

# Radial Lead Type Monolithic Ceramic Capacitors



### **EU RoHS Compliant**

- All the products in this catalog comply with EU RoHS.
- EU RoHS is "the European Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment."
- For more details, please refer to our website 'Murata's Approach for EU RoHS' (<http://www.murata.com/info/rohs.html>).

# CONTENTS

|                                                                                                                |    |
|----------------------------------------------------------------------------------------------------------------|----|
| <b>Part Numbering</b>                                                                                          | 2  |
| <b>1 RCE Series 125°C max. (for Automotive) (DC25V-DC1kV)</b>                                                  | 4  |
| ● Marking                                                                                                      | 6  |
| Temperature Compensating Type, C0G/U2J Characteristics                                                         | 6  |
| High Dielectric Constant Type, X7R/X7S Characteristics                                                         | 11 |
| ● Specifications and Test Methods                                                                              | 14 |
| <b>2 RHE Series 150°C max. (for Automotive) (DC50V-DC100V)</b>                                                 | 20 |
| ● Marking                                                                                                      | 21 |
| Temperature Compensating Type, X8G Characteristics                                                             | 22 |
| High Dielectric Constant Type, X8L Characteristics                                                             | 23 |
| ● Specifications and Test Methods                                                                              | 26 |
| <b>3 RDE Series (For General Use Only) (DC25V-DC1kV)</b>                                                       | 29 |
| ● Marking                                                                                                      | 30 |
| Temperature Compensating Type, C0G/U2J Characteristics                                                         | 30 |
| High Dielectric Constant Type, X7R/X7S Characteristics                                                         | 35 |
| High Dielectric Constant Type, F/Y5V Characteristics                                                           | 38 |
| ● Specifications and Test Methods                                                                              | 39 |
| <b>4 RDE Series Large Capacitance and High Allowable Ripple Current (For General Use Only) (DC250V-DC630V)</b> | 42 |
| ● Marking                                                                                                      | 43 |
| High Dielectric Constant Type, X7T Characteristics                                                             | 43 |
| ● Specifications and Test Methods                                                                              | 45 |
| <b>Reference Data (Typical Example)</b>                                                                        | 47 |
| RCE Series                                                                                                     | 47 |
| RHE Series                                                                                                     | 48 |
| RDE Series                                                                                                     | 49 |
| <b>Packaging</b>                                                                                               | 50 |
| <b>⚠Caution</b>                                                                                                | 52 |
| <b>Notice</b>                                                                                                  | 54 |

## ● Part Numbering

### Radial Lead Type Monolithic Ceramic Capacitors

(Part Number)

|    |   |    |    |     |   |   |    |     |   |
|----|---|----|----|-----|---|---|----|-----|---|
| RC | E | R7 | 1H | 104 | K | 0 | M1 | H03 | A |
| ①  | ② | ③  | ④  | ⑤   | ⑥ | ⑦ | ⑧  | ⑨   | ⑩ |

① Product ID

② Series/Terminal

| Product ID | Series/Terminal |                                                                                           |
|------------|-----------------|-------------------------------------------------------------------------------------------|
| RC         | E               | Radial Lead Type Monolithic Ceramic Capacitors 125°C max. (for Automotive) (DC25V-DC1kV)  |
| RH         | E               | Radial Lead Type Monolithic Ceramic Capacitors 150°C max. (for Automotive) (DC50V-DC100V) |
| RD         | E               | Radial Lead Type Monolithic Ceramic Capacitors (Only for General Use) (DC25V-DC1kV)       |

③ Temperature Characteristics

| Code | Temperature Characteristics | Reference Temperature | Temperature Range | Capacitance Change or Temperature Coefficient | Operating Temperature Range |
|------|-----------------------------|-----------------------|-------------------|-----------------------------------------------|-----------------------------|
| 5C   | C0G*                        | 25°C                  | 25 to 125°C       | 0±30ppm/°C                                    | -55 to 125°C                |
| 5G   | X8G*                        | 25°C                  | 25 to 150°C       | 0±30ppm/°C                                    | -55 to 150°C                |
| 7U   | U2J                         | 25°C                  | 25 to 125°C       | -750±120ppm/°C                                | -55 to 125°C                |
| C7   | X7S                         | 25°C                  | -55 to 125°C      | ±22%                                          | -55 to 125°C                |
| D7   | X7T                         | 25°C                  | -55 to 125°C      | +22, -33%                                     | -55 to 125°C                |
| F1   | F                           | 20°C                  | -25 to 85°C       | +30, -80%                                     | -25 to 85°C                 |
| F5   | Y5V                         | 25°C                  | -30 to 85°C       | +22, -82%                                     | -30 to 85°C                 |
| L8   | X8L                         | 25°C                  | -55 to 125°C      | ±15%                                          | -55 to 150°C                |
|      |                             |                       | 125 to 150°C      | +15, -40%                                     |                             |
| R7   | X7R                         | 25°C                  | -55 to 125°C      | ±15%                                          | -55 to 125°C                |

\* Please refer to table for Capacitance change under reference temperature.

• Capacitance change from each temperature

| Char. | Nominal Values (ppm/°C) *1 | Capacitance Change from 25°C (%) |       |       |       |       |       |
|-------|----------------------------|----------------------------------|-------|-------|-------|-------|-------|
|       |                            | -55°C                            |       | -30°C |       | -10°C |       |
|       |                            | Max.                             | Min.  | Max.  | Min.  | Max.  | Min.  |
| C0G   | 0±30                       | 0.58                             | -0.24 | 0.40  | -0.17 | 0.25  | -0.11 |
| X8G   |                            |                                  |       |       |       |       |       |
| U2J   | -750±120                   | 8.78                             | 5.04  | 6.04  | 3.47  | 3.84  | 2.21  |

\*1: Nominal values denote the temperature coefficient within a range of 25 to 125°C.

④ Rated Voltage

| Code | Rated Voltage |
|------|---------------|
| 1E   | DC25V         |
| 1H   | DC50V         |
| 2A   | DC100V        |
| 2E   | DC250V        |
| 2W   | DC450V        |
| 2J   | DC630V        |
| 3A   | DC1kV         |

⑤ Capacitance

Expressed by three figures. The unit is pico-farad (pF). The first and second figures are significant digits, and the third figure expresses the number of zeros that follow the two numbers. If there is a decimal point, it is expressed by the capital letter "R." In this case, all figures are significant digits.

⑥ Capacitance Tolerance

| Code | Capacitance Tolerance | Temperature Characteristics | Capacitance Step    |
|------|-----------------------|-----------------------------|---------------------|
| C    | ±0.25pF               | C0G/X8G                     | ≤5pF : 1pF Step     |
| D    | ±0.5pF                |                             | 6 to 9pF : 1pF Step |
| J    | ±5%                   |                             | ≥10 : E12 Series    |
| K    | ±10%                  | X7S/X7T/X7R/X8L             | E6 Series           |
| M    | ±20%                  | X7S/X7T/X7R/X8L             | E3 Series           |
| Z    | +80%, -20%            | F/Y5V                       | E3 Series           |

Continued on the following page. 

Continued from the preceding page.

⑦Dimensions (LxW)

| Code     | Dimensions (LxW)                                                     |
|----------|----------------------------------------------------------------------|
| <b>0</b> | 3.6×3.5mm or 4.0×3.5mm or 5.0×3.5mm<br>(Depends on Part Number List) |
| <b>1</b> | 4.0×3.5mm or 4.5×3.5mm or 5.0×3.5mm<br>(Depends on Part Number List) |
| <b>2</b> | 5.5×4.0mm                                                            |
| <b>3</b> | 5.5×5.0mm                                                            |
| <b>4</b> | 7.5×5.5mm                                                            |
| <b>5</b> | 7.5×7.5mm (DC630V, DC1kV: 7.5×8.0mm)                                 |
| <b>U</b> | 7.7×12.5mm (DC630V, DC1kV: 7.7×13.0mm)                               |
| <b>W</b> | 5.5×7.5mm                                                            |

⑧Lead Style

| Code         | Lead Style           | Lead Spacing |
|--------------|----------------------|--------------|
| <b>A2</b>    | Straight Long        | 2.5mm        |
| <b>B1</b>    | Straight Long        | 5.0mm        |
| <b>DB</b>    | Straight Taping      | 2.5mm        |
| <b>E1/E2</b> | Straight Taping      | 5.0mm        |
| <b>K1</b>    | Inside Crimp         | 5.0mm        |
| <b>M1/M2</b> | Inside Crimp Taping  | 5.0mm        |
| <b>P1</b>    | Outside Crimp        | 2.5mm        |
| <b>S1/S2</b> | Outside Crimp Taping | 2.5mm        |

Lead distance between reference and bottom planes.

M1, S1, DB : H<sub>0</sub> = 16.0±0.5mm

M2, S2 : H<sub>0</sub> = 20.0±0.5mm

E1 : H = 17.5±0.5mm

E2 : H = 20.0±0.5mm

⑨Individual Specification Code

Expressed by three figures

⑩Packaging

| Code     | Packaging |
|----------|-----------|
| <b>A</b> | Ammo Pack |
| <b>B</b> | Bulk      |

# Radial Lead Type Monolithic Ceramic Capacitors

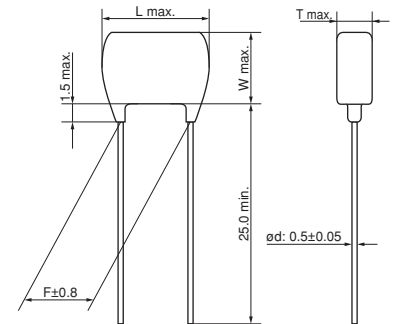
**muRata**

## RCE Series 125°C max. (for Automotive) (DC25V-DC1kV)

### ■ Features

1. Small size and large capacitance
2. Low ESR and ESL suitable for high frequency
3. Meet AEC-Q200, ISO7637-2 (surge test) requirement
4. Meet LF (Lead Free) and HF (Halogen Free)
5. Flow soldering and welding are available.  
(Re-flow soldering is not available.)
6. If copper wire is necessary at welding process,  
copper wire is available based on request.

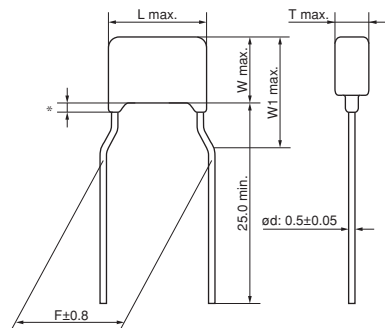
Dimensions code: 0  
Lead style code: A2



• Lead Wire: Solder Coated CP Wire

(in mm)

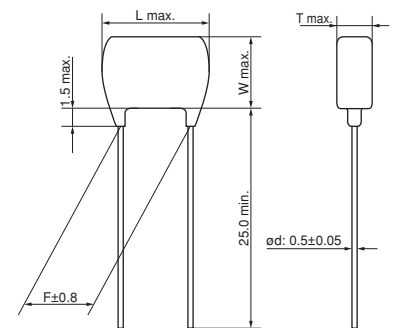
Dimensions code: 0  
Lead style code: K1



\* Coating extension does not exceed the end of the lead bend.  
• Lead Wire: Solder Coated CP Wire

(in mm)

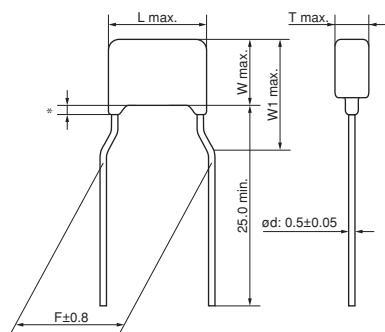
Dimensions code: 1  
Lead style code: A2



• Lead Wire: Solder Coated CP Wire

(in mm)

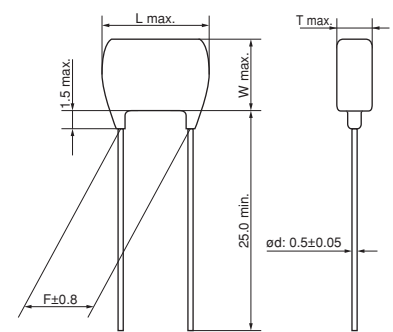
Dimensions code: 1  
Lead style code: K1



\* Coating extension does not exceed the end of the lead bend.  
• Lead Wire: Solder Coated CP Wire

(in mm)

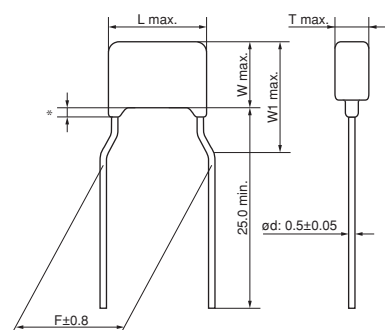
Dimensions code: 2  
Lead style code: A2



• Lead Wire: Solder Coated CP Wire

(in mm)

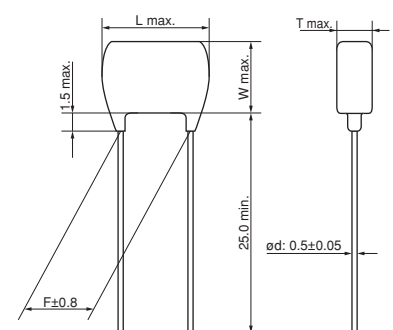
Dimensions code: 2  
Lead style code: K1



\* Coating extension does not exceed the end of the lead bend.  
• Lead Wire: Solder Coated CP Wire

(in mm)

Dimensions code: 3  
Lead style code: A2



• Lead Wire: Solder Coated CP Wire

(in mm)

Continued on the following page. ➤

Continued from the preceding page.

Dimensions code: 3  
Lead style code: K1



Dimensions code: 4  
Lead style code: K1



Dimensions code: 5  
Lead style code: B1



Dimensions code: U  
Lead style code: B1



Dimensions code: W  
Lead style code: K1



## Dimensions

| Dimensions and Lead Style Code | Dimensions (mm) |       |      |                                          |     |     |
|--------------------------------|-----------------|-------|------|------------------------------------------|-----|-----|
|                                | L               | W     | W1   | T                                        | F   | d   |
| 0A2/0DB                        | 3.6             | 3.5   | -    | See the individual product specification | 2.5 | 0.5 |
| 0K1/0M1                        | 3.6             | 3.5   | 6.0  |                                          | 5.0 | 0.5 |
| 1A2/1DB                        | 4.0             | 3.5   | -    |                                          | 2.5 | 0.5 |
| 1K1/1M1                        | 4.0             | 3.5   | 5.0  |                                          | 5.0 | 0.5 |
| 2A2/2DB                        | 5.5             | 4.0   | -    |                                          | 2.5 | 0.5 |
| 2K1/2M1                        | 5.5             | 4.0   | 6.0  |                                          | 5.0 | 0.5 |
| 3A2/3DB                        | 5.5             | 5.0   | -    |                                          | 2.5 | 0.5 |
| 3K1/3M1                        | 5.5             | 5.0   | 7.5  |                                          | 5.0 | 0.5 |
| 4K1/4M1                        | 7.5             | 5.5   | 8.0  |                                          | 5.0 | 0.5 |
| 5B1/5E1                        | 7.5             | 7.5*  | -    |                                          | 5.0 | 0.5 |
| UB1/UE1                        | 7.7             | 12.5* | -    |                                          | 5.0 | 0.5 |
| WK1/WM1                        | 5.5             | 7.5   | 10.0 |                                          | 5.0 | 0.5 |

\*DC630V, DC1kV: W+0.5mm

## ■ Marking

| Dimensions<br>Code            | Rated<br>Voltage | DC25V                                                                                                                                                       |      | DC50V     |            |            | DC100V    |            |            | DC250V              | DC630V              | DC1kV               |
|-------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|------------|------------|-----------|------------|------------|---------------------|---------------------|---------------------|
|                               | Temp.<br>Char.   | X7S                                                                                                                                                         | X7R  | C0G       | X7S        | X7R        | C0G       | X7S        | X7R        | X7R, U2J            |                     |                     |
| 0                             |                  |                                                                                                                                                             | 104K |           | —          |            |           | —          |            | —                   | —                   | —                   |
| 1                             |                  | 224K                                                                                                                                                        |      | A<br>102J | —          | 224K       | A<br>102J | —          | 224K       | U<br>102J           | —                   | —                   |
| 2                             |                  | 475<br>K2C                                                                                                                                                  | —    | —         | 475<br>K5C | 105<br>K5C | —         | —          | 105<br>K1C | 103<br>J4U<br>(U2J) | 472<br>J7U<br>(U2J) | 102<br>JAU<br>(U2J) |
|                               |                  |                                                                                                                                                             |      |           |            |            |           |            |            | 473<br>K4C<br>(X7R) | 153<br>K7C<br>(X7R) | 102<br>KAC<br>(X7R) |
| 3, 4, W                       |                  | 226<br>K2C                                                                                                                                                  | —    | —         | —          | 335<br>K5C | —         | 225<br>K1C | —          | 473<br>J4U<br>(U2J) | 103<br>J7U<br>(U2J) | 472<br>JAU<br>(U2J) |
|                               |                  |                                                                                                                                                             |      |           |            |            |           |            |            | 224<br>K4C<br>(X7R) | 104<br>K7C<br>(X7R) | 333<br>KAC<br>(X7R) |
| 5, U                          |                  | —                                                                                                                                                           | —    | —         | —          | —          | —         | —          | —          | —                   | 333<br>J7U<br>(U2J) | 103<br>JAU<br>(U2J) |
|                               |                  |                                                                                                                                                             |      |           |            |            |           |            |            | 474<br>K4C<br>(X7R) | 474<br>M7C<br>(X7R) | 104<br>KAC<br>(X7R) |
| Temperature Characteristics   |                  | Marked with code (C0G char.: A, X7S/X7R char.: C, U2J char.: U)<br>A part is omitted (Please refer to the marking example.)                                 |      |           |            |            |           |            |            |                     |                     |                     |
| Nominal Capacitance           |                  | Under 100pF: Actual value    100pF and over: Marked with 3 figures                                                                                          |      |           |            |            |           |            |            |                     |                     |                     |
| Capacitance Tolerance         |                  | Marked with code<br>A part is omitted (Please refer to the marking example.)                                                                                |      |           |            |            |           |            |            |                     |                     |                     |
| Rated Voltage                 |                  | Marked with code (DC25V: 2, DC50V: 5, DC100V: 1, DC250V: 4, DC630V: 7, DC1kV: A)<br>A part is omitted (Please refer to the marking example.)                |      |           |            |            |           |            |            |                     |                     |                     |
| Manufacturer's Identification |                  | Marked with <br>A part is omitted (Please refer to the marking example.) |      |           |            |            |           |            |            |                     |                     |                     |

## Temperature Compensating Type, C0G/U2J Characteristics

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RCE5C1H1R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 1.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H1R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 1.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H2R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 2.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H2R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 2.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H3R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 3.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H3R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 3.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H4R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 4.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H4R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 4.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H5R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 5.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H5R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 5.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H6R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 6.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H6R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 6.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H7R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 7.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H7R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 7.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H8R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 8.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |

Continued on the following page. 

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RCE5C1H8R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 8.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H9R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 9.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H9R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 9.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H100J0□□H03□ | C0G (EIA)      | 50Vdc            | 10pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H100J0□□H03□ | C0G (EIA)      | 50Vdc            | 10pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H120J0□□H03□ | C0G (EIA)      | 50Vdc            | 12pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H120J0□□H03□ | C0G (EIA)      | 50Vdc            | 12pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H150J0□□H03□ | C0G (EIA)      | 50Vdc            | 15pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H150J0□□H03□ | C0G (EIA)      | 50Vdc            | 15pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H180J0□□H03□ | C0G (EIA)      | 50Vdc            | 18pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H180J0□□H03□ | C0G (EIA)      | 50Vdc            | 18pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H220J0□□H03□ | C0G (EIA)      | 50Vdc            | 22pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H220J0□□H03□ | C0G (EIA)      | 50Vdc            | 22pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H270J0□□H03□ | C0G (EIA)      | 50Vdc            | 27pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H270J0□□H03□ | C0G (EIA)      | 50Vdc            | 27pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H330J0□□H03□ | C0G (EIA)      | 50Vdc            | 33pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H330J0□□H03□ | C0G (EIA)      | 50Vdc            | 33pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H390J0□□H03□ | C0G (EIA)      | 50Vdc            | 39pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H390J0□□H03□ | C0G (EIA)      | 50Vdc            | 39pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H470J0□□H03□ | C0G (EIA)      | 50Vdc            | 47pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H470J0□□H03□ | C0G (EIA)      | 50Vdc            | 47pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H560J0□□H03□ | C0G (EIA)      | 50Vdc            | 56pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H560J0□□H03□ | C0G (EIA)      | 50Vdc            | 56pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H680J0□□H03□ | C0G (EIA)      | 50Vdc            | 68pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H680J0□□H03□ | C0G (EIA)      | 50Vdc            | 68pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H820J0□□H03□ | C0G (EIA)      | 50Vdc            | 82pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H820J0□□H03□ | C0G (EIA)      | 50Vdc            | 82pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H101J0□□H03□ | C0G (EIA)      | 50Vdc            | 100pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H101J0□□H03□ | C0G (EIA)      | 50Vdc            | 100pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H121J0□□H03□ | C0G (EIA)      | 50Vdc            | 120pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H121J0□□H03□ | C0G (EIA)      | 50Vdc            | 120pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H151J0□□H03□ | C0G (EIA)      | 50Vdc            | 150pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H151J0□□H03□ | C0G (EIA)      | 50Vdc            | 150pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H181J0□□H03□ | C0G (EIA)      | 50Vdc            | 180pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H181J0□□H03□ | C0G (EIA)      | 50Vdc            | 180pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H221J0□□H03□ | C0G (EIA)      | 50Vdc            | 220pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H221J0□□H03□ | C0G (EIA)      | 50Vdc            | 220pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H271J0□□H03□ | C0G (EIA)      | 50Vdc            | 270pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H271J0□□H03□ | C0G (EIA)      | 50Vdc            | 270pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H331J0□□H03□ | C0G (EIA)      | 50Vdc            | 330pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H331J0□□H03□ | C0G (EIA)      | 50Vdc            | 330pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H391J0□□H03□ | C0G (EIA)      | 50Vdc            | 390pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H391J0□□H03□ | C0G (EIA)      | 50Vdc            | 390pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H471J0□□H03□ | C0G (EIA)      | 50Vdc            | 470pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H471J0□□H03□ | C0G (EIA)      | 50Vdc            | 470pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H561J0□□H03□ | C0G (EIA)      | 50Vdc            | 560pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H561J0□□H03□ | C0G (EIA)      | 50Vdc            | 560pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H681J0□□H03□ | C0G (EIA)      | 50Vdc            | 680pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H681J0□□H03□ | C0G (EIA)      | 50Vdc            | 680pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H821J0□□H03□ | C0G (EIA)      | 50Vdc            | 820pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H821J0□□H03□ | C0G (EIA)      | 50Vdc            | 820pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H102J0□□H03□ | C0G (EIA)      | 50Vdc            | 1000pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H102J0□□H03□ | C0G (EIA)      | 50Vdc            | 1000pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H122J0□□H03□ | C0G (EIA)      | 50Vdc            | 1200pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H122J0□□H03□ | C0G (EIA)      | 50Vdc            | 1200pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H152J0□□H03□ | C0G (EIA)      | 50Vdc            | 1500pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H152J0□□H03□ | C0G (EIA)      | 50Vdc            | 1500pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |

Continued on the following page.

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RCE5C1H182J0□□H03□ | C0G (EIA)      | 50Vdc            | 1800pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H182J0□□H03□ | C0G (EIA)      | 50Vdc            | 1800pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H222J0□□H03□ | C0G (EIA)      | 50Vdc            | 2200pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H222J0□□H03□ | C0G (EIA)      | 50Vdc            | 2200pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H272J0□□H03□ | C0G (EIA)      | 50Vdc            | 2700pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H272J0□□H03□ | C0G (EIA)      | 50Vdc            | 2700pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H332J0□□H03□ | C0G (EIA)      | 50Vdc            | 3300pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H332J0□□H03□ | C0G (EIA)      | 50Vdc            | 3300pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H392J0□□H03□ | C0G (EIA)      | 50Vdc            | 3900pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H392J0□□H03□ | C0G (EIA)      | 50Vdc            | 3900pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H472J1□□H03□ | C0G (EIA)      | 50Vdc            | 4700pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H472J1□□H03□ | C0G (EIA)      | 50Vdc            | 4700pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H562J1□□H03□ | C0G (EIA)      | 50Vdc            | 5600pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H562J1□□H03□ | C0G (EIA)      | 50Vdc            | 5600pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H682J1□□H03□ | C0G (EIA)      | 50Vdc            | 6800pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H682J1□□H03□ | C0G (EIA)      | 50Vdc            | 6800pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H822J1□□H03□ | C0G (EIA)      | 50Vdc            | 8200pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H822J1□□H03□ | C0G (EIA)      | 50Vdc            | 8200pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H103J1□□H03□ | C0G (EIA)      | 50Vdc            | 10000pF±5%  | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H103J1□□H03□ | C0G (EIA)      | 50Vdc            | 10000pF±5%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H123J1□□H03□ | C0G (EIA)      | 50Vdc            | 12000pF±5%  | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H123J1□□H03□ | C0G (EIA)      | 50Vdc            | 12000pF±5%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H153J1□□H03□ | C0G (EIA)      | 50Vdc            | 15000pF±5%  | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H153J1□□H03□ | C0G (EIA)      | 50Vdc            | 15000pF±5%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H183J1□□H03□ | C0G (EIA)      | 50Vdc            | 18000pF±5%  | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H183J1□□H03□ | C0G (EIA)      | 50Vdc            | 18000pF±5%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C1H223J1□□H03□ | C0G (EIA)      | 50Vdc            | 22000pF±5%  | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C1H223J1□□H03□ | C0G (EIA)      | 50Vdc            | 22000pF±5%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A1R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 1.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A1R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 1.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A2R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 2.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A2R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 2.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A3R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 3.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A3R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 3.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A4R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 4.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A4R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 4.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A5R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 5.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A5R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 5.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A6R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 6.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A6R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 6.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A7R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 7.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A7R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 7.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A8R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 8.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A8R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 8.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A9R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 9.0pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A9R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 9.0pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A100J0□□H03□ | C0G (EIA)      | 100Vdc           | 10pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A100J0□□H03□ | C0G (EIA)      | 100Vdc           | 10pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A120J0□□H03□ | C0G (EIA)      | 100Vdc           | 12pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A120J0□□H03□ | C0G (EIA)      | 100Vdc           | 12pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A150J0□□H03□ | C0G (EIA)      | 100Vdc           | 15pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A150J0□□H03□ | C0G (EIA)      | 100Vdc           | 15pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A180J0□□H03□ | C0G (EIA)      | 100Vdc           | 18pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A180J0□□H03□ | C0G (EIA)      | 100Vdc           | 18pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A220J0□□H03□ | C0G (EIA)      | 100Vdc           | 22pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A220J0□□H03□ | C0G (EIA)      | 100Vdc           | 22pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A270J0□□H03□ | C0G (EIA)      | 100Vdc           | 27pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |

Continued on the following page. ↗

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RCE5C2A270J0□□H03□ | C0G (EIA)      | 100Vdc           | 27pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A330J0□□H03□ | C0G (EIA)      | 100Vdc           | 33pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A330J0□□H03□ | C0G (EIA)      | 100Vdc           | 33pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A390J0□□H03□ | C0G (EIA)      | 100Vdc           | 39pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A390J0□□H03□ | C0G (EIA)      | 100Vdc           | 39pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A470J0□□H03□ | C0G (EIA)      | 100Vdc           | 47pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A470J0□□H03□ | C0G (EIA)      | 100Vdc           | 47pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A560J0□□H03□ | C0G (EIA)      | 100Vdc           | 56pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A560J0□□H03□ | C0G (EIA)      | 100Vdc           | 56pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A680J0□□H03□ | C0G (EIA)      | 100Vdc           | 68pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A680J0□□H03□ | C0G (EIA)      | 100Vdc           | 68pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A820J0□□H03□ | C0G (EIA)      | 100Vdc           | 82pF±5%     | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A820J0□□H03□ | C0G (EIA)      | 100Vdc           | 82pF±5%     | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A101J0□□H03□ | C0G (EIA)      | 100Vdc           | 100pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A101J0□□H03□ | C0G (EIA)      | 100Vdc           | 100pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A121J0□□H03□ | C0G (EIA)      | 100Vdc           | 120pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A121J0□□H03□ | C0G (EIA)      | 100Vdc           | 120pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A151J0□□H03□ | C0G (EIA)      | 100Vdc           | 150pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A151J0□□H03□ | C0G (EIA)      | 100Vdc           | 150pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A181J0□□H03□ | C0G (EIA)      | 100Vdc           | 180pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A181J0□□H03□ | C0G (EIA)      | 100Vdc           | 180pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A221J0□□H03□ | C0G (EIA)      | 100Vdc           | 220pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A221J0□□H03□ | C0G (EIA)      | 100Vdc           | 220pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A271J0□□H03□ | C0G (EIA)      | 100Vdc           | 270pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A271J0□□H03□ | C0G (EIA)      | 100Vdc           | 270pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A331J0□□H03□ | C0G (EIA)      | 100Vdc           | 330pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A331J0□□H03□ | C0G (EIA)      | 100Vdc           | 330pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A391J0□□H03□ | C0G (EIA)      | 100Vdc           | 390pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A391J0□□H03□ | C0G (EIA)      | 100Vdc           | 390pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A471J0□□H03□ | C0G (EIA)      | 100Vdc           | 470pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A471J0□□H03□ | C0G (EIA)      | 100Vdc           | 470pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A561J0□□H03□ | C0G (EIA)      | 100Vdc           | 560pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A561J0□□H03□ | C0G (EIA)      | 100Vdc           | 560pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A681J0□□H03□ | C0G (EIA)      | 100Vdc           | 680pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A681J0□□H03□ | C0G (EIA)      | 100Vdc           | 680pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A821J0□□H03□ | C0G (EIA)      | 100Vdc           | 820pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A821J0□□H03□ | C0G (EIA)      | 100Vdc           | 820pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A102J0□□H03□ | C0G (EIA)      | 100Vdc           | 1000pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A102J0□□H03□ | C0G (EIA)      | 100Vdc           | 1000pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A122J0□□H03□ | C0G (EIA)      | 100Vdc           | 1200pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A122J0□□H03□ | C0G (EIA)      | 100Vdc           | 1200pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A152J0□□H03□ | C0G (EIA)      | 100Vdc           | 1500pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A152J0□□H03□ | C0G (EIA)      | 100Vdc           | 1500pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A182J1□□H03□ | C0G (EIA)      | 100Vdc           | 1800pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A182J1□□H03□ | C0G (EIA)      | 100Vdc           | 1800pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A222J1□□H03□ | C0G (EIA)      | 100Vdc           | 2200pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A222J1□□H03□ | C0G (EIA)      | 100Vdc           | 2200pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A272J1□□H03□ | C0G (EIA)      | 100Vdc           | 2700pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A272J1□□H03□ | C0G (EIA)      | 100Vdc           | 2700pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE5C2A332J1□□H03□ | C0G (EIA)      | 100Vdc           | 3300pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCE5C2A332J1□□H03□ | C0G (EIA)      | 100Vdc           | 3300pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCE7U2E101J1□□H03□ | U2J (EIA)      | 250Vdc           | 100pF±5%    | 4.0×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2E151J1□□H03□ | U2J (EIA)      | 250Vdc           | 150pF±5%    | 4.0×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2E221J1□□H03□ | U2J (EIA)      | 250Vdc           | 220pF±5%    | 4.0×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2E331J1□□H03□ | U2J (EIA)      | 250Vdc           | 330pF±5%    | 4.0×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2E471J1□□H03□ | U2J (EIA)      | 250Vdc           | 470pF±5%    | 4.0×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2E681J1□□H03□ | U2J (EIA)      | 250Vdc           | 680pF±5%    | 4.0×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |

Continued on the following page. 9

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RCE7U2E102J1□□H03□ | U2J (EIA)      | 250Vdc           | 1000pF±5%   | 4.0×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2E152J1□□H03□ | U2J (EIA)      | 250Vdc           | 1500pF±5%   | 4.0×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2E222J1□□H03□ | U2J (EIA)      | 250Vdc           | 2200pF±5%   | 4.0×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2E332J1□□H03□ | U2J (EIA)      | 250Vdc           | 3300pF±5%   | 4.0×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2E472J1□□H03□ | U2J (EIA)      | 250Vdc           | 4700pF±5%   | 4.0×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2E682J2□□H03□ | U2J (EIA)      | 250Vdc           | 6800pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2E103J2□□H03□ | U2J (EIA)      | 250Vdc           | 10000pF±5%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J100J2□□H03□ | U2J (EIA)      | 630Vdc           | 10pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J150J2□□H03□ | U2J (EIA)      | 630Vdc           | 15pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J220J2□□H03□ | U2J (EIA)      | 630Vdc           | 22pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J330J2□□H03□ | U2J (EIA)      | 630Vdc           | 33pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J470J2□□H03□ | U2J (EIA)      | 630Vdc           | 47pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J680J2□□H03□ | U2J (EIA)      | 630Vdc           | 68pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J101J2□□H03□ | U2J (EIA)      | 630Vdc           | 100pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J151J2□□H03□ | U2J (EIA)      | 630Vdc           | 150pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J221J2□□H03□ | U2J (EIA)      | 630Vdc           | 220pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J331J2□□H03□ | U2J (EIA)      | 630Vdc           | 330pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J471J2□□H03□ | U2J (EIA)      | 630Vdc           | 470pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J681J2□□H03□ | U2J (EIA)      | 630Vdc           | 680pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J102J2□□H03□ | U2J (EIA)      | 630Vdc           | 1000pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J152J2□□H03□ | U2J (EIA)      | 630Vdc           | 1500pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J222J2□□H03□ | U2J (EIA)      | 630Vdc           | 2200pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J332J2□□H03□ | U2J (EIA)      | 630Vdc           | 3300pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J472J2□□H03□ | U2J (EIA)      | 630Vdc           | 4700pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U2J682J3□□H03□ | U2J (EIA)      | 630Vdc           | 6800pF±5%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCE7U2J103J3□□H03□ | U2J (EIA)      | 630Vdc           | 10000pF±5%  | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCE7U2J153J4□□H03□ | U2J (EIA)      | 630Vdc           | 15000pF±5%  | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCE7U2J223J4□□H03□ | U2J (EIA)      | 630Vdc           | 22000pF±5%  | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCE7U2J333J5□□H03□ | U2J (EIA)      | 630Vdc           | 33000pF±5%  | 7.5×8.0                   | 4.0                    | 5.0                     | B1                         | E1                           |
| RCE7U2J473J5□□H03□ | U2J (EIA)      | 630Vdc           | 47000pF±5%  | 7.5×8.0                   | 4.0                    | 5.0                     | B1                         | E1                           |
| RCE7U2J943JU□□H03□ | U2J (EIA)      | 630Vdc           | 94000pF±5%  | 7.7×13.0                  | 4.0                    | 5.0                     | B1                         | E1                           |
| RCE7U3A100J2□□H03□ | U2J (EIA)      | 1000Vdc          | 10pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A150J2□□H03□ | U2J (EIA)      | 1000Vdc          | 15pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A220J2□□H03□ | U2J (EIA)      | 1000Vdc          | 22pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A330J2□□H03□ | U2J (EIA)      | 1000Vdc          | 33pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A470J2□□H03□ | U2J (EIA)      | 1000Vdc          | 47pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A680J2□□H03□ | U2J (EIA)      | 1000Vdc          | 68pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A101J2□□H03□ | U2J (EIA)      | 1000Vdc          | 100pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A151J2□□H03□ | U2J (EIA)      | 1000Vdc          | 150pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A221J2□□H03□ | U2J (EIA)      | 1000Vdc          | 220pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A331J2□□H03□ | U2J (EIA)      | 1000Vdc          | 330pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A471J2□□H03□ | U2J (EIA)      | 1000Vdc          | 470pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A681J2□□H03□ | U2J (EIA)      | 1000Vdc          | 680pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A102J2□□H03□ | U2J (EIA)      | 1000Vdc          | 1000pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCE7U3A152J3□□H03□ | U2J (EIA)      | 1000Vdc          | 1500pF±5%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCE7U3A222J3□□H03□ | U2J (EIA)      | 1000Vdc          | 2200pF±5%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCE7U3A332J4□□H03□ | U2J (EIA)      | 1000Vdc          | 3300pF±5%   | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCE7U3A472J4□□H03□ | U2J (EIA)      | 1000Vdc          | 4700pF±5%   | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCE7U3A682J5□□H03□ | U2J (EIA)      | 1000Vdc          | 6800pF±5%   | 7.5×8.0                   | 4.0                    | 5.0                     | B1                         | E1                           |
| RCE7U3A103J5□□H03□ | U2J (EIA)      | 1000Vdc          | 10000pF±5%  | 7.5×8.0                   | 4.0                    | 5.0                     | B1                         | E1                           |
| RCE7U3A203JU□□H03□ | U2J (EIA)      | 1000Vdc          | 20000pF±5%  | 7.7×13.0                  | 4.0                    | 5.0                     | B1                         | E1                           |

Two blank columns are filled with the lead style code. Please refer to the 3 columns on the right for the appropriate code.  
The last blank column is filled with the packaging code. (B: bulk, A: ammo pack)

## High Dielectric Constant Type, X7R/X7S Characteristics

| Part Number        | Temp. Char. | Rated Voltage | Capacitance | Dimensions LxW (mm) | Dimension T (mm) | Lead Space F (mm) | Lead Style Code Bulk | Lead Style Code Taping |
|--------------------|-------------|---------------|-------------|---------------------|------------------|-------------------|----------------------|------------------------|
| RCER71E335K2□□H03□ | X7R (EIA)   | 25Vdc         | 3.3μF±10%   | 5.5×4.0             | 3.15             | 2.5               | A2                   | DB                     |
| RCER71E335K2□□H03□ | X7R (EIA)   | 25Vdc         | 3.3μF±10%   | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER71E475K2□□H03□ | X7R (EIA)   | 25Vdc         | 4.7μF±10%   | 5.5×4.0             | 3.15             | 2.5               | A2                   | DB                     |
| RCER71E475K2□□H03□ | X7R (EIA)   | 25Vdc         | 4.7μF±10%   | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER71E106K3□□H03□ | X7R (EIA)   | 25Vdc         | 10μF±10%    | 5.5×5.0             | 4.0              | 2.5               | A2                   | DB                     |
| RCER71E106K3□□H03□ | X7R (EIA)   | 25Vdc         | 10μF±10%    | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RCER71E226MW□□H03□ | X7R (EIA)   | 25Vdc         | 22μF±20%    | 5.5×7.5             | 4.0              | 5.0               | K1                   | M1                     |
| RCER71H221K0□□H03□ | X7R (EIA)   | 50Vdc         | 220pF±10%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H221K0□□H03□ | X7R (EIA)   | 50Vdc         | 220pF±10%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H331K0□□H03□ | X7R (EIA)   | 50Vdc         | 330pF±10%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H331K0□□H03□ | X7R (EIA)   | 50Vdc         | 330pF±10%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H471K0□□H03□ | X7R (EIA)   | 50Vdc         | 470pF±10%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H471K0□□H03□ | X7R (EIA)   | 50Vdc         | 470pF±10%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H681K0□□H03□ | X7R (EIA)   | 50Vdc         | 680pF±10%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H681K0□□H03□ | X7R (EIA)   | 50Vdc         | 680pF±10%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H102K0□□H03□ | X7R (EIA)   | 50Vdc         | 1000pF±10%  | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H102K0□□H03□ | X7R (EIA)   | 50Vdc         | 1000pF±10%  | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H152K0□□H03□ | X7R (EIA)   | 50Vdc         | 1500pF±10%  | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H152K0□□H03□ | X7R (EIA)   | 50Vdc         | 1500pF±10%  | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H222K0□□H03□ | X7R (EIA)   | 50Vdc         | 2200pF±10%  | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H222K0□□H03□ | X7R (EIA)   | 50Vdc         | 2200pF±10%  | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H332K0□□H03□ | X7R (EIA)   | 50Vdc         | 3300pF±10%  | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H332K0□□H03□ | X7R (EIA)   | 50Vdc         | 3300pF±10%  | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H472K0□□H03□ | X7R (EIA)   | 50Vdc         | 4700pF±10%  | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H472K0□□H03□ | X7R (EIA)   | 50Vdc         | 4700pF±10%  | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H682K0□□H03□ | X7R (EIA)   | 50Vdc         | 6800pF±10%  | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H682K0□□H03□ | X7R (EIA)   | 50Vdc         | 6800pF±10%  | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H103K0□□H03□ | X7R (EIA)   | 50Vdc         | 10000pF±10% | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H103K0□□H03□ | X7R (EIA)   | 50Vdc         | 10000pF±10% | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H153K0□□H03□ | X7R (EIA)   | 50Vdc         | 15000pF±10% | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H153K0□□H03□ | X7R (EIA)   | 50Vdc         | 15000pF±10% | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H223K0□□H03□ | X7R (EIA)   | 50Vdc         | 22000pF±10% | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H223K0□□H03□ | X7R (EIA)   | 50Vdc         | 22000pF±10% | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H333K0□□H03□ | X7R (EIA)   | 50Vdc         | 33000pF±10% | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H333K0□□H03□ | X7R (EIA)   | 50Vdc         | 33000pF±10% | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H473K0□□H03□ | X7R (EIA)   | 50Vdc         | 47000pF±10% | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H473K0□□H03□ | X7R (EIA)   | 50Vdc         | 47000pF±10% | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H683K0□□H03□ | X7R (EIA)   | 50Vdc         | 68000pF±10% | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H683K0□□H03□ | X7R (EIA)   | 50Vdc         | 68000pF±10% | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H104K0□□H03□ | X7R (EIA)   | 50Vdc         | 0.10μF±10%  | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H104K0□□H03□ | X7R (EIA)   | 50Vdc         | 0.10μF±10%  | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H154K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.15μF±10%  | 4.0×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H154K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.15μF±10%  | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H224K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.22μF±10%  | 4.0×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H224K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.22μF±10%  | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H334K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.33μF±10%  | 4.0×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H334K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.33μF±10%  | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H474K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.47μF±10%  | 4.0×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RCER71H474K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.47μF±10%  | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RCER71H684K2□□H03□ | X7R (EIA)   | 50Vdc         | 0.68μF±10%  | 5.5×4.0             | 3.15             | 2.5               | A2                   | DB                     |
| RCER71H684K2□□H03□ | X7R (EIA)   | 50Vdc         | 0.68μF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER71H105K2□□H03□ | X7R (EIA)   | 50Vdc         | 1.0μF±10%   | 5.5×4.0             | 3.15             | 2.5               | A2                   | DB                     |
| RCER71H105K2□□H03□ | X7R (EIA)   | 50Vdc         | 1.0μF±10%   | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER71H155K2□□H03□ | X7R (EIA)   | 50Vdc         | 1.5μF±10%   | 5.5×4.0             | 3.15             | 2.5               | A2                   | DB                     |
| RCER71H155K2□□H03□ | X7R (EIA)   | 50Vdc         | 1.5μF±10%   | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |

Continued on the following page. 

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RCER71H225K2□□H03□ | X7R (EIA)      | 50Vdc            | 2.2μF±10%   | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RCER71H225K2□□H03□ | X7R (EIA)      | 50Vdc            | 2.2μF±10%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCER71H335K3□□H03□ | X7R (EIA)      | 50Vdc            | 3.3μF±10%   | 5.5×5.0                   | 4.0                    | 2.5                     | A2                         | DB                           |
| RCER71H335K3□□H03□ | X7R (EIA)      | 50Vdc            | 3.3μF±10%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCER71H475K3□□H03□ | X7R (EIA)      | 50Vdc            | 4.7μF±10%   | 5.5×5.0                   | 4.0                    | 2.5                     | A2                         | DB                           |
| RCER71H475K3□□H03□ | X7R (EIA)      | 50Vdc            | 4.7μF±10%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCER71H106MW□□H03□ | X7R (EIA)      | 50Vdc            | 10μF±20%    | 5.5×7.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCER72A221K0□□H03□ | X7R (EIA)      | 100Vdc           | 220pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A221K0□□H03□ | X7R (EIA)      | 100Vdc           | 220pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A331K0□□H03□ | X7R (EIA)      | 100Vdc           | 330pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A331K0□□H03□ | X7R (EIA)      | 100Vdc           | 330pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A471K0□□H03□ | X7R (EIA)      | 100Vdc           | 470pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A471K0□□H03□ | X7R (EIA)      | 100Vdc           | 470pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A681K0□□H03□ | X7R (EIA)      | 100Vdc           | 680pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A681K0□□H03□ | X7R (EIA)      | 100Vdc           | 680pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A102K0□□H03□ | X7R (EIA)      | 100Vdc           | 1000pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A102K0□□H03□ | X7R (EIA)      | 100Vdc           | 1000pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A152K0□□H03□ | X7R (EIA)      | 100Vdc           | 1500pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A152K0□□H03□ | X7R (EIA)      | 100Vdc           | 1500pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A222K0□□H03□ | X7R (EIA)      | 100Vdc           | 2200pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A222K0□□H03□ | X7R (EIA)      | 100Vdc           | 2200pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A332K0□□H03□ | X7R (EIA)      | 100Vdc           | 3300pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A332K0□□H03□ | X7R (EIA)      | 100Vdc           | 3300pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A472K0□□H03□ | X7R (EIA)      | 100Vdc           | 4700pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A472K0□□H03□ | X7R (EIA)      | 100Vdc           | 4700pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A682K0□□H03□ | X7R (EIA)      | 100Vdc           | 6800pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A682K0□□H03□ | X7R (EIA)      | 100Vdc           | 6800pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A103K0□□H03□ | X7R (EIA)      | 100Vdc           | 10000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A103K0□□H03□ | X7R (EIA)      | 100Vdc           | 10000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A153K0□□H03□ | X7R (EIA)      | 100Vdc           | 15000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A153K0□□H03□ | X7R (EIA)      | 100Vdc           | 15000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A223K0□□H03□ | X7R (EIA)      | 100Vdc           | 22000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A223K0□□H03□ | X7R (EIA)      | 100Vdc           | 22000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A333K1□□H03□ | X7R (EIA)      | 100Vdc           | 33000pF±10% | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A333K1□□H03□ | X7R (EIA)      | 100Vdc           | 33000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A473K1□□H03□ | X7R (EIA)      | 100Vdc           | 47000pF±10% | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A473K1□□H03□ | X7R (EIA)      | 100Vdc           | 47000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A683K1□□H03□ | X7R (EIA)      | 100Vdc           | 68000pF±10% | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A683K1□□H03□ | X7R (EIA)      | 100Vdc           | 68000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A104K1□□H03□ | X7R (EIA)      | 100Vdc           | 0.10μF±10%  | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A104K1□□H03□ | X7R (EIA)      | 100Vdc           | 0.10μF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A154K2□□H03□ | X7R (EIA)      | 100Vdc           | 0.15μF±10%  | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RCER72A154K2□□H03□ | X7R (EIA)      | 100Vdc           | 0.15μF±10%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCER72A224K2□□H03□ | X7R (EIA)      | 100Vdc           | 0.22μF±10%  | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RCER72A224K2□□H03□ | X7R (EIA)      | 100Vdc           | 0.22μF±10%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCER72A334K1□□H03□ | X7R (EIA)      | 100Vdc           | 0.33μF±10%  | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RCER72A334K1□□H03□ | X7R (EIA)      | 100Vdc           | 0.33μF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RCER72A474K2□□H03□ | X7R (EIA)      | 100Vdc           | 0.47μF±10%  | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RCER72A474K2□□H03□ | X7R (EIA)      | 100Vdc           | 0.47μF±10%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCER72A684K2□□H03□ | X7R (EIA)      | 100Vdc           | 0.68μF±10%  | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RCER72A684K2□□H03□ | X7R (EIA)      | 100Vdc           | 0.68μF±10%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCER72A105K2□□H03□ | X7R (EIA)      | 100Vdc           | 1.0μF±10%   | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RCER72A105K2□□H03□ | X7R (EIA)      | 100Vdc           | 1.0μF±10%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RCEC72A155K3□□H03□ | X7S (EIA)      | 100Vdc           | 1.5μF±10%   | 5.5×5.0                   | 4.0                    | 2.5                     | A2                         | DB                           |
| RCEC72A155K3□□H03□ | X7S (EIA)      | 100Vdc           | 1.5μF±10%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RCEC72A225K3□□H03□ | X7S (EIA)      | 100Vdc           | 2.2μF±10%   | 5.5×5.0                   | 4.0                    | 2.5                     | A2                         | DB                           |
| RCEC72A225K3□□H03□ | X7S (EIA)      | 100Vdc           | 2.2μF±10%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |

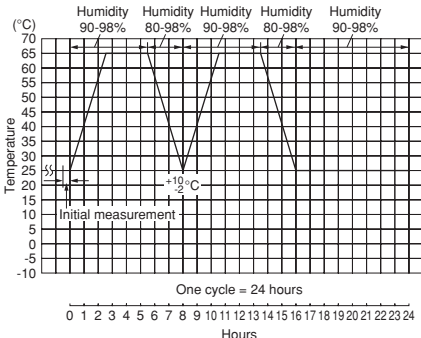
Continued on the following page. ↗

Continued from the preceding page.

| Part Number        | Temp. Char. | Rated Voltage | Capacitance | Dimensions LxW (mm) | Dimension T (mm) | Lead Space F (mm) | Lead Style Code Bulk | Lead Style Code Taping |
|--------------------|-------------|---------------|-------------|---------------------|------------------|-------------------|----------------------|------------------------|
| RCER72A475MW□□H03□ | X7S (EIA)   | 100Vdc        | 4.7μF±20%   | 5.5×7.5             | 4.0              | 5.0               | K1                   | M1                     |
| RCER72E102K1□□H03□ | X7R (EIA)   | 250Vdc        | 1000pF±10%  | 4.0×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E152K1□□H03□ | X7R (EIA)   | 250Vdc        | 1500pF±10%  | 4.0×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E222K1□□H03□ | X7R (EIA)   | 250Vdc        | 2200pF±10%  | 4.0×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E332K1□□H03□ | X7R (EIA)   | 250Vdc        | 3300pF±10%  | 4.0×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E472K1□□H03□ | X7R (EIA)   | 250Vdc        | 4700pF±10%  | 4.0×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E682K1□□H03□ | X7R (EIA)   | 250Vdc        | 6800pF±10%  | 4.0×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E103K1□□H03□ | X7R (EIA)   | 250Vdc        | 10000pF±10% | 4.0×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E153K1□□H03□ | X7R (EIA)   | 250Vdc        | 15000pF±10% | 4.0×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E223K1□□H03□ | X7R (EIA)   | 250Vdc        | 22000pF±10% | 4.0×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E333K2□□H03□ | X7R (EIA)   | 250Vdc        | 33000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E473K2□□H03□ | X7R (EIA)   | 250Vdc        | 47000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E683K2□□H03□ | X7R (EIA)   | 250Vdc        | 68000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E104K2□□H03□ | X7R (EIA)   | 250Vdc        | 0.10μF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72E154K3□□H03□ | X7R (EIA)   | 250Vdc        | 0.15μF±10%  | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RCER72E224K3□□H03□ | X7R (EIA)   | 250Vdc        | 0.22μF±10%  | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RCER72E334K4□□H03□ | X7R (EIA)   | 250Vdc        | 0.33μF±10%  | 7.5×5.5             | 4.0              | 5.0               | K1                   | M1                     |
| RCER72E474K4□□H03□ | X7R (EIA)   | 250Vdc        | 0.47μF±10%  | 7.5×5.5             | 4.0              | 5.0               | K1                   | M1                     |
| RCER72E684K5□□H03□ | X7R (EIA)   | 250Vdc        | 0.68μF±10%  | 7.5×7.5             | 4.0              | 5.0               | B1                   | E1                     |
| RCER72E105K5□□H03□ | X7R (EIA)   | 250Vdc        | 1.0μF±10%   | 7.5×7.5             | 4.0              | 5.0               | B1                   | E1                     |
| RCER72E225MU□□H03□ | X7R (EIA)   | 250Vdc        | 2.2μF±20%   | 7.5×12.5            | 4.0              | 5.0               | B1                   | E1                     |
| RCER72J102K2□□H03□ | X7R (EIA)   | 630Vdc        | 1000pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72J152K2□□H03□ | X7R (EIA)   | 630Vdc        | 1500pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72J222K2□□H03□ | X7R (EIA)   | 630Vdc        | 2200pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72J332K2□□H03□ | X7R (EIA)   | 630Vdc        | 3300pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72J472K2□□H03□ | X7R (EIA)   | 630Vdc        | 4700pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72J682K2□□H03□ | X7R (EIA)   | 630Vdc        | 6800pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72J103K2□□H03□ | X7R (EIA)   | 630Vdc        | 10000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72J153K2□□H03□ | X7R (EIA)   | 630Vdc        | 15000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72J223K2□□H03□ | X7R (EIA)   | 630Vdc        | 22000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER72J333K3□□H03□ | X7R (EIA)   | 630Vdc        | 33000pF±10% | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RCER72J473K3□□H03□ | X7R (EIA)   | 630Vdc        | 47000pF±10% | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RCER72J683K4□□H03□ | X7R (EIA)   | 630Vdc        | 68000pF±10% | 7.5×5.5             | 4.0              | 5.0               | K1                   | M1                     |
| RCER72J104K4□□H03□ | X7R (EIA)   | 630Vdc        | 0.10μF±10%  | 7.5×5.5             | 4.0              | 5.0               | K1                   | M1                     |
| RCER72J154K5□□H03□ | X7R (EIA)   | 630Vdc        | 0.15μF±10%  | 7.5×8.0             | 4.0              | 5.0               | B1                   | E1                     |
| RCER72J224K5□□H03□ | X7R (EIA)   | 630Vdc        | 0.22μF±10%  | 7.5×8.0             | 4.0              | 5.0               | B1                   | E1                     |
| RCER72J474MU□□H03□ | X7R (EIA)   | 630Vdc        | 0.47μF±20%  | 7.7×13.0            | 4.0              | 5.0               | B1                   | E1                     |
| RCER73A102K2□□H03□ | X7R (EIA)   | 1000Vdc       | 1000pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER73A152K2□□H03□ | X7R (EIA)   | 1000Vdc       | 1500pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER73A222K2□□H03□ | X7R (EIA)   | 1000Vdc       | 2200pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER73A332K2□□H03□ | X7R (EIA)   | 1000Vdc       | 3300pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER73A472K2□□H03□ | X7R (EIA)   | 1000Vdc       | 4700pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER73A682K2□□H03□ | X7R (EIA)   | 1000Vdc       | 6800pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER73A103K2□□H03□ | X7R (EIA)   | 1000Vdc       | 10000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RCER73A153K3□□H03□ | X7R (EIA)   | 1000Vdc       | 15000pF±10% | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RCER73A223K3□□H03□ | X7R (EIA)   | 1000Vdc       | 22000pF±10% | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RCER73A333K4□□H03□ | X7R (EIA)   | 1000Vdc       | 33000pF±10% | 7.5×5.5             | 4.0              | 5.0               | K1                   | M1                     |
| RCER73A473K4□□H03□ | X7R (EIA)   | 1000Vdc       | 47000pF±10% | 7.5×5.5             | 4.0              | 5.0               | K1                   | M1                     |
| RCER73A683K5□□H03□ | X7R (EIA)   | 1000Vdc       | 68000pF±10% | 7.5×8.0             | 4.0              | 5.0               | B1                   | E1                     |
| RCER73A104K5□□H03□ | X7R (EIA)   | 1000Vdc       | 0.10μF±10%  | 7.5×8.0             | 4.0              | 5.0               | B1                   | E1                     |
| RCER73A224MU□□H03□ | X7R (EIA)   | 1000Vdc       | 0.22μF±20%  | 7.7×13.0            | 4.0              | 5.0               | B1                   | E1                     |

Two blank columns are filled with the lead style code. Please refer to the 3 columns on the right for the appropriate code.  
The last blank column is filled with the packaging code. (B: bulk, A: ammo pack)

# Temperature Compensating Type Specifications and Test Methods

| No.                | AEC-Q200 Test Item                                                                                             | Specifications                                                                                                 | AEC-Q200 Test Method                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|--------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|---------------------------|--------|---------------------------|---------------|---------------------------|----------|------------|-------------|------|---|------|---|
| 1                  | Pre-and Post-Stress Electrical Test                                                                            | —                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| 2                  | High Temperature Exposure (Storage)                                                                            | The measured and observed characteristics should satisfy the specifications in the following table.            | Sit the capacitor for 1,000±12h at 150±3°C. Let sit for 24±2h at room temperature, then measure.                                                                                                                                                                                                                                                                                                                                            |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Appearance                                                                                                     | No defects or abnormalities                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Capacitance Change                                                                                             | Within ±3% or ±0.3pF (Whichever is larger)                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Q                                                                                                              | 30pF ≤ C: Q ≥ 350<br>10pF ≤ C < 30pF: Q ≥ 275+5C/2<br>10pF > C: Q ≥ 200+10C<br><br>C: Nominal Capacitance (pF) |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | I.R.                                                                                                           | More than 1,000MΩ or 50MΩ · μF (Whichever is smaller)                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| 3                  | Temperature Cycling                                                                                            | The measured and observed characteristics should satisfy the specifications in the following table.            | Perform the 1,000 cycles according to the four heat treatments listed in the following table. Let sit for 24±2h at *room condition, then measure.<br><table><tr><th>Step</th><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><th>Temp. (°C)</th><td>-55+0/-3</td><td>Room Temp.</td><td>125+3/-0</td><td>Room Temp.</td></tr><tr><th>Time (min.)</th><td>15±3</td><td>1</td><td>15±3</td><td>1</td></tr></table>                           | Step          | 1            | 2             | 3                         | 4      | Temp. (°C)                | -55+0/-3      | Room Temp.                | 125+3/-0 | Room Temp. | Time (min.) | 15±3 | 1 | 15±3 | 1 |
|                    | Step                                                                                                           | 1                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2             | 3            | 4             |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Temp. (°C)                                                                                                     | -55+0/-3                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                             | Room Temp.    | 125+3/-0     | Room Temp.    |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Time (min.)                                                                                                    | 15±3                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1             | 15±3         | 1             |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Appearance                                                                                                     | No defects or abnormalities                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| Capacitance Change | Within ±5% or ±0.5pF (Whichever is larger)                                                                     |                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| Q                  | 30pF ≤ C: Q ≥ 350<br>10pF ≤ C < 30pF: Q ≥ 275+5C/2<br>10pF > C: Q ≥ 200+10C<br><br>C: Nominal Capacitance (pF) |                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| I.R.               | 1,000MΩ or 50MΩ · μF min. (Whichever is smaller)                                                               |                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| 4                  | Moisture Resistance                                                                                            | The measured and observed characteristics should satisfy the specifications in the following table.            | Apply the 24h heat (25 to 65°C) and humidity (80 to 98%) treatment shown below, 10 consecutive times.<br>Let sit for 24±2h at *room condition, then measure.<br>                                                                                                                                                                                        |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Appearance                                                                                                     | No defects or abnormalities                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Capacitance Change                                                                                             | Within ±5% or ±0.5pF (Whichever is larger)                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Q                                                                                                              | 30pF ≤ C: Q ≥ 200<br>30pF > C: Q ≥ 100+10C/3<br><br>C: Nominal Capacitance (pF)                                |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | I.R.                                                                                                           | 500MΩ or 25MΩ · μF min. (Whichever is smaller)                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| 5                  | Biased Humidity                                                                                                | The measured and observed characteristics should satisfy the specifications in the following table.            | Apply the rated voltage and DC1.3+0.2/-0V (add 6.8kΩ resistor) at 85±3°C and 80 to 85% humidity for 1,000±12h.<br>Remove and let sit for 24±2h at *room condition, then measure.<br>The charge/discharge current is less than 50mA.                                                                                                                                                                                                         |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Appearance                                                                                                     | No defects or abnormalities                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Capacitance Change                                                                                             | Within ±5% or ±0.5pF (Whichever is larger)                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | Q                                                                                                              | 30pF ≤ C: Q ≥ 200<br>30pF > C: Q ≥ 100+10C/3<br><br>C: Nominal Capacitance (pF)                                |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | I.R.                                                                                                           | 500MΩ or 25MΩ · μF min. (Whichever is smaller)                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| 6                  | Operational Life                                                                                               | The measured and observed characteristics should satisfy the specifications in the following table.            | Apply the voltage shown in the table for 1,000±12h at 125±3°C.<br>Let sit for 24±2h at *room condition, then measure.<br>The charge/discharge current is less than 50mA.<br><table><tr><th>Rated Voltage</th><th>Test Voltage</th></tr><tr><td>DC50V, DC100V</td><td>200% of the rated voltage</td></tr><tr><td>DC250V</td><td>150% of the rated voltage</td></tr><tr><td>DC630V, DC1kV</td><td>120% of the rated voltage</td></tr></table> | Rated Voltage | Test Voltage | DC50V, DC100V | 200% of the rated voltage | DC250V | 150% of the rated voltage | DC630V, DC1kV | 120% of the rated voltage |          |            |             |      |   |      |   |
|                    | Rated Voltage                                                                                                  | Test Voltage                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | DC50V, DC100V                                                                                                  | 200% of the rated voltage                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | DC250V                                                                                                         | 150% of the rated voltage                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
|                    | DC630V, DC1kV                                                                                                  | 120% of the rated voltage                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| Appearance         | No defects or abnormalities                                                                                    |                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| Capacitance Change | Within ±3% or ±0.3pF (Whichever is larger)                                                                     |                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| Q                  | 30pF ≤ C: Q ≥ 350<br>10pF ≤ C < 30pF: Q ≥ 275+5C/2<br>10pF > C: Q ≥ 200+10C<br><br>C: Nominal Capacitance (pF) |                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |
| I.R.               | 1,000MΩ or 50MΩ · μF min. (Whichever is smaller)                                                               |                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |              |               |                           |        |                           |               |                           |          |            |             |      |   |      |   |

\* "room condition" Temperature:  $15$  to  $35^\circ\text{C}$ , Relative humidity:  $45$  to  $75\%$ , Atmosphere pressure:  $86$  to  $106\text{kPa}$

Continued on the following page.

## Temperature Compensating Type Specifications and Test Methods

1

Continued from the preceding page.

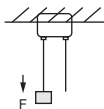
| No. | AEC-Q200 Test Item           | Specifications                                                                                                      | AEC-Q200 Test Method                                                                                                                                                                                                                                                                                                                                                                                        |
|-----|------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7   | External Visual              | No defects or abnormalities                                                                                         | Visual inspection                                                                                                                                                                                                                                                                                                                                                                                           |
| 8   | Physical Dimension           | Within the specified dimensions                                                                                     | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                             |
| 9   | Marking                      | To be easily legible.                                                                                               | Visual inspection                                                                                                                                                                                                                                                                                                                                                                                           |
| 10  | Resistance to Solvents       | Appearance                                                                                                          | Per MIL-STD-202 Method 215<br>Solvent 1: 1 part (by volume) of isopropyl alcohol<br>3 parts (by volume) of mineral spirits<br>Solvent 2: Terpene defluxer<br>Solvent 3: 42 parts (by volume) of water<br>1 part (by volume) of propylene glycol monomethyl ether<br>1 part (by volume) of monoethanolamine                                                                                                  |
|     |                              | Capacitance                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | Q                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | I.R.                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                             |
| 11  | Mechanical Shock             | Appearance                                                                                                          | Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks). The specified test pulse should be Half-sine and should have a duration: 0.5ms, peak value: 1,500G and velocity change: 4.7m/s.                                                                                                                                                      |
|     |                              | Capacitance                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | Q                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | C : Nominal Capacitance (pF)                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                             |
| 12  | Vibration                    | Appearance                                                                                                          | The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 2,000Hz. The frequency range, from 10 to 2,000Hz and return to 10Hz, should be traversed in approximately 20min. This motion should be applied for 12 items in each 3 mutually perpendicular directions (total of 36 times). |
|     |                              | Capacitance                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | Q                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | C: Nominal Capacitance (pF)                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                             |
| 13  | Resistance to Soldering Heat | The measured and observed characteristics should satisfy the specifications in the following table.                 | The lead wire is immersed in the melted solder 1.5 to 2mm from the main body at 260±5°C for 10±1s. The specified items are measured after 24±2h.                                                                                                                                                                                                                                                            |
|     |                              | Appearance                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | Capacitance Change                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | Dielectric Strength (Between Terminals)                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                             |
| 14  | Thermal Shock                | The measured and observed characteristics should satisfy the specifications in the following table.                 | Perform the 300 cycles according to the two heat treatments listed in the following table (Maximum transfer time is 20s.). Let sit for 24±2h at *room condition, then measure.                                                                                                                                                                                                                              |
|     |                              | Appearance                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | Capacitance Change                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | Q                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | I.R.                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                             |
| 15  | ESD                          | Appearance                                                                                                          | Per AEC-Q200-004                                                                                                                                                                                                                                                                                                                                                                                            |
|     |                              | Capacitance                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | Q                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                             |
|     |                              | I.R.                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                             |
| 16  | Solderability                | Lead wire should be soldered with uniform coating on the axial direction over 95% of the circumferential direction. | Should be placed into steam aging for 8h±15min. The terminal of capacitor is dipped into a solution of ethanol (JIS K 8101) and rosin (JIS K 5902) (25% rosin in weight proportion). Immerse in solder solution for 2±0.5 seconds. In both cases the depth of dipping is up to about 1.5 to 2mm from the terminal body.                                                                                     |

\* "room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ➤

## Temperature Compensating Type Specifications and Test Methods

Continued from the preceding page.

| No.                 | AEC-Q200 Test Item                      |                                                                                                                           | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | AEC-Q200 Test Method                                                                                                                                                                                                                                                                                                               |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
|---------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------------|---------|---------------------------|----------|---------------------------|------------|---------------------------|-------------------|---|------|
| 17                  | Electrical Charac-<br>terization        | Appearance                                                                                                                | No defects or abnormalities                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Visual inspection.                                                                                                                                                                                                                                                                                                                 |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
|                     |                                         | Capacitance                                                                                                               | Within the specified tolerance                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The capacitance, Q should be measured at 25°C at the frequency and voltage shown in the table. <table><tr><th>Nominal Cap.</th><th>Frequency</th><th>Voltage</th></tr><tr><td>C ≤ 1000pF</td><td>1±0.1MHz</td><td>AC0.5 to 5V (r.m.s.)</td></tr><tr><td>C &gt; 1000pF</td><td>1±0.1kHz</td><td>AC1±0.2V (r.m.s.)</td></tr></table> | Nominal Cap.     | Frequency                 | Voltage | C ≤ 1000pF                | 1±0.1MHz | AC0.5 to 5V (r.m.s.)      | C > 1000pF | 1±0.1kHz                  | AC1±0.2V (r.m.s.) |   |      |
|                     |                                         | Nominal Cap.                                                                                                              | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
|                     |                                         | C ≤ 1000pF                                                                                                                | 1±0.1MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | AC0.5 to 5V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
|                     |                                         | C > 1000pF                                                                                                                | 1±0.1kHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | AC1±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
|                     |                                         | Q                                                                                                                         | 30pF ≤ C: Q ≥ 1,000<br>30pF > C: Q ≥ 400+20C<br><br>C: Nominal Capacitance (pF)                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| I.R.                | Between Terminals                       | 10,000MΩ or 500MΩ · μF min.<br>(Whichever is smaller)                                                                     | The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at 25°C within 2min. of charging.                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| Dielectric Strength | Between Terminals                       | No defects or abnormalities                                                                                               | The capacitor should not be damaged when DC voltage shown in the table is applied between the terminations for 1 to 5 seconds.<br>(Charge/Discharge current ≤ 50mA.) <table><tr><th>Rated Voltage</th><th>Test Voltage</th></tr><tr><td>DC50V, DC100V</td><td>300% of the rated voltage</td></tr><tr><td>DC250V</td><td>200% of the rated voltage</td></tr><tr><td>DC630V</td><td>150% of the rated voltage</td></tr><tr><td>DC1kV</td><td>130% of the rated voltage</td></tr></table> | Rated Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Test Voltage                                                                                                                                                                                                                                                                                                                       | DC50V, DC100V    | 300% of the rated voltage | DC250V  | 200% of the rated voltage | DC630V   | 150% of the rated voltage | DC1kV      | 130% of the rated voltage |                   |   |      |
|                     | Rated Voltage                           | Test Voltage                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| DC50V, DC100V       | 300% of the rated voltage               |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| DC250V              | 200% of the rated voltage               |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| DC630V              | 150% of the rated voltage               |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| DC1kV               | 130% of the rated voltage               |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
|                     | Body Insulation                         | No defects or abnormalities                                                                                               | The capacitor is placed in a container with metal balls of 1mm diameter so that each terminal, short-circuit is kept approximately 2mm from the balls, and 250% of the rated DC voltage is impressed for 1 to 5 seconds between capacitor terminals and metal balls.<br>(Charge/Discharge current ≤ 50mA.)                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| 18                  | Terminal Strength                       | Tensile Strength                                                                                                          | Termination not to be broken or loosened                                                                                                                                                                                                                                                                                                                                                                                                                                               | As in the figure, fix the capacitor body, apply the force gradually to each lead in the radial direction of the capacitor until reaching 10N and then keep the force applied for 10±1 seconds. <div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
|                     |                                         | Bending Strength                                                                                                          | Termination not to be broken or loosened                                                                                                                                                                                                                                                                                                                                                                                                                                               | Each lead wire should be subjected to a force of 2.5N and then be bent 90° at the point of egress in one direction. Each wire is then returned to the original position and bent 90° in the opposite direction at the rate of one bend per 2 to 3 seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| 19                  | Capacitance Temperature Characteristics | Within the specified Tolerance.<br>(Table A)<br><br>Capacitance Drift is within ±0.2% or ±0.05pF<br>(Whichever is larger) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The capacitance change should be measured after 5min. at each specified temperature step. <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>25±2</td></tr><tr><td>2</td><td>-55±3</td></tr><tr><td>3</td><td>25±2</td></tr><tr><td>4</td><td>125±3</td></tr><tr><td>5</td><td>25±2</td></tr></table> The temperature coefficient is determind using the capacitance measured in step 3 as a reference. When cycling the temperature sequentially from step 1 through 5 (-55°C to +125°C) the capacitance should be within the specified tolerance for the temperature coefficient and capacitance change as Table A.<br>The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the step 1, 3 and 5 by the capacitance value in step 3. | Step                                                                                                                                                                                                                                                                                                                               | Temperature (°C) | 1                         | 25±2    | 2                         | -55±3    | 3                         | 25±2       | 4                         | 125±3             | 5 | 25±2 |
| Step                | Temperature (°C)                        |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| 1                   | 25±2                                    |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| 2                   | -55±3                                   |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| 3                   | 25±2                                    |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| 4                   | 125±3                                   |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |
| 5                   | 25±2                                    |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                    |                  |                           |         |                           |          |                           |            |                           |                   |   |      |

\* "room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Table A

| Char. | Nominal Values (ppm/°C) * | Capacitance Change from 25°C (%) |       |      |       |      |       |
|-------|---------------------------|----------------------------------|-------|------|-------|------|-------|
|       |                           | -55                              |       | -30  |       | -10  |       |
|       |                           | Max.                             | Min.  | Max. | Min.  | Max. | Min.  |
| C0G   | 0 $\pm$ 30                | 0.58                             | -0.24 | 0.40 | -0.17 | 0.25 | -0.11 |
| U2J   | -750 $\pm$ 120            | 8.78                             | 5.04  | 6.04 | 3.47  | 3.84 | 2.21  |

\* Nominal values denote the temperature coefficient within a range of 25°C to 125°C.

# High Dielectric Constant Type Specifications and Test Methods

1

| No.                | AEC-Q200 Test Item                               | Specifications                                                                                      | AEC-Q200 Test Method                                                                                                                                                                                                                                                                                                                                                                  |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|--------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|----------------------|------------------------------|--------|---------------------------|----------|---------------------------|----------|---------------------------|-------------|------|---|------|---|
| 1                  | Pre-and Post-Stress Electrical Test              | —                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| 2                  | High Temperature Exposure (Storage)              | The measured and observed characteristics should satisfy the specifications in the following table. | Sit the capacitor for 1,000±12h at 150±3°C. Let sit for 24±2h at room temperature, then measure.                                                                                                                                                                                                                                                                                      |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | Appearance                                       | No defects or abnormalities                                                                         |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | Capacitance Change                               | Within ±12.5%                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | D.F.                                             | 0.04 max.                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | I.R.                                             | More than 1,000MΩ or 50MΩ · μF (Whichever is smaller)                                               |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| 3                  | Temperature Cycling                              | The measured and observed characteristics should satisfy the specifications in the following table. | Perform the 1,000 cycles according to the four heat treatments listed in the following table. Let sit for 24±2h at *room condition, then measure.                                                                                                                                                                                                                                     |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | Appearance                                       | No defects or abnormalities                                                                         | <table><tr><th>Step</th><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><td>Temp. (°C)</td><td>-55+0/-3</td><td>Room Temp.</td><td>125+3/-0</td><td>Room Temp.</td></tr><tr><td>Time (min.)</td><td>15±3</td><td>1</td><td>15±3</td><td>1</td></tr></table><br>•Pretreatment<br>Perform the heat treatment at 150+0/-10°C for 60±5min and then let sit for 24±2h at *room condition. | Step          | 1            | 2                    | 3                            | 4      | Temp. (°C)                | -55+0/-3 | Room Temp.                | 125+3/-0 | Room Temp.                | Time (min.) | 15±3 | 1 | 15±3 | 1 |
|                    | Step                                             | 1                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                       | 2             | 3            | 4                    |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | Temp. (°C)                                       | -55+0/-3                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                       | Room Temp.    | 125+3/-0     | Room Temp.           |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | Time (min.)                                      | 15±3                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                       | 1             | 15±3         | 1                    |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| Capacitance Change | Within ±12.5%                                    |                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| D.F.               | 0.05 max.                                        |                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| I.R.               | 1,000MΩ or 50MΩ · μF min. (Whichever is smaller) |                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| 4                  | Moisture Resistance                              | The measured and observed characteristics should satisfy the specifications in the following table. | Apply the 24h heat (25 to 65°C) and humidity (80 to 98%) treatment shown below, 10 consecutive times.<br>Let sit for 24±2h at *room condition, then measure.                                                                                                                                                                                                                          |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | Appearance                                       | No defects or abnormalities                                                                         |                                                                                                                                                                                                                                                                                                    |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | Capacitance Change                               | Within ±12.5%                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | D.F.                                             | 0.05 max.                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | I.R.                                             | 500MΩ or 25MΩ · μF min. (Whichever is smaller)                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| 5                  | Biased Humidity                                  | The measured and observed characteristics should satisfy the specifications in the following table. | Apply the rated voltage and DC1.3+0.2/-0V (add 6.8kΩ resistor) at 85±3°C and 80 to 85% humidity for 1,000±12h. Remove and let sit for 24±2h at *room condition, then measure. The charge/discharge current is less than 50mA.                                                                                                                                                         |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | Appearance                                       | No defects or abnormalities                                                                         |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | Capacitance Change                               | Within ±12.5%                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | D.F.                                             | 0.05 max.                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | I.R.                                             | 500MΩ or 25MΩ · μF min. (Whichever is smaller)                                                      |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| 6                  | Operational Life                                 | The measured and observed characteristics should satisfy the specifications in the following table. | Apply the voltage shown in the table for 1,000±12h at 125±3°C. Let sit for 24±2h at *room condition, then measure. The charge/discharge current is less than 50mA.<br>•Pretreatment<br>Apply test voltage for 60±5min at test temperature. Remove and let sit for 24±2h at *room condition.                                                                                           |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | Appearance                                       | No defects or abnormalities                                                                         | <table><tr><th>Rated Voltage</th><th>Test Voltage</th></tr><tr><td>DC25V, DC50V, DC100V</td><td>200% of the rated voltage *1</td></tr><tr><td>DC250V</td><td>150% of the rated voltage</td></tr><tr><td>DC630V</td><td>120% of the rated voltage</td></tr><tr><td>DC1kV</td><td>110% of the rated voltage</td></tr></table>                                                           | Rated Voltage | Test Voltage | DC25V, DC50V, DC100V | 200% of the rated voltage *1 | DC250V | 150% of the rated voltage | DC630V   | 120% of the rated voltage | DC1kV    | 110% of the rated voltage |             |      |   |      |   |
|                    | Rated Voltage                                    | Test Voltage                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | DC25V, DC50V, DC100V                             | 200% of the rated voltage *1                                                                        |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
|                    | DC250V                                           | 150% of the rated voltage                                                                           |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| DC630V             | 120% of the rated voltage                        |                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| DC1kV              | 110% of the rated voltage                        |                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| Capacitance Change | Within ±12.5%                                    |                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| D.F.               | 0.04 max.                                        |                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| I.R.               | 1,000MΩ or 50MΩ · μF min. (Whichever is smaller) |                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| 7                  | External Visual                                  | No defects or abnormalities                                                                         | Visual inspection                                                                                                                                                                                                                                                                                                                                                                     |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| 8                  | Physical Dimension                               | Within the specified dimensions                                                                     | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                       |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |
| 9                  | Marking                                          | To be easily legible.                                                                               | Visual inspection                                                                                                                                                                                                                                                                                                                                                                     |               |              |                      |                              |        |                           |          |                           |          |                           |             |      |   |      |   |

\* "room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

\*1: below parts are applicable in rated voltage×150%.

| Char. | Rated Voltage | Capacitance | Dimensions |
|-------|---------------|-------------|------------|
| R7    | 2A            | 334         | 1          |
| R7    | 2A            | 474-105     | 2          |
| C7    | 2A            | 155-225     | 3          |
| C7    | 2A            | 475         | W          |

Continued on the following page. ↗

## High Dielectric Constant Type Specifications and Test Methods

Continued from the preceding page.

| No.                | AEC-Q200 Test Item                               |                             | Specifications                                                                                                      | AEC-Q200 Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |   |   |            |          |          |             |      |      |
|--------------------|--------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---|---|------------|----------|----------|-------------|------|------|
| 10                 | Resistance to Solvents                           | Appearance                  | No defects or abnormalities                                                                                         | Per MIL-STD-202 Method 215<br>Solvent 1: 1 part (by volume) of isopropyl alcohol<br>3 parts (by volume) of mineral spirits<br>Solvent 2: Terpene defluxer<br>Solvent 3: 42 parts (by volume) of water<br>1 part (by volume) of propylene glycol monomethyl ether<br>1 part (by volume) of monoethanolamine                                                                                                                                                                                |      |   |   |            |          |          |             |      |      |
|                    |                                                  | Capacitance                 | Within the specified tolerance                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
|                    |                                                  | D.F.                        | 0.025 max.                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
|                    |                                                  | I.R.                        | More than 10,000MΩ or 500MΩ · μF (Whichever is smaller)                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
| 11                 | Mechanical Shock                                 | Appearance                  | No defects or abnormalities                                                                                         | Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks).<br>The specified test pulse should be Half-sine and should have a duration: 0.5ms, peak value: 1,500G and velocity change: 4.7m/s.                                                                                                                                                                                                                                 |      |   |   |            |          |          |             |      |      |
|                    |                                                  | Capacitance                 | Within the specified tolerance                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
|                    |                                                  | D.F.                        | 0.025 max.                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
| 12                 | Vibration                                        | Appearance                  | No defects or abnormalities                                                                                         | The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 2,000Hz.<br>The frequency range, from 10 to 2,000Hz and return to 10Hz, should be traversed in approximately 20min. This motion should be applied for 12 items in each 3 mutually perpendicular directions (total of 36 times).                                                                            |      |   |   |            |          |          |             |      |      |
|                    |                                                  | Capacitance                 | Within the specified tolerance                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
|                    |                                                  | D.F.                        | 0.025 max.                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
| 13                 | Resistance to Soldering Heat                     |                             | The measured and observed characteristics should satisfy the specifications in the following table.                 | The lead wire is immersed in the melted solder 1.5 to 2mm from the main body at 260±5°C for 10±1s. The specified items are measured after 24±2h.<br>•Pretreatment<br>Perform the heat treatment at 150+0/-10°C for 60±5min and then let sit for 24±2h at *room condition.                                                                                                                                                                                                                 |      |   |   |            |          |          |             |      |      |
|                    | Appearance                                       | No defects or abnormalities |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
|                    | Capacitance Change                               | Wthin ±7.5%                 |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
|                    | Dielectric Strength (Between terminals)          | No defects                  |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
| 14                 | Thermal Shock                                    |                             | The measured and observed characteristics should satisfy the specifications in the following table.                 | Perform the 300 cycles according to the two heat treatments listed in the following table (Maximum transfer time is 20s.).<br>Let sit for 24±2h at *room condition, then measure. <table><tr><td>Step</td><td>1</td><td>2</td></tr><tr><td>Temp. (°C)</td><td>-55+0/-3</td><td>125+3/-0</td></tr><tr><td>Time (min.)</td><td>15±3</td><td>15±3</td></tr></table><br>•Pretreatment<br>Perform the heat treatment at 150+0/-10°C for 60±5min and then let sit for 24±2h at *room condition. | Step | 1 | 2 | Temp. (°C) | -55+0/-3 | 125+3/-0 | Time (min.) | 15±3 | 15±3 |
|                    | Step                                             | 1                           | 2                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
|                    | Temp. (°C)                                       | -55+0/-3                    | 125+3/-0                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
|                    | Time (min.)                                      | 15±3                        | 15±3                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
|                    | Appearance                                       | No defects or abnormalities |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
| Capacitance Change | Within ±12.5%                                    |                             |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
| D.F.               | 0.05 max.                                        |                             |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
| I.R.               | 1,000MΩ or 50MΩ · μF min. (Whichever is smaller) |                             |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
| 15                 | ESD                                              | Appearance                  | No defects or abnormalities                                                                                         | Per AEC-Q200-004                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |   |   |            |          |          |             |      |      |
|                    |                                                  | Capacitance                 | Within the specified tolerance                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
|                    |                                                  | D.F.                        | 0.025 max.                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
|                    |                                                  | I.R.                        | More than 10,000MΩ or 500MΩ · μF (Whichever is smaller)                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |   |            |          |          |             |      |      |
| 16                 | Solderability                                    |                             | Lead wire should be soldered with uniform coating on the axial direction over 95% of the circumferential direction. | Should be placed into steam aging for 8h±15min.<br>The terminal of capacitor is dipped into a solution of ethanol (JIS K 8101) and rosin (JIS K 5902) (25% rosin in weight popotion). Immerse in solder solution for 2±0.5 seconds.<br>In both cases the depth of dipping is up to about 1.5 to 2mm from the terminal body.                                                                                                                                                               |      |   |   |            |          |          |             |      |      |

\* "room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ➤

## High Dielectric Constant Type Specifications and Test Methods

1

Continued from the preceding page.

| No.                 | AEC-Q200 Test Item                      |                                                       | Specifications                                                                                                                                                                                                                                                                                             |  | AEC-Q200 Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
|---------------------|-----------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------|------------------|-----------------|------|---|-------|---|------|---|-------|---|------|
| 17                  | Electrical Charac-<br>terization        | Appearance                                            | No defects or abnormalities                                                                                                                                                                                                                                                                                |  | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
|                     |                                         | Capacitance                                           | Within the specified tolerance                                                                                                                                                                                                                                                                             |  | The capacitance/D.F. should be measured at 25°C at the frequency and voltage shown in the table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
|                     |                                         | D.F.                                                  | 0.025 max.                                                                                                                                                                                                                                                                                                 |  | <table><tr><th>Frequency</th><th>Voltage</th></tr><tr><td>1±0.1kHz</td><td>1±0.2V (r.m.s.)</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Frequency | Voltage | 1±0.1kHz         | 1±0.2V (r.m.s.) |      |   |       |   |      |   |       |   |      |
|                     |                                         | Frequency                                             | Voltage                                                                                                                                                                                                                                                                                                    |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
|                     |                                         | 1±0.1kHz                                              | 1±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
| I.R.                | Between Terminals                       | 10,000MΩ or 500MΩ · μF min.<br>(Whichever is smaller) | The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at 25°C within 2min. of charging.                                                                                                                                                                           |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
| Dielectric Strength | Between Terminals                       | No defects or abnormalities                           | The capacitor should not be damaged when DC voltage shown in the table is applied between the terminations for 1 to 5 seconds.<br>(Charge/Discharge current ≤ 50mA.)                                                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
|                     | Body Insulation                         | No defects or abnormalities                           | The capacitor is placed in a container with metal balls of 1mm diameter so that each terminal, short-circuit is kept approximately 2mm from the balls, and 250% of the rated DC voltage is impressed for 1 to 5 seconds between capacitor terminals and metal balls.<br>(Charge/Discharge current ≤ 50mA.) |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
| 18                  | Terminal Strength                       | Tensile Strength                                      | Termination not to be broken or loosened                                                                                                                                                                                                                                                                   |  | As in the figure, fix the capacitor body, apply the force gradually to each lead in the radial direction of the capacitor until reaching 10N and then keep the force applied for 10±1 seconds.<br>                                                                                                                                                                                                                                                                                                                                                                 |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
|                     |                                         | Bending Strength                                      | Termination not to be broken or loosened                                                                                                                                                                                                                                                                   |  | Each lead wire should be subjected to a force of 2.5N and then be bent 90° at the point of egress in one direction. Each wire is then returned to the original position and bent 90° in the opposite direction at the rate of one bend per 2 to 3 seconds.                                                                                                                                                                                                                                                                                                                                                                                              |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
| 19                  | Capacitance Temperature Characteristics |                                                       | Char.X7R: Within ±15%<br>Char.X7S: Within ±22%                                                                                                                                                                                                                                                             |  | The capacitance change should be measured after 5min. at each specified temperature step.<br><table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>25±2</td></tr><tr><td>2</td><td>-55±3</td></tr><tr><td>3</td><td>25±2</td></tr><tr><td>4</td><td>125±3</td></tr><tr><td>5</td><td>25±2</td></tr></table><br>The ranges of capacitance change compared with the above 25°C value over the temperature ranges shown in the table should be within the specified ranges.<br>•Pretreatment<br>Perform the heat treatment at 150+0/-10°C for 60±5min and then let sit for 24±2h at *room condition.<br>Perform the initial measurement. |           | Step    | Temperature (°C) | 1               | 25±2 | 2 | -55±3 | 3 | 25±2 | 4 | 125±3 | 5 | 25±2 |
| Step                | Temperature (°C)                        |                                                       |                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
| 1                   | 25±2                                    |                                                       |                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
| 2                   | -55±3                                   |                                                       |                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
| 3                   | 25±2                                    |                                                       |                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
| 4                   | 125±3                                   |                                                       |                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |         |                  |                 |      |   |       |   |      |   |       |   |      |
| 5                   | 25±2                                    |                                                       |                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |         |                  |                 |      |   |       |   |      |   |       |   |      |

\* "room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

# Radial Lead Type Monolithic Ceramic Capacitors

**muRata**

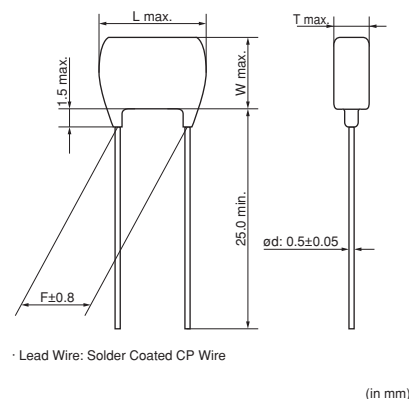
## RHE Series 150°C max. (for Automotive) (DC50V-DC100V)

2

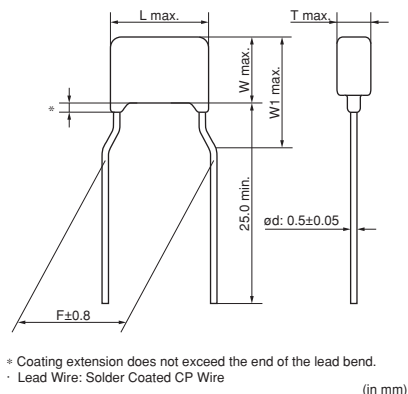
### ■ Features

1. Small size and large capacitance
2. Low ESR and ESL suitable for high frequency
3. Applied maximum temperature up to 150°C  
Note : Maximum accumulative time to 150°C is within 2000 hours.
4. Meet AEC-Q200, ISO7637-2 (surge test) requirement
5. Meet LF (Lead Free) and HF (Halogen Free)
6. Flow soldering and welding are available.  
(Re-flow soldering is not available.)
7. If copper wire is necessary at welding process, copper wire is available based on request.

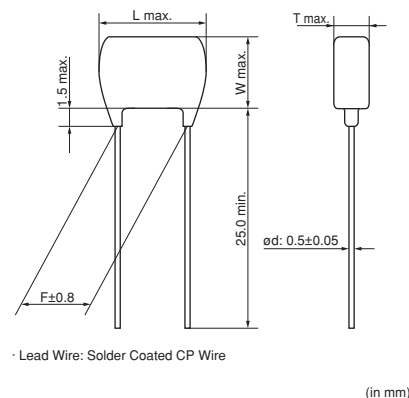
Dimensions code: 0  
Lead style code: A2



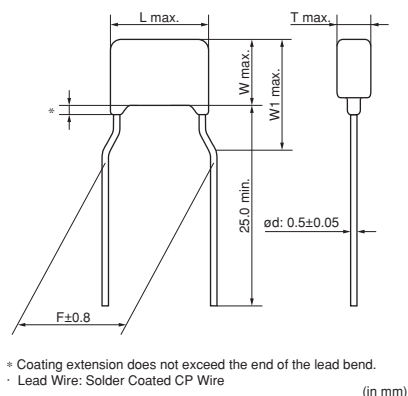
Dimensions code: 0  
Lead style code: K1



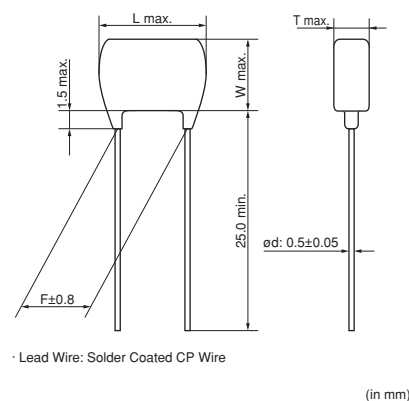
Dimensions code: 1  
Lead style code: A2



Dimensions code: 1  
Lead style code: K1



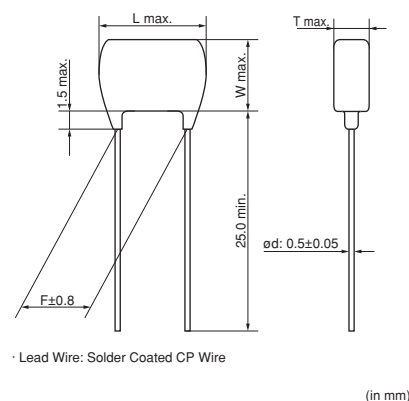
Dimensions code: 2  
Lead style code: A2



Dimensions code: 2  
Lead style code: K1



Dimensions code: 3  
Lead style code: A2



Continued on the following page. ➤

Continued from the preceding page.



## Dimensions

| Dimensions and Lead Style Code | Dimensions (mm) |     |      |                                          |     |     |
|--------------------------------|-----------------|-----|------|------------------------------------------|-----|-----|
|                                | L               | W   | W1   | T                                        | F   | d   |
| 0A2/0DB                        | 3.6             | 3.5 | -    | See the individual product specification | 2.5 | 0.5 |
| 0K1/0M1                        | 3.6             | 3.5 | 6.0  |                                          | 5.0 | 0.5 |
| 1A2/1DB                        | 4.0             | 3.5 | -    |                                          | 2.5 | 0.5 |
| 1K1/1M1                        | 4.0             | 3.5 | 5.0  |                                          | 5.0 | 0.5 |
| 2A2/2DB                        | 5.5             | 4.0 | -    |                                          | 2.5 | 0.5 |
| 2K1/2M1                        | 5.5             | 4.0 | 6.0  |                                          | 5.0 | 0.5 |
| 3A2/3DB                        | 5.5             | 5.0 | -    |                                          | 2.5 | 0.5 |
| 3K1/3M1                        | 5.5             | 5.0 | 7.5  |                                          | 5.0 | 0.5 |
| WK1/WM1                        | 5.5             | 7.5 | 10.0 |                                          | 5.0 | 0.5 |

## Marking

| Dimensions Code               | Type          | Temperature Compensating Type                                                                      | High Dielectric Constant Type |              |
|-------------------------------|---------------|----------------------------------------------------------------------------------------------------|-------------------------------|--------------|
|                               | Rated Voltage | DC50V, DC100V                                                                                      | DC50V                         | DC100V       |
|                               | Temp. Char.   | X8G                                                                                                | X8L                           |              |
| 0                             |               | 8<br>102J                                                                                          | 8<br>104K                     | 8<br>103K    |
| 1                             |               |                                                                                                    |                               |              |
| 2                             |               | —                                                                                                  | Ⓜ 105<br>K58                  | Ⓜ 224<br>K18 |
| 3, W                          |               | —                                                                                                  | Ⓜ 335<br>K58                  | —            |
| Temperature Characteristics   |               | Marked with code (X8G, X8L char.: 8)                                                               |                               |              |
| Nominal Capacitance           |               | Marked with 3 figures                                                                              |                               |              |
| Capacitance Tolerance         |               | Marked with code                                                                                   |                               |              |
| Rated Voltage                 |               | Marked with code (DC50V: 5, DC100V: 1)<br>A part is omitted (Please refer to the marking example.) |                               |              |
| Manufacturer's Identification |               | Marked with Ⓜ<br>A part is omitted (Please refer to the marking example.)                          |                               |              |

## Temperature Compensating Type, X8G Characteristics

| Part Number        | Temp. Char.  | Rated Voltage | Capacitance | Dimensions LxW (mm) | Dimension T (mm) | Lead Space F (mm) | Lead Style Code Bulk | Lead Style Code Taping |
|--------------------|--------------|---------------|-------------|---------------------|------------------|-------------------|----------------------|------------------------|
| RHE5G1H101J0□□H03□ | X8G (Murata) | 50Vdc         | 100pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H101J0□□H03□ | X8G (Murata) | 50Vdc         | 100pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H121J0□□H03□ | X8G (Murata) | 50Vdc         | 120pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H121J0□□H03□ | X8G (Murata) | 50Vdc         | 120pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H151J0□□H03□ | X8G (Murata) | 50Vdc         | 150pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H151J0□□H03□ | X8G (Murata) | 50Vdc         | 150pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H181J0□□H03□ | X8G (Murata) | 50Vdc         | 180pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H181J0□□H03□ | X8G (Murata) | 50Vdc         | 180pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H221J0□□H03□ | X8G (Murata) | 50Vdc         | 220pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H221J0□□H03□ | X8G (Murata) | 50Vdc         | 220pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H271J0□□H03□ | X8G (Murata) | 50Vdc         | 270pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H271J0□□H03□ | X8G (Murata) | 50Vdc         | 270pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H331J0□□H03□ | X8G (Murata) | 50Vdc         | 330pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H331J0□□H03□ | X8G (Murata) | 50Vdc         | 330pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H391J0□□H03□ | X8G (Murata) | 50Vdc         | 390pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H391J0□□H03□ | X8G (Murata) | 50Vdc         | 390pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H471J0□□H03□ | X8G (Murata) | 50Vdc         | 470pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H471J0□□H03□ | X8G (Murata) | 50Vdc         | 470pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H561J0□□H03□ | X8G (Murata) | 50Vdc         | 560pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H561J0□□H03□ | X8G (Murata) | 50Vdc         | 560pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H681J0□□H03□ | X8G (Murata) | 50Vdc         | 680pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H681J0□□H03□ | X8G (Murata) | 50Vdc         | 680pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H821J0□□H03□ | X8G (Murata) | 50Vdc         | 820pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H821J0□□H03□ | X8G (Murata) | 50Vdc         | 820pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H102J0□□H03□ | X8G (Murata) | 50Vdc         | 1000pF±5%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H102J0□□H03□ | X8G (Murata) | 50Vdc         | 1000pF±5%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H122J0□□H03□ | X8G (Murata) | 50Vdc         | 1200pF±5%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H122J0□□H03□ | X8G (Murata) | 50Vdc         | 1200pF±5%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H152J0□□H03□ | X8G (Murata) | 50Vdc         | 1500pF±5%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H152J0□□H03□ | X8G (Murata) | 50Vdc         | 1500pF±5%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H182J0□□H03□ | X8G (Murata) | 50Vdc         | 1800pF±5%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H182J0□□H03□ | X8G (Murata) | 50Vdc         | 1800pF±5%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H222J0□□H03□ | X8G (Murata) | 50Vdc         | 2200pF±5%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H222J0□□H03□ | X8G (Murata) | 50Vdc         | 2200pF±5%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H272J0□□H03□ | X8G (Murata) | 50Vdc         | 2700pF±5%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H272J0□□H03□ | X8G (Murata) | 50Vdc         | 2700pF±5%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H332J0□□H03□ | X8G (Murata) | 50Vdc         | 3300pF±5%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H332J0□□H03□ | X8G (Murata) | 50Vdc         | 3300pF±5%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H392J0□□H03□ | X8G (Murata) | 50Vdc         | 3900pF±5%   | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H392J0□□H03□ | X8G (Murata) | 50Vdc         | 3900pF±5%   | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H472J1□□H03□ | X8G (Murata) | 50Vdc         | 4700pF±5%   | 4.0×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H472J1□□H03□ | X8G (Murata) | 50Vdc         | 4700pF±5%   | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H562J1□□H03□ | X8G (Murata) | 50Vdc         | 5600pF±5%   | 4.0×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H562J1□□H03□ | X8G (Murata) | 50Vdc         | 5600pF±5%   | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H682J1□□H03□ | X8G (Murata) | 50Vdc         | 6800pF±5%   | 4.0×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H682J1□□H03□ | X8G (Murata) | 50Vdc         | 6800pF±5%   | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H822J1□□H03□ | X8G (Murata) | 50Vdc         | 8200pF±5%   | 4.0×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H822J1□□H03□ | X8G (Murata) | 50Vdc         | 8200pF±5%   | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G1H103J1□□H03□ | X8G (Murata) | 50Vdc         | 10000pF±5%  | 4.0×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G1H103J1□□H03□ | X8G (Murata) | 50Vdc         | 10000pF±5%  | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G2A101J0□□H03□ | X8G (Murata) | 100Vdc        | 100pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G2A101J0□□H03□ | X8G (Murata) | 100Vdc        | 100pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G2A121J0□□H03□ | X8G (Murata) | 100Vdc        | 120pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |
| RHE5G2A121J0□□H03□ | X8G (Murata) | 100Vdc        | 120pF±5%    | 3.6×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RHE5G2A151J0□□H03□ | X8G (Murata) | 100Vdc        | 150pF±5%    | 3.6×3.5             | 2.5              | 2.5               | A2                   | DB                     |

Continued on the following page. ↗

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RHE5G2A151J0□□H03□ | X8G (Murata)   | 100Vdc           | 150pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A181J0□□H03□ | X8G (Murata)   | 100Vdc           | 180pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A181J0□□H03□ | X8G (Murata)   | 100Vdc           | 180pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A221J0□□H03□ | X8G (Murata)   | 100Vdc           | 220pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A221J0□□H03□ | X8G (Murata)   | 100Vdc           | 220pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A271J0□□H03□ | X8G (Murata)   | 100Vdc           | 270pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A271J0□□H03□ | X8G (Murata)   | 100Vdc           | 270pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A331J0□□H03□ | X8G (Murata)   | 100Vdc           | 330pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A331J0□□H03□ | X8G (Murata)   | 100Vdc           | 330pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A391J0□□H03□ | X8G (Murata)   | 100Vdc           | 390pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A391J0□□H03□ | X8G (Murata)   | 100Vdc           | 390pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A471J0□□H03□ | X8G (Murata)   | 100Vdc           | 470pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A471J0□□H03□ | X8G (Murata)   | 100Vdc           | 470pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A561J0□□H03□ | X8G (Murata)   | 100Vdc           | 560pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A561J0□□H03□ | X8G (Murata)   | 100Vdc           | 560pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A681J0□□H03□ | X8G (Murata)   | 100Vdc           | 680pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A681J0□□H03□ | X8G (Murata)   | 100Vdc           | 680pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A821J0□□H03□ | X8G (Murata)   | 100Vdc           | 820pF±5%    | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A821J0□□H03□ | X8G (Murata)   | 100Vdc           | 820pF±5%    | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A102J0□□H03□ | X8G (Murata)   | 100Vdc           | 1000pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A102J0□□H03□ | X8G (Murata)   | 100Vdc           | 1000pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A122J0□□H03□ | X8G (Murata)   | 100Vdc           | 1200pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A122J0□□H03□ | X8G (Murata)   | 100Vdc           | 1200pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A152J0□□H03□ | X8G (Murata)   | 100Vdc           | 1500pF±5%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A152J0□□H03□ | X8G (Murata)   | 100Vdc           | 1500pF±5%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A182J1□□H03□ | X8G (Murata)   | 100Vdc           | 1800pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A182J1□□H03□ | X8G (Murata)   | 100Vdc           | 1800pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A222J1□□H03□ | X8G (Murata)   | 100Vdc           | 2200pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A222J1□□H03□ | X8G (Murata)   | 100Vdc           | 2200pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A272J1□□H03□ | X8G (Murata)   | 100Vdc           | 2700pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A272J1□□H03□ | X8G (Murata)   | 100Vdc           | 2700pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHE5G2A332J1□□H03□ | X8G (Murata)   | 100Vdc           | 3300pF±5%   | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHE5G2A332J1□□H03□ | X8G (Murata)   | 100Vdc           | 3300pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |

Two blank columns are filled with the lead style code. Please refer to the 3 columns on the right for the appropriate code.  
The last blank column is filled with the packaging code. (B: bulk, A: ammo pack)

## High Dielectric Constant Type, X8L Characteristics

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RHEL81H221K0□□H03□ | X8L (Murata)   | 50Vdc            | 220pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H221K0□□H03□ | X8L (Murata)   | 50Vdc            | 220pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H331K0□□H03□ | X8L (Murata)   | 50Vdc            | 330pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H331K0□□H03□ | X8L (Murata)   | 50Vdc            | 330pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H471K0□□H03□ | X8L (Murata)   | 50Vdc            | 470pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H471K0□□H03□ | X8L (Murata)   | 50Vdc            | 470pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H681K0□□H03□ | X8L (Murata)   | 50Vdc            | 680pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H681K0□□H03□ | X8L (Murata)   | 50Vdc            | 680pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H102K0□□H03□ | X8L (Murata)   | 50Vdc            | 1000pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H102K0□□H03□ | X8L (Murata)   | 50Vdc            | 1000pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H152K0□□H03□ | X8L (Murata)   | 50Vdc            | 1500pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H152K0□□H03□ | X8L (Murata)   | 50Vdc            | 1500pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H222K0□□H03□ | X8L (Murata)   | 50Vdc            | 2200pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H222K0□□H03□ | X8L (Murata)   | 50Vdc            | 2200pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H332K0□□H03□ | X8L (Murata)   | 50Vdc            | 3300pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H332K0□□H03□ | X8L (Murata)   | 50Vdc            | 3300pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |

Continued on the following page.

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RHEL81H472K0□□H03□ | X8L (Murata)   | 50Vdc            | 4700pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H472K0□□H03□ | X8L (Murata)   | 50Vdc            | 4700pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H682K0□□H03□ | X8L (Murata)   | 50Vdc            | 6800pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H682K0□□H03□ | X8L (Murata)   | 50Vdc            | 6800pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H103K0□□H03□ | X8L (Murata)   | 50Vdc            | 10000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H103K0□□H03□ | X8L (Murata)   | 50Vdc            | 10000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H153K0□□H03□ | X8L (Murata)   | 50Vdc            | 15000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H153K0□□H03□ | X8L (Murata)   | 50Vdc            | 15000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H223K0□□H03□ | X8L (Murata)   | 50Vdc            | 22000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H223K0□□H03□ | X8L (Murata)   | 50Vdc            | 22000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H333K0□□H03□ | X8L (Murata)   | 50Vdc            | 33000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H333K0□□H03□ | X8L (Murata)   | 50Vdc            | 33000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H473K0□□H03□ | X8L (Murata)   | 50Vdc            | 47000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H473K0□□H03□ | X8L (Murata)   | 50Vdc            | 47000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H683K0□□H03□ | X8L (Murata)   | 50Vdc            | 68000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H683K0□□H03□ | X8L (Murata)   | 50Vdc            | 68000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H104K0□□H03□ | X8L (Murata)   | 50Vdc            | 0.10μF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H104K0□□H03□ | X8L (Murata)   | 50Vdc            | 0.10μF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H154K1□□H03□ | X8L (Murata)   | 50Vdc            | 0.15μF±10%  | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H154K1□□H03□ | X8L (Murata)   | 50Vdc            | 0.15μF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H224K1□□H03□ | X8L (Murata)   | 50Vdc            | 0.22μF±10%  | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H224K1□□H03□ | X8L (Murata)   | 50Vdc            | 0.22μF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H334K1□□H03□ | X8L (Murata)   | 50Vdc            | 0.33μF±10%  | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL81H334K1□□H03□ | X8L (Murata)   | 50Vdc            | 0.33μF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL81H474K2□□H03□ | X8L (Murata)   | 50Vdc            | 0.47μF±10%  | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RHEL81H474K2□□H03□ | X8L (Murata)   | 50Vdc            | 0.47μF±10%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RHEL81H684K2□□H03□ | X8L (Murata)   | 50Vdc            | 0.68μF±10%  | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RHEL81H684K2□□H03□ | X8L (Murata)   | 50Vdc            | 0.68μF±10%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RHEL81H105K2□□H03□ | X8L (Murata)   | 50Vdc            | 1.0μF±10%   | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RHEL81H105K2□□H03□ | X8L (Murata)   | 50Vdc            | 1.0μF±10%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RHEL81H155K2□□H03□ | X8L (Murata)   | 50Vdc            | 1.5μF±10%   | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RHEL81H155K2□□H03□ | X8L (Murata)   | 50Vdc            | 1.5μF±10%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RHEL81H225K2□□H03□ | X8L (Murata)   | 50Vdc            | 2.2μF±10%   | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RHEL81H225K2□□H03□ | X8L (Murata)   | 50Vdc            | 2.2μF±10%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RHEL81H335K3□□H03□ | X8L (Murata)   | 50Vdc            | 3.3μF±10%   | 5.5×5.0                   | 4.0                    | 2.5                     | A2                         | DB                           |
| RHEL81H335K3□□H03□ | X8L (Murata)   | 50Vdc            | 3.3μF±10%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RHEL81H475K3□□H03□ | X8L (Murata)   | 50Vdc            | 4.7μF±10%   | 5.5×5.0                   | 4.0                    | 2.5                     | A2                         | DB                           |
| RHEL81H475K3□□H03□ | X8L (Murata)   | 50Vdc            | 4.7μF±10%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RHEL81H106MW□□H03□ | X8L (Murata)   | 50Vdc            | 10μF±20%    | 5.5×7.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RHEL82A221K0□□H03□ | X8L (Murata)   | 100Vdc           | 220pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A221K0□□H03□ | X8L (Murata)   | 100Vdc           | 220pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A331K0□□H03□ | X8L (Murata)   | 100Vdc           | 330pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A331K0□□H03□ | X8L (Murata)   | 100Vdc           | 330pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A471K0□□H03□ | X8L (Murata)   | 100Vdc           | 470pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A471K0□□H03□ | X8L (Murata)   | 100Vdc           | 470pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A681K0□□H03□ | X8L (Murata)   | 100Vdc           | 680pF±10%   | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A681K0□□H03□ | X8L (Murata)   | 100Vdc           | 680pF±10%   | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A102K0□□H03□ | X8L (Murata)   | 100Vdc           | 1000pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A102K0□□H03□ | X8L (Murata)   | 100Vdc           | 1000pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A152K0□□H03□ | X8L (Murata)   | 100Vdc           | 1500pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A152K0□□H03□ | X8L (Murata)   | 100Vdc           | 1500pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A222K0□□H03□ | X8L (Murata)   | 100Vdc           | 2200pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A222K0□□H03□ | X8L (Murata)   | 100Vdc           | 2200pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A332K0□□H03□ | X8L (Murata)   | 100Vdc           | 3300pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A332K0□□H03□ | X8L (Murata)   | 100Vdc           | 3300pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A472K0□□H03□ | X8L (Murata)   | 100Vdc           | 4700pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A472K0□□H03□ | X8L (Murata)   | 100Vdc           | 4700pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |

Continued on the following page. ↗

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RHEL82A682K0□□H03□ | X8L (Murata)   | 100Vdc           | 6800pF±10%  | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A682K0□□H03□ | X8L (Murata)   | 100Vdc           | 6800pF±10%  | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A103K0□□H03□ | X8L (Murata)   | 100Vdc           | 10000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A103K0□□H03□ | X8L (Murata)   | 100Vdc           | 10000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A153K0□□H03□ | X8L (Murata)   | 100Vdc           | 15000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A153K0□□H03□ | X8L (Murata)   | 100Vdc           | 15000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A223K0□□H03□ | X8L (Murata)   | 100Vdc           | 22000pF±10% | 3.6×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A223K0□□H03□ | X8L (Murata)   | 100Vdc           | 22000pF±10% | 3.6×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A333K1□□H03□ | X8L (Murata)   | 100Vdc           | 33000pF±10% | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A333K1□□H03□ | X8L (Murata)   | 100Vdc           | 33000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A473K1□□H03□ | X8L (Murata)   | 100Vdc           | 47000pF±10% | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A473K1□□H03□ | X8L (Murata)   | 100Vdc           | 47000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A683K1□□H03□ | X8L (Murata)   | 100Vdc           | 68000pF±10% | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A683K1□□H03□ | X8L (Murata)   | 100Vdc           | 68000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A104K1□□H03□ | X8L (Murata)   | 100Vdc           | 0.10μF±10%  | 4.0×3.5                   | 2.5                    | 2.5                     | A2                         | DB                           |
| RHEL82A104K1□□H03□ | X8L (Murata)   | 100Vdc           | 0.10μF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RHEL82A154K2□□H03□ | X8L (Murata)   | 100Vdc           | 0.15μF±10%  | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RHEL82A154K2□□H03□ | X8L (Murata)   | 100Vdc           | 0.15μF±10%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RHEL82A224K2□□H03□ | X8L (Murata)   | 100Vdc           | 0.22μF±10%  | 5.5×4.0                   | 3.15                   | 2.5                     | A2                         | DB                           |
| RHEL82A224K2□□H03□ | X8L (Murata)   | 100Vdc           | 0.22μF±10%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |

Two blank columns are filled with the lead style code. Please refer to the 3 columns on the right for the appropriate code.  
The last blank column is filled with the packaging code. (B: bulk, A: ammo pack)

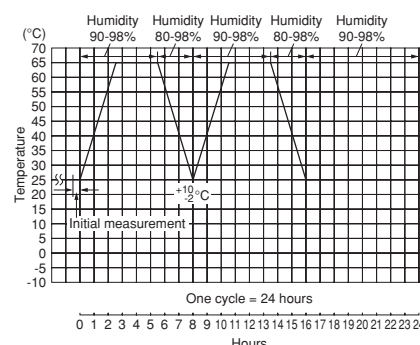
## Specifications and Test Methods

| No. | AEC-Q200 Test Item                  | Specification                                                                                       |                                                                  | AEC-Q200 Test Method                                                                                                                                                                                                          |
|-----|-------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                                     | Temperature Compensating Type<br>(Char. X8G)                                                        | High Dielectric Constant Type<br>(Char. X8L)                     |                                                                                                                                                                                                                               |
| 1   | Pre-and Post-Stress Electrical Test | —                                                                                                   |                                                                  |                                                                                                                                                                                                                               |
| 2   | High Temperature Exposure (Storage) | The measured and observed characteristics should satisfy the specifications in the following table. |                                                                  | Sit the capacitor for 1,000±12h at 150±3°C. Let sit for 24±2h at room temperature, then measure.                                                                                                                              |
|     |                                     | Appearance                                                                                          | No defects or abnormalities                                      |                                                                                                                                                                                                                               |
|     |                                     | Capacitance Change                                                                                  | Within ±3% or ±0.3pF (Whichever is larger)                       |                                                                                                                                                                                                                               |
|     |                                     | Q/D.F.                                                                                              | Q≥350                                                            |                                                                                                                                                                                                                               |
| 3   | Temperature Cycling                 | The measured and observed characteristics should satisfy the specifications in the following table. |                                                                  | Perform the 1,000 cycles according to the four heat treatments listed in the following table. Let sit for 24±2h at *room condition, then measure.                                                                             |
|     |                                     | Appearance                                                                                          | No defects or abnormalities except color change of outer coating |                                                                                                                                                                                                                               |
|     |                                     | Capacitance Change                                                                                  | Within ±5% or ±0.5pF (Whichever is larger)                       |                                                                                                                                                                                                                               |
|     |                                     | Q/D.F.                                                                                              | Q≥350                                                            |                                                                                                                                                                                                                               |
| 4   | Moisture Resistance                 | The measured and observed characteristics should satisfy the specifications in the following table. |                                                                  | Apply the 24h heat (25 to 65°C) and humidity (80 to 98%) treatment shown below, 10 consecutive times. Let sit for 24±2h at *room condition, then measure.                                                                     |
|     |                                     | Appearance                                                                                          | No defects or abnormalities                                      |                                                                                                                                                                                                                               |
|     |                                     | Capacitance Change                                                                                  | Within ±5% or ±0.5pF (Whichever is larger)                       |                                                                                                                                                                                                                               |
|     |                                     | Q/D.F.                                                                                              | Q≥200                                                            |                                                                                                                                                                                                                               |
| 5   | Biased Humidity                     | The measured and observed characteristics should satisfy the specifications in the following table. |                                                                  | Apply the rated voltage and DC1.3+0.2/-0V (add 6.8kΩ resistor) at 85±3°C and 80 to 85% humidity for 1,000±12h. Remove and let sit for 24±2h at *room condition, then measure. The charge/discharge current is less than 50mA. |
|     |                                     | Appearance                                                                                          | No defects or abnormalities                                      |                                                                                                                                                                                                                               |
|     |                                     | Capacitance Change                                                                                  | Within ±5% or ±0.5pF (Whichever is larger)                       |                                                                                                                                                                                                                               |
|     |                                     | Q/D.F.                                                                                              | Q≥200                                                            |                                                                                                                                                                                                                               |
| 6   | Operational Life                    | The measured and observed characteristics should satisfy the specifications in the following table. |                                                                  | Apply 150% of the rated voltage for 1,000±12h at 150±3°C. Let sit for 24±2h at *room condition, then measure. The charge/discharge current is less than 50mA.                                                                 |
|     |                                     | Appearance                                                                                          | No defects or abnormalities except color change of outer coating |                                                                                                                                                                                                                               |
|     |                                     | Capacitance Change                                                                                  | Within ±3% or ±0.3pF (Whichever is larger)                       |                                                                                                                                                                                                                               |
|     |                                     | Q/D.F.                                                                                              | Q≥350                                                            |                                                                                                                                                                                                                               |
| 7   | External Visual                     | No defects or abnormalities                                                                         |                                                                  | Visual inspection                                                                                                                                                                                                             |
| 8   | Physical Dimension                  | Within the specified dimensions                                                                     |                                                                  | Using calipers and micrometers.                                                                                                                                                                                               |
| 9   | Marking                             | To be easily legible.                                                                               |                                                                  | Visual inspection                                                                                                                                                                                                             |

| Step        | 1        | 2          | 3        | 4          |
|-------------|----------|------------|----------|------------|
| Temp. (°C)  | -55+0/-3 | Room Temp. | 150+3/-0 | Room Temp. |
| Time (min.) | 15±3     | 1          | 15±3     | 1          |

•Pretreatment

Perform the heat treatment at 150+0/-10°C for 60±5 min and then let sit for 24±2h at \*room condition. (for Char. X8L)



\* "room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ➤

## Specifications and Test Methods

Continued from the preceding page.

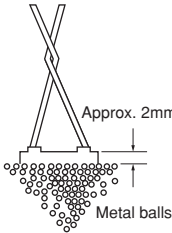
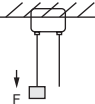
| No.                | AEC-Q200 Test Item                               |               | Specification                                                                                                       |                                               | AEC-Q200 Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |   |   |            |          |          |             |      |      |
|--------------------|--------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---|---|------------|----------|----------|-------------|------|------|
|                    |                                                  |               | Temperature Compensating Type<br>(Char. X8G)                                                                        | High Dielectric Constant Type<br>(Char. X8L)  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
| 10                 | Resistance to Solvents                           | Appearance    | No defects or abnormalities                                                                                         |                                               | Per MIL-STD-202 Method 215<br>Solvent 1: 1 part (by volume) of isopropyl alcohol<br>3 parts (by volume) of mineral spirits<br>Solvent 2: Terpene defluxer<br>Solvent 3: 42 parts (by volume) of water<br>1 part (by volume) of propylene glycol monomethyl ether<br>1 part (by volume) of monoethanolamine                                                                                                                                                                                          |              |   |   |            |          |          |             |      |      |
|                    |                                                  | Capacitance   | Within the specified tolerance                                                                                      |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
|                    |                                                  | Q/D.F.        | Q≥1,000                                                                                                             | 0.025 max.                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
|                    |                                                  | I.R.          | More than 10,000MΩ or 500MΩ · μF (Whichever is smaller)                                                             |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
| 11                 | Mechanical Shock                                 | Appearance    | No defects or abnormalities                                                                                         |                                               | Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks). The specified test pulse should be Half-sine and should have a duration: 0.5ms, peak value: 1,500G and velocity change: 4.7m/s.                                                                                                                                                                                                                                              |              |   |   |            |          |          |             |      |      |
|                    |                                                  | Capacitance   | Within the specified tolerance                                                                                      |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
|                    |                                                  | Q/D.F.        | Q≥1,000                                                                                                             | 0.025 max.                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
| 12                 | Vibration                                        | Appearance    | No defects or abnormalities                                                                                         |                                               | The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 2,000Hz. The frequency range, from 10 to 2,000Hz and return to 10Hz, should be traversed in approximately 20min. This motion should be applied for 12 items in each 3 mutually perpendicular directions (total of 36 times).                                                                                         |              |   |   |            |          |          |             |      |      |
|                    |                                                  | Capacitance   | Within the specified tolerance                                                                                      |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
|                    |                                                  | Q/D.F.        | Q≥1,000                                                                                                             | 0.025 max.                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
| 13                 | Resistance to Soldering Heat                     |               | The measured and observed characteristics should satisfy the specifications in the following table.                 |                                               | The lead wire is immersed in the melted solder 1.5 to 2mm from the main body at 260±5°C for 10±1s. The specified items are measured after 24±2h.<br><br>•Pretreatment<br>Perform the heat treatment at 150+0/-10°C for 60±5 min and then let sit for 24±2h at *room condition. (for Char. X8L)                                                                                                                                                                                                      |              |   |   |            |          |          |             |      |      |
|                    |                                                  |               | Appearance                                                                                                          | No defects or abnormalities                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
|                    |                                                  |               | Capacitance Change                                                                                                  | Within ±2.5% or ±0.25pF (Whichever is larger) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Within ±7.5% |   |   |            |          |          |             |      |      |
|                    |                                                  |               | Dielectric Strength (Between Terminals)                                                                             | No defects                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
| 14                 | Thermal Shock                                    |               | The measured and observed characteristics should satisfy the specifications in the following table.                 |                                               | Perform the 300 cycles according to the two heat treatments listed in the following table (Maximum transfer time is 20s.). Let sit for 24±2h at *room condition, then measure. <table><tr><td>Step</td><td>1</td><td>2</td></tr><tr><td>Temp. (°C)</td><td>-55+0/-3</td><td>150+3/-0</td></tr><tr><td>Time (min.)</td><td>15±3</td><td>15±3</td></tr></table> •Pretreatment<br>Perform the heat treatment at 150+0/-10°C for 60±5min and then let sit for 24±2h at *room condition. (for Char. X8L) | Step         | 1 | 2 | Temp. (°C) | -55+0/-3 | 150+3/-0 | Time (min.) | 15±3 | 15±3 |
|                    |                                                  |               | Step                                                                                                                | 1                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2            |   |   |            |          |          |             |      |      |
|                    |                                                  |               | Temp. (°C)                                                                                                          | -55+0/-3                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 150+3/-0     |   |   |            |          |          |             |      |      |
|                    |                                                  |               | Time (min.)                                                                                                         | 15±3                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 15±3         |   |   |            |          |          |             |      |      |
|                    |                                                  |               | Appearance                                                                                                          | No defects or abnormalities                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
| Capacitance Change | Within ±5% or ±0.5pF (Whichever is larger)       | Within ±12.5% |                                                                                                                     |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
| Q/D.F.             | Q≥350                                            | 0.05 max.     |                                                                                                                     |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
| I.R.               | 1,000MΩ or 50MΩ · μF min. (Whichever is smaller) |               |                                                                                                                     |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
| 15                 | ESD                                              | Appearance    | No defects or abnormalities                                                                                         |                                               | Per AEC-Q200-004                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |   |   |            |          |          |             |      |      |
|                    |                                                  | Capacitance   | Within the specified tolerance                                                                                      |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
|                    |                                                  | Q/D.F.        | Q≥1,000                                                                                                             | 0.025 max.                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
|                    |                                                  | I.R.          | More than 10,000MΩ or 500MΩ · μF (Whichever is smaller)                                                             |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |
| 16                 | Solderability                                    |               | Lead wire should be soldered with uniform coating on the axial direction over 95% of the circumferential direction. |                                               | The terminal of a capacitor is dipped into a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25%rosin in weight propotion) and then into molten solder (JIS-Z-3282) for 2±0.5 sec. In both cases the depth of dipping is up to about 1.5 to 2mm from the terminal body.<br><br>Temp. of solder:<br>245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu)<br>235±5°C H60A or H63A Eutectic Solder                                                                                                       |              |   |   |            |          |          |             |      |      |
|                    |                                                  |               |                                                                                                                     |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |   |   |            |          |          |             |      |      |

\* "room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. 

## Specifications and Test Methods

Continued from the preceding page.

| No.                    | AEC-Q200 Test Item                               |                                                                                                                                 | Specification                                                                                                                                                                                                                                                                                                                                                                                   |                                                       | AEC-Q200 Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
|------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------|-----------|---------|-----|-----------|----------|----------------------|-----|----------|----------|-------------------|-----|---|----------|-------------------|
|                        |                                                  |                                                                                                                                 | Temperature Compensating Type<br>(Char. X8G)                                                                                                                                                                                                                                                                                                                                                    | High Dielectric Constant Type<br>(Char. X8L)          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
| 17                     | Electrical<br>Charac-<br>terization              | Appearance                                                                                                                      | No defects or abnormalities                                                                                                                                                                                                                                                                                                                                                                     |                                                       | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
|                        |                                                  | Capacitance                                                                                                                     | Within the specified tolerance                                                                                                                                                                                                                                                                                                                                                                  |                                                       | The capacitance, Q/D.F. should be measured at 25°C at the frequency and voltage shown in the table. <table><tr><th>Char.</th><th>Nominal Cap.</th><th>Frequency</th><th>Voltage</th></tr><tr><td>X8G</td><td>C≤1,000pF</td><td>1±0.1MHz</td><td>AC0.5 to 5V (r.m.s.)</td></tr><tr><td>X8G</td><td>C&gt;1000pF</td><td>1±0.1kHz</td><td>AC1±0.2V (r.m.s.)</td></tr><tr><td>X8L</td><td>—</td><td>1±0.1kHz</td><td>AC1±0.2V (r.m.s.)</td></tr></table>                                                                                                                                                                                            | Char.                | Nominal Cap.     | Frequency | Voltage | X8G | C≤1,000pF | 1±0.1MHz | AC0.5 to 5V (r.m.s.) | X8G | C>1000pF | 1±0.1kHz | AC1±0.2V (r.m.s.) | X8L | — | 1±0.1kHz | AC1±0.2V (r.m.s.) |
|                        |                                                  | Char.                                                                                                                           | Nominal Cap.                                                                                                                                                                                                                                                                                                                                                                                    | Frequency                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Voltage              |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
|                        |                                                  | X8G                                                                                                                             | C≤1,000pF                                                                                                                                                                                                                                                                                                                                                                                       | 1±0.1MHz                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | AC0.5 to 5V (r.m.s.) |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
|                        |                                                  | X8G                                                                                                                             | C>1000pF                                                                                                                                                                                                                                                                                                                                                                                        | 1±0.1kHz                                              | AC1±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
|                        |                                                  | X8L                                                                                                                             | —                                                                                                                                                                                                                                                                                                                                                                                               | 1±0.1kHz                                              | AC1±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
|                        |                                                  | Q/D.F.                                                                                                                          | Q≥1,000                                                                                                                                                                                                                                                                                                                                                                                         | 0.025 max.                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
|                        |                                                  | Insulation<br>Resistance<br>(I.R.)                                                                                              | Room<br>Temperature                                                                                                                                                                                                                                                                                                                                                                             | 10,000MΩ or 500MΩ · μF min.<br>(Whichever is smaller) | The insulation resistance should be measured at 25±3°C with a DC voltage not exceeding the rated voltage at normal temperature and humidity and within 2min. of charging.<br>(Charge/Discharge current ≤ 50mA.)                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
| High<br>Temperature    | 100MΩ or 5MΩ · μF min.<br>(Whichever is smaller) |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
| Dielectric<br>Strength | Between<br>Terminals                             | No defects or abnormalities                                                                                                     | The capacitor should not be damaged when DC voltage of 300% of the rated voltage (for Char. X8G) or DC voltage of 250% of the rated voltage (for Char. X8L) is applied between the terminations for 1 to 5 seconds.<br>(Charge/Discharge current ≤ 50mA.)                                                                                                                                       |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
|                        | Body<br>Insulation                               | No defects or abnormalities                                                                                                     | The capacitor is placed in a container with metal balls of 1mm diameter so that each terminal, short-circuit is kept approximately 2mm from the balls, and 250% of the rated DC voltage is impressed for 1 to 5 seconds between capacitor terminals and metal balls.<br>(Charge/Discharge current ≤ 50mA.)  |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
| 18                     | Terminal<br>Strength                             | Tensile<br>Strength                                                                                                             | Termination not to be broken or loosened                                                                                                                                                                                                                                                                                                                                                        |                                                       | As in the figure, fix the capacitor body, apply the force gradually to each lead in the radial direction of the capacitor until reaching 10N and then keep the force applied for 10±1 seconds.                                                                                                                                                                                                                                                                                                                                                             |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
|                        |                                                  | Bending<br>Strength                                                                                                             | Termination not to be broken or loosened                                                                                                                                                                                                                                                                                                                                                        |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
| 19                     | Capacitance<br>Temperature<br>Characteristics    | Within the specified<br>Tolerance.<br>(Table A)<br><br>Capacitance Drift is within<br>±0.2% or ±0.05pF<br>(Whichever is larger) | Within ±15%<br>(Temp. Range: -55 to +125°C)<br>Within +15/-40%<br>(Temp. Range: +125 to +150°C)                                                                                                                                                                                                                                                                                                 |                                                       | The capacitance change should be measured after 5min. at each specified temperature step. <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>25±2</td></tr><tr><td>2</td><td>-55±3</td></tr><tr><td>3</td><td>25±2</td></tr><tr><td>4</td><td>150±3</td></tr><tr><td>5</td><td>25±2</td></tr></table> The temperature coefficient or the ranges of capacitance change is determined using the capacitance measured in step 3 as a reference.<br>•Pretreatment<br>Perform the heat treatment at 150+0/-10°C for 60±5 min and then let sit for 24±2h at *room condition.<br>Perform the initial measurement. (for Char. X8L) | Step                 | Temperature (°C) | 1         | 25±2    | 2   | -55±3     | 3        | 25±2                 | 4   | 150±3    | 5        | 25±2              |     |   |          |                   |
| Step                   | Temperature (°C)                                 |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
| 1                      | 25±2                                             |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
| 2                      | -55±3                                            |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
| 3                      | 25±2                                             |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
| 4                      | 150±3                                            |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |
| 5                      | 25±2                                             |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |           |         |     |           |          |                      |     |          |          |                   |     |   |          |                   |

\* "room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Table A

| Char. | Nominal Values<br>(ppm/°C) * | Capacitance Change from 25°C (%) |       |       |       |       |       |
|-------|------------------------------|----------------------------------|-------|-------|-------|-------|-------|
|       |                              | -55°C                            |       | -30°C |       | -10°C |       |
|       |                              | Max.                             | Min.  | Max.  | Min.  | Max.  | Min.  |
| X8G   | 0±30                         | 0.58                             | -0.24 | 0.40  | -0.17 | 0.25  | -0.11 |

\* Nominal values denote the temperature coefficient within a range of 25°C to 150°C.

# Radial Lead Type Monolithic Ceramic Capacitors

**muRata**

## RDE Series (For General Use Only) (DC25V-DC1kV)

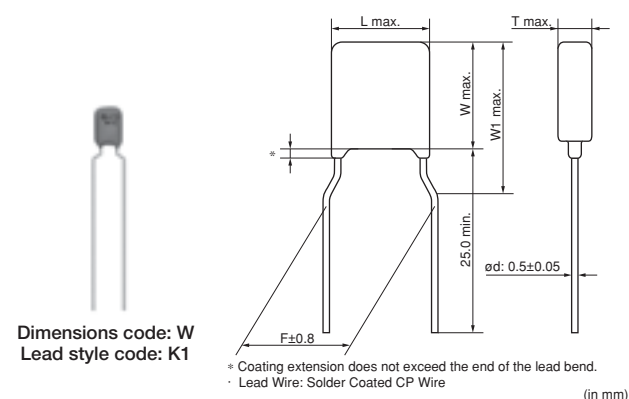
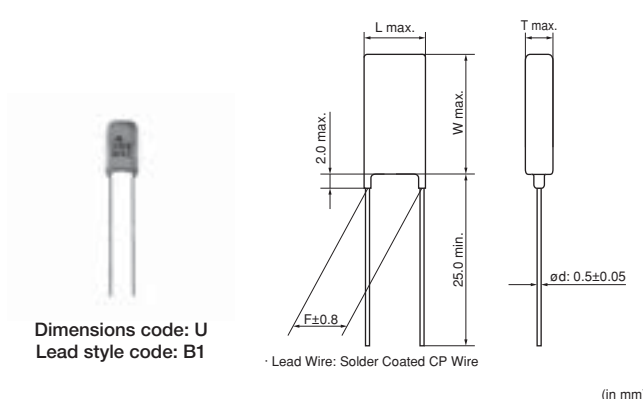
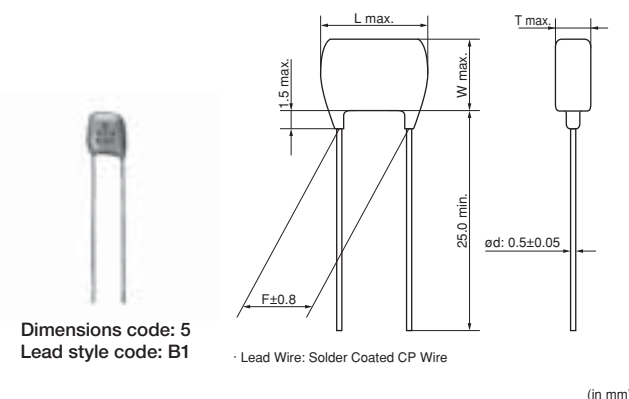
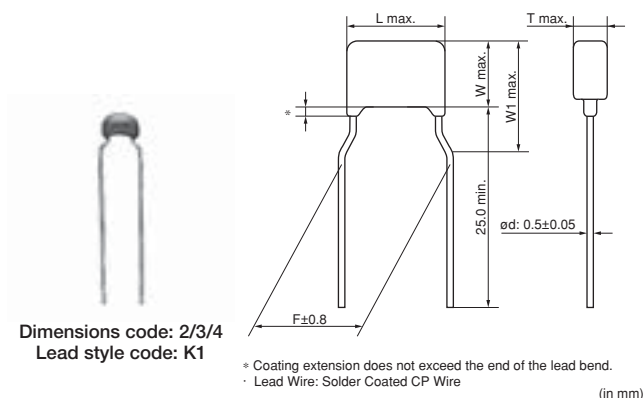
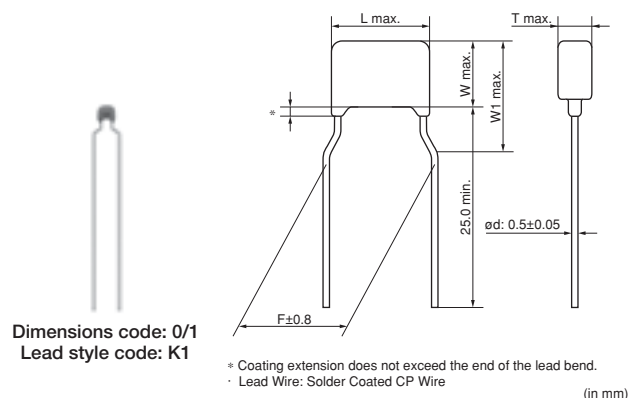
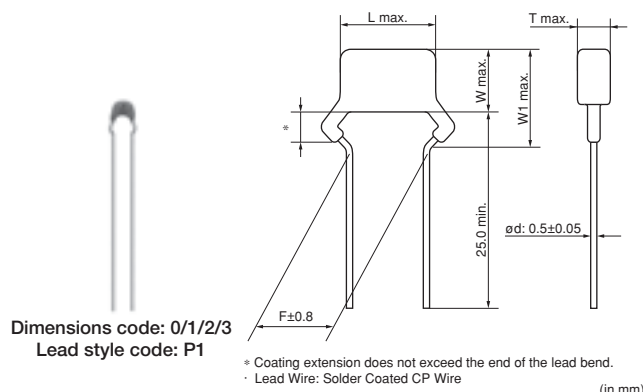
### ■ Features

1. Small size and large capacitance
2. Low ESR characteristics for high frequency
3. Meet LF (Lead Free) and HF (Halogen Free)
4. Flow soldering is available, but re-flow soldering is not available.

### ■ Applications

General electronic equipment

(Do not use for automotive-related power train and safety equipment.)



### ■ Dimensions

| Dimensions and Lead Style Code | Dimensions (mm) |       |      |                                          |     |     |
|--------------------------------|-----------------|-------|------|------------------------------------------|-----|-----|
|                                | L               | W     | W1   | T                                        | F   | d   |
| 0P1/0S1                        | 5.0             | 3.5   | 6.0  | See the individual product specification | 2.5 | 0.5 |
| 0K1/0M1                        | 4.0             | 3.5   | 6.0  |                                          | 5.0 | 0.5 |
| 1P1/1S1                        | 5.0             | 3.5   | 5.0  |                                          | 2.5 | 0.5 |
| 1K1/1M1                        | 4.5             | 3.5   | 5.0  |                                          | 5.0 | 0.5 |
| 2P1/2S1                        | 5.5             | 4.0   | 6.0  |                                          | 2.5 | 0.5 |
| 2K1/2M1                        | 5.5             | 4.0   | 6.0  |                                          | 5.0 | 0.5 |
| 3P1/3S1                        | 5.5             | 5.0   | 7.5  |                                          | 2.5 | 0.5 |
| 3K1/3M1                        | 5.5             | 5.0   | 7.5  |                                          | 5.0 | 0.5 |
| 4K1/4M1                        | 7.5             | 5.5   | 8.0  |                                          | 5.0 | 0.5 |
| 5B1/5E1                        | 7.5             | 7.5*  | -    |                                          | 5.0 | 0.5 |
| UB1/UE1                        | 7.7             | 12.5* | -    |                                          | 5.0 | 0.5 |
| WK1/WM1                        | 5.5             | 7.5   | 10.0 |                                          | 5.0 | 0.5 |

\*DC630V, DC1kV: W+0.5mm

## ■ Marking

| Dimensions<br>Code               | Rated<br>Voltage                                                                                                                                                                  | DC25V           |      | DC50V     |                 |                 |     | DC100V |           |     | DC250V          | DC630V                   | DC1kV                    |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------|-----------|-----------------|-----------------|-----|--------|-----------|-----|-----------------|--------------------------|--------------------------|
|                                  | Temp.<br>Char.                                                                                                                                                                    | X7S             | X7R  | C0G       | X7S             | X7R             | F   | Y5V    | C0G       | X7S | X7R             | X7R, U2J                 |                          |
| 0                                |                                                                                                                                                                                   |                 | 104K |           | —               |                 | 473 | 103Z   |           | —   |                 | —                        | —                        |
|                                  |                                                                                                                                                                                   | 224K            |      | A<br>102J |                 | 224K            |     |        | A<br>102J |     | 224K            |                          |                          |
| 1                                |                                                                                                                                                                                   |                 | —    |           | —               |                 | —   | —      |           | —   |                 | U<br>102J                | —                        |
| 2                                |                                                                                                                                                                                   | Ⓜ<br>475<br>K2C | —    | —         | Ⓜ<br>475<br>K5C | Ⓜ<br>105<br>K5C | —   | —      | —         | —   | Ⓜ<br>105<br>K1C | Ⓜ<br>103<br>J4U<br>(U2J) | Ⓜ<br>472<br>J7U<br>(U2J) |
|                                  |                                                                                                                                                                                   |                 |      |           |                 |                 |     |        |           |     |                 | Ⓜ<br>473<br>K4C<br>(X7R) | Ⓜ<br>153<br>K7C<br>(X7R) |
| 3, 4, W                          |                                                                                                                                                                                   | Ⓜ<br>226<br>K2C | —    | —         | —               | Ⓜ<br>335<br>K5C | —   | —      | —         |     | Ⓜ<br>225<br>K1C | —                        | Ⓜ<br>473<br>J4U<br>(U2J) |
|                                  |                                                                                                                                                                                   |                 |      |           |                 |                 |     |        |           |     |                 | Ⓜ<br>103<br>J7U<br>(U2J) | Ⓜ<br>472<br>JAU<br>(U2J) |
|                                  |                                                                                                                                                                                   |                 |      |           |                 |                 |     |        |           |     |                 | Ⓜ<br>224<br>K4C<br>(X7R) | Ⓜ<br>104<br>K7C<br>(X7R) |
| 5, U                             |                                                                                                                                                                                   | —               | —    | —         | —               | —               | —   | —      | —         | —   | —               | —                        | Ⓜ<br>333<br>J7U<br>(U2J) |
|                                  |                                                                                                                                                                                   |                 |      |           |                 |                 |     |        |           |     |                 | Ⓜ<br>474<br>K4C<br>(X7R) | Ⓜ<br>104<br>KAC<br>(X7R) |
| Temperature<br>Characteristics   | Marked with code (C0G char.: A, X7S/X7R char.: C, F/Y5V char.: F, U2J char.: U)<br>A part is omitted (Please refer to the marking example.)                                       |                 |      |           |                 |                 |     |        |           |     |                 |                          |                          |
| Nominal Capacitance              | Under 100pF: Actual value    100pF and over: Marked with 3 figures                                                                                                                |                 |      |           |                 |                 |     |        |           |     |                 |                          |                          |
| Capacitance Tolerance            | Marked with code<br>A part is omitted (Please refer to the marking example.)                                                                                                      |                 |      |           |                 |                 |     |        |           |     |                 |                          |                          |
| Rated Voltage                    | Marked with code (DC25V: 2, DC50V: 5, DC100V: 1, DC250V: 4, DC630V: 7, DC1kV: A)<br>Lower horizontal line for F char.<br>A part is omitted (Please refer to the marking example.) |                 |      |           |                 |                 |     |        |           |     |                 |                          |                          |
| Manufacturer's<br>Identification | Marked with Ⓜ<br>A part is omitted (Please refer to the marking example.)                                                                                                         |                 |      |           |                 |                 |     |        |           |     |                 |                          |                          |

## Temperature Compensating Type, C0G/U2J Characteristics

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance  | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|--------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RDE5C1H1R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 1.0pF±0.25pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H1R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 1.0pF±0.25pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H2R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 2.0pF±0.25pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H2R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 2.0pF±0.25pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H3R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 3.0pF±0.25pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H3R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 3.0pF±0.25pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H4R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 4.0pF±0.25pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H4R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 4.0pF±0.25pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H5R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 5.0pF±0.25pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H5R0C0□□H03□ | C0G (EIA)      | 50Vdc            | 5.0pF±0.25pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H6R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 6.0pF±0.5pF  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H6R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 6.0pF±0.5pF  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H7R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 7.0pF±0.5pF  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H7R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 7.0pF±0.5pF  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |

Continued on the following page. ↗

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RDE5C1H8R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 8.0pF±0.5pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H8R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 8.0pF±0.5pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H9R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 9.0pF±0.5pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H9R0D0□□H03□ | C0G (EIA)      | 50Vdc            | 9.0pF±0.5pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H100J0□□H03□ | C0G (EIA)      | 50Vdc            | 10pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H100J0□□H03□ | C0G (EIA)      | 50Vdc            | 10pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H120J0□□H03□ | C0G (EIA)      | 50Vdc            | 12pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H120J0□□H03□ | C0G (EIA)      | 50Vdc            | 12pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H150J0□□H03□ | C0G (EIA)      | 50Vdc            | 15pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H150J0□□H03□ | C0G (EIA)      | 50Vdc            | 15pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H180J0□□H03□ | C0G (EIA)      | 50Vdc            | 18pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H180J0□□H03□ | C0G (EIA)      | 50Vdc            | 18pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H220J0□□H03□ | C0G (EIA)      | 50Vdc            | 22pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H220J0□□H03□ | C0G (EIA)      | 50Vdc            | 22pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H270J0□□H03□ | C0G (EIA)      | 50Vdc            | 27pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H270J0□□H03□ | C0G (EIA)      | 50Vdc            | 27pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H330J0□□H03□ | C0G (EIA)      | 50Vdc            | 33pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H330J0□□H03□ | C0G (EIA)      | 50Vdc            | 33pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H390J0□□H03□ | C0G (EIA)      | 50Vdc            | 39pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H390J0□□H03□ | C0G (EIA)      | 50Vdc            | 39pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H470J0□□H03□ | C0G (EIA)      | 50Vdc            | 47pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H470J0□□H03□ | C0G (EIA)      | 50Vdc            | 47pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H560J0□□H03□ | C0G (EIA)      | 50Vdc            | 56pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H560J0□□H03□ | C0G (EIA)      | 50Vdc            | 56pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H680J0□□H03□ | C0G (EIA)      | 50Vdc            | 68pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H680J0□□H03□ | C0G (EIA)      | 50Vdc            | 68pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H820J0□□H03□ | C0G (EIA)      | 50Vdc            | 82pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H820J0□□H03□ | C0G (EIA)      | 50Vdc            | 82pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H101J0□□H03□ | C0G (EIA)      | 50Vdc            | 100pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H101J0□□H03□ | C0G (EIA)      | 50Vdc            | 100pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H121J0□□H03□ | C0G (EIA)      | 50Vdc            | 120pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H121J0□□H03□ | C0G (EIA)      | 50Vdc            | 120pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H151J0□□H03□ | C0G (EIA)      | 50Vdc            | 150pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H151J0□□H03□ | C0G (EIA)      | 50Vdc            | 150pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H181J0□□H03□ | C0G (EIA)      | 50Vdc            | 180pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H181J0□□H03□ | C0G (EIA)      | 50Vdc            | 180pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H221J0□□H03□ | C0G (EIA)      | 50Vdc            | 220pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H221J0□□H03□ | C0G (EIA)      | 50Vdc            | 220pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H271J0□□H03□ | C0G (EIA)      | 50Vdc            | 270pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H271J0□□H03□ | C0G (EIA)      | 50Vdc            | 270pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H331J0□□H03□ | C0G (EIA)      | 50Vdc            | 330pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H331J0□□H03□ | C0G (EIA)      | 50Vdc            | 330pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H391J0□□H03□ | C0G (EIA)      | 50Vdc            | 390pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H391J0□□H03□ | C0G (EIA)      | 50Vdc            | 390pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H471J0□□H03□ | C0G (EIA)      | 50Vdc            | 470pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H471J0□□H03□ | C0G (EIA)      | 50Vdc            | 470pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H561J0□□H03□ | C0G (EIA)      | 50Vdc            | 560pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H561J0□□H03□ | C0G (EIA)      | 50Vdc            | 560pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H681J0□□H03□ | C0G (EIA)      | 50Vdc            | 680pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H681J0□□H03□ | C0G (EIA)      | 50Vdc            | 680pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H821J0□□H03□ | C0G (EIA)      | 50Vdc            | 820pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H821J0□□H03□ | C0G (EIA)      | 50Vdc            | 820pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H102J0□□H03□ | C0G (EIA)      | 50Vdc            | 1000pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H102J0□□H03□ | C0G (EIA)      | 50Vdc            | 1000pF±5%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H122J0□□H03□ | C0G (EIA)      | 50Vdc            | 1200pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H122J0□□H03□ | C0G (EIA)      | 50Vdc            | 1200pF±5%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H152J0□□H03□ | C0G (EIA)      | 50Vdc            | 1500pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |

Continued on the following page.

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance  | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|--------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RDE5C1H152J0□□H03□ | C0G (EIA)      | 50Vdc            | 1500pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H182J0□□H03□ | C0G (EIA)      | 50Vdc            | 1800pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H182J0□□H03□ | C0G (EIA)      | 50Vdc            | 1800pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H222J0□□H03□ | C0G (EIA)      | 50Vdc            | 2200pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H222J0□□H03□ | C0G (EIA)      | 50Vdc            | 2200pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H272J0□□H03□ | C0G (EIA)      | 50Vdc            | 2700pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H272J0□□H03□ | C0G (EIA)      | 50Vdc            | 2700pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H332J0□□H03□ | C0G (EIA)      | 50Vdc            | 3300pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H332J0□□H03□ | C0G (EIA)      | 50Vdc            | 3300pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H392J0□□H03□ | C0G (EIA)      | 50Vdc            | 3900pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C1H392J0□□H03□ | C0G (EIA)      | 50Vdc            | 3900pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C1H472J1□□H03□ | C0G (EIA)      | 50Vdc            | 4700pF±5%    | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C1H472J1□□H03□ | C0G (EIA)      | 50Vdc            | 4700pF±5%    | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C1H562J1□□H03□ | C0G (EIA)      | 50Vdc            | 5600pF±5%    | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C1H562J1□□H03□ | C0G (EIA)      | 50Vdc            | 5600pF±5%    | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C1H682J1□□H03□ | C0G (EIA)      | 50Vdc            | 6800pF±5%    | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C1H682J1□□H03□ | C0G (EIA)      | 50Vdc            | 6800pF±5%    | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C1H822J1□□H03□ | C0G (EIA)      | 50Vdc            | 8200pF±5%    | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C1H822J1□□H03□ | C0G (EIA)      | 50Vdc            | 8200pF±5%    | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C1H103J1□□H03□ | C0G (EIA)      | 50Vdc            | 10000pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C1H103J1□□H03□ | C0G (EIA)      | 50Vdc            | 10000pF±5%   | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C1H123J1□□H03□ | C0G (EIA)      | 50Vdc            | 12000pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C1H123J1□□H03□ | C0G (EIA)      | 50Vdc            | 12000pF±5%   | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C1H153J1□□H03□ | C0G (EIA)      | 50Vdc            | 15000pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C1H153J1□□H03□ | C0G (EIA)      | 50Vdc            | 15000pF±5%   | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C1H183J1□□H03□ | C0G (EIA)      | 50Vdc            | 18000pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C1H183J1□□H03□ | C0G (EIA)      | 50Vdc            | 18000pF±5%   | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C1H223J1□□H03□ | C0G (EIA)      | 50Vdc            | 22000pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C1H223J1□□H03□ | C0G (EIA)      | 50Vdc            | 22000pF±5%   | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C2A1R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 1.0pF±0.25pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A1R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 1.0pF±0.25pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A2R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 2.0pF±0.25pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A2R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 2.0pF±0.25pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A3R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 3.0pF±0.25pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A3R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 3.0pF±0.25pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A4R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 4.0pF±0.25pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A4R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 4.0pF±0.25pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A5R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 5.0pF±0.25pF | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A5R0C0□□H03□ | C0G (EIA)      | 100Vdc           | 5.0pF±0.25pF | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A6R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 6.0pF±0.5pF  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A6R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 6.0pF±0.5pF  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A7R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 7.0pF±0.5pF  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A7R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 7.0pF±0.5pF  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A8R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 8.0pF±0.5pF  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A8R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 8.0pF±0.5pF  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A9R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 9.0pF±0.5pF  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A9R0D0□□H03□ | C0G (EIA)      | 100Vdc           | 9.0pF±0.5pF  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A100J0□□H03□ | C0G (EIA)      | 100Vdc           | 10pF±5%      | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A100J0□□H03□ | C0G (EIA)      | 100Vdc           | 10pF±5%      | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A120J0□□H03□ | C0G (EIA)      | 100Vdc           | 12pF±5%      | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A120J0□□H03□ | C0G (EIA)      | 100Vdc           | 12pF±5%      | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A150J0□□H03□ | C0G (EIA)      | 100Vdc           | 15pF±5%      | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A150J0□□H03□ | C0G (EIA)      | 100Vdc           | 15pF±5%      | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A180J0□□H03□ | C0G (EIA)      | 100Vdc           | 18pF±5%      | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A180J0□□H03□ | C0G (EIA)      | 100Vdc           | 18pF±5%      | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A220J0□□H03□ | C0G (EIA)      | 100Vdc           | 22pF±5%      | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A220J0□□H03□ | C0G (EIA)      | 100Vdc           | 22pF±5%      | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |

Continued on the following page. ↗

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RDE5C2A270J0□□H03□ | C0G (EIA)      | 100Vdc           | 27pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A270J0□□H03□ | C0G (EIA)      | 100Vdc           | 27pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A330J0□□H03□ | C0G (EIA)      | 100Vdc           | 33pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A330J0□□H03□ | C0G (EIA)      | 100Vdc           | 33pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A390J0□□H03□ | C0G (EIA)      | 100Vdc           | 39pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A390J0□□H03□ | C0G (EIA)      | 100Vdc           | 39pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A470J0□□H03□ | C0G (EIA)      | 100Vdc           | 47pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A470J0□□H03□ | C0G (EIA)      | 100Vdc           | 47pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A560J0□□H03□ | C0G (EIA)      | 100Vdc           | 56pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A560J0□□H03□ | C0G (EIA)      | 100Vdc           | 56pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A680J0□□H03□ | C0G (EIA)      | 100Vdc           | 68pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A680J0□□H03□ | C0G (EIA)      | 100Vdc           | 68pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A820J0□□H03□ | C0G (EIA)      | 100Vdc           | 82pF±5%     | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A820J0□□H03□ | C0G (EIA)      | 100Vdc           | 82pF±5%     | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A101J0□□H03□ | C0G (EIA)      | 100Vdc           | 100pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A101J0□□H03□ | C0G (EIA)      | 100Vdc           | 100pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A121J0□□H03□ | C0G (EIA)      | 100Vdc           | 120pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A121J0□□H03□ | C0G (EIA)      | 100Vdc           | 120pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A151J0□□H03□ | C0G (EIA)      | 100Vdc           | 150pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A151J0□□H03□ | C0G (EIA)      | 100Vdc           | 150pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A181J0□□H03□ | C0G (EIA)      | 100Vdc           | 180pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A181J0□□H03□ | C0G (EIA)      | 100Vdc           | 180pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A221J0□□H03□ | C0G (EIA)      | 100Vdc           | 220pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A221J0□□H03□ | C0G (EIA)      | 100Vdc           | 220pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A271J0□□H03□ | C0G (EIA)      | 100Vdc           | 270pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A271J0□□H03□ | C0G (EIA)      | 100Vdc           | 270pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A331J0□□H03□ | C0G (EIA)      | 100Vdc           | 330pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A331J0□□H03□ | C0G (EIA)      | 100Vdc           | 330pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A391J0□□H03□ | C0G (EIA)      | 100Vdc           | 390pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A391J0□□H03□ | C0G (EIA)      | 100Vdc           | 390pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A471J0□□H03□ | C0G (EIA)      | 100Vdc           | 470pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A471J0□□H03□ | C0G (EIA)      | 100Vdc           | 470pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A561J0□□H03□ | C0G (EIA)      | 100Vdc           | 560pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A561J0□□H03□ | C0G (EIA)      | 100Vdc           | 560pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A681J0□□H03□ | C0G (EIA)      | 100Vdc           | 680pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A681J0□□H03□ | C0G (EIA)      | 100Vdc           | 680pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A821J0□□H03□ | C0G (EIA)      | 100Vdc           | 820pF±5%    | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A821J0□□H03□ | C0G (EIA)      | 100Vdc           | 820pF±5%    | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A102J0□□H03□ | C0G (EIA)      | 100Vdc           | 1000pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A102J0□□H03□ | C0G (EIA)      | 100Vdc           | 1000pF±5%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A122J0□□H03□ | C0G (EIA)      | 100Vdc           | 1200pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A122J0□□H03□ | C0G (EIA)      | 100Vdc           | 1200pF±5%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A152J0□□H03□ | C0G (EIA)      | 100Vdc           | 1500pF±5%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDE5C2A152J0□□H03□ | C0G (EIA)      | 100Vdc           | 1500pF±5%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDE5C2A182J1□□H03□ | C0G (EIA)      | 100Vdc           | 1800pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C2A182J1□□H03□ | C0G (EIA)      | 100Vdc           | 1800pF±5%   | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C2A222J1□□H03□ | C0G (EIA)      | 100Vdc           | 2200pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C2A222J1□□H03□ | C0G (EIA)      | 100Vdc           | 2200pF±5%   | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C2A272J1□□H03□ | C0G (EIA)      | 100Vdc           | 2700pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C2A272J1□□H03□ | C0G (EIA)      | 100Vdc           | 2700pF±5%   | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE5C2A332J1□□H03□ | C0G (EIA)      | 100Vdc           | 3300pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE5C2A332J1□□H03□ | C0G (EIA)      | 100Vdc           | 3300pF±5%   | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDE7U2E101J1□□H03□ | U2J (EIA)      | 250Vdc           | 100pF±5%    | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E151J1□□H03□ | U2J (EIA)      | 250Vdc           | 150pF±5%    | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E221J1□□H03□ | U2J (EIA)      | 250Vdc           | 220pF±5%    | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E331J1□□H03□ | U2J (EIA)      | 250Vdc           | 330pF±5%    | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E471J1□□H03□ | U2J (EIA)      | 250Vdc           | 470pF±5%    | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |

Continued on the following page.

Continued from the preceding page.

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RDE7U2E681J1□□H03□ | U2J (EIA)      | 250Vdc           | 680pF±5%    | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E102J1□□H03□ | U2J (EIA)      | 250Vdc           | 1000pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E152J1□□H03□ | U2J (EIA)      | 250Vdc           | 1500pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E222J1□□H03□ | U2J (EIA)      | 250Vdc           | 2200pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E332J1□□H03□ | U2J (EIA)      | 250Vdc           | 3300pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E472J1□□H03□ | U2J (EIA)      | 250Vdc           | 4700pF±5%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E682J2□□H03□ | U2J (EIA)      | 250Vdc           | 6800pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E103J2□□H03□ | U2J (EIA)      | 250Vdc           | 10000pF±5%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E153J2□□H03□ | U2J (EIA)      | 250Vdc           | 15000pF±5%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E223J2□□H03□ | U2J (EIA)      | 250Vdc           | 22000pF±5%  | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2E333J3□□H03□ | U2J (EIA)      | 250Vdc           | 33000pF±5%  | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDE7U2E473J3□□H03□ | U2J (EIA)      | 250Vdc           | 47000pF±5%  | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDE7U2J100J2□□H03□ | U2J (EIA)      | 630Vdc           | 10pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J150J2□□H03□ | U2J (EIA)      | 630Vdc           | 15pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J220J2□□H03□ | U2J (EIA)      | 630Vdc           | 22pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J330J2□□H03□ | U2J (EIA)      | 630Vdc           | 33pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J470J2□□H03□ | U2J (EIA)      | 630Vdc           | 47pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J680J2□□H03□ | U2J (EIA)      | 630Vdc           | 68pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J101J2□□H03□ | U2J (EIA)      | 630Vdc           | 100pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J151J2□□H03□ | U2J (EIA)      | 630Vdc           | 150pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J221J2□□H03□ | U2J (EIA)      | 630Vdc           | 220pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J331J2□□H03□ | U2J (EIA)      | 630Vdc           | 330pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J471J2□□H03□ | U2J (EIA)      | 630Vdc           | 470pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J681J2□□H03□ | U2J (EIA)      | 630Vdc           | 680pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J102J2□□H03□ | U2J (EIA)      | 630Vdc           | 1000pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J152J2□□H03□ | U2J (EIA)      | 630Vdc           | 1500pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J222J2□□H03□ | U2J (EIA)      | 630Vdc           | 2200pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J332J2□□H03□ | U2J (EIA)      | 630Vdc           | 3300pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J472J2□□H03□ | U2J (EIA)      | 630Vdc           | 4700pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U2J682J3□□H03□ | U2J (EIA)      | 630Vdc           | 6800pF±5%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDE7U2J103J3□□H03□ | U2J (EIA)      | 630Vdc           | 10000pF±5%  | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDE7U2J153J4□□H03□ | U2J (EIA)      | 630Vdc           | 15000pF±5%  | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDE7U2J223J4□□H03□ | U2J (EIA)      | 630Vdc           | 22000pF±5%  | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDE7U2J333J5□□H03□ | U2J (EIA)      | 630Vdc           | 33000pF±5%  | 7.5×8.0                   | 4.0                    | 5.0                     | B1                         | E1                           |
| RDE7U2J473J5□□H03□ | U2J (EIA)      | 630Vdc           | 47000pF±5%  | 7.5×8.0                   | 4.0                    | 5.0                     | B1                         | E1                           |
| RDE7U2J943JU□□H03□ | U2J (EIA)      | 630Vdc           | 94000pF±5%  | 7.7×13.0                  | 4.0                    | 5.0                     | B1                         | E1                           |
| RDE7U3A100J2□□H03□ | U2J (EIA)      | 1000Vdc          | 10pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A150J2□□H03□ | U2J (EIA)      | 1000Vdc          | 15pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A220J2□□H03□ | U2J (EIA)      | 1000Vdc          | 22pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A330J2□□H03□ | U2J (EIA)      | 1000Vdc          | 33pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A470J2□□H03□ | U2J (EIA)      | 1000Vdc          | 47pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A680J2□□H03□ | U2J (EIA)      | 1000Vdc          | 68pF±5%     | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A101J2□□H03□ | U2J (EIA)      | 1000Vdc          | 100pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A151J2□□H03□ | U2J (EIA)      | 1000Vdc          | 150pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A221J2□□H03□ | U2J (EIA)      | 1000Vdc          | 220pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A331J2□□H03□ | U2J (EIA)      | 1000Vdc          | 330pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A471J2□□H03□ | U2J (EIA)      | 1000Vdc          | 470pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A681J2□□H03□ | U2J (EIA)      | 1000Vdc          | 680pF±5%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A102J2□□H03□ | U2J (EIA)      | 1000Vdc          | 1000pF±5%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDE7U3A152J3□□H03□ | U2J (EIA)      | 1000Vdc          | 1500pF±5%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDE7U3A222J3□□H03□ | U2J (EIA)      | 1000Vdc          | 2200pF±5%   | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDE7U3A332J4□□H03□ | U2J (EIA)      | 1000Vdc          | 3300pF±5%   | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDE7U3A472J4□□H03□ | U2J (EIA)      | 1000Vdc          | 4700pF±5%   | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDE7U3A682J5□□H03□ | U2J (EIA)      | 1000Vdc          | 6800pF±5%   | 7.5×8.0                   | 4.0                    | 5.0                     | B1                         | E1                           |
| RDE7U3A103J5□□H03□ | U2J (EIA)      | 1000Vdc          | 10000pF±5%  | 7.5×8.0                   | 4.0                    | 5.0                     | B1                         | E1                           |
| RDE7U3A203JU□□H03□ | U2J (EIA)      | 1000Vdc          | 20000pF±5%  | 7.7×13.0                  | 4.0                    | 5.0                     | B1                         | E1                           |

Two blank columns are filled with the lead style code. Please refer to the 3 columns on the right for the appropriate code.  
The last blank column is filled with the packaging code. (B: bulk, A: ammo pack)

## High Dielectric Constant Type, X7R/X7S Characteristics

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RDER71E104K0□□H03□ | X7R (EIA)      | 25Vdc            | 0.1μF±10%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71E104K0□□H03□ | X7R (EIA)      | 25Vdc            | 0.1μF±10%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDEC71E224K0□□H03□ | X7S (EIA)      | 25Vdc            | 0.22μF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDEC71E224K0□□H03□ | X7S (EIA)      | 25Vdc            | 0.22μF±10%  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDEC71E474K0□□H03□ | X7S (EIA)      | 25Vdc            | 0.47μF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDEC71E474K0□□H03□ | X7S (EIA)      | 25Vdc            | 0.47μF±10%  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDEC71E105K0□□H03□ | X7S (EIA)      | 25Vdc            | 1.0μF±10%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDEC71E105K0□□H03□ | X7S (EIA)      | 25Vdc            | 1.0μF±10%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDEC71E225K1□□H03□ | X7S (EIA)      | 25Vdc            | 2.2μF±10%   | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDEC71E225K1□□H03□ | X7S (EIA)      | 25Vdc            | 2.2μF±10%   | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDEC71E475K2□□H03□ | X7S (EIA)      | 25Vdc            | 4.7μF±10%   | 5.5×4.0                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDEC71E475K2□□H03□ | X7S (EIA)      | 25Vdc            | 4.7μF±10%   | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDEC71E106K2□□H03□ | X7S (EIA)      | 25Vdc            | 10μF±10%    | 5.5×4.0                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDEC71E106K2□□H03□ | X7S (EIA)      | 25Vdc            | 10μF±10%    | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDEC71E226K3□□H03□ | X7S (EIA)      | 25Vdc            | 22μF±10%    | 5.5×5.0                   | 4.0                    | 2.5                     | P1                         | S1                           |
| RDEC71E226K3□□H03□ | X7S (EIA)      | 25Vdc            | 22μF±10%    | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDEC71E476MW□□H03□ | X7S (EIA)      | 25Vdc            | 47μF±20%    | 5.5×7.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDER71H221K0□□H03□ | X7R (EIA)      | 50Vdc            | 220pF±10%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H221K0□□H03□ | X7R (EIA)      | 50Vdc            | 220pF±10%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H331K0□□H03□ | X7R (EIA)      | 50Vdc            | 330pF±10%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H331K0□□H03□ | X7R (EIA)      | 50Vdc            | 330pF±10%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H471K0□□H03□ | X7R (EIA)      | 50Vdc            | 470pF±10%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H471K0□□H03□ | X7R (EIA)      | 50Vdc            | 470pF±10%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H681K0□□H03□ | X7R (EIA)      | 50Vdc            | 680pF±10%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H681K0□□H03□ | X7R (EIA)      | 50Vdc            | 680pF±10%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H102K0□□H03□ | X7R (EIA)      | 50Vdc            | 1000pF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H102K0□□H03□ | X7R (EIA)      | 50Vdc            | 1000pF±10%  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H152K0□□H03□ | X7R (EIA)      | 50Vdc            | 1500pF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H152K0□□H03□ | X7R (EIA)      | 50Vdc            | 1500pF±10%  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H222K0□□H03□ | X7R (EIA)      | 50Vdc            | 2200pF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H222K0□□H03□ | X7R (EIA)      | 50Vdc            | 2200pF±10%  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H332K0□□H03□ | X7R (EIA)      | 50Vdc            | 3300pF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H332K0□□H03□ | X7R (EIA)      | 50Vdc            | 3300pF±10%  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H472K0□□H03□ | X7R (EIA)      | 50Vdc            | 4700pF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H472K0□□H03□ | X7R (EIA)      | 50Vdc            | 4700pF±10%  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H682K0□□H03□ | X7R (EIA)      | 50Vdc            | 6800pF±10%  | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H682K0□□H03□ | X7R (EIA)      | 50Vdc            | 6800pF±10%  | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H103K0□□H03□ | X7R (EIA)      | 50Vdc            | 10000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H103K0□□H03□ | X7R (EIA)      | 50Vdc            | 10000pF±10% | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H153K0□□H03□ | X7R (EIA)      | 50Vdc            | 15000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H153K0□□H03□ | X7R (EIA)      | 50Vdc            | 15000pF±10% | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H223K0□□H03□ | X7R (EIA)      | 50Vdc            | 22000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H223K0□□H03□ | X7R (EIA)      | 50Vdc            | 22000pF±10% | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H333K0□□H03□ | X7R (EIA)      | 50Vdc            | 33000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H333K0□□H03□ | X7R (EIA)      | 50Vdc            | 33000pF±10% | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H473K0□□H03□ | X7R (EIA)      | 50Vdc            | 47000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H473K0□□H03□ | X7R (EIA)      | 50Vdc            | 47000pF±10% | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H683K0□□H03□ | X7R (EIA)      | 50Vdc            | 68000pF±10% | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H683K0□□H03□ | X7R (EIA)      | 50Vdc            | 68000pF±10% | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H104K0□□H03□ | X7R (EIA)      | 50Vdc            | 0.1μF±10%   | 4.0×3.5                   | 2.5                    | 5.0                     | K1                         | M1                           |
| RDER71H104K0□□H03□ | X7R (EIA)      | 50Vdc            | 0.1μF±10%   | 5.0×3.5                   | 2.5                    | 2.5                     | P1                         | S1                           |
| RDER71H154K1□□H03□ | X7R (EIA)      | 50Vdc            | 0.15μF±10%  | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDER71H154K1□□H03□ | X7R (EIA)      | 50Vdc            | 0.15μF±10%  | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |
| RDER71H224K1□□H03□ | X7R (EIA)      | 50Vdc            | 0.22μF±10%  | 4.5×3.5                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDER71H224K1□□H03□ | X7R (EIA)      | 50Vdc            | 0.22μF±10%  | 5.0×3.5                   | 3.15                   | 2.5                     | P1                         | S1                           |

Continued on the following page. 

Continued from the preceding page.

| Part Number        | Temp. Char. | Rated Voltage | Capacitance | Dimensions LxW (mm) | Dimension T (mm) | Lead Space F (mm) | Lead Style Code Bulk | Lead Style Code Taping |
|--------------------|-------------|---------------|-------------|---------------------|------------------|-------------------|----------------------|------------------------|
| RDER71H334K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.33μF±10%  | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER71H334K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.33μF±10%  | 5.0×3.5             | 3.15             | 2.5               | P1                   | S1                     |
| RDER71H474K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.47μF±10%  | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER71H474K1□□H03□ | X7R (EIA)   | 50Vdc         | 0.47μF±10%  | 5.0×3.5             | 3.15             | 2.5               | P1                   | S1                     |
| RDER71H684K2□□H03□ | X7R (EIA)   | 50Vdc         | 0.68μF±10%  | 5.5×4.0             | 3.15             | 2.5               | P1                   | S1                     |
| RDER71H684K2□□H03□ | X7R (EIA)   | 50Vdc         | 0.68μF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER71H105K2□□H03□ | X7R (EIA)   | 50Vdc         | 1.0μF±10%   | 5.5×4.0             | 3.15             | 2.5               | P1                   | S1                     |
| RDER71H105K2□□H03□ | X7R (EIA)   | 50Vdc         | 1.0μF±10%   | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER71H155K2□□H03□ | X7R (EIA)   | 50Vdc         | 1.5μF±10%   | 5.5×4.0             | 3.15             | 2.5               | P1                   | S1                     |
| RDER71H155K2□□H03□ | X7R (EIA)   | 50Vdc         | 1.5μF±10%   | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER71H225K2□□H03□ | X7R (EIA)   | 50Vdc         | 2.2μF±10%   | 5.5×4.0             | 3.15             | 2.5               | P1                   | S1                     |
| RDER71H225K2□□H03□ | X7R (EIA)   | 50Vdc         | 2.2μF±10%   | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER71H335K3□□H03□ | X7R (EIA)   | 50Vdc         | 3.3μF±10%   | 5.5×5.0             | 4.0              | 2.5               | P1                   | S1                     |
| RDER71H335K3□□H03□ | X7R (EIA)   | 50Vdc         | 3.3μF±10%   | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RDEC71H475K2□□H03□ | X7S (EIA)   | 50Vdc         | 4.7μF±10%   | 5.5×4.0             | 3.15             | 2.5               | P1                   | S1                     |
| RDEC71H475K2□□H03□ | X7S (EIA)   | 50Vdc         | 4.7μF±10%   | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDEC71H106K3□□H03□ | X7S (EIA)   | 50Vdc         | 10μF±10%    | 5.5×5.0             | 4.0              | 2.5               | P1                   | S1                     |
| RDEC71H106K3□□H03□ | X7S (EIA)   | 50Vdc         | 10μF±10%    | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RDEC71H226MW□□H03□ | X7S (EIA)   | 50Vdc         | 22μF±20%    | 5.5×7.5             | 4.0              | 5.0               | K1                   | M1                     |
| RDER72A221K0□□H03□ | X7R (EIA)   | 100Vdc        | 220pF±10%   | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A221K0□□H03□ | X7R (EIA)   | 100Vdc        | 220pF±10%   | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A331K0□□H03□ | X7R (EIA)   | 100Vdc        | 330pF±10%   | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A331K0□□H03□ | X7R (EIA)   | 100Vdc        | 330pF±10%   | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A471K0□□H03□ | X7R (EIA)   | 100Vdc        | 470pF±10%   | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A471K0□□H03□ | X7R (EIA)   | 100Vdc        | 470pF±10%   | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A681K0□□H03□ | X7R (EIA)   | 100Vdc        | 680pF±10%   | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A681K0□□H03□ | X7R (EIA)   | 100Vdc        | 680pF±10%   | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A102K0□□H03□ | X7R (EIA)   | 100Vdc        | 1000pF±10%  | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A102K0□□H03□ | X7R (EIA)   | 100Vdc        | 1000pF±10%  | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A152K0□□H03□ | X7R (EIA)   | 100Vdc        | 1500pF±10%  | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A152K0□□H03□ | X7R (EIA)   | 100Vdc        | 1500pF±10%  | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A222K0□□H03□ | X7R (EIA)   | 100Vdc        | 2200pF±10%  | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A222K0□□H03□ | X7R (EIA)   | 100Vdc        | 2200pF±10%  | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A332K0□□H03□ | X7R (EIA)   | 100Vdc        | 3300pF±10%  | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A332K0□□H03□ | X7R (EIA)   | 100Vdc        | 3300pF±10%  | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A472K0□□H03□ | X7R (EIA)   | 100Vdc        | 4700pF±10%  | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A472K0□□H03□ | X7R (EIA)   | 100Vdc        | 4700pF±10%  | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A682K0□□H03□ | X7R (EIA)   | 100Vdc        | 6800pF±10%  | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A682K0□□H03□ | X7R (EIA)   | 100Vdc        | 6800pF±10%  | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A103K0□□H03□ | X7R (EIA)   | 100Vdc        | 10000pF±10% | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A103K0□□H03□ | X7R (EIA)   | 100Vdc        | 10000pF±10% | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A153K0□□H03□ | X7R (EIA)   | 100Vdc        | 15000pF±10% | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A153K0□□H03□ | X7R (EIA)   | 100Vdc        | 15000pF±10% | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A223K0□□H03□ | X7R (EIA)   | 100Vdc        | 22000pF±10% | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDER72A223K0□□H03□ | X7R (EIA)   | 100Vdc        | 22000pF±10% | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDER72A333K1□□H03□ | X7R (EIA)   | 100Vdc        | 33000pF±10% | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72A333K1□□H03□ | X7R (EIA)   | 100Vdc        | 33000pF±10% | 5.0×3.5             | 3.15             | 2.5               | P1                   | S1                     |
| RDER72A473K1□□H03□ | X7R (EIA)   | 100Vdc        | 47000pF±10% | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72A473K1□□H03□ | X7R (EIA)   | 100Vdc        | 47000pF±10% | 5.0×3.5             | 3.15             | 2.5               | P1                   | S1                     |
| RDER72A683K1□□H03□ | X7R (EIA)   | 100Vdc        | 68000pF±10% | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72A683K1□□H03□ | X7R (EIA)   | 100Vdc        | 68000pF±10% | 5.0×3.5             | 3.15             | 2.5               | P1                   | S1                     |
| RDER72A104K1□□H03□ | X7R (EIA)   | 100Vdc        | 0.1μF±10%   | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72A104K1□□H03□ | X7R (EIA)   | 100Vdc        | 0.1μF±10%   | 5.0×3.5             | 3.15             | 2.5               | P1                   | S1                     |
| RDER72A154K2□□H03□ | X7R (EIA)   | 100Vdc        | 0.15μF±10%  | 5.5×4.0             | 3.15             | 2.5               | P1                   | S1                     |
| RDER72A154K2□□H03□ | X7R (EIA)   | 100Vdc        | 0.15μF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72A224K1□□H03□ | X7R (EIA)   | 100Vdc        | 0.22μF±10%  | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72A224K1□□H03□ | X7R (EIA)   | 100Vdc        | 0.22μF±10%  | 5.0×3.5             | 3.15             | 2.5               | P1                   | S1                     |

Continued on the following page. ↗

Continued from the preceding page.

| Part Number        | Temp. Char. | Rated Voltage | Capacitance | Dimensions LxW (mm) | Dimension T (mm) | Lead Space F (mm) | Lead Style Code Bulk | Lead Style Code Taping |
|--------------------|-------------|---------------|-------------|---------------------|------------------|-------------------|----------------------|------------------------|
| RDER72A334K1□□H03□ | X7R (EIA)   | 100Vdc        | 0.33μF±10%  | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72A334K1□□H03□ | X7R (EIA)   | 100Vdc        | 0.33μF±10%  | 5.0×3.5             | 3.15             | 2.5               | P1                   | S1                     |
| RDER72A474K1□□H03□ | X7R (EIA)   | 100Vdc        | 0.47μF±10%  | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72A474K1□□H03□ | X7R (EIA)   | 100Vdc        | 0.47μF±10%  | 5.0×3.5             | 3.15             | 2.5               | P1                   | S1                     |
| RDER72A684K2□□H03□ | X7R (EIA)   | 100Vdc        | 0.68μF±10%  | 5.5×4.0             | 3.15             | 2.5               | P1                   | S1                     |
| RDER72A684K2□□H03□ | X7R (EIA)   | 100Vdc        | 0.68μF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72A105K2□□H03□ | X7R (EIA)   | 100Vdc        | 1.0μF±10%   | 5.5×4.0             | 3.15             | 2.5               | P1                   | S1                     |
| RDER72A105K2□□H03□ | X7R (EIA)   | 100Vdc        | 1.0μF±10%   | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDEC72A155K3□□H03□ | X7S (EIA)   | 100Vdc        | 1.5μF±10%   | 5.5×5.0             | 4.0              | 2.5               | P1                   | S1                     |
| RDEC72A155K3□□H03□ | X7S (EIA)   | 100Vdc        | 1.5μF±10%   | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RDEC72A225K3□□H03□ | X7S (EIA)   | 100Vdc        | 2.2μF±10%   | 5.5×5.0             | 4.0              | 2.5               | P1                   | S1                     |
| RDEC72A225K3□□H03□ | X7S (EIA)   | 100Vdc        | 2.2μF±10%   | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RDEC72A475MW□□H03□ | X7S (EIA)   | 100Vdc        | 4.7μF±20%   | 5.5×7.5             | 4.0              | 5.0               | K1                   | M1                     |
| RDER72E102K1□□H03□ | X7R (EIA)   | 250Vdc        | 1000pF±10%  | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E152K1□□H03□ | X7R (EIA)   | 250Vdc        | 1500pF±10%  | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E222K1□□H03□ | X7R (EIA)   | 250Vdc        | 2200pF±10%  | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E332K1□□H03□ | X7R (EIA)   | 250Vdc        | 3300pF±10%  | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E472K1□□H03□ | X7R (EIA)   | 250Vdc        | 4700pF±10%  | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E682K1□□H03□ | X7R (EIA)   | 250Vdc        | 6800pF±10%  | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E103K1□□H03□ | X7R (EIA)   | 250Vdc        | 10000pF±10% | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E153K1□□H03□ | X7R (EIA)   | 250Vdc        | 15000pF±10% | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E223K1□□H03□ | X7R (EIA)   | 250Vdc        | 22000pF±10% | 4.5×3.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E333K2□□H03□ | X7R (EIA)   | 250Vdc        | 33000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E473K2□□H03□ | X7R (EIA)   | 250Vdc        | 47000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E683K2□□H03□ | X7R (EIA)   | 250Vdc        | 68000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E104K2□□H03□ | X7R (EIA)   | 250Vdc        | 0.10μF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E154K3□□H03□ | X7R (EIA)   | 250Vdc        | 0.15μF±10%  | 5.5×5.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E224K3□□H03□ | X7R (EIA)   | 250Vdc        | 0.22μF±10%  | 5.5×5.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72E334K4□□H03□ | X7R (EIA)   | 250Vdc        | 0.33μF±10%  | 7.5×5.5             | 4.0              | 5.0               | K1                   | M1                     |
| RDER72E474K4□□H03□ | X7R (EIA)   | 250Vdc        | 0.47μF±10%  | 7.5×5.5             | 4.0              | 5.0               | K1                   | M1                     |
| RDER72E684K5□□H03□ | X7R (EIA)   | 250Vdc        | 0.68μF±10%  | 7.5×7.5             | 4.0              | 5.0               | B1                   | E1                     |
| RDER72E105K5□□H03□ | X7R (EIA)   | 250Vdc        | 1.0μF±10%   | 7.5×7.5             | 4.0              | 5.0               | B1                   | E1                     |
| RDER72E225MU□□H03□ | X7R (EIA)   | 250Vdc        | 2.2μF±20%   | 7.7×12.5            | 4.0              | 5.0               | B1                   | E1                     |
| RDER72J102K2□□H03□ | X7R (EIA)   | 630Vdc        | 1000pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J152K2□□H03□ | X7R (EIA)   | 630Vdc        | 1500pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J222K2□□H03□ | X7R (EIA)   | 630Vdc        | 2200pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J332K2□□H03□ | X7R (EIA)   | 630Vdc        | 3300pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J472K2□□H03□ | X7R (EIA)   | 630Vdc        | 4700pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J682K2□□H03□ | X7R (EIA)   | 630Vdc        | 6800pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J103K2□□H03□ | X7R (EIA)   | 630Vdc        | 10000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J153K2□□H03□ | X7R (EIA)   | 630Vdc        | 15000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J223K2□□H03□ | X7R (EIA)   | 630Vdc        | 22000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J333K3□□H03□ | X7R (EIA)   | 630Vdc        | 33000pF±10% | 5.5×5.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J473K3□□H03□ | X7R (EIA)   | 630Vdc        | 47000pF±10% | 5.5×5.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J683K4□□H03□ | X7R (EIA)   | 630Vdc        | 68000pF±10% | 7.5×5.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J104K4□□H03□ | X7R (EIA)   | 630Vdc        | 0.10μF±10%  | 7.5×5.5             | 3.15             | 5.0               | K1                   | M1                     |
| RDER72J154K5□□H03□ | X7R (EIA)   | 630Vdc        | 0.15μF±10%  | 7.5×8.0             | 4.0              | 5.0               | B1                   | E1                     |
| RDER72J224K5□□H03□ | X7R (EIA)   | 630Vdc        | 0.22μF±10%  | 7.5×8.0             | 4.0              | 5.0               | B1                   | E1                     |
| RDER72J474MU□□H03□ | X7R (EIA)   | 630Vdc        | 0.47μF±20%  | 7.7×13.0            | 4.0              | 5.0               | B1                   | E1                     |
| RDER73A471K2□□H03□ | X7R (EIA)   | 1000Vdc       | 470pF±10%   | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER73A681K2□□H03□ | X7R (EIA)   | 1000Vdc       | 680pF±10%   | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER73A102K2□□H03□ | X7R (EIA)   | 1000Vdc       | 1000pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER73A152K2□□H03□ | X7R (EIA)   | 1000Vdc       | 1500pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER73A222K2□□H03□ | X7R (EIA)   | 1000Vdc       | 2200pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER73A332K2□□H03□ | X7R (EIA)   | 1000Vdc       | 3300pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER73A472K2□□H03□ | X7R (EIA)   | 1000Vdc       | 4700pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER73A682K2□□H03□ | X7R (EIA)   | 1000Vdc       | 6800pF±10%  | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |

Continued on the following page.

Continued from the preceding page.

| Part Number        | Temp. Char. | Rated Voltage | Capacitance | Dimensions LxW (mm) | Dimension T (mm) | Lead Space F (mm) | Lead Style Code Bulk | Lead Style Code Taping |
|--------------------|-------------|---------------|-------------|---------------------|------------------|-------------------|----------------------|------------------------|
| RDER73A103K2□□H03□ | X7R (EIA)   | 1000Vdc       | 10000pF±10% | 5.5×4.0             | 3.15             | 5.0               | K1                   | M1                     |
| RDER73A153K3□□H03□ | X7R (EIA)   | 1000Vdc       | 15000pF±10% | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RDER73A223K3□□H03□ | X7R (EIA)   | 1000Vdc       | 22000pF±10% | 5.5×5.0             | 4.0              | 5.0               | K1                   | M1                     |
| RDER73A333K4□□H03□ | X7R (EIA)   | 1000Vdc       | 33000pF±10% | 7.5×5.5             | 4.0              | 5.0               | K1                   | M1                     |
| RDER73A473K4□□H03□ | X7R (EIA)   | 1000Vdc       | 47000pF±10% | 7.5×5.5             | 4.0              | 5.0               | K1                   | M1                     |
| RDER73A683K5□□H03□ | X7R (EIA)   | 1000Vdc       | 68000pF±10% | 7.5×8.0             | 4.0              | 5.0               | B1                   | E1                     |
| RDER73A104K5□□H03□ | X7R (EIA)   | 1000Vdc       | 0.10μF±10%  | 7.5×8.0             | 4.0              | 5.0               | B1                   | E1                     |
| RDER73A224MU□□H03□ | X7R (EIA)   | 1000Vdc       | 0.22μF±20%  | 7.7×13.0            | 4.0              | 5.0               | B1                   | E1                     |

Two blank columns are filled with the lead style code. Please refer to the 3 columns on the right for the appropriate code.  
 The last blank column is filled with the packaging code. (B: bulk, A: ammo pack)

3

## High Dielectric Constant Type, F/Y5V Characteristics

| Part Number        | Temp. Char. | Rated Voltage | Capacitance     | Dimensions LxW (mm) | Dimension T (mm) | Lead Space F (mm) | Lead Style Code Bulk | Lead Style Code Taping |
|--------------------|-------------|---------------|-----------------|---------------------|------------------|-------------------|----------------------|------------------------|
| RDEF11H103Z0□□H01□ | F (JIS)     | 50Vdc         | 10000pF+80/-20% | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDEF11H103Z0□□H01□ | F (JIS)     | 50Vdc         | 10000pF+80/-20% | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDEF51H103Z0□□H03□ | Y5V (EIA)   | 50Vdc         | 10000pF+80/-20% | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDEF51H103Z0□□H03□ | Y5V (EIA)   | 50Vdc         | 10000pF+80/-20% | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDEF11H223Z0□□H01□ | F (JIS)     | 50Vdc         | 22000pF+80/-20% | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDEF11H223Z0□□H01□ | F (JIS)     | 50Vdc         | 22000pF+80/-20% | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDEF51H223Z0□□H03□ | Y5V (EIA)   | 50Vdc         | 22000pF+80/-20% | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDEF51H223Z0□□H03□ | Y5V (EIA)   | 50Vdc         | 22000pF+80/-20% | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDEF11H473Z0□□H01□ | F (JIS)     | 50Vdc         | 47000pF+80/-20% | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDEF11H473Z0□□H01□ | F (JIS)     | 50Vdc         | 47000pF+80/-20% | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDEF51H473Z0□□H03□ | Y5V (EIA)   | 50Vdc         | 47000pF+80/-20% | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDEF51H473Z0□□H03□ | Y5V (EIA)   | 50Vdc         | 47000pF+80/-20% | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDEF11H104Z0□□H01□ | F (JIS)     | 50Vdc         | 0.1μF+80/-20%   | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDEF11H104Z0□□H01□ | F (JIS)     | 50Vdc         | 0.1μF+80/-20%   | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |
| RDEF51H104Z0□□H03□ | Y5V (EIA)   | 50Vdc         | 0.1μF+80/-20%   | 4.0×3.5             | 2.5              | 5.0               | K1                   | M1                     |
| RDEF51H104Z0□□H03□ | Y5V (EIA)   | 50Vdc         | 0.1μF+80/-20%   | 5.0×3.5             | 2.5              | 2.5               | P1                   | S1                     |

Two blank columns are filled with the lead style code. Please refer to the 3 columns on the right for the appropriate code.  
 The last blank column is filled with the packaging code. (B: bulk, A: ammo pack)

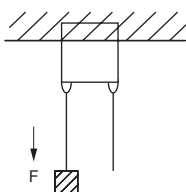
## Specifications and Test Methods

| No.                           | Item                                                                                                                                                                                                                                                                                            | Specifications                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|---------------------------|-------------------------------|---------------------------|---------------------------|-----------|---------------------------|---------------------|---------------------------|-------------------------------|-------------------|---------------------------|--------------|---------------------------|----------------|---------------------------|--|--------|---------------------------|--|-------|---------------------------|
|                               |                                                                                                                                                                                                                                                                                                 | Temperature Compensating Type                                             | High Dielectric Constant Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| 1                             | Operating Temperature Range                                                                                                                                                                                                                                                                     | -55 to +125°C                                                             | Char. X7R, X7S: -55 to +125°C<br>Char. F: -25 to +85°C<br>Char. Y5V: -30 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| 2                             | Appearance                                                                                                                                                                                                                                                                                      | No defects or abnormalities                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Visual inspection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| 3                             | Dimension and Marking                                                                                                                                                                                                                                                                           | See previous pages                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Visual inspection, Vernier Caliper                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| 4                             | Dielectric Strength                                                                                                                                                                                                                                                                             | Between Terminals                                                         | No defects or abnormalities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <div>The capacitors should not be damaged when test voltages of Table are applied between the terminals for 1 to 5 sec. (Charge/Discharge current ≤ 50mA)</div> <table><tr><th></th><th>Rated Voltage</th><th>Test Voltage</th></tr><tr><td rowspan="3">Temperature Compensating Type</td><td>DC50V, DC100V</td><td>300% of the rated voltage</td></tr><tr><td>DC250V</td><td>200% of the rated voltage</td></tr><tr><td>DC630V</td><td>150% of the rated voltage</td></tr><tr><td rowspan="3">High Dielectric Constant Type</td><td>DC1kV</td><td>130% of the rated voltage</td></tr><tr><td>DC25V, DC50V</td><td>250% of the rated voltage</td></tr><tr><td>DC100V, DC250V</td><td>200% of the rated voltage</td></tr><tr><td></td><td>DC630V</td><td>150% of the rated voltage</td></tr><tr><td></td><td>DC1kV</td><td>120% of the rated voltage</td></tr></table> |              | Rated Voltage | Test Voltage              | Temperature Compensating Type | DC50V, DC100V             | 300% of the rated voltage | DC250V    | 200% of the rated voltage | DC630V              | 150% of the rated voltage | High Dielectric Constant Type | DC1kV             | 130% of the rated voltage | DC25V, DC50V | 250% of the rated voltage | DC100V, DC250V | 200% of the rated voltage |  | DC630V | 150% of the rated voltage |  | DC1kV | 120% of the rated voltage |
|                               |                                                                                                                                                                                                                                                                                                 |                                                                           | Rated Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Test Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| Temperature Compensating Type | DC50V, DC100V                                                                                                                                                                                                                                                                                   | 300% of the rated voltage                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
|                               | DC250V                                                                                                                                                                                                                                                                                          | 200% of the rated voltage                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
|                               | DC630V                                                                                                                                                                                                                                                                                          | 150% of the rated voltage                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| High Dielectric Constant Type | DC1kV                                                                                                                                                                                                                                                                                           | 130% of the rated voltage                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
|                               | DC25V, DC50V                                                                                                                                                                                                                                                                                    | 250% of the rated voltage                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
|                               | DC100V, DC250V                                                                                                                                                                                                                                                                                  | 200% of the rated voltage                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
|                               | DC630V                                                                                                                                                                                                                                                                                          | 150% of the rated voltage                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
|                               | DC1kV                                                                                                                                                                                                                                                                                           | 120% of the rated voltage                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
|                               | Body Insulation                                                                                                                                                                                                                                                                                 | No defects or abnormalities                                               | <div>The capacitor is placed in a container with metal balls of 1mm diameter so that each terminal, short-circuited, is kept approximately 2mm from the balls as shown in the figure, for 1 to 5 sec. between capacitor terminals and metal balls. (Charge/Discharge current ≤ 50mA)</div>  <table><tr><th>Rated Voltage</th><th>Test Voltage</th></tr><tr><td>DC25V, DC50V</td><td>250% of the rated voltage</td></tr><tr><td>DC100V, DC250V</td><td>200% of the rated voltage</td></tr><tr><td>DC630V, DC1kV</td><td>DC1300V</td></tr></table> | Rated Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Test Voltage | DC25V, DC50V  | 250% of the rated voltage | DC100V, DC250V                | 200% of the rated voltage | DC630V, DC1kV             | DC1300V   |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| Rated Voltage                 | Test Voltage                                                                                                                                                                                                                                                                                    |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| DC25V, DC50V                  | 250% of the rated voltage                                                                                                                                                                                                                                                                       |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| DC100V, DC250V                | 200% of the rated voltage                                                                                                                                                                                                                                                                       |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| DC630V, DC1kV                 | DC1300V                                                                                                                                                                                                                                                                                         |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| 5                             | Insulation Resistance                                                                                                                                                                                                                                                                           | Between Terminals                                                         | Rated Voltage: DC25V, DC50V, DC100V<br>10,000MΩ min. or 500MΩ • μF min. whichever is smaller<br>Rated Voltage: DC250V, DC630V<br>10,000MΩ min. or 100MΩ • μF min. whichever is smaller                                                                                                                                                                                                                                                                                                                                                                                                                                               | The insulation resistance should be measured with a DC voltage not exceeding the rated voltage (DC500±50V in case of rated vlotage: DC630V, DC1kV) at normal temperature and humidity and within 2 min. of charging. (Charge/Discharge current ≤ 50mA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| 6                             | Capacitance                                                                                                                                                                                                                                                                                     | Within the specified tolerance                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | The capacitance, Q/D.F. should be measured at 25°C at the frequency and voltage shown in the table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| 7                             | Q/Dissipation Factor (D.F.)                                                                                                                                                                                                                                                                     | 30pF min.: Q≥1,000<br>30pF max.: Q≥400+20C<br>C: Nominal capacitance (pF) | Char. X7R: 0.025 max.<br>Char. F, Y5V: 0.05 max.<br>Char. X7S: 0.125 max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Temperature Compensating Type <table><tr><th>Capacitance</th><th>C≤1000pF</th><th>C&gt;1000pF</th></tr><tr><th>Item</th><td></td><td></td></tr><tr><td>Frequency</td><td>1±0.1MHz</td><td>1±0.1kHz</td></tr><tr><td>Voltage</td><td>AC0.5 to 5V (r.m.s.)</td><td>AC1±0.2V (r.m.s.)</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Capacitance  | C≤1000pF      | C>1000pF                  | Item                          |                           |                           | Frequency | 1±0.1MHz                  | 1±0.1kHz            | Voltage                   | AC0.5 to 5V (r.m.s.)          | AC1±0.2V (r.m.s.) |                           |              |                           |                |                           |  |        |                           |  |       |                           |
|                               |                                                                                                                                                                                                                                                                                                 |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Capacitance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C≤1000pF     | C>1000pF      |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| Item                          |                                                                                                                                                                                                                                                                                                 |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| Frequency                     | 1±0.1MHz                                                                                                                                                                                                                                                                                        | 1±0.1kHz                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| Voltage                       | AC0.5 to 5V (r.m.s.)                                                                                                                                                                                                                                                                            | AC1±0.2V (r.m.s.)                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
|                               | High Dielectric Constant Type <table><tr><th>Capacitance</th><th>C≤10μF</th><th>C&gt;10μF</th></tr><tr><th>Item</th><td></td><td></td></tr><tr><td>Frequency</td><td>1±0.1kHz</td><td>120±24Hz</td></tr><tr><td>Voltage</td><td>AC1±0.2V (r.m.s.)</td><td>AC0.5±0.1V (r.m.s.)</td></tr></table> | Capacitance                                                               | C≤10μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | C>10μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Item         |               |                           | Frequency                     | 1±0.1kHz                  | 120±24Hz                  | Voltage   | AC1±0.2V (r.m.s.)         | AC0.5±0.1V (r.m.s.) |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| Capacitance                   | C≤10μF                                                                                                                                                                                                                                                                                          | C>10μF                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| Item                          |                                                                                                                                                                                                                                                                                                 |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| Frequency                     | 1±0.1kHz                                                                                                                                                                                                                                                                                        | 120±24Hz                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |
| Voltage                       | AC1±0.2V (r.m.s.)                                                                                                                                                                                                                                                                               | AC0.5±0.1V (r.m.s.)                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                           |                               |                           |                           |           |                           |                     |                           |                               |                   |                           |              |                           |                |                           |  |        |                           |  |       |                           |

Continued on the following page. 

## Specifications and Test Methods

Continued from the preceding page.

| No.                     | Item                                                    |                                         | Specifications                                                                                                      |                                                                           | Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |      |   |       |   |      |   |       |   |      |
|-------------------------|---------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|------|---|-------|---|------|---|-------|---|------|
|                         |                                                         |                                         | Temperature Compensating Type                                                                                       | High Dielectric Constant Type                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
| 8                       | Capacitance Temperature Characteristics                 | Capacitance Change                      | Within the specified tolerance (Table A on last column)                                                             | Within the specified tolerance (Table B on last column)                   | <p>The capacitance change should be measured after 5 min. at each specified temperature stage.</p> <p>(1) Temperature Compensating Type</p> <p>The temperature coefficient is determined using the capacitance measured in step 3 as a reference. When cycling the temperature sequentially from step 1 through 5 (-55 to +125°C) the capacitance should be within the specified tolerance for the temperature coefficient and capacitance change as shown in Table A. The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in step 1, 3 and 5 by the cap. value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>25±2</td></tr><tr><td>2</td><td>-55±3</td></tr><tr><td>3</td><td>25±2</td></tr><tr><td>4</td><td>125±3</td></tr><tr><td>5</td><td>25±2</td></tr></table> <p>(2) High Dielectric Constant Type</p> <p>The ranges of capacitance change compared with the 25°C (Char. F: 20°C) value over the temperature ranges as shown in Table B should be within the specified ranges.</p> <p>• Pretreatment (for high dielectric constant type)</p> <p>Perform a heat treatment at 150+0/-10°C for 1 hr., and then let sit at room temperature for 24±2 hrs.</p> | Step | Temperature (°C) | 1 | 25±2 | 2 | -55±3 | 3 | 25±2 | 4 | 125±3 | 5 | 25±2 |
|                         |                                                         | Step                                    | Temperature (°C)                                                                                                    |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
|                         |                                                         | 1                                       | 25±2                                                                                                                |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
|                         |                                                         | 2                                       | -55±3                                                                                                               |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
| 3                       | 25±2                                                    |                                         |                                                                                                                     |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
| 4                       | 125±3                                                   |                                         |                                                                                                                     |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
| 5                       | 25±2                                                    |                                         |                                                                                                                     |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
| Temperature Coefficient | Within the specified tolerance (Table A on last column) |                                         |                                                                                                                     |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
| Capacitance Drift       | Within ±0.2% or ±0.05pF, whichever is larger            |                                         |                                                                                                                     |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
|                         |                                                         |                                         |                                                                                                                     |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
| 9                       | Terminal Strength                                       | Tensile Strength                        | Termination not to be broken or loosened                                                                            |                                                                           | <p>As in the figure, fix the capacitor body, apply the force gradually to each lead in the radial direction of the capacitor until reaching 10N and then keep the force applied for 10±1 sec.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                  |   |      |   |       |   |      |   |       |   |      |
|                         |                                                         | Bending Strength                        | Termination not to be broken or loosened                                                                            |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
| 10                      | Vibration Resistance                                    | Appearance                              | No defects or abnormalities                                                                                         |                                                                           | <p>The capacitor is soldered securely to a supporting terminal and a 10 to 55Hz vibration of 1.5mm peak-peak amplitude is applied for 6 hrs. total, 2 hrs. in each mutually perpendicular direction. Allow 1 min. to cycle the frequency from 10Hz to 55Hz and the converse.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |      |   |       |   |      |   |       |   |      |
|                         |                                                         | Capacitance                             | Within the specified tolerance                                                                                      |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
|                         |                                                         | Q/D.F.                                  | 30pF min.: Q≥1,000<br>30pF max.: Q≥400+20C<br>C: Nominal capacitance (pF)                                           | Char. X7R: 0.025 max.<br>Char. F, Y5V: 0.05 max.<br>Char. X7S: 0.125 max. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
| 11                      | Solderability of Leads                                  |                                         | Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction. |                                                                           | <p>The terminal of a capacitor is dipped into a 25% ethanol (JIS-K-8101) solution of rosin (JIS-K-5902) and then into molten solder for 2±0.5 sec. In both cases the depth of dipping is up to about 1.5mm to 2mm from the terminal body.</p> <p>Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu)<br/>235±5°C H60A or H63A Eutectic Solder</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                  |   |      |   |       |   |      |   |       |   |      |
| 12                      | Resistance to Soldering Heat                            | Appearance                              | No defects or abnormalities                                                                                         |                                                                           | <p>The lead wire is immersed in the melted solder 1.5mm to 2mm from the main body at 350±10°C for 3.5±0.5 sec.</p> <p>The specified items are measured after 24±2 hrs.</p> <p>• Pretreatment (for high dielectric constant type)</p> <p>Perform a heat treatment at 150+0/-10°C for 1 hr., and then let sit at room temperature for 24±2 hrs.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |      |   |       |   |      |   |       |   |      |
|                         |                                                         | Capacitance Change                      | Within ±2.5% or ±0.25pF (whichever is larger)                                                                       | Char. X7R, X7S: Within ±10%<br>Char. F, Y5V: Within ±20%                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |
|                         |                                                         | Dielectric Strength (Between Terminals) | No defects                                                                                                          |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |      |   |       |   |      |   |       |   |      |

Continued on the following page. ➤

## Specifications and Test Methods

Continued from the preceding page.

| No.                                     | Item                                                                                                                                                                     |                                                                         | Specifications                                                                                                                                                             |                                                                         | Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|--------------|-------------------------------|-------------------------|---------------------------|---------------|---------------------------|-------------------------------|------------------------------|---------------------------|--------|---------------------------|------------|---------------------------|
|                                         |                                                                                                                                                                          |                                                                         | Temperature Compensating Type                                                                                                                                              | High Dielectric Constant Type                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| 13                                      | Temperature Cycle                                                                                                                                                        | Appearance                                                              | No defects or abnormalities                                                                                                                                                |                                                                         | <p>The capacitor should be subjected to 5 temperature cycles.</p> <p>Remove and set for 24±2 hrs. at room temperature, then measure.</p> <table><tr><th>Step</th><th>Temperature (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. ±3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>3 max.</td></tr><tr><td>3</td><td>Max. Operating Temp. ±3</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>3 max.</td></tr></table> <p>• Pretreatment (for high dielectric constant type)</p> <p>Perform a heat treatment at 150+0/-10°C for 1 hr., and then let sit at room temperature for 24±2 hrs.</p>                                                                                                                                                                                                                                                                                        | Step | Temperature (°C) | Time (min)   | 1                             | Min. Operating Temp. ±3 | 30±3                      | 2             | Room Temp.                | 3 max.                        | 3                            | Max. Operating Temp. ±3   | 30±3   | 4                         | Room Temp. | 3 max.                    |
|                                         |                                                                                                                                                                          | Step                                                                    | Temperature (°C)                                                                                                                                                           | Time (min)                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | 1                                                                       | Min. Operating Temp. ±3                                                                                                                                                    | 30±3                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | 2                                                                       | Room Temp.                                                                                                                                                                 | 3 max.                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | 3                                                                       | Max. Operating Temp. ±3                                                                                                                                                    | 30±3                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| 4                                       | Room Temp.                                                                                                                                                               | 3 max.                                                                  |                                                                                                                                                                            |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| Capacitance Change                      | Within ±5% or ±0.5pF (whichever is larger)                                                                                                                               | Char. X7R, X7S: Within ±12.5%<br>Char. F, Y5V: Within ±30%              |                                                                                                                                                                            |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| Q/D.F.                                  | 30pF min.: Q≥350<br>10pF to 30pF: Q≥275+5C/2<br>10pF max.: Q≥200+10C<br>C: Nominal capacitance (pF)                                                                      | Char. X7R: 0.05 max.<br>Char. F, Y5V: 0.075 max.<br>Char. X7S: 0.2 max. |                                                                                                                                                                            |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| Insulation Resistance                   | Rated Voltage: DC25V, DC50V, DC100V<br>1,000MΩ, 50MΩ • μF min. (whichever is smaller)<br>Rated Voltage: DC250V, DC630V<br>1,000MΩ, 10MΩ • μF min. (whichever is smaller) |                                                                         |                                                                                                                                                                            |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| Dielectric Strength (Between Terminals) | No defects or abnormalities                                                                                                                                              |                                                                         |                                                                                                                                                                            |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| 14                                      | Humidity (Steady State)                                                                                                                                                  | Appearance                                                              | No defects or abnormalities                                                                                                                                                |                                                                         | <p>Set the capacitor at 40±2°C and relative humidity of 90 to 95% for 500<sup>+24</sup><sub>0</sub> hrs.</p> <p>Remove and set for 24±2 hrs. at room temperature, then measure.</p> <p>• Pretreatment (for high dielectric constant type)</p> <p>Perform a heat treatment at 150+0/-10°C for 1 hr., and then let sit at room temperature for 24±2 hrs.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | Capacitance Change                                                      | Within ±5% or ±0.5pF (whichever is larger)                                                                                                                                 | Char. X7R, X7S: Within ±15%<br>Char. F, Y5V: Within ±30%                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | Q/D.F.                                                                  | 30pF min.: Q≥350<br>10pF to 30pF: Q≥275+5C/2<br>10pF max.: Q≥200+10C<br>C: Nominal capacitance (pF)                                                                        | Char. X7R: 0.05 max.<br>Char. F, Y5V: 0.075 max.<br>Char. X7S: 0.2 max. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | Insulation Resistance                                                   | Rated Voltage: DC25V, DC50V, DC100V<br>1,000MΩ, 50MΩ • μF min. (whichever is smaller)<br>Rated Voltage: DC250V, DC630V<br>1,000MΩ, 10MΩ • μF min. (whichever is smaller)   |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| 15                                      | Humidity Load                                                                                                                                                            | Appearance                                                              | No defects or abnormalities                                                                                                                                                |                                                                         | <p>Apply the rated voltage for 500<sup>+24</sup><sub>0</sub> hrs. at 40±2°C and in 90 to 95% humidity.</p> <p>Remove and set for 24±2 hrs. at room temperature, then measure.</p> <p>(Charge/Discharge current ≤50mA)</p> <p>• Pretreatment (for high dielectric constant type)</p> <p>Perform a heat treatment at 150+0/-10°C for 1 hr., and then let sit at room temperature for 24±2 hrs.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | Capacitance Change                                                      | Within ±7.5% or ±0.75pF (whichever is larger)                                                                                                                              | Char. X7R, X7S: Within ±15%<br>Char. F, Y5V: Within ±30%                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | Q/D.F.                                                                  | 30pF min.: Q≥200<br>30pF max.: Q≥100+10C/3<br>C: Nominal capacitance (pF)                                                                                                  | Char. X7R: 0.05 max.<br>Char. F, Y5V: 0.075 max.<br>Char. X7S: 0.2 max. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | Insulation Resistance                                                   | Rated Voltage: DC25V, DC50V, DC100V<br>500MΩ or 25MΩ • μF min. (whichever is smaller)<br>Rated Voltage: DC250V, DC630V<br>1,000MΩ or 10MΩ • μF min. (whichever is smaller) |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| 16                                      | High Temperature Load                                                                                                                                                    | Appearance                                                              | No defects or abnormalities                                                                                                                                                |                                                                         | <p>Apply voltage in Table for 1000<sup>+48</sup><sub>0</sub> hrs. at the maximum operating temperature±3°C.</p> <p>Remove and set for 24±2 hrs. at room temperature, then measure. (Charge/Discharge current ≤50mA)</p> <table><tr><th></th><th>Rated Voltage</th><th>Test Voltage</th></tr><tr><td rowspan="2">Temperature Compensating Type</td><td>DC50V, DC100V, DC250V</td><td>150% of the rated voltage</td></tr><tr><td>DC630V, DC1kV</td><td>120% of the rated voltage</td></tr><tr><td rowspan="4">High Dielectric Constant Type</td><td>DC25V, DC50V, DC100V, DC250V</td><td>150% of the rated voltage</td></tr><tr><td>DC630V</td><td>120% of the rated voltage</td></tr><tr><td>DC1kV</td><td>110% of the rated voltage</td></tr></table> <p>• Pretreatment (for high dielectric constant type)</p> <p>Apply test voltage for 1 hr., at test temperature.</p> <p>Remove and set for 24±2 hrs. at room temperature.</p> |      | Rated Voltage    | Test Voltage | Temperature Compensating Type | DC50V, DC100V, DC250V   | 150% of the rated voltage | DC630V, DC1kV | 120% of the rated voltage | High Dielectric Constant Type | DC25V, DC50V, DC100V, DC250V | 150% of the rated voltage | DC630V | 120% of the rated voltage | DC1kV      | 110% of the rated voltage |
|                                         |                                                                                                                                                                          |                                                                         | Rated Voltage                                                                                                                                                              | Test Voltage                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | Temperature Compensating Type                                           | DC50V, DC100V, DC250V                                                                                                                                                      | 150% of the rated voltage                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          |                                                                         | DC630V, DC1kV                                                                                                                                                              | 120% of the rated voltage                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | High Dielectric Constant Type                                           | DC25V, DC50V, DC100V, DC250V                                                                                                                                               | 150% of the rated voltage                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| DC630V                                  | 120% of the rated voltage                                                                                                                                                |                                                                         |                                                                                                                                                                            |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| DC1kV                                   | 110% of the rated voltage                                                                                                                                                |                                                                         |                                                                                                                                                                            |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| Capacitance Change                      | Within ±3% or ±0.3pF (whichever is larger)                                                                                                                               |                                                                         | Char. X7R, X7S: Within ±15%<br>(Rated Voltage: DC630V or less)<br>Within ±20%<br>(Rated Voltage: DC1kV)<br>Char. F, Y5V: Within ±30%                                       |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| Q/D.F.                                  | 30pF min.: Q≥350<br>10pF to 30pF: Q≥275+5C/2<br>10pF max.: Q≥200+10C<br>C: Nominal capacitance (pF)                                                                      | Char. X7R: 0.05 max.<br>Char. F, Y5V: 0.075 max.<br>Char. X7S: 0.2 max. |                                                                                                                                                                            |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| Insulation Resistance                   | Rated Voltage: DC25V, DC50V, DC100V<br>1,000MΩ, 50MΩ • μF min. (whichever is smaller)<br>Rated Voltage: DC250V, DC630V<br>1,000MΩ, 10MΩ • μF min. (whichever is smaller) |                                                                         |                                                                                                                                                                            |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
| 17                                      | Solvent Resistance                                                                                                                                                       | Appearance                                                              | No defects or abnormalities                                                                                                                                                |                                                                         | <p>The capacitor should be fully immersed, unagitated, in reagent at 20 to 25°C for 30±5 sec. and then removed gently. Marking on the surface of the capacitor should immediately be visually examined.</p> <p>Reagent:</p> <p>• Isopropyl alcohol</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |
|                                         |                                                                                                                                                                          | Marking                                                                 | Legible                                                                                                                                                                    |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |              |                               |                         |                           |               |                           |                               |                              |                           |        |                           |            |                           |

Table A

| Char. | Nominal Values (ppm/°C) *1 | Capacitance Change from 25°C (%) |       |       |       |       |       |
|-------|----------------------------|----------------------------------|-------|-------|-------|-------|-------|
|       |                            | -55°C                            |       | -30°C |       | -10°C |       |
|       |                            | Max.                             | Min.  | Max.  | Min.  | Max.  | Min.  |
| C0G   | 0±30                       | 0.58                             | -0.24 | 0.40  | -0.17 | 0.25  | -0.11 |
| U2J   | -750±120                   | 8.78                             | 5.04  | 6.04  | 3.47  | 3.84  | 2.21  |

\*1: Nominal values denote the temperature coefficient within a range of 25 to 125°C

Table B

| Char. | Temp. Range   | Reference Temp. | Cap. Change Rate |
|-------|---------------|-----------------|------------------|
| X7R   | -55 to +125°C | 25°C            | Within ±15%      |
| X7S   | -55 to +125°C |                 | Within ±22%      |
| Y5V   | -30 to + 85°C | 20°C            | Within ±33%      |
| F     | -25 to + 85°C |                 | Within ±38%      |

# Radial Lead Type Monolithic Ceramic Capacitors

**muRata**

## RDE Series Large Capacitance and High Allowable Ripple Current (For General Use Only) (DC250V-DC630V)

### ■ Features

1. Higher capacitance with DC-Bias; approximately 40% higher than X7R under loaded rated voltage.
2. Meet LF (Lead Free) and HF (Halogen Free)
3. Allowable higher ripple current
4. Reduces acoustic noise  
Approximately 15dB reduction in comparison to leaded X7R characteristics parts.  
Approximately 30dB reduction in comparison to SMD X7R characteristics part because the contact area is smaller than a SMD.

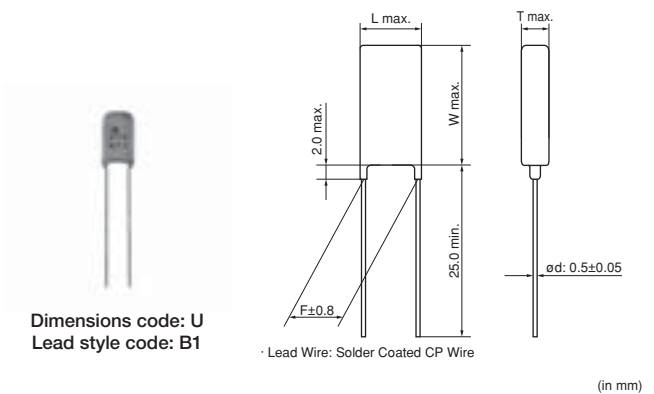
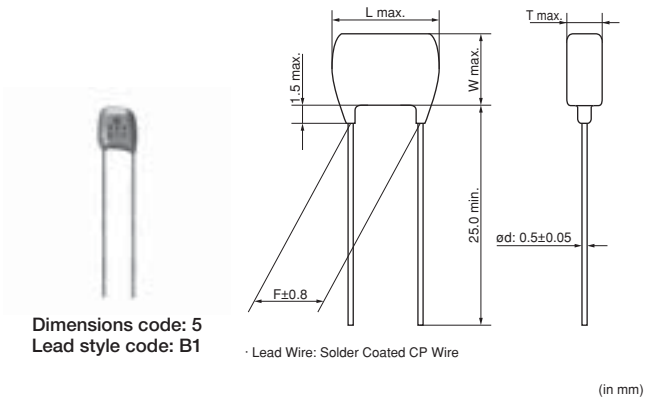
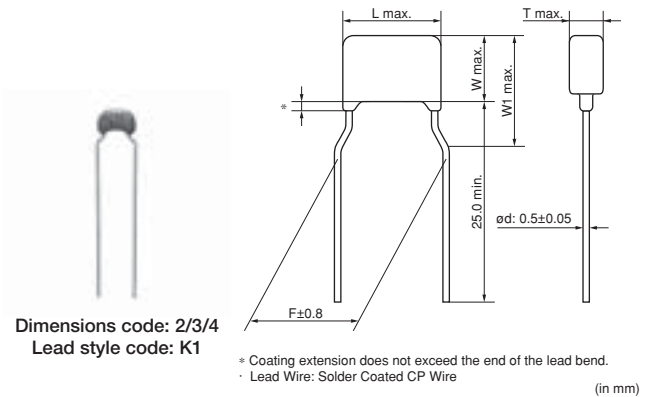
### ■ Applications

1. DC smoothing capacitor for LED bulb
2. PFC capacitor for general use SMPS
3. Replace Al-E capacitor for long-life equipment

### ■ Dimensions

| Dimensions and Lead Style Code | DC Rated Voltage | Dimensions (mm) |       |     |                                          |     |     |
|--------------------------------|------------------|-----------------|-------|-----|------------------------------------------|-----|-----|
|                                |                  | L               | W     | W1  | T                                        | F   | d   |
| <b>2K1/2M1</b>                 | 250V/450V/630V   | 5.5             | 4.0   | 6.0 | See the individual product specification | 5.0 | 0.5 |
| <b>3K1/3M1</b>                 | 250V/450V/630V   | 5.5             | 5.0   | 7.5 |                                          | 5.0 | 0.5 |
| <b>4K1/4M1</b>                 | 250V/450V/630V   | 7.5             | 5.5   | 8.0 |                                          | 5.0 | 0.5 |
| <b>5B1/5E1</b>                 | 250V/450V/630V   | 7.5             | 7.5*  | -   |                                          | 5.0 | 0.5 |
| <b>UB1/UE1</b>                 | 250V/450V/630V   | 7.7             | 12.5* | -   |                                          | 5.0 | 0.5 |

\*DC630V: W+0.5mm



## ■ Marking

| Dimensions<br>Code            | Rated Voltage | DC250V                                             | DC450V | DC630V |
|-------------------------------|---------------|----------------------------------------------------|--------|--------|
|                               | Temp. Char.   | X7T                                                |        |        |
| 2                             |               |                                                    |        |        |
| 3, 8                          |               |                                                    |        |        |
| 5, U                          |               |                                                    |        |        |
| Temperature Characteristics   |               | Marked with code (X7T char.: 7)                    |        |        |
| Nominal Capacitance           |               | Marked with 3 figures                              |        |        |
| Capacitance Tolerance         |               | Marked with code                                   |        |        |
| Rated Voltage                 |               | Marked with code (DC250V: 4, DC450V: 9, DC630V: 7) |        |        |
| Manufacturer's Identification |               | Marked with                                        |        |        |

4

## High Dielectric Constant Type, X7T Characteristics

| Part Number        | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|--------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| RDED72E333K2□□H03□ | X7T (EIA)      | 250Vdc           | 33000pF±10% | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDED72E473K2□□H03□ | X7T (EIA)      | 250Vdc           | 47000pF±10% | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDED72E683K2□□H03□ | X7T (EIA)      | 250Vdc           | 68000pF±10% | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDED72E104K3□□H03□ | X7T (EIA)      | 250Vdc           | 0.10μF±10%  | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDED72E154K3□□H03□ | X7T (EIA)      | 250Vdc           | 0.15μF±10%  | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDED72E224K4□□H03□ | X7T (EIA)      | 250Vdc           | 0.22μF±10%  | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDED72E334K4□□H03□ | X7T (EIA)      | 250Vdc           | 0.33μF±10%  | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDED72E474K5□□H03□ | X7T (EIA)      | 250Vdc           | 0.47μF±10%  | 7.5×7.5                   | 4.5                    | 5.0                     | B1                         | E1                           |
| RDED72E684K5□□H03□ | X7T (EIA)      | 250Vdc           | 0.68μF±10%  | 7.5×7.5                   | 4.5                    | 5.0                     | B1                         | E1                           |
| RDED72E105K5□□H03□ | X7T (EIA)      | 250Vdc           | 1.0μF±10%   | 7.5×7.5                   | 4.5                    | 5.0                     | B1                         | E1                           |
| RDED72E225MU□□H03□ | X7T (EIA)      | 250Vdc           | 2.2μF±20%   | 7.7×12.5                  | 4.5                    | 5.0                     | B1                         | E1                           |
| RDED72W103K2□□H03□ | X7T (EIA)      | 450Vdc           | 10000pF±10% | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDED72W153K2□□H03□ | X7T (EIA)      | 450Vdc           | 15000pF±10% | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDED72W223K2□□H03□ | X7T (EIA)      | 450Vdc           | 22000pF±10% | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDED72W333K2□□H03□ | X7T (EIA)      | 450Vdc           | 33000pF±10% | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDED72W473K2□□H03□ | X7T (EIA)      | 450Vdc           | 47000pF±10% | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDED72W683K3□□H03□ | X7T (EIA)      | 450Vdc           | 68000pF±10% | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDED72W104K3□□H03□ | X7T (EIA)      | 450Vdc           | 0.10μF±10%  | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDED72W154K4□□H03□ | X7T (EIA)      | 450Vdc           | 0.15μF±10%  | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDED72W224K5□□H03□ | X7T (EIA)      | 450Vdc           | 0.22μF±10%  | 7.5×7.5                   | 4.5                    | 5.0                     | B1                         | E1                           |
| RDED72W334K5□□H03□ | X7T (EIA)      | 450Vdc           | 0.33μF±10%  | 7.5×7.5                   | 4.5                    | 5.0                     | B1                         | E1                           |
| RDED72W474K5□□H03□ | X7T (EIA)      | 450Vdc           | 0.47μF±10%  | 7.5×7.5                   | 4.5                    | 5.0                     | B1                         | E1                           |
| RDED72W564K5□□H03□ | X7T (EIA)      | 450Vdc           | 0.56μF±10%  | 7.5×7.5                   | 4.5                    | 5.0                     | B1                         | E1                           |
| RDED72W105MU□□H03□ | X7T (EIA)      | 450Vdc           | 1.0μF±20%   | 7.7×12.5                  | 4.5                    | 5.0                     | B1                         | E1                           |
| RDED72W125MU□□H03□ | X7T (EIA)      | 450Vdc           | 1.2μF±20%   | 7.7×12.5                  | 4.5                    | 5.0                     | B1                         | E1                           |
| RDED72J103K2□□H03□ | X7T (EIA)      | 630Vdc           | 10000pF±10% | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDED72J153K2□□H03□ | X7T (EIA)      | 630Vdc           | 15000pF±10% | 5.5×4.0                   | 3.15                   | 5.0                     | K1                         | M1                           |
| RDED72J223K3□□H03□ | X7T (EIA)      | 630Vdc           | 22000pF±10% | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDED72J333K3□□H03□ | X7T (EIA)      | 630Vdc           | 33000pF±10% | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDED72J473K3□□H03□ | X7T (EIA)      | 630Vdc           | 47000pF±10% | 5.5×5.0                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDED72J683K4□□H03□ | X7T (EIA)      | 630Vdc           | 68000pF±10% | 7.5×5.5                   | 4.0                    | 5.0                     | K1                         | M1                           |
| RDED72J104K5□□H03□ | X7T (EIA)      | 630Vdc           | 0.10μF±10%  | 7.5×8.0                   | 4.5                    | 5.0                     | B1                         | E1                           |
| RDED72J154K5□□H03□ | X7T (EIA)      | 630Vdc           | 0.15μF±10%  | 7.5×8.0                   | 4.5                    | 5.0                     | B1                         | E1                           |

Continued on the following page.

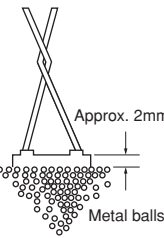
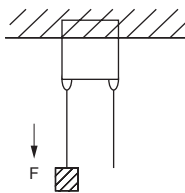
Continued from the preceding page.

| Part Number               | Temp.<br>Char. | Rated<br>Voltage | Capacitance | Dimensions<br>LxW<br>(mm) | Dimension<br>T<br>(mm) | Lead Space<br>F<br>(mm) | Lead Style<br>Code<br>Bulk | Lead Style<br>Code<br>Taping |
|---------------------------|----------------|------------------|-------------|---------------------------|------------------------|-------------------------|----------------------------|------------------------------|
| <b>RDED72J224K5□□H03□</b> | X7T (EIA)      | 630Vdc           | 0.22μF±10%  | 7.5×8.0                   | 4.5                    | 5.0                     | B1                         | E1                           |
| <b>RDED72J274K5□□H03□</b> | X7T (EIA)      | 630Vdc           | 0.27μF±10%  | 7.5×8.0                   | 4.5                    | 5.0                     | B1                         | E1                           |
| <b>RDED72J474MU□□H03□</b> | X7T (EIA)      | 630Vdc           | 0.47μF±20%  | 7.7×13.0                  | 4.5                    | 5.0                     | B1                         | E1                           |
| <b>RDED72J564MU□□H03□</b> | X7T (EIA)      | 630Vdc           | 0.56μF±20%  | 7.7×13.0                  | 4.5                    | 5.0                     | B1                         | E1                           |

Two blank columns are filled with the lead style code. Please refer to the 3 columns on the right for the appropriate code.

The last blank column is filled with the packaging code. (B: bulk, A: ammo pack)

## Specifications and Test Methods

| No.    | Item                                    |                   | Specifications                                         | Test Method                                                                                                                                                                                                                                                                                                                                                                                                                |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
|--------|-----------------------------------------|-------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|--------|---------------------------|--------|---------------------------|--------|---------------------------|---|-------|---|------|
| 1      | Operating Temperature Range             |                   | -55 to +125°C                                          | —                                                                                                                                                                                                                                                                                                                                                                                                                          |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 2      | Appearance                              |                   | No defects or abnormalities                            | Visual inspection                                                                                                                                                                                                                                                                                                                                                                                                          |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 3      | Dimension and Marking                   |                   | See previous pages                                     | Visual inspection, Vernier Caliper                                                                                                                                                                                                                                                                                                                                                                                         |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 4      | Dielectric Strength                     | Between Terminals | No defects or abnormalities                            | <p>The capacitor should not be damaged when voltage in Table is applied between the terminations for 1 to 5 sec.<br/>(Charge/Discharge current ≤ 50mA)</p> <table><tr><th>Rated Voltage</th><th>Test Voltage</th></tr><tr><td>DC250V</td><td>200% of the rated voltage</td></tr><tr><td>DC450V</td><td>150% of the rated voltage</td></tr><tr><td>DC630V</td><td>120% of the rated voltage</td></tr></table>               | Rated Voltage | Test Voltage     | DC250V | 200% of the rated voltage | DC450V | 150% of the rated voltage | DC630V | 120% of the rated voltage |   |       |   |      |
|        |                                         | Rated Voltage     | Test Voltage                                           |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| DC250V | 200% of the rated voltage               |                   |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| DC450V | 150% of the rated voltage               |                   |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| DC630V | 120% of the rated voltage               |                   |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
|        |                                         | Body Insulation   | No defects or abnormalities                            | <p>The capacitor is placed in a container with metal balls of 1mm diameter so that each terminal, short-circuit, is kept approximately 2mm from the balls as shown in the figure, and 200% of the rated DC voltage is impressed for 1 to 5 sec. between capacitor terminals and metal balls.<br/>(Charge/Discharge current ≤ 50mA)</p>  |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 5      | Insulation Resistance                   | Between Terminals | More than 10,000MΩ or 100MΩ · μF, Whichever is smaller | <p>The insulation resistance should be measured with DC500±50V (DC250±25V in case of rated voltage: DC250V,DC450V) at normal temperature and humidity and within 2 min. of charging.<br/>(Charge/Discharge current ≤ 50mA)</p>                                                                                                                                                                                             |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 6      | Capacitance                             |                   | Within the specified tolerance                         | <p>The capacitance/D.F. should be measured at the frequency of 1±0.1kHz and a voltage of AC1±0.2V(r.m.s.).</p>                                                                                                                                                                                                                                                                                                             |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 7      | Dissipation Factor (D.F.)               |                   | 0.01 max.                                              |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 8      | Capacitance Temperature Characteristics |                   | Within +22/-33%                                        | <p>The capacitance change should be measured after 5 min. at each specified temperature stage.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>25±2</td></tr><tr><td>2</td><td>-55±3</td></tr><tr><td>3</td><td>25±2</td></tr><tr><td>4</td><td>125±3</td></tr><tr><td>5</td><td>25±2</td></tr></table>                                                                                        | Step          | Temperature (°C) | 1      | 25±2                      | 2      | -55±3                     | 3      | 25±2                      | 4 | 125±3 | 5 | 25±2 |
| Step   | Temperature (°C)                        |                   |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 1      | 25±2                                    |                   |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 2      | -55±3                                   |                   |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 3      | 25±2                                    |                   |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 4      | 125±3                                   |                   |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 5      | 25±2                                    |                   |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 9      | Terminal Strength                       | Tensile Strength  | Termination not to be broken or loosened               | <p>As in the figure, fix the capacitor body, apply the force gradually to each lead in the radial direction of the capacitor until reaching 10N and then keep the force applied for 10±1 sec.</p>                                                                                                                                     |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
|        |                                         | Bending Strength  | Termination not to be broken or loosened               | <p>Each lead wire should be subjected to a force of 2.5N and then bent 90° at the point of egress in one direction. Each wire is then returned to the original position and bent 90° in the opposite direction at the rate of one bend per 2 to 3 sec.</p>                                                                                                                                                                 |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
| 10     | Vibration Resistance                    | Appearance        | No defects or abnormalities                            | <p>The capacitor should be firmly soldered to the supporting lead wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in total amplitude, with about a 1 minute rate of vibration change from 10Hz to 55Hz and back to 10Hz. Apply for a total of 6 hrs., 2 hrs. each in 3 mutually perpendicular directions.</p>                                                                                                  |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
|        |                                         | Capacitance       | Within the specified tolerance                         |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |
|        |                                         | D.F.              | 0.01 max.                                              |                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |        |                           |        |                           |        |                           |   |       |   |      |

Continued on the following page. ➤

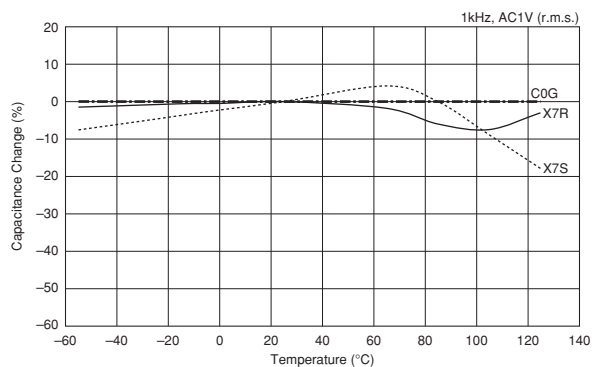
## Specifications and Test Methods

Continued from the preceding page.

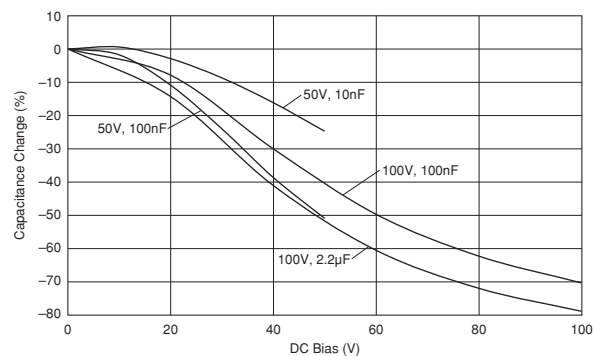
| No.                                     | Item                                                    |                                         | Specifications                                                                                                      | Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|-----------------------------------------|---------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|------------|---------------------------|--------|---------------------------|--------|---------------------------|--------|---|-------|------|---|------------|--------|
| 11                                      | Solderability of Leads                                  |                                         | Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction. | The terminal of a capacitor is dipped into a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion) and then into molten solder (JIS-Z-3282) for 2±0.5 sec. In both cases the depth of dipping is up to about 1.5 to 2mm from the terminal body.<br>Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu)<br>235±5°C H60A or H63A Eutectic Solder                                                                                                                                                                              |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| 12                                      | Resistance to Soldering Heat                            | Appearance                              | No defects or abnormalities                                                                                         | The lead wire is immersed in the melted solder 1.5 to 2mm from the main body at 350±10°C for 3.5±0.5 sec. The specified items are measured after 24±2 hrs.<br><br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1 hr., and then let sit at room temperature for 24±2 hrs.                                                                                                                                                                                                                                                                             |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | Capacitance Change                      | Within ±10%                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | Dielectric Strength (Between Terminals) | No defects                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| 13                                      | Temperature Cycle                                       | Appearance                              | No defects or abnormalities                                                                                         | The capacitor should be subjected to 5 temperature cycles. <table><tr><th>Step</th><th>Temperature (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>-55±3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>3 max.</td></tr><tr><td>3</td><td>125±3</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>3 max.</td></tr></table><br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1 hr., and then let sit at room temperature for 24±2 hrs.                                                                                         | Step          | Temperature (°C) | Time (min) | 1                         | -55±3  | 30±3                      | 2      | Room Temp.                | 3 max. | 3 | 125±3 | 30±3 | 4 | Room Temp. | 3 max. |
|                                         |                                                         | Step                                    | Temperature (°C)                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Time (min)    |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | 1                                       | -55±3                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 30±3          |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | 2                                       | Room Temp.                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3 max.        |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | 3                                       | 125±3                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 30±3          |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| 4                                       | Room Temp.                                              | 3 max.                                  |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| Capacitance Change                      | Within ±7.5%                                            |                                         |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| D.F.                                    | 0.01 max.                                               |                                         |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| Insulation Resistance                   | More than 10,000MΩ or 100MΩ · μF (Whichever is smaller) |                                         |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| Dielectric Strength (Between Terminals) | No defects or abnormalities                             |                                         |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| 14                                      | Humidity (Steady State)                                 | Appearance                              | No defects or abnormalities                                                                                         | Set the capacitor at 40±2°C and relative humidity of 90 to 95% for 500 $\pm^{24}_0$ hrs. Remove and set for 24±2 hrs. at room temperature, then measure.<br><br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1 hr., and then let sit at room temperature for 24±2 hrs.                                                                                                                                                                                                                                                                               |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | Capacitance Change                      | Within ±12.5%                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | D.F.                                    | 0.02 max.                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | Insulation Resistance                   | More than 1,000MΩ or 10MΩ · μF (Whichever is smaller)                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| 15                                      | Humidity Load                                           | Appearance                              | No defects or abnormalities                                                                                         | Apply the rated voltage at 40±2°C and relative humidity of 90 to 95% for 500 $\pm^{24}_0$ hrs. Remove and set for 24±2 hrs. at room temperature, then measure. (Charge/Discharge current ≤ 50mA)<br><br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1 hr., and then let sit at room temperature for 24±2 hrs.                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | Capacitance Change                      | Within ±12.5%                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | D.F.                                    | 0.02 max.                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | Insulation Resistance                   | More than 1,000MΩ or 10MΩ · μF (Whichever is smaller)                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| 16                                      | High Temperature Load                                   | Appearance                              | No defects or abnormalities                                                                                         | Apply voltage in Table for 1000 $\pm^{48}_0$ hrs. at the maximum operating temperature. Remove and set for 24±2 hrs. at room temperature, then measure. (Charge/Discharge current ≤ 50mA) <table><tr><th>Rated Voltage</th><th>Test Voltage</th></tr><tr><td>DC250V</td><td>150% of the rated voltage</td></tr><tr><td>DC450V</td><td>130% of the rated voltage</td></tr><tr><td>DC630V</td><td>120% of the rated voltage</td></tr></table><br>• Pretreatment<br>Apply test voltage for 1 hr., at test temperature. Remove and set for 24±2 hrs. at room temperature. | Rated Voltage | Test Voltage     | DC250V     | 150% of the rated voltage | DC450V | 130% of the rated voltage | DC630V | 120% of the rated voltage |        |   |       |      |   |            |        |
|                                         |                                                         | Rated Voltage                           | Test Voltage                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | DC250V                                  | 150% of the rated voltage                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | DC450V                                  | 130% of the rated voltage                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| DC630V                                  | 120% of the rated voltage                               |                                         |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| Capacitance Change                      | Within ±12.5%                                           |                                         |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| D.F.                                    | 0.02 max.                                               |                                         |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| Insulation Resistance                   | More than 1,000MΩ or 10MΩ · μF (Whichever is smaller)   |                                         |                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
| 17                                      | Solvent Resistance                                      | Appearance                              | No defects or abnormalities                                                                                         | The capacitor should be fully immersed, unagitated, in reagent at 20 to 25°C for 30±5 sec. and then removed gently. Marking on the surface of the capacitor should immediately be visually examined.<br>Reagent :<br>• Isopropyl alcohol                                                                                                                                                                                                                                                                                                                              |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |
|                                         |                                                         | Marking                                 | Legible                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |            |                           |        |                           |        |                           |        |   |       |      |   |            |        |

## RCE Series Characteristics Reference Data (Typical Example)

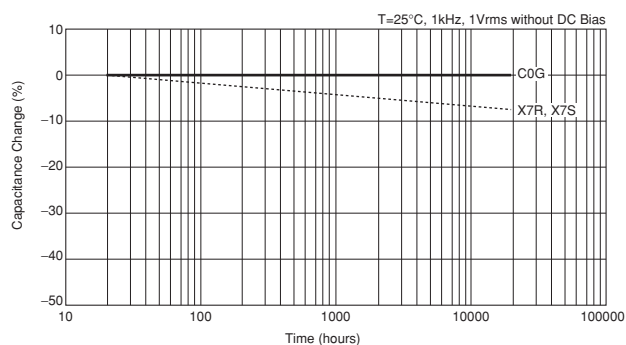
### ■ Capacitance - Temperature Characteristics



### ■ Capacitance - DC Voltage Characteristics



### ■ Capacitance Change - Aging

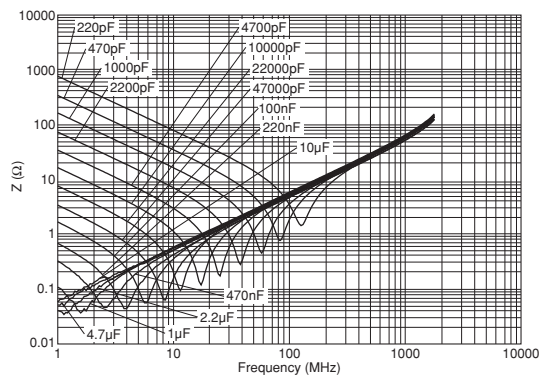


### ■ Impedance - Frequency Characteristics

Temperature Compensating Type



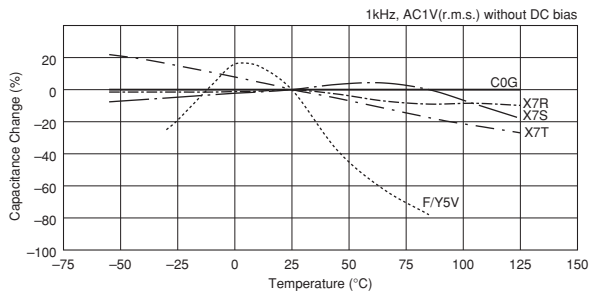
High Dielectric Constant Type





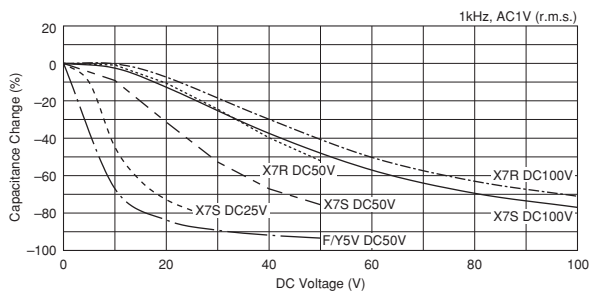
## RDE Series Characteristics Reference Data (Typical Example)

### ■ Capacitance - Temperature Characteristics

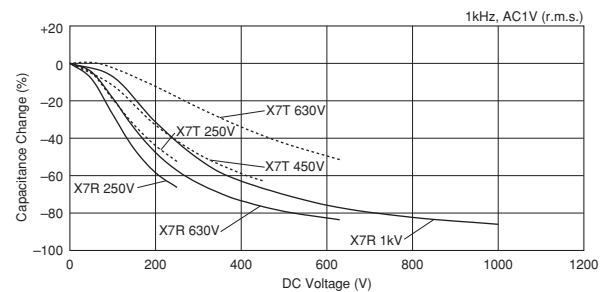


### ■ Capacitance - DC Voltage Characteristics

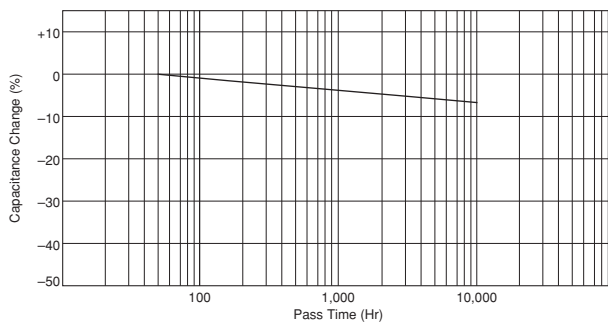
Rated Voltage: DC25V to DC100V



Rated Voltage: DC250V to DC1kV

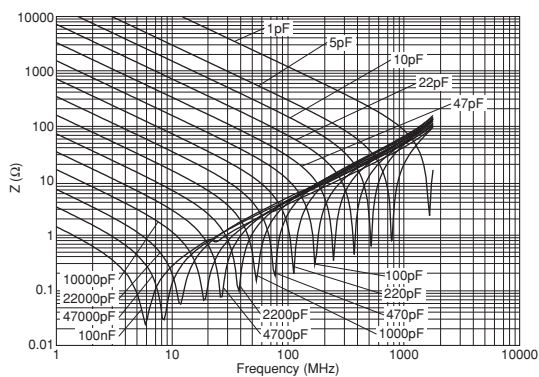


### ■ Capacitance Change - Aging

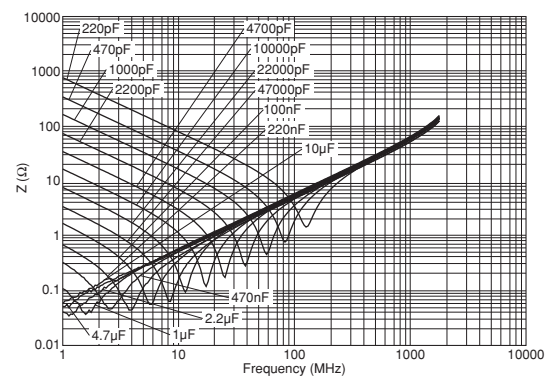


### ■ Impedance - Frequency Characteristics

Temperature Compensating Type



High Dielectric Constant Type



## Packaging

### ■ Packaging

Two types of packaging for monolithic ceramic capacitors are available.

#### 1. Bulk Packaging

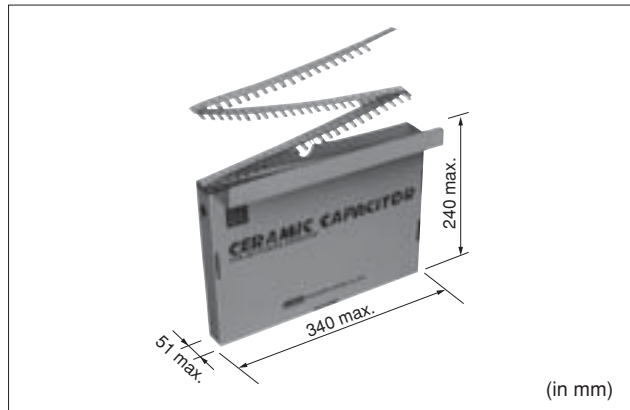
Minimum Quantity

| Dimensions Code | Dimensions (L×W)                                                  | Minimum Quantity (pcs./Bag) |
|-----------------|-------------------------------------------------------------------|-----------------------------|
| 0               | 3.6×3.5mm or 4.0×3.5mm or 5.0×3.5mm (Depends on Part Number List) | 500                         |
| 1               | 4.0×3.5mm or 4.5×3.5mm or 5.0×3.5mm (Depends on Part Number List) |                             |
| 2               | 5.5×4.0mm                                                         |                             |
| 3               | 5.5×5.0mm                                                         |                             |
| 4               | 7.5×5.5mm                                                         |                             |
| 5               | 7.5×7.5mm (DC630V: 7.5×8.0mm)                                     |                             |
| W               | 5.5×7.5mm or 6.0×8.0mm (Depends on Part Number List)              |                             |
| U               | 7.7×12.5mm (DC630V: 7.7×13.0mm)                                   | 200                         |

Please order with an integral multiple of the minimum quantity above.

#### 2. Tape Carrier Packaging

##### (1) Dimensions of Ammo Pack



##### (2) Minimum Quantity

| Dimensions Code | Dimensions (L×W)                                                  | Minimum Quantity (pcs./Ammo Pack) |
|-----------------|-------------------------------------------------------------------|-----------------------------------|
| 0               | 4.0×3.5mm or 5.0×3.5mm (Depends on Part Number List)              | 2000*1                            |
| 1               | 4.0×3.5mm or 4.5×3.5mm or 5.0×3.5mm (Depends on Part Number List) |                                   |
| 2               | 5.5×4.0mm                                                         |                                   |
| 3               | 5.5×5.0mm                                                         |                                   |
| 5               | 7.5×7.5mm (DC630V: 7.5×8.0mm)                                     | 2000*2                            |
| 6               | 10.0×10.0mm                                                       | 1500                              |
| 8               | 7.5×5.5mm                                                         |                                   |
| W               | 5.5×7.5mm or 6.0×8.0mm (Depends on Part Number List)              | 1000*3                            |
| U               | 7.7×12.5mm (DC630V: 7.7×13.0mm)                                   |                                   |

Please order with an integral multiple of the minimum quantity above.

\*1 1500 pcs. for **RDER71H335K3□□C03A**, **RDEC71E226K3□□C03A**, **RDEC72A155K3□□C03A**, **RDEC72A225K3□□C03A**

(Two blank columns are filled with the lead style code.)

\*2 1500 pcs. for **RDE Series**

\*3 1500 pcs. for **RDED72W105MUE1H03A**, **RDER72E105MUE1H03A**, **RDER72J474MUE1K03A**

"Minimum Quantity" means the numbers of units of each delivery or order. The quantity should be an integral multiple of the "minimum quantity." (Please note that the actual delivery quantity in a package may change sometimes.)

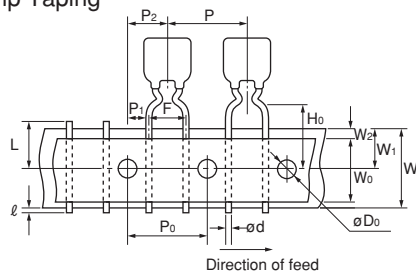
Continued on the following page.

## Packaging

Continued from the preceding page.

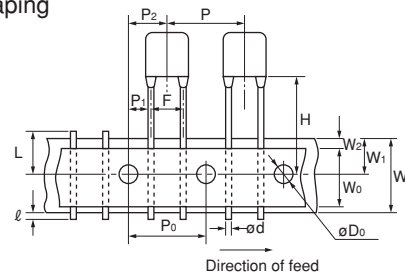
### Taping Dimensions

#### Inside Crimp Taping



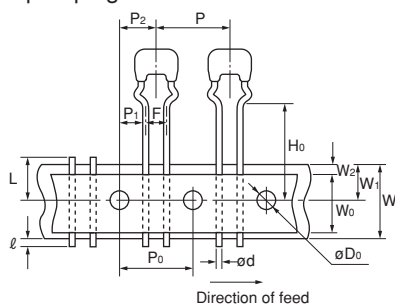
| Dimensions and Lead style code | Dimensions (L×W)                                        |
|--------------------------------|---------------------------------------------------------|
| 0M1                            | 3.6×3.5mm or 4.0×3.5mm                                  |
| 1M1                            | 4.0×3.5mm or 4.5×3.5mm<br>(Depends on Part Number List) |
| 2M1                            | 5.5×4.0mm                                               |
| 2M2                            |                                                         |
| 3M1                            | 5.5×5.0mm                                               |
| 3M2                            |                                                         |
| 4M1                            | 7.5×5.5mm                                               |
| 4M2                            |                                                         |
| WM1                            | 5.5×7.5mm                                               |

#### Straight Taping



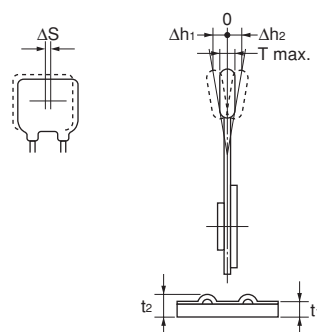
| Dimensions and Lead style code | Dimensions (L×W)                          |
|--------------------------------|-------------------------------------------|
| 0DB                            | 3.6×3.5mm                                 |
| 1DB                            | 4.0×3.5mm                                 |
| 2DB                            | 5.5×4.0mm                                 |
| 3DB                            | 5.5×5.0mm                                 |
| 5E1                            | 7.5×7.5mm<br>(DC630V, DC1kV: 7.5×8.0mm)   |
| 5E2                            |                                           |
| UE1                            | 7.7×12.5mm<br>(DC630V, DC1kV: 7.7×13.0mm) |

#### Outside Crimp Taping



| Dimensions and Lead style code | Dimensions (L×W) |
|--------------------------------|------------------|
| 0S1                            | 5.0×3.5mm        |
| 1S1                            |                  |
| 2S1                            | 5.5×4.0mm        |
| 2S2                            |                  |
| 3S1                            | 5.5×5.0mm        |
| 3S2                            |                  |

| Item                                             | Code       | Dimensions (mm)                                                                           |
|--------------------------------------------------|------------|-------------------------------------------------------------------------------------------|
| Pitch of Component                               | P          | 12.7±1.0                                                                                  |
| Pitch of Sprocket Hole                           | P0         | 12.7±0.2                                                                                  |
| Lead Spacing                                     | F          | 2.5 <sup>+0.4</sup> <sub>-0.2</sub> (DB) (S1) (S2)<br>5.0 <sup>+0.6</sup> <sub>-0.2</sub> |
| Length from Hole Center to Component Center      | P2         | 6.35±1.3                                                                                  |
| Length from Hole Center to Lead                  | P1         | 3.85±0.7<br>5.1±0.7 (DB) (S1) (S2)<br>254±1.5 Total length of components pitch X 20       |
| Body Dimension                                   |            | Depends on Part Number List                                                               |
| Deviation Along Tape, Left or Right Defect       | ΔS         | ±2.0                                                                                      |
| Carrier Tape Width                               | W          | 18.0±0.5                                                                                  |
| Position of Sprocket Hole                        | W1         | 9.0 <sup>+0</sup> <sub>-0.5</sub>                                                         |
| Lead Distance between Reference and Bottom Plane | H0         | 16.0±0.5 (M1) (S1)<br>20.0±0.5 (M2) (S2)                                                  |
| For Straight Lead Type                           | H          | 20±0.5 (E2), 17.5±0.5 (E1), 16±0.5 (DB)                                                   |
| Diameter of Sprocket Hole                        | D0         | 4.0±0.1                                                                                   |
| Lead Diameter                                    | d          | 0.5±0.05                                                                                  |
| Total Tape Thickness                             | t1         | 0.6±0.3                                                                                   |
| Total Thickness of Tape and Lead Wire            | t2         | 1.5 max.                                                                                  |
| Body Thickness                                   | T          | Depends on Part Number List                                                               |
| Deviation Across Tape                            | Δh1<br>Δh2 | 1.0 max.<br>(Dimensions code W, U: 2.0 max.)                                              |
| Portion to Cut in Case of Defect                 | L          | 11.0 <sup>+0</sup> <sub>-1.0</sub>                                                        |
| Protrusion Length                                | ℓ          | 0.5 max.                                                                                  |
| Hold Down Tape Width                             | W0         | 9.5 min.                                                                                  |
| Hold Down Tape Position                          | W2         | 1.5±1.5                                                                                   |
| Coating Extension                                |            | Depends on Dimensions                                                                     |



## ⚠Caution

### ■ ⚠Caution (Storage and Operating Condition)

#### Operating and storage environment

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. Also avoid exposure to moisture. Before cleaning, bonding or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended

equipment. Store the capacitors where the temperature and relative humidity do not exceed 5 to 40 degrees centigrade and 20 to 70%.  
Use capacitors within 6 months after delivery.

FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

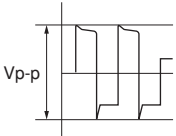
### ■ ⚠Caution (Rating)

#### 1. Operating Voltage

When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the  $V_{p-p}$  value of the applied voltage or the  $V_{0-p}$  which contains DC bias within the rated voltage range.

When the voltage is applied to the circuit, starting or stopping may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.

When DC-rated capacitors are to be used in input circuits from commercial power source (AC filter), be sure to use Safety Recognized Capacitors because various regulations on withstand voltage or impulse withstand established for all equipment should be taken into consideration.

| Voltage                | DC Voltage                                                                          | DC+AC Voltage                                                                       | AC Voltage                                                                          | Pulse Voltage (1)                                                                     | Pulse Voltage (2)                                                                     |
|------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Positional Measurement |  |  |  |  |  |

#### 2. Operating Temperature and Self-generated Heat

Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself. When the capacitor is used in a high-frequency current, pulse current or similar current, it may have self-generated heat due to dielectric loss. In the case of "High Dielectric Constant Type Capacitors," applied voltage load should be such that self-generated heat is within 20 °C under the condition where the capacitor is subjected at an atmosphere temperature of 25 °C. Please contact us if self-generated heat occurs with "Temperature Compensating Type Capacitors".  
When measuring, use a thermocouple of small thermal capacity -K of ø0.1mm under conditions where the capacitor is not affected by radiant heat from other components or wind from surroundings. Excessive heat may lead to deterioration of the capacitor's characteristics and reliability. Never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.

#### 3. Fail-Safe

Be sure to provide an appropriate fail-safe function on your product to prevent a second damage that may be caused by the abnormal function or the failure of our product.

FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

## ⚠Caution

### ■ ⚠Caution (Soldering and Mounting)

#### 1. Vibration and impact

Do not expose a capacitor or its leads to excessive shock or vibration during use.

#### 2. Soldering

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.

#### 3. Bonding, resin molding and coating

In case of bonding, molding or coating this product, verify that these processes do not affect the quality of the capacitor by testing the performance of the bonded, molded or coated product in the intended equipment.

In case the amount of application, dryness/hardening conditions of adhesives and molding resins

containing organic solvents (ethyl acetate, methyl ethyl ketone, toluene, etc.) are unsuitable, the outer coating resin of a capacitor may be damaged by the organic solvents and may result, worst case, in a short circuit.

The variation in thickness of adhesive or molding resin or coating may cause an outer coating resin cracking and/or ceramic element cracking of a capacitor in a temperature cycling.

#### 4. Treatment after bonding, resin molding and coating

When the outer coating is hot (over 100 degrees centigrade) after soldering, it becomes soft and fragile, so please be careful not to give it mechanical stress.

FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

### ■ ⚠Caution (Handling)

#### Vibration and impact

Do not expose a capacitor or its leads to excessive shock or vibration during use.

FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

## Notice

### ■ Notice (Rating)

Capacitance change of capacitor

In case of F/X7R/X7S/X7T/X8L/Y5V char.

Capacitors have an aging characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor is left on for a long time. Moreover, capacitance might change greatly depending on the surrounding temperature or an applied voltage.

### ■ Notice (Soldering and Mounting)

#### 1. Cleaning (ultrasonic cleaning)

To perform ultrasonic cleaning, observe the following conditions.

Rinse bath capacity: Output of 20 watts per liter or less.

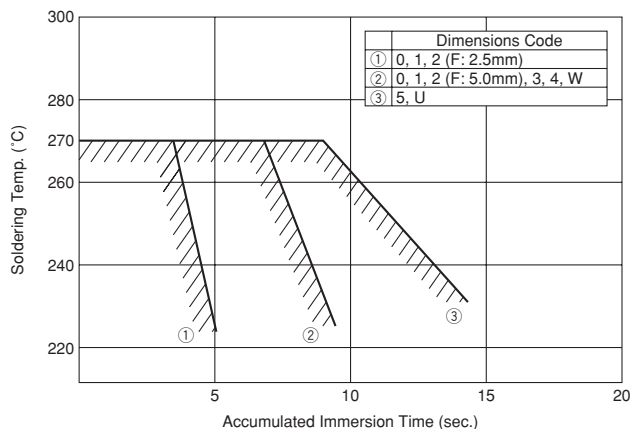
Rinsing time: 5 min. maximum.

Do not vibrate the PCB/PWB directly.

Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires.

#### 2. Soldering and Mounting

##### (1) Allowable Conditions for Soldering Temperature and Time



Perform soldering within tolerance range (shaded portion).

##### (2) Insertion of the Lead Wire

- When soldering, insert the lead wire into the PCB without mechanically stressing the lead wire.
- Insert the lead wire into the PCB with a distance appropriate to the lead space.

⚠Note:

1. Export Control

<For customers outside Japan>

No Murata products should be used or sold, through any channels, for use in the design, development, production, utilization, maintenance or operation of, or otherwise contribution to (1) any weapons (Weapons of Mass Destruction [nuclear, chemical or biological weapons or missiles] or conventional weapons) or (2) goods or systems specially designed or intended for military end-use or utilization by military end-users.

<For customers in Japan>

For products which are controlled items subject to the "Foreign Exchange and Foreign Trade Law" of Japan, the export license specified by the law is required for export.

2. Please contact our sales representatives or product engineers before using the products in this catalog for the applications listed below, which require especially high reliability for the prevention of defects which might directly damage a third party's life, body or property, or when one of our products is intended for use in applications other than those specified in this catalog.

- |                             |                                                                                                      |
|-----------------------------|------------------------------------------------------------------------------------------------------|
| ① Aircraft equipment        | ② Aerospace equipment                                                                                |
| ③ Undersea equipment        | ④ Power plant equipment                                                                              |
| ⑤ Medical equipment         | ⑥ Transportation equipment (vehicles, trains, ships, etc.)                                           |
| ⑦ Traffic signal equipment  | ⑧ Disaster prevention / crime prevention equipment                                                   |
| ⑨ Data-processing equipment | ⑩ Application of similar complexity and/or reliability requirements to the applications listed above |

3. Product specifications in this catalog are as of January 2014. They are subject to change or our products in it may be discontinued without advance notice.

Please check with our sales representatives or product engineers before ordering. If there are any questions, please contact our sales representatives or product engineers.

4. Please read rating and ⚠CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.

5. This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

6. Please note that unless otherwise specified, we shall assume no responsibility whatsoever for any conflict or dispute that may occur in connection with the effect of our and/or a third party's intellectual property rights and other related rights in consideration of your use of our products and/or information described or contained in our catalogs. In this connection, no representation shall be made to the effect that any third parties are authorized to use the rights mentioned above under licenses without our consent.

7. No ozone depleting substances (ODS) under the Montreal Protocol are used in our manufacturing process.



**Murata Manufacturing Co., Ltd.**

<http://www.murata.com/>

**Head Office**

1-10-1, Higashi Kotari, Nagaokakyo-shi, Kyoto 617-8555, Japan  
Phone: 81-75-951-9111

**International Division**

3-29-12, Shibuya, Shibuya-ku, Tokyo 150-0002, Japan  
Phone: 81-3-5469-6123 Fax: 81-3-5469-6155 E-mail: intl@murata.co.jp



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.