

# Solid Tantalum Surface Mount Capacitors

## TANTAMOUNT® Molded Case, Standard Industrial Grade


**FEATURES**

- Terminations: 100 % matte tin, standard, tin/lead available
- Compliant terminations
- Molded case available in six case codes
- Compatible with "High Volume" automatic pick and place equipment
- Optical character recognition qualified
- Meets IEC specification QC300801/US0001 and EIA535BAAC mechanical and performance requirements
- Compliant to RoHS directive 2002/95/EC


**RoHS\***  
COMPLIANT

**PERFORMANCE/ELECTRICAL CHARACTERISTICS**
**Operating Temperature:** - 55 °C to + 125 °C

**Note:** Refer to Doc. 40088

**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 VDC to 63 VDC

**ORDERING INFORMATION**

| 293D<br>TYPE   | 107<br>CAPACITANCE                       | X9<br>CAPACITANCE<br>TOLERANCE   | 010<br>DC VOLTAGE RATING<br>AT + 85 °C | D<br>CASE CODE   | 2WE3<br>TERMINATION AND<br>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 % | 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 |                                      |

**Note**

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.

Effective July 15, 2008, part numbers with solderable termination codes "2T" and "2W" may have either matte tin or tin/lead terminations. Codes 2TE3 and 2WE3 specify only matte tin terminations. Codes 8T and 8W specify only tin/lead terminations.

**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] | 0.170 ± 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]  | 0.095 ± 0.004<br>[2.4 ± 0.10] | 0.039<br>[1.0]      |
| E         | 7343-43  | 0.287 ± 0.012<br>[7.3 ± 0.30] | 0.170 ± 0.012<br>[4.3 ± 0.30] | 0.158 ± 0.012<br>[4.0 ± 0.30] | 0.051 ± 0.012<br>[1.3 ± 0.30]  | 0.095 ± 0.004<br>[2.4 ± 0.10] | 0.039<br>[1.0]      |
| V         | 7343-20  | 0.287 ± 0.012<br>[7.3 ± 0.30] | 0.170 ± 0.012<br>[4.3 ± 0.30] | 0.079 max.<br>[2.0 max.]      | 0.051 ± 0.012<br>[1.3 ± 0.30]  | 0.095 ± 0.004<br>[2.4 ± 0.10] | 0.039<br>[1.0]      |

\* Pb containing terminations are not RoHS compliant, exemptions may apply

| 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     |      |
| 0.15                   |         |         |         |       |       |         | A     | A/B   |      |
| 0.22                   |         |         |         |       |       |         | A     | A/B   |      |
| 0.33                   |         |         |         |       |       |         | A     | A/B   |      |
| 0.47                   |         |         |         |       |       | A       | A/B   | A/B/C |      |
| 0.68                   |         |         |         |       | A     | A       | A/B   | B/C   |      |
| 1.0                    |         |         |         | A     | A     | A/B     | A/B   | B/C   |      |
| 1.5                    |         |         | A       | A     | A     | A/B     | B/C   | B/C   |      |
| 2.2                    |         | A       | A       | A/B   | A/B   | A/B     | B/C   | C/D   |      |
| 3.3                    | A       | A       | A       | A/B   | A/B   | A/B/C   | B/C   | C/D   |      |
| 4.7                    | A       | A/B     | A/B     | A/B   | A/B/C | A/B/C/D | B/C/D | D     | D    |
| 6.8                    | A       | A/B     | A/B     | A/B/C | A/B/C | B/C     | C/D   | D/E   |      |
| 10                     | A/B     | A/B/C   | A/B/C   | A/B/C | B/C   | B/C/D   | C/D   | D/E   | E    |
| 15                     | A/B     | 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   | B/C/D | B/C/D | C/D/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   | D/E   | D/E     |       |       |      |
| 68                     | B/C/D   | B/C/D   | B/C/D/V | D     | D/E   |         |       |       |      |
| 100                    | A/B/C/D | B/C/D/V | B/C/D/V | D/E   | D/E   |         |       |       |      |
| 150                    | B/C/D   | C/D/E   | D/E     | D/E   |       |         |       |       |      |
| 220                    | B/C/D/E | C/D/E   | D/E     | E     |       |         |       |       |      |
| 330                    | D/E     | D/E     | D/E     |       |       |         |       |       |      |
| 470                    | D/E     | D/E     | E       |       |       |         |       |       |      |
| 680                    | E       | E       |         |       |       |         |       |       |      |
| 1000                   | E       |         |         |       |       |         |       |       |      |

**Note**

- Preliminary values, contact factory for availability.

| MARKING                                  |                              |             |
|--|------------------------------|-------------|
| <p><b>"A" Case Size</b></p>              | <b>"A" CASE VOLTAGE CODE</b> |             |
|  | <b>VOLTS</b>                 | <b>CODE</b> |
|  | 4.0                          | G           |
|  | 6.3                          | J           |
|  | 10                           | A           |
|  | 16                           | C           |
|  | 20                           | D           |
|  | 25                           | E           |
| 35                                       | V                            |             |
| 50                                       | T                            |             |
| <p><b>"B, C, D, E, V" Case Sizes</b></p> |                              |             |

**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 might bear a slightly different marking than the one shown above. For example, rating 22 μF 10 V could be marked either as 22-10L or 22R10.

Call the factory for further explanation.



Solid Tantalum Surface Mount Capacitors  
TANTAMOUNT® Molded Case, Standard Industrial Grade

Vishay Sprague

| RATINGS AND PART NUMBER REFERENCE            |           |                   |  |  |   |  |
|--|-----------|-------------------|--|--|---|--|
| 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) |
| <b>4 VDC AT + 85 °C, 2.7 VDC AT + 125 °C</b> |           |                   |  |  |   |  |
| 3.3  | A         | 293D335(1)004A(2) | 0.5  | 6                                      | 7.6   | 0.10                                       |
| 4.7  | A         | 293D475(1)004A(2) | 0.5  | 6                                      | 6.3   | 0.11                                       |
| 6.8  | A         | 293D685(1)004A(2) | 0.5  | 6                                      | 5.5   | 0.12                                       |
| 10   | A         | 293D106(1)004A(2) | 0.5  | 6                                      | 5.1   | 0.12                                       |
| 10   | B         | 293D106(1)004B(2) | 0.5  | 6                                      | 3.5   | 0.16                                       |
| 15   | A         | 293D156(1)004A(2) | 0.6  | 6                                      | 3.4   | 0.15                                       |
| 15   | B         | 293D156(1)004B(2) | 0.6  | 6                                      | 2.9   | 0.17                                       |
| 22   | A         | 293D226(1)004A(2) | 0.9  | 6                                      | 2.9   | 0.16                                       |
| 22   | B         | 293D226(1)004B(2) | 0.9  | 6                                      | 2.5   | 0.18                                       |
| 22   | C         | 293D226(1)004C(2) | 0.9  | 6                                      | 1.8   | 0.25                                       |
| 33   | A         | 293D336(1)004A(2) | 1.3  | 6                                      | 2.9   | 0.16                                       |
| 33   | B         | 293D336(1)004B(2) | 1.3  | 6                                      | 2.0   | 0.21                                       |
| 33   | C         | 293D336(1)004C(2) | 1.3  | 6                                      | 1.8   | 0.25                                       |
| 47   | A         | 293D476(1)004A(2) | 1.9  | 14                                     | 2.5   | 0.17                                       |
| 47   | B         | 293D476(1)004B(2) | 1.9  | 6                                      | 1.9   | 0.21                                       |
| 47   | C         | 293D476(1)004C(2) | 1.9  | 6                                      | 1.8   | 0.25                                       |
| 68   | B         | 293D686(1)004B(2) | 2.7  | 6                                      | 1.9   | 0.21                                       |
| 68   | C         | 293D686(1)004C(2) | 2.7  | 6                                      | 1.4   | 0.28                                       |
| 68   | D         | 293D686(1)004D(2) | 2.7  | 6                                      | 0.8   | 0.43                                       |
| 100  | A         | 293D107(1)004A(2) | 10.0   | 30                                     | 2.5   | 0.22                                       |
| 100  | B         | 293D107(1)004B(2) | 4.0  | 8                                      | 1.8   | 0.22                                       |
| 100  | C         | 293D107(1)004C(2) | 4.0  | 6                                      | 0.8   | 0.37                                       |
| 100  | D         | 293D107(1)004D(2) | 4.0  | 6                                      | 0.7   | 0.46                                       |
| 150  | B         | 293D157(1)004B(2) | 6.0  | 14                                     | 1.6   | 0.23                                       |
| 150  | C         | 293D157(1)004C(2) | 6.0  | 12                                     | 0.7   | 0.40                                       |
| 150  | D         | 293D157(1)004D(2) | 6.0  | 8                                      | 0.6   | 0.50                                       |
| 220  | B         | 293D227X0004B(2)  | 8.8  | 18                                     | 1.5   | 0.24                                       |
| 220  | C         | 293D227(1)004C(2) | 8.8  | 8                                      | 0.7   | 0.40                                       |
| 220  | D         | 293D227(1)004D(2) | 8.8  | 8                                      | 0.6   | 0.50                                       |
| 220  | E         | 293D227(1)004E(2) | 8.8  | 8                                      | 0.5   | 0.57                                       |
| 330  | D         | 293D337(1)004D(2) | 13.2   | 8                                      | 0.6   | 0.50                                       |
| 330  | E         | 293D337(1)004E(2) | 13.2   | 8                                      | 0.5   | 0.57                                       |
| 470  | D         | 293D477(1)004D(2) | 18.8   | 10                                     | 0.6   | 0.50                                       |
| 470  | E         | 293D477(1)004E(2) | 18.8   | 10                                     | 0.5   | 0.57                                       |
| 680  | E         | 293D687(1)004E(2) | 27.2   | 12                                     | 0.5   | 0.57                                       |
| 1000   | E         | 293D108X0004E(2)  | 40.0   | 20                                     | 0.5   | 0.57                                       |
| <b>6.3 VDC AT + 85 °C, 4 VDC AT + 125 °C</b> |           |                   |  |  |   |  |
| 2.2  | A         | 293D225(1)6R3A(2) | 0.5  | 6                                      | 7.6   | 0.10                                       |
| 3.3  | A         | 293D335(1)6R3A(2) | 0.5  | 6                                      | 6.3   | 0.11                                       |
| 4.7  | A         | 293D475(1)6R3A(2) | 0.5  | 6                                      | 5.5   | 0.12                                       |
| 6.8  | A         | 293D685(1)6R3A(2) | 0.5  | 6                                      | 5.0   | 0.12                                       |
| 6.8  | B         | 293D685(1)6R3B(2) | 0.5  | 6                                      | 3.4   | 0.16                                       |
| 10   | A         | 293D106(1)6R3A(2) | 0.6  | 6                                      | 3.4   | 0.15                                       |
| 10   | B         | 293D106(1)6R3B(2) | 0.6  | 6                                      | 2.9   | 0.17                                       |
| 15   | A         | 293D156(1)6R3A(2) | 0.9  | 6                                      | 2.9   | 0.16                                       |
| 15   | B         | 293D156(1)6R3B(2) | 0.9  | 6                                      | 2.5   | 0.18                                       |
| 15   | C         | 293D156(1)6R3C(2) | 0.9  | 6                                      | 1.8   | 0.25                                       |
| 22   | A         | 293D226(1)6R3A(2) | 1.3  | 6                                      | 2.9   | 0.16                                       |
| 22   | B         | 293D226(1)6R3B(2) | 1.3  | 6                                      | 2.0   | 0.21                                       |
| 22   | C         | 293D226(1)6R3C(2) | 1.3  | 6                                      | 1.8   | 0.25                                       |
| 33   | A         | 293D336(1)6R3A(2) | 2.0  | 14                                     | 2.5   | 0.17                                       |
| 33   | B         | 293D336(1)6R3B(2) | 2.0  | 6                                      | 1.9   | 0.21                                       |
| 33   | C         | 293D336(1)6R3C(2) | 2.0  | 6                                      | 1.5   | 0.27                                       |
| 47   | A         | 293D476(1)6R3A(2) | 2.8  | 12                                     | 1.6   | 0.22                                       |
| 47   | B         | 293D476(1)6R3B(2) | 2.8  | 6                                      | 1.9   | 0.21                                       |
| 47   | C         | 293D476(1)6R3C(2) | 2.8  | 6                                      | 1.4   | 0.28                                       |

**Notes**

- (1) Tolerance: X0, X9, X5
- (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W



| RATINGS AND PART NUMBER REFERENCE            |           |                   |  |  |   |  |
|--|-----------|-------------------|--|--|---|--|
| 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) |
| <b>6.3 VDC AT + 85 °C, 4 VDC AT + 125 °C</b> |           |                   |  |  |   |  |
| 47   | D         | 293D476(1)6R3D(2) | 2.8  | 6                                      | 0.8   | 0.43                                       |
| 68   | B         | 293D686(1)6R3B(2) | 4.1  | 6                                      | 1.8   | 0.22                                       |
| 68   | C         | 293D686(1)6R3C(2) | 4.1  | 6                                      | 0.8   | 0.37                                       |
| 68   | D         | 293D686(1)6R3D(2) | 4.1  | 6                                      | 0.7   | 0.46                                       |
| 100  | B         | 293D107(1)6R3B(2) | 6.0  | 15                                     | 1.7   | 0.22                                       |
| 100  | C         | 293D107(1)6R3C(2) | 6.0  | 6                                      | 0.8   | 0.37                                       |
| 100  | D         | 293D107(1)6R3D(2) | 6.0  | 6                                      | 0.7   | 0.46                                       |
| 100  | V         | 293D107(1)6R3V(2) | 6.0  | 8                                      | 0.7   | 0.42                                       |
| 150  | C         | 293D157(1)6R3C(2) | 9.0  | 8                                      | 0.7   | 0.40                                       |
| 150  | D         | 293D157(1)6R3D(2) | 9.0  | 8                                      | 0.6   | 0.50                                       |
| 150  | E         | 293D157(1)6R3E(2) | 9.0  | 8                                      | 0.5   | 0.57                                       |
| 220  | C         | 293D227(1)6R3C(2) | 13.9   | 14                                     | 0.7   | 0.39                                       |
| 220  | D         | 293D227(1)6R3D(2) | 13.2   | 8                                      | 0.6   | 0.50                                       |
| 220  | E         | 293D227(1)6R3E(2) | 13.2   | 8                                      | 0.5   | 0.57                                       |
| 330  | D         | 293D337(1)6R3D(2) | 19.8   | 8                                      | 0.6   | 0.50                                       |
| 330  | E         | 293D337(1)6R3E(2) | 19.8   | 8                                      | 0.5   | 0.57                                       |
| 470  | D         | 293D477(1)6R3D(2) | 28.2   | 14                                     | 0.5   | 0.55                                       |
| 470  | E         | 293E477(1)6R3E(2) | 28.2   | 10                                     | 1.5   | 0.57                                       |
| 680  | E         | 293D687X06R3E(2)  | 42.8   | 20                                     | 0.5   | 0.57                                       |
| <b>10 VDC AT + 85 °C, 7 VDC AT + 125 °C</b>  |           |                   |  |  |   |  |
| 1.5  | A         | 293D155(1)010A(2) | 0.5  | 6                                      | 8.0   | 0.10                                       |
| 2.2  | A         | 293D225(1)010A(2) | 0.5  | 6                                      | 6.3   | 0.11                                       |
| 3.3  | A         | 293D335(1)010A(2) | 0.5  | 6                                      | 5.5   | 0.12                                       |
| 4.7  | A         | 293D475(1)010A(2) | 0.5  | 6                                      | 5.0   | 0.12                                       |
| 4.7  | B         | 293D475(1)010B(2) | 0.5  | 6                                      | 3.4   | 0.16                                       |
| 6.8  | A         | 293D685(1)010A(2) | 0.7  | 6                                      | 4.2   | 0.13                                       |
| 6.8  | B         | 293D685(1)010B(2) | 0.7  | 6                                      | 2.9   | 0.17                                       |
| 10   | A         | 293D106(1)010A(2) | 1.0  | 6                                      | 3.4   | 0.15                                       |
| 10   | B         | 293D106(1)010B(2) | 1.0  | 6                                      | 2.5   | 0.18                                       |
| 10   | C         | 293D106(1)010C(2) | 1.0  | 6                                      | 1.8   | 0.25                                       |
| 15   | A         | 293D156(1)010A(2) | 1.5  | 6                                      | 2.9   | 0.16                                       |
| 15   | B         | 293D156(1)010B(2) | 1.5  | 6                                      | 2.0   | 0.21                                       |
| 15   | C         | 293D156(1)010C(2) | 1.5  | 6                                      | 1.8   | 0.25                                       |
| 22   | A         | 293D226(1)010A(2) | 2.2  | 8                                      | 2.5   | 0.17                                       |
| 22   | B         | 293D226(1)010B(2) | 2.2  | 6                                      | 1.9   | 0.21                                       |
| 22   | C         | 293D226(1)010C(2) | 2.2  | 6                                      | 1.5   | 0.27                                       |
| 33   | B         | 293D336(1)010B(2) | 3.3  | 6                                      | 1.9   | 0.21                                       |
| 33   | C         | 293D336(1)010C(2) | 3.3  | 6                                      | 1.4   | 0.28                                       |
| 33   | D         | 293D336(1)010D(2) | 3.3  | 6                                      | 0.8   | 0.43                                       |
| 47   | B         | 293D476(1)010B(2) | 4.7  | 6                                      | 1.8   | 0.22                                       |
| 47   | C         | 293D476(1)010C(2) | 4.7  | 6                                      | 1.1   | 0.32                                       |
| 47   | D         | 293D476(1)010D(2) | 4.7  | 6                                      | 0.7   | 0.46                                       |
| 68   | B         | 293D686(1)010B(2) | 6.8  | 14                                     | 1.8   | 0.22                                       |
| 68   | C         | 293D686(1)010C(2) | 6.8  | 6                                      | 1.0   | 0.33                                       |
| 68   | D         | 293D686(1)010D(2) | 6.8  | 6                                      | 0.7   | 0.46                                       |
| 68   | V         | 293D686(1)010V(2) | 6.8  | 6                                      | 0.7   | 0.42                                       |

**Notes**

- (1) Tolerance: X0, X9, X5
- (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W



Solid Tantalum Surface Mount Capacitors  
TANTAMOUNT® Molded Case, Standard Industrial Grade

Vishay Sprague

| <b>RATINGS AND PART NUMBER REFERENCE</b>     |           |                   |  |  |   |  |
|--|-----------|-------------------|--|--|---|--|
| 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) |
| <b>10 VDC AT + 85 °C, 7 VDC AT + 125 °C</b>  |           |                   |  |  |   |  |
| 100  | B         | 293D107X0010B(2)  | 10   | 25                                     | 2.5   | 0.18                                       |
| 100  | C         | 293D107(1)010C(2) | 10   | 8                                      | 0.9   | 0.35                                       |
| 100  | D         | 293D107(1)010D(2) | 10   | 8                                      | 0.6   | 0.50                                       |
| 100  | V         | 293D107(1)010V(2) | 10   | 8                                      | 0.7   | 0.42                                       |
| 150  | D         | 293D157(1)010D(2) | 15   | 8                                      | 0.6   | 0.50                                       |
| 150  | E         | 293D157(1)010E(2) | 15   | 8                                      | 0.5   | 0.57                                       |
| 220  | D         | 293D227(1)010D(2) | 22   | 8                                      | 0.6   | 0.50                                       |
| 220  | E         | 293D227(1)010E(2) | 22   | 8                                      | 0.5   | 0.57                                       |
| 330  | D         | 293D337X0010D(2)  | 33   | 15                                     | 0.5   | 0.57                                       |
| 330  | E         | 293D337(1)010E(2) | 33   | 10                                     | 0.5   | 0.57                                       |
| 470  | E         | 293D477X0010E(2)  | 47   | 15                                     | 0.5   | 0.57                                       |
| <b>16 VDC AT + 85 °C, 10 VDC AT + 125 °C</b> |           |                   |  |  |   |  |
| 1.0  | A         | 293D105(1)016A(2) | 0.5  | 4                                      | 9.3   | 0.09                                       |
| 1.5  | A         | 293D155(1)016A(2) | 0.5  | 6                                      | 6.7   | 0.11                                       |
| 2.2  | A         | 293D225(1)016A(2) | 0.5  | 6                                      | 5.9   | 0.11                                       |
| 2.2  | B         | 293D225(1)016B(2) | 0.5  | 6                                      | 4.6   | 0.14                                       |
| 3.3  | A         | 293D335(1)016A(2) | 0.5  | 6                                      | 5.0   | 0.12                                       |
| 3.3  | B         | 293D335(1)016B(2) | 0.5  | 6                                      | 3.5   | 0.16                                       |
| 4.7  | A         | 293D475(1)016A(2) | 0.8  | 6                                      | 5.0   | 0.12                                       |
| 4.7  | B         | 293D475(1)016B(2) | 0.8  | 6                                      | 2.9   | 0.17                                       |
| 6.8  | A         | 293D685(1)016A(2) | 1.1  | 6                                      | 4.2   | 0.13                                       |
| 6.8  | B         | 293D685(1)016B(2) | 1.1  | 6                                      | 2.5   | 0.18                                       |
| 6.8  | C         | 293D685(1)016C(2) | 1.1  | 6                                      | 1.9   | 0.24                                       |
| 10   | A         | 293D106(1)016A(2) | 1.6  | 6                                      | 3.0   | 0.16                                       |
| 10   | B         | 293D106(1)016B(2) | 1.6  | 6                                      | 2.0   | 0.21                                       |
| 10   | C         | 293D106(1)016C(2) | 1.6  | 6                                      | 1.8   | 0.25                                       |
| 15   | B         | 293D156(1)016B(2) | 2.4  | 6                                      | 2.0   | 0.21                                       |
| 15   | C         | 293D156(1)016C(2) | 2.4  | 6                                      | 1.5   | 0.27                                       |
| 22   | B         | 293D226X0016B(2)  | 3.5  | 6                                      | 1.9   | 0.21                                       |
| 22   | C         | 293D226(1)016C(2) | 3.5  | 6                                      | 1.4   | 0.28                                       |
| 22   | D         | 293D226(1)016D(2) | 3.5  | 6                                      | 0.8   | 0.43                                       |
| 33   | B         | 293D336(1)016B(2) | 5.3  | 6                                      | 1.8   | 0.22                                       |
| 33   | C         | 293D336(1)016C(2) | 5.3  | 6                                      | 1.1   | 0.32                                       |
| 33   | D         | 293D336(1)016D(2) | 5.3  | 6                                      | 0.7   | 0.46                                       |
| 47   | C         | 293D476(1)016C(2) | 7.5  | 6                                      | 1.0   | 0.33                                       |
| 47   | D         | 293D476(1)016D(2) | 7.5  | 6                                      | 0.7   | 0.46                                       |
| 68   | D         | 293D686(1)016D(2) | 10.9   | 6                                      | 0.6   | 0.50                                       |
| 100  | D         | 293D107(1)016D(2) | 16   | 8                                      | 0.6   | 0.50                                       |
| 100  | E         | 293D107(1)016E(2) | 16   | 8                                      | 0.6   | 0.52                                       |
| 150  | D         | 293D157(1)016D(2) | 24   | 8                                      | 0.6   | 0.50                                       |
| 150  | E         | 293D157(1)016E(2) | 24   | 8                                      | 0.5   | 0.57                                       |
| 220  | E         | 293D227(1)016E(2) | 35.2   | 14                                     | 0.5   | 0.57                                       |
| <b>20 VDC AT + 85 °C, 13 VDC AT + 125 °C</b> |           |                   |  |  |   |  |
| 0.68   | A         | 293D684(1)020A(2) | 0.5  | 4                                      | 10.0  | 0.09                                       |
| 1.0  | A         | 293D105(1)020A(2) | 0.5  | 4                                      | 8.4   | 0.09                                       |
| 1.5  | A         | 293D155(1)020A(2) | 0.5  | 6                                      | 6.3   | 0.11                                       |
| 2.2  | A         | 293D225(1)020A(2) | 0.5  | 6                                      | 5.9   | 0.11                                       |
| 2.2  | B         | 293D225(1)020B(2) | 0.5  | 6                                      | 3.5   | 0.16                                       |
| 3.3  | A         | 293D335(1)020A(2) | 0.7  | 6                                      | 5.9   | 0.11                                       |
| 3.3  | B         | 293D335(1)020B(2) | 0.7  | 6                                      | 3.0   | 0.17                                       |
| 4.7  | A         | 293D475(1)020A(2) | 0.9  | 6                                      | 5.0   | 0.12                                       |
| 4.7  | B         | 293D475(1)020B(2) | 0.9  | 6                                      | 2.9   | 0.17                                       |
| 4.7  | C         | 293D475(1)020C(2) | 0.9  | 6                                      | 2.3   | 0.22                                       |

**Notes**

- (1) Tolerance: X0, X9, X5
- (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W



| RATINGS AND PART NUMBER REFERENCE            |           |                   |   |  |   |   |
|--|-----------|-------------------|---|--|---|---|
| CAPACITANCE<br>( $\mu\text{F}$ )             | CASE CODE | PART NUMBER       | MAX. DC<br>LEAKAGE<br>AT + 25 °C<br>( $\mu\text{A}$ ) | 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>$I_{\text{rms}}$<br>(A) |
| <b>20 VDC AT + 85 °C, 13 VDC AT + 125 °C</b> |           |                   |   |  |   |   |
| 6.8  | A         | 293D685(1)020A(2) | 1.4   | 6                                      | 4.5   | 0.13  |
| 6.8  | B         | 293D685(1)020B(2) | 1.4   | 6                                      | 2.5   | 0.18  |
| 6.8  | C         | 293D685(1)020C(2) | 1.4   | 6                                      | 1.9   | 0.24  |
| 10   | B         | 293D106(1)020B(2) | 2.0   | 6                                      | 2.1   | 0.20  |
| 10   | C         | 293D106(1)020C(2) | 2.0   | 6                                      | 1.7   | 0.25  |
| 15   | B         | 293D156(1)020B(2) | 3.0   | 6                                      | 2.3   | 0.19  |
| 15   | C         | 293D156(1)020C(2) | 3.0   | 6                                      | 1.5   | 0.27  |
| 15   | D         | 293D156(1)020D(2) | 3.0   | 6                                      | 0.9   | 0.41  |
| 22   | B         | 293D226(1)020B(2) | 4.4   | 6                                      | 2.1   | 0.20  |
| 22   | C         | 293D226(1)020C(2) | 4.4   | 6                                      | 1.1   | 0.32  |
| 22   | D         | 293D226(1)020D(2) | 4.4   | 6                                      | 0.7   | 0.46  |
| 33   | C         | 293D336(1)020C(2) | 6.6   | 6                                      | 1.0   | 0.33  |
| 33   | D         | 293D336(1)020D(2) | 6.6   | 6                                      | 0.7   | 0.46  |
| 47   | D         | 293D476(1)020D(2) | 9.4   | 6                                      | 0.7   | 0.46  |
| 47   | E         | 293D476(1)020E(2) | 9.4   | 6                                      | 0.6   | 0.52  |
| 68   | D         | 293D686(1)020D(2) | 13.6  | 6                                      | 0.7   | 0.46  |
| 68   | E         | 293D686(1)020E(2) | 13.6  | 6                                      | 0.6   | 0.52  |
| 100  | D         | 293D107(1)020D(2) | 20.0  | 8                                      | 0.6   | 0.50  |
| 100  | E         | 293D107(1)020E(2) | 20.0  | 8                                      | 0.5   | 0.57  |
| <b>25 VDC AT + 85 °C, 17 VDC AT + 125 °C</b> |           |                   |   |  |   |   |
| 0.47   | A         | 293D474(1)025A(2) | 0.5   | 4                                      | 12.0  | 0.08  |
| 0.68   | A         | 293D684(1)025A(2) | 0.5   | 4                                      | 8.4   | 0.09  |
| 1.0  | A         | 293D105(1)025A(2) | 0.5   | 4                                      | 7.6   | 0.10  |
| 1.0  | B         | 293D105(1)025B(2) | 0.5   | 4                                      | 5.0   | 0.13  |
| 1.5  | A         | 293D155(1)025A(2) | 0.5   | 6                                      | 6.7   | 0.11  |
| 1.5  | B         | 293D155(1)025B(2) | 0.5   | 6                                      | 4.6   | 0.14  |
| 2.2  | A         | 293D225(1)025A(2) | 0.6   | 6                                      | 6.3   | 0.11  |
| 2.2  | B         | 293D225(1)025B(2) | 0.6   | 6                                      | 3.8   | 0.15  |
| 3.3  | A         | 293D335(1)025A(2) | 0.8   | 6                                      | 4.0   | 0.14  |
| 3.3  | B         | 293D335(1)025B(2) | 0.8   | 6                                      | 3.1   | 0.17  |
| 3.3  | C         | 293D335(1)025C(2) | 0.8   | 6                                      | 2.3   | 0.22  |
| 4.7  | A         | 293D475(1)025A(2) | 1.2   | 6                                      | 5.5   | 0.12  |
| 4.7  | B         | 293D475(1)025B(2) | 1.2   | 6                                      | 2.8   | 0.17  |
| 4.7  | C         | 293D475(1)025C(2) | 1.2   | 6                                      | 2.0   | 0.24  |
| 4.7  | D         | 293D475(1)025D(2) | 1.2   | 6                                      | 1.3   | 0.34  |
| 6.8  | B         | 293D685(1)025B(2) | 1.7   | 6                                      | 2.4   | 0.19  |
| 6.8  | C         | 293D685(1)025C(2) | 1.7   | 6                                      | 1.7   | 0.25  |
| 10   | B         | 293D106(1)025B(2) | 2.5   | 6                                      | 2.3   | 0.19  |
| 10   | C         | 293D106(1)025C(2) | 2.5   | 6                                      | 1.5   | 0.27  |
| 10   | D         | 293D106(1)025D(2) | 2.5   | 6                                      | 1.0   | 0.39  |
| 15   | B         | 293D156(1)025B(2) | 3.8   | 6                                      | 2.2   | 0.20  |
| 15   | C         | 293D156(1)025C(2) | 3.8   | 6                                      | 1.2   | 0.30  |
| 15   | D         | 293D156(1)025D(2) | 3.8   | 6                                      | 0.8   | 0.43  |
| 22   | C         | 293D226(1)025C(2) | 5.5   | 6                                      | 1.2   | 0.30  |
| 22   | D         | 293D226(1)025D(2) | 5.5   | 6                                      | 0.7   | 0.46  |
| 22   | V         | 293D226(1)025V(2) | 5.5   | 6                                      | 0.7   | 0.42  |
| 33   | D         | 293D336(1)025D(2) | 8.3   | 6                                      | 0.7   | 0.46  |
| 33   | E         | 293D336(1)025E(2) | 8.3   | 6                                      | 0.6   | 0.52  |
| 47   | D         | 293D476(1)025D(2) | 11.8  | 8                                      | 0.7   | 0.46  |
| 47   | E         | 293D476(1)025E(2) | 11.8  | 6                                      | 0.6   | 0.52  |

**Notes**

- (1) Tolerance: X0, X9, X5
- (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W



Solid Tantalum Surface Mount Capacitors  
TANTAMOUNT® Molded Case, Standard Industrial Grade

Vishay Sprague

| RATINGS AND PART NUMBER REFERENCE            |           |                   |  |  |   |  |
|--|-----------|-------------------|--|--|---|--|
| 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) |
| <b>35 VDC AT + 85 °C, 23 VDC AT + 125 °C</b> |           |                   |  |  |   |  |
| 0.10   | A         | 293D104(1)035A(2) | 0.5  | 4                                      | 20.0  | 0.06                                       |
| 0.15   | A         | 293D154(1)035A(2) | 0.5  | 4                                      | 18.0  | 0.07                                       |
| 0.22   | A         | 293D224(1)035A(2) | 0.5  | 4                                      | 15.0  | 0.07                                       |
| 0.33   | A         | 293D334(1)035A(2) | 0.5  | 4                                      | 13.0  | 0.08                                       |
| 0.47   | A         | 293D474(1)035A(2) | 0.5  | 4                                      | 10.0  | 0.09                                       |
| 0.47   | B         | 293D474(1)035B(2) | 0.5  | 4                                      | 8.0   | 0.10                                       |
| 0.68   | A         | 293D684(1)035A(2) | 0.5  | 4                                      | 7.6   | 0.10                                       |
| 0.68   | B         | 293D684(1)035B(2) | 0.5  | 4                                      | 6.5   | 0.11                                       |
| 1.0  | A         | 293D105(1)035A(2) | 0.5  | 4                                      | 7.5   | 0.10                                       |
| 1.0  | B         | 293D105(1)035B(2) | 0.5  | 4                                      | 5.0   | 0.13                                       |
| 1.5  | B         | 293D155(1)035B(2) | 0.5  | 6                                      | 4.2   | 0.14                                       |
| 1.5  | C         | 293D155(1)035C(2) | 0.5  | 6                                      | 3.8   | 0.17                                       |
| 2.2  | B         | 293D225(1)035B(2) | 0.8  | 6                                      | 3.8   | 0.15                                       |
| 2.2  | C         | 293D225(1)035C(2) | 0.8  | 6                                      | 2.9   | 0.20                                       |
| 3.3  | B         | 293D335(1)035B(2) | 1.2  | 6                                      | 3.5   | 0.16                                       |
| 3.3  | C         | 293D335(1)035C(2) | 1.2  | 6                                      | 2.1   | 0.23                                       |
| 4.7  | B         | 293D475(1)035B(2) | 1.7  | 6                                      | 3.1   | 0.17                                       |
| 4.7  | C         | 293D475(1)035C(2) | 1.6  | 6                                      | 1.9   | 0.24                                       |
| 4.7  | D         | 293D475(1)035D(2) | 1.6  | 6                                      | 1.3   | 0.34                                       |
| 6.8  | C         | 293D685(1)035C(2) | 2.4  | 6                                      | 1.8   | 0.25                                       |
| 6.8  | D         | 293D685(1)035D(2) | 2.4  | 6                                      | 1.1   | 0.37                                       |
| 10   | C         | 293D106(1)035C(2) | 3.5  | 6                                      | 1.6   | 0.26                                       |
| 10   | D         | 293D106(1)035D(2) | 3.5  | 6                                      | 0.8   | 0.43                                       |
| 15   | D         | 293D156(1)035D(2) | 5.3  | 6                                      | 0.7   | 0.46                                       |
| 15   | E         | 293D156(1)035E(2) | 5.3  | 6                                      | 0.7   | 0.49                                       |
| 22   | D         | 293D226(1)035D(2) | 7.7  | 6                                      | 0.6   | 0.52                                       |
| 22   | E         | 293D226(1)035E(2) | 7.7  | 6                                      | 0.6   | 0.52                                       |
| <b>50 VDC AT + 85 °C, 33 VDC AT + 125 °C</b> |           |                   |  |  |   |  |
| 0.10   | A         | 293D104(1)050A(2) | 0.5  | 4                                      | 19.0  | 0.06                                       |
| 0.15   | A         | 293D154(1)050A(2) | 0.5  | 4                                      | 17.0  | 0.07                                       |
| 0.15   | B         | 293D154(1)050B(2) | 0.5  | 4                                      | 14.0  | 0.08                                       |
| 0.22   | A         | 293D224(1)050A(2) | 0.5  | 4                                      | 15.0  | 0.07                                       |
| 0.22   | B         | 293D224(1)050B(2) | 0.5  | 4                                      | 12.0  | 0.08                                       |
| 0.33   | A         | 293D334(1)050A(2) | 0.5  | 4                                      | 14.0  | 0.07                                       |
| 0.33   | B         | 293D334(1)050B(2) | 0.5  | 4                                      | 10.0  | 0.09                                       |
| 0.47   | A         | 293D474(1)050A(2) | 0.5  | 4                                      | 12.0  | 0.08                                       |
| 0.47   | B         | 293D474(1)050B(2) | 0.5  | 4                                      | 8.4   | 0.10                                       |
| 0.47   | C         | 293D474(1)050C(2) | 0.5  | 4                                      | 6.7   | 0.13                                       |
| 0.68   | B         | 293D684(1)050B(2) | 0.5  | 4                                      | 7.6   | 0.11                                       |
| 0.68   | C         | 293D684(1)050C(2) | 0.5  | 4                                      | 5.9   | 0.14                                       |
| 1.0  | B         | 293D105(1)050B(2) | 0.5  | 4                                      | 6.7   | 0.11                                       |
| 1.0  | C         | 293D105(1)050C(2) | 0.5  | 4                                      | 4.6   | 0.16                                       |
| 1.5  | B         | 293D155(1)050B(2) | 0.8  | 6                                      | 6.0   | 0.12                                       |
| 1.5  | C         | 293D155(1)050C(2) | 0.8  | 6                                      | 3.4   | 0.18                                       |
| 2.2  | C         | 293D225(1)050C(2) | 1.1  | 6                                      | 2.9   | 0.20                                       |
| 2.2  | D         | 293D225(1)050D(2) | 1.1  | 6                                      | 2.1   | 0.27                                       |
| 3.3  | C         | 293D335(1)050C(2) | 1.7  | 6                                      | 2.5   | 0.21                                       |
| 3.3  | D         | 293D335(1)050D(2) | 1.7  | 6                                      | 1.7   | 0.30                                       |
| 4.7  | C         | 293D457(1)050C(2) | 2.4  | 6                                      | 1.5   | 0.27                                       |
| 4.7  | D         | 293D475(1)050D(2) | 2.4  | 6                                      | 1.2   | 0.37                                       |

**Notes**

- (1) Tolerance: X0, X9, X5
- (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W

| RATINGS AND PART NUMBER REFERENCE            |           |                   |                                 |                               |                                 |  |
|--|-----------|-------------------|---------------------------------|-------------------------------|---------------------------------|--|
| CAPACITANCE (μF)                             | CASE CODE | PART NUMBER       | MAX. DC LEAKAGE AT + 25 °C (μA) | MAX. DF AT + 25 °C 120 Hz (%) | MAX. ESR AT + 25 °C 100 kHz (Ω) | MAX. RIPPLE 100 kHz I <sub>rms</sub> (A) |
| <b>50 VDC AT + 85 °C, 33 VDC AT + 125 °C</b> |           |                   |                                 |                               |                                 |  |
| 6.8  | D         | 293D685(1)050D(2) | 3.4                             | 6                             | 0.9                             | 0.41                                     |
| 6.8  | E         | 293D685(1)050E(2) | 3.4                             | 6                             | 0.9                             | 0.43                                     |
| 10   | D         | 293D106(1)050D(2) | 5.0                             | 6                             | 0.8                             | 0.43                                     |
| 10   | E         | 293D106(1)050E(2) | 5.0                             | 6                             | 0.8                             | 0.45                                     |
| 15   | E         | 293D156(1)050E(2) | 7.5                             | 6                             | 0.8                             | 0.45                                     |
| <b>63 VDC AT + 85 °C, 40 VDC AT + 125 °C</b> |           |                   |                                 |                               |                                 |  |
| 4.7  | D         | 293D475(1)063D(2) | 3.0                             | 6                             | 1.1                             | 0.37                                     |
| 10   | E         | 293D106(1)063E(2) | 6.3                             | 6                             | 1.0                             | 0.41                                     |

**Notes**

- (1) Tolerance: X0, X9, X5
- (2) Terminations and packaging: 2TE3, 2WE3, 8T, 8W







## Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.

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

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А