

## Surface Mount Multilayer Ceramic Chip Capacitors for Commercial Applications



### FEATURES

- C0G (NP0) and X7R dielectrics offered
- C0G (NP0) is an ultra-stable dielectric offering a very low Temperature Coefficient of Capacitance (TCC)
- C0G (NP0) offers low dissipation
- Excellent aging characteristics
- Ideal for decoupling and filtering (X7R)
- Ideal for surge suppression and high voltage applications
- Wide range of case sizes, voltage ratings and capacitance values
- Wet build process
- Reliable Noble Metal Electrode (NME) system
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

### APPLICATIONS

- Timing and tuning circuits
- Sensor and scanner applications
- Decoupling and filtering
- Surge suppression

### ELECTRICAL SPECIFICATIONS

#### COG (NP0) DIELECTRIC

##### GENERAL SPECIFICATION

###### Note

Electrical characteristics at +25 °C unless otherwise specified

**Operating Temperature:** -55 °C to +150 °C  
(above +125 °C changed characteristics)

**Capacitance Range:** 1 pF to 56 nF

**Voltage Range:** 25 V<sub>DC</sub> to 1000 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 Rate:** 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 |

#### X7R DIELECTRIC

##### GENERAL SPECIFICATION

###### Note

Electrical characteristics at +25 °C unless otherwise specified

**Operating Temperature:** -55 °C to +150 °C  
(above +125 °C changed characteristics)

**Capacitance Range:** 120 pF to 6.8 μF

**Voltage Range:** 16 V<sub>DC</sub> to 1000 V<sub>DC</sub>

**Temperature Coefficient of Capacitance (TCC):**  
± 15 % from -55 °C to +125 °C, with 0 V<sub>DC</sub> applied

##### Dissipation Factor (DF):

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

|                                                    |                             |
|----------------------------------------------------|-----------------------------|
| ≤ 250 V <sub>DC</sub> -rated:                      | 250 % of rated voltage      |
| 500 V <sub>DC</sub> -rated:                        | min. 150 % of rated voltage |
| 630 V <sub>DC</sub> , 1000 V <sub>DC</sub> -rated: | min. 120 % of rated voltage |



| QUICK REFERENCE DATA |      |                     |             |             |
|----------------------|------|---------------------|-------------|-------------|
| DIELECTRIC           | CASE | MAXIMUM VOLTAGE (V) | CAPACITANCE |             |
|                      |      |                     | MINIMUM     | MAXIMUM     |
| C0G (NP0)            | 0402 | 100                 | 1.0 pF      | 220 pF      |
|                      | 0603 | 250                 | 1.0 pF      | 1.0 nF      |
|                      | 0805 | 500                 | 1.0 pF      | 4.7 nF      |
|                      | 1206 | 630                 | 1.0 pF      | 10 nF       |
|                      | 1210 | 630                 | 56 pF       | 12 nF       |
|                      | 1808 | 1000                | 27 pF       | 10 nF       |
|                      | 1812 | 1000                | 27 pF       | 22 nF       |
|                      | 1825 | 500                 | 100 pF      | 39 nF       |
|                      | 2220 | 1000                | 270 pF      | 47 nF       |
|                      | 2225 | 1000                | 270 pF      | 56 nF       |
| X7R                  | 0402 | 100                 | 120 pF      | 47 nF       |
|                      | 0603 | 200                 | 330 pF      | 150 nF      |
|                      | 0805 | 250                 | 330 pF      | 470 nF      |
|                      | 1206 | 630                 | 330 pF      | 1.0 $\mu$ F |
|                      | 1210 | 630                 | 390 pF      | 1.0 $\mu$ F |
|                      | 1808 | 1000                | 470 pF      | 270 nF      |
|                      | 1812 | 1000                | 1.0 nF      | 1.0 $\mu$ F |
|                      | 1825 | 1000                | 10 nF       | 2.7 $\mu$ F |
|                      | 2220 | 500                 | 15 nF       | 2.2 $\mu$ F |
|                      | 2225 | 1000                | 33 nF       | 4.7 $\mu$ F |
|                      | 3640 | 500                 | 27 nF       | 6.8 $\mu$ F |

**Note**

- Detail ratings see “Selection Chart”

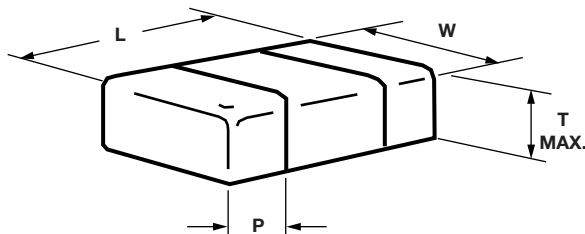


| ORDERING INFORMATION                                                                 |                          |                                                                                                                                                     |                                                                                                                                                                                                                                                 |                                                                                                                                                    |                                                                                                                 |                                                                                                                          |                                                                                                                                                                                                                                                                                                                 |                       |
|--------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| VJ0805 <sup>(1)</sup>                                                                | Y                        | 102                                                                                                                                                 | K                                                                                                                                                                                                                                               | X                                                                                                                                                  | A                                                                                                               | A                                                                                                                        | T                                                                                                                                                                                                                                                                                                               | ### <sup>(3)(6)</sup> |
| CASE CODE                                                                            | DIELECTRIC               | CAPACITANCE NOMINAL CODE                                                                                                                            | CAPACITANCE TOLERANCE                                                                                                                                                                                                                           | TERMINATION                                                                                                                                        | DC VOLTAGE RATING <sup>(2)</sup>                                                                                | MARKING                                                                                                                  | PACKAGING                                                                                                                                                                                                                                                                                                       | PROCESS CODE          |
| 0402<br>0603<br>0805<br>1206<br>1210<br>1808<br>1812<br>1825<br>2220<br>2225<br>3640 | A = C0G (NP0)<br>Y = X7R | Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier.<br><b>Examples:</b><br>1R8 = 1.8 pF<br>102 = 1000 pF | B = $\pm 0.10$ pF<br>C = $\pm 0.25$ pF<br>D = $\pm 0.5$ pF<br>F = $\pm 1$ %<br>G = $\pm 2$ %<br>J = $\pm 5$ %<br>K = $\pm 10$ %<br>M = $\pm 20$ %<br><b>Note</b><br>C0G (NP0):<br>B, C, D < 10 pF<br>F, G, J, K $\geq 10$ pF<br>X7R:<br>J, K, M | X = Ni barrier<br>100 % tin plated<br>matte finish<br>F, E = AgPd <sup>(4)</sup><br>B = polymer<br>100 % tin plated<br>matte finish <sup>(5)</sup> | J = 16 V<br>X = 25 V<br>A = 50 V<br>B = 100 V<br>C = 200 V<br>P = 250 V<br>E = 500 V<br>L = 630 V<br>G = 1000 V | A = unmarked<br>M = marked<br><b>Note</b><br>Marking is only available for 0805 and 1206 with termination code "X" / "B" | C = 7" reel / paper tape<br>T = 7" reel / plastic tape<br>P = 11 1/4" / 13" reel / paper tape<br>R = 11 1/4" / 13" reel / plastic tape<br>O = 7" reel / flamed paper tape<br>I = 11 1/4" / 13" reel / flamed paper tape<br><b>Note</b><br>"I" and "O" are used for "F", "E" termination size 0402 / 0603 / 0805 |                       |

**Notes**

- (1) Case size designator may be replaced by four digit drawing number used to control non-standard products and / or special requirements
- (2) DC voltage rating should not be exceeded in application. Other application factors may affect the MLCC performance. Consult for questions: [mlcc@vishay.com](mailto:mlcc@vishay.com)
- (3) Process code may be added with up to three digits, used to control non-standard products and / or special requirements
- (4) Termination code "E" is for conductive epoxy assembly
- (5) Polymer termination for size 0603 and larger. Packaging only in plastic tape "T" / "R"
- (6) Variable plastic / paper tape, see ratings in "Selection Charts"

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

**DIMENSIONS** in inches (millimeters)


| CASE CODE | STYLE  | LENGTH<br>(L)                                     | WIDTH<br>(W)                                      | MAXIMUM<br>THICKNESS<br>(T) | TERMINATION<br>(P) |                 |
|-----------|--------|---------------------------------------------------|---------------------------------------------------|-----------------------------|--------------------|-----------------|
|           |        |                                                   |                                                   |                             | MINIMUM            | MAXIMUM         |
| 0402      | VJ0402 | 0.040 + 0.004 / - 0.002<br>(1.00 + 0.10 / - 0.05) | 0.020 + 0.004 / - 0.002<br>(0.50 + 0.10 / - 0.05) | 0.024<br>(0.60)             | 0.004<br>(0.10)    | 0.016<br>(0.41) |
| 0603      | VJ0603 | 0.063 ± 0.006<br>(1.60 ± 0.15)                    | 0.031 ± 0.006<br>(0.80 ± 0.15)                    | 0.038<br>(0.97)             | 0.012<br>(0.30)    | 0.022<br>(0.55) |
| 0805      | VJ0805 | 0.079 ± 0.008<br>(2.00 ± 0.20)                    | 0.049 ± 0.008<br>(1.25 ± 0.20)                    | 0.057<br>(1.45)             | 0.010<br>(0.25)    | 0.030<br>(0.76) |
| 1206      | VJ1206 | 0.126 ± 0.010<br>(3.20 ± 0.25)                    | 0.063 ± 0.010<br>(1.60 ± 0.25)                    | 0.067<br>(1.70)             | 0.010<br>(0.25)    | 0.030<br>(0.76) |
| 1210      | VJ1210 | 0.126 ± 0.010<br>(3.20 ± 0.25)                    | 0.098 ± 0.010<br>(2.50 ± 0.25)                    | 0.067<br>(1.70)             | 0.010<br>(0.25)    | 0.030<br>(0.76) |
| 1808      | VJ1808 | 0.180 ± 0.012<br>(4.57 ± 0.30)                    | 0.080 ± 0.010<br>(2.03 ± 0.25)                    | 0.086<br>(2.18)             | 0.010<br>(0.25)    | 0.035<br>(0.90) |
| 1812      | VJ1812 | 0.177 ± 0.012<br>(4.50 ± 0.30)                    | 0.126 ± 0.008<br>(3.20 ± 0.20)                    | 0.086<br>(2.18)             | 0.010<br>(0.25)    | 0.035<br>(0.90) |
| 1825      | VJ1825 | 0.177 ± 0.012<br>(4.50 ± 0.30)                    | 0.252 ± 0.010<br>(6.40 ± 0.25)                    | 0.086<br>(2.18)             | 0.010<br>(0.25)    | 0.035<br>(0.90) |
| 2220      | VJ2220 | 0.220 ± 0.010<br>(5.59 ± 0.25)                    | 0.200 ± 0.010<br>(5.08 ± 0.25)                    | 0.086<br>(2.18)             | 0.010<br>(0.25)    | 0.037<br>(0.95) |
| 2225      | VJ2225 | 0.220 ± 0.010<br>(5.59 ± 0.25)                    | 0.250 ± 0.010<br>(6.35 ± 0.25)                    | 0.086<br>(2.18)             | 0.010<br>(0.25)    | 0.037<br>(0.95) |
| 3640      | VJ3640 | 0.360 ± 0.015<br>(9.14 ± 0.38)                    | 0.400 ± 0.015<br>(10.20 ± 0.38)                   | 0.086<br>(2.18)             | 0.010<br>(0.25)    | 0.039<br>(1.00) |

**Note**

- Polymer (B-termination) have increased dimensions:  
length 0.006"(0.15 mm)



| SELECTION CHART            |        |           |    |     |        |     |     |     |        |     |     |     |                       |     |     |     |     |                       |     |     |     |     |
|----------------------------|--------|-----------|----|-----|--------|-----|-----|-----|--------|-----|-----|-----|-----------------------|-----|-----|-----|-----|-----------------------|-----|-----|-----|-----|
| DIELECTRIC                 |        | C0G (NP0) |    |     |        |     |     |     |        |     |     |     |                       |     |     |     |     |                       |     |     |     |     |
| STYLE                      |        | VJ0402    |    |     | VJ0603 |     |     |     | VJ0805 |     |     |     | VJ1206 <sup>(1)</sup> |     |     |     |     | VJ1210 <sup>(1)</sup> |     |     |     |     |
| CASE CODE                  |        | 0402      |    |     | 0603   |     |     |     | 0805   |     |     |     | 1206                  |     |     |     |     | 1210                  |     |     |     |     |
| VOLTAGE (V <sub>DC</sub> ) |        | 25        | 50 | 100 | 50     | 100 | 200 | 250 | 50     | 100 | 200 | 500 | 50                    | 100 | 200 | 500 | 630 | 50                    | 100 | 200 | 500 | 630 |
| VOLTAGE CODE               |        | X         | A  | B   | A      | B   | C   | P   | A      | B   | C   | E   | A                     | B   | C   | E   | L   | A                     | B   | C   | E   | L   |
| 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  |           |    |     |        |     |     |     |        |     |     |     |                       |     |     |     |     | •                     | •   |     |     |     |
| 153                        | 15 nF  |           |    |     |        |     |     |     |        |     |     |     |                       |     |     |     |     |                       |     |     |     |     |
| 183                        | 18 nF  |           |    |     |        |     |     |     |        |     |     |     |                       |     |     |     |     |                       |     |     |     |     |
| 223                        | 22 nF  |           |    |     |        |     |     |     |        |     |     |     |                       |     |     |     |     |                       |     |     |     |     |
| 273                        | 27 nF  |           |    |     |        |     |     |     |        |     |     |     |                       |     |     |     |     |                       |     |     |     |     |
| 333                        | 33 nF  |           |    |     |        |     |     |     |        |     |     |     |                       |     |     |     |     |                       |     |     |     |     |
| 393                        | 39 nF  |           |    |     |        |     |     |     |        |     |     |     |                       |     |     |     |     |                       |     |     |     |     |
| 473                        | 47 nF  |           |    |     |        |     |     |     |        |     |     |     |                       |     |     |     |     |                       |     |     |     |     |
| 563                        | 56 nF  |           |    |     |        |     |     |     |        |     |     |     |                       |     |     |     |     |                       |     |     |     |     |

## Notes

•• RoHS-compliant

•• Paper tape • Plastic tape

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



## SELECTION CHART

| DIELECTRIC                 |        | COG (NP0)             |     |     |     |      |                       |     |     |     |      |                       |     |     |     |
|----------------------------|--------|-----------------------|-----|-----|-----|------|-----------------------|-----|-----|-----|------|-----------------------|-----|-----|-----|
| STYLE                      |        | VJ1808 <sup>(1)</sup> |     |     |     |      | VJ1812 <sup>(1)</sup> |     |     |     |      | VJ1825 <sup>(1)</sup> |     |     |     |
| CASE CODE                  |        | 1808                  |     |     |     |      | 1812                  |     |     |     |      | 1825                  |     |     |     |
| VOLTAGE (V <sub>DC</sub> ) |        | 50                    | 100 | 200 | 500 | 1000 | 50                    | 100 | 200 | 500 | 1000 | 50                    | 100 | 200 | 500 |
| VOLTAGE CODE               |        | A                     | B   | C   | E   | G    | A                     | B   | C   | E   | G    | 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  |                       |     |     |     |      | •                     | •   | •   | •   |      | •                     | •   | •   |     |
| 153                        | 15 nF  |                       |     |     |     |      | •                     | •   |     |     |      | •                     | •   | •   |     |
| 183                        | 18 nF  |                       |     |     |     |      | •                     |     |     |     |      | •                     | •   | •   |     |
| 223                        | 22 nF  |                       |     |     |     |      | •                     |     |     |     |      | •                     | •   | •   |     |
| 273                        | 27 nF  |                       |     |     |     |      |                       |     |     |     |      | •                     | •   | •   |     |
| 333                        | 33 nF  |                       |     |     |     |      |                       |     |     |     |      | •                     | •   |     |     |
| 393                        | 39 nF  |                       |     |     |     |      |                       |     |     |     |      | •                     |     |     |     |
| 473                        | 47 nF  |                       |     |     |     |      |                       |     |     |     |      |                       |     |     |     |
| 563                        | 56 nF  |                       |     |     |     |      |                       |     |     |     |      |                       |     |     |     |

## Notes

• RoHS-compliant

• Plastic tape

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



| SELECTION CHART            |        |                       |     |     |     |     |      |                       |     |     |     |      |
|----------------------------|--------|-----------------------|-----|-----|-----|-----|------|-----------------------|-----|-----|-----|------|
| DIELECTRIC                 |        | C0G (NP0)             |     |     |     |     |      |                       |     |     |     |      |
| STYLE                      |        | VJ2220 <sup>(1)</sup> |     |     |     |     |      | VJ2225 <sup>(1)</sup> |     |     |     |      |
| CASE CODE                  |        | 2220                  |     |     |     |     |      | 2225                  |     |     |     |      |
| VOLTAGE (V <sub>dc</sub> ) |        | 50                    | 100 | 200 | 500 | 630 | 1000 | 50                    | 100 | 200 | 500 | 1000 |
| VOLTAGE CODE               |        | A                     | B   | C   | E   | L   | G    | A                     | B   | C   | E   | G    |
| 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  | •                     | •   | •   |     |     |      | •                     | •   | •   | •   |      |
| 153                        | 15 nF  | •                     | •   | •   |     |     |      | •                     | •   | •   |     |      |
| 183                        | 18 nF  | •                     | •   |     |     |     |      | •                     | •   | •   |     |      |
| 223                        | 22 nF  | •                     | •   |     |     |     |      | •                     | •   | •   |     |      |
| 273                        | 27 nF  | •                     | •   |     |     |     |      | •                     | •   | •   |     |      |
| 333                        | 33 nF  | •                     | •   |     |     |     |      | •                     | •   | •   |     |      |
| 393                        | 39 nF  | •                     |     |     |     |     |      | •                     | •   | •   |     |      |
| 473                        | 47 nF  | •                     |     |     |     |     |      | •                     | •   |     |     |      |
| 563                        | 56 nF  |                       |     |     |     |     |      | •                     |     |     |     |      |

**Notes**

• RoHS-compliant

• Plastic tape

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



## SELECTION CHART

| DIELECTRIC                 |        | X7R    |    |    |     |        |    |    |     |     |        |    |    |     |     |
|----------------------------|--------|--------|----|----|-----|--------|----|----|-----|-----|--------|----|----|-----|-----|
| STYLE                      |        | VJ0402 |    |    |     | VJ0603 |    |    |     |     | VJ0805 |    |    |     |     |
| CASE CODE                  |        | 0402   |    |    |     | 0603   |    |    |     |     | 0805   |    |    |     |     |
| VOLTAGE (V <sub>DC</sub> ) |        | 16     | 25 | 50 | 100 | 16     | 25 | 50 | 100 | 200 | 16     | 25 | 50 | 100 | 200 |
| VOLTAGE CODE               |        | J      | X  | A  | B   | J      | X  | A  | B   | C   | J      | X  | A  | B   | C   |
| CAP. CODE                  | CAP.   |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 121                        | 120 pF | ••     | •• | •• | ••  |        |    |    |     |     |        |    |    |     |     |
| 151                        | 150 pF | ••     | •• | •• | ••  |        |    |    |     |     |        |    |    |     |     |
| 181                        | 180 pF | ••     | •• | •• | ••  |        |    |    |     |     |        |    |    |     |     |
| 221                        | 220 pF | ••     | •• | •• | ••  |        |    |    |     |     |        |    |    |     |     |
| 271                        | 270 pF | ••     | •• | •• | ••  |        |    |    |     |     |        |    |    |     |     |
| 331                        | 330 pF | ••     | •• | •• | ••  |        |    | •• | ••  | ••  |        |    |    |     | ••  |
| 391                        | 390 pF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  |        |    |    |     | ••  |
| 471                        | 470 pF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 561                        | 560 pF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 681                        | 680 pF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 821                        | 820 pF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 102                        | 1.0 nF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 122                        | 1.2 nF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 152                        | 1.5 nF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 182                        | 1.8 nF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 222                        | 2.2 nF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 272                        | 2.7 nF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 332                        | 3.3 nF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 392                        | 3.9 nF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 472                        | 4.7 nF | ••     | •• | •• | ••  | ••     | •• | •• | ••  | ••  | ••     | •• | •• | ••  | ••  |
| 562                        | 5.6 nF | ••     | •• | •• |     | ••     | •• | •• | ••  |     | ••     | •• | •• | ••  | ••  |
| 682                        | 6.8 nF | ••     | •• | •• |     | ••     | •• | •• | ••  |     | ••     | •• | •• | ••  | ••  |
| 822                        | 8.2 nF | ••     | •• | •• |     | ••     | •• | •• | ••  |     | ••     | •• | •• | ••  | ••  |
| 103                        | 10 nF  | ••     | •• | •• |     | ••     | •• | •• | ••  |     | ••     | •• | •• | ••  | •   |
| 123                        | 12 nF  | ••     | •• |    |     | ••     | •• | •• | ••  |     | ••     | •• | •• | ••  | •   |
| 153                        | 15 nF  | ••     | •• |    |     | ••     | •• | •• | ••  |     | ••     | •• | •• | ••  | •   |
| 183                        | 18 nF  | ••     | •• |    |     | ••     | •• | •• | ••  |     | ••     | •• | •• | ••  | •   |
| 223                        | 22 nF  | ••     |    |    |     | ••     | •• | •• | ••  |     | ••     | •• | •• | ••  | •   |
| 273                        | 27 nF  | ••     |    |    |     | ••     | •• | •• | ••  |     | ••     | •• | •• | ••  | •   |
| 333                        | 33 nF  | ••     |    |    |     | ••     | •• | •• | ••  |     | ••     | •• | •• | •   |     |
| 393                        | 39 nF  | ••     |    |    |     | ••     | •• | •• | ••  |     | ••     | •• | •• | •   |     |
| 473                        | 47 nF  | ••     |    |    |     | ••     | •• | •• |     |     | ••     | •• | •• | •   |     |
| 563                        | 56 nF  |        |    |    |     | ••     | •• | •• |     |     | ••     | •• | •• | •   |     |
| 683                        | 68 nF  |        |    |    |     | ••     | •• | •• |     |     | ••     | •• | •  | •   |     |
| 823                        | 82 nF  |        |    |    |     | ••     | •• | •• |     |     | •      | •  | •  | •   |     |
| 104                        | 100 nF |        |    |    |     | ••     | •• | •• |     |     | •      | •  | •  | •   |     |
| 124                        | 120 nF |        |    |    |     | ••     |    |    |     |     | •      | •  | •  |     |     |
| 154                        | 150 nF |        |    |    |     | ••     |    |    |     |     | •      | •  | •  |     |     |
| 184                        | 180 nF |        |    |    |     |        |    |    |     |     | •      | •  |    |     |     |
| 224                        | 220 nF |        |    |    |     |        |    |    |     |     | •      | •  |    |     |     |
| 274                        | 270 nF |        |    |    |     |        |    |    |     |     | •      | •  |    |     |     |
| 334                        | 330 nF |        |    |    |     |        |    |    |     |     | •      | •  |    |     |     |
| 394                        | 390 nF |        |    |    |     |        |    |    |     |     | •      |    |    |     |     |
| 474                        | 470 nF |        |    |    |     |        |    |    |     |     | •      |    |    |     |     |
| 564                        | 560 nF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 684                        | 680 nF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 824                        | 820 nF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 105                        | 1.0 μF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 125                        | 1.2 μF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 155                        | 1.5 μF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 185                        | 1.8 μF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 225                        | 2.2 μF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 275                        | 2.7 μF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 335                        | 3.3 μF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 395                        | 3.9 μF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 475                        | 4.7 μF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 565                        | 5.6 μF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |
| 685                        | 6.8 μF |        |    |    |     |        |    |    |     |     |        |    |    |     |     |

## Notes

•• RoHS-compliant

•• Paper tape • Plastic tape ••• Variable plastic / paper tape



| SELECTION CHART            |        |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
|----------------------------|--------|-----------------------|----|----|-----|-----|-----|-----|-----|-----------------------|----|----|-----|-----|-----|-----|-----|
| DIELECTRIC                 |        | X7R                   |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| STYLE                      |        | VJ1206 <sup>(1)</sup> |    |    |     |     |     |     |     | VJ1210 <sup>(1)</sup> |    |    |     |     |     |     |     |
| CASE CODE                  |        | 1206                  |    |    |     |     |     |     |     | 1210                  |    |    |     |     |     |     |     |
| VOLTAGE (V <sub>DC</sub> ) |        | 16                    | 25 | 50 | 100 | 200 | 250 | 500 | 630 | 16                    | 25 | 50 | 100 | 200 | 250 | 500 | 630 |
| VOLTAGE CODE               |        | J                     | X  | A  | B   | C   | P   | E   | L   | J                     | X  | A  | B   | C   | P   | E   | L   |
| CAP. CODE                  | CAP.   |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 121                        | 120 pF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 151                        | 150 pF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 181                        | 180 pF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 221                        | 220 pF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 271                        | 270 pF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 331                        | 330 pF |                       |    |    |     |     |     | ••  | ••  |                       |    |    |     |     |     |     |     |
| 391                        | 390 pF |                       |    |    |     |     |     | ••  | ••  |                       |    |    |     |     |     |     | •   |
| 471                        | 470 pF |                       | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     |     |     |     | •   |
| 561                        | 560 pF |                       | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     |     |     |     | •   |
| 681                        | 680 pF |                       | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     |     |     |     | •   |
| 821                        | 820 pF |                       | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     |     |     |     | •   |
| 102                        | 1.0 nF | ••                    | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     |     |     | •   | •   |
| 122                        | 1.2 nF | ••                    | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     |     |     | •   | •   |
| 152                        | 1.5 nF | ••                    | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     |     |     | •   | •   |
| 182                        | 1.8 nF | ••                    | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     |     |     | •   | •   |
| 222                        | 2.2 nF | ••                    | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     |     |     | •   | •   |
| 272                        | 2.7 nF | ••                    | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     |     |     | •   | •   |
| 332                        | 3.3 nF | ••                    | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     | •   |     | •   | •   |
| 392                        | 3.9 nF | ••                    | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     | •   |     | •   | •   |
| 472                        | 4.7 nF | ••                    | •• | •• | ••  | ••  |     | ••  | ••  |                       |    |    |     | •   |     | •   | •   |
| 562                        | 5.6 nF | ••                    | •• | •• | ••  | ••  |     | •   | •   |                       |    |    |     | •   |     | •   | •   |
| 682                        | 6.8 nF | ••                    | •• | •• | ••  | ••  |     | •   | •   |                       |    |    |     | •   |     | •   | •   |
| 822                        | 8.2 nF | ••                    | •• | •• | ••  | ••  |     | •   | •   |                       |    |    |     | •   |     | •   | •   |
| 103                        | 10 nF  | ••                    | •• | •• | ••  | ••  | •   | •   | •   | •                     | •  | •  | •   | •   |     | •   | •   |
| 123                        | 12 nF  | ••                    | •• | •• | ••  | ••  | •   | •   | •   | •                     | •  | •  | •   | •   |     | •   | •   |
| 153                        | 15 nF  | ••                    | •• | •• | ••  | ••  | •   | •   | •   | •                     | •  | •  | •   | •   |     | •   | •   |
| 183                        | 18 nF  | ••                    | •• | •• | ••  | ••  | •   | •   | •   | •                     | •  | •  | •   | •   |     | •   | •   |
| 223                        | 22 nF  | ••                    | •• | •• | ••  | ••  | •   |     |     | •                     | •  | •  | •   | •   |     | •   | •   |
| 273                        | 27 nF  | ••                    | •• | •• | ••  | ••  | •   |     |     | •                     | •  | •  | •   | •   |     | •   | •   |
| 333                        | 33 nF  | ••                    | •• | •• | ••  | ••  | •   |     |     | •                     | •  | •  | •   | •   | •   | •   | •   |
| 393                        | 39 nF  | ••                    | •• | •• | ••  | •   | •   |     |     | •                     | •  | •  | •   | •   | •   | •   | •   |
| 473                        | 47 nF  | ••                    | •• | •• | ••  | •   | •   |     |     | •                     | •  | •  | •   | •   | •   | •   | •   |
| 563                        | 56 nF  | ••                    | •• | •• | ••  | •   | •   |     |     | •                     | •  | •  | •   | •   | •   |     |     |
| 683                        | 68 nF  | ••                    | •• | •• | ••  | •   | •   |     |     | •                     | •  | •  | •   | •   | •   |     |     |
| 823                        | 82 nF  | ••                    | •• | •  | •   | •   | •   |     |     | •                     | •  | •  | •   | •   | •   |     |     |
| 104                        | 100 nF | •                     | •  | •  | •   | •   | •   |     |     | •                     | •  | •  | •   | •   | •   |     |     |
| 124                        | 120 nF | •                     | •  | •  | •   |     |     |     |     | •                     | •  | •  | •   | •   |     |     |     |
| 154                        | 150 nF | •                     | •  | •  | •   |     |     |     |     | •                     | •  | •  | •   | •   |     |     |     |
| 184                        | 180 nF | •                     | •  | •  | •   |     |     |     |     | •                     | •  | •  | •   | •   |     |     |     |
| 224                        | 220 nF | •                     | •  | •  | •   |     |     |     |     | •                     | •  | •  | •   |     |     |     |     |
| 274                        | 270 nF | •                     | •  | •  | •   |     |     |     |     | •                     | •  | •  | •   |     |     |     |     |
| 334                        | 330 nF | •                     | •  | •  |     |     |     |     |     | •                     | •  | •  | •   |     |     |     |     |
| 394                        | 390 nF | •                     | •  | •  |     |     |     |     |     | •                     | •  | •  | •   |     |     |     |     |
| 474                        | 470 nF | •                     | •  | •  |     |     |     |     |     | •                     | •  | •  | •   |     |     |     |     |
| 564                        | 560 nF | •                     | •  |    |     |     |     |     |     | •                     | •  | •  |     |     |     |     |     |
| 684                        | 680 nF | •                     | •  |    |     |     |     |     |     | •                     | •  | •  |     |     |     |     |     |
| 824                        | 820 nF | •                     | •  |    |     |     |     |     |     | •                     | •  | •  |     |     |     |     |     |
| 105                        | 1.0 µF | •                     | •  |    |     |     |     |     |     | •                     | •  | •  |     |     |     |     |     |
| 125                        | 1.2 µF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 155                        | 1.5 µF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 185                        | 1.8 µF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 225                        | 2.2 µF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 275                        | 2.7 µF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 335                        | 3.3 µF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 395                        | 3.9 µF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 475                        | 4.7 µF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 565                        | 5.6 µF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |
| 685                        | 6.8 µF |                       |    |    |     |     |     |     |     |                       |    |    |     |     |     |     |     |

## Notes

• RoHS-compliant

•• Paper tape • Plastic tape

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



## SELECTION CHART

| DIELECTRIC                 |        | X7R                   |     |     |     |      |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
|----------------------------|--------|-----------------------|-----|-----|-----|------|-----------------------|----|-----|-----|-----|-----|-----|------|-----------------------|----|-----|-----|-----|-----|------|--|
| STYLE                      |        | VJ1808 <sup>(1)</sup> |     |     |     |      | VJ1812 <sup>(1)</sup> |    |     |     |     |     |     |      | VJ1825 <sup>(1)</sup> |    |     |     |     |     |      |  |
| CASE CODE                  |        | 1808                  |     |     |     |      | 1812                  |    |     |     |     |     |     |      | 1825                  |    |     |     |     |     |      |  |
| VOLTAGE (V <sub>DC</sub> ) |        | 50                    | 100 | 200 | 500 | 1000 | 25                    | 50 | 100 | 200 | 250 | 500 | 630 | 1000 | 25                    | 50 | 100 | 200 | 250 | 500 | 1000 |  |
| VOLTAGE CODE               |        | A                     | B   | C   | E   | G    | X                     | A  | B   | C   | P   | E   | L   | G    | X                     | A  | B   | C   | P   | E   | G    |  |
| CAP. CODE                  | CAP.   |                       |     |     |     |      |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 121                        | 120 pF |                       |     |     |     |      |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 151                        | 150 pF |                       |     |     |     |      |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 181                        | 180 pF |                       |     |     |     |      |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 221                        | 220 pF |                       |     |     |     |      |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 271                        | 270 pF |                       |     |     |     |      |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 331                        | 330 pF |                       |     |     |     |      |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 391                        | 390 pF |                       |     |     |     |      |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 471                        | 470 pF |                       |     |     |     | •    |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 561                        | 560 pF |                       |     |     |     | •    |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 681                        | 680 pF |                       |     |     |     | •    |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 821                        | 820 pF |                       |     |     |     | •    |                       |    |     |     |     |     |     |      |                       |    |     |     |     |     |      |  |
| 102                        | 1.0 nF |                       |     |     | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 122                        | 1.2 nF |                       |     |     | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 152                        | 1.5 nF |                       |     |     | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 182                        | 1.8 nF |                       |     |     | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 222                        | 2.2 nF |                       |     |     | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 272                        | 2.7 nF |                       |     |     | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 332                        | 3.3 nF |                       |     |     | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 392                        | 3.9 nF |                       |     |     | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 472                        | 4.7 nF |                       |     | •   | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 562                        | 5.6 nF |                       |     | •   | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 682                        | 6.8 nF |                       |     | •   | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 822                        | 8.2 nF |                       |     | •   | •   | •    |                       |    |     |     |     | •   | •   | •    |                       |    |     |     |     |     |      |  |
| 103                        | 10 nF  | •                     | •   | •   | •   | •    |                       |    |     | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 123                        | 12 nF  | •                     | •   | •   | •   | •    |                       |    |     | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 153                        | 15 nF  | •                     | •   | •   | •   | •    |                       |    |     | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 183                        | 18 nF  | •                     | •   | •   | •   | •    |                       |    |     | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 223                        | 22 nF  | •                     | •   | •   | •   | •    | •                     | •  | •   | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 273                        | 27 nF  | •                     | •   | •   | •   | •    | •                     | •  | •   | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 333                        | 33 nF  | •                     | •   | •   | •   | •    | •                     | •  | •   | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 393                        | 39 nF  | •                     | •   | •   | •   | •    | •                     | •  | •   | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 473                        | 47 nF  | •                     | •   | •   | •   | •    | •                     | •  | •   | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 563                        | 56 nF  | •                     | •   | •   | •   | •    | •                     | •  | •   | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 683                        | 68 nF  | •                     | •   | •   | •   | •    | •                     | •  | •   | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 823                        | 82 nF  | •                     | •   | •   | •   | •    | •                     | •  | •   | •   |     | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 104                        | 100 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 124                        | 120 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 154                        | 150 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 184                        | 180 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 224                        | 220 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 274                        | 270 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 334                        | 330 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 394                        | 390 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 474                        | 470 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 564                        | 560 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 684                        | 680 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 824                        | 820 nF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 105                        | 1.0 µF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 125                        | 1.2 µF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 155                        | 1.5 µF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 185                        | 1.8 µF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 225                        | 2.2 µF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 275                        | 2.7 µF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 335                        | 3.3 µF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 395                        | 3.9 µF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 475                        | 4.7 µF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 565                        | 5.6 µF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |
| 685                        | 6.8 µF | •                     | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •   | •    | •                     | •  | •   | •   | •   | •   | •    |  |

## Notes

• RoHS-compliant

• Plastic tape

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



| SELECTION CHART            |        |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
|----------------------------|--------|-----------------------|-----|-----|-----|-----------------------|----|-----|-----|-----|------|-----------------------|----|-----|-----|-----|
| DIELECTRIC                 |        | X7R                   |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| STYLE                      |        | VJ2220 <sup>(1)</sup> |     |     |     | VJ2225 <sup>(1)</sup> |    |     |     |     |      | VJ3640 <sup>(1)</sup> |    |     |     |     |
| CASE CODE                  |        | 2220                  |     |     |     | 2225                  |    |     |     |     |      | 3640                  |    |     |     |     |
| VOLTAGE (V <sub>DC</sub> ) |        | 50                    | 100 | 200 | 500 | 25                    | 50 | 100 | 200 | 500 | 1000 | 25                    | 50 | 100 | 200 | 500 |
| VOLTAGE CODE               |        | A                     | B   | C   | E   | X                     | A  | B   | C   | E   | G    | X                     | A  | B   | C   | E   |
| CAP. CODE                  | CAP.   |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 121                        | 120 pF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 151                        | 150 pF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 181                        | 180 pF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 221                        | 220 pF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 271                        | 270 pF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 331                        | 330 pF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 391                        | 390 pF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 471                        | 470 pF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 561                        | 560 pF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 681                        | 680 pF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 821                        | 820 pF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 102                        | 1.0 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 122                        | 1.2 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 152                        | 1.5 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 182                        | 1.8 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 222                        | 2.2 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 272                        | 2.7 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 332                        | 3.3 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 392                        | 3.9 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 472                        | 4.7 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 562                        | 5.6 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 682                        | 6.8 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 822                        | 8.2 nF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 103                        | 10 nF  |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 123                        | 12 nF  |                       |     |     |     |                       |    |     |     |     |      |                       |    |     |     |     |
| 153                        | 15 nF  |                       |     |     | •   |                       |    |     |     |     |      |                       |    |     |     |     |
| 183                        | 18 nF  |                       |     |     | •   |                       |    |     |     |     |      |                       |    |     |     |     |
| 223                        | 22 nF  |                       |     |     | •   |                       |    |     |     |     |      |                       |    |     |     |     |
| 273                        | 27 nF  |                       |     |     | •   |                       |    |     |     |     |      |                       |    |     | •   | •   |
| 333                        | 33 nF  |                       |     |     | •   | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 393                        | 39 nF  |                       |     |     | •   | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 473                        | 47 nF  |                       |     |     | •   | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 563                        | 56 nF  |                       |     |     | •   | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 683                        | 68 nF  |                       |     |     | •   | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 823                        | 82 nF  |                       |     |     | •   | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 104                        | 100 nF |                       |     | •   | •   | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 124                        | 120 nF |                       |     | •   | •   | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 154                        | 150 nF |                       |     | •   | •   | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 184                        | 180 nF |                       |     | •   | •   | •                     | •  | •   | •   | •   | •    | •                     | •  | •   | •   | •   |
| 224                        | 220 nF |                       | •   | •   | •   | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 274                        | 270 nF | •                     | •   | •   |     | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 334                        | 330 nF | •                     | •   | •   |     | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 394                        | 390 nF | •                     | •   | •   |     | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 474                        | 470 nF | •                     | •   | •   |     | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 564                        | 560 nF | •                     | •   | •   |     | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 684                        | 680 nF | •                     | •   | •   |     | •                     | •  | •   | •   | •   | •    |                       |    |     | •   | •   |
| 824                        | 820 nF | •                     | •   | •   |     | •                     | •  | •   | •   | •   | •    |                       |    |     | •   |     |
| 105                        | 1.0 μF | •                     | •   | •   |     | •                     | •  | •   | •   | •   | •    |                       |    |     | •   |     |
| 125                        | 1.2 μF | •                     | •   |     |     | •                     | •  | •   | •   | •   | •    |                       |    |     | •   |     |
| 155                        | 1.5 μF | •                     |     |     |     | •                     | •  | •   |     |     |      |                       |    |     | •   |     |
| 185                        | 1.8 μF | •                     |     |     |     | •                     | •  | •   |     |     |      |                       |    |     | •   |     |
| 225                        | 2.2 μF | •                     |     |     |     | •                     | •  |     |     |     |      |                       |    |     | •   |     |
| 275                        | 2.7 μF |                       |     |     |     | •                     | •  |     |     |     |      |                       |    |     | •   |     |
| 335                        | 3.3 μF |                       |     |     |     | •                     |    |     |     |     |      |                       |    |     | •   |     |
| 395                        | 3.9 μF |                       |     |     |     | •                     |    |     |     |     |      |                       |    |     | •   |     |
| 475                        | 4.7 μF |                       |     |     |     | •                     |    |     |     |     |      |                       |    |     | •   |     |
| 565                        | 5.6 μF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     | •   |     |
| 685                        | 6.8 μF |                       |     |     |     |                       |    |     |     |     |      |                       |    |     | •   |     |

## Notes

• RoHS-compliant

• Plastic tape

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



COG (NP0) DIELECTRIC - TYPICAL PARAMETERS





## X7R DIELECTRIC - TYPICAL PARAMETERS



**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" / "O" | PLASTIC TAPE PACKAGING CODE "T" | PAPER TAPE PACKAGING CODE "P" / "I" | PLASTIC TAPE PACKAGING CODE "R" |
| 0402           | 8 mm      | 5000                                | n/a                             | 10 000                              | n/a                             |
| 0603 (4)(5)(6) | 8 mm      | 4000                                | 4000                            | 10 000                              | 10 000                          |
| 0805 (4)(5)    | 8 mm      | 3000                                | 3000                            | 10 000                              | 10 000                          |
| 1206 (4)(5)    | 8 mm      | 3000                                | 2500 / 3000                     | 10 000                              | 9000 / 10 000                   |
| 1210 (4)       | 8 mm      | n/a                                 | 2000 / 2500 / 3000              | n/a                                 | 9000 / 10 000                   |
| 1808           | 12 mm     | n/a                                 | 2000                            | n/a                                 | 10 000                          |
| 1812           | 12 mm     | n/a                                 | 1000                            | n/a                                 | 4000                            |
| 1825           | 12 mm     | n/a                                 | 500                             | n/a                                 | 4000                            |
| 2220           | 12 mm     | n/a                                 | 1000                            | n/a                                 | n/a                             |
| 2225           | 12 mm     | n/a                                 | 500                             | n/a                                 | n/a                             |
| 3640           | 16 mm     | n/a                                 | 500                             | 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 "C" / "P" / "O" / "I" and "T" / "R" or lower quantities can depend from product thickness
- (5) Polymer termination, code "B", only available in plastic tape "T" / "R"
- (6) Variable packaging codes, see ratings in "Selection Charts"

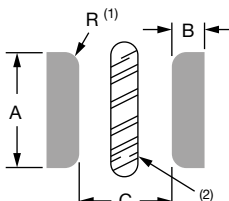
**STORAGE AND HANDLING CONDITIONS**

- (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.

**Precautions:**

- 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 oxidation of the terminations, which can easily lead to poor soldering.
- Store products on the shelf and avoid exposure to moisture or dust.
- 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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