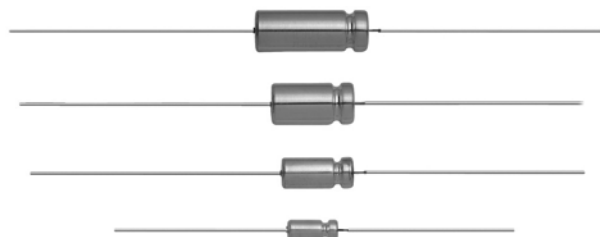


# Wet Tantalum Capacitors Sintered Anode TANTALEX® Capacitors for Operation to + 125 °C, Elastomer-Sealed



## FEATURES

- Axial through-hole terminations: Standard tin/lead (SnPb), 100 % tin (RoHS compliant) available
- Vishay Sprague model 109D tubular elastomer-sealed, sintered anode TANTALEX® capacitors fill the basic requirements for applications where a superior quality, reliable design for industrial, automotive and telecommunications application is desired.
- Model 109D capacitors are the commercial equivalents of Tansitor style WC, UWC, Mallory-NACC style TLS, TLH and the Military Style CL64 and CL65, designed to meet the performance requirements of Military Specification MIL-DTL-3965.
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS\***  
COMPLIANT

## Note

\* Lead (Pb)-containing terminations are not RoHS-compliant. Exemptions may apply.

## PERFORMANCE CHARACTERISTICS

**Operating Temperature:** - 55 °C to + 85 °C  
(to + 125 °C with voltage derating)

**Capacitance Tolerance:** At 120 Hz, + 25 °C.  
± 20 % standard. ± 10 %, ± 5 % available as special.

### DC Leakage Current (DCL max.):

At + 25 °C, + 85 °C, + 125 °C: Leakage current shall not exceed the values listed in the Standard Ratings tables.

**Life Test:** Capacitors are capable of withstanding a 2000 h life test at a temperature of + 85 °C or + 125 °C at the applicable DC working voltage.

Following the life test:

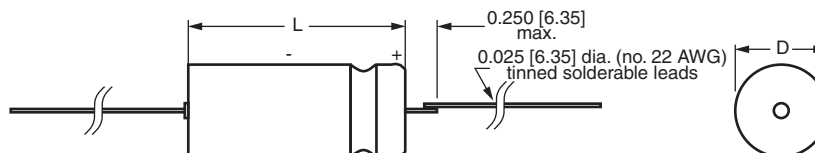
1. DCL shall not exceed the initial requirements or 1 µA, whichever is greater.
2. The ESR shall meet the initial requirement.
3. Change in capacitance shall not exceed 10 % from the initial measurement. For capacitors with voltage ratings of 15 V<sub>DC</sub> and below, change in capacitance shall not exceed + 10 %, - 25 % from the initial measurement.

## ORDERING INFORMATION

| 109D  | 207                                                                                                                           | X0                                                        | 006                                                                                                                                                   | C                                | 0                                                                    | E3                                                                                        |
|-------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| MODEL | CAPACITANCE                                                                                                                   | CAPACITANCE TOLERANCE                                     | DC VOLTAGE RATING AT + 85 °C                                                                                                                          | CASE CODE                        | STYLE NUMBER                                                         | RoHS COMPLIANT                                                                            |
|       | This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow | X0 = ± 20 %<br>X9 = ± 10 %<br>X5 = ± 5 %<br>special order | This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating. A decimal point is indicated by an "R" (6R3 = 6.3 V) | See Ratings and Case Codes table | 0 = No outer sleeve<br>Standard<br>2 = Outer plastic film insulation | E3 = 100 % tin termination (RoHS compliant)<br>Blank = SnPb termination (standard design) |

## Note

- Packaging: The use of formed plastic trays for packaging these axial lead components is standard. Tape and reel is not recommended due to the unit weight.

**DIMENSIONS** in inches [millimeters]


| CASE CODE        | BARE TUBE                   |                                             | WITH PLASTIC-FILM INSULATING SLEEVE |               | LEAD LENGTH                  |
|------------------|-----------------------------|---------------------------------------------|-------------------------------------|---------------|------------------------------|
|                  | D                           | L                                           | D Max.                              | L Max.        |                              |
| C                | 0.188 ± 0.016 [4.78 ± 0.41] | 0.453 + 0.031/- 0.016 [11.51 + 0.79/- 0.41] | 0.219 [5.56]                        | 0.608 [15.45] | 1.500 ± 0.250 [38.10 ± 6.35] |
| F                | 0.281 ± 0.016 [7.14 ± 0.41] | 0.641 + 0.031/- 0.016 [16.28 + 0.79/- 0.41] | 0.312 [7.92]                        | 0.796 [20.22] | 2.250 ± 0.250 [57.15 ± 6.35] |
| T                | 0.375 ± 0.016 [9.53 ± 0.41] | 0.766 + 0.031/- 0.016 [19.46 + 0.79/- 0.41] | 0.406 [10.31]                       | 0.921 [23.40] | 2.250 ± 0.250 [57.15 ± 6.35] |
| K <sup>(1)</sup> | 0.375 ± 0.016 [9.53 ± 0.41] | 1.062 + 0.031/- 0.016 [26.97 + 0.79/- 0.41] | 0.406 [10.31]                       | 1.217 [30.91] | 2.250 ± 0.250 [57.15 ± 6.35] |

**Note**
<sup>(1)</sup> Replaces previous W case

**STANDARD RATINGS**

| CAPACITANCE<br>(μF)                                           | CASE<br>CODE | PART NUMBER <sup>(1)</sup> | MAX. ESR                    | MAX. IMP.                   | MAX. DCL |                     | MAX. CAPACITANCE |         |          | MAX. RMS<br>RIPPLE<br>CURRENT |
|---------------------------------------------------------------|--------------|----------------------------|-----------------------------|-----------------------------|----------|---------------------|------------------|---------|----------|-------------------------------|
|                                                               |              |                            | AT + 25 °C<br>120 Hz<br>(Ω) | AT - 55 °C<br>120 Hz<br>(Ω) | (μA) AT  | CHANGE (%) AT       |                  |         |          |                               |
|                                                               |              |                            |                             |                             | + 25 °C  | + 85 °C<br>+ 125 °C | - 55 °C          | + 85 °C | + 125 °C | 120 Hz<br>(mA)                |
| 6 V <sub>DC</sub> AT + 85 °C; 4 V <sub>DC</sub> AT + 125 °C   |              |                            |                             |                             |          |                     |                  |         |          |                               |
| 68                                                            | C            | 109D686X0006C0             | 4                           | 60                          | 1        | 2                   | - 40             | + 14    | + 16     | 160                           |
| 140                                                           | F            | 109D147X0006F0             | 2                           | 40                          | 1        | 3                   | - 40             | + 14    | + 16     | 330                           |
| 270                                                           | F            | 109D277X0006F0             | 4                           | 25                          | 1        | 7                   | - 44             | + 17.5  | + 20     | 270                           |
| 560                                                           | T            | 109D567X0006T0             | 3                           | 25                          | 2        | 13                  | - 64             | + 17.5  | + 20     | 340                           |
| 1200                                                          | K            | 109D128X0006K0             | 1.6                         | 20                          | 3        | 14                  | - 80             | + 25    | + 25     | 530                           |
| 8 V <sub>DC</sub> AT + 85 °C; 5 V <sub>DC</sub> AT + 125 °C   |              |                            |                             |                             |          |                     |                  |         |          |                               |
| 22                                                            | C            | 109D226X0008C0             | 6                           | 115                         | 1        | 2                   | - 40             | + 10.5  | + 12     | 130                           |
| 220                                                           | F            | 109D227X0008F0             | 4                           | 30                          | 1        | 7                   | - 44             | + 17.5  | + 20     | 270                           |
| 10 V <sub>DC</sub> AT + 85 °C; 7 V <sub>DC</sub> AT + 125 °C  |              |                            |                             |                             |          |                     |                  |         |          |                               |
| 20                                                            | C            | 109D206X0010C0             | 5                           | 175                         | 1        | 2                   | - 32             | + 10.5  | + 12     | 140                           |
| 47                                                            | C            | 109D476X0010C0             | 5                           | 100                         | 1        | 2                   | - 36             | + 14    | + 16     | 160                           |
| 180                                                           | F            | 109D187X0010F0             | 4                           | 40                          | 1        | 7                   | - 36             | + 14    | + 16     | 270                           |
| 390                                                           | T            | 109D397X0010T0             | 3                           | 25                          | 2        | 16                  | - 64             | + 17.5  | + 20     | 340                           |
| 15 V <sub>DC</sub> AT + 85 °C; 10 V <sub>DC</sub> AT + 125 °C |              |                            |                             |                             |          |                     |                  |         |          |                               |
| 15                                                            | C            | 109D156X0015C0             | 6                           | 155                         | 1        | 2                   | - 24             | + 10.5  | + 12     | 130                           |
| 33                                                            | C            | 109D336X0015C0             | 5                           | 90                          | 1        | 2                   | - 28             | + 14    | + 16     | 160                           |
| 120                                                           | F            | 109D127X0015F0             | 4                           | 50                          | 1        | 7                   | - 28             | + 17.5  | + 20     | 270                           |
| 270                                                           | T            | 109D277X0015T0             | 3                           | 30                          | 2        | 16                  | - 56             | + 17.5  | + 20     | 340                           |
| 540                                                           | K            | 109D547X0015K0             | 1.2                         | 23                          | 6        | 24                  | - 80             | + 25    | + 25     | 610                           |
| 25 V <sub>DC</sub> AT + 85 °C; 15 V <sub>DC</sub> AT + 125 °C |              |                            |                             |                             |          |                     |                  |         |          |                               |
| 10                                                            | C            | 109D106X0025C0             | 6                           | 220                         | 1        | 2                   | - 16             | + 8     | + 9      | 130                           |
| 22                                                            | C            | 109D226X0025C0             | 5                           | 140                         | 1        | 3                   | - 20             | + 10.5  | + 12     | 160                           |
| 50                                                            | F            | 109D506X0025F0             | 4                           | 70                          | 1        | 5                   | - 28             | + 13    | + 15     | 270                           |
| 100                                                           | F            | 109D107X0025F0             | 4                           | 50                          | 1        | 10                  | - 28             | + 13    | + 15     | 270                           |
| 100                                                           | T            | 109D107X0025T0             | 4                           | 45                          | 2        | 10                  | - 48             | + 13    | + 15     | 410                           |
| 180                                                           | T            | 109D187X0025T0             | 4                           | 32                          | 2        | 18                  | - 48             | + 13    | + 15     | 340                           |
| 350                                                           | K            | 109D357X0025K0             | 1.3                         | 24                          | 7        | 28                  | - 70             | + 25    | + 25     | 580                           |
| 30 V <sub>DC</sub> AT + 85 °C; 20 V <sub>DC</sub> AT + 125 °C |              |                            |                             |                             |          |                     |                  |         |          |                               |
| 7                                                             | C            | 109D705X0030C0             | 8                           | 275                         | 1        | 2                   | - 16             | + 8     | + 12     | 110                           |
| 8                                                             | C            | 109D805X0030C0             | 7.5                         | 275                         | 1        | 2                   | - 16             | + 8     | + 12     | 130                           |
| 15                                                            | C            | 109D156X0030C0             | 8                           | 175                         | 1        | 2                   | - 20             | + 10.5  | + 12     | 160                           |
| 40                                                            | F            | 109D406X0030F0             | 4                           | 65                          | 1        | 5                   | - 24             | + 10.5  | + 12     | 270                           |
| 68                                                            | F            | 109D686X0030F0             | 6                           | 60                          | 1        | 8                   | - 24             | + 13    | + 15     | 270                           |
| 100                                                           | T            | 109D107X0030T0             | 6                           | 40                          | 2        | 12                  | - 28             | + 10.5  | + 12     | 410                           |
| 150                                                           | T            | 109D157X0030T0             | 4.1                         | 35                          | 2        | 18                  | - 48             | + 13    | + 15     | 340                           |
| 300                                                           | K            | 109D307X0030K0             | 1.6                         | 25                          | 8        | 32                  | - 60             | + 25    | + 25     | 550                           |

**Note**
<sup>(1)</sup> Part numbers shown are for units with ± 20 % capacitance tolerance and uninsulated capacitors. For ± 10 % units, change the digit following the letter "X" from "0" to "9". For units with outer plastic-film insulation, substitute "2" for "0" at the end of the part number. For RoHS compliant add "E3".



## STANDARD RATINGS

| CAPACITANCE<br>(μF)                                            | CASE<br>CODE | PART NUMBER <sup>(1)</sup> | MAX. ESR<br>AT + 25 °C<br>120 Hz<br>(Ω) | MAX. IMP.<br>AT - 55 °C<br>120 Hz<br>(Ω) | MAX. DCL<br>(μA) AT |                     | MAX. CAPACITANCE<br>CHANGE (%) AT |         |          | MAX. RMS<br>RIPPLE<br>CURRENT<br>120 Hz<br>(mA) |
|----------------------------------------------------------------|--------------|----------------------------|-----------------------------------------|------------------------------------------|---------------------|---------------------|-----------------------------------|---------|----------|-------------------------------------------------|
|                                                                |              |                            |                                         |                                          | + 25 °C             | + 85 °C<br>+ 125 °C | - 55 °C                           | + 85 °C | + 125 °C |                                                 |
|                                                                |              |                            |                                         |                                          |                     |                     |                                   |         |          |                                                 |
| 50 V <sub>DC</sub> AT + 85 °C; 30 V <sub>DC</sub> AT + 125 °C  |              |                            |                                         |                                          |                     |                     |                                   |         |          |                                                 |
| 4.5                                                            | C            | 109D455X0050C0             | 9                                       | 400                                      | 1                   | 2                   | - 16                              | + 5     | + 6      | 110                                             |
| 5                                                              | C            | 109D505X0050C0             | 9                                       | 400                                      | 1                   | 2                   | - 16                              | + 5     | + 6      | 130                                             |
| 10                                                             | C            | 109D106X0050C0             | 8                                       | 250                                      | 1                   | 2                   | - 24                              | + 8     | + 9      | 160                                             |
| 22                                                             | F            | 109D226X0050F0             | 7                                       | 95                                       | 1                   | 4                   | - 20                              | + 10.5  | + 12     | 230                                             |
| 25                                                             | F            | 109D256X0050F0             | 6                                       | 95                                       | 1                   | 5                   | - 20                              | + 10.5  | + 12     | 270                                             |
| 47                                                             | F            | 109D476X0050F0             | 6                                       | 70                                       | 1                   | 9                   | - 28                              | + 13    | + 15     | 270                                             |
| 60                                                             | T            | 109D606X0050T0             | 3                                       | 45                                       | 2                   | 12                  | - 16                              | + 10.5  | + 12     | 410                                             |
| 82                                                             | T            | 109D826X0050T0             | 4                                       | 45                                       | 2                   | 16                  | - 32                              | + 13    | + 15     | 340                                             |
| 160                                                            | K            | 109D167X0050K0             | 2.2                                     | 27                                       | 8                   | 32                  | - 50                              | + 25    | + 25     | 460                                             |
| 60 V <sub>DC</sub> AT + 85 °C; 40 V <sub>DC</sub> AT + 125 °C  |              |                            |                                         |                                          |                     |                     |                                   |         |          |                                                 |
| 4                                                              | C            | 109D405X0060C0             | 10                                      | 550                                      | 1                   | 2                   | - 16                              | + 5     | + 6      | 110                                             |
| 8.2                                                            | C            | 109D825X0060C0             | 8                                       | 275                                      | 1                   | 2                   | - 24                              | + 8     | + 9      | 140                                             |
| 20                                                             | F            | 109D206X0060F0             | 5                                       | 105                                      | 1                   | 5                   | - 16                              | + 10.5  | + 12     | 270                                             |
| 39                                                             | F            | 109D396X0060F0             | 7                                       | 90                                       | 1                   | 9                   | - 28                              | + 10.5  | + 12     | 230                                             |
| 50                                                             | T            | 109D506X0060T0             | 4                                       | 50                                       | 2                   | 12                  | - 16                              | + 10.5  | + 12     | 410                                             |
| 68                                                             | T            | 109D686X0060T0             | 6                                       | 50                                       | 2                   | 16                  | - 32                              | + 10.5  | + 12     | 340                                             |
| 140                                                            | K            | 109D147X0060K0             | 2.4                                     | 28                                       | 8                   | 32                  | - 40                              | + 20    | + 20     | 430                                             |
| 75 V <sub>DC</sub> AT + 85 °C; 50 V <sub>DC</sub> AT + 125 °C  |              |                            |                                         |                                          |                     |                     |                                   |         |          |                                                 |
| 3.5                                                            | C            | 109D355X0075C0             | 10                                      | 650                                      | 1                   | 2                   | - 16                              | + 5     | + 6      | 110                                             |
| 6.8                                                            | C            | 109D685X0075C0             | 8                                       | 300                                      | 1                   | 2                   | - 20                              | + 8     | + 9      | 140                                             |
| 13                                                             | F            | 109D136X0075F0             | 6                                       | 160                                      | 1                   | 4                   | - 16                              | + 8     | + 9      | 190                                             |
| 15                                                             | F            | 109D156X0075F0             | 6.5                                     | 150                                      | 1                   | 5                   | - 16                              | + 8     | + 9      | 270                                             |
| 33                                                             | F            | 109D336X0075F0             | 7                                       | 90                                       | 1                   | 10                  | - 24                              | + 10.5  | + 15     | 230                                             |
| 40                                                             | T            | 109D406X0075T0             | 5                                       | 60                                       | 2                   | 12                  | - 16                              | + 10.5  | + 12     | 410                                             |
| 56                                                             | T            | 109D566X0075T0             | 6                                       | 60                                       | 2                   | 17                  | - 28                              | + 10.5  | + 15     | 300                                             |
| 110                                                            | K            | 109D117X0075K0             | 3.1                                     | 29                                       | 9                   | 36                  | - 35                              | + 20    | + 20     | 400                                             |
| 100 V <sub>DC</sub> AT + 85 °C; 65 V <sub>DC</sub> AT + 125 °C |              |                            |                                         |                                          |                     |                     |                                   |         |          |                                                 |
| 2.5                                                            | C            | 109D255X0100C0             | 26.5                                    | 950                                      | 1                   | 2                   | - 16                              | + 7     | + 8      | 100                                             |
| 3.0                                                            | C            | 109D305X0100C0             | 10                                      | 800                                      | 1                   | 2                   | - 16                              | + 7     | + 8      | 110                                             |
| 4.7                                                            | C            | 109D475X0100C0             | 10                                      | 500                                      | 1                   | 2                   | - 16                              | + 7     | + 8      | 130                                             |
| 10                                                             | F            | 109D106X0100F0             | 6                                       | 215                                      | 1                   | 4                   | - 16                              | + 7     | + 8      | 190                                             |
| 11                                                             | F            | 109D116X0100F0             | 6                                       | 200                                      | 1                   | 4                   | - 16                              | + 7     | + 8      | 230                                             |
| 22                                                             | F            | 109D226X0100F0             | 7                                       | 100                                      | 1                   | 9                   | - 16                              | + 7     | + 8      | 230                                             |
| 30                                                             | T            | 109D306X0100T0             | 4                                       | 80                                       | 2                   | 12                  | - 16                              | + 7     | + 8      | 340                                             |
| 43                                                             | T            | 109D436X0100T0             | 6                                       | 70                                       | 2                   | 17                  | - 20                              | + 7     | + 8      | 300                                             |
| 125 V <sub>DC</sub> AT + 85 °C; 85 V <sub>DC</sub> AT + 125 °C |              |                            |                                         |                                          |                     |                     |                                   |         |          |                                                 |
| 1.7                                                            | C            | 109D175X0125C0             | 54.6                                    | 1250                                     | 1                   | 2                   | - 16                              | + 7     | + 8      | 100                                             |
| 3.6                                                            | C            | 109D365X0125C0             | 15                                      | 600                                      | 1                   | 2                   | - 16                              | + 7     | + 8      | 110                                             |
| 9                                                              | F            | 109D905X0125F0             | 15                                      | 240                                      | 1                   | 5                   | - 16                              | + 7     | + 8      | 210                                             |
| 14                                                             | F            | 109D146X0125F0             | 12                                      | 167                                      | 1                   | 7                   | - 16                              | + 7     | + 8      | 190                                             |
| 25                                                             | T            | 109D256X0125T0             | 10                                      | 93                                       | 2                   | 13                  | - 16                              | + 7     | + 8      | 260                                             |

## Note

<sup>(1)</sup> Part numbers shown are for units with  $\pm 20$  % capacitance tolerance and uninsulated capacitors. For  $\pm 10$  % units, change the digit following the letter "X" from "0" to "9". For units with outer plastic-film insulation, substitute "2" for "0" at the end of the part number. For RoHS compliant add "E3".

**EXTENDED RATINGS**

| CAPACITANCE<br>(μF)                                           | CASE<br>CODE | PART NUMBER <sup>(1)</sup> | MAX. ESR      | MAX. IMP.     | MAX. DCL |                     | MAX. CAPACITANCE |         |          | MAX. RMS<br>RIPPLE<br>CURRENT |
|---------------------------------------------------------------|--------------|----------------------------|---------------|---------------|----------|---------------------|------------------|---------|----------|-------------------------------|
|                                                               |              |                            | AT + 25 °C    | AT - 55 °C    | (μA) AT  | CHANGE (%) AT       |                  |         |          |                               |
|                                                               |              |                            | 120 Hz<br>(Ω) | 120 Hz<br>(Ω) | + 25 °C  | + 85 °C<br>+ 125 °C | - 55 °C          | + 85 °C | + 125 °C | 120 Hz<br>(mA)                |
| 6 V <sub>DC</sub> AT + 85 °C; 4 V <sub>DC</sub> AT + 125 °C   |              |                            |               |               |          |                     |                  |         |          |                               |
| 140                                                           | C            | 109D147X0006C2             | 3             | 54            | 2        | 9                   | - 45             | + 13    | + 16     | 160                           |
| 820                                                           | F            | 109D827X0006F0             | 2.5           | 18            | 3        | 14                  | - 88             | + 16    | + 20     | 300                           |
| 1500                                                          | T            | 109D158X0006T0             | 1.5           | 18            | 5        | 20                  | - 90             | + 20    | + 25     | 480                           |
| 2200                                                          | K            | 109D228X0006K0             | 1             | 13            | 6        | 24                  | - 90             | + 25    | + 30     | 670                           |
| 8 V <sub>DC</sub> AT + 85 °C; 5 V <sub>DC</sub> AT + 125 °C   |              |                            |               |               |          |                     |                  |         |          |                               |
| 680                                                           | F            | 109D687X0008F0             | 2.5           | 22            | 3        | 14                  | - 83             | + 16    | + 20     | 300                           |
| 10 V <sub>DC</sub> AT + 85 °C; 7 V <sub>DC</sub> AT + 125 °C  |              |                            |               |               |          |                     |                  |         |          |                               |
| 120                                                           | C            | 109D127X0010C0             | 4             | 60            | 2        | 9                   | - 45             | + 13    | + 16     | 160                           |
| 150                                                           | C            | 109D157X0010C0             | 3             | 54            | 2        | 9                   | - 55             | + 13    | + 16     | 180                           |
| 470                                                           | F            | 109D477X0010F0             | 2.5           | 30            | 3        | 16                  | - 65             | + 16    | + 20     | 300                           |
| 560                                                           | F            | 109D567X0010F0             | 2.5           | 27            | 3        | 16                  | - 77             | + 16    | + 20     | 300                           |
| 1000                                                          | T            | 109D108X0010T0             | 1.5           | 20            | 5        | 20                  | - 75             | + 20    | + 25     | 480                           |
| 1200                                                          | T            | 109D128X0010T0             | 1.5           | 18            | 5        | 20                  | - 88             | + 20    | + 25     | 480                           |
| 1200                                                          | K            | 109D128X0010K0             | 1             | 18            | 7        | 25                  | - 75             | + 30    | + 30     | 670                           |
| 1500                                                          | K            | 109D158X0010K0             | 1             | 15            | 7        | 25                  | - 88             | + 25    | + 30     | 670                           |
| 15 V <sub>DC</sub> AT + 85 °C; 10 V <sub>DC</sub> AT + 125 °C |              |                            |               |               |          |                     |                  |         |          |                               |
| 82                                                            | C            | 109D826X0015C0             | 4             | 80            | 2        | 9                   | - 38             | + 13    | + 16     | 160                           |
| 100                                                           | C            | 109D107X0015C0             | 4             | 72            | 2        | 9                   | - 44             | + 13    | + 16     | 160                           |
| 330                                                           | F            | 109D337X0015F0             | 2.5           | 35            | 3        | 16                  | - 60             | + 16    | + 20     | 300                           |
| 390                                                           | F            | 109D397X0015F0             | 2.5           | 31            | 3        | 16                  | - 66             | + 16    | + 20     | 300                           |
| 510                                                           | T            | 109D517X0015T0             | 1.8           | 25            | 6        | 24                  | - 65             | + 20    | + 25     | 340                           |
| 820                                                           | T            | 109D827X0015T0             | 1.8           | 22            | 6        | 24                  | - 77             | + 20    | + 25     | 440                           |
| 820                                                           | K            | 109D827X0015K0             | 1.2           | 20            | 8        | 32                  | - 70             | + 30    | + 30     | 610                           |
| 1000                                                          | K            | 109D108X0015K0             | 1.2           | 17            | 8        | 32                  | - 77             | + 25    | + 30     | 610                           |
| 25 V <sub>DC</sub> AT + 85 °C; 15 V <sub>DC</sub> AT + 125 °C |              |                            |               |               |          |                     |                  |         |          |                               |
| 68                                                            | C            | 109D686X0025C0             | 4.3           | 90            | 2        | 9                   | - 40             | + 12    | + 15     | 160                           |
| 270                                                           | F            | 109D277X0025F0             | 2.7           | 33            | 3        | 16                  | - 62             | + 13    | + 16     | 300                           |
| 560                                                           | T            | 109D567X0025T0             | 1.8           | 24            | 7        | 28                  | - 72             | + 20    | + 25     | 440                           |
| 680                                                           | K            | 109D687X0025K0             | 1.2           | 19            | 8        | 32                  | - 72             | + 25    | + 30     | 610                           |
| 750                                                           | K            | 109D757X0025K2             | 1.0           | 18            | 8        | 29                  | - 60             | + 25    | + 25     | 610                           |
| 30 V <sub>DC</sub> AT + 85 °C; 20 V <sub>DC</sub> AT + 125 °C |              |                            |               |               |          |                     |                  |         |          |                               |
| 39                                                            | C            | 109D396X0030C0             | 5.2           | 110           | 2        | - 28                | + 10             | + 12    |          | 140                           |
| 47                                                            | C            | 109D476X0030C0             | 5.2           | 100           | 2        | 9                   | - 30             | + 10    | + 12     | 140                           |
| 56                                                            | C            | 109D566X0030C0             | 5.2           | 100           | 2        | 9                   | - 38             | + 12    | + 15     | 140                           |
| 150                                                           | F            | 109D157X0030F0             | 2.5           | 40            | 3        | 9                   | - 40             | + 12    | + 15     | 300                           |
| 180                                                           | F            | 109D187X0030F0             | 2.5           | 40            | 3        | 16                  | - 45             | + 13    | + 16     | 300                           |
| 220                                                           | F            | 109D227X0030F0             | 2.5           | 36            | 3        | 16                  | - 60             | + 13    | + 16     | 300                           |
| 330                                                           | T            | 109D337X0030T0             | 1.8           | 28            | 8        | 16                  | - 45             | + 20    | + 25     | 440                           |
| 390                                                           | T            | 109D397X0030T0             | 1.8           | 28            | 8        | 32                  | - 50             | + 20    | + 25     | 440                           |
| 470                                                           | T            | 109D477X0030T0             | 1.8           | 25            | 8        | 32                  | - 65             | + 20    | + 25     | 550                           |
| 560                                                           | K            | 109D567X0030K0             | 1.3           | 20            | 9        | 32                  | - 65             | + 25    | + 30     | 590                           |

**Note**

<sup>(1)</sup> Part numbers shown are for units with  $\pm 20\%$  capacitance tolerance and uninsulated capacitors. For  $\pm 10\%$  units, change the digit following the letter "X" from "0" to "9". For units with outer plastic-film insulation, substitute "2" for "0" at the end of the part number. For RoHS compliant add "E3".



| EXTENDED RATINGS                                               |              |                            |                             |                             |                                           |    |                                                 |      |      |                                                 |
|----------------------------------------------------------------|--------------|----------------------------|-----------------------------|-----------------------------|-------------------------------------------|----|-------------------------------------------------|------|------|-------------------------------------------------|
| CAPACITANCE<br>(μF)                                            | CASE<br>CODE | PART NUMBER <sup>(1)</sup> | MAX. ESR                    | MAX. IMP.                   | MAX. DCL                                  |    | MAX. CAPACITANCE                                |      |      | MAX. RMS<br>RIPPLE<br>CURRENT<br>120 Hz<br>(mA) |
|                                                                |              |                            | AT + 25 °C<br>120 Hz<br>(Ω) | AT - 55 °C<br>120 Hz<br>(Ω) | (μA) AT<br>+ 25 °C    + 85 °C<br>+ 125 °C |    | CHANGE (%) AT<br>- 55 °C    + 85 °C    + 125 °C |      |      |                                                 |
| 50 V <sub>DC</sub> AT + 85 °C; 30 V <sub>DC</sub> AT + 125 °C  |              |                            |                             |                             |                                           |    |                                                 |      |      |                                                 |
| 33                                                             | C            | 109D336X0050C0             | 5                           | 135                         | 2                                         | 9  | - 29                                            | + 10 | + 12 | 140                                             |
| 120                                                            | F            | 109D127X0050F0             | 2.5                         | 49                          | 4                                         | 24 | - 42                                            | + 12 | + 15 | 300                                             |
| 270                                                            | T            | 109D277X0050T0             | 1.8                         | 29                          | 8                                         | 32 | - 46                                            | + 20 | + 25 | 440                                             |
| 330                                                            | K            | 109D337X0050K0             | 1.5                         | 22                          | 9                                         | 36 | - 46                                            | + 25 | + 30 | 550                                             |
| 60 V <sub>DC</sub> AT + 85 °C; 40 V <sub>DC</sub> AT + 125 °C  |              |                            |                             |                             |                                           |    |                                                 |      |      |                                                 |
| 27                                                             | C            | 109D276X0060C0             | 5                           | 144                         | 3                                         | 12 | - 24                                            | + 10 | + 12 | 140                                             |
| 68                                                             | F            | 109D686X0060F0             | 3                           | 60                          | 3                                         | 20 | - 30                                            | + 12 | + 15 | 270                                             |
| 100                                                            | F            | 109D107X0060F0             | 2.5                         | 54                          | 4                                         | 20 | - 36                                            | + 12 | + 15 | 300                                             |
| 140                                                            | T            | 109D147X0060T0             | 2                           | 32                          | 8                                         | 32 | - 30                                            | + 16 | + 20 | 420                                             |
| 220                                                            | T            | 109D227X0060T0             | 1.8                         | 29                          | 8                                         | 32 | - 40                                            | + 16 | + 20 | 440                                             |
| 270                                                            | K            | 109D277X0060K0             | 1.5                         | 23                          | 9                                         | 36 | - 45                                            | + 20 | + 25 | 550                                             |
| 75 V <sub>DC</sub> AT + 85 °C; 50 V <sub>DC</sub> AT + 125 °C  |              |                            |                             |                             |                                           |    |                                                 |      |      |                                                 |
| 12                                                             | C            | 109D126X0075C0             | 5                           | 175                         | 2                                         | 12 | - 12                                            | + 8  | + 10 | 140                                             |
| 15                                                             | C            | 109D156X0075C0             | 5                           | 160                         | 2                                         | 12 | - 14                                            | + 10 | + 12 | 140                                             |
| 22                                                             | C            | 109D226X0075C0             | 5                           | 157                         | 3                                         | 12 | - 19                                            | + 10 | + 12 | 140                                             |
| 47                                                             | F            | 109D476X0075F0             | 3                           | 75                          | 4                                         | 24 | - 18                                            | + 10 | + 12 | 270                                             |
| 56                                                             | F            | 109D566X0075F0             | 3                           | 70                          | 4                                         | 24 | - 20                                            | + 12 | + 15 | 270                                             |
| 82                                                             | F            | 109D826X0075F0             | 2.5                         | 63                          | 4                                         | 24 | - 30                                            | + 12 | + 15 | 300                                             |
| 110                                                            | T            | 109D117X0075T0             | 2                           | 33                          | 9                                         | 36 | - 25                                            | + 16 | + 20 | 420                                             |
| 180                                                            | T            | 109D187X0075T0             | 1.8                         | 30                          | 9                                         | 36 | - 35                                            | + 16 | + 20 | 440                                             |
| 220                                                            | K            | 109D227X0075K0             | 2.2                         | 24                          | 10                                        | 40 | - 40                                            | + 20 | + 25 | 450                                             |
| 270                                                            | K            | 109D277X0075K2             | 1.3                         | 24                          | 10                                        | 40 | - 40                                            | + 20 | + 25 | 450                                             |
| 100 V <sub>DC</sub> AT + 85 °C; 65 V <sub>DC</sub> AT + 125 °C |              |                            |                             |                             |                                           |    |                                                 |      |      |                                                 |
| 8.2                                                            | C            | 109D825X0100C0             | 6                           | 250                         | 3                                         | 12 | - 12                                            | + 12 | + 12 | 130                                             |
| 10                                                             | C            | 109D106X0100C0             | 6                           | 200                         | 3                                         | 12 | - 17                                            | + 10 | + 12 | 130                                             |
| 33                                                             | F            | 109D336X0100F0             | 3.5                         | 85                          | 4                                         | 24 | - 18                                            | + 15 | + 15 | 250                                             |
| 39                                                             | F            | 109D396X0100F0             | 3.5                         | 80                          | 5                                         | 24 | - 20                                            | + 12 | + 15 | 250                                             |
| 56                                                             | T            | 109D566X0100T0             | 2.2                         | 45                          | 9                                         | 36 | - 20                                            | + 15 | + 15 | 400                                             |
| 68                                                             | T            | 109D686X0100T0             | 2.2                         | 40                          | 10                                        | 40 | - 30                                            | + 14 | + 16 | 400                                             |
| 86                                                             | K            | 109D866X0100K0             | 3.2                         | 30                          | 10                                        | 40 | - 25                                            | + 15 | + 15 | 370                                             |
| 125 V <sub>DC</sub> AT + 85 °C; 85 V <sub>DC</sub> AT + 125 °C |              |                            |                             |                             |                                           |    |                                                 |      |      |                                                 |
| 6.8                                                            | C            | 109D685X0125C0             | 11.7                        | 300                         | 3                                         | 12 | - 14                                            | + 10 | + 12 | 130                                             |
| 27                                                             | F            | 109D276X0125F0             | 3.5                         | 90                          | 5                                         | 24 | - 18                                            | + 12 | + 15 | 250                                             |
| 47                                                             | T            | 109D476X0125T0             | 2.2                         | 50                          | 10                                        | 40 | - 26                                            | + 14 | + 16 | 400                                             |
| 56                                                             | K            | 109D566X0125K0             | 4.1                         | 32                          | 10                                        | 40 | - 25                                            | + 15 | + 15 | 330                                             |

**Note**

<sup>(1)</sup> Part numbers shown are for units with  $\pm 20$  % capacitance tolerance and uninsulated capacitors. For  $\pm 10$  % units, change the digit following the letter "X" from "0" to "9". For units with outer plastic-film insulation, substitute "2" for "0" at the end of the part number. For RoHS compliant add "E3".



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