

## Surface Mount Multilayer Ceramic Chip Capacitor Solutions for Boardflex Sensitive Applications



### FEATURES

- Open Mode Design (OMD) reduces risk of shorts or leakage in board flex applications
- Excellent reliability and thermal shock performance
- Efficient low-power consumption, ripple current capable to 1.2 A<sub>RMS</sub> at 100 kHz
- High voltage breakdown compared to standard design
- 100 % voltage conditioning available up to 630 V<sub>DC</sub> rating (process code "5H")  
Contact [mlcc@vishay.com](mailto:mlcc@vishay.com) for higher voltages
- Polymer termination available for intensive board flex requirements
- Wet build process
- Reliable Noble Metal Electrode (NME) system
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)  
Available

### APPLICATIONS

- Demanding boardflex applications
- Input filter capacitors
- Output filter capacitors
- Snubber capacitors reduce MOSFET voltage spikes
- Filtering for switching power supplies
- For lighting and other AC applications please contact: [mlcc@vishay.com](mailto:mlcc@vishay.com)

### ELECTRICAL SPECIFICATIONS

| COG (NP0)   |                        |
|---|------------------------|
| <b>GENERAL SPECIFICATION</b>  |                        |
| <b>Note</b><br>Electrical characteristics at +25 °C unless otherwise specified  |                        |
| <b>Operating Temperature:</b> -55 °C to +125 °C   |                        |
| <b>Capacitance Range:</b> 10 pF to 47 nF  |                        |
| <b>Voltage Range:</b> 50 V <sub>DC</sub> to 3000 V <sub>DC</sub>  |                        |
| <b>Temperature Coefficient of Capacitance (TCC):</b><br>0 ppm/°C ± 30 ppm/°C from -55 °C to +125 °C   |                        |
| <b>Dissipation Factor (DF):</b><br>0.1 % maximum at 1.0 V <sub>RMS</sub> and 1 MHz for values ≤ 1000 pF<br>0.1 % maximum at 1.0 V <sub>RMS</sub> and 1 kHz for values > 1000 pF |                        |
| <b>Insulating Resistance:</b><br>at +25 °C 100 000 MΩ min. or 1000 ΩF whichever is less<br>at +125 °C 10 000 MΩ min. or 100 ΩF whichever is less                                |                        |
| <b>Aging Rate:</b> 0 % maximum per decade   |                        |
| <b>Dielectric Strength Test:</b><br>performed per method 103 of EIA 198-2-E<br>Applied test voltages  |                        |
| ≤ 200 V <sub>DC</sub> -rated:   | 250 % of rated voltage |
| 500 V <sub>DC</sub> -rated:   | 200 % of rated voltage |
| 630 V <sub>DC</sub> / 1000 V <sub>DC</sub> -rated:  | 150 % of rated voltage |
| 1500 V <sub>DC</sub> to 3000 V <sub>DC</sub> -rated:  | 120 % of rated voltage |

| X7R   |                             |
|---|-----------------------------|
| <b>GENERAL SPECIFICATION</b>  |                             |
| <b>Note</b><br>Electrical characteristics at +25 °C unless otherwise specified  |                             |
| <b>Operating Temperature:</b> -55 °C to +125 °C   |                             |
| <b>Capacitance Range:</b> 100 pF to 1.8 μF  |                             |
| <b>Voltage Range:</b> 16 V <sub>DC</sub> to 3000 V <sub>DC</sub>  |                             |
| <b>Temperature Coefficient of Capacitance (TCC):</b><br>± 15 % from -55 °C to +125 °C, with 0 V <sub>DC</sub> applied   |                             |
| <b>Dissipation Factor (DF):</b><br>< 50 V ratings 3.5 % maximum at 1.0 V <sub>RMS</sub> and 1 kHz<br>≥ 50 V ratings 2.5 % maximum at 1.0 V <sub>RMS</sub> and 1 kHz |                             |
| <b>Insulating Resistance:</b><br>at +25 °C 100 000 MΩ min. or 1000 ΩF whichever is less<br>at +125 °C 10 000 MΩ min. or 100 ΩF whichever is less                    |                             |
| <b>Aging Rate:</b> 1 % maximum per decade   |                             |
| <b>Dielectric Strength Test:</b><br>performed per method 103 of EIA 198-2-E<br>Applied test voltages  |                             |
| ≤ 250 V <sub>DC</sub> -rated:   | 250 % of rated voltage      |
| 500 V <sub>DC</sub> -rated:   | min. 150 % of rated voltage |
| 630 V <sub>DC</sub> / 1000 V <sub>DC</sub> -rated:  | 150 % of rated voltage      |
| 1500 V <sub>DC</sub> to 3000 V <sub>DC</sub> -rated:  | 120 % of rated voltage      |



| QUICK REFERENCE DATA |      |                     |             |         |
|----------------------|------|---------------------|-------------|---------|
| DIELECTRIC           | CASE | MAXIMUM VOLTAGE (V) | CAPACITANCE |         |
|                      |      |                     | MINIMUM     | MAXIMUM |
| COG (NP0)            | 1206 | 1500                | 10 pF       | 4.7 nF  |
|                      | 1210 | 2000                | 10 pF       | 8.2 nF  |
|                      | 1808 | 3000                | 27 pF       | 8.2 nF  |
|                      | 1812 | 3000                | 27 pF       | 18 nF   |
|                      | 1825 | 1000                | 15 pF       | 33 nF   |
|                      | 2220 | 1000                | 270 pF      | 39 nF   |
|                      | 2225 | 1000                | 270 pF      | 47 nF   |
| X7R                  | 0805 | 630                 | 470 pF      | 220 nF  |
|                      | 1206 | 2000                | 270 pF      | 680 nF  |
|                      | 1210 | 2000                | 390 pF      | 1.0 μF  |
|                      | 1808 | 3000                | 220 pF      | 18 nF   |
|                      | 1812 | 3000                | 100 pF      | 1.2 μF  |
|                      | 1825 | 2000                | 5.6 nF      | 1.5 μF  |
|                      | 2220 | 3000                | 1.0 nF      | 1.8 μF  |
| 2225                 | 2000 | 5.6 nF              | 1.8 μF      |         |

**Note**

- Detail ratings see “Selection Chart”

| ORDERING INFORMATION   |                          |   |   |   |   |              |  |  |
|--|--------------------------|---|---|---|---|--------------|--|--|
| VJ1210   | Y                        | 474   | J   | X   | A   | A            | T  | # (2)  |
| CASE CODE  | DIELECTRIC               | CAPACITANCE NOMINAL CODE  | CAPACITANCE TOLERANCE   | TERMINATION (4)   | DC VOLTAGE RATING (1)   | MARKING      | PACKAGING  | PROCESS CODE   |
| 0805<br>1206<br>1210<br>1808<br>1812<br>1825<br>2220<br>2225 | A = COG (NP0)<br>Y = X7R | Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. An “R” indicates a decimal point.<br><b>Examples</b><br>474 = 470 000 pF | F = ± 1 %<br>G = ± 2 %<br>J = ± 5 %<br>K = ± 10 %<br>M = ± 20 %<br><b>Note</b><br>COG (NP0):<br>F, G, J, K<br>X7R:<br>J, K, M | X = Ni barrier<br>100 % tin plated matte finish<br>E = AgPd (3)<br>B = polymer<br>100 % tin plated matte finish (5) | J = 16 V<br>X = 25 V<br>A = 50 V<br>B = 100 V<br>C = 200 V<br>P = 250 V<br>E = 500 V<br>L = 630 V<br>G = 1000 V<br>R = 1500 V<br>F = 2000 V<br>H = 3000 V | A = unmarked | C = 7" reel / paper tape<br>T = 7" reel / plastic tape<br>P = 11 1/4" / 13" reel / paper tape<br>R = 11 1/4" / 13" reel / plastic tape<br>O = 7" reel / flamed paper tape<br>I = 11 1/4" / 13" reel / flamed paper tape<br><b>Note</b><br>“I” and “O” are used for “E” termination size 0805 | 4X = OMD cap<br>5H = OMD cap<br>100 % voltage conditioning |

**Notes**

- (1) DC voltage rating should not be exceeded in application. Other application factors may affect the MLCC performance. Consult for questions: [mlcc@vishay.com](mailto:mlcc@vishay.com)
- (2) Process code with 2 digits has to be added
- (3) Termination code “E” is for conductive epoxy assembly
- (4) Other termination options contact [mlcc@vishay.com](mailto:mlcc@vishay.com) for availability
- (5) Polymer termination, code “B”, only available in plastic tape “T” / “R”

| ENVIRONMENTAL STATUS |  |                |              |
|----------------------|--|----------------|--------------|
| TERMINATION CODE     | TERMINATION DESCRIPTION                      | RoHS COMPLIANT | VISHAY GREEN |
| X                    | Ni barrier 100 % tin plated matte finish     | Yes            | Yes          |
| E                    | AgPd   | Yes            | Yes          |
| B                    | Polymer layer, 100 % tin plated matte finish | Yes            | No           |

**DIMENSIONS** in inches (millimeters)


| CASE CODE | STYLE  | LENGTH<br>(L)                  | WIDTH<br>(W)                   | MAXIMUM<br>THICKNESS<br>(T) | TERMINATION PAD<br>(P) |              |
|-----------|--------|--------------------------------|--------------------------------|-----------------------------|------------------------|--------------|
|           |        |                                |                                |                             | MINIMUM                | MAXIMUM      |
| 0805      | VJ0805 | 0.079 ± 0.008<br>(2.00 ± 0.20) | 0.049 ± 0.008<br>(1.25 ± 0.20) | 0.057 (1.45)                | 0.010 (0.25)           | 0.030 (0.76) |
| 1206      | VJ1206 | 0.126 ± 0.010<br>(3.20 ± 0.25) | 0.063 ± 0.010<br>(1.60 ± 0.25) | 0.067 (1.70) <sup>(1)</sup> | 0.010 (0.25)           | 0.030 (0.76) |
| 1210      | VJ1210 | 0.126 ± 0.010<br>(3.20 ± 0.25) | 0.098 ± 0.010<br>(2.50 ± 0.25) | 0.067 (1.70)                | 0.010 (0.25)           | 0.030 (0.76) |
| 1808      | VJ1808 | 0.180 ± 0.012<br>(4.57 ± 0.30) | 0.080 ± 0.010<br>(2.03 ± 0.25) | 0.086 (2.18)                | 0.010 (0.25)           | 0.035 (0.90) |
| 1812      | VJ1812 | 0.177 ± 0.012<br>(4.50 ± 0.30) | 0.126 ± 0.008<br>(3.20 ± 0.20) | 0.086 (2.18)                | 0.010 (0.25)           | 0.035 (0.90) |
| 1825      | VJ1825 | 0.177 ± 0.012<br>(4.50 ± 0.30) | 0.252 ± 0.010<br>(6.40 ± 0.25) | 0.086 (2.18)                | 0.010 (0.25)           | 0.035 (0.90) |
| 2220      | VJ2220 | 0.220 ± 0.010<br>(5.59 ± 0.25) | 0.200 ± 0.010<br>(5.08 ± 0.25) | 0.086 (2.18)                | 0.010 (0.25)           | 0.037 (0.95) |
| 2225      | VJ2225 | 0.220 ± 0.010<br>(5.59 ± 0.25) | 0.250 ± 0.010<br>(6.35 ± 0.25) | 0.086 (2.18)                | 0.010 (0.25)           | 0.037 (0.95) |

**Notes**

- Polymer (B-termination) have increased dimensions:  
length 0.006" (0.15 mm)
- <sup>(1)</sup> Maximum thickness (T) = 0.067 (1.71) for VJ1206Y104\*



| SELECTION CHART            |        |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
|----------------------------|--------|-----------------------|-----|-----|-----|-----|------|-----------------------|----|-----|-----|-----|-----|-----------------------|------|------|----|-----|-----|-----|-----|------|------|------|------|
| DIELECTRIC                 |        | COG (NP0)             |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| STYLE                      |        | VJ1206 <sup>(1)</sup> |     |     |     |     |      | VJ1210 <sup>(1)</sup> |    |     |     |     |     | VJ1808 <sup>(1)</sup> |      |      |    |     |     |     |     |      |      |      |      |
| CASE CODE                  |        | 1206                  |     |     |     |     |      | 1210                  |    |     |     |     |     | 1808                  |      |      |    |     |     |     |     |      |      |      |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 50                    | 100 | 200 | 500 | 630 | 1000 | 1500                  | 50 | 100 | 200 | 500 | 630 | 1000                  | 1500 | 2000 | 50 | 100 | 200 | 500 | 630 | 1000 | 1500 | 2000 | 3000 |
| VOLTAGE CODE               |        | A                     | B   | C   | E   | L   | G    | R                     | A  | B   | C   | E   | L   | G                     | R    | F    | A  | B   | C   | E   | L   | G    | R    | F    | H    |
| CAP. CODE                  | CAP.   |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 100                        | 10 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 120                        | 12 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 150                        | 15 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 180                        | 18 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 220                        | 22 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 270                        | 27 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 330                        | 33 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 390                        | 39 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 470                        | 47 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 560                        | 56 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 680                        | 68 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 820                        | 82 pF  | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 101                        | 100 pF | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 121                        | 120 pF | •                     | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •                     | •    | •    |    |     |     |     |     |      |      |      |      |
| 151                        | 150 pF | •                     | •   | •   | •   | •   |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 181                        | 180 pF | •                     | •   | •   | •   | •   |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 221                        | 220 pF | •                     | •   | •   | •   | •   |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 271                        | 270 pF | •                     | •   | •   | •   | •   |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 331                        | 330 pF | •                     | •   | •   | •   | •   |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 391                        | 390 pF | •                     | •   | •   | •   | •   |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 471                        | 470 pF | •                     | •   | •   | •   | •   |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 561                        | 560 pF | •                     | •   | •   | •   | •   |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 681                        | 680 pF | •                     | •   | •   | •   | •   |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 821                        | 820 pF | •                     | •   | •   | •   | •   |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 102                        | 1.0 nF | •                     | •   | •   | •   | •   |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 122                        | 1.2 nF | •                     | •   | •   |     |     |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 152                        | 1.5 nF | •                     | •   | •   |     |     |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 182                        | 1.8 nF | •                     | •   | •   |     |     |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 222                        | 2.2 nF | •                     | •   | •   |     |     |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 272                        | 2.7 nF | •                     | •   |     |     |     |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 332                        | 3.3 nF | •                     | •   |     |     |     |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 392                        | 3.9 nF | •                     |     |     |     |     |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 472                        | 4.7 nF | •                     |     |     |     |     |      |                       | •  | •   | •   | •   |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 562                        | 5.6 nF |                       |     |     |     |     |      |                       | •  |     |     |     |     |                       |      |      | •  | •   | •   | •   | •   | •    | •    | •    | •    |
| 682                        | 6.8 nF |                       |     |     |     |     |      |                       | •  |     |     |     |     |                       |      |      | •  | •   |     |     |     |      |      |      |      |
| 822                        | 8.2 nF |                       |     |     |     |     |      |                       | •  |     |     |     |     |                       |      |      | •  |     |     |     |     |      |      |      |      |
| 103                        | 10 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 123                        | 12 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 153                        | 15 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 183                        | 18 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 223                        | 22 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 273                        | 27 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 333                        | 33 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 393                        | 39 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 473                        | 47 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 563                        | 56 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 683                        | 68 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 823                        | 82 nF  |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |
| 104                        | 100 nF |                       |     |     |     |     |      |                       |    |     |     |     |     |                       |      |      |    |     |     |     |     |      |      |      |      |

Notes

• RoHS-compliant

<sup>(1)</sup> See soldering recommendations within this data book, or visit: [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034)



| SELECTION CHART            |        |                       |     |     |     |     |      |      |      |                       |    |     |     |     |     |      |
|----------------------------|--------|-----------------------|-----|-----|-----|-----|------|------|------|-----------------------|----|-----|-----|-----|-----|------|
| DIELECTRIC                 |        | COG (NP0)             |     |     |     |     |      |      |      |                       |    |     |     |     |     |      |
| STYLE                      |        | VJ1812 <sup>(1)</sup> |     |     |     |     |      |      |      | VJ1825 <sup>(1)</sup> |    |     |     |     |     |      |
| CASE CODE                  |        | 1812                  |     |     |     |     |      |      |      | 1825                  |    |     |     |     |     |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 50                    | 100 | 200 | 500 | 630 | 1000 | 1500 | 2000 | 3000                  | 50 | 100 | 200 | 500 | 630 | 1000 |
| VOLTAGE CODE               |        | A                     | B   | C   | E   | L   | G    | R    | F    | H                     | A  | B   | C   | E   | L   | G    |
| CAP. CODE                  | CAP.   |                       |     |     |     |     |      |      |      |                       |    |     |     |     |     |      |
| 100                        | 10 pF  |                       |     |     |     |     |      |      |      |                       |    |     |     |     |     |      |
| 120                        | 12 pF  |                       |     |     |     |     |      |      |      |                       |    |     |     |     |     |      |
| 150                        | 15 pF  |                       |     |     |     |     |      |      |      |                       |    |     |     |     |     |      |
| 180                        | 18 pF  |                       |     |     |     |     |      |      |      |                       |    |     |     |     | •   | •    |
| 220                        | 22 pF  |                       |     |     |     |     |      |      |      |                       |    |     |     |     | •   | •    |
| 270                        | 27 pF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     |    |     |     |     | •   | •    |
| 330                        | 33 pF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 390                        | 39 pF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 470                        | 47 pF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 560                        | 56 pF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 680                        | 68 pF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 820                        | 82 pF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 101                        | 100 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 121                        | 120 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 151                        | 150 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 181                        | 180 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 221                        | 220 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 271                        | 270 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 331                        | 330 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 391                        | 390 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 471                        | 470 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 561                        | 560 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 681                        | 680 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 821                        | 820 pF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 102                        | 1.0 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 122                        | 1.2 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 152                        | 1.5 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 182                        | 1.8 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 222                        | 2.2 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 272                        | 2.7 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 332                        | 3.3 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 392                        | 3.9 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 472                        | 4.7 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 562                        | 5.6 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 682                        | 6.8 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 822                        | 8.2 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 103                        | 10 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 123                        | 12 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 153                        | 15 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 183                        | 18 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 223                        | 22 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 273                        | 27 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 333                        | 33 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 393                        | 39 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 473                        | 47 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 563                        | 56 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 683                        | 68 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 823                        | 82 nF  | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |
| 104                        | 100 nF | •                     | •   | •   | •   | •   | •    | •    | •    | •                     | •  | •   | •   | •   | •   | •    |

Notes

RoHS-compliant

<sup>(1)</sup> See soldering recommendations within this data book, or visit: [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034)



| SELECTION CHART            |        |                       |     |     |     |     |                       |    |     |     |     |     |      |
|----------------------------|--------|-----------------------|-----|-----|-----|-----|-----------------------|----|-----|-----|-----|-----|------|
| DIELECTRIC                 |        | COG (NPO)             |     |     |     |     |                       |    |     |     |     |     |      |
| STYLE                      |        | VJ2220 <sup>(1)</sup> |     |     |     |     | VJ2225 <sup>(1)</sup> |    |     |     |     |     |      |
| CASE CODE                  |        | 2220                  |     |     |     |     | 2225                  |    |     |     |     |     |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 50                    | 100 | 200 | 500 | 630 | 1000                  | 50 | 100 | 200 | 500 | 630 | 1000 |
| VOLTAGE CODE               |        | A                     | B   | C   | E   | L   | G                     | A  | B   | C   | E   | L   | G    |
| CAP. CODE                  | CAP.   |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 100                        | 10 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 120                        | 12 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 150                        | 15 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 180                        | 18 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 220                        | 22 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 270                        | 27 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 330                        | 33 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 390                        | 39 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 470                        | 47 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 560                        | 56 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 680                        | 68 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 820                        | 82 pF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 101                        | 100 pF |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 121                        | 120 pF |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 151                        | 150 pF |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 181                        | 180 pF |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 221                        | 220 pF |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 271                        | 270 pF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 331                        | 330 pF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 391                        | 390 pF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 471                        | 470 pF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 561                        | 560 pF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 681                        | 680 pF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 821                        | 820 pF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 102                        | 1.0 nF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 122                        | 1.2 nF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 152                        | 1.5 nF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 182                        | 1.8 nF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 222                        | 2.2 nF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 272                        | 2.7 nF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 332                        | 3.3 nF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 392                        | 3.9 nF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 472                        | 4.7 nF | •                     | •   | •   | •   | •   | •                     | •  | •   | •   | •   | •   | •    |
| 562                        | 5.6 nF | •                     | •   | •   |     |     |                       | •  | •   | •   | •   |     |      |
| 682                        | 6.8 nF | •                     | •   | •   |     |     |                       | •  | •   | •   | •   |     |      |
| 822                        | 8.2 nF | •                     | •   | •   |     |     |                       | •  | •   | •   | •   |     |      |
| 103                        | 10 nF  | •                     | •   | •   |     |     |                       | •  | •   | •   | •   |     |      |
| 123                        | 12 nF  | •                     | •   | •   |     |     |                       | •  | •   | •   | •   |     |      |
| 153                        | 15 nF  | •                     | •   |     |     |     |                       | •  | •   | •   |     |     |      |
| 183                        | 18 nF  | •                     | •   |     |     |     |                       | •  | •   | •   |     |     |      |
| 223                        | 22 nF  | •                     | •   |     |     |     |                       | •  | •   | •   |     |     |      |
| 273                        | 27 nF  | •                     | •   |     |     |     |                       | •  | •   | •   |     |     |      |
| 333                        | 33 nF  | •                     |     |     |     |     |                       | •  | •   | •   |     |     |      |
| 393                        | 39 nF  | •                     |     |     |     |     |                       | •  | •   |     |     |     |      |
| 473                        | 47 nF  |                       |     |     |     |     |                       | •  |     |     |     |     |      |
| 563                        | 56 nF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 683                        | 68 nF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 823                        | 82 nF  |                       |     |     |     |     |                       |    |     |     |     |     |      |
| 104                        | 100 nF |                       |     |     |     |     |                       |    |     |     |     |     |      |

Notes

• RoHS-compliant

(1) See soldering recommendations within this data book, or visit: [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034)



| SELECTION CHART            |        |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
|----------------------------|--------|-----------------------|----|----|-----|-----|-----|-----|----|-----------------------|----|-----|-----|-----|-----|------|------|------|
| DIELECTRIC                 |        | X7R                   |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
| STYLE                      |        | VJ0805 <sup>(1)</sup> |    |    |     |     |     |     |    | VJ1206 <sup>(1)</sup> |    |     |     |     |     |      |      |      |
| CASE CODE                  |        | 0805                  |    |    |     |     |     |     |    | 1206                  |    |     |     |     |     |      |      |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 16                    | 25 | 50 | 100 | 200 | 500 | 630 | 16 | 25                    | 50 | 100 | 200 | 500 | 630 | 1000 | 1500 | 2000 |
| VOLTAGE CODE               |        | J                     | X  | A  | B   | C   | E   | L   | J  | X                     | A  | B   | C   | E   | L   | G    | R    | F    |
| CAP. CODE                  | CAP.   |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
| 101                        | 100 pF |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
| 121                        | 120 pF |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
| 151                        | 150 pF |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
| 181                        | 180 pF |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
| 221                        | 220 pF |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
| 271                        | 270 pF |                       |    |    |     |     |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 331                        | 330 pF |                       |    |    |     |     |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 391                        | 390 pF |                       |    |    |     |     |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 471                        | 470 pF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 561                        | 560 pF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 681                        | 680 pF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 821                        | 820 pF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 102                        | 1.0 nF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 122                        | 1.2 nF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 152                        | 1.5 nF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 182                        | 1.8 nF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 222                        | 2.2 nF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 272                        | 2.7 nF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 332                        | 3.3 nF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 392                        | 3.9 nF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 472                        | 4.7 nF | ••                    | •• | •• | ••  | ••  | •   | •   | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 562                        | 5.6 nF | ••                    | •• | •• | ••  | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 682                        | 6.8 nF | ••                    | •• | •• | ••  | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 822                        | 8.2 nF | ••                    | •• | •• | ••  | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 103                        | 10 nF  | ••                    | •• | •• | ••  | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 123                        | 12 nF  | ••                    | •• | •• | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 153                        | 15 nF  | ••                    | •• | •• | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 183                        | 18 nF  | ••                    | •• | •• | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 223                        | 22 nF  | ••                    | •• | •• | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 273                        | 27 nF  | ••                    | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 333                        | 33 nF  | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 393                        | 39 nF  | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 473                        | 47 nF  | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 563                        | 56 nF  | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 683                        | 68 nF  | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 823                        | 82 nF  | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 104                        | 100 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 124                        | 120 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 154                        | 150 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 184                        | 180 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 224                        | 220 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 274                        | 270 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 334                        | 330 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 394                        | 390 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 474                        | 470 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 564                        | 560 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 684                        | 680 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 824                        | 820 nF | •                     | •  | •  | •   | •   |     |     | •  | •                     | •  | •   | •   | •   | •   | •    | •    | •    |
| 105                        | 1.0 µF |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
| 125                        | 1.2 µF |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
| 155                        | 1.5 µF |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
| 185                        | 1.8 µF |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |
| 225                        | 2.2 µF |                       |    |    |     |     |     |     |    |                       |    |     |     |     |     |      |      |      |

Notes

•• RoHS-compliant

•• Paper tape • Plastic tape

<sup>(1)</sup> See soldering recommendations within this data book, or visit: [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034)



| SELECTION CHART            |        |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |
|----------------------------|--------|-----------------------|----|----|-----|-----|-----|-----|------|------|------|-----------------------|------|------|------|------|
| DIELECTRIC                 |        | X7R                   |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |
| STYLE                      |        | VJ1210 <sup>(1)</sup> |    |    |     |     |     |     |      |      |      | VJ1808 <sup>(1)</sup> |      |      |      |      |
| CASE CODE                  |        | 1210                  |    |    |     |     |     |     |      |      |      | 1808                  |      |      |      |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 16                    | 25 | 50 | 100 | 200 | 500 | 630 | 1000 | 1500 | 2000 | 630                   | 1000 | 1500 | 2000 | 3000 |
| VOLTAGE CODE               |        | J                     | X  | A  | B   | C   | E   | L   | G    | R    | F    | L                     | G    | R    | F    | H    |
| CAP. CODE                  | CAP.   |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |
| 101                        | 100 pF |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |
| 121                        | 120 pF |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |
| 151                        | 150 pF |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |
| 181                        | 180 pF |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |
| 221                        | 220 pF |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      | •    |
| 271                        | 270 pF |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      | •    |
| 331                        | 330 pF |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      | •    |
| 391                        | 390 pF |                       |    |    |     |     |     |     | •    | •    | •    |                       |      |      |      | •    |
| 471                        | 470 pF |                       |    |    |     |     |     |     | •    | •    | •    | •                     | •    | •    | •    | •    |
| 561                        | 560 pF |                       |    |    |     |     |     |     | •    | •    | •    | •                     | •    | •    | •    | •    |
| 681                        | 680 pF |                       |    |    |     |     |     |     | •    | •    | •    | •                     | •    | •    | •    | •    |
| 821                        | 820 pF |                       |    |    |     |     |     |     | •    | •    | •    | •                     | •    | •    | •    | •    |
| 102                        | 1.0 nF |                       |    |    |     |     |     |     | •    | •    | •    | •                     | •    | •    | •    | •    |
| 122                        | 1.2 nF |                       |    |    |     |     |     |     | •    | •    | •    | •                     | •    | •    | •    | •    |
| 152                        | 1.5 nF |                       |    |    |     |     |     |     | •    | •    | •    | •                     | •    | •    | •    | •    |
| 182                        | 1.8 nF |                       |    |    |     |     |     |     | •    | •    | •    | •                     | •    | •    | •    |      |
| 222                        | 2.2 nF |                       |    |    |     |     |     |     | •    | •    | •    | •                     | •    | •    | •    |      |
| 272                        | 2.7 nF |                       |    |    |     |     |     |     | •    | •    | •    | •                     | •    | •    | •    |      |
| 332                        | 3.3 nF |                       |    |    |     |     |     |     | •    | •    | •    | •                     | •    | •    | •    |      |
| 392                        | 3.9 nF |                       |    |    |     |     |     |     | •    | •    |      | •                     | •    | •    | •    |      |
| 472                        | 4.7 nF |                       |    |    |     |     |     |     | •    | •    |      | •                     | •    | •    | •    |      |
| 562                        | 5.6 nF |                       |    |    |     |     |     |     | •    |      |      | •                     | •    | •    |      |      |
| 682                        | 6.8 nF |                       |    |    |     |     |     |     | •    |      |      | •                     | •    | •    |      |      |
| 822                        | 8.2 nF |                       |    |    |     |     |     |     |      |      |      | •                     | •    |      |      |      |
| 103                        | 10 nF  | •                     | •  | •  | •   | •   | •   | •   | •    |      |      | •                     | •    |      |      |      |
| 123                        | 12 nF  | •                     | •  | •  | •   | •   | •   | •   |      |      |      | •                     | •    |      |      |      |
| 153                        | 15 nF  | •                     | •  | •  | •   | •   | •   | •   |      |      |      | •                     | •    |      |      |      |
| 183                        | 18 nF  | •                     | •  | •  | •   | •   | •   | •   |      |      |      | •                     | •    |      |      |      |
| 223                        | 22 nF  | •                     | •  | •  | •   | •   | •   | •   |      |      |      |                       |      |      |      |      |
| 273                        | 27 nF  | •                     | •  | •  | •   | •   | •   | •   |      |      |      |                       |      |      |      |      |
| 333                        | 33 nF  | •                     | •  | •  | •   | •   | •   | •   |      |      |      |                       |      |      |      |      |
| 393                        | 39 nF  | •                     | •  | •  | •   | •   | •   | •   |      |      |      |                       |      |      |      |      |
| 473                        | 47 nF  | •                     | •  | •  | •   | •   |     |     |      |      |      |                       |      |      |      |      |
| 563                        | 56 nF  | •                     | •  | •  | •   | •   |     |     |      |      |      |                       |      |      |      |      |
| 683                        | 68 nF  | •                     | •  | •  | •   | •   |     |     |      |      |      |                       |      |      |      |      |
| 823                        | 82 nF  | •                     | •  | •  | •   | •   |     |     |      |      |      |                       |      |      |      |      |
| 104                        | 100 nF | •                     | •  | •  | •   | •   |     |     |      |      |      |                       |      |      |      |      |
| 124                        | 120 nF | •                     | •  | •  | •   | •   |     |     |      |      |      |                       |      |      |      |      |
| 154                        | 150 nF | •                     | •  | •  | •   | •   |     |     |      |      |      |                       |      |      |      |      |
| 184                        | 180 nF | •                     | •  | •  | •   |     |     |     |      |      |      |                       |      |      |      |      |
| 224                        | 220 nF | •                     | •  | •  | •   |     |     |     |      |      |      |                       |      |      |      |      |
| 274                        | 270 nF | •                     | •  | •  | •   |     |     |     |      |      |      |                       |      |      |      |      |
| 334                        | 330 nF | •                     | •  | •  | •   |     |     |     |      |      |      |                       |      |      |      |      |
| 394                        | 390 nF | •                     | •  | •  | •   |     |     |     |      |      |      |                       |      |      |      |      |
| 474                        | 470 nF | •                     | •  | •  | •   |     |     |     |      |      |      |                       |      |      |      |      |
| 564                        | 560 nF | •                     | •  | •  |     |     |     |     |      |      |      |                       |      |      |      |      |
| 684                        | 680 nF | •                     | •  | •  |     |     |     |     |      |      |      |                       |      |      |      |      |
| 824                        | 820 nF | •                     | •  |    |     |     |     |     |      |      |      |                       |      |      |      |      |
| 105                        | 1.0 μF | •                     |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |
| 125                        | 1.2 μF |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |
| 155                        | 1.5 μF |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |
| 185                        | 1.8 μF |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |
| 225                        | 2.2 μF |                       |    |    |     |     |     |     |      |      |      |                       |      |      |      |      |

Notes

• RoHS-compliant

<sup>(1)</sup> See soldering recommendations within this data book, or visit: [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034)





| SELECTION CHART            |        |                       |     |     |     |     |     |      |      |      |                       |     |     |     |     |      |      |      |
|----------------------------|--------|-----------------------|-----|-----|-----|-----|-----|------|------|------|-----------------------|-----|-----|-----|-----|------|------|------|
| DIELECTRIC                 |        | X7R                   |     |     |     |     |     |      |      |      |                       |     |     |     |     |      |      |      |
| STYLE                      |        | VJ1812 <sup>(1)</sup> |     |     |     |     |     |      |      |      | VJ1825 <sup>(1)</sup> |     |     |     |     |      |      |      |
| CASE CODE                  |        | 1812                  |     |     |     |     |     |      |      |      | 1825                  |     |     |     |     |      |      |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 50                    | 100 | 200 | 250 | 500 | 630 | 1000 | 1500 | 2000 | 3000                  | 100 | 200 | 500 | 630 | 1000 | 1500 | 2000 |
| VOLTAGE CODE               |        | A                     | B   | C   | P   | E   | L   | G    | R    | F    | H                     | B   | C   | E   | L   | G    | R    | F    |
| CAP. CODE                  | CAP.   |                       |     |     |     |     |     |      |      |      |                       |     |     |     |     |      |      |      |
| 101                        | 100 pF | •                     | •   | •   | •   | •   |     |      |      |      |                       |     |     |     |     |      |      |      |
| 121                        | 120 pF | •                     | •   | •   | •   | •   |     |      |      |      |                       |     |     |     |     |      |      |      |
| 151                        | 150 pF | •                     | •   | •   | •   | •   |     |      |      |      |                       |     |     |     |     |      |      |      |
| 181                        | 180 pF | •                     | •   | •   | •   | •   |     |      |      |      |                       |     |     |     |     |      |      |      |
| 221                        | 220 pF | •                     | •   | •   | •   | •   |     |      |      |      |                       |     |     |     |     |      |      |      |
| 271                        | 270 pF | •                     | •   | •   | •   | •   | •   |      |      |      |                       |     |     |     |     |      |      |      |
| 331                        | 330 pF | •                     | •   | •   | •   | •   | •   |      |      |      |                       |     |     |     |     |      |      |      |
| 391                        | 390 pF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 471                        | 470 pF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 561                        | 560 pF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 681                        | 680 pF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 821                        | 820 pF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 102                        | 1.0 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 122                        | 1.2 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 152                        | 1.5 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 182                        | 1.8 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 222                        | 2.2 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 272                        | 2.7 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 332                        | 3.3 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 392                        | 3.9 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 472                        | 4.7 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      |      |      |
| 562                        | 5.6 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      | •    | •    |
| 682                        | 6.8 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      | •    | •    |
| 822                        | 8.2 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     |     |     |     |      | •    | •    |
| 103                        | 10 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 123                        | 12 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 153                        | 15 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 183                        | 18 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 203                        | 20 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 223                        | 22 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 273                        | 27 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 333                        | 33 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 393                        | 39 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 473                        | 47 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 563                        | 56 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 683                        | 68 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 823                        | 82 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 104                        | 100 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 124                        | 120 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 154                        | 150 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 184                        | 180 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 224                        | 220 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 274                        | 270 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 334                        | 330 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 394                        | 390 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 474                        | 470 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 564                        | 560 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 684                        | 680 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 824                        | 820 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 105                        | 1.0 μF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 125                        | 1.2 μF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 155                        | 1.5 μF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 185                        | 1.8 μF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |
| 225                        | 2.2 μF | •                     | •   | •   | •   | •   | •   | •    | •    | •    | •                     |     | •   | •   | •   | •    | •    | •    |

Notes

• RoHS-compliant

<sup>(1)</sup> See soldering recommendations within this data book, or visit: [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034)



| SELECTION CHART            |        |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
|----------------------------|--------|-----------------------|-----|-----|-----|-----|-----|------|------|-----------------------|-----|-----|-----|-----|------|------|------|
| DIELECTRIC                 |        | X7R                   |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| STYLE                      |        | VJ2220 <sup>(1)</sup> |     |     |     |     |     |      |      | VJ2225 <sup>(1)</sup> |     |     |     |     |      |      |      |
| CASE CODE                  |        | 2220                  |     |     |     |     |     |      |      | 2225                  |     |     |     |     |      |      |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 50                    | 100 | 200 | 250 | 500 | 630 | 1000 | 2000 | 3000                  | 100 | 200 | 500 | 630 | 1000 | 1500 | 2000 |
| VOLTAGE CODE               |        | A                     | B   | C   | P   | E   | L   | G    | F    | H                     | B   | C   | E   | L   | G    | R    | F    |
| CAP. CODE                  | CAP.   |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 101                        | 100 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 121                        | 120 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 151                        | 150 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 181                        | 180 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 221                        | 220 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 271                        | 270 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 331                        | 330 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 391                        | 390 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 471                        | 470 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 561                        | 560 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 681                        | 680 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 821                        | 820 pF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 102                        | 1.0 nF |                       |     |     |     |     |     |      |      | •                     |     |     |     |     |      |      |      |
| 122                        | 1.2 nF |                       |     |     |     |     |     |      |      | •                     |     |     |     |     |      |      |      |
| 152                        | 1.5 nF |                       |     |     |     |     |     |      |      | •                     |     |     |     |     |      |      |      |
| 182                        | 1.8 nF |                       |     |     |     |     |     |      |      | •                     |     |     |     |     |      |      |      |
| 222                        | 2.2 nF |                       |     |     |     |     |     |      |      | •                     |     |     |     |     |      |      |      |
| 272                        | 2.7 nF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 332                        | 3.3 nF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 392                        | 3.9 nF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 472                        | 4.7 nF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |
| 562                        | 5.6 nF |                       |     |     |     |     |     |      | •    |                       |     |     |     |     |      | •    | •    |
| 682                        | 6.8 nF |                       |     |     |     |     |     |      | •    |                       |     |     |     |     |      | •    | •    |
| 822                        | 8.2 nF |                       |     |     |     |     |     |      | •    |                       |     |     |     |     |      | •    | •    |
| 103                        | 10 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 123                        | 12 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 153                        | 15 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 183                        | 18 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 203                        | 20 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 223                        | 22 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 273                        | 27 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 333                        | 33 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 393                        | 39 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 473                        | 47 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 563                        | 56 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 683                        | 68 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 823                        | 82 nF  | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 104                        | 100 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 124                        | 120 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 154                        | 150 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 184                        | 180 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 224                        | 220 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 274                        | 270 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 334                        | 330 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 394                        | 390 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 474                        | 470 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 564                        | 560 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 684                        | 680 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 824                        | 820 nF | •                     | •   | •   | •   | •   | •   | •    | •    | •                     | •   | •   | •   | •   | •    | •    | •    |
| 105                        | 1.0 μF | •                     | •   |     |     |     |     |      |      |                       | •   | •   |     |     |      |      |      |
| 125                        | 1.2 μF | •                     | •   |     |     |     |     |      |      |                       | •   | •   |     |     |      |      |      |
| 155                        | 1.5 μF | •                     | •   |     |     |     |     |      |      |                       | •   |     |     |     |      |      |      |
| 185                        | 1.8 μF | •                     |     |     |     |     |     |      |      |                       | •   |     |     |     |      |      |      |
| 225                        | 2.2 μF |                       |     |     |     |     |     |      |      |                       |     |     |     |     |      |      |      |

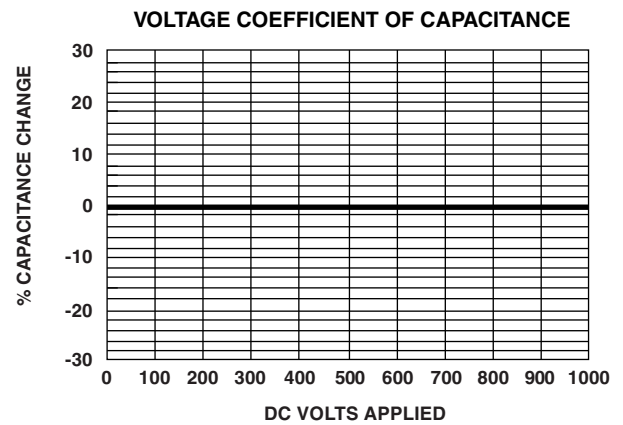
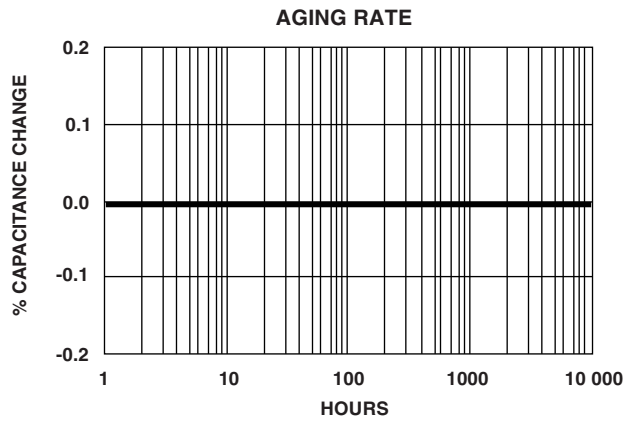
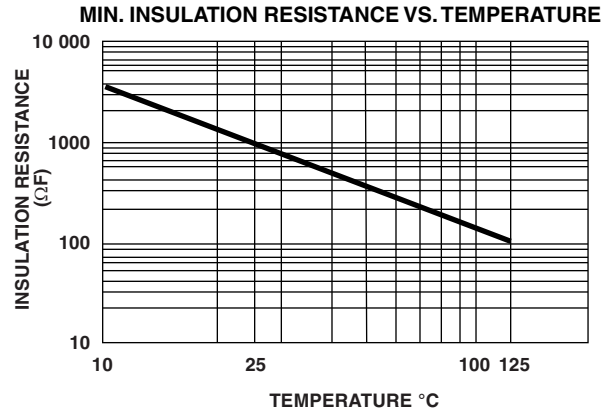
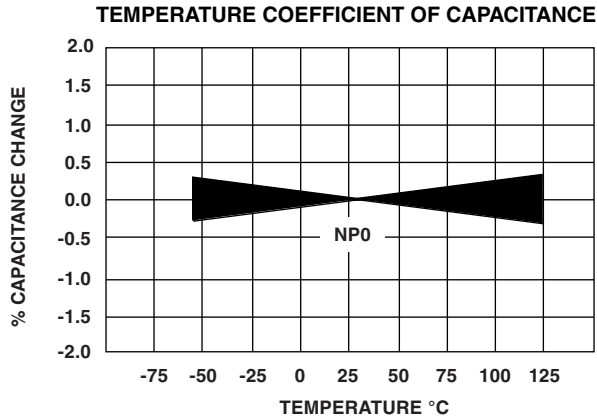
Notes

• RoHS-compliant

<sup>(1)</sup> See soldering recommendations within this data book, or visit: [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034)



COG (NP0) CAPACITORS - TYPICAL PARAMETERS



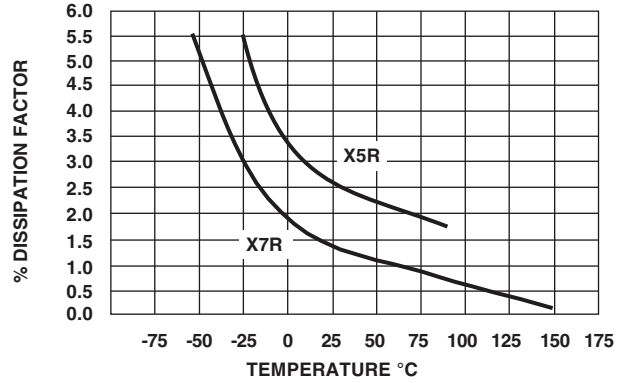


**X7R DIELECTRIC - TYPICAL PARAMETERS**

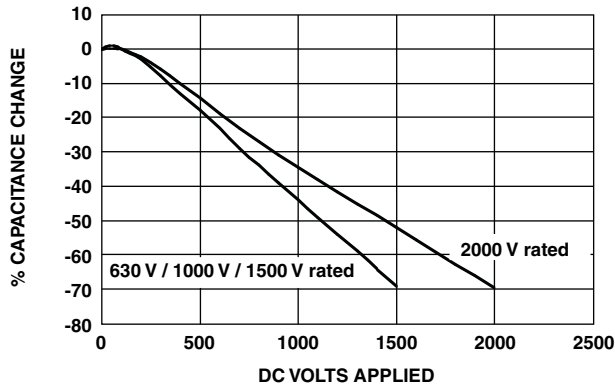
**RATED VOLTAGE VS. TEMPERATURE**



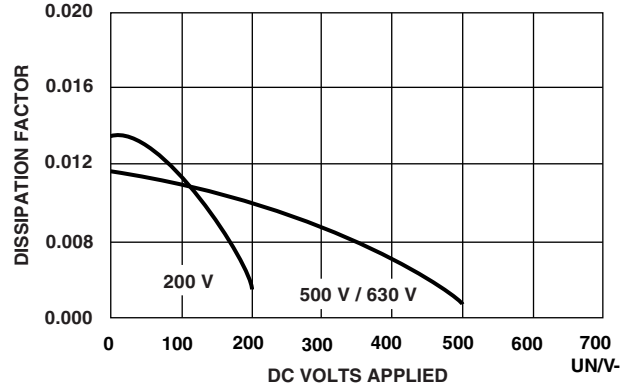
**DISSIPATION FACTOR VS. TEMPERATURE**



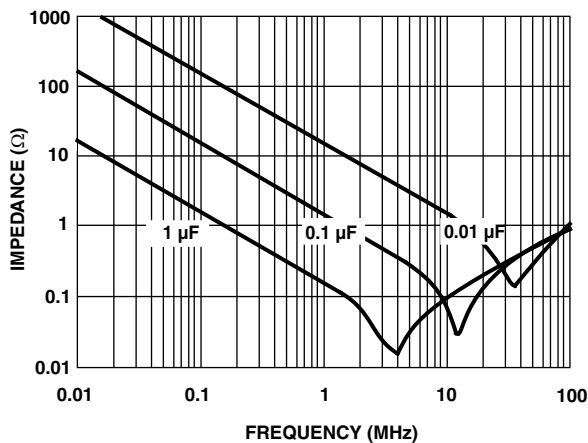
**VOLTAGE COEFFICIENT OF CAPACITANCE**



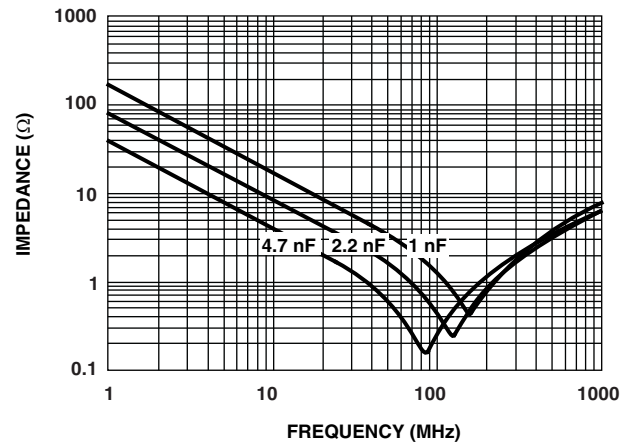
**DISSIPATION FACTOR VS. VOLTAGE**



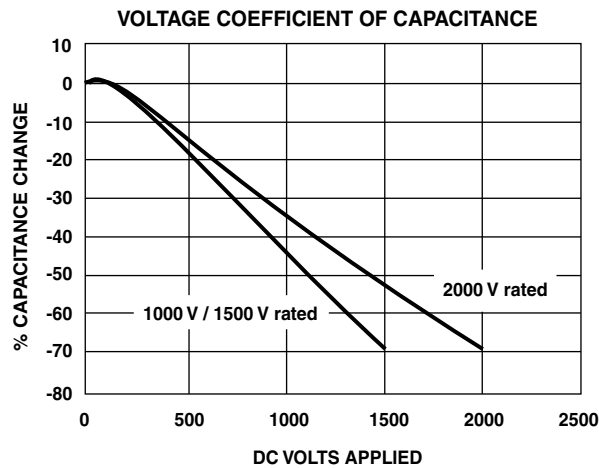
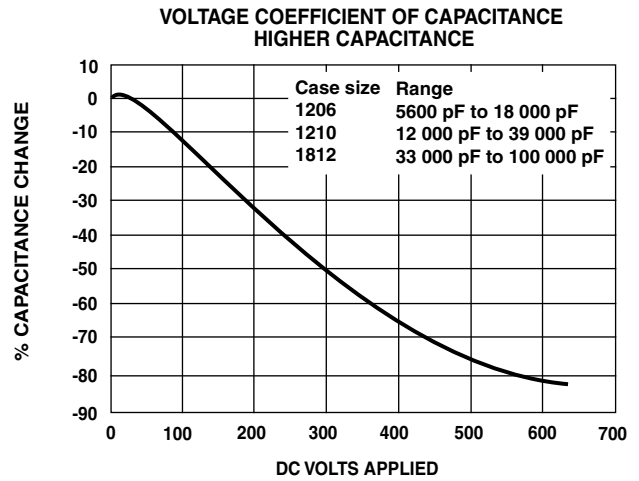
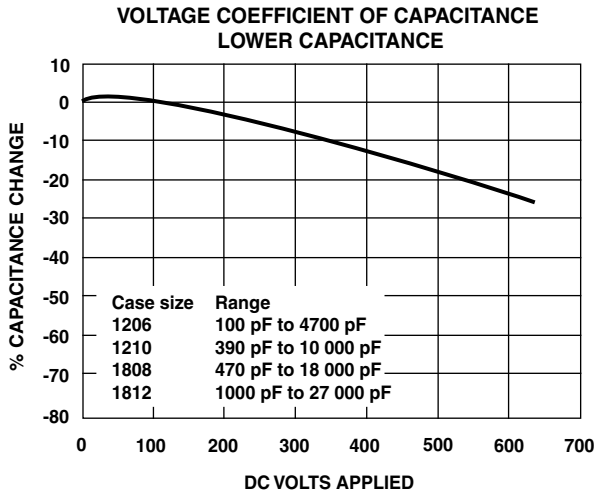
**IMPEDANCE VS. FREQUENCY 500 V / 630 V**



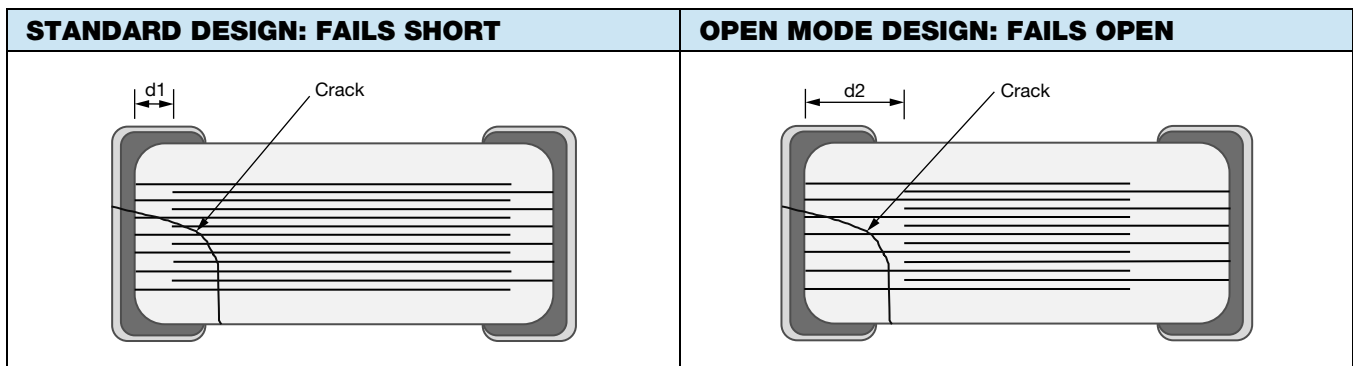
**IMPEDANCE VS. FREQUENCY 2000 V**



**X7R DIELECTRIC - TYPICAL PARAMETERS**



Cracking due to board flexure is a common failure mode for MLCC's. Using an open mode design reduces the risk of a short circuit by increasing the margin between the terminal and the electrodes.  $d2 > d1$ , therefore the same size crack does not cause a short in the open mode design.



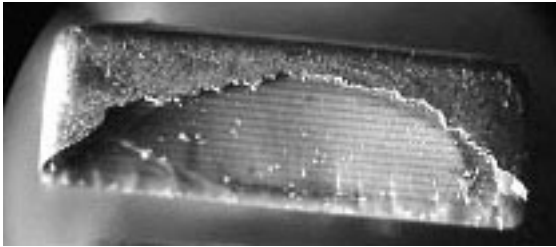
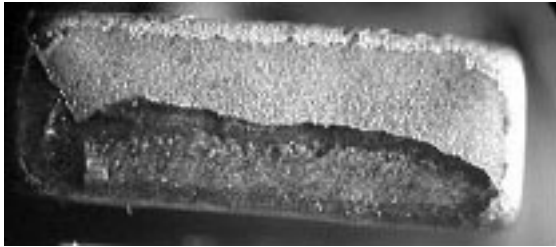
**BOARDFLEX SENSITIVE APPLICATIONS - SOLUTION**

A predominant failure mode in multilayer ceramic chip capacitors is cracking caused by board flexure. Cracks can then create a path for current to pass from one electrode through the dielectric to an opposing electrode or from the terminations at one end of the MLCC through the dielectric to an opposing electrode. This may subsequently result in capacitance loss, leakage - low Insulation Resistance (IR) - and / or more seriously, high current shorts. A short circuit condition in the surface mounted capacitors can cause further failures of downstream components. Vishay's Open Mode Design Capacitors (VJ OMD - Cap. series) reduce the risk of these destructive conditions through MLCC designs that prevent board flexure cracks reaching the opposing electrode.

VJ OMD - Cap. MLCCs reduce the risk of early field failures associated with board flex cracks. However, it is important to note that even in the open mode designs the presence of flexure related cracks can cause capacitance loss leading to localized stresses on the parts. eventually, depending on the application environment, including such factors and high voltage pulse frequency and thermal cycling this may lead to internal breakdown of the component.

**POLYMER TERMINATION**

Polymer termination provides additional protection against board flexure damage by absorbing greater mechanical and thermal stresses. Components can be packaged, transported, stored and handled the same standard terminated product. Wave and reflow soldering of MLCC does not require modification to equipment and / or process. Polymer termination greatly reduces the risk of mechanical cracking however it does not completely eliminate.

| STANDARD TERMINATION   | OMD CAP PLUS POLYMER TERMINATION  |
|--|---|
| Exposed Electrodes = Electrical Short  | No Exposed Electrodes = No Electrical Short   |
|  |  |

| STANDARD PACKAGING QUANTITIES (1)(2)(3) |           |                                     |                                 |                                     |                                 |
|---|-----------|-------------------------------------|---------------------------------|-------------------------------------|---------------------------------|
| CASE CODE                               | TAPE SIZE | 7" REEL QUANTITIES                  |                                 | 11 1/4" AND 13" REEL QUANTITIES     |                                 |
|   |           | PAPER TAPE PACKAGING CODE "C" / "O" | PLASTIC TAPE PACKAGING CODE "T" | PAPER TAPE PACKAGING CODE "P" / "I" | PLASTIC TAPE PACKAGING CODE "R" |
| 0805 (4)(5)                             | 8 mm      | 3000                                | 3000                            | 10 000                              | 10 000                          |
| 1206 (4)                                | 8 mm      | n/a                                 | 2500 / 3000                     | n/a                                 | 9000 / 10 000                   |
| 1210 (4)                                | 8 mm      | n/a                                 | 2000 / 2500 / 3000              | n/a                                 | 9000 / 10 000                   |
| 1808 (4)                                | 12 mm     | n/a                                 | 2000                            | n/a                                 | 10 000                          |
| 1812 (4)                                | 12 mm     | n/a                                 | 1000                            | n/a                                 | 4000                            |
| 1825                                    | 12 mm     | n/a                                 | 1000                            | n/a                                 | 4000                            |
| 2220                                    | 12 mm     | n/a                                 | 1000                            | n/a                                 | n/a                             |
| 2225                                    | 12 mm     | n/a                                 | 500                             | n/a                                 | n/a                             |

**Notes**

- (1) Vishay Vitramon uses embossed plastic, and punch paper carrier tapes. Paper tape is not available for case sizes  $\geq$  1206 or for component thickness  $>$  0.035" (0.89 mm)
- (2) Reference: EIA standard RS 481 - "Taping of Surface Mount Components for Automatic Placement"
- (3) n/a = not available
- (4) Packaging code "C" / "O", "P" / "I" and lower quantities can depend from product thickness
- (5) Polymer termination, code "B", only available in plastic tape "T" / "R"

| STORAGE AND HANDLING CONDITIONS  |
|--|
| (1) Store the components at 5 °C to 40 °C ambient temperature and $\leq$ 70 % relative humidity conditions.<br>(2) The product is recommended to be used within a time-frame of 2 years after shipment.<br>Check solderability in case extended shelf life beyond the expiry date is needed.<br><br>Precautions:<br>a. Do not store products in an environment containing corrosive elements, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. This may cause corrosion or oxidization of the terminations, which can easily lead to poor soldering.<br>b. Store products on the shelf and avoid exposure to moisture or dust.<br>c. Do not expose products to excessive shock, vibration, direct sunlight and so on. |



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