

# Solid Tantalum Chip Capacitors TANTAMOUNT<sup>®</sup>, Conformal Coated



## FEATURES

- 8 mm, 12 mm tape packaging to EIA-481 reeling per IEC 60286-3.  
7" (178 mm) standard 13" (330 mm) available
- US and European case sizes available
- Mounting: Surface mount
- Terminations: 100 % tin (2) standard, tin/lead available
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS\***  
COMPLIANT

### Note

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

## PERFORMANCE/ELECTRICAL CHARACTERISTICS

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

**Operating Temperature:** - 55 °C to + 125 °C  
(above 85 °C, voltage derating is required)

**Capacitance Range:** 0.1 μF to 330 μF

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

**Voltage Rating:** 2 V<sub>DC</sub> to 50 V<sub>DC</sub>

| ORDERING INFORMATION |  |  |  |                                  |  |   |
|----------------------|--|--|--|----------------------------------|--|---|
| 195D                 | 106  | X0   | 004  | S                                | 2  | T   |
| TYPE                 | CAPACITANCE  | CAPACITANCE TOLERANCE  | DC VOLTAGE RATING AT + 85 °C   | CASE CODE                        | TERMINATION  | PACKAGING   |
|                      | This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow. | <b>X0 = ± 20 %</b><br>X9 = ± 10 %<br>X5 = ± 5 %<br>(Special order) | This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating. A decimal point is indicated by an "R" (6R3 = 6.3 V). | See Ratings and Case Codes table | Style 2 is standard<br><b>2 = 100 % tin</b><br>4 = Gold plated<br>8 = Solder plated (60/40)<br>Special order | <b>T = Tape and reel</b><br><b>7" [178 mm] reel standard.</b><br><b>For H case size lengthwise</b><br><b>W = Tape and reel</b><br><b>13" [330 mm] reel available</b><br>See Standard Packaging Quantity table |

### Note

- Preferred tolerance and reel sizes are in bold.  
We reserve the right to supply higher voltage ratings and tighter capacitance tolerance capacitors in the same case size.

| DIMENSIONS in inches [millimeters] |                                |  |                                |                                |                                |                |                 |                 |
|------------------------------------|--------------------------------|--|--------------------------------|--------------------------------|--------------------------------|----------------|-----------------|-----------------|
|                                    |                                |  |                                |                                |                                |                |                 |                 |
| CASE CODE                          | L                              | W  | H                              | A                              | B                              | C (MIN.)       | D (REF.)        | J (MAX.)        |
| STANDARD CASE CODES                |                                |  |                                |                                |                                |                |                 |                 |
| C                                  | 0.087 max.<br>[2.21 max.]      | 0.045 ± 0.010<br>[1.14 ± 0.25]               | 0.045 ± 0.010<br>[1.14 ± 0.25] | 0.016 ± 0.008<br>[0.40 ± 0.20] | 0.042 ± 0.010<br>[1.07 ± 0.25] | -              | 0.063<br>[1.60] | 0.004<br>[0.10] |
| S                                  | 0.143 max.<br>[3.63 max.]      | 0.072 ± 0.008<br>[1.83 ± 0.20]               | 0.048 ± 0.008<br>[1.22 ± 0.20] | 0.023 ± 0.010<br>[0.58 ± 0.25] | 0.085 ± 0.015<br>[2.16 ± 0.37] | -              | 0.114<br>[2.90] | 0.004<br>[0.10] |
| V                                  | 0.143 max.<br>[3.63 max.]      | 0.104 ± 0.010<br>[2.65 ± 0.25]               | 0.051 ± 0.010<br>[1.30 ± 0.25] | 0.023 ± 0.010<br>[0.58 ± 0.25] | 0.085 ± 0.015<br>[2.16 ± 0.37] | -              | 0.114<br>[2.90] | 0.004<br>[0.10] |
| X                                  | 0.285 max.<br>[7.24 max.]      | 0.104 ± 0.010<br>[2.65 ± 0.25]               | 0.051 ± 0.010<br>[1.30 ± 0.25] | 0.039 ± 0.020<br>[1.00 ± 0.50] | 0.200 ± 0.027<br>[5.08 ± 0.69] | -              | 0.244<br>[6.20] | 0.004<br>[0.10] |
| Y                                  | 0.285 max.<br>[7.24 max.]      | 0.104 ± 0.010<br>[2.65 ± 0.25]               | 0.069 ± 0.010<br>[1.75 ± 0.25] | 0.039 ± 0.020<br>[1.00 ± 0.50] | 0.200 ± 0.027<br>[5.08 ± 0.69] | -              | 0.244<br>[6.20] | 0.004<br>[0.10] |
| Z                                  | 0.285 max.<br>[7.24 max.]      | 0.104 ± 0.010<br>[2.65 ± 0.25]               | 0.104 ± 0.010<br>[2.65 ± 0.25] | 0.039 ± 0.020<br>[1.00 ± 0.50] | 0.200 ± 0.027<br>[5.08 ± 0.69] | -              | 0.244<br>[6.20] | 0.004<br>[0.10] |
| R                                  | 0.283 max.<br>[7.20 max.]      | 0.236 + 0.012/- 0.024<br>[6.0 + 0.30/- 0.60] | 0.138 ± 0.012<br>[3.50 ± 0.30] | 0.051 ± 0.012<br>[1.30 ± 0.30] | 0.181 ± 0.025<br>[4.60 ± 0.60] | -              | 0.244<br>[6.20] | 0.004<br>[0.10] |
| EUROPEAN CASE CODES                |                                |  |                                |                                |                                |                |                 |                 |
| A                                  | 0.110 ± 0.008<br>[2.80 ± 0.20] | 0.0591 ± 0.012<br>[1.5 ± 0.30]               | 0.055 max.<br>[1.40 max.]      | 0.028 ± 0.012<br>[0.70 ± 0.30] | 0.063 ± 0.012<br>[1.60 ± 0.30] | 0.012<br>[0.3] | -               | -               |
| B                                  | 0.165 ± 0.008<br>[4.20 ± 0.20] | 0.055 ± 0.012<br>[1.4 ± 0.30]                | 0.063 max.<br>[1.6 max.]       | 0.031 ± 0.012<br>[0.80 ± 0.30] | 0.098 ± 0.012<br>[2.50 ± 0.30] | 0.012<br>[0.3] | -               | -               |
| D                                  | 0.165 ± 0.008<br>[4.20 ± 0.20] | 0.083 ± 0.012<br>[2.1 ± 0.30]                | 0.063 max.<br>[1.6 max.]       | 0.031 ± 0.012<br>[0.80 ± 0.30] | 0.098 ± 0.012<br>[2.50 ± 0.30] | 0.02<br>[0.5]  | -               | -               |
| E                                  | 0.217 ± 0.012<br>[5.50 ± 0.30] | 0.083 ± 0.012<br>[2.1 ± 0.30]                | 0.067 max.<br>[1.70 max.]      | 0.039 ± 0.012<br>[1.00 ± 0.30] | 0.126 ± 0.012<br>[3.20 ± 0.30] | 0.031<br>[0.8] | -               | -               |
| F                                  | 0.197 ± 0.012<br>[5.0 ± 0.30]  | 0.130 ± 0.012<br>[3.3 ± 0.30]                | 0.079 max.<br>[2.00 max.]      | 0.039 ± 0.012<br>[1.00 ± 0.30] | 0.142 ± 0.012<br>[3.60 ± 0.30] | 0.031<br>[0.8] | -               | -               |
| G                                  | 0.276 ± 0.012<br>[7.00 ± 0.30] | 0.102 ± 0.012<br>[2.6 ± 0.30]                | 0.110 max.<br>[2.80 max.]      | 0.039 ± 0.012<br>[1.00 ± 0.30] | 0.177 ± 0.012<br>[4.5 ± 0.30]  | 0.031<br>[0.8] | -               | -               |
| H                                  | 0.307 ± 0.012<br>[7.80 ± 0.30] | 0.146 ± 0.012<br>[3.7 ± 0.30]                | 0.118 max.<br>[3.0 max.]       | 0.039 ± 0.012<br>[1.00 ± 0.30] | 0.197 ± 0.012<br>[5.00 ± 0.30] | 0.031<br>[0.8] | -               | -               |

**Note**

- The anode termination (D less B) will be a minimum of 0.010" (0.25 mm), C case = 0.005" (0.131 mm) minimum



| RATINGS AND CASE CODES |     |     |       |      |      |       |      |      |      |      |       |
|------------------------|-----|-----|-------|------|------|-------|------|------|------|------|-------|
| μF                     | 2 V | 4 V | 6.3 V | 10 V | 15 V | 16 V  | 20 V | 25 V | 35 V | 40 V | 50 V  |
| 0.10                   |     |     |       |      |      |       |      |      | A    | A    | A/C   |
| 0.15                   |     |     |       |      |      |       |      |      | A    | A    | A/C   |
| 0.22                   |     |     |       | S    |      |       |      |      | A    | A    | B/C/S |
| 0.33                   |     |     |       |      |      |       |      | A    | B/C  | B    | B/S   |
| 0.47                   |     |     |       |      | A    | A     | A    | C    | B/S  | B    | D/V   |
| 0.68                   |     |     |       |      | A    | A     | C    | B/S  | D/S  | D    | D/V   |
| 1.0                    |     |     |       | A/S  | B    | B/C   | B/S  | S    | D/S  | D    | E/X   |
| 1.5                    |     |     | A     | C    | B    | B/S   | S    | D/S  | E/V  | E    | F/X   |
| 2.2                    |     | A   | C     | B/S  |      | S     | D/S  | E/V  | F/X  | F    | F/Y   |
| 3.3                    | A   | C   | B/S   | S    | D    | D/S   | E/V  | X    | F/Y  | F    | G/Z   |
| 4.7                    | A   | B/S | S     | D/S  | E    | E/V   | X    | F/X  | G/Z  | G    | H/Z   |
| 6.8                    | A   | S   | D/S   | E/V  |      | X     | F/X  | G/Y  | H/Z  | H    | R     |
| 10                     | A   | D/S | E/V   | X    | F    | F/X   | Y    | G/Y  | Z    |      | R     |
| 15                     |     | E/V | X     | F/X  |      | Y     | G/Z  | H/Z  | R    |      |       |
| 22                     |     | X   | F/X   | Y    | G    | G/Y/Z | H/Z  | R    | R    |      |       |
| 33                     |     | F/X | Y     | G/Z  | H    | H/Z   | R    | R    |      |      |       |
| 47                     |     | Y   | G/Y   | H/Z  |      | R     | R    |      |      |      |       |
| 68                     |     | G/Y | H/Z   | R    |      | R     |      |      |      |      |       |
| 100                    |     | H/Z | Z     | H/R  |      |       |      |      |      |      |       |
| 120                    |     | R   | R     | R    |      |       |      |      |      |      |       |
| 150                    |     | R   | R     | R    |      |       |      |      |      |      |       |
| 180                    |     | R   | R     |      |      |       |      |      |      |      |       |
| 220                    |     | R   | R     |      |      |       |      |      |      |      |       |
| 330                    |     | R   |       |      |      |       |      |      |      |      |       |

| STANDARD RATINGS   |           |                      |                          |                               |  |
|--|-----------|----------------------|--------------------------|-------------------------------|--|
| CAPACITANCE (μF)   | CASE CODE | PART NUMBER          | MAX. DCL AT + 25 °C (μA) | MAX. DF AT + 25 °C 120 Hz (%) |  |
| <b>2 V<sub>DC</sub> AT + 85 °C, 1.2 V<sub>DC</sub> AT + 125 °C</b> |           |                      |                          |                               |  |
| 3.3  | A         | 195D335(1)002A(2)(3) | 0.5                      | 8                             |  |
| 4.7  | A         | 195D475(1)002A(2)(3) | 0.5                      | 8                             |  |
| 6.8  | A         | 195D685(1)002A(2)(3) | 0.5                      | 8                             |  |
| 10   | A         | 195D106(1)002A(2)(3) | 0.6                      | 8                             |  |
| <b>4 V<sub>DC</sub> AT + 85 °C, 2.7 V<sub>DC</sub> AT + 125 °C</b> |           |                      |                          |                               |  |
| 2.2  | A         | 195D225(1)004A(2)(3) | 0.5                      | 8                             |  |
| 3.3  | C         | 195D335(1)004C(2)(3) | 0.5                      | 6                             |  |
| 4.7  | B         | 195D475(1)004B(2)(3) | 0.5                      | 8                             |  |
| 4.7  | S         | 195D475(1)004S(2)(3) | 0.5                      | 6                             |  |
| 6.8  | S         | 195D685(1)004S(2)(3) | 0.5                      | 6                             |  |
| 10   | D         | 195D106(1)004D(2)(3) | 0.5                      | 8                             |  |
| 10   | S         | 195D106(1)004S(2)(3) | 0.5                      | 6                             |  |
| 15   | E         | 195D156(1)004E(2)(3) | 0.6                      | 8                             |  |
| 15   | V         | 195D156(1)004V(2)(3) | 0.6                      | 6                             |  |
| 22   | X         | 195D226(1)004X(2)(3) | 0.9                      | 6                             |  |

**Note**

- Part number definitions:
  - (1) Tolerance: For 10 % tolerance, specify "X9", for 20 % tolerance, change to "X0"
  - (2) Termination: For 100 % tin specify "2", for gold plated specify "4", for solder plated 60/40 specify "8"
  - (3) Packaging code: For 7" reels specify "T", for 13" reels specify "W"



| STANDARD RATINGS   |           |                      |                                      |                                     |
|--|-----------|----------------------|--------------------------------------|-------------------------------------|
| CAPACITANCE<br>( $\mu$ F)  | CASE CODE | PART NUMBER          | MAX. DCL<br>AT + 25 °C<br>( $\mu$ A) | MAX. DF<br>AT + 25 °C<br>120 Hz (%) |
| <b>4 V<sub>DC</sub> AT + 85 °C, 2.7 V<sub>DC</sub> AT + 125 °C</b> |           |                      |                                      |                                     |
| 33   | F         | 195D336(1)004F(2)(3) | 1.3                                  | 8                                   |
| 33   | X         | 195D336(1)004X(2)(3) | 1.3                                  | 6                                   |
| 47   | Y         | 195D476(1)004Y(2)(3) | 1.9                                  | 6                                   |
| 68   | G         | 195D686(1)004G(2)(3) | 2.7                                  | 8                                   |
| 68   | Y         | 195D686(1)004Y(2)(3) | 2.7                                  | 6                                   |
| 100  | H         | 195D107(1)004H(2)(3) | 4.0                                  | 8                                   |
| 100  | Z         | 195D107(1)004Z(2)(3) | 4.0                                  | 8                                   |
| 120  | R         | 195D127(1)004R(2)(3) | 4.8                                  | 8                                   |
| 150  | R         | 195D157(1)004R(2)(3) | 6.0                                  | 8                                   |
| 180  | R         | 195D187(1)004R(2)(3) | 7.2                                  | 8                                   |
| 220  | R         | 195D227(1)004R(2)(3) | 8.8                                  | 8                                   |
| 330  | R         | 195D337(1)004R(2)(3) | 13.2                                 | 8                                   |
| <b>6.3 V<sub>DC</sub> AT + 85 °C, 4 V<sub>DC</sub> AT + 125 °C</b> |           |                      |                                      |                                     |
| 1.5  | A         | 195D155(1)6R3A(2)(3) | 0.5                                  | 8                                   |
| 2.2  | C         | 195D225(1)6R3C(2)(3) | 0.5                                  | 6                                   |
| 3.3  | B         | 195D335(1)6R3B(2)(3) | 0.5                                  | 8                                   |
| 3.3  | S         | 195D335(1)6R3S(2)(3) | 0.5                                  | 6                                   |
| 4.7  | S         | 195D475(1)6R3S(2)(3) | 0.5                                  | 6                                   |
| 6.8  | D         | 195D685(1)6R3D(2)(3) | 0.5                                  | 8                                   |
| 6.8  | S         | 195D685(1)6R3S(2)(3) | 0.5                                  | 6                                   |
| 10   | E         | 195D106(1)6R3E(2)(3) | 0.6                                  | 8                                   |
| 10   | V         | 195D106(1)6R3V(2)(3) | 0.6                                  | 6                                   |
| 15   | X         | 195D156(1)6R3X(2)(3) | 0.9                                  | 6                                   |
| 22   | F         | 195D226(1)6R3F(2)(3) | 1.3                                  | 8                                   |
| 22   | X         | 195D226(1)6R3X(2)(3) | 1.3                                  | 6                                   |
| 33   | Y         | 195D336(1)6R3Y(2)(3) | 2.0                                  | 6                                   |
| 47   | G         | 195D476(1)6R3G(2)(3) | 2.8                                  | 8                                   |
| 47   | Y         | 195D476(1)6R3Y(2)(3) | 2.8                                  | 6                                   |
| 68   | H         | 195D686(1)6R3H(2)(3) | 4.1                                  | 8                                   |
| 68   | Z         | 195D686(1)6R3Z(2)(3) | 4.1                                  | 6                                   |
| 100  | Z         | 195D107(1)6R3Z(2)(3) | 6.0                                  | 8                                   |
| 120  | R         | 195D127(1)6R3R(2)(3) | 7.2                                  | 8                                   |
| 150  | R         | 195D157(1)6R3R(2)(3) | 9.0                                  | 8                                   |
| 180  | R         | 195D187(1)6R3R(2)(3) | 10.8                                 | 8                                   |
| 220  | R         | 195D227(1)6R3R(2)(3) | 13.2                                 | 8                                   |
| <b>10 V<sub>DC</sub> AT + 85 °C, 7 V<sub>DC</sub> AT + 125 °C</b>  |           |                      |                                      |                                     |
| 0.22   | S         | 195D224(1)010S(2)(3) | 0.5                                  | 4                                   |
| 1.0  | A         | 195D105(1)010A(2)(3) | 0.5                                  | 6                                   |
| 1.0  | S         | 195D105(1)010S(2)(3) | 0.5                                  | 6                                   |
| 1.5  | C         | 195D155(1)010C(2)(3) | 0.5                                  | 6                                   |
| 2.2  | B         | 195D225(1)010B(2)(3) | 0.5                                  | 6                                   |
| 2.2  | S         | 195D225(1)010S(2)(3) | 0.5                                  | 6                                   |
| 3.3  | S         | 195D335(1)010S(2)(3) | 0.5                                  | 6                                   |
| 4.7  | D         | 195D475(1)010D(2)(3) | 0.5                                  | 6                                   |
| 4.7  | S         | 195D475(1)010S(2)(3) | 0.5                                  | 6                                   |
| 6.8  | E         | 195D685(1)010E(2)(3) | 0.7                                  | 6                                   |
| 6.8  | V         | 195D685(1)010V(2)(3) | 0.7                                  | 6                                   |

**Note**

- Part number definitions:
  - Tolerance: For 10 % tolerance, specify "X9", for 20 % tolerance, change to "X0"
  - Termination: For 100 % tin specify "2", for gold plated specify "4", for solder plated 60/40 specify "8"
  - Packaging code: For 7" reels specify "T", for 13" reels specify "W"



| <b>STANDARD RATINGS</b>  |                  |                      |  |  |
|--|------------------|----------------------|--|--|
| <b>CAPACITANCE<br/>(<math>\mu</math>F)</b>                         | <b>CASE CODE</b> | <b>PART NUMBER</b>   | <b>MAX. DCL<br/>AT + 25 °C<br/>(<math>\mu</math>A)</b> | <b>MAX. DF<br/>AT + 25 °C<br/>120 Hz (%)</b> |
| <b>10 V<sub>DC</sub> AT + 85 °C, 7 V<sub>DC</sub> AT + 125 °C</b>  |                  |                      |  |  |
| 10   | X                | 195D106(1)010X(2)(3) | 1.0  | 6  |
| 15   | F                | 195D156(1)010F(2)(3) | 1.5  | 6  |
| 15   | X                | 195D156(1)010X(2)(3) | 1.5  | 6  |
| 22   | Y                | 195D226(1)010Y(2)(3) | 2.2  | 6  |
| 33   | G                | 195D336(1)010G(2)(3) | 3.3  | 6  |
| 33   | Z                | 195D336(1)010Z(2)(3) | 3.0  | 6  |
| 47   | H                | 195D476(1)010H(2)(3) | 4.7  | 6  |
| 47   | Z                | 195D476(1)010Z(2)(3) | 4.7  | 6  |
| 68   | R                | 195D686(1)010R(2)(3) | 6.8  | 6  |
| 100  | H                | 195D107(1)010H(2)(3) | 8.0  | 7  |
| 100  | R                | 195D107(1)010R(2)(3) | 10.0   | 8  |
| 120  | R                | 195D127(1)010R(2)(3) | 12.0   | 8  |
| 150  | R                | 195D157(1)010R(2)(3) | 15.0   | 8  |
| <b>15 V<sub>DC</sub> AT + 85 °C, 10 V<sub>DC</sub> AT + 125 °C</b> |                  |                      |  |  |
| 0.47   | A                | 195D474(1)015A(2)(3) | 0.5  | 6  |
| 0.68   | A                | 195D684(1)015A(2)(3) | 0.5  | 6  |
| 1.0  | B                | 195D105(1)015B(2)(3) | 0.5  | 6  |
| 1.5  | B                | 195D155(1)015B(2)(3) | 0.5  | 6  |
| 3.3  | D                | 195D335(1)015D(2)(3) | 0.5  | 6  |
| 4.7  | E                | 195D475(1)015E(2)(3) | 0.7  | 6  |
| 10   | F                | 195D106(1)015F(2)(3) | 1.5  | 6  |
| 22   | G                | 195D226(1)015G(2)(3) | 3.3  | 6  |
| 33   | H                | 195D336(1)015H(2)(3) | 5.0  | 6  |
| <b>16 V<sub>DC</sub> AT + 85 °C, 10 V<sub>DC</sub> AT + 125 °C</b> |                  |                      |  |  |
| 0.47   | A                | 195D474(1)016A(2)(3) | 0.5  | 6  |
| 0.68   | A                | 195D684(1)016A(2)(3) | 0.5  | 6  |
| 1.0  | B                | 195D105(1)016B(2)(3) | 0.5  | 6  |
| 1.0  | C                | 195D105(1)016C(2)(3) | 0.5  | 4  |
| 1.5  | B                | 195D155(1)016B(2)(3) | 0.5  | 6  |
| 1.5  | S                | 195D155(1)016S(2)(3) | 0.5  | 6  |
| 2.2  | S                | 195D225(1)016S(2)(3) | 0.5  | 6  |
| 3.3  | D                | 195D335(1)016D(2)(3) | 0.5  | 6  |
| 3.3  | S                | 195D335(1)016S(2)(3) | 0.5  | 6  |
| 4.7  | E                | 195D475(1)016E(2)(3) | 0.7  | 6  |
| 4.7  | V                | 195D475(1)016V(2)(3) | 0.7  | 6  |
| 6.8  | X                | 195D685(1)016X(2)(3) | 1.0  | 6  |
| 10   | F                | 195D106(1)016F(2)(3) | 1.5  | 6  |
| 10   | X                | 195D106(1)016X(2)(3) | 1.5  | 6  |
| 15   | Y                | 195D156(1)016Y(2)(3) | 2.3  | 6  |
| 22   | G                | 195D226(1)016G(2)(3) | 3.3  | 6  |
| 22   | Y                | 195D226(1)016Y(2)(3) | 3.2  | 6  |
| 22   | Z                | 195D226(1)016Z(2)(3) | 3.3  | 6  |
| 33   | H                | 195D336(1)016H(2)(3) | 5.0  | 6  |
| 33   | Z                | 195D336(1)016Z(2)(3) | 5.0  | 6  |
| 47   | R                | 195D476(1)016R(2)(3) | 7.1  | 6  |
| 68   | R                | 195D686(1)016R(2)(3) | 10.2   | 6  |

**Note**

- Part number definitions:
  - Tolerance: For 10 % tolerance, specify "X9", for 20 % tolerance, change to "X0"
  - Termination: For 100 % tin specify "2", for gold plated specify "4", for solder plated 60/40 specify "8"
  - Packaging code: For 7" reels specify "T", for 13" reels specify "W"



| STANDARD RATINGS   |           |                      |                                      |                                     |
|--|-----------|----------------------|--------------------------------------|-------------------------------------|
| CAPACITANCE<br>( $\mu$ F)  | CASE CODE | PART NUMBER          | MAX. DCL<br>AT + 25 °C<br>( $\mu$ A) | MAX. DF<br>AT + 25 °C<br>120 Hz (%) |
| <b>20 V<sub>DC</sub> AT + 85 °C, 13 V<sub>DC</sub> AT + 125 °C</b> |           |                      |                                      |                                     |
| 0.47   | A         | 195D474(1)020A(2)(3) | 0.5                                  | 6                                   |
| 0.68   | C         | 195D684(1)020C(2)(3) | 0.5                                  | 4                                   |
| 1.0  | B         | 195D105(1)020B(2)(3) | 0.5                                  | 6                                   |
| 1.0  | S         | 195D105(1)020S(2)(3) | 0.5                                  | 4                                   |
| 1.5  | S         | 195D155(1)020S(2)(3) | 0.5                                  | 6                                   |
| 2.2  | D         | 195D225(1)020D(2)(3) | 0.5                                  | 6                                   |
| 2.2  | S         | 195D225(1)020S(2)(3) | 0.5                                  | 6                                   |
| 3.3  | E         | 195D335(1)020E(2)(3) | 0.7                                  | 6                                   |
| 3.3  | V         | 195D335(1)020V(2)(3) | 0.7                                  | 6                                   |
| 4.7  | X         | 195D475(1)020X(2)(3) | 0.9                                  | 6                                   |
| 6.8  | F         | 195D685(1)020F(2)(3) | 1.4                                  | 6                                   |
| 6.8  | X         | 195D685(1)020X(2)(3) | 1.4                                  | 6                                   |
| 10   | Y         | 195D106(1)020Y(2)(3) | 2.0                                  | 6                                   |
| 15   | G         | 195D156(1)020G(2)(3) | 3.0                                  | 6                                   |
| 15   | Z         | 195D156(1)020Z(2)(3) | 3.0                                  | 6                                   |
| 22   | H         | 195D226(1)020H(2)(3) | 4.4                                  | 6                                   |
| 22   | Z         | 195D226(1)020Z(2)(3) | 4.4                                  | 6                                   |
| 33   | R         | 195D336(1)020R(2)(3) | 6.6                                  | 6                                   |
| 47   | R         | 195D476(1)020R(2)(3) | 9.4                                  | 6                                   |
| <b>25 V<sub>DC</sub> AT + 85 °C, 17 V<sub>DC</sub> AT + 125 °C</b> |           |                      |                                      |                                     |
| 0.33   | A         | 195D334(1)025A(2)(3) | 0.5                                  | 6                                   |
| 0.47   | C         | 195D474(1)025C(2)(3) | 0.5                                  | 4                                   |
| 0.68   | B         | 195D684(1)025B(2)(3) | 0.5                                  | 6                                   |
| 0.68   | S         | 195D684(1)025S(2)(3) | 0.5                                  | 4                                   |
| 1.0  | S         | 195D105(1)025S(2)(3) | 0.5                                  | 4                                   |
| 1.5  | D         | 195D155(1)025D(2)(3) | 0.5                                  | 6                                   |
| 1.5  | S         | 195D155(1)025S(2)(3) | 0.5                                  | 6                                   |
| 2.2  | E         | 195D225(1)025E(2)(3) | 0.6                                  | 6                                   |
| 2.2  | V         | 195D225(1)025V(2)(3) | 0.6                                  | 6                                   |
| 3.3  | X         | 195D335(1)025X(2)(3) | 0.8                                  | 6                                   |
| 4.7  | F         | 195D475(1)025F(2)(3) | 1.2                                  | 6                                   |
| 4.7  | X         | 195D475(1)025X(2)(3) | 1.2                                  | 6                                   |
| 6.8  | G         | 195D685(1)025G(2)(3) | 1.7                                  | 6                                   |
| 6.8  | Y         | 195D685(1)025Y(2)(3) | 1.7                                  | 6                                   |
| 10   | G         | 195D106(1)025G(2)(3) | 2.5                                  | 6                                   |
| 10   | Y         | 195D106(1)025Y(2)(3) | 2.5                                  | 6                                   |
| 15   | H         | 195D156(1)025H(2)(3) | 3.8                                  | 6                                   |
| 15   | Z         | 195D156(1)025Z(2)(3) | 3.8                                  | 6                                   |
| 22   | R         | 195D226(1)025R(2)(3) | 5.5                                  | 6                                   |
| 33   | R         | 195D336(1)025R(2)(3) | 8.3                                  | 6                                   |

**Note**

- Part number definitions:
  - Tolerance: For 10 % tolerance, specify "X9", for 20 % tolerance, change to "X0"
  - Termination: For 100 % tin specify "2", for gold plated specify "4", for solder plated 60/40 specify "8"
  - Packaging code: For 7" reels specify "T", for 13" reels specify "W"



| STANDARD RATINGS  |           |                      |                                      |                                     |
|---|-----------|----------------------|--------------------------------------|-------------------------------------|
| CAPACITANCE<br>( $\mu$ F)   | CASE CODE | PART NUMBER          | MAX. DCL<br>AT + 25 °C<br>( $\mu$ A) | MAX. DF<br>AT + 25 °C<br>120 Hz (%) |
| <b>35 V<sub>DC</sub> AT + 85 °C, 23 V<sub>DC</sub> AT + 125 °C</b>                      |           |                      |                                      |                                     |
| 0.10  | A         | 195D104(1)035A(2)(3) | 0.5                                  | 6                                   |
| 0.15  | A         | 195D154(1)035A(2)(3) | 0.5                                  | 6                                   |
| 0.22  | A         | 195D224(1)035A(2)(3) | 0.5                                  | 6                                   |
| 0.33  | B         | 195D334(1)035B(2)(3) | 0.5                                  | 6                                   |
| 0.33  | C         | 195D334(1)035C(2)(3) | 0.5                                  | 4                                   |
| 0.47  | B         | 195D474(1)035B(2)(3) | 0.5                                  | 6                                   |
| 0.47  | S         | 195D474(1)035S(2)(3) | 0.5                                  | 4                                   |
| 0.68  | D         | 195D684(1)035D(2)(3) | 0.5                                  | 6                                   |
| 0.68  | S         | 195D684(1)035S(2)(3) | 0.5                                  | 4                                   |
| 1.0   | D         | 195D105(1)035D(2)(3) | 0.5                                  | 6                                   |
| 1.0   | S         | 195D105(1)035S(2)(3) | 0.5                                  | 4                                   |
| 1.5   | E         | 195D155(1)035E(2)(3) | 0.5                                  | 6                                   |
| 1.5   | V         | 195D155(1)035V(2)(3) | 0.5                                  | 6                                   |
| 2.2   | F         | 195D225(1)035F(2)(3) | 0.8                                  | 6                                   |
| 2.2   | X         | 195D225(1)035X(2)(3) | 0.8                                  | 6                                   |
| 3.3   | F         | 195D335(1)035F(2)(3) | 1.2                                  | 6                                   |
| 3.3   | Y         | 195D335(1)035Y(2)(3) | 1.2                                  | 6                                   |
| 4.7   | G         | 195D475(1)035G(2)(3) | 1.6                                  | 6                                   |
| 4.7   | Z         | 195D475(1)035Z(2)(3) | 1.6                                  | 6                                   |
| 6.8   | H         | 195D685(1)035H(2)(3) | 2.4                                  | 6                                   |
| 6.8   | Z         | 195D685(1)035Z(2)(3) | 2.4                                  | 6                                   |
| 10  | Z         | 195D106(1)035Z(2)(3) | 3.5                                  | 6                                   |
| 15  | R         | 195D156(1)035R(2)(3) | 5.3                                  | 6                                   |
| 22  | R         | 195D226(1)035R(2)(3) | 7.7                                  | 6                                   |
| <b>40 V<sub>DC</sub> AT + 85 °C, 23 V<sub>DC</sub> TO 25 V<sub>DC</sub> AT + 125 °C</b> |           |                      |                                      |                                     |
| 0.10  | A         | 195D104(1)040A(2)(3) | 0.5                                  | 6                                   |
| 0.15  | A         | 195D154(1)040A(2)(3) | 0.5                                  | 6                                   |
| 0.22  | A         | 195D224(1)040A(2)(3) | 0.5                                  | 6                                   |
| 0.33  | B         | 195D334(1)040B(2)(3) | 0.5                                  | 6                                   |
| 0.47  | B         | 195D474(1)040B(2)(3) | 0.5                                  | 6                                   |
| 0.68  | D         | 195D684(1)040D(2)(3) | 0.5                                  | 6                                   |
| 1.0   | D         | 195D105(1)040D(2)(3) | 0.5                                  | 6                                   |
| 1.5   | E         | 195D155(1)040E(2)(3) | 0.5                                  | 6                                   |
| 2.2   | F         | 195D225(1)040F(2)(3) | 0.8                                  | 6                                   |
| 3.3   | F         | 195D335(1)040F(2)(3) | 1.2                                  | 6                                   |
| 4.7   | G         | 195D475(1)040G(2)(3) | 1.6                                  | 6                                   |
| 6.8   | H         | 195D685(1)040H(2)(3) | 2.4                                  | 6                                   |
| <b>50 V<sub>DC</sub> AT + 85 °C, 33 V<sub>DC</sub> AT + 125 °C</b>                      |           |                      |                                      |                                     |
| 0.10  | A         | 195D104(1)050A(2)(3) | 0.5                                  | 6                                   |
| 0.10  | C         | 195D104(1)050C(2)(3) | 0.5                                  | 4                                   |
| 0.15  | A         | 195D154(1)050A(2)(3) | 0.5                                  | 6                                   |
| 0.15  | C         | 195D154(1)050C(2)(3) | 0.5                                  | 4                                   |
| 0.22  | B         | 195D224(1)050B(2)(3) | 0.5                                  | 6                                   |
| 0.22  | C         | 195D224(1)050C(2)(3) | 0.5                                  | 4                                   |
| 0.22  | S         | 195D224(1)050S(2)(3) | 0.5                                  | 4                                   |
| 0.33  | B         | 195D334(1)050B(2)(3) | 0.5                                  | 6                                   |
| 0.33  | S         | 195D334(1)050S(2)(3) | 0.5                                  | 4                                   |

**Note**

- Part number definitions:
  - Tolerance: For 10 % tolerance, specify "X9", for 20 % tolerance, change to "X0"
  - Termination: For 100 % tin specify "2", for gold plated specify "4", for solder plated 60/40 specify "8"
  - Packaging code: For 7" reels specify "T", for 13" reels specify "W"



| <b>STANDARD RATINGS</b>  |           |                      |                                      |                                     |
|--|-----------|----------------------|--------------------------------------|-------------------------------------|
| CAPACITANCE<br>( $\mu$ F)  | CASE CODE | PART NUMBER          | MAX. DCL<br>AT + 25 °C<br>( $\mu$ A) | MAX. DF<br>AT + 25 °C<br>120 Hz (%) |
| <b>50 V<sub>DC</sub> AT + 85 °C, 33 V<sub>DC</sub> AT + 125 °C</b> |           |                      |                                      |                                     |
| 0.47   | D         | 195D474(1)050D(2)(3) | 0.5                                  | 6                                   |
| 0.47   | V         | 195D474(1)050V(2)(3) | 0.5                                  | 4                                   |
| 0.68   | D         | 195D684(1)050D(2)(3) | 0.5                                  | 6                                   |
| 0.68   | V         | 195D684(1)050V(2)(3) | 0.5                                  | 4                                   |
| 1.0  | E         | 195D105(1)050E(2)(3) | 0.5                                  | 6                                   |
| 1.0  | X         | 195D105(1)050X(2)(3) | 0.5                                  | 4                                   |
| 1.5  | F         | 195D155(1)050F(2)(3) | 0.8                                  | 6                                   |
| 1.5  | X         | 195D155(1)050X(2)(3) | 0.8                                  | 6                                   |
| 2.2  | F         | 195D225(1)050F(2)(3) | 1.1                                  | 6                                   |
| 2.2  | Y         | 195D225(1)050Y(2)(3) | 1.1                                  | 6                                   |
| 3.3  | G         | 195D335(1)050G(2)(3) | 1.7                                  | 6                                   |
| 3.3  | Z         | 195D335(1)050Z(2)(3) | 1.7                                  | 6                                   |
| 4.7  | H         | 195D475(1)050H(2)(3) | 2.4                                  | 6                                   |
| 4.7  | Z         | 195D475(1)050Z(2)(3) | 2.4                                  | 6                                   |
| 6.8  | R         | 195D685(1)050R(2)(3) | 3.4                                  | 6                                   |
| 10   | R         | 195D106(1)050R(2)(3) | 5.0                                  | 6                                   |

**Note**

- Part number definitions:
  - Tolerance: For 10 % tolerance, specify "X9", for 20 % tolerance, change to "X0"
  - Termination: For 100 % tin specify "2", for gold plated specify "4", for solder plated 60/40 specify "8"
  - Packaging code: For 7" reels specify "T", for 13" reels specify "W"

| <b>RECOMMENDED VOLTAGE DERATING GUIDELINES</b> (for temperature below + 85 °C) |                   |
|--|-------------------|
| <b>STANDARD CONDITIONS. FOR EXAMPLE: OUTPUT FILTERS</b>                        |                   |
| Capacitor Voltage Rating   | Operating Voltage |
| 2.0  | 1.2               |
| 4.0  | 2.5               |
| 6.3  | 3.6               |
| 10   | 6                 |
| 15/16  | 9                 |
| 20   | 12                |
| 25   | 15                |
| 35   | 24                |
| 40   | 26                |
| 50   | 28                |
| <b>SEVERE CONDITIONS. FOR EXAMPLE: INPUT FILTERS</b>                           |                   |
| Capacitor Voltage Rating   | Operating Voltage |
| 2.0  | 1.0               |
| 4.0  | 2.5               |
| 6.3  | 3.3               |
| 10   | 5.0               |
| 15/16  | 7.5               |
| 20   | 10                |
| 25   | 12                |
| 35   | 15                |
| 40   | 20                |
| 50   | 24                |



**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                 | 0.040  |
| B                 | 0.050  |
| C                 | 0.030  |
| D                 | 0.080  |
| E                 | 0.090  |
| F                 | 0.110  |
| G                 | 0.120  |
| H                 | 0.140  |
| R                 | 0.250  |
| S                 | 0.080  |
| V                 | 0.095  |
| X                 | 0.110  |
| Y                 | 0.120  |
| Z                 | 0.135  |

| STANDARD PACKAGING QUANTITY |                |          |
|-----------------------------|----------------|----------|
| CASE CODE                   | UNITS PER REEL |          |
|                             | 7" REEL        | 13" REEL |
| A                           | 2500           | n/a      |
| B                           | 2000           | n/a      |
| C                           | 2500           | 10 000   |
| D                           | 2000           | n/a      |
| E                           | 2000           | n/a      |
| F                           | 700            | n/a      |
| G                           | 1400           | n/a      |
| H                           | 400            | n/a      |
| R                           | 600            | n/a      |
| S                           | 2500           | 10 000   |
| V                           | 2500           | 10 000   |
| X                           | 200            | 10 000   |
| Y                           | 1500           | 7500     |
| Z                           | 1500           | 5000     |

| PRODUCT INFORMATION            |  |
|--------------------------------|--|
| Conformal Coated Guide         | <a href="http://www.vishay.com/doc?40150">www.vishay.com/doc?40150</a> |
| Moisture Sensitivity           | <a href="http://www.vishay.com/doc?40135">www.vishay.com/doc?40135</a> |
| SELECTOR GUIDES                |  |
| 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> |
| FAQ                            |  |
| Frequently Asked Questions     | <a href="http://www.vishay.com/doc?40110">www.vishay.com/doc?40110</a> |



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