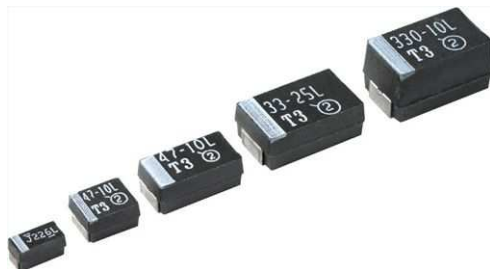


# Solid Tantalum Surface Mount Chip Capacitors

## TANTAMOUNT<sup>®</sup>, Molded Case, Standard Industrial Grade



### PERFORMANCE/ELECTRICAL CHARACTERISTICS

[www.vishay.com/doc?40088](http://www.vishay.com/doc?40088)

**Operating Temperature:** - 55 °C to + 85 °C

(to + 125 °C with voltage derating)

**Capacitance Range:** 0.10 µF to 1000 µF

**Capacitance Tolerance:** ± 5 %, ± 10 %, ± 20 %

**100 % Surge Current Tested (D and E Case Codes)**

**Voltage Rating:** 4 V<sub>DC</sub> to 63 V<sub>DC</sub>

### FEATURES

- Molded case available in six case codes
- Terminations: 100 % matte tin, standard, tin/lead available
- Compatible with "High Volume" automatic pick and place equipment
- Meets IEC specification QC300801/US0001 and EIA535BAAC mechanical and performance requirements
- Moisture sensitivity level 1
- Optical character recognition qualified
- Compliant terminations
- 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.

### APPLICATIONS

- Industrial
- Telecom infrastructure
- General purpose

### ORDERING INFORMATION

| 293D<br>TYPE | 107<br>CAPACITANCE                                                                                                             | X9<br>CAPACITANCE TOLERANCE                              | 010<br>DC VOLTAGE RATING AT + 85 °C                                                                                                                | D<br>CASE CODE                   | 2WE3<br>TERMINATION AND PACKAGING                                                                                                            |
|--------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
|              | 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 % (special order) | This is expressed in V. 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 | 2TE3: Matte tin, 7" (178 mm) reel<br>2WE3: Matte tin, 13" (330 mm) reel<br>8T: Tin/lead, 7" (178 mm) reel<br>8W: Tin/lead, 13" (330 mm) reel |

### Notes

- We reserve the right to supply higher voltage ratings and tighter capacitance tolerance capacitors in the same case size. Voltage substitutions will be marked with the higher voltage rating.
- We reserve the right to supply better series with more extensive screening.
- Dry pack is available per request, contact regional marketing.

### DIMENSIONS in inches [millimeters]

| CASE CODE | EIA SIZE | L                             | W                             | H                             | P                              | T <sub>w</sub>                | T <sub>H</sub> (MIN.) |
|-----------|----------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|-------------------------------|-----------------------|
| A         | 3216-18  | 0.126 ± 0.008<br>[3.2 ± 0.20] | 0.063 ± 0.008<br>[1.6 ± 0.20] | 0.063 ± 0.008<br>[1.6 ± 0.20] | 0.031 ± 0.012<br>[0.80 ± 0.30] | 0.047 ± 0.004<br>[1.2 ± 0.10] | 0.028<br>[0.70]       |
| B         | 3528-21  | 0.138 ± 0.008<br>[3.5 ± 0.20] | 0.110 ± 0.008<br>[2.8 ± 0.20] | 0.075 ± 0.008<br>[1.9 ± 0.20] | 0.031 ± 0.012<br>[0.80 ± 0.30] | 0.087 ± 0.004<br>[2.2 ± 0.10] | 0.028<br>[0.70]       |
| C         | 6032-28  | 0.236 ± 0.012<br>[6.0 ± 0.30] | 0.126 ± 0.012<br>[3.2 ± 0.30] | 0.098 ± 0.012<br>[2.5 ± 0.30] | 0.051 ± 0.012<br>[1.3 ± 0.30]  | 0.087 ± 0.004<br>[2.2 ± 0.10] | 0.039<br>[1.0]        |
| D         | 7343-31  | 0.287 ± 0.012<br>[7.3 ± 0.30] | 0.169 ± 0.012<br>[4.3 ± 0.30] | 0.110 ± 0.012<br>[2.8 ± 0.30] | 0.051 ± 0.012<br>[1.3 ± 0.30]  | 0.094 ± 0.004<br>[2.4 ± 0.10] | 0.039<br>[1.0]        |
| E         | 7343-43  | 0.287 ± 0.012<br>[7.3 ± 0.30] | 0.169 ± 0.012<br>[4.3 ± 0.30] | 0.157 ± 0.012<br>[4.0 ± 0.30] | 0.051 ± 0.012<br>[1.3 ± 0.30]  | 0.094 ± 0.004<br>[2.4 ± 0.10] | 0.039<br>[1.0]        |
| V         | 7343-20  | 0.287 ± 0.012<br>[7.3 ± 0.30] | 0.169 ± 0.012<br>[4.3 ± 0.30] | 0.079 max<br>[2.0 max]        | 0.051 ± 0.012<br>[1.3 ± 0.30]  | 0.094 ± 0.004<br>[2.4 ± 0.10] | 0.039<br>[1.0]        |

## RATINGS AND CASE CODES

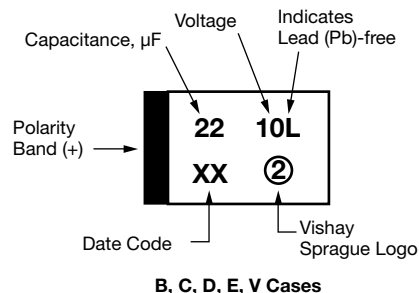
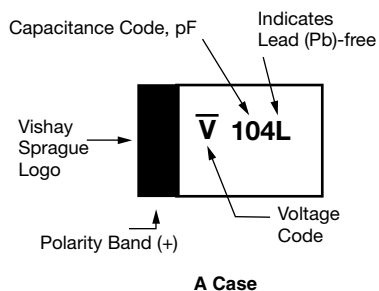
| μF   | 4 V     | 6.3 V   | 10 V      | 16 V                 | 20 V  | 25 V    | 35 V  | 50 V  | 63 V |
|------|---------|---------|-----------|----------------------|-------|---------|-------|-------|------|
| 0.10 |         |         |           |                      |       | A       | A     | A     |      |
| 0.15 |         |         |           |                      |       |         | A     | A/B   |      |
| 0.22 |         |         |           |                      |       |         | A     | A/B   |      |
| 0.33 |         |         |           |                      |       | A       | A     | A/B   |      |
| 0.47 |         |         | A         |                      | A     | A       | A/B   | A/B/C |      |
| 0.68 |         |         |           | A                    | A     | A       | A/B   | B/C   |      |
| 1.0  |         |         | A         | A                    | A/B   | A/B     | A/B   | B/C   |      |
| 1.5  |         | A       | A         | A/B                  | A/B   | A/B     | B/C   | B/C/D |      |
| 2.2  | A       | A       | A/B       | A/B                  | A/B   | A/B/C   | B/C   | B/C/D |      |
| 3.3  | A       | A/B     | A/B       | A/B                  | A/B/C | A/B/C   | B/C/D | C/D   |      |
| 4.7  | A/B     | A/B     | A/B/C     | A/B/C                | A/B/C | A/B/C/D | B/C/D | C/D/E | D    |
| 6.8  | A/B     | A/B     | A/B/C     | A/B/C                | A/B/C | B/C/D   | C/D   | D/E   |      |
| 10   | A/B     | A/B/C   | A/B/C     | A/B/C/D              | B/C/D | B/C/D   | C/D   | D/E   | E    |
| 15   | A/B/C   | A/B/C   | A/B/C     | B/C                  | B/C/D | B/C/D   | D/E   | E     |      |
| 22   | A/B/C   | A/B/C   | A/B/C/D   | B/C/D                | B/C/D | C/D/E/V | D/E   |       |      |
| 33   | A/B/C   | A/B/C   | B/C/D     | B/C/D                | C/D   | D/E     |       |       |      |
| 47   | A/B/C   | A/B/C/D | B/C/D     | C/D/E                | D/E   | D/E     |       |       |      |
| 68   | B/C/D   | B/C/D   | B/C/D/E/V | D/E                  | D/E   | E       |       |       |      |
| 100  | A/B/C/D | B/C/D/E | B/C/D/E/V | D/E/V <sup>(1)</sup> | D/E   |         |       |       |      |
| 120  | D       | D       | E         |                      |       |         |       |       |      |
| 150  | B/C/D   | C/D/E   | C/D/E     | D/E                  |       |         |       |       |      |
| 220  | B/C/D/E | C/D/E   | D/E/V     | E                    |       |         |       |       |      |
| 330  | D/E     | D/E     | D/E       |                      |       |         |       |       |      |
| 470  | D/E     | D/E     | E         |                      |       |         |       |       |      |
| 680  | D/E     | E       |           |                      |       |         |       |       |      |
| 1000 | E       | E       |           |                      |       |         |       |       |      |

### Note

<sup>(1)</sup> Rating under development.

## MARKING

| “A” CASE VOLTAGE CODE |      |  |  |
|-----------------------|------|--|--|
| VOLTS                 | CODE |  |  |
| 4.0                   | G    |  |  |
| 6.3                   | J    |  |  |
| 10                    | A    |  |  |
| 16                    | C    |  |  |
| 20                    | D    |  |  |
| 25                    | E    |  |  |
| 35                    | V    |  |  |
| 50                    | T    |  |  |



### Marking

Capacitor marking includes an anode (+) polarity band, capacitance in microfarads and the voltage rating. “A” Case capacitors use a letter code for the voltage and EIA capacitance code.

The Vishay Sprague® trademark is included if space permits. Capacitors rated at 6.3 V are marked 6 V.

A manufacturing date code is marked on all capacitors.

Capacitors may bear a different marking scheme if a part with more extensive screening is substituted. These would include “R” for low ESR series (TR3) or “P” for professional series (TP3).

Call the factory for further explanation.



| STANDARD RATINGS                                              |           |                   |                                                |                                        |                                                   |                                            |
|---------------------------------------------------------------|-----------|-------------------|------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------|
| CAPACITANCE<br>( $\mu$ F)                                     | CASE CODE | PART NUMBER       | MAX. DC<br>LEAKAGE<br>AT + 25 °C<br>( $\mu$ A) | MAX. DF<br>AT + 25 °C<br>120 Hz<br>(%) | MAX. ESR<br>AT + 25 °C<br>100 kHz<br>( $\Omega$ ) | MAX. RIPPLE<br>100 kHz<br>$I_{RMS}$<br>(A) |
| 4 V <sub>DC</sub> AT + 85 °C; 2.7 V <sub>DC</sub> AT + 125 °C |           |                   |                                                |                                        |                                                   |                                            |
| 2.2                                                           | A         | 293D225(1)004A(2) | 0.5                                            | 6                                      | 7.60                                              | 0.10                                       |
| 3.3                                                           | A         | 293D335(1)004A(2) | 0.5                                            | 6                                      | 7.60                                              | 0.10                                       |
| 4.7                                                           | A         | 293D475(1)004A(2) | 0.5                                            | 6                                      | 6.30                                              | 0.11                                       |
| 4.7                                                           | B         | 293D475(1)004B(2) | 0.5                                            | 6                                      | 7.00                                              | 0.11                                       |
| 6.8                                                           | A         | 293D685(1)004A(2) | 0.5                                            | 6                                      | 5.50                                              | 0.12                                       |
| 6.8                                                           | B         | 293D685(1)004B(2) | 0.5                                            | 6                                      | 3.40                                              | 0.16                                       |
| 10                                                            | A         | 293D106(1)004A(2) | 0.5                                            | 6                                      | 5.10                                              | 0.12                                       |
| 10                                                            | B         | 293D106(1)004B(2) | 0.5                                            | 6                                      | 3.50                                              | 0.16                                       |
| 15                                                            | A         | 293D156(1)004A(2) | 0.6                                            | 6                                      | 3.40                                              | 0.15                                       |
| 15                                                            | B         | 293D156(1)004B(2) | 0.6                                            | 6                                      | 2.90                                              | 0.17                                       |
| 15                                                            | C         | 293D156(1)004C(2) | 0.6                                            | 6                                      | 2.80                                              | 0.20                                       |
| 22                                                            | A         | 293D226(1)004A(2) | 0.9                                            | 6                                      | 2.90                                              | 0.16                                       |
| 22                                                            | B         | 293D226(1)004B(2) | 0.9                                            | 6                                      | 2.50                                              | 0.18                                       |
| 22                                                            | C         | 293D226(1)004C(2) | 0.9                                            | 6                                      | 1.80                                              | 0.25                                       |
| 33                                                            | A         | 293D336(1)004A(2) | 1.3                                            | 6                                      | 2.90                                              | 0.16                                       |
| 33                                                            | B         | 293D336(1)004B(2) | 1.3                                            | 6                                      | 2.00                                              | 0.21                                       |
| 33                                                            | C         | 293D336(1)004C(2) | 1.3                                            | 6                                      | 1.80                                              | 0.25                                       |
| 47                                                            | A         | 293D476(1)004A(2) | 1.9                                            | 14                                     | 2.50                                              | 0.17                                       |
| 47                                                            | B         | 293D476(1)004B(2) | 1.9                                            | 6                                      | 1.90                                              | 0.21                                       |
| 47                                                            | C         | 293D476(1)004C(2) | 1.9                                            | 6                                      | 1.80                                              | 0.25                                       |
| 68                                                            | B         | 293D686(1)004B(2) | 2.7                                            | 6                                      | 1.90                                              | 0.21                                       |
| 68                                                            | C         | 293D686(1)004C(2) | 2.7                                            | 6                                      | 1.40                                              | 0.28                                       |
| 68                                                            | D         | 293D686(1)004D(2) | 2.7                                            | 6                                      | 0.80                                              | 0.43                                       |
| 100                                                           | A         | 293D107X0004A(2)  | 10.0                                           | 30                                     | 2.50                                              | 0.22                                       |
| 100                                                           | B         | 293D107(1)004B(2) | 4.0                                            | 8                                      | 1.80                                              | 0.22                                       |
| 100                                                           | C         | 293D107(1)004C(2) | 4.0                                            | 6                                      | 0.80                                              | 0.37                                       |
| 100                                                           | D         | 293D107(1)004D(2) | 4.0                                            | 6                                      | 0.70                                              | 0.46                                       |
| 120                                                           | D         | 293D127(1)004D(2) | 4.8                                            | 6                                      | 0.60                                              | 0.51                                       |
| 150                                                           | B         | 293D157(1)004B(2) | 6.0                                            | 14                                     | 1.60                                              | 0.23                                       |
| 150                                                           | C         | 293D157(1)004C(2) | 6.0                                            | 12                                     | 0.70                                              | 0.40                                       |
| 150                                                           | D         | 293D157(1)004D(2) | 6.0                                            | 8                                      | 0.60                                              | 0.50                                       |
| 220                                                           | B         | 293D227X0004B(2)  | 8.8                                            | 18                                     | 1.50                                              | 0.24                                       |
| 220                                                           | C         | 293D227(1)004C(2) | 8.8                                            | 8                                      | 0.70                                              | 0.40                                       |
| 220                                                           | D         | 293D227(1)004D(2) | 8.8                                            | 8                                      | 0.60                                              | 0.50                                       |
| 220                                                           | E         | 293D227(1)004E(2) | 8.8                                            | 8                                      | 0.50                                              | 0.57                                       |
| 330                                                           | D         | 293D337(1)004D(2) | 13.2                                           | 8                                      | 0.60                                              | 0.50                                       |
| 330                                                           | E         | 293D337(1)004E(2) | 13.2                                           | 8                                      | 0.50                                              | 0.57                                       |
| 470                                                           | D         | 293D477(1)004D(2) | 18.8                                           | 10                                     | 0.60                                              | 0.50                                       |
| 470                                                           | E         | 293D477(1)004E(2) | 18.8                                           | 10                                     | 0.50                                              | 0.57                                       |
| 680                                                           | D         | 293D687X0004D(2)  | 27.2                                           | 25                                     | 0.20                                              | 0.87                                       |
| 680                                                           | E         | 293D687(1)004E(2) | 27.2                                           | 12                                     | 0.50                                              | 0.57                                       |
| 1000                                                          | E         | 293D108X0004E(2)  | 40.0                                           | 20                                     | 0.50                                              | 0.57                                       |

**Notes**

- Part number definitions:
  - Tolerance: X0, X9
  - Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3
- <sup>(1)</sup> Rating under development.



| STANDARD RATINGS                                            |           |                   |                                                |                                        |                                                   |                                            |
|-------------------------------------------------------------|-----------|-------------------|------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------|
| CAPACITANCE<br>( $\mu$ F)                                   | CASE CODE | PART NUMBER       | MAX. DC<br>LEAKAGE<br>AT + 25 °C<br>( $\mu$ A) | MAX. DF<br>AT + 25 °C<br>120 Hz<br>(%) | MAX. ESR<br>AT + 25 °C<br>100 kHz<br>( $\Omega$ ) | MAX. RIPPLE<br>100 kHz<br>$I_{RMS}$<br>(A) |
| 6.3 V <sub>DC</sub> AT + 85 °C; 4 V <sub>DC</sub> AT 125 °C |           |                   |                                                |                                        |                                                   |                                            |
| 1.5                                                         | A         | 293D155(1)6R3A(2) | 0.5                                            | 6                                      | 2.90                                              | 0.16                                       |
| 2.2                                                         | A         | 293D225(1)6R3A(2) | 0.5                                            | 6                                      | 7.60                                              | 0.10                                       |
| 3.3                                                         | A         | 293D335(1)6R3A(2) | 0.5                                            | 6                                      | 6.30                                              | 0.11                                       |
| 3.3                                                         | B         | 293D335(1)6R3B(2) | 0.5                                            | 6                                      | 5.50                                              | 0.12                                       |
| 4.7                                                         | A         | 293D475(1)6R3A(2) | 0.5                                            | 6                                      | 5.50                                              | 0.12                                       |
| 4.7                                                         | B         | 293D475(1)6R3B(2) | 0.5                                            | 6                                      | 4.40                                              | 0.14                                       |
| 6.8                                                         | A         | 293D685(1)6R3A(2) | 0.5                                            | 6                                      | 5.00                                              | 0.12                                       |
| 6.8                                                         | B         | 293D685(1)6R3B(2) | 0.5                                            | 6                                      | 3.40                                              | 0.16                                       |
| 10                                                          | A         | 293D106(1)6R3A(2) | 0.6                                            | 6                                      | 3.40                                              | 0.15                                       |
| 10                                                          | B         | 293D106(1)6R3B(2) | 0.6                                            | 6                                      | 2.90                                              | 0.17                                       |
| 10                                                          | C         | 293D106(1)6R3C(2) | 0.6                                            | 6                                      | 3.00                                              | 0.19                                       |
| 15                                                          | A         | 293D156(1)6R3A(2) | 0.9                                            | 6                                      | 2.90                                              | 0.16                                       |
| 15                                                          | B         | 293D156(1)6R3B(2) | 0.9                                            | 6                                      | 2.50                                              | 0.18                                       |
| 15                                                          | C         | 293D156(1)6R3C(2) | 0.9                                            | 6                                      | 1.80                                              | 0.25                                       |
| 22                                                          | A         | 293D226(1)6R3A(2) | 1.3                                            | 6                                      | 2.90                                              | 0.16                                       |
| 22                                                          | B         | 293D226(1)6R3B(2) | 1.3                                            | 6                                      | 2.00                                              | 0.21                                       |
| 22                                                          | C         | 293D226(1)6R3C(2) | 1.3                                            | 6                                      | 1.80                                              | 0.25                                       |
| 33                                                          | A         | 293D336(1)6R3A(2) | 2.0                                            | 14                                     | 2.50                                              | 0.17                                       |
| 33                                                          | B         | 293D336(1)6R3B(2) | 2.0                                            | 6                                      | 1.90                                              | 0.21                                       |
| 33                                                          | C         | 293D336(1)6R3C(2) | 2.0                                            | 6                                      | 1.50                                              | 0.27                                       |
| 47                                                          | A         | 293D476(1)6R3A(2) | 2.8                                            | 12                                     | 1.60                                              | 0.22                                       |
| 47                                                          | B         | 293D476(1)6R3B(2) | 2.8                                            | 6                                      | 1.90                                              | 0.21                                       |
| 47                                                          | C         | 293D476(1)6R3C(2) | 2.8                                            | 6                                      | 1.40                                              | 0.28                                       |
| 47                                                          | D         | 293D476(1)6R3D(2) | 2.8                                            | 6                                      | 0.80                                              | 0.43                                       |
| 68                                                          | B         | 293D686(1)6R3B(2) | 4.1                                            | 6                                      | 1.80                                              | 0.22                                       |
| 68                                                          | C         | 293D686(1)6R3C(2) | 4.1                                            | 6                                      | 0.80                                              | 0.37                                       |
| 68                                                          | D         | 293D686(1)6R3D(2) | 4.1                                            | 6                                      | 0.70                                              | 0.46                                       |
| 100                                                         | B         | 293D107(1)6R3B(2) | 6.0                                            | 15                                     | 1.70                                              | 0.22                                       |
| 100                                                         | C         | 293D107(1)6R3C(2) | 6.0                                            | 6                                      | 0.80                                              | 0.37                                       |
| 100                                                         | D         | 293D107(1)6R3D(2) | 6.0                                            | 6                                      | 0.70                                              | 0.46                                       |
| 100                                                         | E         | 293D107(1)6R3E(2) | 6.0                                            | 8                                      | 0.70                                              | 0.49                                       |
| 120                                                         | D         | 293D127(1)6R3D(2) | 6.3                                            | 8                                      | 0.70                                              | 0.46                                       |
| 150                                                         | C         | 293D157(1)6R3C(2) | 9.0                                            | 8                                      | 0.70                                              | 0.40                                       |
| 150                                                         | D         | 293D157(1)6R3D(2) | 9.0                                            | 8                                      | 0.60                                              | 0.50                                       |
| 150                                                         | E         | 293D157(1)6R3E(2) | 9.0                                            | 8                                      | 0.50                                              | 0.57                                       |
| 220                                                         | C         | 293D227(1)6R3C(2) | 13.9                                           | 14                                     | 0.70                                              | 0.39                                       |
| 220                                                         | D         | 293D227(1)6R3D(2) | 13.2                                           | 8                                      | 0.60                                              | 0.50                                       |
| 220                                                         | E         | 293D227(1)6R3E(2) | 13.2                                           | 8                                      | 0.50                                              | 0.57                                       |
| 330                                                         | D         | 293D337(1)6R3D(2) | 19.8                                           | 8                                      | 0.60                                              | 0.50                                       |
| 330                                                         | E         | 293D337(1)6R3E(2) | 19.8                                           | 8                                      | 0.50                                              | 0.57                                       |
| 470                                                         | D         | 293D477(1)6R3D(2) | 28.2                                           | 14                                     | 0.50                                              | 0.55                                       |
| 470                                                         | E         | 293E477(1)6R3E(2) | 28.2                                           | 10                                     | 1.50                                              | 0.57                                       |
| 680                                                         | E         | 293D687(1)6R3E(2) | 42.8                                           | 20                                     | 0.50                                              | 0.57                                       |
| 1000                                                        | E         | 293D108X06R3E(2)  | 63.0                                           | 30                                     | 0.40                                              | 0.64                                       |

**Notes**

- Part number definitions:
  - Tolerance: X0, X9
  - Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3
- Rating under development.



| STANDARD RATINGS                                           |           |                   |                                                |                                        |                                                   |                                            |
|------------------------------------------------------------|-----------|-------------------|------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------|
| CAPACITANCE<br>( $\mu$ F)                                  | CASE CODE | PART NUMBER       | MAX. DC<br>LEAKAGE<br>AT + 25 °C<br>( $\mu$ A) | MAX. DF<br>AT + 25 °C<br>120 Hz<br>(%) | MAX. ESR<br>AT + 25 °C<br>100 kHz<br>( $\Omega$ ) | MAX. RIPPLE<br>100 kHz<br>$I_{RMS}$<br>(A) |
| 10 V <sub>DC</sub> AT + 85 °C; 7 V <sub>DC</sub> AT 125 °C |           |                   |                                                |                                        |                                                   |                                            |
| 0.47                                                       | A         | 293D474(1)010A(2) | 0.5                                            | 4                                      | 14.00                                             | 0.07                                       |
| 1.0                                                        | A         | 293D105(1)010A(2) | 0.5                                            | 4                                      | 9.60                                              | 0.09                                       |
| 1.5                                                        | A         | 293D155(1)010A(2) | 0.5                                            | 6                                      | 8.00                                              | 0.10                                       |
| 2.2                                                        | A         | 293D225(1)010A(2) | 0.5                                            | 6                                      | 6.30                                              | 0.11                                       |
| 2.2                                                        | B         | 293D225(1)010B(2) | 0.5                                            | 6                                      | 4.60                                              | 0.14                                       |
| 3.3                                                        | A         | 293D335(1)010A(2) | 0.5                                            | 6                                      | 5.50                                              | 0.12                                       |
| 3.3                                                        | B         | 293D335(1)010B(2) | 0.5                                            | 6                                      | 5.50                                              | 0.12                                       |
| 4.7                                                        | A         | 293D475(1)010A(2) | 0.5                                            | 6                                      | 5.00                                              | 0.12                                       |
| 4.7                                                        | B         | 293D475(1)010B(2) | 0.5                                            | 6                                      | 3.40                                              | 0.16                                       |
| 4.7                                                        | C         | 293D475(1)010C(2) | 0.5                                            | 6                                      | 2.30                                              | 0.22                                       |
| 6.8                                                        | A         | 293D685(1)010A(2) | 0.7                                            | 6                                      | 4.20                                              | 0.13                                       |
| 6.8                                                        | B         | 293D685(1)010B(2) | 0.7                                            | 6                                      | 2.90                                              | 0.17                                       |
| 6.8                                                        | C         | 293D685(1)010C(2) | 0.7                                            | 6                                      | 1.90                                              | 0.24                                       |
| 10                                                         | A         | 293D106(1)010A(2) | 1.0                                            | 6                                      | 3.40                                              | 0.15                                       |
| 10                                                         | B         | 293D106(1)010B(2) | 1.0                                            | 6                                      | 2.50                                              | 0.18                                       |
| 10                                                         | C         | 293D106(1)010C(2) | 1.0                                            | 6                                      | 1.80                                              | 0.25                                       |
| 15                                                         | A         | 293D156(1)010A(2) | 1.5                                            | 6                                      | 2.90                                              | 0.16                                       |
| 15                                                         | B         | 293D156(1)010B(2) | 1.5                                            | 6                                      | 2.00                                              | 0.21                                       |
| 15                                                         | C         | 293D156(1)010C(2) | 1.5                                            | 6                                      | 1.80                                              | 0.25                                       |
| 22                                                         | A         | 293D226(1)010A(2) | 2.2                                            | 8                                      | 2.50                                              | 0.17                                       |
| 22                                                         | B         | 293D226(1)010B(2) | 2.2                                            | 6                                      | 1.90                                              | 0.21                                       |
| 22                                                         | C         | 293D226(1)010C(2) | 2.2                                            | 6                                      | 1.50                                              | 0.27                                       |
| 22                                                         | D         | 293D226(1)010D(2) | 2.2                                            | 6                                      | 1.50                                              | 0.32                                       |
| 33                                                         | B         | 293D336(1)010B(2) | 3.3                                            | 6                                      | 1.90                                              | 0.21                                       |
| 33                                                         | C         | 293D336(1)010C(2) | 3.3                                            | 6                                      | 1.40                                              | 0.28                                       |
| 33                                                         | D         | 293D336(1)010D(2) | 3.3                                            | 6                                      | 0.80                                              | 0.43                                       |
| 47                                                         | B         | 293D476(1)010B(2) | 4.7                                            | 6                                      | 1.80                                              | 0.22                                       |
| 47                                                         | C         | 293D476(1)010C(2) | 4.7                                            | 6                                      | 1.10                                              | 0.32                                       |
| 47                                                         | D         | 293D476(1)010D(2) | 4.7                                            | 6                                      | 0.70                                              | 0.46                                       |
| 68                                                         | B         | 293D686(1)010B(2) | 6.8                                            | 14                                     | 1.80                                              | 0.22                                       |
| 68                                                         | C         | 293D686(1)010C(2) | 6.8                                            | 6                                      | 1.00                                              | 0.33                                       |
| 68                                                         | D         | 293D686(1)010D(2) | 6.8                                            | 6                                      | 0.70                                              | 0.46                                       |
| 68                                                         | E         | 293D686(1)010E(2) | 6.8                                            | 6                                      | 0.80                                              | 0.45                                       |
| 68                                                         | V         | 293D686(1)010V(3) | 6.8                                            | 6                                      | 0.70                                              | 0.42                                       |
| 100                                                        | B         | 293D107X0010B(2)  | 10.0                                           | 25                                     | 2.50                                              | 0.18                                       |
| 100                                                        | C         | 293D107(1)010C(2) | 10.0                                           | 8                                      | 0.90                                              | 0.35                                       |
| 100                                                        | D         | 293D107(1)010D(2) | 10.0                                           | 8                                      | 0.60                                              | 0.50                                       |
| 100                                                        | E         | 293D107(1)010E(2) | 10.0                                           | 8                                      | 0.70                                              | 0.49                                       |
| 100                                                        | V         | 293D107(1)010V(3) | 10.0                                           | 8                                      | 0.70                                              | 0.42                                       |
| 120                                                        | E         | 293D127(1)010E(2) | 12.0                                           | 6                                      | 1.00                                              | 0.41                                       |
| 150                                                        | C         | 293D157X0010C(2)  | 15.0                                           | 20                                     | 0.90                                              | 0.35                                       |
| 150                                                        | D         | 293D157(1)010D(2) | 15.0                                           | 8                                      | 0.60                                              | 0.50                                       |
| 150                                                        | E         | 293D157(1)010E(2) | 15.0                                           | 8                                      | 0.50                                              | 0.57                                       |
| 220                                                        | D         | 293D227(1)010D(2) | 22.0                                           | 8                                      | 0.60                                              | 0.50                                       |

**Notes**

- Part number definitions:
  - Tolerance: X0, X9
  - Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3
- Rating under development.



| STANDARD RATINGS                                              |                  |                   |                                                |                                        |                                                   |                                            |
|---------------------------------------------------------------|------------------|-------------------|------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------|
| CAPACITANCE<br>( $\mu$ F)                                     | CASE CODE        | PART NUMBER       | MAX. DC<br>LEAKAGE<br>AT + 25 °C<br>( $\mu$ A) | MAX. DF<br>AT + 25 °C<br>120 Hz<br>(%) | MAX. ESR<br>AT + 25 °C<br>100 kHz<br>( $\Omega$ ) | MAX. RIPPLE<br>100 kHz<br>$I_{RMS}$<br>(A) |
| 10 V <sub>DC</sub> AT + 85 °C; 7 V <sub>DC</sub> AT 125 °C    |                  |                   |                                                |                                        |                                                   |                                            |
| 220                                                           | E                | 293D227(1)010E(2) | 22.0                                           | 8                                      | 0.50                                              | 0.57                                       |
| 220                                                           | V                | 293D227(1)010V(3) | 30.0                                           | 12                                     | 0.50                                              | 0.50                                       |
| 330                                                           | D                | 293D337(1)010D(2) | 33.0                                           | 15                                     | 0.50                                              | 0.57                                       |
| 330                                                           | E                | 293D337(1)010E(2) | 33.0                                           | 10                                     | 0.50                                              | 0.57                                       |
| 470                                                           | E                | 293D477(1)010E(2) | 47.0                                           | 15                                     | 0.50                                              | 0.57                                       |
| 16 V <sub>DC</sub> AT + 85 °C; 10 V <sub>DC</sub> AT + 125 °C |                  |                   |                                                |                                        |                                                   |                                            |
| 0.68                                                          | A                | 293D684(1)016A(2) | 0.5                                            | 4                                      | 10.40                                             | 0.08                                       |
| 1.0                                                           | A                | 293D105(1)016A(2) | 0.5                                            | 4                                      | 9.30                                              | 0.09                                       |
| 1.5                                                           | A                | 293D155(1)016A(2) | 0.5                                            | 6                                      | 6.70                                              | 0.11                                       |
| 1.5                                                           | B                | 293D155(1)016B(2) | 0.5                                            | 6                                      | 6.40                                              | 0.12                                       |
| 2.2                                                           | A                | 293D225(1)016A(2) | 0.5                                            | 6                                      | 5.90                                              | 0.11                                       |
| 2.2                                                           | B                | 293D225(1)016B(2) | 0.5                                            | 6                                      | 4.60                                              | 0.14                                       |
| 3.3                                                           | A                | 293D335(1)016A(2) | 0.5                                            | 6                                      | 5.00                                              | 0.12                                       |
| 3.3                                                           | B                | 293D335(1)016B(2) | 0.5                                            | 6                                      | 3.50                                              | 0.16                                       |
| 4.7                                                           | A                | 293D475(1)016A(2) | 0.8                                            | 6                                      | 5.00                                              | 0.12                                       |
| 4.7                                                           | B                | 293D475(1)016B(2) | 0.8                                            | 6                                      | 2.90                                              | 0.17                                       |
| 4.7                                                           | C                | 293D475(1)016C(2) | 0.8                                            | 6                                      | 2.90                                              | 0.19                                       |
| 6.8                                                           | A                | 293D685(1)016A(2) | 1.1                                            | 6                                      | 4.20                                              | 0.13                                       |
| 6.8                                                           | B                | 293D685(1)016B(2) | 1.1                                            | 6                                      | 2.50                                              | 0.18                                       |
| 6.8                                                           | C                | 293D685(1)016C(2) | 1.1                                            | 6                                      | 1.90                                              | 0.24                                       |
| 10                                                            | A                | 293D106(1)016A(2) | 1.6                                            | 6                                      | 3.00                                              | 0.16                                       |
| 10                                                            | B                | 293D106(1)016B(2) | 1.6                                            | 6                                      | 2.00                                              | 0.21                                       |
| 10                                                            | C                | 293D106(1)016C(2) | 1.6                                            | 6                                      | 1.80                                              | 0.25                                       |
| 10                                                            | D                | 293D106(1)016D(2) | 2.5                                            | 6                                      | 1.20                                              | 0.35                                       |
| 15                                                            | B                | 293D156(1)016B(2) | 2.4                                            | 6                                      | 2.00                                              | 0.21                                       |
| 15                                                            | C                | 293D156(1)016C(2) | 2.4                                            | 6                                      | 1.50                                              | 0.27                                       |
| 22                                                            | B                | 293D226(1)016B(2) | 3.5                                            | 6                                      | 1.90                                              | 0.21                                       |
| 22                                                            | C                | 293D226(1)016C(2) | 3.5                                            | 6                                      | 1.40                                              | 0.28                                       |
| 22                                                            | D                | 293D226(1)016D(2) | 3.5                                            | 6                                      | 0.80                                              | 0.43                                       |
| 33                                                            | B                | 293D336(1)016B(2) | 5.3                                            | 6                                      | 1.80                                              | 0.22                                       |
| 33                                                            | C                | 293D336(1)016C(2) | 5.3                                            | 6                                      | 1.10                                              | 0.32                                       |
| 33                                                            | D                | 293D336(1)016D(2) | 5.3                                            | 6                                      | 0.70                                              | 0.46                                       |
| 47                                                            | C                | 293D476(1)016C(2) | 7.5                                            | 6                                      | 1.00                                              | 0.33                                       |
| 47                                                            | D                | 293D476(1)016D(2) | 7.5                                            | 6                                      | 0.70                                              | 0.46                                       |
| 47                                                            | E                | 293D476(1)016E(2) | 7.5                                            | 6                                      | 0.80                                              | 0.45                                       |
| 68                                                            | D                | 293D686(1)016D(2) | 10.9                                           | 6                                      | 0.60                                              | 0.50                                       |
| 68                                                            | E                | 293D686(1)016E(2) | 10.9                                           | 6                                      | 0.80                                              | 0.45                                       |
| 100                                                           | D                | 293D107(1)016D(2) | 16.0                                           | 8                                      | 0.60                                              | 0.50                                       |
| 100                                                           | E                | 293D107(1)016E(2) | 16.0                                           | 8                                      | 0.60                                              | 0.52                                       |
| 100                                                           | V <sup>(1)</sup> | 293D107(1)016V(3) | 16.0                                           | 10                                     | 0.40                                              | 0.56                                       |
| 150                                                           | D                | 293D157(1)016D(2) | 24.0                                           | 8                                      | 0.60                                              | 0.50                                       |
| 150                                                           | E                | 293D157(1)016E(2) | 24.0                                           | 8                                      | 0.50                                              | 0.57                                       |
| 220                                                           | E                | 293D227(1)016E(2) | 35.2                                           | 14                                     | 0.50                                              | 0.57                                       |

**Notes**

- Part number definitions:
  - Tolerance: X0, X9
  - Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3
- <sup>(1)</sup> Rating under development.



| STANDARD RATINGS                                              |           |                   |                                                |                                        |                                                   |                                            |
|---------------------------------------------------------------|-----------|-------------------|------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------|
| CAPACITANCE<br>( $\mu$ F)                                     | CASE CODE | PART NUMBER       | MAX. DC<br>LEAKAGE<br>AT + 25 °C<br>( $\mu$ A) | MAX. DF<br>AT + 25 °C<br>120 Hz<br>(%) | MAX. ESR<br>AT + 25 °C<br>100 kHz<br>( $\Omega$ ) | MAX. RIPPLE<br>100 kHz<br>$I_{RMS}$<br>(A) |
| 20 V <sub>DC</sub> AT + 85 °C; 13 V <sub>DC</sub> AT + 125 °C |           |                   |                                                |                                        |                                                   |                                            |
| 0.47                                                          | A         | 293D474(1)020A(2) | 0.5                                            | 4                                      | 14.00                                             | 0.07                                       |
| 0.68                                                          | A         | 293D684(1)020A(2) | 0.5                                            | 4                                      | 10.00                                             | 0.09                                       |
| 1.0                                                           | A         | 293D105(1)020A(2) | 0.5                                            | 4                                      | 8.40                                              | 0.09                                       |
| 1.0                                                           | B         | 293D105(1)020B(2) | 0.5                                            | 4                                      | 9.00                                              | 0.10                                       |
| 1.5                                                           | A         | 293D155(1)020A(2) | 0.5                                            | 6                                      | 6.30                                              | 0.11                                       |
| 1.5                                                           | B         | 293D155(1)020B(2) | 0.5                                            | 4.8                                    | 5.60                                              | 0.12                                       |
| 2.2                                                           | A         | 293D225(1)020A(2) | 0.5                                            | 6                                      | 5.90                                              | 0.11                                       |
| 2.2                                                           | B         | 293D225(1)020B(2) | 0.5                                            | 6                                      | 3.50                                              | 0.16                                       |
| 3.3                                                           | A         | 293D335(1)020A(2) | 0.7                                            | 6                                      | 5.90                                              | 0.11                                       |
| 3.3                                                           | B         | 293D335(1)020B(2) | 0.7                                            | 6                                      | 3.00                                              | 0.17                                       |
| 3.3                                                           | C         | 293D335(1)020C(2) | 0.8                                            | 6                                      | 2.30                                              | 0.22                                       |
| 4.7                                                           | A         | 293D475(1)020A(2) | 0.9                                            | 6                                      | 5.00                                              | 0.12                                       |
| 4.7                                                           | B         | 293D475(1)020B(2) | 0.9                                            | 6                                      | 2.90                                              | 0.17                                       |
| 4.7                                                           | C         | 293D475(1)020C(2) | 0.9                                            | 6                                      | 2.30                                              | 0.22                                       |
| 6.8                                                           | A         | 293D685(1)020A(2) | 1.4                                            | 6                                      | 4.50                                              | 0.13                                       |
| 6.8                                                           | B         | 293D685(1)020B(2) | 1.4                                            | 6                                      | 2.50                                              | 0.18                                       |
| 6.8                                                           | C         | 293D685(1)020C(2) | 1.4                                            | 6                                      | 1.90                                              | 0.24                                       |
| 10                                                            | B         | 293D106(1)020B(2) | 2.0                                            | 6                                      | 2.10                                              | 0.20                                       |
| 10                                                            | C         | 293D106(1)020C(2) | 2.0                                            | 6                                      | 1.70                                              | 0.25                                       |
| 10                                                            | D         | 293D106(1)020D(2) | 2.0                                            | 6                                      | 1.00                                              | 0.38                                       |
| 15                                                            | B         | 293D156(1)020B(2) | 3.0                                            | 6                                      | 2.30                                              | 0.19                                       |
| 15                                                            | C         | 293D156(1)020C(2) | 3.0                                            | 6                                      | 1.50                                              | 0.27                                       |
| 15                                                            | D         | 293D156(1)020D(2) | 3.0                                            | 6                                      | 0.90                                              | 0.41                                       |
| 22                                                            | B         | 293D226(1)020B(2) | 4.4                                            | 6                                      | 2.10                                              | 0.20                                       |
| 22                                                            | C         | 293D226(1)020C(2) | 4.4                                            | 6                                      | 1.10                                              | 0.32                                       |
| 22                                                            | D         | 293D226(1)020D(2) | 4.4                                            | 6                                      | 0.70                                              | 0.46                                       |
| 33                                                            | C         | 293D336(1)020C(2) | 6.6                                            | 6                                      | 1.00                                              | 0.33                                       |
| 33                                                            | D         | 293D336(1)020D(2) | 6.6                                            | 6                                      | 0.70                                              | 0.46                                       |
| 47                                                            | D         | 293D476(1)020D(2) | 9.4                                            | 6                                      | 0.70                                              | 0.46                                       |
| 47                                                            | E         | 293D476(1)020E(2) | 9.4                                            | 6                                      | 0.60                                              | 0.52                                       |
| 68                                                            | D         | 293D686(1)020D(2) | 13.6                                           | 6                                      | 0.70                                              | 0.46                                       |
| 68                                                            | E         | 293D686(1)020E(2) | 13.6                                           | 6                                      | 0.60                                              | 0.52                                       |
| 100                                                           | D         | 293D107(1)020D(2) | 20.0                                           | 8                                      | 0.60                                              | 0.50                                       |
| 100                                                           | E         | 293D107(1)020E(2) | 20.0                                           | 8                                      | 0.50                                              | 0.57                                       |
| 25 V <sub>DC</sub> AT + 85 °C; 17 V <sub>DC</sub> AT + 125 °C |           |                   |                                                |                                        |                                                   |                                            |
| 0.10                                                          | A         | 293D104(1)025A(2) | 0.5                                            | 4                                      | 20.00                                             | 0.06                                       |
| 0.33                                                          | A         | 293D334(1)025A(2) | 0.5                                            | 4                                      | 13.00                                             | 0.08                                       |
| 0.47                                                          | A         | 293D474(1)025A(2) | 0.5                                            | 4                                      | 12.00                                             | 0.08                                       |
| 0.68                                                          | A         | 293D684(1)025A(2) | 0.5                                            | 4                                      | 8.40                                              | 0.09                                       |
| 1.0                                                           | A         | 293D105(1)025A(2) | 0.5                                            | 4                                      | 7.60                                              | 0.10                                       |
| 1.0                                                           | B         | 293D105(1)025B(2) | 0.5                                            | 4                                      | 5.00                                              | 0.13                                       |
| 1.5                                                           | A         | 293D155(1)025A(2) | 0.5                                            | 6                                      | 6.70                                              | 0.11                                       |
| 1.5                                                           | B         | 293D155(1)025B(2) | 0.5                                            | 6                                      | 4.60                                              | 0.14                                       |
| 2.2                                                           | A         | 293D225(1)025A(2) | 0.6                                            | 6                                      | 6.30                                              | 0.11                                       |

**Notes**

- Part number definitions:
  - Tolerance: X0, X9
  - Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3
- Rating under development.



| STANDARD RATINGS                                              |           |                   |                                                |                                        |                                                   |                                            |
|---------------------------------------------------------------|-----------|-------------------|------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------|
| CAPACITANCE<br>( $\mu$ F)                                     | CASE CODE | PART NUMBER       | MAX. DC<br>LEAKAGE<br>AT + 25 °C<br>( $\mu$ A) | MAX. DF<br>AT + 25 °C<br>120 Hz<br>(%) | MAX. ESR<br>AT + 25 °C<br>100 kHz<br>( $\Omega$ ) | MAX. RIPPLE<br>100 kHz<br>$I_{RMS}$<br>(A) |
| 25 V <sub>DC</sub> AT + 85 °C; 17 V <sub>DC</sub> AT + 125 °C |           |                   |                                                |                                        |                                                   |                                            |
| 2.2                                                           | B         | 293D225(1)025B(2) | 0.6                                            | 6                                      | 3.80                                              | 0.15                                       |
| 2.2                                                           | C         | 293D225(1)025C(2) | 0.6                                            | 6                                      | 3.20                                              | 0.19                                       |
| 3.3                                                           | A         | 293D335(1)025A(2) | 0.8                                            | 6                                      | 6.00                                              | 0.14                                       |
| 3.3                                                           | B         | 293D335(1)025B(2) | 0.8                                            | 6                                      | 3.10                                              | 0.17                                       |
| 3.3                                                           | C         | 293D335(1)025C(2) | 0.8                                            | 6                                      | 2.30                                              | 0.22                                       |
| 4.7                                                           | A         | 293D475(1)025A(2) | 1.2                                            | 6                                      | 5.50                                              | 0.12                                       |
| 4.7                                                           | B         | 293D475(1)025B(2) | 1.2                                            | 6                                      | 2.80                                              | 0.17                                       |
| 4.7                                                           | C         | 293D475(1)025C(2) | 1.2                                            | 6                                      | 2.00                                              | 0.24                                       |
| 4.7                                                           | D         | 293D475(1)025D(2) | 1.2                                            | 6                                      | 1.30                                              | 0.34                                       |
| 6.8                                                           | B         | 293D685(1)025B(2) | 1.7                                            | 6                                      | 2.40                                              | 0.19                                       |
| 6.8                                                           | C         | 293D685(1)025C(2) | 1.7                                            | 6                                      | 1.70                                              | 0.25                                       |
| 6.8                                                           | D         | 293D685(1)025D(2) | 1.7                                            | 6                                      | 1.10                                              | 0.37                                       |
| 10                                                            | B         | 293D106(1)025B(2) | 2.5                                            | 6                                      | 2.30                                              | 0.19                                       |
| 10                                                            | C         | 293D106(1)025C(2) | 2.5                                            | 6                                      | 1.50                                              | 0.27                                       |
| 10                                                            | D         | 293D106(1)025D(2) | 2.5                                            | 6                                      | 1.00                                              | 0.39                                       |
| 15                                                            | B         | 293D156(1)025B(2) | 3.8                                            | 6                                      | 2.20                                              | 0.20                                       |
| 15                                                            | C         | 293D156(1)025C(2) | 3.8                                            | 6                                      | 1.20                                              | 0.30                                       |
| 15                                                            | D         | 293D156(1)025D(2) | 3.8                                            | 6                                      | 0.80                                              | 0.43                                       |
| 22                                                            | C         | 293D226(1)025C(2) | 5.5                                            | 6                                      | 1.20                                              | 0.30                                       |
| 22                                                            | D         | 293D226(1)025D(2) | 5.5                                            | 6                                      | 0.70                                              | 0.46                                       |
| 22                                                            | E         | 293D226(1)025E(2) | 5.5                                            | 6                                      | 0.80                                              | 0.45                                       |
| 22                                                            | V         | 293D226(1)025V(3) | 5.5                                            | 6                                      | 0.70                                              | 0.42                                       |
| 33                                                            | D         | 293D336(1)025D(2) | 8.3                                            | 6                                      | 0.70                                              | 0.46                                       |
| 33                                                            | E         | 293D336(1)025E(2) | 8.3                                            | 6                                      | 0.60                                              | 0.52                                       |
| 47                                                            | D         | 293D476(1)025D(2) | 11.8                                           | 8                                      | 0.70                                              | 0.46                                       |
| 47                                                            | E         | 293D476(1)025E(2) | 11.8                                           | 6                                      | 0.60                                              | 0.52                                       |
| 68                                                            | E         | 293D686(1)025E(2) | 17.0                                           | 8                                      | 0.60                                              | 0.52                                       |
| 35 V <sub>DC</sub> AT + 85 °C; 23 V <sub>DC</sub> AT + 125 °C |           |                   |                                                |                                        |                                                   |                                            |
| 0.10                                                          | A         | 293D104(1)035A(2) | 0.5                                            | 4                                      | 20.00                                             | 0.06                                       |
| 0.15                                                          | A         | 293D154(1)035A(2) | 0.5                                            | 4                                      | 18.00                                             | 0.07                                       |
| 0.22                                                          | A         | 293D224(1)035A(2) | 0.5                                            | 4                                      | 15.00                                             | 0.07                                       |
| 0.33                                                          | A         | 293D334(1)035A(2) | 0.5                                            | 4                                      | 13.00                                             | 0.08                                       |
| 0.47                                                          | A         | 293D474(1)035A(2) | 0.5                                            | 4                                      | 10.00                                             | 0.09                                       |
| 0.47                                                          | B         | 293D474(1)035B(2) | 0.5                                            | 4                                      | 8.00                                              | 0.10                                       |
| 0.68                                                          | A         | 293D684(1)035A(2) | 0.5                                            | 4                                      | 7.60                                              | 0.10                                       |
| 0.68                                                          | B         | 293D684(1)035B(2) | 0.5                                            | 4                                      | 6.50                                              | 0.11                                       |
| 1.0                                                           | A         | 293D105(1)035A(2) | 0.5                                            | 4                                      | 7.50                                              | 0.10                                       |
| 1.0                                                           | B         | 293D105(1)035B(2) | 0.5                                            | 4                                      | 5.00                                              | 0.13                                       |
| 1.5                                                           | B         | 293D155(1)035B(2) | 0.5                                            | 6                                      | 4.20                                              | 0.14                                       |
| 1.5                                                           | C         | 293D155(1)035C(2) | 0.5                                            | 6                                      | 3.80                                              | 0.17                                       |
| 2.2                                                           | B         | 293D225(1)035B(2) | 0.8                                            | 6                                      | 3.80                                              | 0.15                                       |
| 2.2                                                           | C         | 293D225(1)035C(2) | 0.8                                            | 6                                      | 2.90                                              | 0.20                                       |
| 3.3                                                           | B         | 293D335(1)035B(2) | 1.2                                            | 6                                      | 3.50                                              | 0.16                                       |
| 3.3                                                           | C         | 293D335(1)035C(2) | 1.2                                            | 6                                      | 2.10                                              | 0.23                                       |
| 3.3                                                           | D         | 293D335(1)035D(2) | 1.2                                            | 6                                      | 1.70                                              | 0.30                                       |

**Notes**

- Part number definitions:
  - Tolerance: X0, X9
  - Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3
- (1) Rating under development.



| STANDARD RATINGS                                              |           |                   |                                                |                                        |                                                   |                                            |
|---------------------------------------------------------------|-----------|-------------------|------------------------------------------------|----------------------------------------|---------------------------------------------------|--------------------------------------------|
| CAPACITANCE<br>( $\mu$ F)                                     | CASE CODE | PART NUMBER       | MAX. DC<br>LEAKAGE<br>AT + 25 °C<br>( $\mu$ A) | MAX. DF<br>AT + 25 °C<br>120 Hz<br>(%) | MAX. ESR<br>AT + 25 °C<br>100 kHz<br>( $\Omega$ ) | MAX. RIPPLE<br>100 kHz<br>$I_{RMS}$<br>(A) |
| 35 V <sub>DC</sub> AT + 85 °C; 23 V <sub>DC</sub> AT + 125 °C |           |                   |                                                |                                        |                                                   |                                            |
| 4.7                                                           | B         | 293D475(1)035B(2) | 1.7                                            | 6                                      | 3.10                                              | 0.17                                       |
| 4.7                                                           | C         | 293D475(1)035C(2) | 1.6                                            | 6                                      | 1.90                                              | 0.24                                       |
| 4.7                                                           | D         | 293D475(1)035D(2) | 1.6                                            | 6                                      | 1.30                                              | 0.34                                       |
| 6.8                                                           | C         | 293D685(1)035C(2) | 2.4                                            | 6                                      | 1.80                                              | 0.25                                       |
| 6.8                                                           | D         | 293D685(1)035D(2) | 2.4                                            | 6                                      | 1.10                                              | 0.37                                       |
| 10                                                            | C         | 293D106(1)035C(2) | 3.5                                            | 6                                      | 1.60                                              | 0.26                                       |
| 10                                                            | D         | 293D106(1)035D(2) | 3.5                                            | 6                                      | 0.80                                              | 0.43                                       |
| 15                                                            | D         | 293D156(1)035D(2) | 5.3                                            | 6                                      | 0.70                                              | 0.46                                       |
| 15                                                            | E         | 293D156(1)035E(2) | 5.3                                            | 6                                      | 0.70                                              | 0.49                                       |
| 22                                                            | D         | 293D226(1)035D(2) | 7.7                                            | 6                                      | 0.60                                              | 0.50                                       |
| 22                                                            | E         | 293D226(1)035E(2) | 7.7                                            | 6                                      | 0.60                                              | 0.57                                       |
| 50 V <sub>DC</sub> AT + 85 °C; 33 V <sub>DC</sub> AT + 125 °C |           |                   |                                                |                                        |                                                   |                                            |
| 0.10                                                          | A         | 293D104(1)050A(2) | 0.5                                            | 4                                      | 19.00                                             | 0.06                                       |
| 0.15                                                          | A         | 293D154(1)050A(2) | 0.5                                            | 4                                      | 17.00                                             | 0.07                                       |
| 0.15                                                          | B         | 293D154(1)050B(2) | 0.5                                            | 4                                      | 14.00                                             | 0.08                                       |
| 0.22                                                          | A         | 293D224(1)050A(2) | 0.5                                            | 4                                      | 15.00                                             | 0.07                                       |
| 0.22                                                          | B         | 293D224(1)050B(2) | 0.5                                            | 4                                      | 12.00                                             | 0.08                                       |
| 0.33                                                          | A         | 293D334(1)050A(2) | 0.5                                            | 4                                      | 14.00                                             | 0.07                                       |
| 0.33                                                          | B         | 293D334(1)050B(2) | 0.5                                            | 4                                      | 10.00                                             | 0.09                                       |
| 0.47                                                          | A         | 293D474(1)050A(2) | 0.5                                            | 4                                      | 12.00                                             | 0.08                                       |
| 0.47                                                          | B         | 293D474(1)050B(2) | 0.5                                            | 4                                      | 8.40                                              | 0.10                                       |
| 0.47                                                          | C         | 293D474(1)050C(2) | 0.5                                            | 4                                      | 6.70                                              | 0.13                                       |
| 0.68                                                          | B         | 293D684(1)050B(2) | 0.5                                            | 4                                      | 7.60                                              | 0.11                                       |
| 0.68                                                          | C         | 293D684(1)050C(2) | 0.5                                            | 4                                      | 5.90                                              | 0.14                                       |
| 1.0                                                           | B         | 293D105(1)050B(2) | 0.5                                            | 4                                      | 6.70                                              | 0.11                                       |
| 1.0                                                           | C         | 293D105(1)050C(2) | 0.5                                            | 4                                      | 4.60                                              | 0.16                                       |
| 1.5                                                           | B         | 293D155(1)050B(2) | 0.8                                            | 6                                      | 6.00                                              | 0.12                                       |
| 1.5                                                           | C         | 293D155(1)050C(2) | 0.8                                            | 6                                      | 3.40                                              | 0.18                                       |
| 1.5                                                           | D         | 293D155(1)050D(2) | 0.8                                            | 6                                      | 2.90                                              | 0.23                                       |
| 2.2                                                           | B         | 293D225(1)050B(2) | 1.1                                            | 6                                      | 3.50                                              | 0.16                                       |
| 2.2                                                           | C         | 293D225(1)050C(2) | 1.1                                            | 6                                      | 2.90                                              | 0.20                                       |
| 2.2                                                           | D         | 293D225(1)050D(2) | 1.1                                            | 6                                      | 2.10                                              | 0.27                                       |
| 3.3                                                           | C         | 293D335(1)050C(2) | 1.7                                            | 6                                      | 2.50                                              | 0.21                                       |
| 3.3                                                           | D         | 293D335(1)050D(2) | 1.7                                            | 6                                      | 1.70                                              | 0.30                                       |
| 4.7                                                           | C         | 293D475(1)050C(2) | 2.4                                            | 6                                      | 1.50                                              | 0.27                                       |
| 4.7                                                           | D         | 293D475(1)050D(2) | 2.4                                            | 6                                      | 1.20                                              | 0.37                                       |
| 4.7                                                           | E         | 293D475(1)050E(2) | 2.4                                            | 6                                      | 1.10                                              | 0.34                                       |
| 6.8                                                           | D         | 293D685(1)050D(2) | 3.4                                            | 6                                      | 0.90                                              | 0.41                                       |
| 6.8                                                           | E         | 293D685(1)050E(2) | 3.4                                            | 6                                      | 0.90                                              | 0.43                                       |
| 10                                                            | D         | 293D106(1)050D(2) | 5.0                                            | 6                                      | 0.80                                              | 0.43                                       |
| 10                                                            | E         | 293D106(1)050E(2) | 5.0                                            | 6                                      | 0.80                                              | 0.45                                       |
| 15                                                            | E         | 293D156(1)050E(2) | 7.5                                            | 6                                      | 0.80                                              | 0.45                                       |
| 63 V <sub>DC</sub> AT + 85 °C; 40 V <sub>DC</sub> AT + 125 °C |           |                   |                                                |                                        |                                                   |                                            |
| 4.7                                                           | D         | 293D475(1)063D(2) | 3.0                                            | 6                                      | 1.10                                              | 0.37                                       |
| 10                                                            | E         | 293D106(1)063E(2) | 6.3                                            | 6                                      | 1.00                                              | 0.41                                       |

**Notes**

- Part number definitions:
  - Tolerance: X0, X9
  - Terminations and packaging: 2TE3, 2WE3, 8T, 8W
  - Lead (Pb)-free terminations and packaging codes: 2TE3, 2WE3
- Rating under development.



**RECOMMENDED VOLTAGE DERATING GUIDELINES** (for temperatures below + 85 °C)

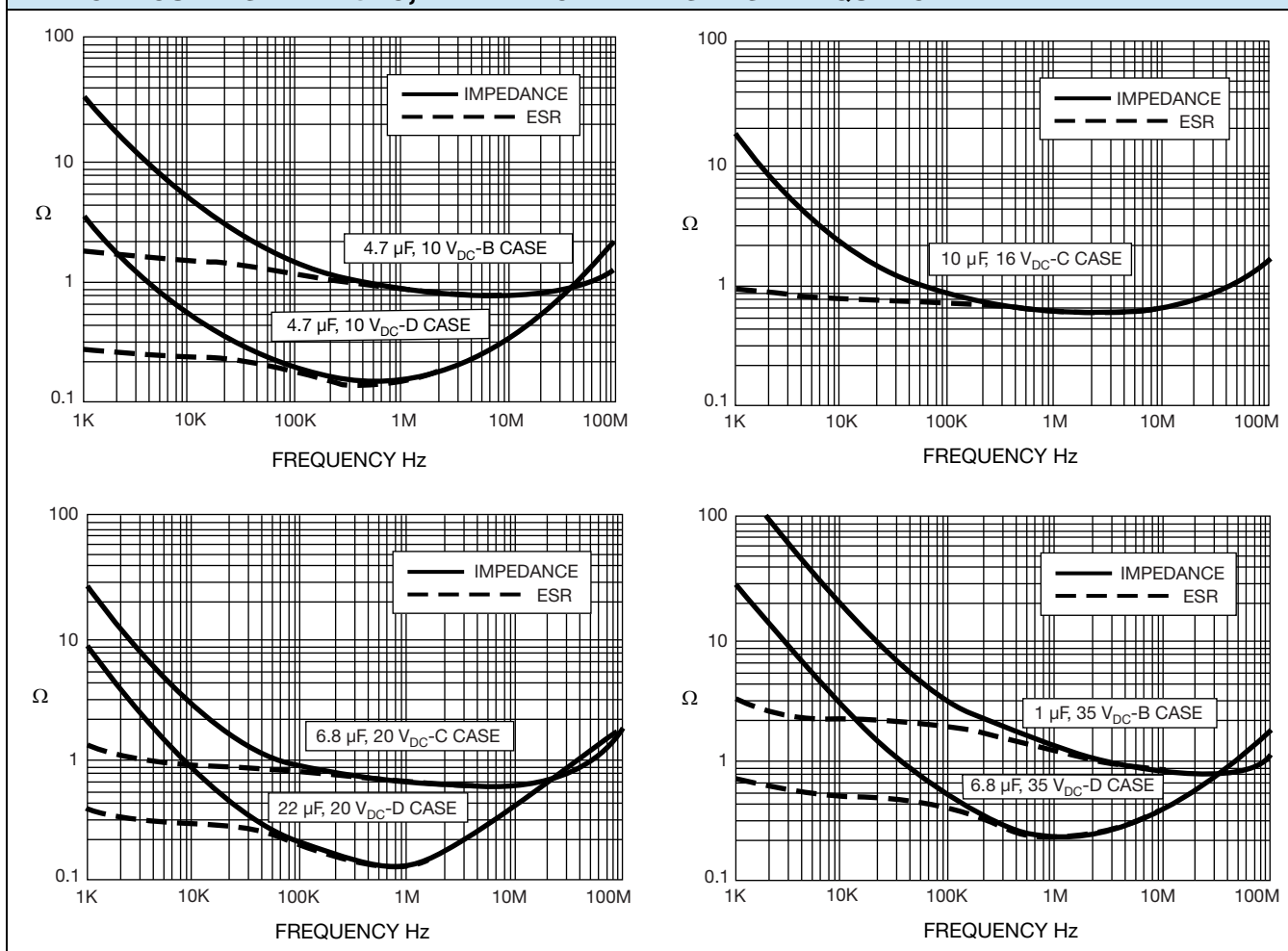
**STANDARD CONDITIONS. FOR EXAMPLE: OUTPUT FILTERS**

| Capacitor Voltage Rating | Operating Voltage |
|--------------------------|-------------------|
| 4.0                      | 2.5               |
| 6.3                      | 3.6               |
| 10                       | 6.0               |
| 16                       | 10                |
| 20                       | 12                |
| 25                       | 15                |
| 35                       | 24                |
| 50                       | 28                |
| 63                       | 36                |

**SEVERE CONDITIONS. FOR EXAMPLE: INPUT FILTERS**

| Capacitor Voltage Rating | Operating Voltage |
|--------------------------|-------------------|
| 4.0                      | 2.5               |
| 6.3                      | 3.3               |
| 10                       | 5.0               |
| 16                       | 8.0               |
| 20                       | 10                |
| 25                       | 12                |
| 35                       | 15                |
| 50                       | 24                |
| 63                       | 31                |

**TYPICAL CURVES AT + 25 °C, IMPEDANCE AND ESR VS. FREQUENCY**



**POWER DISSIPATION**

| CASE CODE | MAXIMUM PERMISSIBLE POWER DISSIPATION AT + 25 °C (W) IN FREE AIR |
|-----------|------------------------------------------------------------------|
| A         | 0.075                                                            |
| B         | 0.085                                                            |
| C         | 0.110                                                            |
| D         | 0.150                                                            |
| E         | 0.165                                                            |
| V         | 0.125                                                            |

**STANDARD PACKAGING QUANTITY**

| CASE CODE | UNITS PER REEL |          |
|-----------|----------------|----------|
|           | 7" REEL        | 13" REEL |
| A         | 2000           | 9000     |
| B         | 2000           | 8000     |
| C         | 500            | 3000     |
| D         | 500            | 2500     |
| E         | 400            | 1500     |
| V         | 1000           | 5000     |

**PRODUCT INFORMATION**

|                                      |                                                                        |
|--------------------------------------|------------------------------------------------------------------------|
| Guide for Molded Tantalum Capacitors | <a href="http://www.vishay.com/doc?40074">www.vishay.com/doc?40074</a> |
| Pad Dimensions                       |                                                                        |
| Packaging Dimensions                 |                                                                        |
| Moisture Sensitivity                 | <a href="http://www.vishay.com/doc?40135">www.vishay.com/doc?40135</a> |
| <b>SELECTOR GUIDES</b>               |                                                                        |
| Solid Tantalum Selector Guide        | <a href="http://www.vishay.com/doc?49053">www.vishay.com/doc?49053</a> |
| Solid Tantalum Chip Capacitors       | <a href="http://www.vishay.com/doc?40091">www.vishay.com/doc?40091</a> |
| <b>FAQ</b>                           |                                                                        |
| Frequently Asked Questions           | <a href="http://www.vishay.com/doc?40110">www.vishay.com/doc?40110</a> |



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