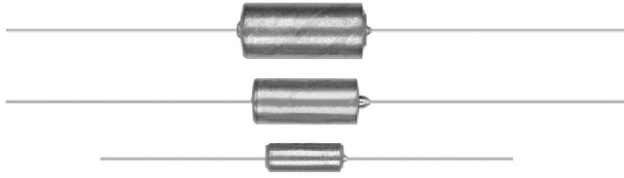


## Solid-Electrolyte TANTALEX® Capacitors, Military MIL-PRF-39003/09 Qualified, Style CSR21



### PERFORMANCE CHARACTERISTICS

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

**Capacitance Range:** 5.6 µF to 330 µF

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

**Voltage Rating:** 6 V<sub>DC</sub> to 50 V<sub>DC</sub>

### DESCRIPTION

Solid-Electrolyte TANTALEX® capacitors to military specification MIL-PRF-39003 - Exponential and Weibull Distribution: Hermetically sealed, metal cased, axial leaded tubular capacitors manufactured as military style CSR21. These capacitors are furnished to the requirements of the military specification, including marking, testing and inspection.

In accordance with the specification, all capacitors are marked with the military part number (M39003/xx-xxxx) rather than the older style designation (CSRxxxxxxx) and should be ordered as such. All capacitors covered by MIL-PRF-39003 are now ordered with the military part number as illustrated in the Part Numbering System chart. Capacitors must not be ordered using the style number identification.

### FEATURES

- Hermetically sealed
- Metal cased
- Axial lead
- Weibull failure rates B, C, D
- Exponential failure rates M, P, R, S
- Low ESR
- 100 % surge current test
- Tape and reel available per EIA-296 standard

### STYLE, MILITARY SPECIFICATION SHEET

Style CSR21, M39003/09 MIL-PRF-39003/09

MIL-PRF-39003 establishes failure rates (expressed in percent per 1000 h) based on exponential and Weibull distribution. Care must be exercised in ordering to insure the part number correctly identifies the desired failure rate level.

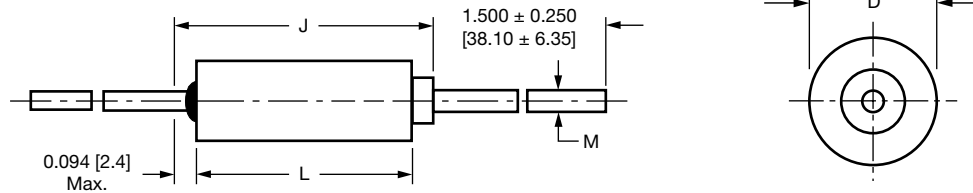
In addition, each order for military style CSR13, CSR21, CSR23 capacitors requiring government inspection must state whether inspection is to be at the destination or at the Vishay Sprague plant. Orders requiring source inspection cannot be shipped until this has been accomplished.

For information on the performance characteristics of these capacitors, please refer to the latest issue of the military specification.

| ORDERING INFORMATION  |  |   |   |  |
|---|--|---|---|--|
| M39003  | /09  | -2085   | B   | /TR  |
| BASIC<br>DOCUMENT NUMBER  | SLASH SHEET  | DASH NUMBER   | SURGE CURRENT<br>OPTION LETTER  | PACKAGING OPTION <sup>(1)</sup>  |
| Indicates the Basic<br>Specification; in this<br>case MIL-PRF-39003 | Indicates the<br>Specification Sheet<br>of the Basic Military<br>Specification | Taken from Ratings<br>table of the<br>Specification Sheet | Blank = Standard, + 25 °C,<br>after Weibull<br>B = - 55 °C and + 85 °C,<br>after Weibull<br>C = - 55 °C and + 85 °C,<br>before Weibull<br>E = - 55 °C and + 85 °C,<br>after Weibull, high<br>temperature solder<br>F = - 55 °C and + 85 °C,<br>before Weibull, high<br>temperature solder<br>H = + 25 °C, after Weibull,<br>high temperature solder | Blank = Bulk<br>/TR = Tape and reel<br>/HR = Tape and reel, half reel<br>/PR = Tape and reel, partial reel<br>/RR = Tape and reel, option R<br>/WR = Tape and reel, option W |

**Note**

(1) See detailed packaging information following the Standard Ratings table.

**DIMENSIONS** in inches [millimeters]


| CASE CODE | L<br>± 0.031 [0.79] | D<br>+ 0.016 [0.41]<br>- 0.015 [0.38] | M<br>± 0.002 [0.05] | J<br>(MAX.)   |
|-----------|---------------------|---------------------------------------|---------------------|---------------|
| C         | 0.686 [17.42]       | 0.289 [7.34]                          | 0.025 [0.64]        | 0.822 [20.88] |
| D         | 0.786 [19.96]       | 0.351 [8.92]                          | 0.025 [0.64]        | 0.922 [23.42] |

**Notes**

- The case insulation shall extend 0.015" [0.38 mm] minimum beyond each end. However, when a shrink-fitted insulation is used, it shall lap over the ends of the capacitor body.
- A minimum lead length of 1.0" [2.54 mm] for use with tape and reel automatic insertion equipment is available upon request.

**RATINGS AND CASE CODES**

| µF  | 6 V | 10 V | 15 V | 20 V | 35 V | 50 V |
|-----|-----|------|------|------|------|------|
| 5.6 |     |      |      |      |      | C    |
| 6.8 |     |      |      |      |      | C    |
| 8.2 |     |      |      |      |      | C    |
| 10  |     |      |      |      |      | C    |
| 12  |     |      |      |      |      | C    |
| 15  |     |      |      |      |      | C    |
| 18  |     |      |      |      |      | C    |
| 22  |     |      |      |      | C    | D    |
| 27  |     |      |      | C    | D    |      |
| 33  |     |      |      | C    | D    |      |
| 39  |     |      |      | C    | D    |      |
| 47  |     |      |      | C    | D    |      |
| 56  |     |      | C    | D    |      |      |
| 68  |     |      | C    | D    |      |      |
| 82  |     | C    |      | D    |      |      |
| 100 |     | C    |      | D    |      |      |
| 120 |     | C    | D    |      |      |      |
| 150 | C   |      | D    |      |      |      |
| 180 | C   | D    |      |      |      |      |
| 220 |     | D    |      |      |      |      |
| 270 | D   |      |      |      |      |      |
| 330 | D   |      |      |      |      |      |



| STANDARD RATINGS   |              |                            |  |      |      |       |      |      |       |         |                        |          |        |  |  |  |  |
|--|--------------|----------------------------|--|------|------|-------|------|------|-------|---------|------------------------|----------|--------|--|--|--|--|
| CAPACITANCE<br>( $\mu$ F)  | CASE<br>CODE | CAP.<br>TOL.<br>( $\pm$ %) | PART NO. M39003/09-<br>FAILURE RATE LEVEL (%/1000 h) |      |      |       |      |      |       |         | MAX. DCL ( $\mu$ A) AT |          |        | MAX.<br>DF AT<br>+ 25 °C<br>1 kHz<br>(%) | MAX.<br>ESR AT<br>+ 25 °C<br>100 kHz<br>( $\Omega$ ) | DERATED<br>MAX. RIPPLE<br>CURRENT<br>AT + 25 °C<br>(A) |  |
|  |              |                            | M  | P    | R    | S     | B    | C    | D     | + 25 °C | + 85 °C                | + 125 °C | 40 kHz |  |  | 1 kHz  |  |
|  |              |                            | 1.0  | 0.1  | 0.01 | 0.001 | 0.1  | 0.01 | 0.001 |         |                        |          |        |  |  |  |  |
| <b>6 V<sub>DC</sub> AT + 85 °C, SURGE = 8 V; 4 V<sub>DC</sub> AT + 125 °C</b>    |              |                            |  |      |      |       |      |      |       |         |                        |          |        |  |  |  |  |
| 150  | C            | 5                          | 0001   | 0101 | 0201 | 0301  | 2001 | 3001 | 4001  | 4.5     | 90.0                   | 113      | 10     | 0.065                                    | 3.3  | 2.0  |  |
| 150  | C            | 10                         | 0002   | 0102 | 0202 | 0302  | 2002 | 3002 | 4002  | 4.5     | 90.0                   | 113      | 10     | 0.065                                    | 3.3  | 2.0  |  |
| 150  | C            | 20                         | 0003   | 0103 | 0203 | 0303  | 2003 | 3003 | 4003  | 4.5     | 90.0                   | 113      | 10     | 0.065                                    | 3.3  | 2.0  |  |
| 180  | C            | 5                          | 0004   | 0104 | 0204 | 0304  | 2004 | 3004 | 4004  | 5.5     | 110                    | 138      | 10     | 0.060                                    | 3.4  | 2.4  |  |
| 180  | C            | 10                         | 0005   | 0105 | 0205 | 0305  | 2005 | 3005 | 4005  | 5.5     | 110                    | 138      | 10     | 0.060                                    | 3.4  | 2.4  |  |
| 270  | D            | 5                          | 0006   | 0106 | 0206 | 0306  | 2006 | 3006 | 4006  | 6.5     | 130                    | 163      | 10     | 0.050                                    | 4.1  | 3.4  |  |
| 270  | D            | 10                         | 0007   | 0107 | 0207 | 0307  | 2007 | 3007 | 4007  | 6.5     | 130                    | 163      | 10     | 0.050                                    | 4.1  | 3.4  |  |
| 330  | D            | 5                          | 0008   | 0108 | 0208 | 0308  | 2008 | 3008 | 4008  | 7.5     | 150                    | 188      | 12     | 0.045                                    | 4.3  | 3.8  |  |
| 330  | D            | 10                         | 0009   | 0109 | 0209 | 0309  | 2009 | 3009 | 4009  | 7.5     | 150                    | 188      | 12     | 0.045                                    | 4.3  | 3.8  |  |
| 330  | D            | 20                         | 0010   | 0110 | 0210 | 0310  | 2010 | 3010 | 4010  | 7.5     | 150                    | 188      | 12     | 0.045                                    | 4.3  | 3.8  |  |
| <b>10 V<sub>DC</sub> AT + 85 °C, SURGE = 13 V; 7 V<sub>DC</sub> AT + 125 °C</b>  |              |                            |  |      |      |       |      |      |       |         |                        |          |        |  |  |  |  |
| 82   | C            | 5                          | 0011   | 0111 | 0211 | 0311  | 2011 | 3011 | 4011  | 4.0     | 80.0                   | 100      | 8      | 0.085                                    | 2.9  | 1.8  |  |
| 82   | C            | 10                         | 0012   | 0112 | 0212 | 0312  | 2012 | 3012 | 4012  | 4.0     | 80.0                   | 100      | 8      | 0.085                                    | 2.9  | 1.8  |  |
| 100  | C            | 5                          | 0013   | 0113 | 0213 | 0313  | 2013 | 3013 | 4013  | 5.0     | 100                    | 125      | 8      | 0.075                                    | 3.0  | 2.2  |  |
| 100  | C            | 10                         | 0014   | 0114 | 0214 | 0314  | 2014 | 3014 | 4014  | 5.0     | 100                    | 125      | 8      | 0.075                                    | 3.0  | 2.2  |  |
| 100  | C            | 20                         | 0015   | 0115 | 0215 | 0315  | 2015 | 3015 | 4015  | 5.0     | 100                    | 125      | 8      | 0.075                                    | 3.0  | 2.2  |  |
| 120  | C            | 5                          | 0016   | 0116 | 0216 | 0136  | 2016 | 3016 | 4016  | 6.0     | 120                    | 150      | 8      | 0.070                                    | 3.2  | 2.5  |  |
| 120  | C            | 10                         | 0017   | 0117 | 0217 | 0317  | 2017 | 3017 | 4017  | 6.0     | 120                    | 150      | 8      | 0.070                                    | 3.2  | 2.5  |  |
| 180  | D            | 5                          | 0018   | 0118 | 0218 | 0318  | 2018 | 3018 | 4018  | 9.0     | 180                    | 226      | 8      | 0.060                                    | 3.7  | 3.4  |  |
| 180  | D            | 10                         | 0019   | 0119 | 0219 | 0319  | 2019 | 3019 | 4019  | 9.0     | 180                    | 226      | 8      | 0.060                                    | 3.7  | 3.4  |  |
| 220  | D            | 5                          | 0020   | 0120 | 0220 | 0320  | 2020 | 3020 | 4020  | 10.0    | 200                    | 250      | 10     | 0.055                                    | 3.9  | 3.4  |  |
| 220  | D            | 10                         | 0021   | 0121 | 0221 | 0321  | 2021 | 3021 | 4021  | 10.0    | 200                    | 250      | 10     | 0.055                                    | 3.9  | 3.4  |  |
| 220  | D            | 20                         | 0022   | 0122 | 0222 | 0322  | 2022 | 3022 | 4022  | 10.0    | 200                    | 250      | 10     | 0.055                                    | 3.9  | 3.4  |  |
| <b>15 V<sub>DC</sub> AT + 85 °C, SURGE = 20 V; 10 V<sub>DC</sub> AT + 125 °C</b> |              |                            |  |      |      |       |      |      |       |         |                        |          |        |  |  |  |  |
| 56   | C            | 5                          | 0023   | 0123 | 0223 | 0323  | 2023 | 3023 | 4023  | 4.0     | 80.0                   | 100      | 6      | 0.100                                    | 2.6  | 1.8  |  |
| 56   | C            | 10                         | 0024   | 0124 | 0224 | 0324  | 2024 | 3024 | 4024  | 4.0     | 80.0                   | 100      | 6      | 0.100                                    | 2.6  | 1.8  |  |
| 68   | C            | 5                          | 0025   | 0125 | 0225 | 0325  | 2025 | 3025 | 4025  | 5.0     | 100                    | 125      | 6      | 0.095                                    | 2.7  | 2.2  |  |
| 68   | C            | 10                         | 0026   | 0126 | 0226 | 0326  | 2026 | 3026 | 4026  | 5.0     | 100                    | 125      | 6      | 0.095                                    | 2.7  | 2.2  |  |
| 68   | C            | 20                         | 0027   | 0127 | 0227 | 0327  | 2027 | 3027 | 4027  | 5.0     | 100                    | 125      | 6      | 0.095                                    | 2.7  | 2.2  |  |
| 120  | D            | 5                          | 0028   | 0128 | 0228 | 0328  | 2028 | 3028 | 4028  | 9.0     | 180                    | 226      | 8      | 0.070                                    | 3.5  | 2.8  |  |
| 120  | D            | 10                         | 0029   | 0129 | 0229 | 0329  | 2029 | 3029 | 4029  | 9.0     | 180                    | 226      | 8      | 0.070                                    | 3.5  | 2.8  |  |
| 150  | D            | 5                          | 0030   | 0130 | 0230 | 0330  | 2030 | 3030 | 4030  | 10.0    | 200                    | 250      | 8      | 0.065                                    | 3.6  | 3.1  |  |
| 150  | D            | 10                         | 0031   | 0131 | 0231 | 0331  | 2031 | 3031 | 4031  | 10.0    | 200                    | 250      | 8      | 0.065                                    | 3.6  | 3.1  |  |
| 150  | D            | 20                         | 0032   | 0132 | 0232 | 0332  | 2032 | 3032 | 4032  | 10.0    | 200                    | 250      | 8      | 0.065                                    | 3.6  | 3.1  |  |
| <b>20 V<sub>DC</sub> AT + 85 °C, SURGE = 26 V; 13 V<sub>DC</sub> AT + 125 °C</b> |              |                            |  |      |      |       |      |      |       |         |                        |          |        |  |  |  |  |
| 27   | C            | 5                          | 0033   | 0133 | 0233 | 0333  | 2033 | 3033 | 4033  | 2.5     | 50.0                   | 63.0     | 5      | 0.145                                    | 2.2  | 1.2  |  |
| 27   | C            | 10                         | 0034   | 0134 | 0234 | 0334  | 2034 | 3034 | 4034  | 2.5     | 50.0                   | 63.0     | 5      | 0.145                                    | 2.2  | 1.2  |  |
| 33   | C            | 5                          | 0035   | 0135 | 0235 | 0335  | 2035 | 3035 | 4035  | 3.5     | 70.0                   | 88.0     | 5      | 0.130                                    | 2.3  | 1.4  |  |
| 33   | C            | 10                         | 0036   | 0136 | 0236 | 0336  | 2036 | 3036 | 4036  | 3.5     | 70.0                   | 88.0     | 5      | 0.130                                    | 2.3  | 1.4  |  |
| 33   | C            | 20                         | 0037   | 0137 | 0237 | 0337  | 2037 | 3037 | 4037  | 3.5     | 70.0                   | 88.0     | 5      | 0.130                                    | 2.3  | 1.4  |  |
| 39   | C            | 5                          | 0038   | 0138 | 0238 | 0338  | 2038 | 3038 | 4038  | 4.0     | 80.0                   | 100      | 5      | 0.120                                    | 2.4  | 1.7  |  |
| 39   | C            | 10                         | 0039   | 0139 | 0239 | 0339  | 2039 | 3039 | 4039  | 4.0     | 80.0                   | 100      | 5      | 0.120                                    | 2.4  | 1.7  |  |
| 47   | C            | 5                          | 0040   | 0140 | 0240 | 0340  | 2040 | 3040 | 4040  | 4.5     | 90.0                   | 113      | 6      | 0.110                                    | 2.5  | 1.8  |  |



| STANDARD RATINGS   |              |                            |  |      |      |       |      |      |       |                        |         |          |  |  |  |       |
|--|--------------|----------------------------|--|------|------|-------|------|------|-------|------------------------|---------|----------|--|--|--|-------|
| CAPACITANCE<br>( $\mu$ F)  | CASE<br>CODE | CAP.<br>TOL.<br>( $\pm$ %) | PART NO. M39003/09-<br>FAILURE RATE LEVEL (%/1000 h) |      |      |       |      |      |       | MAX. DCL ( $\mu$ A) AT |         |          | MAX.<br>DF AT<br>+ 25 °C<br>1 kHz<br>(%) | MAX.<br>ESR AT<br>+ 25 °C<br>100 kHz<br>( $\Omega$ ) | DERATED<br>MAX. RIPPLE<br>CURRENT<br>AT + 25 °C<br>(A) |       |
|  |              |                            | M  | P    | R    | S     | B    | C    | D     | + 25 °C                | + 85 °C | + 125 °C |  |  | 40 kHz   | 1 kHz |
|  |              |                            | 1.0  | 0.1  | 0.01 | 0.001 | 0.1  | 0.01 | 0.001 |                        |         |          |  |  |  |       |
| <b>20 V<sub>DC</sub> AT + 85 °C, SURGE = 26 V; 13 V<sub>DC</sub> AT + 125 °C</b> |              |                            |  |      |      |       |      |      |       |                        |         |          |  |  |  |       |
| 47   | C            | 10                         | 0041   | 0141 | 0241 | 0341  | 2041 | 3041 | 4041  | 4.5                    | 90.0    | 113      | 6  | 0.110  | 2.5  | 1.8   |
| 47   | C            | 20                         | 0042   | 0142 | 0242 | 0342  | 2042 | 3042 | 4042  | 4.5                    | 90.0    | 113      | 6  | 0.110  | 2.5  | 1.8   |
| 56   | D            | 5                          | 0043   | 0143 | 0243 | 0343  | 2043 | 3043 | 4043  | 5.5                    | 110     | 138      | 6  | 0.100  | 2.9  | 2.2   |
| 56   | D            | 10                         | 0044   | 0144 | 0244 | 0344  | 2044 | 3044 | 4044  | 5.5                    | 110     | 138      | 6  | 0.100  | 2.9  | 2.2   |
| 68   | D            | 5                          | 0045   | 0145 | 0245 | 0345  | 2045 | 3045 | 4045  | 7.0                    | 140     | 175      | 6  | 0.095  | 3.0  | 2.4   |
| 68   | D            | 10                         | 0046   | 0146 | 0246 | 0346  | 2046 | 3046 | 4046  | 7.0                    | 140     | 175      | 6  | 0.095  | 3.0  | 2.4   |
| 68   | D            | 20                         | 0047   | 0147 | 0247 | 0347  | 2047 | 3047 | 4047  | 7.0                    | 140     | 175      | 6  | 0.095  | 3.0  | 2.4   |
| 82   | D            | 5                          | 0048   | 0148 | 0248 | 0348  | 2048 | 3048 | 4048  | 8.0                    | 160     | 200      | 6  | 0.085  | 3.1  | 2.5   |
| 82   | D            | 10                         | 0049   | 0149 | 0249 | 0349  | 2049 | 3049 | 4049  | 8.0                    | 160     | 200      | 6  | 0.085  | 3.1  | 2.5   |
| 100  | D            | 5                          | 0050   | 0150 | 0250 | 0350  | 2050 | 3050 | 4050  | 10.0                   | 200     | 250      | 8  | 0.075  | 3.3  | 2.5   |
| 100  | D            | 10                         | 0051   | 0151 | 0251 | 0351  | 2051 | 3051 | 4051  | 10.0                   | 200     | 250      | 8  | 0.075  | 3.3  | 2.5   |
| 100  | D            | 20                         | 0052   | 0152 | 0252 | 0352  | 2052 | 3052 | 4052  | 10.0                   | 200     | 250      | 8  | 0.075  | 3.3  | 2.5   |
| <b>35 V<sub>DC</sub> AT + 85 °C, SURGE = 46 V; 23 V<sub>DC</sub> AT + 125 °C</b> |              |                            |  |      |      |       |      |      |       |                        |         |          |  |  |  |       |
| 22   | C            | 5                          | 0053   | 0153 | 0253 | 0353  | 2053 | 3053 | 4053  | 4.0                    | 80.0    | 100      | 4  | 0.160  | 2.1  | 1.5   |
| 22   | C            | 10                         | 0054   | 0154 | 0254 | 0354  | 2054 | 3054 | 4054  | 4.0                    | 80.0    | 100      | 4  | 0.160  | 2.1  | 1.5   |
| 22   | C            | 20                         | 0055   | 0155 | 0255 | 0355  | 2055 | 3055 | 4055  | 4.0                    | 80.0    | 100      | 4  | 0.160  | 2.1  | 1.5   |
| 27   | D            | 5                          | 0056   | 0156 | 0256 | 0356  | 2056 | 3056 | 4056  | 4.5                    | 90.0    | 113      | 4  | 0.145  | 2.4  | 1.9   |
| 27   | D            | 10                         | 0057   | 0157 | 0257 | 0357  | 2057 | 3057 | 4057  | 4.5                    | 90.0    | 113      | 4  | 0.145  | 2.4  | 1.9   |
| 33   | D            | 5                          | 0058   | 0158 | 0258 | 0358  | 2058 | 3058 | 4058  | 5.5                    | 110     | 138      | 5  | 0.130  | 2.5  | 1.9   |
| 33   | D            | 10                         | 0059   | 0159 | 0259 | 0359  | 2059 | 3059 | 4059  | 5.5                    | 110     | 138      | 5  | 0.130  | 2.5  | 1.9   |
| 33   | D            | 20                         | 0060   | 0160 | 0260 | 0360  | 2060 | 3060 | 4060  | 5.5                    | 110     | 138      | 5  | 0.130  | 2.5  | 1.9   |
| 39   | D            | 5                          | 0061   | 0161 | 0261 | 0361  | 2061 | 3061 | 4061  | 7.0                    | 140     | 175      | 5  | 0.120  | 2.6  | 2.0   |
| 39   | D            | 10                         | 0062   | 0162 | 0262 | 0362  | 2062 | 3062 | 4062  | 7.0                    | 140     | 175      | 5  | 0.120  | 2.6  | 2.0   |
| 47   | D            | 5                          | 0063   | 0163 | 0263 | 0363  | 2063 | 3063 | 4063  | 8.0                    | 160     | 200      | 5  | 0.110  | 2.7  | 2.2   |
| 47   | D            | 10                         | 0064   | 0164 | 0264 | 0364  | 2064 | 3064 | 4064  | 8.0                    | 160     | 200      | 5  | 0.110  | 2.7  | 2.2   |
| 47   | D            | 20                         | 0065   | 0165 | 0265 | 0365  | 2065 | 3065 | 4065  | 8.0                    | 160     | 200      | 5  | 0.110  | 2.7  | 2.2   |
| <b>50 V<sub>DC</sub> AT + 85 °C, SURGE = 65 V; 33 V<sub>DC</sub> AT + 125 °C</b> |              |                            |  |      |      |       |      |      |       |                        |         |          |  |  |  |       |
| 5.6  | C            | 5                          | 0066   | 0166 | 0266 | 0366  | 2066 | 3066 | 4066  | 2.2                    | 45.0    | 56.0     | 3  | 0.300  | 1.5  | 0.6   |
| 5.6  | C            | 10                         | 0067   | 0167 | 0267 | 0367  | 2067 | 3067 | 4067  | 2.2                    | 45.0    | 56.0     | 3  | 0.300  | 1.5  | 0.6   |
| 6.8  | C            | 5                          | 0068   | 0168 | 0268 | 0368  | 2068 | 3068 | 4068  | 2.2                    | 45.0    | 56.0     | 3  | 0.275  | 1.6  | 0.7   |
| 6.8  | C            | 10                         | 0069   | 0169 | 0269 | 0369  | 2069 | 3069 | 4069  | 2.2                    | 45.0    | 56.0     | 3  | 0.275  | 1.6  | 0.7   |
| 6.8  | C            | 20                         | 0070   | 0170 | 0270 | 0370  | 2070 | 3070 | 4070  | 2.2                    | 45.0    | 56.0     | 3  | 0.275  | 1.6  | 0.7   |
| 8.2  | C            | 5                          | 0071   | 0171 | 0271 | 0371  | 2071 | 3071 | 4071  | 2.5                    | 50.0    | 63.0     | 3  | 0.250  | 1.6  | 0.9   |
| 8.2  | C            | 10                         | 0072   | 0172 | 0272 | 0372  | 2072 | 3072 | 4072  | 2.5                    | 50.0    | 63.0     | 3  | 0.250  | 1.6  | 0.9   |
| 10   | C            | 5                          | 0073   | 0173 | 0273 | 0373  | 2073 | 3073 | 4073  | 2.5                    | 50.0    | 63.0     | 3  | 0.230  | 1.7  | 1.1   |
| 10   | C            | 10                         | 0074   | 0174 | 0274 | 0374  | 2074 | 3074 | 4074  | 2.5                    | 50.0    | 63.0     | 3  | 0.230  | 1.7  | 1.1   |
| 10   | C            | 20                         | 0075   | 0175 | 0275 | 0375  | 2075 | 3075 | 4075  | 2.5                    | 50.0    | 63.0     | 3  | 0.230  | 1.7  | 1.1   |
| 12   | C            | 5                          | 0076   | 0176 | 0276 | 0376  | 2076 | 3076 | 4076  | 3.0                    | 60.0    | 75.0     | 3  | 0.210  | 1.8  | 1.3   |
| 12   | C            | 10                         | 0077   | 0177 | 0277 | 0377  | 2077 | 3077 | 4077  | 3.0                    | 60.0    | 75.0     | 3  | 0.210  | 1.8  | 1.3   |
| 15   | C            | 5                          | 0078   | 0178 | 0278 | 0378  | 2078 | 3078 | 4078  | 4.0                    | 80.0    | 100      | 3  | 0.190  | 1.9  | 1.4   |
| 15   | C            | 10                         | 0079   | 0179 | 0279 | 0379  | 2079 | 3079 | 4079  | 4.0                    | 80.0    | 100      | 3  | 0.190  | 1.9  | 1.4   |
| 15   | C            | 20                         | 0080   | 0180 | 0280 | 0380  | 2080 | 3080 | 4080  | 4.0                    | 80.0    | 100      | 3  | 0.190  | 1.9  | 1.4   |
| 18   | C            | 5                          | 0081   | 0181 | 0281 | 0381  | 2081 | 3081 | 4081  | 4.5                    | 90.0    | 113      | 4  | 0.175  | 2.0  | 1.4   |
| 18   | C            | 10                         | 0082   | 0182 | 0282 | 0382  | 2082 | 3082 | 4082  | 4.5                    | 90.0    | 113      | 4  | 0.175  | 2.0  | 1.4   |
| 22   | D            | 5                          | 0083   | 0183 | 0283 | 0383  | 2083 | 3083 | 4083  | 5.5                    | 110     | 138      | 4  | 0.160  | 2.3  | 1.7   |
| 22   | D            | 10                         | 0084   | 0184 | 0284 | 0384  | 2084 | 3084 | 4084  | 5.5                    | 110     | 138      | 4  | 0.160  | 2.3  | 1.7   |
| 22   | D            | 20                         | 0085   | 0185 | 0285 | 0385  | 2085 | 3085 | 4085  | 5.5                    | 110     | 138      | 4  | 0.160  | 2.3  | 1.7   |



| STANDARD PACKAGING QUANTITY |                     |           |              |               |         |
|-----------------------------|---------------------|-----------|--------------|---------------|---------|
| CASE CODE                   | QUANTITY (pcs/reel) |           |              | BULK QUANTITY |         |
|                             | FULL REEL           | HALF REEL | PARTIAL REEL | PER TRAY      | PER BOX |
| C                           | 500                 | 250       | 100          | 20            | 100     |
| D                           | 500                 | 250       | 100          | 20            | 80      |

| INSIDE TAPE SPACING |           |                              |
|---------------------|-----------|------------------------------|
| PACKAGING OPTION    | CASE CODE | TAPE SPACING                 |
| /TR; /HR; /PR       | C, D      | 2.88 ± 0.02<br>[73.0 ± 0.51] |
| /RR                 | C, D      | 2.47 ± 0.02<br>[62.7 ± 0.51] |
| /WR                 | C, D      | 2.05 ± 0.02<br>[52.1 ± 0.51] |

| PRODUCT INFORMATION                 |  |
|-------------------------------------|--|
| Quick Reference Guide               | <a href="http://www.vishay.com/doc?40037">www.vishay.com/doc?40037</a> |
| Selector Guide                      | <a href="http://www.vishay.com/doc?49054">www.vishay.com/doc?49054</a> |
| Parameter Comparison Guide          | <a href="http://www.vishay.com/doc?40033">www.vishay.com/doc?40033</a> |
| Mounting of Through-Hole Components | <a href="http://www.vishay.com/doc?40108">www.vishay.com/doc?40108</a> |
| Frequently Asked Questions          | <a href="http://www.vishay.com/doc?40110">www.vishay.com/doc?40110</a> |



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## Material Category Policy

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**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**