 25     | 2760                                                    | 2300                                                    | 0.022                                 | 0.12                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1V152( )                                      | 100                 | 250    |
|      |                 | 18        | 20     | 2700                                                    | 2250                                                    | 0.028                                 | 0.12                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1V152S( )                                     | 100                 | 250    |
|      | 1600            | 16        | 25     | 2760                                                    | 2300                                                    | 0.022                                 | 0.12                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1V162( )*                                     | 100                 | 250    |
|      | 1800            | 16        | 31.5   | 3250                                                    | 2710                                                    | 0.018                                 | 0.12                           | 5000                          | 2000                          | 0.8         | 7.5        |                 | EEUTP1V182                                         | 100                 |        |
|      |                 | 18        | 25     | 2960                                                    | 2470                                                    | 0.020                                 | 0.12                           | 5000                          | 2000                          | 0.8         | 7.5        | 7.5             | EEUTP1V182S( )                                     | 100                 | 250    |
|      | 2000            | 16        | 31.5   | 3250                                                    | 2710                                                    | 0.018                                 | 0.14                           | 5000                          | 2000                          | 0.8         | 7.5        |                 | EEUTP1V202*                                        | 100                 |        |
| 18   |                 | 25        | 2960   | 2470                                                    | 0.020                                                   | 0.14                                  | 5000                           | 2000                          | 0.8                           | 7.5         | 7.5        | EEUTP1V202S( )* | 100                                                | 250                 |        |
| 2200 | 18              | 31.5      | 3480   | 2900                                                    | 0.016                                                   | 0.14                                  | 5000                           | 2000                          | 0.8                           | 7.5         |            | EEUTP1V222      | 50                                                 |                     |        |
| 2700 | 18              | 31.5      | 3480   | 2900                                                    | 0.016                                                   | 0.14                                  | 5000                           | 2000                          | 0.8                           | 7.5         |            | EEUTP1V272      | 50                                                 |                     |        |

· When requesting taped product, please put the letter "B" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm.  
 · Please refer to the page of "Taping Dimensions".

### Radial Lead Type

Series: **NHG** Type: **A**



#### ■ Features

- Endurance : 105 °C 1000 h to 2000 h
- RoHS directive compliant

#### ■ Specifications

|                       |                                                                                                                                                                                                                                                                                                                                                                                                           |                                               |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Category Temp. Range  | -55 °C to +105 °C                                                                                                                                                                                                                                                                                                                                                                                         | -25 °C to +105 °C                             |
| Rated W.V. Range      | 6.3 V.DC to 100 V.DC                                                                                                                                                                                                                                                                                                                                                                                      | 160 V.DC to 450 V.DC                          |
| Nominal Cap. Range    | 2.2 μF to 22000 μF                                                                                                                                                                                                                                                                                                                                                                                        | 1 μF to 330 μF                                |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                                                                                                                                                     |                                               |
| DC Leakage Current    | $I \leq 0.01 CV$ or $3 (\mu A)$ After 2 minutes<br>(Which is greater)                                                                                                                                                                                                                                                                                                                                     | $I \leq 0.06 CV + 10 (\mu A)$ After 2 minutes |
| tan δ                 | Please see the attached standard products list                                                                                                                                                                                                                                                                                                                                                            |                                               |
| Endurance             | After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), When the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.<br><br>Duration : 6.3 V.DC to 100 V.DC : (φ5 to φ8)=1000 hours, (φ10 to φ18)=2000 hours<br>160 V.DC to 450 V.DC : 2000 hours |                                               |
|                       | Capacitance change                                                                                                                                                                                                                                                                                                                                                                                        | ±20 % of initial measured value               |
|                       | tan δ                                                                                                                                                                                                                                                                                                                                                                                                     | ≤ 200 % of initial specified value            |
|                       | DC leakage current                                                                                                                                                                                                                                                                                                                                                                                        | ≤ initial specified value                     |
| Shelf Life            | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                                                                                                                                               |                                               |

#### ■ Frequency correction factor for ripple current

| W.V.(V.DC) | Cap. (μF)     | Frequency (Hz) |      |      |      |       |
|------------|---------------|----------------|------|------|------|-------|
|            |               | 60             | 120  | 1 k  | 10 k | 100 k |
| 6.3 to 100 | 2.2 to 33     | 0.75           | 1.00 | 1.55 | 1.80 | 2.00  |
|            | 47 to 470     | 0.80           | 1.00 | 1.35 | 1.50 | 1.50  |
|            | 1000 to 22000 | 0.85           | 1.00 | 1.10 | 1.15 | 1.15  |
| 160 to 450 | 1 to 330      | 0.80           | 1.00 | 1.35 | 1.50 | 1.50  |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014



### Standard Products

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                          |                               |                      | Lead Length       |                  |                      |                      | Part No.      | Min. Packaging Qty      |                 |
|-------------|-------------------------|--------------|----------------|--------------------------------------------------------|-------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|---------------|-------------------------|-----------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+105 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |               | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                         |              |                |                                                        |                               |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*i<br>(mm) |               |                         |                 |
| 6.3         | 220                     | 5            | 11             | 140                                                    | 0.28                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA0JHG221( ) | 200                     | 2000            |
|             | 470                     | 6.3          | 11.2           | 230                                                    | 0.28                          | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA0JHG471( ) | 200                     | 2000            |
|             | 1000                    | 8            | 11.5           | 380                                                    | 0.28                          | 1000                 | 0.6               | 3.5              | 5.0                  |                      | ECA0JHG102( ) | 200                     | 1000            |
|             | 2200                    | 10           | 16             | 710                                                    | 0.30                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA0JHG222( ) | 200                     | 500             |
|             | 3300                    | 10           | 20             | 840                                                    | 0.32                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA0JHG332( ) | 200                     | 500             |
|             | 4700                    | 12.5         | 20             | 1090                                                   | 0.34                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA0JHG472( ) | 200                     | 500             |
|             | 6800                    | 12.5         | 25             | 1350                                                   | 0.38                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA0JHG682( ) | 200                     | 500             |
|             | 10000                   | 16           | 25             | 1650                                                   | 0.46                          | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA0JHG103( ) | 100                     | 250             |
|             | 15000                   | 16           | 31.5           | 2010                                                   | 0.56                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA0JHG153    | 100                     |                 |
| 10          | 22000                   | 18           | 35.5           | 2350                                                   | 0.70                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA0JHG223    | 50                      |                 |
|             | 330                     | 6.3          | 11.2           | 200                                                    | 0.24                          | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA1AHG331( ) | 200                     | 2000            |
|             | 470                     | 8            | 11.5           | 250                                                    | 0.24                          | 1000                 | 0.6               | 3.5              | 5.0                  |                      | ECA1AHG471( ) | 200                     | 1000            |
|             | 1000                    | 10           | 12.5           | 460                                                    | 0.24                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1AHG102( ) | 200                     | 500             |
|             | 2200                    | 10           | 20             | 760                                                    | 0.26                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1AHG222( ) | 200                     | 500             |
|             | 3300                    | 12.5         | 20             | 1000                                                   | 0.28                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1AHG332( ) | 200                     | 500             |
|             | 4700                    | 12.5         | 25             | 1260                                                   | 0.30                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1AHG472( ) | 200                     | 500             |
|             | 6800                    | 16           | 25             | 1570                                                   | 0.34                          | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA1AHG682( ) | 100                     | 250             |
|             | 10000                   | 16           | 31.5           | 1890                                                   | 0.42                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA1AHG103    | 100                     |                 |
| 16          | 15000                   | 18           | 35.5           | 2180                                                   | 0.52                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA1AHG153    | 50                      |                 |
|             | 100                     | 5            | 11             | 110                                                    | 0.20                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1CHG101( ) | 200                     | 2000            |
|             | 220                     | 6.3          | 11.2           | 180                                                    | 0.20                          | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA1CHG221( ) | 200                     | 2000            |
|             | 330                     | 8            | 11.5           | 260                                                    | 0.20                          | 1000                 | 0.6               | 3.5              | 5.0                  |                      | ECA1CHG331( ) | 200                     | 1000            |
|             | 470                     | 8            | 11.5           | 310                                                    | 0.20                          | 1000                 | 0.6               | 3.5              | 5.0                  |                      | ECA1CHG471( ) | 200                     | 1000            |
|             | 1000                    | 10           | 16             | 560                                                    | 0.20                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1CHG102( ) | 200                     | 500             |
|             | 2200                    | 12.5         | 20             | 920                                                    | 0.22                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1CHG222( ) | 200                     | 500             |
|             | 3300                    | 12.5         | 25             | 1170                                                   | 0.24                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1CHG332( ) | 200                     | 500             |
|             | 4700                    | 16           | 25             | 1480                                                   | 0.26                          | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA1CHG472( ) | 100                     | 250             |
|             | 6800                    | 16           | 31.5           | 1780                                                   | 0.30                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA1CHG682    | 100                     |                 |
| 25          | 10000                   | 18           | 35.5           | 2060                                                   | 0.38                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA1CHG103    | 50                      |                 |
|             | 47                      | 5            | 11             | 91                                                     | 0.16                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1EHG470( ) | 200                     | 2000            |
|             | 100                     | 6.3          | 11.2           | 130                                                    | 0.16                          | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA1EHG101( ) | 200                     | 2000            |
|             | 220                     | 8            | 11.5           | 230                                                    | 0.16                          | 1000                 | 0.6               | 3.5              | 5.0                  |                      | ECA1EHG221( ) | 200                     | 1000            |
|             | 330                     | 8            | 11.5           | 310                                                    | 0.16                          | 1000                 | 0.6               | 3.5              | 5.0                  |                      | ECA1EHG331( ) | 200                     | 1000            |
|             | 470                     | 10           | 12.5           | 380                                                    | 0.16                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1EHG471( ) | 200                     | 500             |
|             | 1000                    | 10           | 20             | 680                                                    | 0.16                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1EHG102( ) | 200                     | 500             |
|             | 2200                    | 12.5         | 25             | 1090                                                   | 0.18                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1EHG222( ) | 200                     | 500             |
|             | 3300                    | 16           | 25             | 1400                                                   | 0.20                          | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA1EHG332( ) | 100                     | 250             |
|             | 4700                    | 16           | 31.5           | 1750                                                   | 0.22                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA1EHG472    | 100                     |                 |
| 35          | 6800                    | 18           | 35.5           | 2040                                                   | 0.26                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA1EHG682    | 50                      |                 |
|             | 47                      | 5            | 11             | 90                                                     | 0.14                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1VHG470( ) | 200                     | 2000            |
|             | 100                     | 6.3          | 11.2           | 150                                                    | 0.14                          | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA1VHG101( ) | 200                     | 2000            |
|             | 220                     | 8            | 11.5           | 270                                                    | 0.14                          | 1000                 | 0.6               | 3.5              | 5.0                  |                      | ECA1VHG221( ) | 200                     | 1000            |
|             | 330                     | 10           | 12.5           | 350                                                    | 0.14                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1VHG331( ) | 200                     | 500             |
|             | 470                     | 10           | 16             | 460                                                    | 0.14                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1VHG471( ) | 200                     | 500             |
|             | 1000                    | 12.5         | 20             | 810                                                    | 0.14                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1VHG102( ) | 200                     | 500             |
|             | 2200                    | 16           | 25             | 1260                                                   | 0.16                          | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA1VHG222( ) | 100                     | 250             |
|             | 3300                    | 16           | 31.5           | 1610                                                   | 0.18                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA1VHG332    | 100                     |                 |
|             | 4700                    | 18           | 35.5           | 1910                                                   | 0.20                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA1VHG472    | 50                      |                 |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, i=2.5 mm.  
 · Please refer to the page of "Taping Dimensions".

### Standard Products

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                          |                               |                      | Lead Length       |                  |                      |                      | Part No.         | Min. Packaging Qty      |                 |
|-------------|-------------------------|--------------|----------------|--------------------------------------------------------|-------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|------------------|-------------------------|-----------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+105 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                  | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                         |              |                |                                                        |                               |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*i<br>(mm) |                  |                         |                 |
| 50          | 0.1                     | 5            | 11             | 1.1                                                    | 0.12                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1HHG0R1( )*** | 200                     | 2000            |
|             | 0.22                    | 5            | 11             | 2.3                                                    | 0.12                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1HHGR22( )*** | 200                     | 2000            |
|             | 0.33                    | 5            | 11             | 3.5                                                    | 0.12                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1HHGR33( )*** | 200                     | 2000            |
|             | 0.47                    | 5            | 11             | 5                                                      | 0.12                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1HHGR47( )*** | 200                     | 2000            |
|             | 1                       | 5            | 11             | 10                                                     | 0.12                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1HHG010( )*** | 200                     | 2000            |
|             | 2.2                     | 5            | 11             | 18                                                     | 0.12                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1HHG2R2( )    | 200                     | 2000            |
|             | 3.3                     | 5            | 11             | 22                                                     | 0.12                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1HHG3R3( )    | 200                     | 2000            |
|             | 4.7                     | 5            | 11             | 26                                                     | 0.12                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1HHG4R7( )    | 200                     | 2000            |
|             | 10                      | 5            | 11             | 39                                                     | 0.12                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1HHG100( )    | 200                     | 2000            |
|             | 22                      | 5            | 11             | 65                                                     | 0.12                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1HHG220( )    | 200                     | 2000            |
|             | 33                      | 5            | 11             | 90                                                     | 0.12                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1HHG330( )    | 200                     | 2000            |
|             | 47                      | 6.3          | 11.2           | 110                                                    | 0.12                          | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA1HHG470( )    | 200                     | 2000            |
|             | 100                     | 8            | 11.5           | 180                                                    | 0.12                          | 1000                 | 0.6               | 3.5              | 5.0                  |                      | ECA1HHG101( )    | 200                     | 1000            |
|             | 220                     | 10           | 12.5           | 300                                                    | 0.12                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1HHG221( )    | 200                     | 500             |
|             | 330                     | 10           | 16             | 410                                                    | 0.12                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1HHG331( )    | 200                     | 500             |
|             | 470                     | 10           | 20             | 530                                                    | 0.12                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1HHG471( )    | 200                     | 500             |
|             | 1000                    | 12.5         | 25             | 950                                                    | 0.12                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1HHG102( )    | 200                     | 500             |
| 2200        | 16                      | 31.5         | 1470           | 0.14                                                   | 2000                          | 0.8                  | 7.5               |                  |                      | ECA1HHG222           | 100              |                         |                 |
| 3300        | 18                      | 35.5         | 1770           | 0.16                                                   | 2000                          | 0.8                  | 7.5               |                  |                      | ECA1HHG332           | 50               |                         |                 |
| 63          | 10                      | 5            | 11             | 46                                                     | 0.10                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1JHG100( )    | 200                     | 2000            |
|             | 22                      | 5            | 11             | 71                                                     | 0.10                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA1JHG220( )    | 200                     | 2000            |
|             | 33                      | 6.3          | 11.2           | 100                                                    | 0.10                          | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA1JHG330( )    | 200                     | 2000            |
|             | 47                      | 6.3          | 11.2           | 120                                                    | 0.10                          | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA1JHG470( )    | 200                     | 2000            |
|             | 100                     | 10           | 12.5           | 215                                                    | 0.10                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1JHG101( )    | 200                     | 500             |
|             | 220                     | 10           | 16             | 335                                                    | 0.10                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1JHG221( )    | 200                     | 500             |
|             | 330                     | 10           | 20             | 510                                                    | 0.10                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1JHG331( )    | 200                     | 500             |
|             | 470                     | 12.5         | 20             | 640                                                    | 0.10                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA1JHG471( )    | 200                     | 500             |
|             | 1000                    | 16           | 25             | 930                                                    | 0.10                          | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA1JHG102( )    | 100                     | 250             |
|             | 2200                    | 18           | 35.5           | 1610                                                   | 0.12                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA1JHG222       | 50                      |                 |
| 100         | 0.47                    | 5            | 11             | 9                                                      | 0.08                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA2AHGR47( )*** | 200                     | 2000            |
|             | 1                       | 5            | 11             | 14                                                     | 0.08                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA2AHG010( )*** | 200                     | 2000            |
|             | 2.2                     | 5            | 11             | 21                                                     | 0.08                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA2AHG2R2( )    | 200                     | 2000            |
|             | 3.3                     | 5            | 11             | 31                                                     | 0.08                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA2AHG3R3( )    | 200                     | 2000            |
|             | 4.7                     | 5            | 11             | 38                                                     | 0.08                          | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | ECA2AHG4R7( )    | 200                     | 2000            |
|             | 10                      | 6.3          | 11.2           | 54                                                     | 0.08                          | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2AHG100( )    | 200                     | 2000            |
|             | 22                      | 6.3          | 11.2           | 93                                                     | 0.08                          | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2AHG220( )    | 200                     | 2000            |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 31/Mar/2015

### Standard Products

| W.V.<br>(V) | Cap.<br>( $\pm 20\%$ )<br>( $\mu\text{F}$ ) | Case size    |                | Specification                                          |                                       |                      | Lead Length       |                  |                      |                      | Part No.      | Min. Packaging Qty      |                 |
|-------------|---------------------------------------------|--------------|----------------|--------------------------------------------------------|---------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|---------------|-------------------------|-----------------|
|             |                                             | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+105 °C)<br>(mA r.m.s.) | $\tan \delta$<br>(120 Hz)<br>(+20 °C) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |               | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                             |              |                |                                                        |                                       |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*i<br>(mm) |               |                         |                 |
| 100         | 33                                          | 8            | 11.5           | 130                                                    | 0.08                                  | 1000                 | 0.6               | 3.5              | 5.0                  |                      | ECA2AHG330( ) | 200                     | 1000            |
|             | 47                                          | 10           | 12.5           | 165                                                    | 0.08                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2AHG470( ) | 200                     | 500             |
|             | 100                                         | 10           | 20             | 265                                                    | 0.08                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2AHG101( ) | 200                     | 500             |
|             | 220                                         | 12.5         | 25             | 440                                                    | 0.08                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2AHG221( ) | 200                     | 500             |
|             | 330                                         | 16           | 25             | 540                                                    | 0.08                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA2AHG331( ) | 100                     | 250             |
|             | 470                                         | 16           | 25             | 715                                                    | 0.08                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA2AHG471( ) | 100                     | 250             |
|             | 1000                                        | 18           | 35.5           | 985                                                    | 0.08                                  | 2000                 | 0.8               | 7.5              |                      |                      | ECA2AHG102    | 50                      |                 |
| 160         | 1                                           | 6.3          | 11.2           | 17                                                     | 0.15                                  | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2CHG010( ) | 200                     | 2000            |
|             | 2.2                                         | 6.3          | 11.2           | 25                                                     | 0.15                                  | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2CHG2R2( ) | 200                     | 2000            |
|             | 3.3                                         | 6.3          | 11.2           | 36                                                     | 0.15                                  | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2CHG3R3( ) | 200                     | 2000            |
|             | 4.7                                         | 6.3          | 11.2           | 43                                                     | 0.15                                  | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2CHG4R7( ) | 200                     | 2000            |
|             | 10                                          | 10           | 12.5           | 70                                                     | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2CHG100( ) | 200                     | 500             |
|             | 22                                          | 10           | 20             | 130                                                    | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2CHG220( ) | 200                     | 500             |
|             | 33                                          | 10           | 20             | 180                                                    | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2CHG330( ) | 200                     | 500             |
|             | 47                                          | 12.5         | 20             | 220                                                    | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2CHG470( ) | 200                     | 500             |
|             | 100                                         | 16           | 25             | 335                                                    | 0.15                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA2CHG101( ) | 100                     | 250             |
|             | 220                                         | 16           | 31.5           | 540                                                    | 0.15                                  | 2000                 | 0.8               | 7.5              |                      |                      | ECA2CHG221    | 100                     |                 |
| 330         | 18                                          | 31.5         | 705            | 0.15                                                   | 2000                                  | 0.8                  | 7.5               |                  |                      | ECA2CHG331           | 50            |                         |                 |
| 200         | 1                                           | 6.3          | 11.2           | 17                                                     | 0.15                                  | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2DHG010( ) | 200                     | 2000            |
|             | 2.2                                         | 6.3          | 11.2           | 25                                                     | 0.15                                  | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2DHG2R2( ) | 200                     | 2000            |
|             | 3.3                                         | 6.3          | 11.2           | 36                                                     | 0.15                                  | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2DHG3R3( ) | 200                     | 2000            |
|             | 4.7                                         | 8            | 11.5           | 50                                                     | 0.15                                  | 2000                 | 0.6               | 3.5              | 5.0                  |                      | ECA2DHG4R7( ) | 200                     | 1000            |
|             | 10                                          | 10           | 16             | 80                                                     | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2DHG100( ) | 200                     | 500             |
|             | 22                                          | 10           | 20             | 140                                                    | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2DHG220( ) | 200                     | 500             |
|             | 33                                          | 12.5         | 20             | 190                                                    | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2DHG330( ) | 200                     | 500             |
|             | 47                                          | 12.5         | 20             | 220                                                    | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2DHG470( ) | 200                     | 500             |
|             | 100                                         | 16           | 25             | 335                                                    | 0.15                                  | 2000                 | 0.8               | 7.5              | 7.5                  | 2.5                  | ECA2DHG101( ) | 100                     | 250             |
|             | 220                                         | 18           | 31.5           | 575                                                    | 0.15                                  | 2000                 | 0.8               | 7.5              |                      |                      | ECA2DHG221    | 50                      |                 |
| 250         | 1                                           | 6.3          | 11.2           | 17                                                     | 0.15                                  | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2EHG010( ) | 200                     | 2000            |
|             | 2.2                                         | 6.3          | 11.2           | 29                                                     | 0.15                                  | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2EHG2R2( ) | 200                     | 2000            |
|             | 3.3                                         | 8            | 11.5           | 42                                                     | 0.15                                  | 2000                 | 0.6               | 3.5              | 5.0                  |                      | ECA2EHG3R3    | 200                     | 1000            |
|             | 4.7                                         | 8            | 11.5           | 50                                                     | 0.15                                  | 2000                 | 0.6               | 3.5              | 5.0                  |                      | ECA2EHG4R7( ) | 200                     | 1000            |
|             | 10                                          | 10           | 16             | 88                                                     | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2EHG100( ) | 200                     | 500             |
|             | 22                                          | 12.5         | 20             | 155                                                    | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2EHG220( ) | 200                     | 500             |
|             | 33                                          | 12.5         | 20             | 190                                                    | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2EHG330( ) | 200                     | 500             |
|             | 47                                          | 12.5         | 25             | 230                                                    | 0.15                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2EHG470( ) | 200                     | 500             |
|             | 100                                         | 16           | 31.5           | 365                                                    | 0.15                                  | 2000                 | 0.8               | 7.5              |                      |                      | ECA2EHG101    | 100                     |                 |
| 350         | 1                                           | 6.3          | 11.2           | 18                                                     | 0.20                                  | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2VHG010( ) | 200                     | 2000            |
|             | 2.2                                         | 8            | 11.5           | 31                                                     | 0.20                                  | 2000                 | 0.6               | 3.5              | 5.0                  |                      | ECA2VHG2R2( ) | 200                     | 1000            |
|             | 3.3                                         | 10           | 12.5           | 38                                                     | 0.20                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2VHG3R3( ) | 200                     | 500             |
|             | 4.7                                         | 10           | 16             | 50                                                     | 0.20                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2VHG4R7( ) | 200                     | 500             |
|             | 10                                          | 10           | 20             | 82                                                     | 0.20                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2VHG100( ) | 200                     | 500             |
|             | 22                                          | 12.5         | 20             | 130                                                    | 0.20                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2VHG220( ) | 200                     | 500             |
|             | 33                                          | 16           | 25             | 195                                                    | 0.20                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA2VHG330( ) | 100                     | 250             |
|             | 47                                          | 16           | 25             | 230                                                    | 0.20                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA2VHG470( ) | 100                     | 250             |
|             | 100                                         | 18           | 31.5           | 375                                                    | 0.20                                  | 2000                 | 0.8               | 7.5              |                      |                      | ECA2VHG101    | 50                      |                 |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, i=2.5 mm.  
 · Please refer to the page of "Taping Dimensions".

### ■ Standard Products

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                          |                               |                      | Lead Length       |                  |                      |                      | Part No.      | Min. Packaging Q'ty     |                 |
|-------------|-------------------------|--------------|----------------|--------------------------------------------------------|-------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|---------------|-------------------------|-----------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+105 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |               | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                         |              |                |                                                        |                               |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*i<br>(mm) |               |                         |                 |
| 400         | 1                       | 6.3          | 11.2           | 18                                                     | 0.24                          | 2000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2GHG010( ) | 200                     | 2000            |
|             | 2.2                     | 8            | 11.5           | 30                                                     | 0.24                          | 2000                 | 0.6               | 3.5              | 5.0                  |                      | ECA2GHG2R2( ) | 200                     | 1000            |
|             | 3.3                     | 10           | 12.5           | 40                                                     | 0.24                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2GHG3R3( ) | 200                     | 500             |
|             | 4.7                     | 10           | 16             | 50                                                     | 0.24                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2GHG4R7( ) | 200                     | 500             |
|             | 10                      | 10           | 20             | 80                                                     | 0.24                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2GHG100( ) | 200                     | 500             |
|             | 22                      | 12.5         | 25             | 145                                                    | 0.24                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2GHG220( ) | 200                     | 500             |
|             | 33                      | 16           | 25             | 195                                                    | 0.24                          | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA2GHG330( ) | 100                     | 250             |
| 450         | 47                      | 16           | 31.5           | 250                                                    | 0.24                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA2GHG470    | 100                     |                 |
|             | 1                       | 8            | 11.5           | 18                                                     | 0.24                          | 2000                 | 0.6               | 3.5              | 5.0                  |                      | ECA2WHG010( ) | 200                     | 1000            |
|             | 2.2                     | 10           | 12.5           | 29                                                     | 0.24                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2WHG2R2( ) | 200                     | 500             |
|             | 3.3                     | 10           | 16             | 41                                                     | 0.24                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2WHG3R3( ) | 200                     | 500             |
|             | 4.7                     | 10           | 20             | 49                                                     | 0.24                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2WHG4R7( ) | 200                     | 500             |
|             | 10                      | 12.5         | 20             | 75                                                     | 0.24                          | 2000                 | 0.6               | 5.0              | 5.0                  |                      | ECA2WHG100( ) | 200                     | 500             |
|             | 22                      | 16           | 25             | 115                                                    | 0.24                          | 2000                 | 0.8               | 7.5              | 7.5                  |                      | ECA2WHG220( ) | 100                     | 250             |
|             | 33                      | 16           | 31.5           | 155                                                    | 0.24                          | 2000                 | 0.8               | 7.5              |                      |                      | ECA2WHG330    | 100                     |                 |

- When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, i=2.5 mm.
- Please refer to the page of "Taping Dimensions".

### Radial Lead Type

Series: **HD** Type: **A**



#### ■ Features

- Endurance : 105 °C 1000 h to 2000 h
- Minaturize, Higher Capacitance :  
1 Size Miniturized Product of Current A-NHG
- RoHS directive compliant

#### ■ Specifications

|                       |                                                                                                                                                                                                                                                                                                                                           |                                    |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Category Temp. Range  | -55 °C to +105 °C                                                                                                                                                                                                                                                                                                                         |                                    |
| Rated W.V. Range      | 10 V.DC to 50 V.DC                                                                                                                                                                                                                                                                                                                        |                                    |
| Nominal Cap. Range    | 2.2 μF to 22000 μF                                                                                                                                                                                                                                                                                                                        |                                    |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                                                                                     |                                    |
| DC Leakage Current    | $I \leq 0.01 CV$ or 3 (μA) After 2 minutes<br>(Which is greater)                                                                                                                                                                                                                                                                          |                                    |
| tan δ                 | Please see the attached standard products list                                                                                                                                                                                                                                                                                            |                                    |
| Endurance             | After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), When the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.<br><br>Duration : φ5 to φ8=1000 hours, φ10 to φ18=2000 hours |                                    |
|                       | Capacitance change                                                                                                                                                                                                                                                                                                                        | ±20 % of initial measured value    |
|                       | tan δ                                                                                                                                                                                                                                                                                                                                     | ≤ 200 % of initial specified value |
|                       | DC leakage current                                                                                                                                                                                                                                                                                                                        | ≤ initial specified value          |
| Shelf Life            | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                                                                               |                                    |

#### ■ Frequency correction factor for ripple current

| W.V.(V.DC) | Cap. (μF)     | Frequency (Hz) |      |      |      |       |
|------------|---------------|----------------|------|------|------|-------|
|            |               | 60             | 120  | 1 k  | 10 k | 100 k |
| 10 to 50   | 2.2 to 33     | 0.75           | 1.00 | 1.55 | 1.80 | 2.00  |
|            | 47 to 470     | 0.80           | 1.00 | 1.35 | 1.50 | 1.50  |
|            | 1000 to 22000 | 0.85           | 1.00 | 1.10 | 1.15 | 1.15  |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

### Standard Products

Endurance : 105 °C  $\phi 5$  to  $\phi 8$ =1000 h,  $\phi 10$  to  $\phi 18$ =2000 h

| W.V.<br>(V) | Cap.<br>( $\pm 20\%$ )<br>( $\mu\text{F}$ ) | Case size    |                | Specification                                          |                                       |                      | Lead Length       |                  |                      |                      | Part No.      | Min. Packaging Qty      |                 |
|-------------|---------------------------------------------|--------------|----------------|--------------------------------------------------------|---------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|---------------|-------------------------|-----------------|
|             |                                             | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+105 °C)<br>(mA r.m.s.) | $\tan \delta$<br>(120 Hz)<br>(+20 °C) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |               | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                             |              |                |                                                        |                                       |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |               |                         |                 |
| 10          | 330                                         | 6.3          | 11.2           | 200                                                    | 0.24                                  | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUHD1A331( ) | 200                     | 2000            |
|             | 470                                         | 8            | 11.5           | 250                                                    | 0.24                                  | 1000                 | 0.6               | 3.5              | 5.0                  |                      | EEUHD1A471( ) | 200                     | 1000            |
|             | 1000                                        | 10           | 12.5           | 460                                                    | 0.24                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1A102( ) | 200                     | 500             |
|             | 2200                                        | 10           | 16             | 760                                                    | 0.26                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1A222( ) | 200                     | 500             |
|             | 4700                                        | 12.5         | 20             | 1260                                                   | 0.30                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1A472( ) | 200                     | 500             |
|             | 6800                                        | 12.5         | 25             | 1570                                                   | 0.34                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1A682( ) | 200                     | 500             |
|             | 10000                                       | 16           | 25             | 1890                                                   | 0.42                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | EEUHD1A103( ) | 100                     | 250             |
|             | 15000                                       | 16           | 31.5           | 2180                                                   | 0.52                                  | 2000                 | 0.8               | 7.5              |                      |                      | EEUHD1A153    | 100                     |                 |
| 16          | 22000                                       | 18           | 35.5           | 2400                                                   | 0.66                                  | 2000                 | 0.8               | 7.5              |                      |                      | EEUHD1A223    | 50                      |                 |
|             | 100                                         | 5            | 11             | 110                                                    | 0.20                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1C101( ) | 200                     | 2000            |
|             | 220                                         | 6.3          | 11.2           | 180                                                    | 0.20                                  | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUHD1C221( ) | 200                     | 2000            |
|             | 330                                         | 8            | 11.5           | 260                                                    | 0.20                                  | 1000                 | 0.6               | 3.5              | 5.0                  |                      | EEUHD1C331( ) | 200                     | 1000            |
|             | 470                                         | 8            | 11.5           | 310                                                    | 0.20                                  | 1000                 | 0.6               | 3.5              | 5.0                  |                      | EEUHD1C471( ) | 200                     | 1000            |
|             | 3300                                        | 12.5         | 20             | 1170                                                   | 0.24                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1C332( ) | 200                     | 500             |
|             | 4700                                        | 12.5         | 25             | 1480                                                   | 0.26                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1C472( ) | 200                     | 500             |
|             | 6800                                        | 16           | 25             | 1780                                                   | 0.30                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | EEUHD1C682( ) | 100                     | 250             |
|             | 8200                                        | 16           | 25             | 1780                                                   | 0.34                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | EEUHD1C822( ) | 100                     | 250             |
|             | 10000                                       | 16           | 31.5           | 2060                                                   | 0.38                                  | 2000                 | 0.8               | 7.5              |                      |                      | EEUHD1C103    | 100                     |                 |
| 25          | 15000                                       | 18           | 35.5           | 2210                                                   | 0.48                                  | 2000                 | 0.8               | 7.5              |                      |                      | EEUHD1C153    | 50                      |                 |
|             | 47                                          | 5            | 11             | 91                                                     | 0.16                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1E470( ) | 200                     | 2000            |
|             | 68                                          | 5            | 11             | 91                                                     | 0.16                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1E680( ) | 200                     | 2000            |
|             | 100                                         | 6.3          | 11.2           | 130                                                    | 0.16                                  | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUHD1E101( ) | 200                     | 2000            |
|             | 220                                         | 8            | 11.5           | 230                                                    | 0.16                                  | 1000                 | 0.6               | 3.5              | 5.0                  |                      | EEUHD1E221( ) | 200                     | 1000            |
|             | 330                                         | 8            | 11.5           | 310                                                    | 0.16                                  | 1000                 | 0.6               | 3.5              | 5.0                  |                      | EEUHD1E331( ) | 200                     | 1000            |
|             | 470                                         | 10           | 12.5           | 380                                                    | 0.16                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1E471( ) | 200                     | 500             |
|             | 1000                                        | 10           | 16             | 680                                                    | 0.16                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1E102( ) | 200                     | 500             |
|             | 2200                                        | 12.5         | 20             | 1090                                                   | 0.18                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1E222( ) | 200                     | 500             |
|             | 3300                                        | 12.5         | 25             | 1400                                                   | 0.20                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1E332( ) | 200                     | 500             |
|             | 4700                                        | 16           | 25             | 1750                                                   | 0.22                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | EEUHD1E472( ) | 100                     | 250             |
|             | 5600                                        | 16           | 25             | 1750                                                   | 0.24                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | EEUHD1E562( ) | 100                     | 250             |
| 35          | 6800                                        | 16           | 31.5           | 2040                                                   | 0.26                                  | 2000                 | 0.8               | 7.5              |                      |                      | EEUHD1E682    | 100                     |                 |
|             | 10000                                       | 18           | 35.5           | 2200                                                   | 0.34                                  | 2000                 | 0.8               | 7.5              |                      |                      | EEUHD1E103    | 50                      |                 |
|             | 47                                          | 5            | 11             | 90                                                     | 0.14                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1V470( ) | 200                     | 2000            |
|             | 100                                         | 6.3          | 11.2           | 150                                                    | 0.14                                  | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUHD1V101( ) | 200                     | 2000            |
|             | 220                                         | 8            | 11.5           | 270                                                    | 0.14                                  | 1000                 | 0.6               | 3.5              | 5.0                  |                      | EEUHD1V221( ) | 200                     | 1000            |
|             | 330                                         | 10           | 12.5           | 350                                                    | 0.14                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1V331( ) | 200                     | 500             |
|             | 470                                         | 10           | 16             | 460                                                    | 0.14                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1V471( ) | 200                     | 500             |
|             | 680                                         | 10           | 16             | 460                                                    | 0.14                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1V681( ) | 200                     | 500             |
|             | 2200                                        | 12.5         | 25             | 1260                                                   | 0.16                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1V222( ) | 200                     | 500             |
|             | 3300                                        | 16           | 25             | 1610                                                   | 0.18                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | EEUHD1V332( ) | 100                     | 250             |
| 35          | 4700                                        | 16           | 31.5           | 1910                                                   | 0.20                                  | 2000                 | 0.8               | 7.5              |                      |                      | EEUHD1V472    | 100                     |                 |
|             | 6800                                        | 18           | 35.5           | 2050                                                   | 0.24                                  | 2000                 | 0.8               | 7.5              |                      |                      | EEUHD1V682    | 50                      |                 |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.  
 · Please refer to the page of "Taping Dimensions".

### Standard Products

Endurance : 105 °C  $\phi$ 5 to  $\phi$ 8=1000 h,  $\phi$ 10 to  $\phi$ 18=2000 h

| W.V.<br>(V) | Cap.<br>( $\pm$ 20 %)<br>( $\mu$ F) | Case size    |                | Specification                                          |                                       |                      | Lead Length       |                  |                      |                      | Part No.         | Min. Packaging Qty      |                 |
|-------------|-------------------------------------|--------------|----------------|--------------------------------------------------------|---------------------------------------|----------------------|-------------------|------------------|----------------------|----------------------|------------------|-------------------------|-----------------|
|             |                                     | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+105 °C)<br>(mA r.m.s.) | $\tan \delta$<br>(120 Hz)<br>(+20 °C) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                  | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                                     |              |                |                                                        |                                       |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*H<br>(mm) |                  |                         |                 |
| 50          | 0.1                                 | 5            | 11             | 1.1                                                    | 0.12                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1HR10( )*** | 200                     | 2000            |
|             | 0.22                                | 5            | 11             | 2.3                                                    | 0.12                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1HR22( )*** | 200                     | 2000            |
|             | 0.33                                | 5            | 11             | 3.5                                                    | 0.12                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1HR33( )*** | 200                     | 2000            |
|             | 0.47                                | 5            | 11             | 5                                                      | 0.12                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1HR47( )*** | 200                     | 2000            |
|             | 1                                   | 5            | 11             | 10                                                     | 0.12                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1H1R0( )*** | 200                     | 2000            |
|             | 2.2                                 | 5            | 11             | 18                                                     | 0.12                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1H2R2( )    | 200                     | 2000            |
|             | 3.3                                 | 5            | 11             | 22                                                     | 0.12                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1H3R3( )    | 200                     | 2000            |
|             | 4.7                                 | 5            | 11             | 26                                                     | 0.12                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1H4R7( )    | 200                     | 2000            |
|             | 10                                  | 5            | 11             | 39                                                     | 0.12                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1H100( )    | 200                     | 2000            |
|             | 22                                  | 5            | 11             | 65                                                     | 0.12                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1H220( )    | 200                     | 2000            |
|             | 33                                  | 5            | 11             | 90                                                     | 0.12                                  | 1000                 | 0.5               | 2.0              | 5.0                  | 2.5                  | EEUHD1H330( )    | 200                     | 2000            |
|             | 47                                  | 6.3          | 11.2           | 110                                                    | 0.12                                  | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUHD1H470( )    | 200                     | 2000            |
|             | 68                                  | 6.3          | 11.2           | 110                                                    | 0.12                                  | 1000                 | 0.5               | 2.5              | 5.0                  | 2.5                  | EEUHD1H680( )    | 200                     | 2000            |
|             | 100                                 | 8            | 11.5           | 180                                                    | 0.12                                  | 1000                 | 0.6               | 3.5              | 5.0                  |                      | EEUHD1H101( )    | 200                     | 1000            |
|             | 220                                 | 10           | 12.5           | 300                                                    | 0.12                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1H221( )    | 200                     | 500             |
|             | 330                                 | 10           | 16             | 410                                                    | 0.12                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1H331( )    | 200                     | 500             |
|             | 470                                 | 10           | 20             | 530                                                    | 0.12                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1H471( )    | 200                     | 500             |
|             | 560                                 | 16           | 15             | 650                                                    | 0.12                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | EEUHD1H561S( )   | 100                     | 250             |
|             | 680                                 | 16           | 15             | 650                                                    | 0.12                                  | 2000                 | 0.8               | 7.5              | 7.5                  |                      | EEUHD1H681S( )   | 100                     | 250             |
|             | 1000                                | 12.5         | 25             | 950                                                    | 0.12                                  | 2000                 | 0.6               | 5.0              | 5.0                  |                      | EEUHD1H102( )    | 200                     | 500             |
| 2200        | 16                                  | 31.5         | 1470           | 0.14                                                   | 2000                                  | 0.8                  | 7.5               |                  |                      | EEUHD1H222           | 100              |                         |                 |
| 3300        | 18                                  | 35.5         | 1770           | 0.16                                                   | 2000                                  | 0.8                  | 7.5               |                  |                      | EEUHD1H332           | 50               |                         |                 |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 31/Mar/2015

### Radial Lead Type

Series: **GA** Type: **A**

#### ■ Features

- Endurance : 105 °C 1000 h
- RoHS directive compliant



#### ■ Specifications

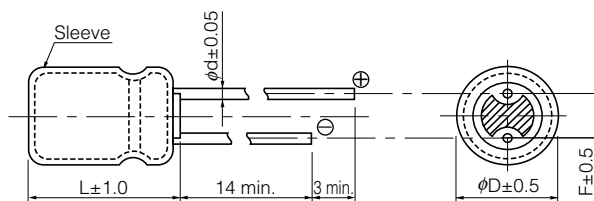
|                       |                                                                                                                                                                                                                                                                                              |                                    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Category Temp. Range  | -55 °C to +105 °C                                                                                                                                                                                                                                                                            |                                    |
| Rated W.V. Range      | 10 V.DC to 50 V.DC                                                                                                                                                                                                                                                                           |                                    |
| Nominal Cap. Range    | 1.5 μF to 220 μF                                                                                                                                                                                                                                                                             |                                    |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                                        |                                    |
| DC Leakage Current    | $I \leq 0.01 CV$ or 3 (μA) After 2 minutes (Whichever is greater)                                                                                                                                                                                                                            |                                    |
| tan δ                 | Please see the attached standard products list                                                                                                                                                                                                                                               |                                    |
| Endurance             | After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), for 1000 hours, when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below. |                                    |
|                       | Capacitance change                                                                                                                                                                                                                                                                           | ±20 % of initial measured value    |
|                       | tan δ                                                                                                                                                                                                                                                                                        | ≤ 200 % of initial specified value |
|                       | DC leakage current                                                                                                                                                                                                                                                                           | ≤ initial specified value          |
| Shelf Life            | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                                  |                                    |

#### ■ Frequency correction factor for ripple current

| W.V.(V.DC) | Cap (μF)   | Frequency (Hz) |      |      |      |          |
|------------|------------|----------------|------|------|------|----------|
|            |            | 60             | 120  | 1 k  | 10 k | 100 k to |
| 10 to 50   | 1.5 to 220 | 0.85           | 1.00 | 1.30 | 1.40 | 1.55     |

#### ■ Dimensions in mm(not to scale)

(Unit : mm)



|                    | 4    | 5    | 6.3  | 8    |
|--------------------|------|------|------|------|
| Body Dia. $\phi D$ | 4    | 5    | 6.3  | 8    |
| Lead Dia. $\phi d$ | 0.45 | 0.45 | 0.45 | 0.45 |
| Lead space F       | 1.5  | 2.0  | 2.5  | 2.5  |



### Standard Products

Endurance : 105 °C 1000 h

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                          |                               |                      | Lead Length       |                  |                      | Part No.      | Min. Packaging Qty      |                 |                      |
|-------------|-------------------------|--------------|----------------|--------------------------------------------------------|-------------------------------|----------------------|-------------------|------------------|----------------------|---------------|-------------------------|-----------------|----------------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+105 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Endurance<br>(hours) | Lead Dia.<br>(mm) | Lead Space       |                      |               | Straight Leads<br>(pcs) | Taping<br>(pcs) |                      |
|             |                         |              |                |                                                        |                               |                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |               |                         |                 | Taping<br>*H<br>(mm) |
| 10          | 22                      | 4            | 7              | 30                                                     | 0.22                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1A220( )           | 200             | 2000                 |
|             | 33                      | 5            | 7              | 50                                                     | 0.22                          | 1000                 | 0.45              | 2.0              | 5.0                  | 2.5           | EEAGA1A330( )           | 200             | 2000                 |
|             | 47                      | 6.3          | 7              | 65                                                     | 0.22                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1A470( )           | 200             | 2000                 |
|             | 68                      | 6.3          | 7              | 75                                                     | 0.22                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1A680( )           | 200             | 2000                 |
|             | 100                     | 6.3          | 7              | 110                                                    | 0.22                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1A101( )           | 200             | 2000                 |
|             | 220                     | 8            | 7              | 160                                                    | 0.22                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1A221( )           | 200             | 1000                 |
| 16          | 10                      | 4            | 7              | 30                                                     | 0.18                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1C100( )           | 200             | 2000                 |
|             | 15                      | 4            | 7              | 33                                                     | 0.18                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1C150( )           | 200             | 2000                 |
|             | 22                      | 5            | 7              | 50                                                     | 0.18                          | 1000                 | 0.45              | 2.0              | 5.0                  | 2.5           | EEAGA1C220( )           | 200             | 2000                 |
|             | 33                      | 6.3          | 7              | 65                                                     | 0.18                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1C330( )           | 200             | 2000                 |
|             | 47                      | 6.3          | 7              | 77                                                     | 0.18                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1C470( )           | 200             | 2000                 |
|             | 100                     | 8            | 7              | 120                                                    | 0.18                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1C101( )           | 200             | 1000                 |
| 25          | 10                      | 4            | 7              | 33                                                     | 0.16                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1E100( )           | 200             | 2000                 |
|             | 15                      | 5            | 7              | 45                                                     | 0.16                          | 1000                 | 0.45              | 2.0              | 5.0                  | 2.5           | EEAGA1E150( )           | 200             | 2000                 |
|             | 22                      | 5            | 7              | 50                                                     | 0.16                          | 1000                 | 0.45              | 2.0              | 5.0                  | 2.5           | EEAGA1E220( )           | 200             | 2000                 |
|             | 33                      | 6.3          | 7              | 75                                                     | 0.16                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1E330( )           | 200             | 2000                 |
|             | 68                      | 8            | 7              | 100                                                    | 0.16                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1E680( )           | 200             | 1000                 |
| 35          | 6.8                     | 4            | 7              | 33                                                     | 0.13                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1V6R8( )           | 200             | 2000                 |
|             | 10                      | 5            | 7              | 35                                                     | 0.13                          | 1000                 | 0.45              | 2.0              | 5.0                  | 2.5           | EEAGA1V100( )           | 200             | 2000                 |
|             | 15                      | 6.3          | 7              | 50                                                     | 0.13                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1V150( )           | 200             | 2000                 |
|             | 22                      | 6.3          | 7              | 70                                                     | 0.13                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1V220( )           | 200             | 2000                 |
|             | 47                      | 8            | 7              | 96                                                     | 0.13                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1V470( )           | 200             | 1000                 |
| 50          | 0.1                     | 4            | 7              | 1.1                                                    | 0.10                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1HR10( )***        | 200             | 2000                 |
|             | 0.15                    | 4            | 7              | 1.7                                                    | 0.10                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1HR15( )***        | 200             | 2000                 |
|             | 0.22                    | 4            | 7              | 2.3                                                    | 0.10                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1HR22( )***        | 200             | 2000                 |
|             | 0.33                    | 4            | 7              | 3.5                                                    | 0.10                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1HR33( )***        | 200             | 2000                 |
|             | 0.47                    | 4            | 7              | 5                                                      | 0.10                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1HR47( )***        | 200             | 2000                 |
|             | 0.68                    | 4            | 7              | 7                                                      | 0.10                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1HR68( )***        | 200             | 2000                 |
|             | 1                       | 4            | 7              | 10                                                     | 0.10                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1H1R0( )***        | 200             | 2000                 |
|             | 1.5                     | 4            | 7              | 16                                                     | 0.10                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1H1R5( )           | 200             | 2000                 |
|             | 2.2                     | 4            | 7              | 18                                                     | 0.10                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1H2R2( )           | 200             | 2000                 |
|             | 3.3                     | 4            | 7              | 22                                                     | 0.10                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1H3R3( )           | 200             | 2000                 |
|             | 4.7                     | 4            | 7              | 26                                                     | 0.10                          | 1000                 | 0.45              | 1.5              | 5.0                  | 2.5           | EEAGA1H4R7( )           | 200             | 2000                 |
|             | 6.8                     | 5            | 7              | 35                                                     | 0.10                          | 1000                 | 0.45              | 2.0              | 5.0                  | 2.5           | EEAGA1H6R8( )           | 200             | 2000                 |
|             | 10                      | 6.3          | 7              | 39                                                     | 0.10                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1H100( )           | 200             | 2000                 |
|             | 15                      | 6.3          | 7              | 55                                                     | 0.10                          | 1000                 | 0.45              | 2.5              | 5.0                  | 2.5           | EEAGA1H150( )           | 200             | 2000                 |
| 22          | 8                       | 7            | 70             | 0.10                                                   | 1000                          | 0.45                 | 2.5               | 5.0              | 2.5                  | EEAGA1H220( ) | 200                     | 1000            |                      |
| 33          | 8                       | 7            | 91             | 0.10                                                   | 1000                          | 0.45                 | 2.5               | 5.0              | 2.5                  | EEAGA1H330( ) | 200                     | 1000            |                      |

· When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch \*B=5 mm, H=2.5 mm.

Suffix "BQ" for ø8×7, 5mm pitch products

· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 31/Mar/2015

### Radial Lead Type

Series: **GA(Bi-polar)** Type: **A**

#### ■ Features

- Endurance : 105 °C 1000 h to 2000 h
- RoHS directive compliant



#### ■ Specifications

|                       |                                                                                                                                                                                                                                                                                  |                                    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Category Temp. Range  | -40 °C to +105 °C                                                                                                                                                                                                                                                                |                                    |
| Rated W.V. Range      | 6.3 V.DC to 50 V.DC                                                                                                                                                                                                                                                              |                                    |
| Nominal Cap. Range    | 2.2 μF to 330 μF                                                                                                                                                                                                                                                                 |                                    |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                                                                                                            |                                    |
| DC Leakage Current    | $I \leq 0.03 CV + 3 (\mu A)$ After 2 minutes<br>or<br>$I \leq 0.03 CV$ or 3 (μA) After 5 minutes (Whichever is greater)                                                                                                                                                          |                                    |
| tan δ                 | Please see the attached standard products list                                                                                                                                                                                                                                   |                                    |
| Endurance             | After following life test of DC working voltage at +105 °C±2 °C when the capacitors are restored to 20 °C, the capacitors shall meet the following limits.<br>Duration<br>φ5 to φ8 : 1000 hours (500 hours for each polarity)<br>φ10 : 2000 hours (1000 hours for each polarity) |                                    |
|                       | Capacitance change                                                                                                                                                                                                                                                               | ± 20% of initial measured value    |
|                       | tan δ                                                                                                                                                                                                                                                                            | ≤ 200 % of initial specified value |
|                       | DC leakage current                                                                                                                                                                                                                                                               | ≤ initial specified value          |
| Shelf Life            | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)                                                                                      |                                    |

#### ■ Frequency correction factor for ripple current

|                   | Frequency (Hz) |      |      |         |
|-------------------|----------------|------|------|---------|
|                   | 50, 60         | 120  | 1 k  | 10 k to |
| Correction factor | 0.70           | 1.00 | 1.30 | 1.70    |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)



### ■ Standard Products (Bi-polar)

Endurance : 105 °C  $\phi$ 5 to  $\phi$ 8=1000 h (500 h for each polarity),  $\phi$ 10=2000 h (1000 h for each polarity)

| W.V.<br>(V) | Cap.<br>( $\pm$ 20 %)<br>( $\mu$ F) | Case size    |                | Specification                                          |                                       | Lead Length       |                  |                      | Part No. | Min. Packaging Q'ty     |                 |                      |
|-------------|-------------------------------------|--------------|----------------|--------------------------------------------------------|---------------------------------------|-------------------|------------------|----------------------|----------|-------------------------|-----------------|----------------------|
|             |                                     | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+105 °C)<br>(mA r.m.s.) | $\tan \delta$<br>(120 Hz)<br>(+20 °C) | Lead Dia.<br>(mm) | Lead Space       |                      |          | Straight Leads<br>(pcs) | Taping<br>(pcs) |                      |
|             |                                     |              |                |                                                        |                                       |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |          |                         |                 | Taping<br>*i<br>(mm) |
| 6.3         | 100                                 | 6.3          | 11.2           | 130                                                    | 0.30                                  | 0.5               | 2.5              | 5.0                  | 2.5      | ECA0JEN101( )           | 200             | 2000                 |
|             | 330                                 | 8            | 11.5           | 250                                                    | 0.30                                  | 0.6               | 3.5              | 5.0                  |          | ECA0JEN331( )           | 200             | 1000                 |
| 10          | 47                                  | 5            | 11             | 90                                                     | 0.24                                  | 0.5               | 2.0              | 5.0                  | 2.5      | ECA1AEN470( )           | 200             | 2000                 |
| 16          | 10                                  | 5            | 11             | 40                                                     | 0.20                                  | 0.5               | 2.0              | 5.0                  | 2.5      | ECA1CEN100( )           | 200             | 2000                 |
|             | 22                                  | 5            | 11             | 60                                                     | 0.20                                  | 0.5               | 2.0              | 5.0                  | 2.5      | ECA1CEN220( )           | 200             | 2000                 |
|             | 33                                  | 5            | 11             | 80                                                     | 0.20                                  | 0.5               | 2.0              | 5.0                  | 2.5      | ECA1CEN330( )           | 200             | 2000                 |
|             | 47                                  | 6.3          | 11.2           | 100                                                    | 0.20                                  | 0.5               | 2.5              | 5.0                  | 2.5      | ECA1CEN470( )           | 200             | 2000                 |
| 25          | 10                                  | 5            | 11             | 45                                                     | 0.15                                  | 0.5               | 2.0              | 5.0                  | 2.5      | ECA1EEN100( )           | 200             | 2000                 |
|             | 22                                  | 6.3          | 11.2           | 60                                                     | 0.15                                  | 0.5               | 2.5              | 5.0                  | 2.5      | ECA1EEN220( )           | 200             | 2000                 |
|             | 33                                  | 6.3          | 11.2           | 90                                                     | 0.15                                  | 0.5               | 2.5              | 5.0                  | 2.5      | ECA1EEN330( )           | 200             | 2000                 |
|             | 47                                  | 6.3          | 11.2           | 110                                                    | 0.15                                  | 0.5               | 2.5              | 5.0                  | 2.5      | ECA1EEN470( )           | 200             | 2000                 |
|             | 100                                 | 8            | 11.5           | 180                                                    | 0.15                                  | 0.6               | 3.5              | 5.0                  |          | ECA1EEN101( )           | 200             | 1000                 |
| 35          | 33                                  | 8            | 11.5           | 100                                                    | 0.15                                  | 0.6               | 3.5              | 5.0                  |          | ECA1VEN330( )           | 200             | 1000                 |
|             | 100                                 | 10           | 16             | 230                                                    | 0.15                                  | 0.6               | 5.0              | 5.0                  |          | ECA1VEN101( )           | 200             | 500                  |
| 50          | 0.47                                | 5            | 11             | 10                                                     | 0.15                                  | 0.5               | 2.0              | 5.0                  | 2.5      | ECA1HENR47( )***        | 200             | 2000                 |
|             | 1                                   | 5            | 11             | 10                                                     | 0.15                                  | 0.5               | 2.0              | 5.0                  | 2.5      | ECA1HEN010( )***        | 200             | 2000                 |
|             | 2.2                                 | 5            | 11             | 18                                                     | 0.15                                  | 0.5               | 2.0              | 5.0                  | 2.5      | ECA1HEN2R2( )           | 200             | 2000                 |
|             | 3.3                                 | 5            | 11             | 25                                                     | 0.15                                  | 0.5               | 2.0              | 5.0                  | 2.5      | ECA1HEN3R3( )           | 200             | 2000                 |
|             | 4.7                                 | 5            | 11             | 30                                                     | 0.15                                  | 0.5               | 2.0              | 5.0                  | 2.5      | ECA1HEN4R7( )           | 200             | 2000                 |
|             | 10                                  | 6.3          | 11.2           | 50                                                     | 0.15                                  | 0.5               | 2.5              | 5.0                  | 2.5      | ECA1HEN100( )           | 200             | 2000                 |
|             | 22                                  | 8            | 11.5           | 90                                                     | 0.15                                  | 0.6               | 3.5              | 5.0                  |          | ECA1HEN220( )           | 200             | 1000                 |
|             | 33                                  | 8            | 11.5           | 110                                                    | 0.15                                  | 0.6               | 3.5              | 5.0                  |          | ECA1HEN330( )           | 200             | 1000                 |
|             | 47                                  | 10           | 12.5           | 140                                                    | 0.15                                  | 0.6               | 5.0              | 5.0                  |          | ECA1HEN470( )           | 200             | 500                  |
|             | 100                                 | 10           | 20             | 250                                                    | 0.15                                  | 0.6               | 5.0              | 5.0                  |          | ECA1HEN101( )           | 200             | 500                  |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 31/Mar/2015

### Radial Lead Type

Series: **M** Type: **A**



#### ■ Features

- Endurance : 85 °C 2000 h
- Smaller than series SU
- RoHS directive compliant

#### ■ Specifications

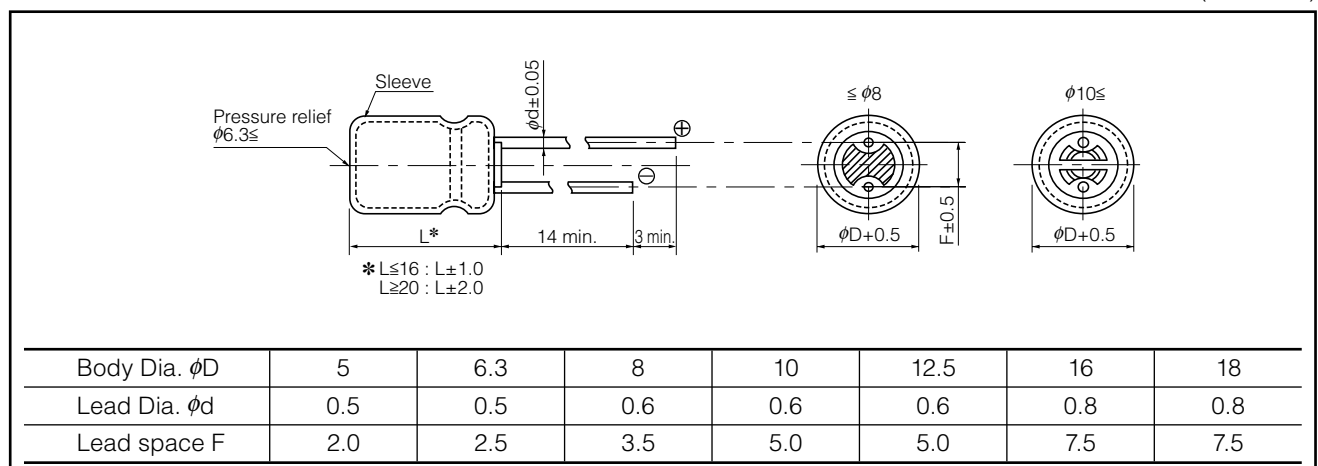
|                       |                                                                                                                                                                                            |                                               |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Category Temp. Range  | -40 °C to + 85 °C                                                                                                                                                                          | -25 °C to +85 °C                              |
| Rated W.V. Range      | 6.3 V.DC to 100 V.DC                                                                                                                                                                       | 160 V.DC to 450 V.DC                          |
| Nominal Cap. Range    | 2.2 μF to 22000 μF                                                                                                                                                                         | 1 μF to 470 μF                                |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                      |                                               |
| DC Leakage Current    | $I \leq 0.01 CV$ or $3 (\mu A)$ After 2 minutes<br>(Whichever is greater)                                                                                                                  | $I \leq 0.06 CV + 10 (\mu A)$ After 2 minutes |
| tan δ                 | Please see the attached standard products list                                                                                                                                             |                                               |
| Endurance             | After applying rated working voltage for 2000 hours at +85°C±2 °C, when the capacitors are restored to 20 °C, capacitors shall meet the following limits.                                  |                                               |
|                       | Capacitance change                                                                                                                                                                         | ±20 % of initial measured value               |
|                       | tan δ                                                                                                                                                                                      | ≤150 % of initial specified value             |
|                       | DC leakage current                                                                                                                                                                         | ≤initial specified value                      |
| Shelf Life            | After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment) |                                               |

#### ■ Frequency correction factor for ripple current

| Correction factor | Frequency (Hz) |      |      |         |
|-------------------|----------------|------|------|---------|
|                   | 50, 60         | 120  | 1 k  | 10 k to |
|                   | 0.70           | 1.00 | 1.30 | 1.70    |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)



### ■ Standard Products

Endurance : 85 °C 2000 h

| W.V.  | Cap.<br>(±20 %) | Case size |        | Specification                                         |                               | Lead Length |            |              |              | Part No.     | Min. Packaging Q'ty |        |
|-------|-----------------|-----------|--------|-------------------------------------------------------|-------------------------------|-------------|------------|--------------|--------------|--------------|---------------------|--------|
|       |                 | Dia.      | Length | Ripple Current<br>(120 Hz)<br>(+85 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Lead Dia.   | Lead Space |              |              |              | Straight Leads      | Taping |
|       |                 |           |        |                                                       |                               |             | Straight   | Taping<br>*B | Taping<br>*i |              |                     |        |
| (V)   | (μF)            | (mm)      | (mm)   | (mA r.m.s.)                                           | (mm)                          | (mm)        | (mm)       | (mm)         |              |              | (pcs)               | (pcs)  |
| 6.3   | 220             | 5         | 11     | 240                                                   | 0.28                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA0JM221( ) | 200                 | 2000   |
|       | 470             | 6.3       | 11.2   | 380                                                   | 0.28                          | 0.5         | 2.5        | 5.0          | 2.5          | ECA0JM471( ) | 200                 | 2000   |
|       | 1000            | 8         | 11.5   | 580                                                   | 0.28                          | 0.6         | 3.5        | 5.0          |              | ECA0JM102( ) | 200                 | 1000   |
|       | 2200            | 10        | 16     | 890                                                   | 0.30                          | 0.6         | 5.0        | 5.0          |              | ECA0JM222( ) | 200                 | 500    |
|       | 3300            | 10        | 20     | 1020                                                  | 0.32                          | 0.6         | 5.0        | 5.0          |              | ECA0JM332( ) | 200                 | 500    |
|       | 4700            | 12.5      | 20     | 1170                                                  | 0.34                          | 0.6         | 5.0        | 5.0          |              | ECA0JM472( ) | 200                 | 500    |
|       | 6800            | 12.5      | 25     | 1270                                                  | 0.38                          | 0.6         | 5.0        | 5.0          |              | ECA0JM682( ) | 200                 | 500    |
|       | 10000           | 16        | 25     | 1450                                                  | 0.46                          | 0.8         | 7.5        | 7.5          |              | ECA0JM103( ) | 100                 | 250    |
|       | 15000           | 16        | 31.5   | 1700                                                  | 0.56                          | 0.8         | 7.5        |              |              | ECA0JM153    | 100                 |        |
| 22000 | 18              | 35.5      | 1900   | 0.70                                                  | 0.8                           | 7.5         |            |              | ECA0JM223    | 50           |                     |        |
| 10    | 330             | 6.3       | 11.2   | 330                                                   | 0.24                          | 0.5         | 2.5        | 5.0          | 2.5          | ECA1AM331( ) | 200                 | 2000   |
|       | 1000            | 10        | 12.5   | 630                                                   | 0.24                          | 0.6         | 5.0        | 5.0          |              | ECA1AM102( ) | 200                 | 500    |
|       | 2200            | 10        | 20     | 920                                                   | 0.26                          | 0.6         | 5.0        | 5.0          |              | ECA1AM222( ) | 200                 | 500    |
|       | 3300            | 12.5      | 20     | 1090                                                  | 0.28                          | 0.6         | 5.0        | 5.0          |              | ECA1AM332( ) | 200                 | 500    |
|       | 4700            | 12.5      | 25     | 1200                                                  | 0.30                          | 0.6         | 5.0        | 5.0          |              | ECA1AM472( ) | 200                 | 500    |
|       | 6800            | 16        | 25     | 1400                                                  | 0.34                          | 0.8         | 7.5        | 7.5          |              | ECA1AM682( ) | 100                 | 250    |
|       | 10000           | 16        | 31.5   | 1600                                                  | 0.42                          | 0.8         | 7.5        |              |              | ECA1AM103    | 100                 |        |
|       | 15000           | 18        | 35.5   | 1850                                                  | 0.52                          | 0.8         | 7.5        |              |              | ECA1AM153    | 50                  |        |
| 16    | 10              | 5         | 11     | 30                                                    | 0.20                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1CM100( ) | 200                 | 2000   |
|       | 22              | 5         | 11     | 75                                                    | 0.20                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1CM220( ) | 200                 | 2000   |
|       | 33              | 5         | 11     | 110                                                   | 0.20                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1CM330( ) | 200                 | 2000   |
|       | 47              | 5         | 11     | 130                                                   | 0.20                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1CM470( ) | 200                 | 2000   |
|       | 100             | 5         | 11     | 180                                                   | 0.20                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1CM101( ) | 200                 | 2000   |
|       | 220             | 6.3       | 11.2   | 280                                                   | 0.20                          | 0.5         | 2.5        | 5.0          | 2.5          | ECA1CM221( ) | 200                 | 2000   |
|       | 470             | 8         | 11.5   | 440                                                   | 0.20                          | 0.6         | 3.5        | 5.0          |              | ECA1CM471( ) | 200                 | 1000   |
|       | 1000            | 10        | 16     | 680                                                   | 0.20                          | 0.6         | 5.0        | 5.0          |              | ECA1CM102( ) | 200                 | 500    |
|       | 2200            | 12.5      | 20     | 1000                                                  | 0.22                          | 0.6         | 5.0        | 5.0          |              | ECA1CM222( ) | 200                 | 500    |
|       | 3300            | 12.5      | 25     | 1200                                                  | 0.24                          | 0.6         | 5.0        | 5.0          |              | ECA1CM332( ) | 200                 | 500    |
|       | 4700            | 16        | 25     | 1360                                                  | 0.26                          | 0.8         | 7.5        | 7.5          |              | ECA1CM472( ) | 100                 | 250    |
|       | 6800            | 16        | 31.5   | 1600                                                  | 0.30                          | 0.8         | 7.5        |              |              | ECA1CM682    | 100                 |        |
| 10000 | 18              | 35.5      | 1800   | 0.38                                                  | 0.8                           | 7.5         |            |              | ECA1CM103    | 50           |                     |        |
| 25    | 100             | 6.3       | 11.2   | 180                                                   | 0.16                          | 0.5         | 2.5        | 5.0          | 2.5          | ECA1EM101( ) | 200                 | 2000   |
|       | 330             | 8         | 11.5   | 390                                                   | 0.16                          | 0.6         | 3.5        | 5.0          |              | ECA1EM331( ) | 200                 | 1000   |
|       | 470             | 10        | 12.5   | 480                                                   | 0.16                          | 0.6         | 5.0        | 5.0          |              | ECA1EM471( ) | 200                 | 500    |
|       | 1000            | 10        | 20     | 850                                                   | 0.16                          | 0.6         | 5.0        | 5.0          |              | ECA1EM102( ) | 200                 | 500    |
|       | 2200            | 12.5      | 25     | 1200                                                  | 0.18                          | 0.6         | 5.0        | 5.0          |              | ECA1EM222( ) | 200                 | 500    |
|       | 3300            | 16        | 25     | 1300                                                  | 0.20                          | 0.8         | 7.5        | 7.5          |              | ECA1EM332( ) | 100                 | 250    |
|       | 4700            | 16        | 31.5   | 1500                                                  | 0.22                          | 0.8         | 7.5        |              |              | ECA1EM472    | 100                 |        |
| 6800  | 18              | 35.5      | 1750   | 0.26                                                  | 0.8                           | 7.5         |            |              | ECA1EM682    | 50           |                     |        |
| 35    | 47              | 5         | 11     | 130                                                   | 0.14                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1VM470( ) | 200                 | 2000   |
|       | 100             | 6.3       | 11.2   | 210                                                   | 0.14                          | 0.5         | 2.5        | 5.0          | 2.5          | ECA1VM101( ) | 200                 | 2000   |
|       | 220             | 8         | 11.5   | 350                                                   | 0.14                          | 0.6         | 3.5        | 5.0          |              | ECA1VM221( ) | 200                 | 1000   |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, i=2.5 mm.  
· Please refer to the page of "Taping Dimensions".

### Standard Products

Endurance : 85 °C 2000 h

| W.V. | Cap.<br>(±20 %) | Case size |        | Specification                                         |                               | Lead Length |            |              |              | Part No.        | Min. Packaging Q'ty |        |
|------|-----------------|-----------|--------|-------------------------------------------------------|-------------------------------|-------------|------------|--------------|--------------|-----------------|---------------------|--------|
|      |                 | Dia.      | Length | Ripple Current<br>(120 Hz)<br>(+85 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Lead Dia.   | Lead Space |              |              |                 | Straight Leads      | Taping |
|      |                 |           |        |                                                       |                               |             | Straight   | Taping<br>*B | Taping<br>*i |                 |                     |        |
| (V)  | (μF)            | (mm)      | (mm)   | (mA r.m.s.)                                           | (mm)                          | (mm)        | (mm)       | (mm)         |              |                 | (pcs)               | (pcs)  |
| 35   | 330             | 10        | 12.5   | 440                                                   | 0.14                          | 0.6         | 5.0        | 5.0          |              | ECA1VM331( )    | 200                 | 500    |
|      | 470             | 10        | 16     | 550                                                   | 0.14                          | 0.6         | 5.0        | 5.0          |              | ECA1VM471( )    | 200                 | 500    |
|      | 1000            | 12.5      | 20     | 900                                                   | 0.14                          | 0.6         | 5.0        | 5.0          |              | ECA1VM102( )    | 200                 | 500    |
|      | 2200            | 16        | 25     | 1250                                                  | 0.16                          | 0.8         | 7.5        | 7.5          |              | ECA1VM222( )    | 100                 | 250    |
|      | 3300            | 16        | 31.5   | 1400                                                  | 0.18                          | 0.8         | 7.5        |              |              | ECA1VM332       | 100                 |        |
|      | 4700            | 18        | 35.5   | 1600                                                  | 0.20                          | 0.8         | 7.5        |              |              | ECA1VM472       | 50                  |        |
| 50   | 0.1             | 5         | 11     | 1.3                                                   | 0.12                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1HM0R1( )*** | 200                 | 2000   |
|      | 0.22            | 5         | 11     | 2.9                                                   | 0.12                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1HMR22( )*** | 200                 | 2000   |
|      | 0.33            | 5         | 11     | 4.4                                                   | 0.12                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1HMR33( )*** | 200                 | 2000   |
|      | 0.47            | 5         | 11     | 5                                                     | 0.12                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1HMR47( )*** | 200                 | 2000   |
|      | 1               | 5         | 11     | 10                                                    | 0.12                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1HM010( )*** | 200                 | 2000   |
|      | 2.2             | 5         | 11     | 20                                                    | 0.12                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1HM2R2( )    | 200                 | 2000   |
|      | 3.3             | 5         | 11     | 35                                                    | 0.12                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1HM3R3( )    | 200                 | 2000   |
|      | 4.7             | 5         | 11     | 45                                                    | 0.12                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1HM4R7( )    | 200                 | 2000   |
|      | 10              | 5         | 11     | 65                                                    | 0.12                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1HM100( )    | 200                 | 2000   |
|      | 22              | 5         | 11     | 100                                                   | 0.12                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1HM220( )    | 200                 | 2000   |
|      | 33              | 5         | 11     | 110                                                   | 0.12                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1HM330( )    | 200                 | 2000   |
|      | 47              | 6.3       | 11.2   | 130                                                   | 0.12                          | 0.5         | 2.5        | 5.0          | 2.5          | ECA1HM470( )    | 200                 | 2000   |
|      | 100             | 8         | 11.5   | 250                                                   | 0.12                          | 0.6         | 3.5        | 5.0          |              | ECA1HM101( )    | 200                 | 1000   |
|      | 220             | 10        | 12.5   | 400                                                   | 0.12                          | 0.6         | 5.0        | 5.0          |              | ECA1HM221( )    | 200                 | 500    |
|      | 330             | 10        | 16     | 500                                                   | 0.12                          | 0.6         | 5.0        | 5.0          |              | ECA1HM331( )    | 200                 | 500    |
|      | 470             | 10        | 20     | 650                                                   | 0.12                          | 0.6         | 5.0        | 5.0          |              | ECA1HM471( )    | 200                 | 500    |
| 1000 | 12.5            | 25        | 1050   | 0.12                                                  | 0.6                           | 5.0         | 5.0        |              | ECA1HM102( ) | 200             | 500                 |        |
| 2200 | 16              | 31.5      | 1300   | 0.14                                                  | 0.8                           | 7.5         |            |              | ECA1HM222    | 100             |                     |        |
| 3300 | 18              | 35.5      | 1500   | 0.16                                                  | 0.8                           | 7.5         |            |              | ECA1HM332    | 50              |                     |        |
| 63   | 10              | 5         | 11     | 70                                                    | 0.11                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1JM100( )    | 200                 | 2000   |
|      | 22              | 5         | 11     | 105                                                   | 0.11                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA1JM220( )    | 200                 | 2000   |
|      | 33              | 6.3       | 11.2   | 130                                                   | 0.11                          | 0.5         | 2.5        | 5.0          | 2.5          | ECA1JM330( )    | 200                 | 2000   |
|      | 47              | 6.3       | 11.2   | 160                                                   | 0.11                          | 0.5         | 2.5        | 5.0          | 2.5          | ECA1JM470( )    | 200                 | 2000   |
|      | 100             | 8         | 11.5   | 270                                                   | 0.11                          | 0.6         | 3.5        | 5.0          |              | ECA1JM101( )    | 200                 | 1000   |
|      | 220             | 10        | 16     | 450                                                   | 0.11                          | 0.6         | 5.0        | 5.0          |              | ECA1JM221( )    | 200                 | 500    |
|      | 330             | 10        | 20     | 550                                                   | 0.11                          | 0.6         | 5.0        | 5.0          |              | ECA1JM331( )    | 200                 | 500    |
|      | 470             | 12.5      | 20     | 750                                                   | 0.11                          | 0.6         | 5.0        | 5.0          |              | ECA1JM471( )    | 200                 | 500    |
|      | 1000            | 16        | 25     | 1100                                                  | 0.11                          | 0.8         | 7.5        | 7.5          |              | ECA1JM102( )    | 100                 | 250    |
|      | 2200            | 18        | 35.5   | 1400                                                  | 0.13                          | 0.8         | 7.5        |              |              | ECA1JM222       | 50                  |        |
| 100  | 0.47            | 5         | 11     | 10                                                    | 0.10                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA2AMR47( )*** | 200                 | 2000   |
|      | 1               | 5         | 11     | 20                                                    | 0.10                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA2AM010( )*** | 200                 | 2000   |
|      | 2.2             | 5         | 11     | 30                                                    | 0.10                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA2AM2R2( )    | 200                 | 2000   |
|      | 3.3             | 5         | 11     | 40                                                    | 0.10                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA2AM3R3( )    | 200                 | 2000   |
|      | 4.7             | 5         | 11     | 50                                                    | 0.10                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA2AM4R7( )    | 200                 | 2000   |
|      | 10              | 5         | 11     | 70                                                    | 0.10                          | 0.5         | 2.0        | 5.0          | 2.5          | ECA2AM100( )    | 200                 | 2000   |
|      | 22              | 6.3       | 11.2   | 115                                                   | 0.10                          | 0.5         | 2.5        | 5.0          | 2.5          | ECA2AM220( )    | 200                 | 2000   |

· When requesting taped product, please put the letter "B" or "I" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 31/Mar/2015

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May, 2014

### Standard Products

Endurance : 85 °C 2000 h

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                         |                               | Lead Length       |                  |                      |                      | Part No.     | Min. Packaging Q'ty     |                 |
|-------------|-------------------------|--------------|----------------|-------------------------------------------------------|-------------------------------|-------------------|------------------|----------------------|----------------------|--------------|-------------------------|-----------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+85 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |              | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                         |              |                |                                                       |                               |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*i<br>(mm) |              |                         |                 |
| 100         | 33                      | 8            | 11.5           | 145                                                   | 0.10                          | 0.6               | 3.5              | 5.0                  |                      | ECA2AM330( ) | 200                     | 1000            |
|             | 47                      | 8            | 11.5           | 180                                                   | 0.10                          | 0.6               | 3.5              | 5.0                  |                      | ECA2AM470( ) | 200                     | 1000            |
|             | 100                     | 10           | 16             | 350                                                   | 0.10                          | 0.6               | 5.0              | 5.0                  |                      | ECA2AM101( ) | 200                     | 500             |
|             | 220                     | 12.5         | 20             | 550                                                   | 0.10                          | 0.6               | 5.0              | 5.0                  |                      | ECA2AM221( ) | 200                     | 500             |
|             | 330                     | 12.5         | 25             | 700                                                   | 0.10                          | 0.6               | 5.0              | 5.0                  |                      | ECA2AM331( ) | 200                     | 500             |
|             | 470                     | 16           | 25             | 900                                                   | 0.10                          | 0.8               | 7.5              | 7.5                  |                      | ECA2AM471( ) | 100                     | 250             |
|             | 1000                    | 18           | 35.5           | 1300                                                  | 0.10                          | 0.8               | 7.5              |                      |                      | ECA2AM102    | 50                      |                 |
| 160         | 1                       | 6.3          | 11.2           | 36                                                    | 0.16                          | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2CM010( ) | 200                     | 2000            |
|             | 2.2                     | 6.3          | 11.2           | 53                                                    | 0.16                          | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2CM2R2( ) | 200                     | 2000            |
|             | 3.3                     | 6.3          | 11.2           | 66                                                    | 0.16                          | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2CM3R3( ) | 200                     | 2000            |
|             | 4.7                     | 6.3          | 11.2           | 78                                                    | 0.16                          | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2CM4R7( ) | 200                     | 2000            |
|             | 10                      | 10           | 12.5           | 105                                                   | 0.16                          | 0.6               | 5.0              | 5.0                  |                      | ECA2CM100( ) | 200                     | 500             |
|             | 22                      | 10           | 16             | 175                                                   | 0.16                          | 0.6               | 5.0              | 5.0                  |                      | ECA2CM220( ) | 200                     | 500             |
|             | 33                      | 10           | 20             | 235                                                   | 0.16                          | 0.6               | 5.0              | 5.0                  |                      | ECA2CM330( ) | 200                     | 500             |
|             | 47                      | 12.5         | 20             | 320                                                   | 0.16                          | 0.6               | 5.0              | 5.0                  |                      | ECA2CM470( ) | 200                     | 500             |
|             | 100                     | 12.5         | 25             | 515                                                   | 0.16                          | 0.6               | 5.0              | 5.0                  |                      | ECA2CM101( ) | 200                     | 500             |
|             | 220                     | 16           | 31.5           | 830                                                   | 0.16                          | 0.8               | 7.5              |                      |                      | ECA2CM221    | 100                     |                 |
|             | 330                     | 18           | 31.5           | 1090                                                  | 0.16                          | 0.8               | 7.5              |                      |                      | ECA2CM331    | 50                      |                 |
| 200         | 1                       | 6.3          | 11.2           | 34                                                    | 0.18                          | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2DM010( ) | 200                     | 2000            |
|             | 2.2                     | 6.3          | 11.2           | 50                                                    | 0.18                          | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2DM2R2( ) | 200                     | 2000            |
|             | 3.3                     | 6.3          | 11.2           | 62                                                    | 0.18                          | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2DM3R3( ) | 200                     | 2000            |
|             | 4.7                     | 8            | 11.5           | 86                                                    | 0.18                          | 0.6               | 3.5              | 5.0                  |                      | ECA2DM4R7( ) | 200                     | 1000            |
|             | 10                      | 10           | 12.5           | 100                                                   | 0.18                          | 0.6               | 5.0              | 5.0                  |                      | ECA2DM100( ) | 200                     | 500             |
|             | 22                      | 10           | 20             | 180                                                   | 0.18                          | 0.6               | 5.0              | 5.0                  |                      | ECA2DM220( ) | 200                     | 500             |
|             | 33                      | 10           | 20             | 220                                                   | 0.18                          | 0.6               | 5.0              | 5.0                  |                      | ECA2DM330( ) | 200                     | 500             |
|             | 47                      | 12.5         | 20             | 300                                                   | 0.18                          | 0.6               | 5.0              | 5.0                  |                      | ECA2DM470( ) | 200                     | 500             |
|             | 100                     | 16           | 25             | 475                                                   | 0.18                          | 0.8               | 7.5              | 7.5                  |                      | ECA2DM101( ) | 100                     | 250             |
|             | 220                     | 18           | 31.5           | 835                                                   | 0.18                          | 0.8               | 7.5              |                      |                      | ECA2DM221    | 50                      |                 |
| 250         | 1                       | 6.3          | 11.2           | 34                                                    | 0.18                          | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2EM010( ) | 200                     | 2000            |
|             | 2.2                     | 6.3          | 11.2           | 50                                                    | 0.18                          | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2EM2R2( ) | 200                     | 2000            |
|             | 3.3                     | 8            | 11.5           | 72                                                    | 0.18                          | 0.6               | 3.5              | 5.0                  |                      | ECA2EM3R3( ) | 200                     | 1000            |
|             | 4.7                     | 8            | 11.5           | 86                                                    | 0.18                          | 0.6               | 3.5              | 5.0                  |                      | ECA2EM4R7( ) | 200                     | 1000            |
|             | 10                      | 10           | 16             | 110                                                   | 0.18                          | 0.6               | 5.0              | 5.0                  |                      | ECA2EM100( ) | 200                     | 500             |
|             | 22                      | 10           | 20             | 180                                                   | 0.18                          | 0.6               | 5.0              | 5.0                  |                      | ECA2EM220( ) | 200                     | 500             |
|             | 33                      | 12.5         | 20             | 250                                                   | 0.18                          | 0.6               | 5.0              | 5.0                  |                      | ECA2EM330( ) | 200                     | 500             |
|             | 47                      | 12.5         | 25             | 330                                                   | 0.18                          | 0.6               | 5.0              | 5.0                  |                      | ECA2EM470( ) | 200                     | 500             |
|             | 100                     | 16           | 31.5           | 530                                                   | 0.18                          | 0.8               | 7.5              |                      |                      | ECA2EM101    | 100                     |                 |
| 350         | 1                       | 6.3          | 11.2           | 32                                                    | 0.20                          | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2VM010( ) | 200                     | 2000            |
|             | 2.2                     | 8            | 11.5           | 55                                                    | 0.20                          | 0.6               | 3.5              | 5.0                  |                      | ECA2VM2R2( ) | 200                     | 1000            |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, i=2.5 mm.  
· Please refer to the page of "Taping Dimensions".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May, 2014

### ■ Standard Products

Endurance : 85 °C 2000 h

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                         |                               | Lead Length       |                  |                      |                      | Part No.     | Min. Packaging Q'ty     |                 |
|-------------|-------------------------|--------------|----------------|-------------------------------------------------------|-------------------------------|-------------------|------------------|----------------------|----------------------|--------------|-------------------------|-----------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+85 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |              | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                         |              |                |                                                       |                               |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*i<br>(mm) |              |                         |                 |
| 350         | 3.3                     | 8            | 11.5           | 60                                                    | 0.20                          | 0.6               | 3.5              | 5.0                  |                      | ECA2VM3R3( ) | 200                     | 1000            |
|             | 4.7                     | 10           | 12.5           | 65                                                    | 0.20                          | 0.6               | 5.0              | 5.0                  |                      | ECA2VM4R7( ) | 200                     | 500             |
|             | 10                      | 10           | 20             | 115                                                   | 0.20                          | 0.6               | 5.0              | 5.0                  |                      | ECA2VM100( ) | 200                     | 500             |
|             | 22                      | 12.5         | 20             | 195                                                   | 0.20                          | 0.6               | 5.0              | 5.0                  |                      | ECA2VM220( ) | 200                     | 500             |
|             | 33                      | 16           | 25             | 300                                                   | 0.20                          | 0.8               | 7.5              | 7.5                  |                      | ECA2VM330( ) | 100                     | 250             |
|             | 47                      | 16           | 25             | 325                                                   | 0.20                          | 0.8               | 7.5              | 7.5                  |                      | ECA2VM470( ) | 100                     | 250             |
|             | 100                     | 18           | 31.5           | 535                                                   | 0.20                          | 0.8               | 7.5              |                      |                      | ECA2VM101    | 50                      |                 |
| 400         | 1                       | 6.3          | 11.2           | 32                                                    | 0.20                          | 0.5               | 2.5              | 5.0                  | 2.5                  | ECA2GM010( ) | 200                     | 2000            |
|             | 2.2                     | 8            | 11.5           | 50                                                    | 0.20                          | 0.6               | 3.5              | 5.0                  |                      | ECA2GM2R2( ) | 200                     | 1000            |
|             | 3.3                     | 10           | 12.5           | 54                                                    | 0.20                          | 0.6               | 5.0              | 5.0                  |                      | ECA2GM3R3( ) | 200                     | 500             |
|             | 4.7                     | 10           | 16             | 72                                                    | 0.20                          | 0.6               | 5.0              | 5.0                  |                      | ECA2GM4R7( ) | 200                     | 500             |
|             | 10                      | 10           | 20             | 115                                                   | 0.20                          | 0.6               | 5.0              | 5.0                  |                      | ECA2GM100( ) | 200                     | 500             |
|             | 22                      | 12.5         | 25             | 215                                                   | 0.20                          | 0.6               | 5.0              | 5.0                  |                      | ECA2GM220( ) | 200                     | 500             |
|             | 33                      | 16           | 25             | 275                                                   | 0.20                          | 0.8               | 7.5              | 7.5                  |                      | ECA2GM330( ) | 100                     | 250             |
|             | 47                      | 16           | 31.5           | 350                                                   | 0.20                          | 0.8               | 7.5              |                      |                      | ECA2GM470    | 100                     |                 |
| 450         | 1                       | 8            | 11.5           | 37                                                    | 0.20                          | 0.6               | 3.5              | 5.0                  |                      | ECA2WM010( ) | 200                     | 1000            |
|             | 2.2                     | 10           | 12.5           | 44                                                    | 0.20                          | 0.6               | 5.0              | 5.0                  |                      | ECA2WM2R2( ) | 200                     | 500             |
|             | 3.3                     | 10           | 16             | 60                                                    | 0.20                          | 0.6               | 5.0              | 5.0                  |                      | ECA2WM3R3( ) | 200                     | 500             |
|             | 4.7                     | 10           | 20             | 79                                                    | 0.20                          | 0.6               | 5.0              | 5.0                  |                      | ECA2WM4R7( ) | 200                     | 500             |
|             | 10                      | 12.5         | 20             | 130                                                   | 0.20                          | 0.6               | 5.0              | 5.0                  |                      | ECA2WM100( ) | 200                     | 500             |
|             | 22                      | 16           | 25             | 210                                                   | 0.20                          | 0.8               | 7.5              | 7.5                  |                      | ECA2WM220( ) | 100                     | 250             |
|             | 33                      | 16           | 31.5           | 285                                                   | 0.20                          | 0.8               | 7.5              |                      |                      | ECA2WM330    | 100                     |                 |

- When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, i=2.5 mm.
- Please refer to the page of "Taping Dimensions".



### Radial Lead Type

Series: **SU(Bi-polar)** Type: **A**



#### ■ Features

- Endurance : 85 °C 2000 h
- RoHS directive compliant

#### ■ Specifications

|                       |                                                                                                                                                                                              |                                    |  |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--|
| Category Temp. Range  | -40 °C to +85 °C                                                                                                                                                                             |                                    |  |
| Rated W.V. Range      | 6.3 V.DC to 50 V.DC                                                                                                                                                                          |                                    |  |
| Nominal Cap. Range    | 2.2 μF to 6800 μF                                                                                                                                                                            |                                    |  |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                        |                                    |  |
| DC Leakage Current    | $I \leq 0.03 CV + 3$ (μA) After 5 minutes                                                                                                                                                    |                                    |  |
| tan δ                 | Please see the attached standard products list.                                                                                                                                              |                                    |  |
| Endurance             | After 2000 hours application of DC working voltage (1000 hours for each polarity) at +85 °C±2 °C, when the capacitors are restored to 20 °C, the capacitors shall meet the following limits. |                                    |  |
|                       | Capacitance change                                                                                                                                                                           | ± 20 % of initial measured value   |  |
|                       | tan δ                                                                                                                                                                                        | ≤ 150 % of initial specified value |  |
|                       | DC leakage current                                                                                                                                                                           | ≤ initial specified value          |  |
| Shelf Life            | After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C capacitors shall meet the limits specified in Endurance. (With voltage treatment)    |                                    |  |

#### ■ Frequency correction factor for ripple current

|                   | Frequency (Hz) |      |      |         |
|-------------------|----------------|------|------|---------|
|                   | 50, 60         | 120  | 1 k  | 10 k to |
| Correction factor | 0.70           | 1.00 | 1.30 | 1.70    |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

### Standard Products (Bi-polar)

Endurance: 85 °C 2000 h (1000 hours for each polarity)

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                         |                                      | Lead Length       |                  |                      | Part No.       | Min. Packaging Qty      |                 |                      |
|-------------|-------------------------|--------------|----------------|-------------------------------------------------------|--------------------------------------|-------------------|------------------|----------------------|----------------|-------------------------|-----------------|----------------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+85 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C)<br>(Ω) | Lead Dia.<br>(mm) | Lead Space       |                      |                | Straight Leads<br>(pcs) | Taping<br>(pcs) |                      |
|             |                         |              |                |                                                       |                                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |                |                         |                 | Taping<br>*i<br>(mm) |
| 6.3         | 330                     | 8            | 11.5           | 250                                                   | 0.30                                 | 0.6               | 3.5              | 5.0                  |                | ECEA0JN331U( )          | 200             | 1000                 |
|             | 470                     | 10           | 12.5           | 310                                                   | 0.30                                 | 0.6               | 5.0              | 5.0                  |                | ECEA0JN471X( )          | 200             | 500                  |
|             | 1000                    | 10           | 20             | 430                                                   | 0.30                                 | 0.6               | 5.0              | 5.0                  |                | ECEA0JN102U( )          | 200             | 500                  |
|             | 2200                    | 12.5         | 25             | 660                                                   | 0.32                                 | 0.6               | 5.0              | 5.0                  |                | ECEA0JN222U( )          | 200             | 500                  |
|             | 3300                    | 16           | 25             | 760                                                   | 0.34                                 | 0.8               | 7.5              | 7.5                  |                | ECEA0JN332U( )          | 100             | 250                  |
|             | 4700                    | 16           | 31.5           | 1170                                                  | 0.36                                 | 0.8               | 7.5              |                      |                | ECEA0JN472U             | 100             |                      |
|             | 6800                    | 18           | 35.5           | 1450                                                  | 0.40                                 | 0.8               | 7.5              |                      |                | ECEA0JN682U             | 50              |                      |
| 10          | 47                      | 5            | 11             | 90                                                    | 0.25                                 | 0.5               | 2.0              | 5.0                  | 2.5            | ECEA1AN470U( )          | 200             | 2000                 |
|             | 100                     | 6.3          | 11.2           | 130                                                   | 0.25                                 | 0.5               | 2.5              | 5.0                  | 2.5            | ECEA1AN101X( )          | 200             | 2000                 |
|             | 220                     | 8            | 11.5           | 200                                                   | 0.25                                 | 0.6               | 3.5              | 5.0                  |                | ECEA1AN221U( )          | 200             | 1000                 |
|             | 330                     | 10           | 16             | 280                                                   | 0.25                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1AN331U( )          | 200             | 500                  |
|             | 470                     | 10           | 16             | 340                                                   | 0.25                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1AN471U( )          | 200             | 500                  |
|             | 1000                    | 12.5         | 20             | 470                                                   | 0.25                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1AN102X( )          | 200             | 500                  |
|             | 2200                    | 16           | 25             | 690                                                   | 0.27                                 | 0.8               | 7.5              | 7.5                  |                | ECEA1AN222U( )          | 100             | 250                  |
|             | 3300                    | 16           | 31.5           | 1090                                                  | 0.29                                 | 0.8               | 7.5              |                      |                | ECEA1AN332U             | 100             |                      |
| 16          | 4700                    | 18           | 35.5           | 1200                                                  | 0.31                                 | 0.8               | 7.5              |                      |                | ECEA1AN472U             | 50              |                      |
|             | 10                      | 5            | 11             | 40                                                    | 0.20                                 | 0.5               | 2.0              | 5.0                  | 2.5            | ECEA1CN100U( )          | 200             | 2000                 |
|             | 22                      | 5            | 11             | 60                                                    | 0.20                                 | 0.5               | 2.0              | 5.0                  | 2.5            | ECEA1CN220U( )          | 200             | 2000                 |
|             | 33                      | 5            | 11             | 80                                                    | 0.20                                 | 0.5               | 2.0              | 5.0                  | 2.5            | ECEA1CN330U( )          | 200             | 2000                 |
|             | 47                      | 6.3          | 11.2           | 100                                                   | 0.20                                 | 0.5               | 2.5              | 5.0                  | 2.5            | ECEA1CN470U( )          | 200             | 2000                 |
|             | 220                     | 10           | 12.5           | 260                                                   | 0.20                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1CN221X( )          | 200             | 500                  |
|             | 330                     | 10           | 16             | 330                                                   | 0.20                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1CN331U( )          | 200             | 500                  |
|             | 470                     | 10           | 20             | 380                                                   | 0.20                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1CN471U( )          | 200             | 500                  |
|             | 1000                    | 12.5         | 25             | 560                                                   | 0.20                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1CN102U( )          | 200             | 500                  |
| 25          | 2200                    | 16           | 31.5           | 750                                                   | 0.22                                 | 0.8               | 7.5              |                      |                | ECEA1CN222U             | 100             |                      |
|             | 3300                    | 18           | 35.5           | 900                                                   | 0.24                                 | 0.8               | 7.5              |                      |                | ECEA1CN332U             | 50              |                      |
|             | 10                      | 5            | 11             | 45                                                    | 0.15                                 | 0.5               | 2.0              | 5.0                  | 2.5            | ECEA1EN100U( )          | 200             | 2000                 |
|             | 22                      | 5            | 11             | 60                                                    | 0.15                                 | 0.5               | 2.0              | 5.0                  | 2.5            | ECEA1EN220X( )          | 200             | 2000                 |
|             | 33                      | 6.3          | 11.2           | 90                                                    | 0.15                                 | 0.5               | 2.5              | 5.0                  | 2.5            | ECEA1EN330U( )          | 200             | 2000                 |
|             | 47                      | 6.3          | 11.2           | 110                                                   | 0.15                                 | 0.5               | 2.5              | 5.0                  | 2.5            | ECEA1EN470U( )          | 200             | 2000                 |
|             | 100                     | 8            | 11.5           | 180                                                   | 0.15                                 | 0.6               | 3.5              | 5.0                  |                | ECEA1EN101U( )          | 200             | 1000                 |
|             | 220                     | 10           | 16             | 320                                                   | 0.15                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1EN221U( )          | 200             | 500                  |
|             | 330                     | 12.5         | 20             | 350                                                   | 0.15                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1EN331U( )          | 200             | 500                  |
| 35          | 470                     | 12.5         | 20             | 430                                                   | 0.15                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1EN471U( )          | 200             | 500                  |
|             | 1000                    | 16           | 25             | 680                                                   | 0.15                                 | 0.8               | 7.5              | 7.5                  |                | ECEA1EN102U( )          | 100             | 250                  |
|             | 2200                    | 18           | 35.5           | 900                                                   | 0.17                                 | 0.8               | 7.5              |                      |                | ECEA1EN222U             | 50              |                      |
|             | 10                      | 5            | 11             | 43                                                    | 0.15                                 | 0.5               | 2.0              | 5.0                  | 2.5            | ECEA1VN100U( )          | 200             | 2000                 |
|             | 22                      | 6.3          | 11.2           | 80                                                    | 0.15                                 | 0.5               | 2.5              | 5.0                  | 2.5            | ECEA1VN220U( )          | 200             | 2000                 |
| 35          | 33                      | 8            | 11.5           | 100                                                   | 0.15                                 | 0.6               | 3.5              | 5.0                  |                | ECEA1VN330U( )          | 200             | 1000                 |
|             | 47                      | 8            | 11.5           | 120                                                   | 0.15                                 | 0.6               | 3.5              | 5.0                  |                | ECEA1VN470U( )          | 200             | 1000                 |
|             | 100                     | 10           | 16             | 230                                                   | 0.15                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1VN101U( )          | 200             | 500                  |
|             | 220                     | 12.5         | 20             | 360                                                   | 0.15                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1VN221U( )          | 200             | 500                  |
|             | 330                     | 12.5         | 20             | 450                                                   | 0.15                                 | 0.6               | 5.0              | 5.0                  |                | ECEA1VN331U( )          | 200             | 500                  |
| 470         | 12.5                    | 25           | 590            | 0.15                                                  | 0.6                                  | 5.0               | 5.0              |                      | ECEA1VN471U( ) | 200                     | 500             |                      |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, i=2.5 mm.  
· Please refer to the page of "Taping Dimensions".

### ■ Standard Products (Bi-polar)

Endurance: 85 °C 2000 h (1000 hours for each polarity)

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                         |                                      | Lead Length       |                  |                      | Part No. | Min. Packaging Q'ty     |                 |                      |
|-------------|-------------------------|--------------|----------------|-------------------------------------------------------|--------------------------------------|-------------------|------------------|----------------------|----------|-------------------------|-----------------|----------------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+85 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C)<br>(Ω) | Lead Dia.<br>(mm) | Lead Space       |                      |          | Straight Leads<br>(pcs) | Taping<br>(pcs) |                      |
|             |                         |              |                |                                                       |                                      |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |          |                         |                 | Taping<br>*i<br>(mm) |
| 50          | 0.47                    | 5            | 11             | 10                                                    | 0.15                                 | 0.5               | 2.0              | 5.0                  | 2.5      | ECEA1HNR47U( )***       | 200             | 2000                 |
|             | 1                       | 5            | 11             | 10                                                    | 0.15                                 | 0.5               | 2.0              | 5.0                  | 2.5      | ECEA1HN010U( )***       | 200             | 2000                 |
|             | 2.2                     | 5            | 11             | 18                                                    | 0.15                                 | 0.5               | 2.0              | 5.0                  | 2.5      | ECEA1HN2R2U( )          | 200             | 2000                 |
|             | 3.3                     | 5            | 11             | 25                                                    | 0.15                                 | 0.5               | 2.0              | 5.0                  | 2.5      | ECEA1HN3R3U( )          | 200             | 2000                 |
|             | 4.7                     | 5            | 11             | 30                                                    | 0.15                                 | 0.5               | 2.0              | 5.0                  | 2.5      | ECEA1HN4R7U( )          | 200             | 2000                 |
|             | 10                      | 6.3          | 11.2           | 50                                                    | 0.15                                 | 0.5               | 2.5              | 5.0                  | 2.5      | ECEA1HN100U( )          | 200             | 2000                 |
|             | 22                      | 8            | 11.5           | 90                                                    | 0.15                                 | 0.6               | 3.5              | 5.0                  |          | ECEA1HN220U( )          | 200             | 1000                 |
|             | 33                      | 8            | 11.5           | 110                                                   | 0.15                                 | 0.6               | 3.5              | 5.0                  |          | ECEA1HN330U( )          | 200             | 1000                 |
|             | 47                      | 10           | 12.5           | 140                                                   | 0.15                                 | 0.6               | 5.0              | 5.0                  |          | ECEA1HN470U( )          | 200             | 500                  |
|             | 100                     | 10           | 20             | 250                                                   | 0.15                                 | 0.6               | 5.0              | 5.0                  |          | ECEA1HN101U( )          | 200             | 500                  |
|             | 220                     | 12.5         | 25             | 360                                                   | 0.15                                 | 0.6               | 5.0              | 5.0                  |          | ECEA1HN221U( )          | 200             | 500                  |
|             | 330                     | 16           | 25             | 450                                                   | 0.15                                 | 0.8               | 7.5              | 7.5                  |          | ECEA1HN331U( )          | 100             | 250                  |
|             | 470                     | 16           | 31.5           | 590                                                   | 0.15                                 | 0.8               | 7.5              |                      |          | ECEA1HN471U             | 100             |                      |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, i=2.5 mm.

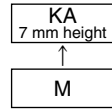
· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 31/Mar/2015

### Radial Lead Type

Series: **KA**      Type: **A**

Low Profile



#### ■ Features

- Endurance : 85° C 1000 h
- 7 mm height
- RoHS directive compliant

#### ■ Specifications

|                       |                                                                                                                                                                                           |                                    |  |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--|
| Category Temp. Range  | -40 °C to +85 °C                                                                                                                                                                          |                                    |  |
| Rated W.V. Range      | 4 V.DC to 50 V.DC                                                                                                                                                                         |                                    |  |
| Nominal Cap. Range    | 2.2 μF to 470 μF                                                                                                                                                                          |                                    |  |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                     |                                    |  |
| DC Leakage Current    | $I \leq 0.01 CV$ or 3 (μA) After 2 minutes (Whichever is greater)                                                                                                                         |                                    |  |
| tan δ                 | Please see the attached standard products list                                                                                                                                            |                                    |  |
| Endurance             | After applying rated working voltage for 1000 hours at +85 °C±2 °C when the capacitors are restored to 20 °C, capacitors shall meet the following limits.                                 |                                    |  |
|                       | Capacitance change                                                                                                                                                                        | ± 20% of initial measured value    |  |
|                       | tan δ                                                                                                                                                                                     | ≤ 200 % of initial specified value |  |
|                       | DC leakage current                                                                                                                                                                        | ≤ initial specified value          |  |
| Shelf Life            | After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment) |                                    |  |

#### ■ Frequency correction factor for ripple current

|                   | Frequency (Hz) |      |      |         |
|-------------------|----------------|------|------|---------|
|                   | 50, 60         | 120  | 1 k  | 10 k to |
| Correction factor | 0.70           | 1.00 | 1.30 | 1.70    |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)



|              | 4    | 5    | 6.3  | 8    |
|--------------|------|------|------|------|
| Body Dia. φD | 4    | 5    | 6.3  | 8    |
| Lead Dia. φd | 0.45 | 0.45 | 0.45 | 0.45 |
| Lead space F | 1.5  | 2.0  | 2.5  | 2.5  |

### Standard Products

Endurance : 85 °C 1000 h

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                         |                               | Lead Length       |                  |                      |                      | Part No.          | Min. Packaging Q'ty     |                 |
|-------------|-------------------------|--------------|----------------|-------------------------------------------------------|-------------------------------|-------------------|------------------|----------------------|----------------------|-------------------|-------------------------|-----------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+85 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Lead Dia.<br>(mm) | Lead Space       |                      |                      |                   | Straight Leads<br>(pcs) | Taping<br>(pcs) |
|             |                         |              |                |                                                       |                               |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) | Taping<br>*i<br>(mm) |                   |                         |                 |
| 4           | 47                      | 4            | 7              | 34                                                    | 0.35                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA0GKA470( )    | 200                     | 2000            |
|             | 100                     | 5            | 7              | 61                                                    | 0.35                          | 0.45              | 2.0              | 5.0                  | 2.5                  | ECEA0GKA101( )    | 200                     | 2000            |
|             | 220                     | 6.3          | 7              | 82                                                    | 0.35                          | 0.45              | 2.5              | 5.0                  | 2.5                  | ECEA0GKA221( )    | 200                     | 2000            |
|             | 330                     | 8            | 7              | 110                                                   | 0.35                          | 0.45              | 2.5              |                      | 2.5                  | ECEA0GKA331( )    | 200                     | 1000            |
|             |                         | 8            | 7              | 110                                                   | 0.35                          | 0.45              |                  | 5.0                  |                      | ECEA0GKA331Q      |                         | 1000            |
|             | 470                     | 8            | 7              | 140                                                   | 0.35                          | 0.45              | 2.5              |                      | 2.5                  | ECEA0GKA471( )    | 200                     | 1000            |
| 8           |                         | 7            | 140            | 0.35                                                  | 0.45                          |                   | 5.0              |                      | ECEA0GKA471Q         |                   | 1000                    |                 |
| 6.3         | 47                      | 4            | 7              | 46                                                    | 0.24                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA0JKA470( )    | 200                     | 2000            |
|             | 100                     | 5            | 7              | 71                                                    | 0.24                          | 0.45              | 2.0              | 5.0                  | 2.5                  | ECEA0JKA101( )    | 200                     | 2000            |
|             | 220                     | 6.3          | 7              | 103                                                   | 0.24                          | 0.45              | 2.5              | 5.0                  | 2.5                  | ECEA0JKA221( )    | 200                     | 2000            |
|             | 330                     | 8            | 7              | 130                                                   | 0.24                          | 0.45              | 2.5              |                      | 2.5                  | ECEA0JKA331( )    | 200                     | 1000            |
|             |                         | 8            | 7              | 130                                                   | 0.24                          | 0.45              |                  | 5.0                  |                      | ECEA0JKA331Q      |                         | 1000            |
| 10          | 33                      | 4            | 7              | 43                                                    | 0.20                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1AKA330( )    | 200                     | 2000            |
|             | 100                     | 6.3          | 7              | 80                                                    | 0.20                          | 0.45              | 2.5              | 5.0                  | 2.5                  | ECEA1AKA101( )    | 200                     | 2000            |
|             | 220                     | 8            | 7              | 120                                                   | 0.20                          | 0.45              | 2.5              |                      | 2.5                  | ECEA1AKA221( )    | 200                     | 1000            |
|             |                         | 8            | 7              | 120                                                   | 0.20                          | 0.45              |                  | 5.0                  |                      | ECEA1AKA221Q      |                         | 1000            |
| 16          | 10                      | 4            | 7              | 28                                                    | 0.16                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1CKA100( )    | 200                     | 2000            |
|             | 22                      | 4            | 7              | 39                                                    | 0.16                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1CKA220( )    | 200                     | 2000            |
|             | 33                      | 5            | 7              | 60                                                    | 0.16                          | 0.45              | 2.0              | 5.0                  | 2.5                  | ECEA1CKA330( )    | 200                     | 2000            |
|             | 47                      | 5            | 7              | 70                                                    | 0.16                          | 0.45              | 2.0              | 5.0                  | 2.5                  | ECEA1CKA470( )    | 200                     | 2000            |
|             | 100                     | 6.3          | 7              | 91                                                    | 0.16                          | 0.45              | 2.5              | 5.0                  | 2.5                  | ECEA1CKA101( )    | 200                     | 2000            |
| 25          | 10                      | 4            | 7              | 28                                                    | 0.14                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1EKA100( )    | 200                     | 2000            |
|             | 22                      | 5            | 7              | 55                                                    | 0.14                          | 0.45              | 2.0              | 5.0                  | 2.5                  | ECEA1EKA220( )    | 200                     | 2000            |
|             | 33                      | 6.3          | 7              | 65                                                    | 0.14                          | 0.45              | 2.5              | 5.0                  | 2.5                  | ECEA1EKA330( )    | 200                     | 2000            |
|             | 47                      | 6.3          | 7              | 70                                                    | 0.14                          | 0.45              | 2.5              | 5.0                  | 2.5                  | ECEA1EKA470( )    | 200                     | 2000            |
| 35          | 10                      | 5            | 7              | 30                                                    | 0.12                          | 0.45              | 2.0              | 5.0                  | 2.5                  | ECEA1VKA100( )    | 200                     | 2000            |
|             | 22                      | 6.3          | 7              | 60                                                    | 0.12                          | 0.45              | 2.5              | 5.0                  | 2.5                  | ECEA1VKA220( )    | 200                     | 2000            |
|             | 33                      | 6.3          | 7              | 65                                                    | 0.12                          | 0.45              | 2.5              | 5.0                  | 2.5                  | ECEA1VKA330( )    | 200                     | 2000            |
|             | 47                      | 8            | 7              | 85                                                    | 0.12                          | 0.45              | 2.5              |                      | 2.5                  | ECEA1VKA470( )    | 200                     | 1000            |
|             |                         | 8            | 7              | 85                                                    | 0.12                          | 0.45              |                  | 5.0                  |                      | ECEA1VKA470Q      |                         | 1000            |
| 50          | 0.1                     | 4            | 7              | 1                                                     | 0.10                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1HKA0R1( )*** | 200                     | 2000            |
|             | 0.22                    | 4            | 7              | 2                                                     | 0.10                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1HKAR22( )*** | 200                     | 2000            |
|             | 0.33                    | 4            | 7              | 3                                                     | 0.10                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1HKAR33( )*** | 200                     | 2000            |
|             | 0.47                    | 4            | 7              | 5                                                     | 0.10                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1HKAR47( )*** | 200                     | 2000            |
|             | 1                       | 4            | 7              | 10                                                    | 0.10                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1HKA010( )*** | 200                     | 2000            |
|             | 2.2                     | 4            | 7              | 16                                                    | 0.10                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1HKA2R2( )    | 200                     | 2000            |
|             | 3.3                     | 4            | 7              | 18                                                    | 0.10                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1HKA3R3( )    | 200                     | 2000            |
|             | 4.7                     | 4            | 7              | 23                                                    | 0.10                          | 0.45              | 1.5              | 5.0                  | 2.5                  | ECEA1HKA4R7( )    | 200                     | 2000            |
|             | 10                      | 5            | 7              | 35                                                    | 0.10                          | 0.45              | 2.0              | 5.0                  | 2.5                  | ECEA1HKA100( )    | 200                     | 2000            |
|             | 22                      | 6.3          | 7              | 60                                                    | 0.10                          | 0.45              | 2.5              | 5.0                  | 2.5                  | ECEA1HKA220( )    | 200                     | 2000            |
|             | 33                      | 8            | 7              | 75                                                    | 0.10                          | 0.45              | 2.5              |                      | 2.5                  | ECEA1HKA330( )    | 200                     | 1000            |
| 8           |                         | 7            | 75             | 0.10                                                  | 0.45                          |                   | 5.0              |                      | ECEA1HKA330Q         |                   | 1000                    |                 |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 31/Mar/2015

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Apr. 2014

### Radial Lead Type

Series: **KA(Bi-polar)** Type: **A**



#### ■ Features

- Endurance : 85° C 1000 h
- 7 mm height
- RoHS directive compliant

#### ■ Specifications

|                       |                                                                                                                                                                                             |                                   |  |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--|
| Category Temp. Range  | -40 °C to +85 °C                                                                                                                                                                            |                                   |  |
| Rated W.V. Range      | 4 V.DC to 50 V.DC                                                                                                                                                                           |                                   |  |
| Nominal Cap. Range    | 2.2 μF to 100 μF                                                                                                                                                                            |                                   |  |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                       |                                   |  |
| DC Leakage Current    | I ≤ 0.05 CV or 10 (μA) After 2 minutes (Whichever is greater)                                                                                                                               |                                   |  |
| tan δ                 | Please see the attached standard products list                                                                                                                                              |                                   |  |
| Endurance             | After 1000 hours application of DC working voltage (500 hours for each polarity) at +85 °C±2 °C, when the capacitors are restored to 20 °C, the capacitors shall meet the following limits. |                                   |  |
|                       | Capacitance change                                                                                                                                                                          | ± 20% of initial measured value   |  |
|                       | tan δ                                                                                                                                                                                       | ≤200 % of initial specified value |  |
|                       | DC leakage current                                                                                                                                                                          | ≤initial specified value          |  |
| Shelf Life            | After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)   |                                   |  |

#### ■ Frequency correction factor for ripple current

|                   | Frequency (Hz) |      |      |         |
|-------------------|----------------|------|------|---------|
|                   | 50, 60         | 120  | 1 k  | 10 k to |
| Correction factor | 0.70           | 1.00 | 1.30 | 1.70    |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)



|              |      |      |      |
|--------------|------|------|------|
| Body Dia. φD | 4    | 5    | 6.3  |
| Lead Dia. φd | 0.45 | 0.45 | 0.45 |
| Lead space F | 1.5  | 2.0  | 2.5  |

### ■ Standard Products (Bi-polar)

Endurance : 85 °C 1000 h (500hours for each polarity)

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                         |                               | Lead Length       |                  |                      | Part No. | Min. Packaging Q'ty     |                 |                      |
|-------------|-------------------------|--------------|----------------|-------------------------------------------------------|-------------------------------|-------------------|------------------|----------------------|----------|-------------------------|-----------------|----------------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+85 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Lead Dia.<br>(mm) | Lead Space       |                      |          | Straight Leads<br>(pcs) | Taping<br>(pcs) |                      |
|             |                         |              |                |                                                       |                               |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |          |                         |                 | Taping<br>*i<br>(mm) |
| 4           | 100                     | 6.3          | 7              | 61                                                    | 0.35                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA0GKN101( )          | 200             | 2000                 |
|             | 22                      | 5            | 7              | 29                                                    | 0.24                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA0JKN220( )          | 200             | 2000                 |
| 6.3         | 33                      | 5            | 7              | 38                                                    | 0.24                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA0JKN330( )          | 200             | 2000                 |
|             | 47                      | 6.3          | 7              | 46                                                    | 0.24                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA0JKN470( )          | 200             | 2000                 |
| 10          | 10                      | 4            | 7              | 25                                                    | 0.20                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1AKN100( )          | 200             | 2000                 |
|             | 22                      | 5            | 7              | 35                                                    | 0.20                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA1AKN220( )          | 200             | 2000                 |
|             | 33                      | 6.3          | 7              | 43                                                    | 0.20                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1AKN330( )          | 200             | 2000                 |
|             | 47                      | 6.3          | 7              | 65                                                    | 0.20                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1AKN470( )          | 200             | 2000                 |
| 16          | 4.7                     | 4            | 7              | 20                                                    | 0.16                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1CKN4R7( )          | 200             | 2000                 |
|             | 10                      | 5            | 7              | 25                                                    | 0.16                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA1CKN100( )          | 200             | 2000                 |
|             | 22                      | 6.3          | 7              | 39                                                    | 0.16                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1CKN220( )          | 200             | 2000                 |
|             | 33                      | 6.3          | 7              | 60                                                    | 0.16                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1CKN330( )          | 200             | 2000                 |
| 25          | 3.3                     | 4            | 7              | 16                                                    | 0.16                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1EKN3R3( )          | 200             | 2000                 |
|             | 4.7                     | 5            | 7              | 21                                                    | 0.16                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA1EKN4R7( )          | 200             | 2000                 |
|             | 10                      | 6.3          | 7              | 28                                                    | 0.16                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1EKN100( )          | 200             | 2000                 |
|             | 22                      | 6.3          | 7              | 55                                                    | 0.16                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1EKN220( )          | 200             | 2000                 |
| 35          | 2.2                     | 4            | 7              | 12                                                    | 0.14                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1VKN2R2( )          | 200             | 2000                 |
|             | 3.3                     | 5            | 7              | 16                                                    | 0.14                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA1VKN3R3( )          | 200             | 2000                 |
|             | 4.7                     | 5            | 7              | 22                                                    | 0.14                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA1VKN4R7( )          | 200             | 2000                 |
|             | 10                      | 6.3          | 7              | 30                                                    | 0.14                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1VKN100( )          | 200             | 2000                 |
| 50          | 0.1                     | 4            | 7              | 1                                                     | 0.12                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1HKN0R1( )***       | 200             | 2000                 |
|             | 0.22                    | 4            | 7              | 2                                                     | 0.12                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1HKNR22( )***       | 200             | 2000                 |
|             | 0.33                    | 4            | 7              | 3                                                     | 0.12                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1HKNR33( )***       | 200             | 2000                 |
|             | 0.47                    | 4            | 7              | 5                                                     | 0.12                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1HKNR47( )***       | 200             | 2000                 |
|             | 1                       | 4            | 7              | 10                                                    | 0.12                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1HKN010( )***       | 200             | 2000                 |
|             | 2.2                     | 5            | 7              | 16                                                    | 0.12                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA1HKN2R2( )          | 200             | 2000                 |
|             | 3.3                     | 5            | 7              | 16                                                    | 0.12                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA1HKN3R3( )          | 200             | 2000                 |
|             | 4.7                     | 6.3          | 7              | 23                                                    | 0.12                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1HKN4R7( )          | 200             | 2000                 |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, 7.5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

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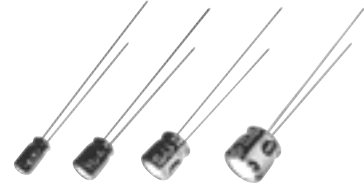
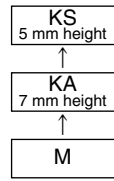
### Radial Lead Type

Series: **KS**    Type: **A**

#### ■ Features

- Endurance : 85° C 1000 h
- 5 mm height
- RoHS directive compliant

Low Profile



#### ■ Specifications

|                       |                                                                                                                                                                                           |                                               |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Category Temp. Range  | -40 °C to +85 °C                                                                                                                                                                          |                                               |
| Rated W.V. Range      | 4 V.DC to 50 V.DC                                                                                                                                                                         |                                               |
| Nominal Cap. Range    | 2.2 μF to 330 μF                                                                                                                                                                          |                                               |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                     |                                               |
| DC Leakage Current    | $I \leq 0.01 CV$ or 3 (μA) After 2 minutes (Whichever is greater)                                                                                                                         |                                               |
| tan δ                 | Please see the attached standard products list                                                                                                                                            |                                               |
| Endurance             | After applying rated working voltage for 1000 hours at +85 °C±2 °C, when the capacitors are restored to 20°C capacitors, shall meet the following limits.                                 |                                               |
|                       | Capacitance change                                                                                                                                                                        | ± 20% of initial measured value (4 V : ±30 %) |
|                       | tan δ                                                                                                                                                                                     | ≤ 200 % of initial specified value            |
|                       | DC leakage current                                                                                                                                                                        | ≤ initial specified value                     |
| Shelf Life            | After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment) |                                               |

#### ■ Frequency correction factor for ripple current

|                   | Frequency (Hz) |      |      |         |
|-------------------|----------------|------|------|---------|
|                   | 50, 60         | 120  | 1 k  | 10 k to |
| Correction factor | 0.70           | 1.00 | 1.30 | 1.70    |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)



|              | 4    | 5    | 6.3  | 8    |
|--------------|------|------|------|------|
| Body Dia. φD | 4    | 5    | 6.3  | 8    |
| Lead Dia. φd | 0.45 | 0.45 | 0.45 | 0.45 |
| Lead space F | 1.5  | 2.0  | 2.5  | 2.5  |



### Standard Products

Endurance : 85 °C 1000 h

| W.V. | Cap.<br>(±20 %) | Case size |        | Specification                                         |                               | Lead Length |            |              |              | Part No.          | Min. Packaging Q'ty |        |       |
|------|-----------------|-----------|--------|-------------------------------------------------------|-------------------------------|-------------|------------|--------------|--------------|-------------------|---------------------|--------|-------|
|      |                 | Dia.      | Length | Ripple Current<br>(120 Hz)<br>(+85 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Lead Dia.   | Lead Space |              |              |                   | Straight Leads      | Taping |       |
|      |                 |           |        |                                                       |                               |             | Straight   | Taping<br>*B | Taping<br>*i |                   |                     |        | (pcs) |
| (V)  | (μF)            | (mm)      | (mm)   | (mA r.m.s.)                                           |                               | (mm)        | (mm)       | (mm)         |              |                   | (pcs)               | (pcs)  |       |
| 4    | 33              | 4         | 5      | 26                                                    | 0.35                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA0GKS330( )    | 200                 | 2000   |       |
|      | 47              | 4         | 5      | 34                                                    | 0.35                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA0GKS470( )    | 200                 | 2000   |       |
|      | 100             | 5         | 5      | 61                                                    | 0.35                          | 0.45        | 2.0        | 5.0          | 2.5          | ECEA0GKS101( )    | 200                 | 2000   |       |
|      | 220             | 6.3       | 5      | 82                                                    | 0.35                          | 0.45        | 2.5        | 5.0          | 2.5          | ECEA0GKS221( )    | 200                 | 2000   |       |
| 6.3  | 22              | 4         | 5      | 29                                                    | 0.24                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA0JKS220( )    | 200                 | 2000   |       |
|      | 33              | 5         | 5      | 38                                                    | 0.24                          | 0.45        | 2.0        | 5.0          | 2.5          | ECEA0JKS330( )    | 200                 | 2000   |       |
|      | 47              | 5         | 5      | 46                                                    | 0.24                          | 0.45        | 2.0        | 5.0          | 2.5          | ECEA0JKS470( )    | 200                 | 2000   |       |
|      | 100             | 6.3       | 5      | 71                                                    | 0.24                          | 0.45        | 2.5        | 5.0          | 2.5          | ECEA0JKS101( )    | 200                 | 2000   |       |
|      | 330             | 8         | 5      | 130                                                   | 0.24                          | 0.45        | 2.5        |              | 2.5          | ECEA0JKS331( )    | 200                 | 1000   |       |
|      |                 | 8         | 5      | 130                                                   | 0.24                          | 0.45        |            | 5.0          |              | ECEA0JKS331Q      |                     | 1000   |       |
| 10   | 22              | 5         | 5      | 35                                                    | 0.20                          | 0.45        | 2.0        | 5.0          | 2.5          | ECEA1AKS220( )    | 200                 | 2000   |       |
|      | 33              | 5         | 5      | 43                                                    | 0.20                          | 0.45        | 2.0        | 5.0          | 2.5          | ECEA1AKS330( )    | 200                 | 2000   |       |
|      | 47              | 6.3       | 5      | 65                                                    | 0.20                          | 0.45        | 2.5        | 5.0          | 2.5          | ECEA1AKS470( )    | 200                 | 2000   |       |
|      | 100             | 6.3       | 5      | 80                                                    | 0.20                          | 0.45        | 2.5        | 5.0          | 2.5          | ECEA1AKS101( )    | 200                 | 2000   |       |
|      | 220             | 8         | 5      | 120                                                   | 0.20                          | 0.45        | 2.5        |              | 2.5          | ECEA1AKS221( )    | 200                 | 1000   |       |
|      |                 | 8         | 5      | 120                                                   | 0.20                          | 0.45        |            | 5.0          |              | ECEA1AKS221Q      |                     | 1000   |       |
| 16   | 10              | 4         | 5      | 28                                                    | 0.16                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA1CKS100( )    | 200                 | 2000   |       |
|      | 22              | 5         | 5      | 39                                                    | 0.16                          | 0.45        | 2.0        | 5.0          | 2.5          | ECEA1CKS220( )    | 200                 | 2000   |       |
|      | 33              | 6.3       | 5      | 60                                                    | 0.16                          | 0.45        | 2.5        | 5.0          | 2.5          | ECEA1CKS330( )    | 200                 | 2000   |       |
|      | 47              | 6.3       | 5      | 70                                                    | 0.16                          | 0.45        | 2.5        | 5.0          | 2.5          | ECEA1CKS470( )    | 200                 | 2000   |       |
|      | 100             | 8         | 5      | 91                                                    | 0.16                          | 0.45        | 2.5        |              | 2.5          | ECEA1CKS101( )    | 200                 | 1000   |       |
|      |                 | 8         | 5      | 91                                                    | 0.16                          | 0.45        |            | 5.0          |              | ECEA1CKS101Q      |                     | 1000   |       |
| 25   | 4.7             | 4         | 5      | 22                                                    | 0.14                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA1EKS4R7( )    | 200                 | 2000   |       |
|      | 10              | 5         | 5      | 28                                                    | 0.14                          | 0.45        | 2.0        | 5.0          | 2.5          | ECEA1EKS100( )    | 200                 | 2000   |       |
|      | 22              | 6.3       | 5      | 55                                                    | 0.14                          | 0.45        | 2.5        | 5.0          | 2.5          | ECEA1EKS220( )    | 200                 | 2000   |       |
|      | 33              | 6.3       | 5      | 65                                                    | 0.14                          | 0.45        | 2.5        | 5.0          | 2.5          | ECEA1EKS330( )    | 200                 | 2000   |       |
|      | 100             | 8         | 5      | 85                                                    | 0.14                          | 0.45        | 2.5        |              | 2.5          | ECEA1EKS101( )    | 200                 | 1000   |       |
|      |                 | 8         | 5      | 85                                                    | 0.14                          | 0.45        |            | 5.0          |              | ECEA1EKS101Q      |                     | 1000   |       |
| 35   | 3.3             | 4         | 5      | 16                                                    | 0.12                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA1VKS3R3( )    | 200                 | 2000   |       |
|      | 4.7             | 4         | 5      | 22                                                    | 0.12                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA1VKS4R7( )    | 200                 | 2000   |       |
|      | 10              | 5         | 5      | 30                                                    | 0.12                          | 0.45        | 2.0        | 5.0          | 2.5          | ECEA1VKS100( )    | 200                 | 2000   |       |
|      | 22              | 6.3       | 5      | 60                                                    | 0.12                          | 0.45        | 2.5        | 5.0          | 2.5          | ECEA1VKS220( )    | 200                 | 2000   |       |
|      | 33              | 8         | 5      | 65                                                    | 0.12                          | 0.45        | 2.5        |              | 2.5          | ECEA1VKS330( )    | 200                 | 1000   |       |
|      |                 |           | 8      | 5                                                     | 65                            | 0.12        | 0.45       |              | 5.0          |                   | ECEA1VKS330Q        |        | 1000  |
|      | 47              | 8         | 5      | 85                                                    | 0.12                          | 0.45        | 2.5        |              | 2.5          | ECEA1VKS470( )    | 200                 | 1000   |       |
|      |                 | 8         | 5      | 85                                                    | 0.12                          | 0.45        |            | 5.0          |              | ECEA1VKS470Q      |                     | 1000   |       |
| 50   | 0.1             | 4         | 5      | 1                                                     | 0.10                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA1HKS0R1( )*** | 200                 | 2000   |       |
|      | 0.22            | 4         | 5      | 2                                                     | 0.10                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA1HKS0R2( )*** | 200                 | 2000   |       |
|      | 0.33            | 4         | 5      | 3                                                     | 0.10                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA1HKS0R3( )*** | 200                 | 2000   |       |
|      | 0.47            | 4         | 5      | 5                                                     | 0.10                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA1HKS0R4( )*** | 200                 | 2000   |       |
|      | 1               | 4         | 5      | 10                                                    | 0.10                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA1HKS010( )*** | 200                 | 2000   |       |
|      | 2.2             | 4         | 5      | 16                                                    | 0.10                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA1HKS2R2( )    | 200                 | 2000   |       |
|      | 3.3             | 4         | 5      | 16                                                    | 0.10                          | 0.45        | 1.5        | 5.0          | 2.5          | ECEA1HKS3R3( )    | 200                 | 2000   |       |
|      | 4.7             | 5         | 5      | 23                                                    | 0.10                          | 0.45        | 2.0        | 5.0          | 2.5          | ECEA1HKS4R7( )    | 200                 | 2000   |       |
|      | 10              | 6.3       | 5      | 35                                                    | 0.10                          | 0.45        | 2.5        | 5.0          | 2.5          | ECEA1HKS100( )    | 200                 | 2000   |       |
|      | 22              | 8         | 5      | 60                                                    | 0.10                          | 0.45        | 2.5        |              | 2.5          | ECEA1HKS220( )    | 200                 | 1000   |       |
|      |                 | 8         | 5      | 60                                                    | 0.10                          | 0.45        |            | 5.0          |              | ECEA1HKS220Q      |                     | 1000   |       |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

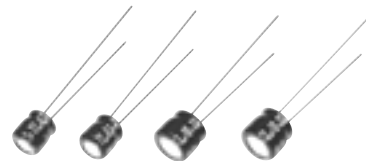
\*\*\* Please kindly accept last shipment : 31/Mar/2015

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

### Radial Lead Type

Series: **KS(Bi-polar)** Type: **A**



#### ■ Features

- Endurance : 85° C 1000 h
- 5 mm height
- RoHS directive compliant

#### ■ Specifications

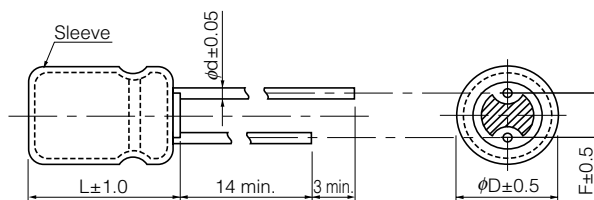
|                       |                                                                                                                                                                                             |                                   |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Category Temp. Range  | -40 °C to +85 °C                                                                                                                                                                            |                                   |
| Rated W.V. Range      | 63 V.DC to 50 V.DC                                                                                                                                                                          |                                   |
| Nominal Cap. Range    | 2.2 μF to 47 μF                                                                                                                                                                             |                                   |
| Capacitance Tolerance | ±20 % (120 Hz/+20 °C)                                                                                                                                                                       |                                   |
| DC Leakage Current    | I ≤ 0.05 CV or 10 (μA) After 2 minutes (Whichever is greater)                                                                                                                               |                                   |
| tan δ                 | Please see the attached standard products list                                                                                                                                              |                                   |
| Endurance             | After 1000 hours application of DC working voltage (500 hours for each polarity) at +85 °C±2 °C, when the capacitors are restored to 20 °C, the capacitors shall meet the following limits. |                                   |
|                       | Capacitance change                                                                                                                                                                          | ± 20% of initial measured value   |
|                       | tan δ                                                                                                                                                                                       | ≤200 % of initial specified value |
|                       | DC leakage current                                                                                                                                                                          | ≤initial specified value          |
| Shelf Life            | After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)   |                                   |

#### ■ Frequency correction factor for ripple current

|                   | Frequency (Hz) |      |      |         |
|-------------------|----------------|------|------|---------|
|                   | 50, 60         | 120  | 1 k  | 10 k to |
| Correction factor | 0.70           | 1.00 | 1.30 | 1.70    |

#### ■ Dimensions in mm (not to scale)

(Unit : mm)



|              |      |      |      |
|--------------|------|------|------|
| Body Dia. φD | 4    | 5    | 6.3  |
| Lead Dia. φd | 0.45 | 0.45 | 0.45 |
| Lead space F | 1.5  | 2.0  | 2.5  |

### ■ Standard Products (Bi-polar)

Endurance : 85 °C 1000 h (500hours for each polarity)

| W.V.<br>(V) | Cap.<br>(±20 %)<br>(μF) | Case size    |                | Specification                                         |                               | Lead Length       |                  |                      | Part No. | Min. Packaging Q'ty     |                 |                      |
|-------------|-------------------------|--------------|----------------|-------------------------------------------------------|-------------------------------|-------------------|------------------|----------------------|----------|-------------------------|-----------------|----------------------|
|             |                         | Dia.<br>(mm) | Length<br>(mm) | Ripple Current<br>(120 Hz)<br>(+85 °C)<br>(mA r.m.s.) | tan δ<br>(120 Hz)<br>(+20 °C) | Lead Dia.<br>(mm) | Lead Space       |                      |          | Straight Leads<br>(pcs) | Taping<br>(pcs) |                      |
|             |                         |              |                |                                                       |                               |                   | Straight<br>(mm) | Taping<br>*B<br>(mm) |          |                         |                 | Taping<br>*i<br>(mm) |
| 6.3         | 22                      | 5            | 5              | 29                                                    | 0.24                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA0JSN220( )          | 200             | 2000                 |
|             | 33                      | 6.3          | 5              | 38                                                    | 0.24                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA0JSN330( )          | 200             | 2000                 |
|             | 47                      | 6.3          | 5              | 46                                                    | 0.24                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA0JSN470( )          | 200             | 2000                 |
| 10          | 10                      | 4            | 5              | 25                                                    | 0.20                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1ASN100( )          | 200             | 2000                 |
|             | 22                      | 6.3          | 5              | 35                                                    | 0.20                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1ASN220( )          | 200             | 2000                 |
|             | 33                      | 6.3          | 5              | 43                                                    | 0.20                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1ASN330( )          | 200             | 2000                 |
| 16          | 4.7                     | 4            | 5              | 20                                                    | 0.20                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1CSN4R7( )          | 200             | 2000                 |
|             | 10                      | 5            | 5              | 25                                                    | 0.20                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA1CSN100( )          | 200             | 2000                 |
|             | 22                      | 6.3          | 5              | 39                                                    | 0.20                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1CSN220( )          | 200             | 2000                 |
| 25          | 3.3                     | 5            | 5              | 18                                                    | 0.20                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA1ESN3R3( )          | 200             | 2000                 |
|             | 4.7                     | 5            | 5              | 21                                                    | 0.20                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA1ESN4R7( )          | 200             | 2000                 |
|             | 10                      | 6.3          | 5              | 28                                                    | 0.20                          | 0.45              | 2.5              | 5.0                  | 2.5      | ECEA1ESN100( )          | 200             | 2000                 |
| 35          | 2.2                     | 4            | 5              | 12                                                    | 0.20                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1VSN2R2( )          | 200             | 2000                 |
| 50          | 0.1                     | 4            | 5              | 1                                                     | 0.20                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1HSN0R1( )***       | 200             | 2000                 |
|             | 0.22                    | 4            | 5              | 2                                                     | 0.20                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1HSNR22( )***       | 200             | 2000                 |
|             | 0.33                    | 4            | 5              | 3                                                     | 0.20                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1HSNR33( )***       | 200             | 2000                 |
|             | 0.47                    | 4            | 5              | 5                                                     | 0.20                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1HSNR47( )***       | 200             | 2000                 |
|             | 1                       | 4            | 5              | 10                                                    | 0.20                          | 0.45              | 1.5              | 5.0                  | 2.5      | ECEA1HSN010( )***       | 200             | 2000                 |
|             | 2.2                     | 5            | 5              | 16                                                    | 0.20                          | 0.45              | 2.0              | 5.0                  | 2.5      | ECEA1HSN2R2( )          | 200             | 2000                 |

· When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch \*B=5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

\*\*\* Please kindly accept last shipment : 31/Mar/2015

## Notices

### ■ Applicable laws and regulations

- This product satisfies the requirements of the RoHS Directive (2011/65/EU) (related to the specified hazardous substances contained in electrical and electronic equipment).
- The ozone-depleting chemicals regulated by the Montreal Protocol are not intentionally used in the materials used in our manufacturing processes.
- PBBs(Poly-Brominated Biphenyls)/PBDEs (Poly-Brominated Diphenyl ethers)  
The above specified brominated flame retardants are not intentionally used.
- When exporting this product, observe the export procedures specified in export control laws such as the Foreign Exchange and Foreign Trade Control Law.

### ■ Limited applications

- This product is intended to be used for general-purpose standard applications for general electronic equipment (such as AV equipment, household appliances, business or office equipment, information or communications equipment, etc.)
- If this product is being examined for possible use in applications where higher reliability or safety is required, in cases where a malfunction of this product may endanger life or property, then the delivery specifications meeting the application requirements must be agreed to and exchanged.

## Items to be observed

- (1) The purpose of these specifications is to ensure the quality of components as individual components.  
Before use, check and evaluate their operation when mounted on your products.
- (2) Do not use our components outside of the corresponding specifications.

### ■ When using this capacitor in a product where safety is critical

We take great care in the quality of this product. However, performance may deteriorate and short-circuiting or open-circuiting may occur if it will be used in transportation equipment (e.g. trains, cars, traffic lights), medical equipment, airborne equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, disaster/crime prevention equipment, or other equipment where a defect in this component may cause the loss of human life or other significant damage. Ensure that the target equipment has a failsafe design and is provided with the following systems to guarantee adequate safety.

- (1) \* Ensure the safety of the whole system by installing a protection circuit and a protection device.
- (2) Redundant circuits, etc. to maintain the safety of the entire system so that a single independent failure will not lead to unsafe conditions.

### ■ Conditions of use

This product is intended to be used in electronic equipment for general-purpose standard applications and is not designed for use in any special environments.  
When this capacitor is used in a special environment or under special conditions, its performance may be affected. Before use, verify the performance and reliability of the capacitor.

## ⚠ Application Guidelines

### 1. Circuit design

Verify the usage and fitting environments and make sure to observe the rated performance specified in the corresponding catalog or specifications.

#### 1.1 Operating temperature and frequency

Variations in temperature and frequency can affect the electrical characteristics of capacitors. Design circuits allowing for these variations.

- (1) At high temperatures leakage current increases.
- (2) At low temperatures the capacitance decreases and an increase in the tangent of the loss angle and impedance.
- (3) As frequency increases, capacitance decreases and the tangent of the loss angle increases, while the capacitive portion of impedance decreases till the resonant frequency is reached.
- (4) At low frequency there is temperature rise caused by ripple currents accompanying the increase in equivalent series resistance.

#### 1.2 Operating temperature and life expectancy

- (1) The capacitor life is affected by usage temperature.  
In general, the capacitor life is approximately doubled when the temperature decreases by 10 °C.  
Reduce the usage temperature as much as possible.
- (2) The use of capacitors beyond the upper category temperatures may cause rapid deterioration in the characteristics and break down may occur.  
The temperature referred to here includes the ambient temperature(within equipment), including heat produced by heat generating devices (power transistors, resistors, etc.), self-heating due to ripple currents, etc. Take these factors into consideration when checking the temperature of capacitors.  
Do not place any heat generating devices, etc. on the back of capacitors.
- (3) The life acceleration can be calculated with the following equation:

$$L_2 = L_1 \times 2^{\frac{T_1 - T_2}{10}}$$

L<sub>1</sub>: Life at a temperature T<sub>1</sub> °C (h)

L<sub>2</sub>: Life at a temperature T<sub>2</sub> °C (h)

T<sub>1</sub>: Category upper limit temperature + heat generation due to ripple currents (°C)

T<sub>2</sub>: Ambient temperature to calculate the life + heat generation due to ripple currents (°C)

#### 1.3 Common application conditions to avoid

If the loads shown below are applied to a capacitor, then its characteristics may degrade rapidly or it may short-circuit. Rapid heat or gas generation may occur, which leads to the activation of the pressure valve. Electrolytes will then leak from the sealing section. In the worst case, an explosion or ignition may occur.

When the capacitor breaks down, combustible materials (electrolytes, element fixing materials, etc.) may flow externally in all directions.

##### (1) Polarity

**Aluminum electrolytic capacitors have polarities.**

Do not apply a reversed or alternating-current voltage.

If the polarity is reversed, then short-circuiting may occur in the initial state or the pressure valve may be activated, leading to capacitor breakdown.

Check the polarity when using a polar capacitor.

If the polarity is unstable or unclear in a circuit, then use bipolar capacitors. However, bipolar capacitors cannot be used in alternating current circuits.

##### (2) Applied voltage

**Do not apply an excessive voltage (voltage exceeding the rating).**

The peak direct current voltage superposed with a ripple voltage (alternating current component) must be equal to or less than the rated voltage. A surge voltage exceeding the rated voltage is allowed and specified. However, the allowable conditions are limited and the specifications do not guarantee the application of such a surge voltage for a long time.

##### (3) Ripple current

**Do not allow an excessive current (current exceeding the rated ripple current) to pass.**

If an excessive ripple current passes through, then the amount of internally generated heat will grow, the capacitor life will be reduced, or the pressure valve will be activated, leading to breakdown.

Even if the current is equivalent to or less than the allowable level, a reversed voltage may be applied when a direct current bias voltage is low.

Use capacitors so that a reversed voltage is not applied.

- (4) Charging/discharging applications  
Standard capacitors are not suitable for use in repeating charge/discharge applications. For charge/discharge applications, consult us with your actual application condition.  
For rush current, please do not exceed 100 A.
- (5) ON-OFF circuit  
Do not use capacitors in circuit where ON-OFF switching is repeated more than 10000 times/per day.  
In case of applying to the these ON-OFF circuit, consult with us about circuit condition and so on.
- (6) Series/parallel connection  
**[Parallel connection]**  
If capacitors are connected in parallel, then the balance of currents between these capacitors may be disrupted and an excessive ripple current may pass through only part of these capacitors.  
Wire your circuits such that excessive ripple current does not pass through the capacitors.  
**[Series connection]**  
If capacitors are connected in series, then the balance of voltages between these capacitors may be disrupted and excessive voltage may be applied. Add a bleeder resistor in parallel with each capacitor. By taking leak currents into consideration the balance of voltages will not be disrupted.
- (7) Electrical isolation of the capacitors  
**Isolate capacitors completely in a circuit in the following cases.**  
Between the housing and cathode and anode terminals and between circuit traces.
- (8) Capacitor sleeve  
Exterior sleeves or lamination covering capacitors are for indication purposes only and do not guarantee electrical insulation.

**1.4 Capacitor mounting considerations**

For aluminum electrolytic capacitors, conductive electrolysis whose main solvent is combustible organic solvent and combustible electrolytic paper is used.  
If the electrolysis leaks onto a printed circuit board, then it may corrode or short-circuit the traces, leading to smoke or fire. Check the following points when designing products.

- (1) Double-sided circuit board  
If capacitors are used in double-sided boards, then do not lay wiring traces immediately below the capacitors.  
If the sealed part of a capacitor adheres to the surface of a through-hole printed circuit board, then the solder may be absorbed into the gap during dip soldering and the anode and cathode terminals may be short-circuited.
- (2) Circuit board hole positioning  
Solder may protrude from the through-holes or holes for post-mounted component leads and damage the capacitor exterior sleeves. Be mindful of the hole positions.
- (3) Circuit board hole spacing  
Make holes for capacitors with a gap equivalent to that of capacitor leads (terminals) during design. Otherwise, there will be stress on the capacitor leads when they are inserted into these holes, leading to current leaks, short-circuiting, or electrolysis leakage.
- (4) Surface-mount types  
For surface-mount type capacitors, design land traces with reference to the recommended board land sizes described in the delivery specifications, etc.
- (5) Capacitors equipped with pressure valves  
Provide a space above the pressure valve so that it can operate properly.  
For capacitors equipped with a pressure valve (as per the shape and dimensional descriptions of each series), provide a space as follows. If the space is smaller than the requirements, then the pressure valve may not operate properly, leading to an explosion.

| Product diameter | Space        |
|------------------|--------------|
| φ6.3 to φ16 mm   | 2 mm or more |
| φ18 to φ35 mm    | 3 mm or more |
| φ40 mm or more   | 5 mm or more |

- (6) Clearance for seal mounted pressure relief vents  
When the pressure valve section of a capacitor faces the printed wiring, provide a degassing hole aligned with the pressure valve position for proper operation of the valve.
- (7) Wiring near the pressure relief vent.  
Considerations must be taken in designing circuits so that there are no traces, particularly for high-voltage or large-current wiring, above the pressure valve sections.  
When a pressure valve is activated, combustible high-temperature gas exceeding 100°C will be released. Gas may condense or the wiring covers may melt and secondary accidents may occur.
- (8) Circuit board patterns under the capacitor.  
If electrolysis leaks, then the circuit traces may short-circuit and tracking or migration may occur.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.

## 2. Mounting

### 2.1 Considerations before using

- (1) Do not reuse capacitors that have been installed and energized.
- (2) Capacitors may generate transient recovery voltages. In this case, discharge them using a resistor of approx. 1 k $\Omega$ .
- (3) Capacitors stored for a long time may have a larger current leak.  
In this case, dispose the voltage using a resistor of approx. 1 k $\Omega$ .
- (4) Do not drop capacitors onto a floor, etc.  
Do not use dropped capacitors because they may be damaged mechanically or electrically.
- (5) Do not use corrupted capacitors.  
If a capacitor's seal is deteriorated, then its performance will be degraded, life reduced, and/or the electrolyte will leak.

### 2.2 Capacitor insertion

- (1) Check the capacitor ratings (capacitance and voltage) before mounting.
- (2) Check the capacitor polarity before mounting.
- (3) Check the capacitor lead and hole intervals and land size before mounting.  
If these intervals are different, then stress will be applied to the inside of the capacitor through its leads when they are inserted into the board holes, leading to short-circuiting or other failures.
- (4) When an automatic mounter is used, the force to clinch and fix capacitor leads must not be excessive.  
When capacitor leads are clinched and fixed onto a circuit board, the leads may be pulled and a large force applied to the capacitor if there are missing cogs or the gap between the clinching section and the circuit board is too small. If this is the case, then the capacitor may break down.  
For surface-mount type capacitors, if the mounting pressure is excessive, then current leaks may increase, short-circuiting may occur, or the capacitor may break down and come off.

### 2.3 Manual soldering

- (1) Solder capacitors under the soldering conditions (temperature and time) as described in the specifications or at 350 °C for three seconds or less.
- (2) If the capacitor lead terminals must be pre-processed in order to align the gaps between the terminals and holes, place them before soldering to prevent stress from being applied to the capacitor body.
- (3) If it is necessary to manually remove soldered capacitors, repair them after the solder has sufficiently melted to prevent stress from being applied to the capacitor terminals.
- (4) Do not touch the capacitor body with the soldering iron tip. Otherwise, a hole may occur on the capacitor exterior sleeve. The sleeve may break or become damaged.

### 2.4 Flow soldering

- (1) Do not immerse the capacitor body in a solder bath. The capacitor's inner pressure could increase and the capacitor will break down.
- (2) Solder capacitors under the soldering conditions (temperature and time) described in the specifications.
- (3) When soldering, do not allow other components to fall or touch the capacitors.  
When soldering, if resistors, ceramic capacitors, or other components (with a high heat conductance) fall and their lead terminals or metallic sections touch the capacitor, then local thermal stress can occur causing the capacitor's exterior sleeve to break down. This phenomenon is identical to short-circuiting.
- (4) Prevent flux from adhering to anything other than the terminals.

### 2.5 Reflow soldering for chip capacitors

- (1) Surface-mount type capacitor are exclusively for reflow soldering. When reflow solder is used an ambient heat condition system such as the simultaneous use of infrared and hot-air is recommended.  
\* This system cannot be used for flow or dip soldering.
- (2) Soldering capacitors under the soldering conditions (pre-heating, soldering temperature and time) described in the specifications.
- (3) Reflow-solder only once.  
If you need to apply reflow soldering twice, then make sure to contact us.
- (4) Do not reuse the installed surface-mount type capacitors.
- (5) The crack on top marking might be occurred by reflow heat stress.  
But please acknowledge that it does not influence the reliability of the product.
- (6) VPS (Vapor Phase Soldering) reflow can cause significant characteristics change and/ or mounting failure due to deformation by acute temperature rise. VPS is acceptable provided that the process does not exceed recommended reflow profile and temperature rise is less than 3degC/sec. Please contact Panasonic for detailed conditions.

### 2.6 Other soldering considerations

If the chip capacitor temperature becomes very high due to pre-heating or hardening of the fixing resin, then the capacitor exterior sleeve may shrink or crack. If capacitors are passed through a heat-curing furnace, then the ambient temperature must be 150°C or less and the duration must be two minutes or less.

### 2.7 Capacitor handling after soldering

- (1) Do not tilt, bring down, or twist the capacitors soldered to the printed circuit board; otherwise a torque will be generated with the capacitor circumference as the fulcrum. As a result, a large force will be applied to the inside of the element through the terminals and the capacitor may break down.
- (2) Do not hold the capacitors soldered to the printed circuit board to carry the board; otherwise the board's entire weight will be applied to the inside of the element through the terminals and the capacitor may break down.
- (3) Do not hit the capacitors soldered to the printed circuit board with foreign objects. When stacking printed circuit boards, do not hit the capacitors with circuit boards or other components (terminals, etc.)

## 2.8 Circuit board cleaning

- (1) Apply the following conditions to flux cleaning after soldering

Temperature: 60°C or less, duration: Five minutes or less (Ultrasonic waves may be used.)  
However, rinse sufficiently and dry the boards (at 100°C for 20 minutes or less).

[Applicable solvents]

Pine Alpha ST-100S  
Clean-thru 750H, 750L, or 710M  
Aqua Cleaner 210SEP  
Sunelec B-12  
DK Beclear CW-5790  
Techno Cleaner 219  
Cold Cleaner P3-375  
Telpen Cleaner EC-7R  
Techno Care FRW-17, FRW-1, or FRV-1  
Isopropyl alcohol (IPA)

Remarks

- 1 : If you wish to use solvents other than the above or Deionized water, please contact us.
- 2 : Please do not use ozone-depleting chemicals in order to protect the environment.
- 3 : Depending on the cleaning method, the marking on a capacitor may be erased or blurred.

- (2) Avoid using the following solvent groups unless specifically allowed for in the specification

- (a) Halogen solvents: Corrode the inside capacitors.

The solvent may enter (diffuse) inside the capacitor, decompose and cause a reaction. Then, the released chlorine ions may react with the aluminum and corrode it.

For capacitors for which we guarantee cleaning, use solvents under the cleaning conditions (temperature, time, etc.) described in the specifications.

- (b) Alkaline solvents: Corrode (melt) aluminum housings.
- (c) Petroleum solvents: Deteriorate sealing rubber.
- (d) Xylene solvents: Deteriorate sealing rubber.
- (e) Acetone: Erases indications.

- (3) Be sure to dry the printed circuit boards immediately after cleaning so that the solvent does not remain between the capacitor's sealed section and the circuit board.

- (4) Manage the contamination of solvents (conductance, PH, specific gravity, amount of water, etc.)

If the solvent is contaminated, then the chlorine concentration will become high and the inside capacitor may be corroded. Control the flux concentration against the solvent to 2 %wt or less.

## 2.9 Mounting adhesives and coating agents

- (1) If bond or coating agents are used to fix capacitors or prevent moisture, then solvents contained in these materials may corrode the capacitors. Select solvents other than halogen compounds. Do not use chloroprene-derived polymers.

Also, if the bond and coating material containing organic solvents, such as xylene and toluene, are used, resin of the top plate of a snap-in terminal type capacitor will be dissolved.

In this case please select part number without the top plate.

- (2) If fixing or coating agents are used for capacitors, then check the following points.

- (a) Do not allow flux residue or contaminants to remain between the capacitor's sealed section and the circuit board.
- (b) Harden and dry bond or coating agents so that the solvents do not remain. Do not completely block the sealed section of a capacitor. (At least 1/3 of the sealed section must be exposed.)

## 2.10 Fumigation process

When electronic equipment incorporating aluminum electrolytic capacitors is exported, wooden packing materials may be fumigated using halogen compounds such as bromomethane. If drying after the fumigation process is insufficient, halogen remaining in the packing materials may be released, enter and corrode the capacitors.

If the fumigation process is carried out, then check carefully for remaining halogen after processing and drying.

Make sure not to apply the fumigation process to completely packed electronic equipment.

## 3. Precautions for using capacitors

### 3.1 Environmental Conditions

Capacitors should not be stored or used in the following environments.

- (1) Exposure to temperatures above the upper category or below the lower category temperature of the capacitor.
- (2) Direct contact with water, salt water, or oil.
- (3) High humidity conditions where water could condense on the capacitor.
- (4) Exposure to toxic gases such as hydrogen sulfide, sulfuric acid, nitric acid, chlorine, Chlorine compound, Bromine, Bromine compound or ammonia.
- (5) Exposure to ozone, radiation, or ultraviolet rays.
- (6) Vibration and shock conditions exceeding specified requirements.



### 3.2 Electrical Precautions

- (1) Do not touch the capacitor terminals directly.  
If you touch the capacitor terminals, you will receive an electric shock. Do not touch the exposed aluminum sections of a capacitor, such as the pressure valve sections because they are not insulated.
- (2) Do not short-circuit the capacitor terminals.  
Do not spill conductive solutions such as acidic or alkaline solutions on the capacitors. Otherwise, short-circuiting will occur. The circuit will malfunction and the capacitors break down.
- (3) A low-molecular-weight-siloxane which is included in a silicon material shall causes abnormal electrical characteristics.

### 4. Precautions for checks and maintenance

- (1) Periodically check the capacitors used in industrial equipment. When checking and maintaining capacitors, turn off the equipment and discharge the capacitors beforehand. In this case, do not apply stress to the capacitor lead terminals, etc.
- (2) Periodically check the following items.
  - (a) Significant appearance abnormalities (deformation, electrolysis leakage, etc.)
  - (b) Electrical characteristics (described in the corresponding catalog or delivery specifications)If any abnormalities are found, then replace the capacitors or take appropriate actions.

### 5. Emergency procedures

- (1) Capacitors of a certain size or larger are equipped with a pressure valve to release excessive pressure.  
If the capacitor pressure valve is activated and gas becomes visible when using equipment, then turn off the equipment or unplug it. If the power is not turned off, then the short-circuited capacitors may damage the circuit or the gas may become liquefied and cause a short-circuit. In the worst case, secondary disasters such as equipment damage may occur.  
Gases released from the capacitor's pressure valve is not fume but liquefied electrolysis.
- (2) When a pressure valve is activated, a high-temperature gas exceeding 100 °C will be released. Do not place your face close to the capacitor.  
If the gas gets into your eyes or you inhale it, then immediately wash your eyes with water or gargle. If the gas comes in contact with your skin, then wash it with soap.

### 6. Long Term Storage

- (1) Leakage current of a capacitor increases with long storage times. The aluminum oxide film deteriorates as a function of temperature and time.  
If used without reconditioning, an abnormally high current will be required to restore the oxide film.  
This surge current could cause the circuit or the capacitor to fail.  
Storage period is one year. When storage period is over 12 months, a capacitor should be reconditioned by applying the rated voltage in series with a 1000 Ω current limiting resistor for a time period of 30 minutes.  
For storage condition, keep room temperature (5 °C to 35 °C) and humidity (45% to 85%) where direct sunshine doesn't reach.
- (2) Environmental Conditions
  - (a) Exposure to temperatures above the upper category or below the lower category temperature of the capacitor.
  - (b) Direct contact with water, salt water, or oil
  - (c) High humidity conditions where water could condense on the capacitor.
  - (d) Exposure to toxic gases such as hydrogen sulfide, sulfuric acid, nitric acid, chlorine, Chlorine compound, Bromine, Bromine compound or ammonia.
  - (e) Exposure to ozone, radiation, or ultraviolet rays.
  - (f) Vibration and shock conditions exceeding specified requirements.

### 7. Discarding

When discarding capacitors, use either of the following procedures.

- (1) Make holes on the capacitor or break it up completely.  
Then burn it at a temperature of 800°C or higher.  
If capacitors are burnt as is, then they may explode.
- (2) If you do not burn them, then ask professional waste disposer.

The precautions in using aluminum electrolytic capacitors follow the Precautionary Guidelines for the Use of Fixed Aluminum Electrolytic Capacitors for Electronic equipment, RCR-2367B issued by EIAJ in March 2002.  
Please refer to the above guidelines for details.

### \* Intellectual property right

We, Panasonic Group are providing the product and service that customers can use without anxiety, and are working positively on the protection of our products under intellectual property rights.

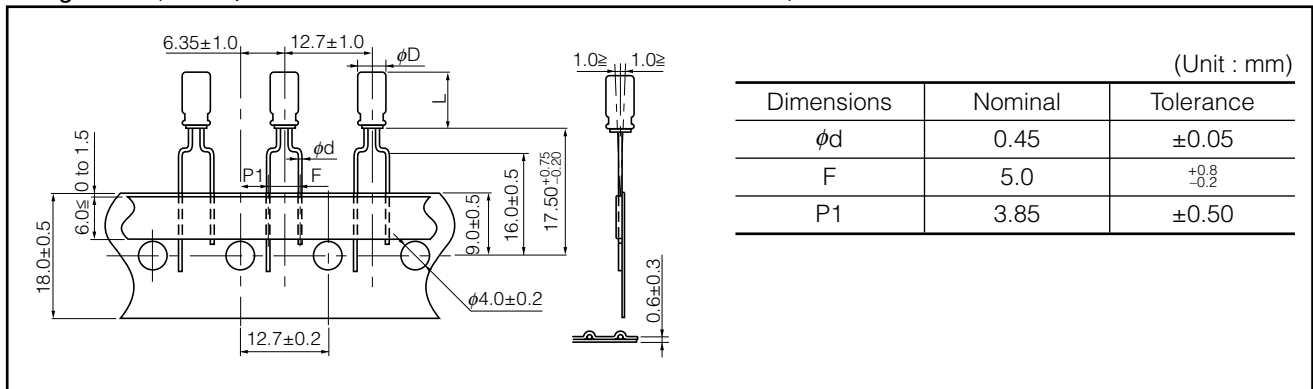
Representative patents relating to Conductive Polymer Hybrid Aluminum Electrolytic Capacitors are as follows :  
US Patent Nos. 7497879 and 7621970    JP Patent No. 5360250

### Lead Taping Radial Lead Type

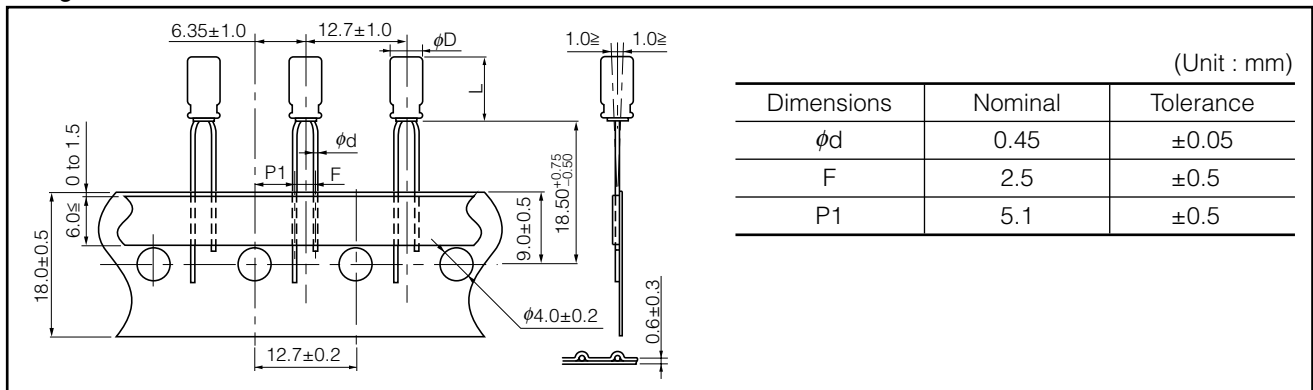
● Dimensions in mm (not to scale)

| Case size                  | Lead space (F) |        |        |
|----------------------------|----------------|--------|--------|
|                            | 2.5 mm         | 5.0 mm | 7.5 mm |
| φ4 × 5L                    | B              | A      |        |
| φ5 × 5L                    | B              | A      |        |
| φ6.3 × 5L                  | C              | A      |        |
| φ8 × 5L                    | C              | E      |        |
| φ4 × 7L                    | B              | A      |        |
| φ5 × 7L                    | B              | A      |        |
| φ6.3 × 7L                  | C              | A      |        |
| φ8 × 7L                    | C              | E      |        |
| φ5 × 11L                   | C              | D      |        |
| φ6.3 × 11.2L, 15L          | C              | D      |        |
| φ8 × 11.5L, 15L, 20L       |                | E      |        |
| φ10 × 12.5L, 16L, 20L, 25L |                | F      |        |
| φ12.5 × 15L, 20L, 25L      |                | G      |        |
| φ16 × 15L, 20L, 25L        |                |        | H      |
| φ18 × 15L, 20L, 25L        |                |        | H      |

■ Figure A (Lead space: 5.0 mm / φD×L : φ4×5, 7, φ5×5, 7, φ6.3×5, 7)



■ Figure B (Lead space: 2.5 mm / φD×L : φ4×5, 7, φ5×5, 7)

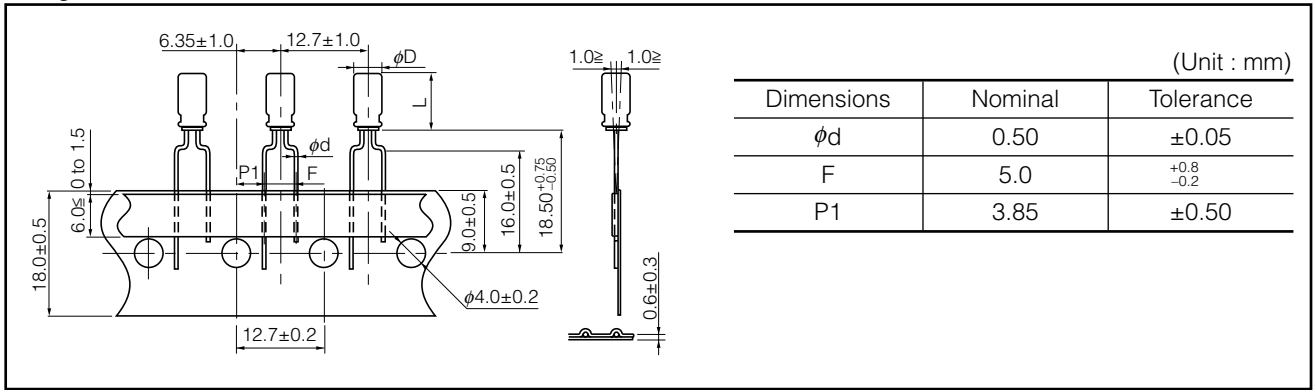


■ Figure C (Lead space: 2.5 mm / φD×L : φ5×11, φ6.3×5, 7, 11.2, 15, φ8×5, 7)

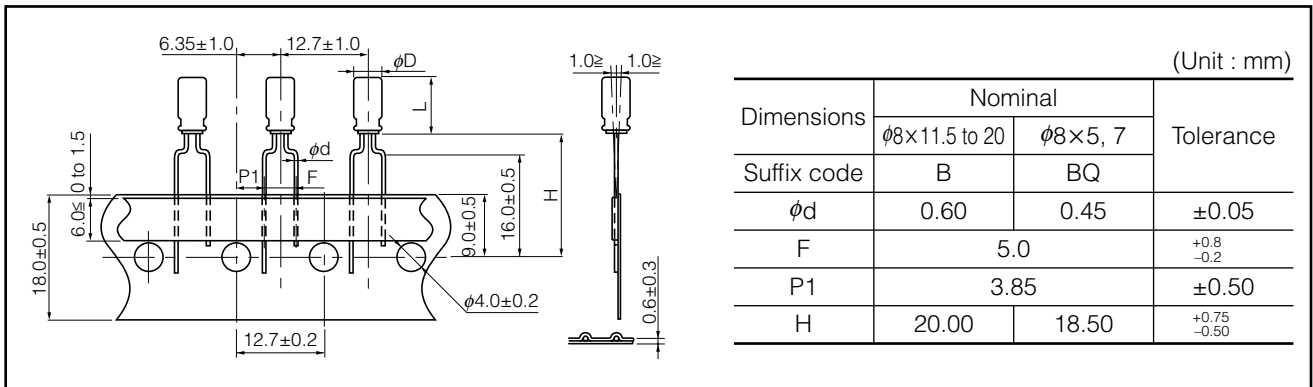


Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

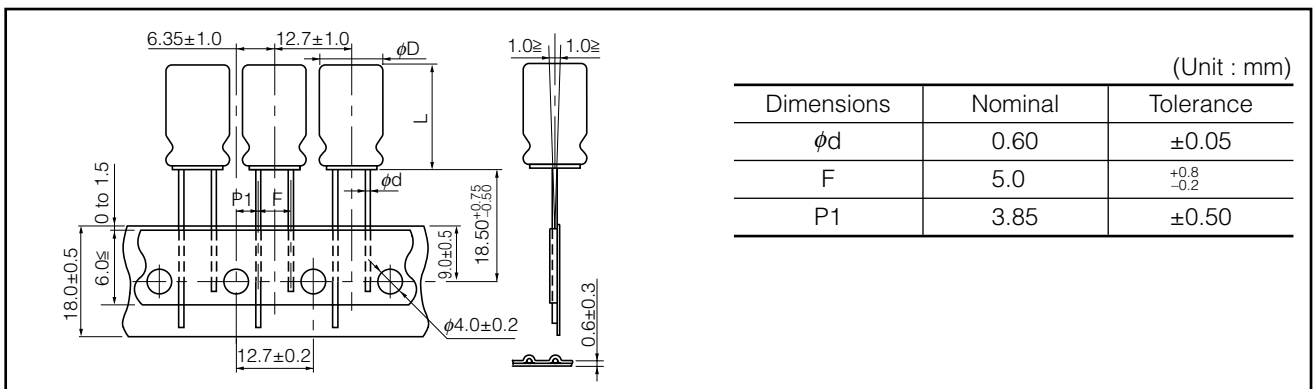
■ Figure D (Lead space: 5 mm /  $\phi D \times L$  :  $\phi 5 \times 11$ ,  $\phi 6.3 \times 11.2$ , 15)



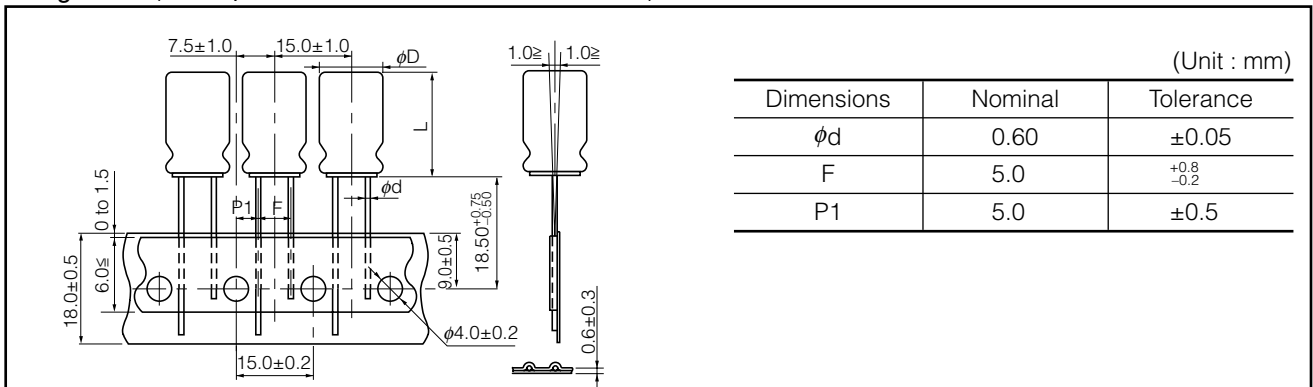
■ Figure E (Lead space: 5 mm /  $\phi D \times L$  :  $\phi 8 \times 5$ , 7, 11.5, 15, 20)



■ Figure F (Lead space: 5 mm /  $\phi D \times L$  :  $\phi 10 \times 12.5$ , 16, 20, 25)



■ Figure G (Lead space: 5 mm /  $\phi D \times L$  :  $\phi 12.5 \times 15$ , 20, 25)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

■ Figure H (Lead space: 7.5 mm /  $\phi D \times L$  :  $\phi 16 \times 15, 20, 25, \phi 18 \times 15, 20, 25$ )



### ■ Packaging Specifications

| Dimensions (mm)    | Dimensions of Outer Carton Box |            |            |                      |                    |
|--------------------|--------------------------------|------------|------------|----------------------|--------------------|
|                    | $\phi 4$ to $\phi 5$           | $\phi 6.3$ | $\phi 8$   | $\phi 10, \phi 12.5$ | $\phi 16, \phi 18$ |
| a                  | 340 max.                       | 340 max.   | 340 max.   | 340 max.             | 340 max.           |
| b                  | to 55 max.                     | to 55 max. | to 55 max. | 55 to 66 max.        | 62 to 75 max.      |
| c                  | 170 to 210 max.                | 270 max.   | 230 max.   | 170 to 270 max.      | 225 to 310 max.    |
| Packaging Quantity | 2000 pcs.                      | 2000 pcs.  | 1000 pcs.  | 500 pcs.             | 250 pcs.           |

### Lead Forming Type (Snap-in)

Lead formed Aluminium Electrolytic Capacitor for self mounting, for rationalization and upgrade of soldering process.



\* Direction of bending shape is not specified

### ■ Dimensions in mm (not to scale)

(Unit : mm)

| Dia $\phi D$ | H1 $\pm 0.5$ | H2  | H3  | F $\pm 0.5$ | P       | E max. | $\phi d$ | for PWB          |           |
|--------------|--------------|-----|-----|-------------|---------|--------|----------|------------------|-----------|
|              |              |     |     |             |         |        |          | hole dia. $\phi$ | thickness |
| 5            | 4.5          | 2.7 | 2.5 | 5.0         | 1.0     | 1.0    | 0.5      | 0.9              | 1.6       |
| 6.3          | 4.5          | 2.7 | 2.5 | 5.0         | 1.0     | 1.0    | 0.5      | 1.0              | 1.6       |
| 8            | 4.5          | 2.7 | 2.5 | 5.0         | 1.0     | 1.0    | 0.6      | 1.0              | 1.6       |
| 10           | 4.5          | 2.7 |     | 5.0         | 1.0/0.9 | 1.0    | 0.6/0.8  | 1.0 / 1.1        | 1.6       |
| 12.5         | 4.5          | 2.7 |     | 5.0         | 1.0/0.9 | 1.0    | 0.6/0.8  | 1.0 / 1.1        | 1.6       |
| 16           | 4.5          | 2.7 |     | 7.5         | 0.9     | 1.0    | 0.8      | 1.1              | 1.6       |
| 18           | 4.5          | 2.7 |     | 7.5         | 0.9     | 1.0    | 0.8      | 1.1              | 1.6       |

### ■ Series KA/KS Dimensions in mm (not to scale)

(Unit : mm)

| Dia $\phi D$ | H1 $\pm 0.5$ | H2  | H3 $\pm 0.3$ | F $\pm 0.5$ | P    | E max. | $\phi d$ | for PWB          |           |
|--------------|--------------|-----|--------------|-------------|------|--------|----------|------------------|-----------|
|              |              |     |              |             |      |        |          | hole dia. $\phi$ | thickness |
| 4            | 4.5          | 2.7 | 1.5          | 5.0         | 0.95 | 1.0    | 0.45     | 0.9              | 1.6       |
| 5            | 4.5          | 2.7 | 1.5          | 5.0         | 0.95 | 1.0    | 0.45     | 0.9              | 1.6       |
| 6.3          | 4.5          | 2.7 | 1.5          | 5.0         | 0.95 | 1.0    | 0.45     | 0.9              | 1.6       |
| 8            | 4.5          | 2.7 | 1.5          | 5.0         | 0.95 | 1.0    | 0.45     | 0.9              | 1.6       |

Discontinued Series (not recommended for new design)

## Aluminum Electrolytic Capacitors (Radial Lead Type)

| Discontinued Product                             |               |                        |                                                      |                   |                           | Replacement            |                            |     |                           |
|--------------------------------------------------|---------------|------------------------|------------------------------------------------------|-------------------|---------------------------|------------------------|----------------------------|-----|---------------------------|
| Series                                           | Part No.      | Endurance              | Features                                             | Rated.W.V.<br>(V) | Capacitance<br>( $\mu$ F) | Series                 | Endurance                  |     |                           |
| S SW<br>S(High voltage)                          | ECEA--S-----  | + 85 °C 1000 h         | Standard                                             | 10 to 50          | 1 to 100                  | M                      | + 85 °C 2000 h             |     |                           |
| S Bi-polar                                       | ECEA--N----S  | + 85 °C 2000 h         | Bi-polar Standard                                    | 4 to 100          | 0.1 to 1000               | SU-BP                  | + 85 °C 2000 h             |     |                           |
| SU                                               | ECEA--U-----  | + 85 °C 2000 h         | Standard                                             | 6.3 to 450        | 0.1 to 15000              | M                      | + 85 °C 2000 h             |     |                           |
| K                                                | ECEA--K-----  | + 85 °C 1000 h         | Height 7 mm                                          | 6.3 to 50         | 0.1 to 100                | KA                     | + 85 °C 1000 h             |     |                           |
| KS( $\phi$ 3)                                    | ECEA--KK----  | + 85 °C 1000 h         | Height 5 mm $\phi$ 3x5                               | 4 to 50           | 0.1 to 22                 | Available upon request |                            |     |                           |
| KG                                               | ECEA--KG----- | +105 °C 1000 h         | Height 7 mm                                          | 6.3 to 50         | 0.1 to 220                | GA                     | +105 °C 1000 h             |     |                           |
| SS                                               | ECEA--SS---   | + 85 °C 2000 h         | Low profile                                          | 6.3 to 50         | 3.3 to 4700               | Available upon request |                            |     |                           |
| Z                                                | ECEA--Z----   | + 85 °C 2000 h         | Low impedance                                        | 6.3 to 50         | 0.1 to 2200               | FC                     | +105 °C<br>1000 to 5000 h  |     |                           |
| HF                                               | ECEA--F----   | +105 °C 2000 h         | Low impedance                                        | 10 to 63          | 22 to 2200                |                        |                            |     |                           |
| HFS                                              | ECEA--FS---   | +105 °C 1000 to 2000 h | Low impedance                                        | 6.3 to 63         | 0.47 to 4700              |                        |                            |     |                           |
| HFE                                              | ECEA--FE---   | +105 °C 2000 h         | Low impedance                                        | 6.3 to 100        | 3.3 to 15000              |                        |                            |     |                           |
| HFG                                              | ECA--FG----   | +105 °C 2000 to 5000 h | Low impedance                                        | 6.3 to 63         | 0.1 to 15000              |                        |                            |     |                           |
| HFQ                                              | ECA--FQ----   | +105 °C 1000 to 2000 h | Low impedance                                        | 6.3 to 63         | 6.8 to 15000              |                        |                            |     |                           |
| HFZ                                              | ECA--FZ----   | +105 °C 5000 h         | Low impedance                                        | 6.3 to 35         | 56 to 5600                |                        |                            |     |                           |
| KF                                               | ECA--KF----   | +105 °C 1000 h         | Height 7 mm, Low impedance                           | 6.3 to 35         | 1 to 120                  |                        |                            |     |                           |
| ESM                                              | ECEA--E---M   | + 85 °C 2000 h         | Low impedance                                        | 10 to 50          | 0.1 to 220                |                        |                            |     |                           |
| FA                                               | EEUFA-----    | +105 °C 2000 to 5000 h | Low impedance                                        | 6.3 to 63         | 68 to 15000               |                        |                            |     |                           |
| FB                                               | EEUFB-----    | +105 °C 1000 to 2000 h | Low impedance                                        | 10 to 50          | 0.47 to 10000             |                        |                            |     |                           |
| NHE                                              | ECEA--GE---   | +105 °C 2000 h         | Longlife                                             | 6.3 to 450        | 0.1 to 15000              |                        |                            | NHG | +105 °C<br>1000 to 2000 h |
| MH                                               | ECA--MH---    | +105 °C 1000 h         | Longlife                                             | 6.3 to 100        | 0.1 to 22000              |                        |                            |     |                           |
| NH                                               | ECEA--G---S   | +105 °C 2000 h         | Longlife                                             | 6.3 to 100        | 0.47 to 4700              |                        |                            |     |                           |
| NE                                               | ECA--TE---    | +105 °C 5000 to 7000 h | Longlife                                             | 10 to 63          | 0.47 to 3300              | EB                     | +105 °C<br>5000 to 10000 h |     |                           |
| NX                                               | ECEA--NX---   | +105 °C 5000 h         | Longlife                                             | 6.3 to 50         | 0.047 to 2200             | TA                     | +125 °C 2000 h             |     |                           |
| 3H                                               | ECEA--T----   | +125 °C 1000 h         | High reliability                                     | 10 to 63          | 1 to 1000                 | Available upon request |                            |     |                           |
| MG                                               | EEUMG----     | + 85 °C 2000 h         | High ripple                                          | 160 to 450        | 2.2 to 470                | NHG                    | +105 °C 1000 to 2000 h     |     |                           |
| TH                                               | ECEA--V---T   | +105 °C 1000 h         | Fixed time-interval circuit                          | 10, 16, 25, 50    | 1 to 2200                 | M                      | +85 °C 2000 h              |     |                           |
| MT                                               | ECEA--M---T   | + 85 °C 1000 h         | Time constant circuit                                | 6.3 to 50         | 47 to 2200                |                        |                            |     |                           |
| MS                                               | ECEA--M---    | + 85 °C 2000 h         | Low LC                                               | 10 to 50          | 0.1 to 100                |                        |                            |     |                           |
| GA                                               | EEUGA-----    | +105 °C 2000 h         | +105°C Standard                                      | 6.3 to 50         | 0.1 to 15000              | NHG                    | +105 °C 1000 to 2000 h     |     |                           |
| EA                                               | EEUEA-----    | +105 °C 5000 h         | Longlife                                             | 160 to 450        | 10 to 150                 | EE                     | +105 °C 8000 to 10000 h    |     |                           |
| Horizontal<br>defection<br>current<br>correction | ECEA--W----   | + 85 °C 2000 h         | Horizontal<br>defection current<br>correction for TV | 25                | 3.5 to 10                 | Not available          |                            |     |                           |

Check Panasonic website for discontinued / revised product series specification.

<http://panasonic.net/id/>

**Panasonic**

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MEMO

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## CAUTION AND WARNING

- The electronic components contained in this catalog are designed and produced for use in home electric appliances, office equipment, information equipment, communications equipment, and other general purpose electronic devices.  
Before use of any of these components for equipment that requires a high degree of safety, such as medical instruments, aerospace equipment, disaster-prevention equipment, security equipment, vehicles (automobile, train, vessel), please be sure to contact our sales representative.
- When applying one of these components for equipment requiring a high degree of safety, no matter what sort of application it might be, be sure to install a protective circuit or redundancy arrangement to enhance the safety of your equipment. In addition, please carry out the safety test on your own responsibility.
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