

## Surface Mount Multilayer Ceramic Chip Capacitors for Non-Magnetic Applications



### FEATURES

- Manufactured with non-magnetic materials
- Safety screened for magnetic properties
- C0G (NP0) and X7R / X5R dielectrics
- Wide range of case sizes, voltage ratings, and capacitance values
- Suitable for reflow assembly methods
- Wet built 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**

### LINKS TO ADDITIONAL RESOURCES



Packages



Technical  
Notes



Related  
Documents

### APPLICATIONS

- Magnetic Resonance Imaging (MRI)
- Medical test and diagnostic equipment
- Laboratory analysis systems
- Navigation and electronic test equipment
- Audio amplifiers

### ELECTRICAL SPECIFICATIONS

#### NON-MAGNETIC C0G (NP0)

##### GENERAL SPECIFICATION

###### Note

Electrical characteristics at +25 °C unless otherwise specified

**Operating Temperature:** -55 °C to +125 °C

**Capacitance Range:** 1.0 pF to 39 nF

**Voltage Range:** 10 V<sub>DC</sub> to 3000 V<sub>DC</sub>

**Temperature Coefficient of Capacitance (TCC):**  
0 ppm/°C ± 30 ppm/°C from -55 °C to +125 °C

###### Dissipation Factor (DF):

0.1 % maximum at 1.0 V<sub>RMS</sub> and

1 MHz for values ≤ 1000 pF

0.1 % maximum at 1.0 V<sub>RMS</sub> and

1 kHz for values > 1000 pF

###### Insulating Resistance:

at +25 °C 100 000 MΩ min. or 1000 ΩF whichever is less  
at +125 °C 10 000 MΩ min. or 100 ΩF whichever is less

**Aging:** 0 % maximum per decade

###### Dielectric Strength Test:

performed per method 103 of EIA 198-2-E.

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

#### NON-MAGNETIC X7R / X5R

##### GENERAL SPECIFICATION

###### Note

Electrical characteristics at +25 °C unless otherwise specified

**Operating Temperature:** -55 °C to +125 °C

**Capacitance Range:** 100 pF to 6.8 μF

**Voltage Range:** 6.3 V<sub>DC</sub> to 3000 V<sub>DC</sub>

###### Temperature Coefficient of Capacitance (TCC):

X5R: ± 15 % from -55 °C to +85 °C, with 0 V<sub>DC</sub> applied

X7R: ± 15 % from -55 °C to +125 °C, with 0 V<sub>DC</sub> applied

###### Dissipation Factor (DF):

≤ 6.3 V, 10 V ratings: 5 % maximum at 1.0 V<sub>RMS</sub> and 1 kHz

16 V, 25 V ratings: 3.5 % maximum at 1.0 V<sub>RMS</sub> and 1 kHz

≥ 50 V ratings: 2.5 % maximum at 1.0 V<sub>RMS</sub> and 1 kHz

###### Insulating Resistance:

at +25 °C 100 000 MΩ min. or 1000 ΩF whichever is less  
at +125 °C 10 000 MΩ min. or 100 ΩF whichever is less

**Aging Rate:** 1 % maximum per decade

###### Dielectric Strength Test:

performed per method 103 of EIA 198-2-E.

Applied test voltages

≤ 200 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: min. 120 % of rated voltage

1500 V<sub>DC</sub>, 3000 V<sub>DC</sub>-rated: 120 % of rated voltage



| QUICK REFERENCE DATA |      |                        |             |             |
|----------------------|------|------------------------|-------------|-------------|
| DIELECTRIC           | CASE | MAXIMUM VOLTAGE<br>(V) | CAPACITANCE |             |
|                      |      |                        | MINIMUM     | MAXIMUM     |
| C0G (NP0)            | 0402 | 100                    | 1.0 pF      | 180 pF      |
|                      | 0603 | 200                    | 1.0 pF      | 1.5 nF      |
|                      | 0805 | 500                    | 1.0 pF      | 3.3 nF      |
|                      | 1206 | 600                    | 1.0 pF      | 10 nF       |
|                      | 1210 | 500                    | 1.0 pF      | 12 nF       |
|                      | 1808 | 3000                   | 27 pF       | 10 nF       |
|                      | 1812 | 3000                   | 27 pF       | 22 nF       |
|                      | 1825 | 1000                   | 15 pF       | 33 nF       |
|                      | 2220 | 1000                   | 100 pF      | 33 nF       |
|                      | 2225 | 1000                   | 120 pF      | 39 nF       |
| X5R                  | 0402 | 16                     | 27 nF       | 47 nF       |
|                      | 0603 | 6.3                    | 120 nF      | 150 nF      |
| X7R                  | 0402 | 100                    | 100 pF      | 22 nF       |
|                      | 0603 | 100                    | 270 pF      | 100 nF      |
|                      | 0805 | 200                    | 390 pF      | 390 nF      |
|                      | 1206 | 500                    | 680 pF      | 1.0 $\mu$ F |
|                      | 1210 | 500                    | 1.0 nF      | 1.0 $\mu$ F |
|                      | 1808 | 3000                   | 220 pF      | 270 nF      |
|                      | 1812 | 3000                   | 270 pF      | 1.0 $\mu$ F |
|                      | 1825 | 1000                   | 10 nF       | 2.7 $\mu$ F |
|                      | 2220 | 3000                   | 1.0 nF      | 2.2 $\mu$ F |
|                      | 2225 | 2000                   | 5.6 nF      | 4.7 $\mu$ F |
|                      | 3640 | 500                    | 15 nF       | 6.8 $\mu$ F |

**Note**

- Detail ratings see “Selection Chart”



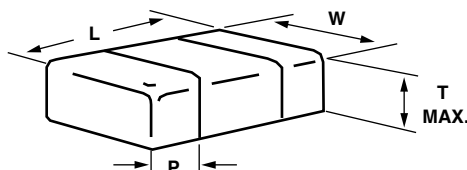
## ORDERING INFORMATION

| VJ0603                                                                               | Y                                            | 102                                                                                                                                                                                     | K                                                                                                                                                                                                                                    | C                                                          | A                                                                                                                                                                                 | A            | C                                                                                                                                                                    |
|--------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CASE CODE                                                                            | DIELECTRIC                                   | CAPACITANCE NOMINAL CODE                                                                                                                                                                | CAPACITANCE TOLERANCE                                                                                                                                                                                                                | TERMINATION                                                | DC VOLTAGE RATING <sup>(1)</sup>                                                                                                                                                  | MARKING      | PACKAGING                                                                                                                                                            |
| 0402<br>0603<br>0805<br>1206<br>1210<br>1808<br>1812<br>1825<br>2220<br>2225<br>3640 | A = C0G<br>Y = X7R<br>G = X5R <sup>(2)</sup> | Expressed in picofarads (pF).<br>The first two digits are significant, the third is a multiplier. An "R" indicates a decimal point.<br><b>Examples</b><br>102 = 1000 pF<br>1R0 = 1.0 pF | C0G (NP0):<br>< 10 pF<br>C = $\pm 0.25$ pF<br>D = 0.5 pF<br>B = $\pm 0.1$ pF<br>$\geq 10$ pF<br>F = $\pm 1$ %<br>G = $\pm 2$ %<br>J = $\pm 5$ %<br>K = $\pm 10$ %<br>X5R / X7R:<br>J = $\pm 5$ %<br>K = $\pm 10$ %<br>M = $\pm 20$ % | C <sup>(3)</sup> = non-magnetic copper barrier termination | Q = 10 V<br>J = 16 V<br>X = 25 V<br>A = 50 V<br>K = 75 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 | T = 7" reel / plastic tape<br>R = 11 1/4" / 13" reel / plastic tape<br>C = 7" reel / paper tape<br>P = 11 1/4" / 13" reel / paper tape<br>J = 7" reel (low quantity) |

## Notes

- (1) DC voltage rating should not be exceeded in application  
 (2) Selected values for X5R, see dielectric selection chart  
 (3) For soldering conditions see Vishay Soldering Recommendations [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034)

## DIMENSIONS in inches (millimeters)



| CASE CODE | STYLE  | LENGTH (L)                                        | WIDTH (W)                                          | MAXIMUM THICKNESS (T) | TERMINATIONS (P) |                 |
|-----------|--------|---------------------------------------------------|----------------------------------------------------|-----------------------|------------------|-----------------|
|           |        |                                                   |                                                    |                       | MINIMUM          | MAXIMUM         |
| 0402      | VJ0402 | 0.04 - 0.004 / + 0.005<br>(1.02 - 0.10 / + 0.12)  | 0.020 - 0.004 / + 0.006<br>(0.50 - 0.10 / + 0.14)  | 0.026<br>(0.64)       | 0.004<br>(0.10)  | 0.017<br>(0.42) |
| 0603      | VJ0603 | 0.063 - 0.006 / + 0.008<br>(1.60 - 0.15 / + 0.20) | 0.031 - 0.006 / + 0.008<br>(0.80 - 0.15 / + 0.20)  | 0.037<br>(0.94)       | 0.012<br>(0.30)  | 0.022<br>(0.55) |
| 0805      | VJ0805 | 0.078 - 0.008 / + 0.010<br>(2.00 - 0.20 / + 0.25) | 0.049 - 0.008 / + 0.009<br>(1.25 - 0.20 / + 0.23)  | 0.057<br>(1.45)       | 0.010<br>(0.25)  | 0.030<br>(0.76) |
| 1206      | VJ1206 | 0.126 - 0.010 / + 0.012<br>(3.20 - 0.25 / + 0.30) | 0.063 - 0.010 / + 0.011<br>(1.60 - 0.25 / + 0.28)  | 0.067<br>(1.70)       | 0.010<br>(0.25)  | 0.030<br>(0.76) |
| 1210      | VJ1210 | 0.126 - 0.010 / + 0.012<br>(3.20 - 0.25 / + 0.30) | 0.098 - 0.010 / + 0.011<br>(2.50 - 0.25 / + 0.28)  | 0.067<br>(1.70)       | 0.010<br>(0.25)  | 0.030<br>(0.76) |
| 1808      | VJ1808 | 0.177 - 0.012 / + 0.014<br>(4.50 - 0.30 / + 0.35) | 0.078 - 0.010 / + 0.011<br>(2.03 - 0.25 / + 0.28)  | 0.086<br>(2.18)       | 0.010<br>(0.25)  | 0.035<br>(0.90) |
| 1812      | VJ1812 | 0.177 - 0.012 / + 0.014<br>(4.50 - 0.30 / + 0.35) | 0.126 - 0.010 / + 0.011<br>(3.20 - 0.25 / + 0.28)  | 0.086<br>(2.18)       | 0.010<br>(0.25)  | 0.035<br>(0.90) |
| 1825      | VJ1825 | 0.177 - 0.012 / + 0.014<br>(4.50 - 0.30 / + 0.35) | 0.252 - 0.010 / + 0.011<br>(6.40 - 0.25 / + 0.28)  | 0.086<br>(2.18)       | 0.010<br>(0.25)  | 0.035<br>(0.90) |
| 2220      | VJ2220 | 0.22 - 0.010 / + 0.012<br>(5.59 - 0.25 / + 0.30)  | 0.200 - 0.010 / + 0.011<br>(5.08 - 0.25 / + 0.28)  | 0.086<br>(2.18)       | 0.010<br>(0.25)  | 0.037<br>(0.95) |
| 2225      | VJ2225 | 0.22 - 0.010 / + 0.012<br>(5.59 - 0.25 / + 0.30)  | 0.250 - 0.010 / + 0.011<br>(6.35 - 0.25 / + 0.28)  | 0.086<br>(2.18)       | 0.010<br>(0.25)  | 0.037<br>(0.95) |
| 3640      | VJ3640 | 0.36 - 0.015 / + 0.017<br>(9.14 - 0.38 / + 0.43)  | 0.400 - 0.015 / + 0.017<br>(10.20 - 0.38 / + 0.43) | 0.086<br>(2.18)       | 0.010<br>(0.25)  | 0.039<br>(1.00) |



| SELECTION CHART            |        |           |    |    |    |     |        |    |    |    |     |     |     |        |    |    |    |     |     |     |
|----------------------------|--------|-----------|----|----|----|-----|--------|----|----|----|-----|-----|-----|--------|----|----|----|-----|-----|-----|
| DIELECTRIC                 |        | C0G (NP0) |    |    |    |     |        |    |    |    |     |     |     |        |    |    |    |     |     |     |
| STYLE                      |        | VJ0402    |    |    |    |     | VJ0603 |    |    |    |     |     |     | VJ0805 |    |    |    |     |     |     |
| CASE CODE                  |        | 0402      |    |    |    |     | 0603   |    |    |    |     |     |     | 0805   |    |    |    |     |     |     |
| VOLTAGE (V <sub>DC</sub> ) |        | 10        | 16 | 25 | 50 | 100 | 10     | 16 | 25 | 50 | 100 | 200 | 250 | 10     | 16 | 25 | 50 | 100 | 200 | 500 |
| VOLTAGE CODE               |        | Q         | J  | X  | A  | B   | Q      | J  | X  | A  | B   | C   | P   | Q      | J  | X  | A  | B   | C   | E   |
| CAP. CODE                  | CAP.   |           |    |    |    |     |        |    |    |    |     |     |     |        |    |    |    |     |     |     |
| 1R0                        | 1.0 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 1R2                        | 1.2 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 1R5                        | 1.5 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 1R8                        | 1.8 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 2R2                        | 2.2 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 2R7                        | 2.7 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 3R3                        | 3.3 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 3R9                        | 3.9 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 4R7                        | 4.7 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 5R6                        | 5.6 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 6R8                        | 6.8 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 8R2                        | 8.2 pF | ••        | •• | •• | •• | ••  | •      | •  | •  | •  | •   | •   | •   | •      | •  | •  | •  | •   | •   | •   |
| 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  |           |    |    |    |     |        |    |    |    |     |     |     |        |    |    |    |     |     |     |

## Notes

- RoHS-compliant
- Paper tape • Plastic tape



| SELECTION CHART            |        |           |    |    |     |     |     |     |        |    |     |     |     |
|----------------------------|--------|-----------|----|----|-----|-----|-----|-----|--------|----|-----|-----|-----|
| DIELECTRIC                 |        | C0G (NP0) |    |    |     |     |     |     |        |    |     |     |     |
| STYLE                      |        | VJ1206    |    |    |     |     |     |     | VJ1210 |    |     |     |     |
| CASE CODE                  |        | 1206      |    |    |     |     |     |     | 1210   |    |     |     |     |
| VOLTAGE (V <sub>DC</sub> ) |        | 16        | 25 | 50 | 100 | 200 | 500 | 600 | 25     | 50 | 100 | 200 | 500 |
| VOLTAGE CODE               |        | J         | X  | A  | B   | C   | E   | N   | X      | A  | B   | C   | E   |
| CAP. CODE                  | CAP.   |           |    |    |     |     |     |     |        |    |     |     |     |
| 1R0                        | 1.0 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 1R2                        | 1.2 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 1R5                        | 1.5 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 1R8                        | 1.8 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 2R2                        | 2.2 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 2R7                        | 2.7 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 3R3                        | 3.3 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 3R9                        | 3.9 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 4R7                        | 4.7 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 5R6                        | 5.6 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 6R8                        | 6.8 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 8R2                        | 8.2 pF | •         | •  | •  | •   | •   | •   | •   | •      | •  | •   | •   | •   |
| 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  |           |    |    |     |     |     |     | •      | •  |     |     |     |

## Notes

- RoHS-compliant
- Paper tape • Plastic tape



| SELECTION CHART            |        |           |    |     |     |     |     |      |      |      |      |        |    |     |     |     |     |      |      |      |      |
|----------------------------|--------|-----------|----|-----|-----|-----|-----|------|------|------|------|--------|----|-----|-----|-----|-----|------|------|------|------|
| DIELECTRIC                 |        | C0G (NP0) |    |     |     |     |     |      |      |      |      |        |    |     |     |     |     |      |      |      |      |
| STYLE                      |        | VJ1808    |    |     |     |     |     |      |      |      |      | VJ1812 |    |     |     |     |     |      |      |      |      |
| CASE CODE                  |        | 1808      |    |     |     |     |     |      |      |      |      | 1812   |    |     |     |     |     |      |      |      |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 25        | 50 | 100 | 200 | 500 | 630 | 1000 | 1500 | 2000 | 3000 | 25     | 50 | 100 | 200 | 500 | 630 | 1000 | 1500 | 2000 | 3000 |
| VOLTAGE CODE               |        | X         | A  | B   | C   | E   | L   | G    | R    | F    | H    | X      | 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  |           |    |     |     |     |     |      |      |      |      |        |    |     |     |     |     |      |      |      |      |

## Notes

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| SELECTION CHART            |        |           |    |     |     |     |     |      |        |    |     |     |     |     |      |        |    |     |     |     |     |      |
|----------------------------|--------|-----------|----|-----|-----|-----|-----|------|--------|----|-----|-----|-----|-----|------|--------|----|-----|-----|-----|-----|------|
| DIELECTRIC                 |        | C0G (NP0) |    |     |     |     |     |      |        |    |     |     |     |     |      |        |    |     |     |     |     |      |
| STYLE                      |        | VJ1825    |    |     |     |     |     |      | VJ2220 |    |     |     |     |     |      | VJ2225 |    |     |     |     |     |      |
| CASE CODE                  |        | 1825      |    |     |     |     |     |      | 2220   |    |     |     |     |     |      | 2225   |    |     |     |     |     |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 25        | 50 | 100 | 200 | 500 | 630 | 1000 | 25     | 50 | 100 | 200 | 500 | 630 | 1000 | 25     | 50 | 100 | 200 | 500 | 630 | 1000 |
| VOLTAGE CODE               |        | X         | A  | B   | C   | E   | L   | G    | X      | A  | B   | C   | E   | L   | G    | X      | 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  |           |    |     |     |     |     |      |        |    |     |     |     |     |      |        |    |     |     |     |     |      |

## Notes

- RoHS-compliant
- Paper tape • Plastic tape



| SELECTION CHART            |        |                          |        |        |    |    |     |        |    |    |    |    |     |        |    |    |    |     |     |
|----------------------------|--------|--------------------------|--------|--------|----|----|-----|--------|----|----|----|----|-----|--------|----|----|----|-----|-----|
| DIELECTRIC                 |        | X7R / X5R <sup>(1)</sup> |        |        |    |    |     |        |    |    |    |    |     |        |    |    |    |     |     |
| STYLE                      |        | VJ0402                   |        |        |    |    |     | VJ0603 |    |    |    |    |     | VJ0805 |    |    |    |     |     |
| CASE CODE                  |        | 0402                     |        |        |    |    |     | 0603   |    |    |    |    |     | 0805   |    |    |    |     |     |
| VOLTAGE (V <sub>DC</sub> ) |        | 6.3                      | 10     | 16     | 25 | 50 | 100 | 6.3    | 10 | 16 | 25 | 50 | 100 | 10     | 16 | 25 | 50 | 100 | 200 |
| VOLTAGE CODE               |        | Y                        | Q      | J      | X  | A  | B   | Y      | Q  | J  | X  | A  | B   | Q      | J  | X  | A  | B   | C   |
| 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  | X5R ••                   | X5R •• | X5R •• |    |    |     | •      | •  | •  | •  | •  |     | •      | •  | •  | •  | •   | •   |
| 333                        | 33 nF  | X5R ••                   | X5R •• | X5R •• |    |    |     | •      | •  | •  | •  | •  |     | •      | •  | •  | •  | •   |     |
| 393                        | 39 nF  | X5R ••                   |        |        |    |    |     | •      | •  | •  | •  | •  |     | •      | •  | •  | •  | •   |     |
| 473                        | 47 nF  | X5R ••                   |        |        |    |    |     | •      | •  | •  | •  | •  |     | •      | •  | •  | •  | •   |     |
| 563                        | 56 nF  |                          |        |        |    |    |     | •      | •  | •  | •  | •  |     | •      | •  | •  | •  | •   |     |
| 683                        | 68 nF  |                          |        |        |    |    |     | •      | •  | •  | •  | •  |     | •      | •  | •  | •  | •   |     |
| 823                        | 82 nF  |                          |        |        |    |    |     | •      | •  | •  | •  | •  |     | •      | •  | •  | •  | •   |     |
| 104                        | 100 nF |                          |        |        |    |    |     | •      | •  | •  | •  | •  |     | •      | •  | •  | •  | •   |     |
| 124                        | 120 nF |                          |        |        |    |    |     | X5R •  |    |    |    |    |     | •      | •  | •  | •  |     |     |
| 154                        | 150 nF |                          |        |        |    |    |     | X5R •  |    |    |    |    |     | •      | •  | •  | •  |     |     |
| 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 |                          |        |        |    |    |     |        |    |    |    |    |     |        |    |    |    |     |     |

## Notes

•• RoHS-compliant

•• Paper tape • Plastic tape

<sup>(1)</sup> See selection chart for values only available as X5R. All other values X7R



| SELECTION CHART            |        |        |    |    |     |     |     |        |    |    |    |     |     |     |
|----------------------------|--------|--------|----|----|-----|-----|-----|--------|----|----|----|-----|-----|-----|
| DIELECTRIC                 |        | X7R    |    |    |     |     |     |        |    |    |    |     |     |     |
| STYLE                      |        | VJ1206 |    |    |     |     |     | VJ1210 |    |    |    |     |     |     |
| CASE CODE                  |        | 1206   |    |    |     |     |     | 1210   |    |    |    |     |     |     |
| VOLTAGE (V <sub>DC</sub> ) |        | 16     | 25 | 50 | 100 | 200 | 500 | 16     | 25 | 50 | 75 | 100 | 200 | 500 |
| VOLTAGE CODE               |        | J      | X  | A  | B   | C   | E   | J      | X  | A  | K  | B   | C   | E   |
| 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 |        |    |    |     |     |     |        |    |    |    |     |     |     |

## Notes

- RoHS-compliant
- Paper tape • Plastic tape



| SELECTION CHART            |        |        |    |     |     |     |     |      |      |      |      |        |     |    |     |     |     |     |     |      |      |      |      |  |  |
|----------------------------|--------|--------|----|-----|-----|-----|-----|------|------|------|------|--------|-----|----|-----|-----|-----|-----|-----|------|------|------|------|--|--|
| DIELECTRIC                 |        |        |    |     |     |     |     |      |      |      |      |        | X7R |    |     |     |     |     |     |      |      |      |      |  |  |
| STYLE                      |        | VJ1808 |    |     |     |     |     |      |      |      |      | VJ1812 |     |    |     |     |     |     |     |      |      |      |      |  |  |
| CASE CODE                  |        | 1808   |    |     |     |     |     |      |      |      |      | 1812   |     |    |     |     |     |     |     |      |      |      |      |  |  |
| VOLTAGE (V <sub>DC</sub> ) |        | 25     | 50 | 100 | 200 | 500 | 630 | 1000 | 1500 | 2000 | 3000 | 25     | 50  | 75 | 100 | 200 | 250 | 500 | 630 | 1000 | 1500 | 2000 | 3000 |  |  |
| VOLTAGE CODE               |        | X      | A  | B   | C   | E   | L   | G    | R    | F    | H    | X      | A   | K  | B   | C   | P   | E   | L   | G    | R    | F    | H    |  |  |
| CAP. CODE                  | CAP.   |        |    |     |     |     |     |      |      |      |      |        |     |    |     |     |     |     |     |      |      |      |      |  |  |
| 221                        | 220 pF |        |    |     |     |     |     |      |      |      | •    |        |     |    |     |     |     |     |     |      |      |      |      |  |  |
| 271                        | 270 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 |        |    |     |     |     |     |      |      |      |      |        |     |    |     |     |     |     |     |      |      |      |      |  |  |
| 275                        | 2.7 µF |        |    |     |     |     |     |      |      |      |      |        |     |    |     |     |     |     |     |      |      |      |      |  |  |
| 335                        | 3.3 µF |        |    |     |     |     |     |      |      |      |      |        |     |    |     |     |     |     |     |      |      |      |      |  |  |
| 395                        | 3.9 µF |        |    |     |     |     |     |      |      |      |      |        |     |    |     |     |     |     |     |      |      |      |      |  |  |
| 475                        | 4.7 µF |        |    |     |     |     |     |      |      |      |      |        |     |    |     |     |     |     |     |      |      |      |      |  |  |
| 565                        | 5.6 µF |        |    |     |     |     |     |      |      |      |      |        |     |    |     |     |     |     |     |      |      |      |      |  |  |
| 685                        | 6.8 µF |        |    |     |     |     |     |      |      |      |      |        |     |    |     |     |     |     |     |      |      |      |      |  |  |
| 825                        | 8.2 µF |        |    |     |     |     |     |      |      |      |      |        |     |    |     |     |     |     |     |      |      |      |      |  |  |

## Notes

- RoHS-compliant
- Paper tape • Plastic tape



| SELECTION CHART            |        |        |    |     |     |     |     |      |        |    |     |     |     |     |      |      |      |
|----------------------------|--------|--------|----|-----|-----|-----|-----|------|--------|----|-----|-----|-----|-----|------|------|------|
| DIELECTRIC                 |        | X7R    |    |     |     |     |     |      |        |    |     |     |     |     |      |      |      |
| STYLE                      |        | VJ1825 |    |     |     |     |     |      | VJ2220 |    |     |     |     |     |      |      |      |
| CASE CODE                  |        | 1825   |    |     |     |     |     |      | 2220   |    |     |     |     |     |      |      |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 25     | 50 | 100 | 200 | 500 | 630 | 1000 | 25     | 50 | 100 | 200 | 500 | 630 | 1000 | 2000 | 3000 |
| VOLTAGE CODE               |        | X      | A  | B   | C   | E   | L   | G    | X      | A  | B   | C   | E   | L   | G    | F    | H    |
| CAP. CODE                  | CAP.   |        |    |     |     |     |     |      |        |    |     |     |     |     |      |      |      |
| 221                        | 220 pF |        |    |     |     |     |     |      |        |    |     |     |     |     |      |      |      |
| 271                        | 270 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 | •      |    |     |     |     |     |      | •      | •  |     |     |     |     |      |      |      |
| 275                        | 2.7 μF | •      |    |     |     |     |     |      |        |    |     |     |     |     |      |      |      |
| 335                        | 3.3 μF |        |    |     |     |     |     |      |        |    |     |     |     |     |      |      |      |
| 395                        | 3.9 μF |        |    |     |     |     |     |      |        |    |     |     |     |     |      |      |      |
| 475                        | 4.7 μF |        |    |     |     |     |     |      |        |    |     |     |     |     |      |      |      |
| 565                        | 5.6 μF |        |    |     |     |     |     |      |        |    |     |     |     |     |      |      |      |
| 685                        | 6.8 μF |        |    |     |     |     |     |      |        |    |     |     |     |     |      |      |      |
| 825                        | 8.2 μF |        |    |     |     |     |     |      |        |    |     |     |     |     |      |      |      |

## Notes

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- Paper tape • Plastic tape



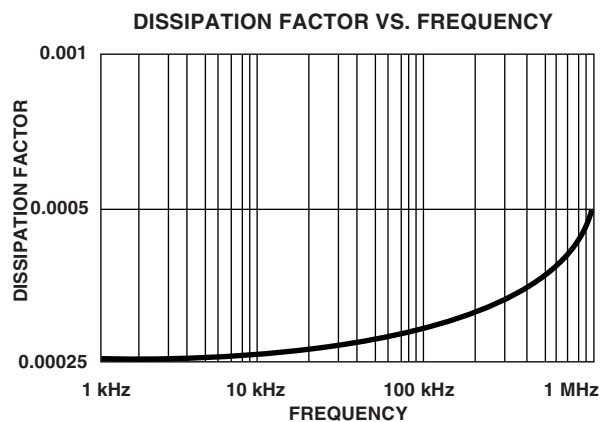
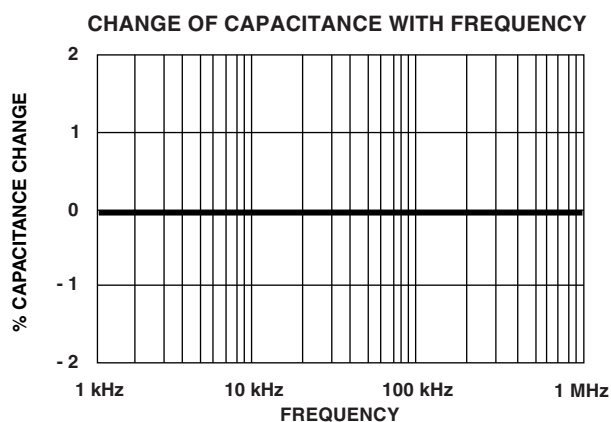
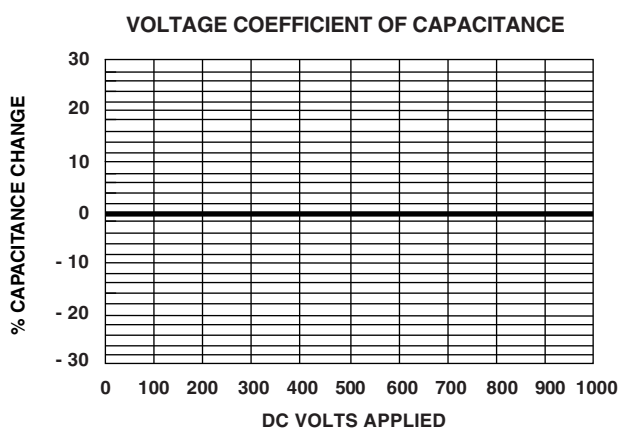
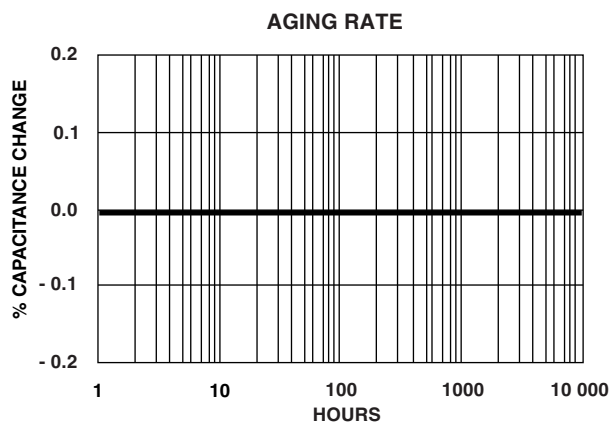
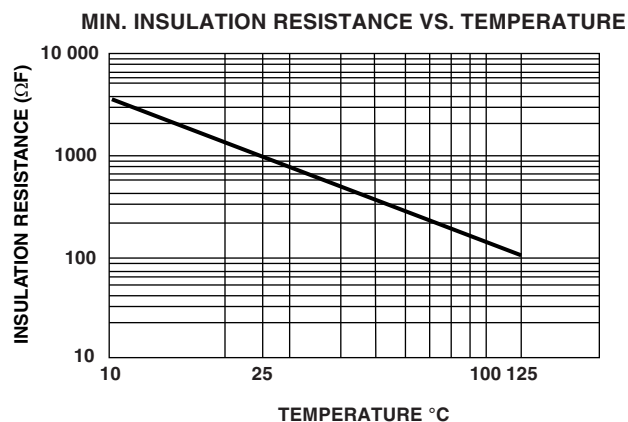
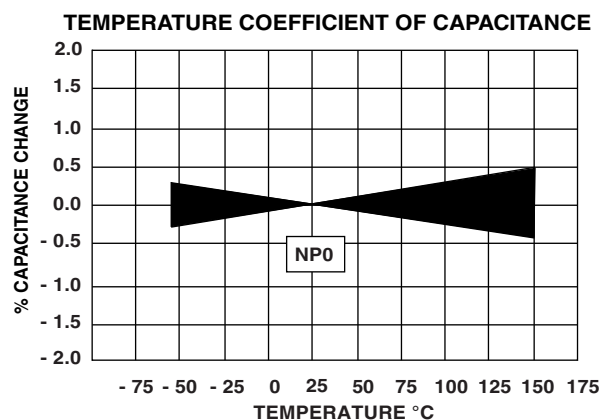
| SELECTION CHART            |        |        |    |     |     |     |     |      |      |      |        |    |     |     |     |
|----------------------------|--------|--------|----|-----|-----|-----|-----|------|------|------|--------|----|-----|-----|-----|
| DIELECTRIC                 |        | X7R    |    |     |     |     |     |      |      |      |        |    |     |     |     |
| STYLE                      |        | VJ2225 |    |     |     |     |     |      |      |      | VJ3640 |    |     |     |     |
| CASE CODE                  |        | 2225   |    |     |     |     |     |      |      |      | 3640   |    |     |     |     |
| VOLTAGE (V <sub>DC</sub> ) |        | 25     | 50 | 100 | 200 | 500 | 630 | 1000 | 1500 | 2000 | 25     | 50 | 100 | 200 | 500 |
| VOLTAGE CODE               |        | X      | A  | B   | C   | E   | L   | G    | R    | F    | X      | A  | B   | C   | E   |
| CAP. CODE                  | CAP.   |        |    |     |     |     |     |      |      |      |        |    |     |     |     |
| 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 | •      | •  |     |     |     |     |      |      |      | •      | •  | •   |     |     |
| 275                        | 2.7 µF | •      | •  |     |     |     |     |      |      |      | •      | •  | •   |     |     |
| 335                        | 3.3 µF | •      |    |     |     |     |     |      |      |      | •      | •  | •   |     |     |
| 395                        | 3.9 µF | •      |    |     |     |     |     |      |      |      | •      | •  | •   |     |     |
| 475                        | 4.7 µF | •      |    |     |     |     |     |      |      |      | •      | •  |     |     |     |
| 565                        | 5.6 µF |        |    |     |     |     |     |      |      |      | •      |    |     |     |     |
| 685                        | 6.8 µF |        |    |     |     |     |     |      |      |      | •      |    |     |     |     |
| 825                        | 8.2 µF |        |    |     |     |     |     |      |      |      |        |    |     |     |     |

## Notes

- RoHS-compliant  
 •• Paper tape • Plastic tape



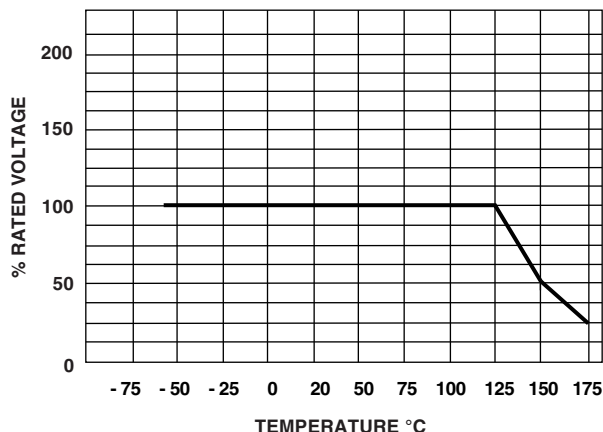
## NON-MAGNETIC COG (NP0) DIELECTRIC - TYPICAL PARAMETERS



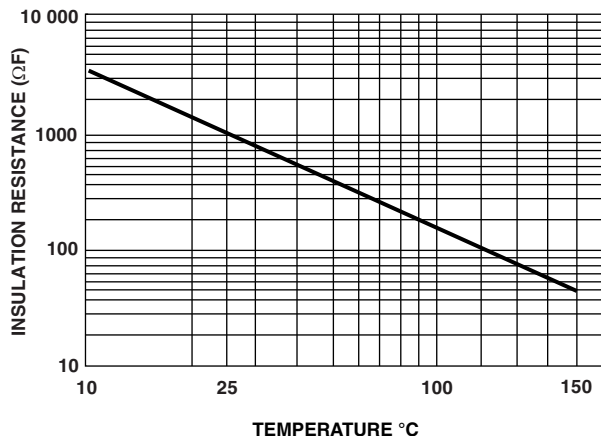


## NON-MAGNETIC X7R DIELECTRIC - TYPICAL PARAMETERS

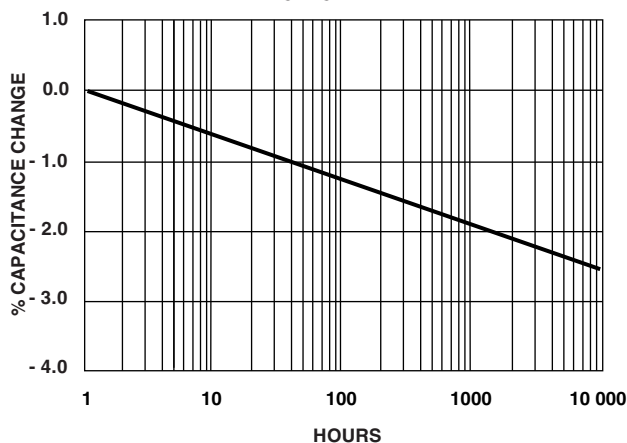
RATED VOLTAGE VS. TEMPERATURE



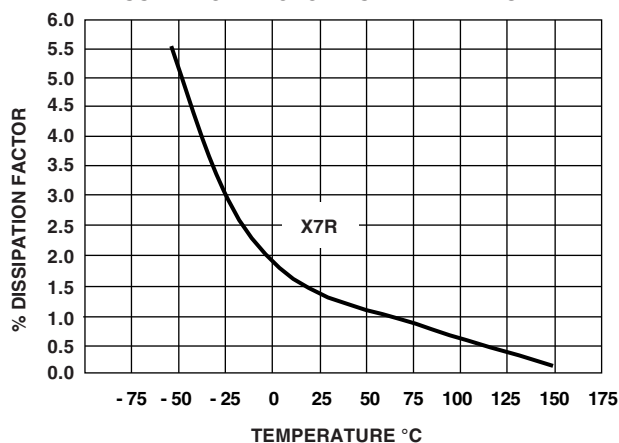
MIN. INSULATION RESISTANCE VS. TEMPERATURE



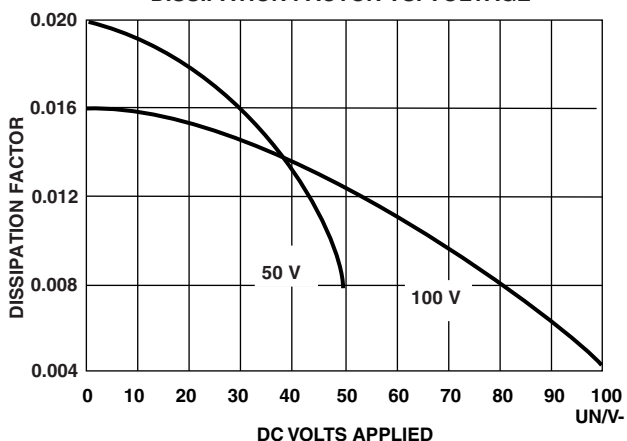
AGING RATE



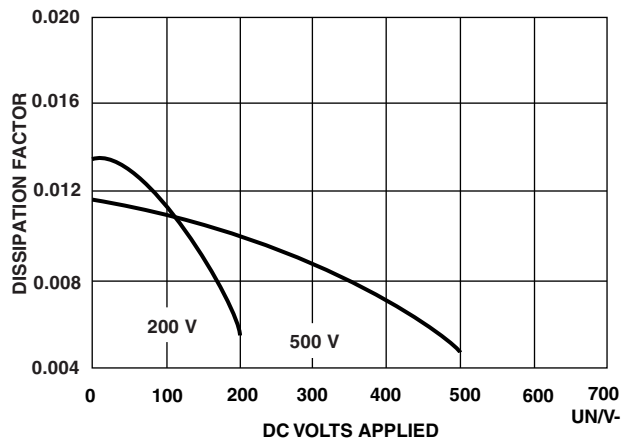
DISSIPATION FACTOR VS. TEMPERATURE



DISSIPATION FACTOR VS. VOLTAGE

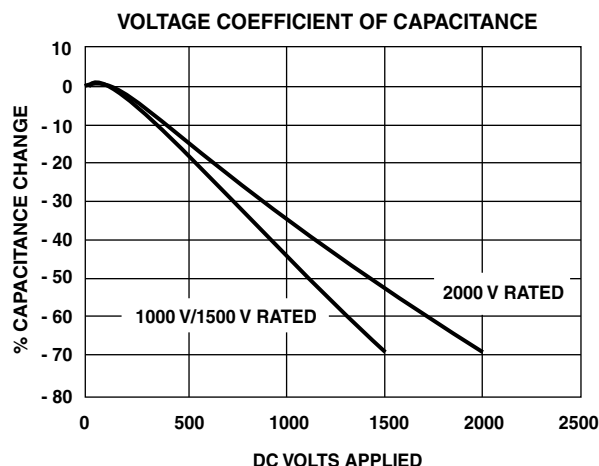
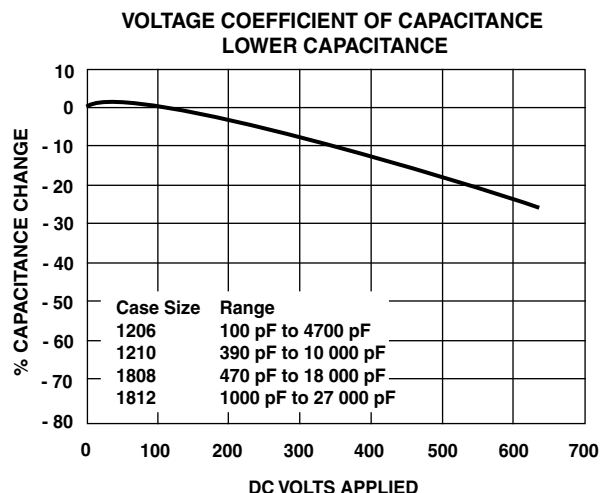
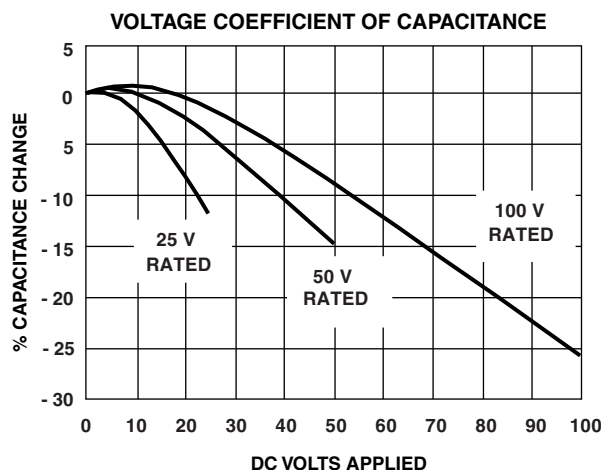
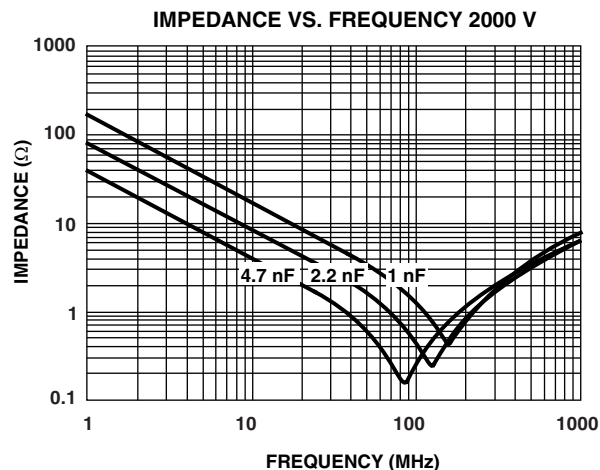
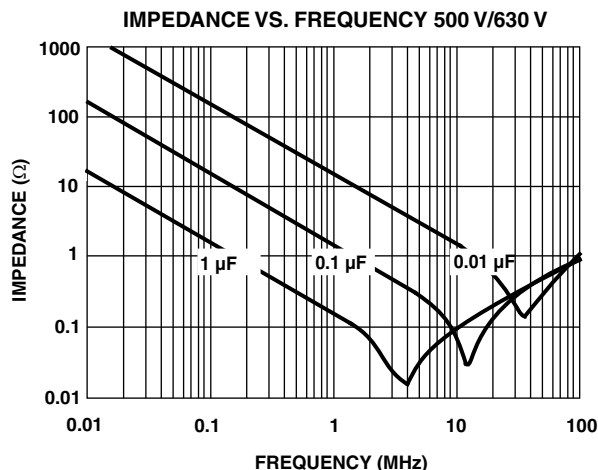


DISSIPATION FACTOR VS. VOLTAGE





## NON-MAGNETIC X7R DIELECTRIC - TYPICAL PARAMETERS





| 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" | PLASTIC TAPE PACKAGING CODE "T" | LOW QUANTITY PACKAGING CODE "J" (5) | PAPER TAPE PACKAGING CODE "P"   | PLASTIC TAPE PACKAGING CODE "R" |
| 0402                                    | 8 mm      | 5000                          | n/a                             | 1000                                | 10 000                          | n/a                             |
| 0603 (4)                                | 8 mm      | n/a                           | 4000                            | 1000                                | n/a                             | 10 000                          |
| 0805 (4)                                | 8 mm      | n/a                           | 3000                            | 1000                                | n/a                             | 10 000                          |
| 1206 (4)                                | 8 mm      | n/a                           | 3000 / 2500                     | 1000                                | n/a                             | 10 000 / 9000                   |
| 1210                                    | 8 mm      | n/a                           | 3000 / 2500 / 2000              | 1000                                | n/a                             | 10 000 / 9000                   |
| 1808                                    | 12 mm     | n/a                           | 2000                            | 500                                 | n/a                             | 10 000                          |
| 1812                                    | 12 mm     | n/a                           | 1000                            | 500                                 | n/a                             | 4000                            |
| 1825                                    | 12 mm     | n/a                           | 500                             | 250                                 | n/a                             | 4000                            |
| 2220                                    | 12 mm     | n/a                           | 1000                            | 500                                 | n/a                             | 4000                            |
| 2225                                    | 12 mm     | n/a                           | 500                             | 250                                 | n/a                             | 4000                            |
| 3640                                    | 16 mm     | n/a                           | 500                             | n/a                                 | n/a                             | n/a                             |

**Notes**

- (1) Vishay Vitramon uses embossed plastic carrier tape  
(2) Reference: EIA standard RS 481 - "Taping of Surface Mount Components for Automatic Placement"  
(3) n/a = not available  
(4) Packaging code "T/R" and lower quantities can depend on product thickness  
(5) Paper / plastic tape used by availability

**STORAGE AND HANDLING CONDITIONS**

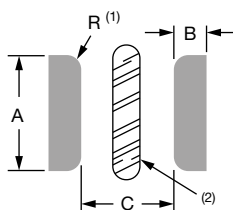
- (1) Store the components at +5 °C to +40 °C ambient temperature and ≤ 70 % relative humidity conditions.  
(2) The product is recommended to be used within a time-frame of 2 years after shipment.  
Check solderability in case extended shelf life beyond the expiry date is needed.  
(3) For soldering conditions see Vishay Soldering Recommendations [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034).

**Precautions:**

- 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.  
b. Store products on the shelf and avoid exposure to moisture or dust.  
c. Do not expose products to excessive shock, vibration, direct sunlight, and so on.

## Solder Pad Dimensions for Vishay Surface-Mount Multilayer Ceramic Chip Capacitors

### DIMENSIONS in millimeters



| CASE CODE | A                   | B    | C                   |
|-----------|---------------------|------|---------------------|
| 0402      | 0.50                | 0.50 | 0.40                |
| 0505      | 1.35                | 1.00 | 0.60                |
| 0603      | 0.90                | 1.00 | 1.00 <sup>(3)</sup> |
| 0805      | 1.30                | 1.20 | 1.00                |
| 1111      | 2.90                | 1.30 | 1.75                |
| 1206      | 1.80                | 1.20 | 2.10                |
| 1210      | 2.80                | 1.30 | 1.90                |
| 1808      | 2.40                | 1.50 | 3.00                |
| 1812      | 3.60                | 1.50 | 3.00                |
| 1825      | 6.50                | 1.50 | 3.00                |
| 2008      | 2.70                | 1.50 | 4.08                |
| 2220      | 5.50 <sup>(4)</sup> | 1.50 | 4.20                |
| 2225      | 6.50                | 1.50 | 4.20                |
| 2525      | 6.60                | 1.50 | 4.50                |
| 3040      | 10.80               | 2.00 | 5.50                |
| 3640      | 10.80               | 2.00 | 7.00                |
| 3838      | 10.20               | 2.00 | 7.50                |
| 4044      | 12.30               | 2.00 | 8.00                |

#### Notes

- <sup>(1)</sup> For safety capacitors and voltages above 3000 V, corner rounding (R) of 0.5 mm is recommended to suppress arcing
- <sup>(2)</sup> Add a 1 mm slot in PCB between pads to allow cleaning and coating under MLCC
- <sup>(3)</sup> For VJ HiFREQ Series, this dimension is 0.6 mm
- <sup>(4)</sup> For safety capacitors, the A dimension should be 5.80 mm



## PRINTED CIRCUIT BOARD PCB DESIGN CONSIDERATIONS FOR HIGH VOLTAGE SURFACE-MOUNT MLCCS

Special assembly process and design considerations should be employed for today's high voltage rating MLCCs. As case sizes remain the same and voltage ratings increase, MLCC manufacturers must design, evaluate, and qualify their capacitors using methods that reduce the occurrence of corona discharge and arcover events. To meet similar capability in high voltage applications, users should employ similar cautionary design and assembly methods.

### MLCC PAD LAYOUT

A capacitor's arcover inception point can degrade due to factors such as the MLCC termination, PCB pad design, PCB cleanliness, solder flux residue, surface contamination / deposits and environmental conditions. PCB pads and their design affect the air gap distance between the opposing polarities of the MLCC termination. For voltage rating greater than 1500 V<sub>DC</sub> add a corner radius to the inward facing edge of the MLCC pads and as large a gap as possible between the pads. Too small of a pad gap distance will reduce the capacitor's own arcover inception voltage level. Refer to the Figure and Table Figure 1.0, MLCC Pad Layout and Table 1.0, Vishay MLCC Solder Pad Dimensions for the recommended MLCC solder pad dimensions.

### SLOT OR TRENCH BETWEEN PADS

PCB assembly can deposit dust, trap solder balls, or flux residue underneath the capacitors. These contaminants will reduce conductive clearances and the arcover inception level. Assembly methods must include a final PCB cleaning process. A slot or trench can be cut into the PCB in between the pads to allow cleaners to penetrate underneath the MLCC. The slot will also allow conformal or epoxy coatings to flow underneath the MLCC and build an insulative barrier between pads. Refer to Figure 1.0 MLCC Pad Layout for slot reference location.

### COATING PRINTED CIRCUIT BOARD

Coating a printed circuit board with materials such as acrylic, silicone and urethane resins provide a protective dielectric barrier that is non-conductive and will enhance the resistance to arcing. Various processes exist which include dipping, brushing, and spraying. Optimal performance will come from coating the MLCC on all sides, top and bottom. The PCB slot in between the pads should extend slightly beyond the width of the MLCC. Refer to Figure 1.0 MLCC Pad Layout for slot reference location.



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