

## Surface Mount Multilayer Ceramic Chip Capacitors Prohibit Surface Arc-Over in High-Voltage Applications



HV Arc Guard® Capacitor with no Surface Arc-over



Standard Capacitor with Surface Arc-over

### FEATURES

#### For this Worldwide Patented Technology

- Specialty: High-voltage applications
- MLCC that protects against surface arc-over
- Excellent high-voltage performance
- Higher capacitances and smaller case sizes that save board space, as compared to standard high-voltage MLCCs
- Voltage breakdowns as much as twice that of competitors' products
- Available with polymer termination for increase resistance to board flex cracking. Please contact factory for availability
- 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

- Power supplies
- DC/DC converters (buck and boost)
- Voltage multipliers for flyback converters
- For lighting and other AC applications please contact: [mlcc@vishay.com](mailto:mlcc@vishay.com)

### ELECTRICAL SPECIFICATIONS

#### COG (NP0)

##### GENERAL SPECIFICATION

###### Note

Electrical characteristics at + 25 °C unless otherwise specified

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

**Capacitance Range:** 10 pF to 8.2 nF

**Voltage Range:** 1000 V<sub>DC</sub> to 2500 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

1000 V<sub>DC</sub>-rated: 150 % of rated voltage

1500 V<sub>DC</sub>, 2500 V<sub>DC</sub>-rated: 120 % of rated voltage

#### X7R

##### GENERAL SPECIFICATION

###### Note

Electrical characteristics at + 25 °C unless otherwise specified

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

**Capacitance Range:** 220 pF to 270 nF

**Voltage Range:** 250 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):

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: 200 % 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: 120 % of rated voltage



## QUICK REFERENCE DATA

| DIELECTRIC | CASE | MAXIMUM VOLTAGE (V) | CAPACITANCE |         |
|------------|------|---------------------|-------------|---------|
|            |      |                     | MINIMUM     | MAXIMUM |
| C0G (NP0)  | 0805 | 1500                | 10 pF       | 390 pF  |
|            | 1206 | 1500                | 10 pF       | 1.5 nF  |
|            | 1210 | 1500                | 10 pF       | 2.7 nF  |
|            | 2220 | 1500                | 470 pF      | 5.6 nF  |
|            | 2225 | 2500                | 470 pF      | 8.2 nF  |
| X7R        | 0805 | 1000                | 470 pF      | 3.3 nF  |
|            | 1206 | 1000                | 220 pF      | 47 nF   |
|            | 1210 | 1000                | 220 pF      | 82 nF   |
|            | 1808 | 1000                | 220 pF      | 100 nF  |
|            | 1812 | 1000                | 220 pF      | 270 nF  |

## Note

- Detail ratings see "Selection Chart"

ORDERING INFORMATION <sup>(4)</sup>

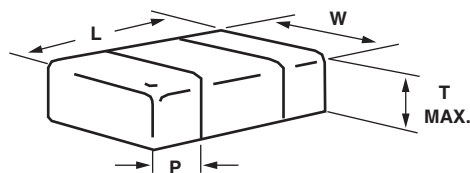
| VJ0805                                               | A                        | 101                                                                                                                                                   | J                                                 | X                                                                                                                                                      | G                                                                             | A            | C                                                                                                                                                                                                                                                                                         | 5Z <sup>(2)</sup> |
|------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| CASE CODE                                            | DIELECTRIC               | CAPACITANCE NOMINAL CODE                                                                                                                              | CAPACITANCE TOLERANCE                             | TERMINATION                                                                                                                                            | DC VOLTAGE RATING <sup>(1)</sup>                                              | MARKING      | PACKAGING                                                                                                                                                                                                                                                                                 | PROCESS CODE      |
| 0805<br>1206<br>1210<br>1808<br>1812<br>2220<br>2225 | 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>102 = 1000 pF<br>223 = 22 000 pF | J = $\pm 5\%$<br>K = $\pm 10\%$<br>M = $\pm 20\%$ | X = Ni barrier<br>100 % tin plated<br>F, E = AgPd <sup>(3)</sup><br>B = Polymer<br>100 % tin plated<br>matte finish <sup>(4)</sup><br>N = Non-magnetic | P = 250 V<br>E = 500 V<br>L = 630 V<br>G = 1000 V<br>R = 1500 V<br>O = 2500 V | A = Unmarked | C = 7" reel/paper tape<br>T = 7" reel/plastic tape<br>P = 11 1/4"/13" reel/paper tape<br>R = 11 1/4"/13" reel/plastic tape<br>O = 7" reel/flamed paper tape<br>I = 11 1/4"/13" reel/flamed paper tape<br><br><b>Note:</b><br>"I" and "O" are used for "F", "E", "N" termination size 0805 | 5Z = HVArc Guard® |

## Notes

- 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)
- Process code with 2 digits has to be added
- Termination code "E" is for conductive epoxy assembly, contact [mlcc@vishay.com](mailto:mlcc@vishay.com) for availability
- Please contact factory for polymer termination availability

## 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           |
| N                | Non-magnetic                                 | Yes            | No           |

**DIMENSIONS** in inches (millimeters)


| CASE CODE | STYLE  | LENGTH (L)                     | WIDTH (W)                       | MAXIMUM THICKNESS (T) | TERMINATION PAD (P) |              |
|-----------|--------|--------------------------------|---------------------------------|-----------------------|---------------------|--------------|
|           |        |                                |                                 |                       | MINIMUM             | MAXIMUM      |
| 0805      | VJ0805 | 0.079 ± 0.008<br>(2.00 ± 0.20) | 0.049 ± 0.008<br>(1.25 ± 0.020) | 0.057 (1.45)          | 0.010 (0.25)        | 0.028 (0.71) |
| 1206      | VJ1206 | 0.126 ± 0.008<br>(3.20 ± 0.20) | 0.063 ± 0.008<br>(1.60 ± 0.20)  | 0.067 (1.70)          | 0.010 (0.25)        | 0.030 (0.76) |
| 1210      | VJ1210 | 0.126 ± 0.008<br>(3.20 ± 0.20) | 0.098 ± 0.008<br>(2.50 ± 0.020) | 0.067 (1.70)          | 0.010 (0.25)        | 0.030 (0.76) |
| 1808      | VJ1808 | 0.180 ± 0.012<br>(4.57 ± 0.30) | 0.080 ± 0.010<br>(2.03 ± 0.25)  | 0.067 (1.70)          | 0.010 (0.25)        | 0.030 (0.76) |
| 1812      | VJ1812 | 0.177 ± 0.012<br>(4.50 ± 0.30) | 0.126 ± 0.008<br>(3.20 ± 0.20)  | 0.086 (2.18)          | 0.010 (0.25)        | 0.030 (0.76) |
| 2220      | VJ2220 | 0.220 ± 0.010<br>(5.59 ± 0.25) | 0.200 ± 0.010<br>(5.08 ± 0.25)  | 0.086 (2.18)          | 0.010 (0.25)        | 0.030 (0.76) |
| 2225      | VJ2225 | 0.220 ± 0.010<br>(5.59 ± 0.25) | 0.250 ± 0.010<br>(6.35 ± 0.25)  | 0.090 (2.30)          | 0.010 (0.25)        | 0.030 (0.76) |

**Note**

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



| SELECTION CHART COG (NP0)  |        |           |      |        |      |        |      |        |      |        |      |      |
|----------------------------|--------|-----------|------|--------|------|--------|------|--------|------|--------|------|------|
| DIELECTRIC                 |        | COG (NP0) |      |        |      |        |      |        |      |        |      |      |
| STYLE                      |        | VJ0805    |      | VJ1206 |      | VJ1210 |      | VJ2220 |      | VJ2225 |      |      |
| CASE CODE                  |        | 0805      |      | 1206   |      | 1210   |      | 2220   |      | 2225   |      |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 1000      | 1500 | 1000   | 1500 | 1000   | 1500 | 1000   | 1500 | 1000   | 1500 | 2500 |
| VOLTAGE CODE               |        | G         | R    | G      | R    | G      | R    | G      | R    | G      | R    | O    |
| CAP. CODE                  | CAP.   |           |      |        |      |        |      |        |      |        |      |      |
| 100                        | 10 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 120                        | 12 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 150                        | 15 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 180                        | 18 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 220                        | 22 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 270                        | 27 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 330                        | 33 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 390                        | 39 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 470                        | 47 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 560                        | 56 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 680                        | 68 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 820                        | 82 pF  | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 101                        | 100 pF | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 121                        | 120 pF | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 151                        | 150 pF | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 181                        | 180 pF | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 221                        | 220 pF | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 271                        | 270 pF | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 331                        | 330 pF | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 391                        | 390 pF | •         | •    | •      | •    | •      | •    |        |      |        |      |      |
| 471                        | 470 pF |           |      | •      | •    | •      | •    | •      | •    | •      | •    | •    |
| 561                        | 560 pF |           |      | •      | •    | •      | •    | •      | •    | •      | •    | •    |
| 681                        | 680 pF |           |      | •      | •    | •      | •    | •      | •    | •      | •    | •    |
| 821                        | 820 pF |           |      | •      | •    | •      | •    | •      | •    | •      | •    | •    |
| 102                        | 1.0 nF |           |      | •      | •    | •      | •    | •      | •    | •      | •    | •    |
| 122                        | 1.2 nF |           |      | •      | •    | •      | •    | •      | •    | •      | •    | •    |
| 152                        | 1.5 nF |           |      | •      | •    | •      | •    | •      | •    | •      | •    | •    |
| 182                        | 1.8 nF |           |      |        |      | •      | •    | •      | •    | •      | •    | •    |
| 222                        | 2.2 nF |           |      |        |      | •      | •    | •      | •    | •      | •    | •    |
| 272                        | 2.7 nF |           |      |        |      | •      | •    | •      | •    | •      | •    | •    |
| 332                        | 3.3 nF |           |      |        |      |        |      | •      | •    | •      | •    | •    |
| 392                        | 3.9 nF |           |      |        |      |        |      | •      | •    | •      | •    | •    |
| 472                        | 4.7 nF |           |      |        |      |        |      | •      | •    | •      | •    | •    |
| 562                        | 5.6 nF |           |      |        |      |        |      | •      | •    | •      | •    | •    |
| 682                        | 6.8 nF |           |      |        |      |        |      |        |      | •      | •    | •    |
| 822                        | 8.2 nF |           |      |        |      |        |      |        |      | •      | •    | •    |

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

- Available in plastic carrier tape only

• RoHS-compliant

**SELECTION CHART X7R**

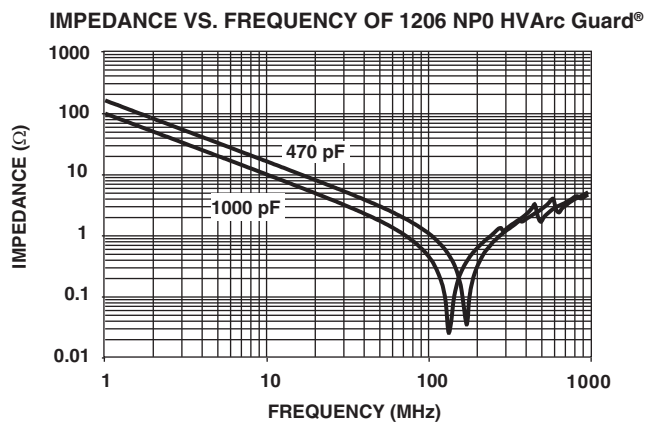
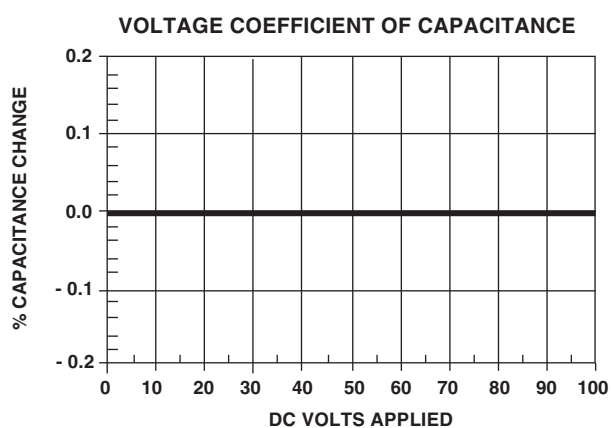
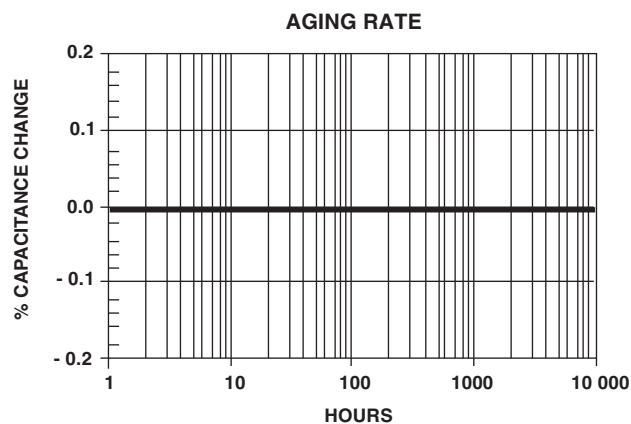
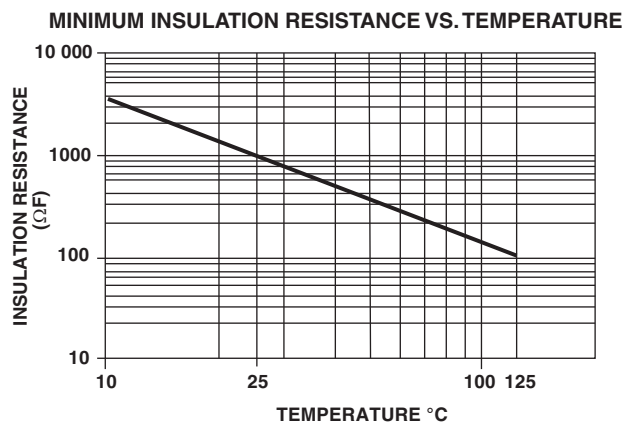
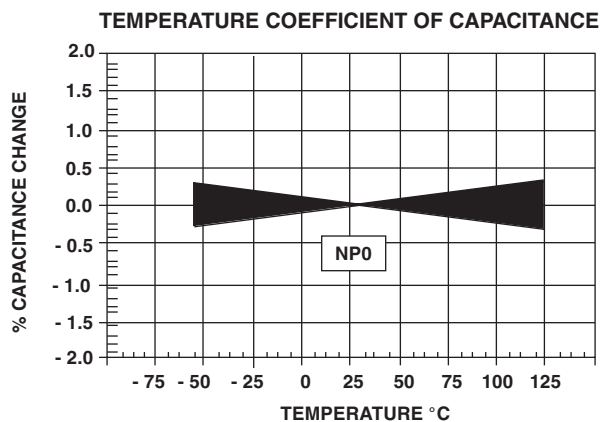
| DIELECTRIC                 |        | X7R    |      |        |     |     |      |        |     |     |      |        |     |     |      |        |     |     |      |
|----------------------------|--------|--------|------|--------|-----|-----|------|--------|-----|-----|------|--------|-----|-----|------|--------|-----|-----|------|
| STYLE                      |        | VJ0805 |      | VJ1206 |     |     |      | VJ1210 |     |     |      | VJ1808 |     |     |      | VJ1812 |     |     |      |
| CASE CODE                  |        | 0805   |      | 1206   |     |     |      | 1210   |     |     |      | 1808   |     |     |      | 1812   |     |     |      |
| VOLTAGE (V <sub>DC</sub> ) |        | 630    | 1000 | 250    | 500 | 630 | 1000 | 250    | 500 | 630 | 1000 | 250    | 500 | 630 | 1000 | 250    | 500 | 630 | 1000 |
| VOLTAGE CODE               |        | L      | G    | P      | E   | L   | G    | P      | E   | L   | G    | P      | E   | L   | G    | P      | E   | L   | G    |
| CAP. CODE                  | CAP.   |        |      |        |     |     |      |        |     |     |      |        |     |     |      |        |     |     |      |
| 101                        | 100 pF |        |      |        |     |     |      |        |     |     |      |        |     |     |      |        |     |     |      |
| 121                        | 120 pF |        |      |        |     |     |      |        |     |     |      |        |     |     |      |        |     |     |      |
| 151                        | 150 pF |        |      |        |     |     |      |        |     |     |      |        |     |     |      |        |     |     |      |
| 181                        | 180 pF |        |      |        |     |     |      |        |     |     |      |        |     |     |      |        |     |     |      |
| 221                        | 220 pF |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 271                        | 270 pF |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 331                        | 330 pF |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 391                        | 390 pF |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 471                        | 470 pF | ••     | ••   | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 561                        | 560 pF | ••     | ••   | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 681                        | 680 pF | ••     | ••   | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 821                        | 820 pF | ••     | ••   | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 102                        | 1.0 nF | ••     | ••   | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 122                        | 1.2 nF | ••     | ••   | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 152                        | 1.5 nF | •      | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 182                        | 1.8 nF | •      | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 222                        | 2.2 nF | •      | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 272                        | 2.7 nF | •      | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 332                        | 3.3 nF | •      | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 392                        | 3.9 nF |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 472                        | 4.7 nF |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 562                        | 5.6 nF |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 682                        | 6.8 nF |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 822                        | 8.2 nF |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 103                        | 10 nF  |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 123                        | 12 nF  |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 153                        | 15 nF  |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 183                        | 18 nF  |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 223                        | 22 nF  |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 273                        | 27 nF  |        |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 333                        | 33 nF  |        |      | •      | •   |     |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 393                        | 39 nF  |        |      | •      | •   |     |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 473                        | 47 nF  |        |      | •      | •   |     |      | •      | •   | •   | •    | •      | •   | •   | •    | •      | •   | •   | •    |
| 563                        | 56 nF  |        |      |        |     |     |      | •      | •   | •   |      | •      | •   |     |      | •      | •   | •   | •    |
| 683                        | 68 nF  |        |      |        |     |     |      | •      | •   |     |      | •      |     |     |      | •      | •   | •   | •    |
| 823                        | 82 nF  |        |      |        |     |     |      | •      | •   |     |      | •      |     |     |      | •      | •   | •   | •    |
| 104                        | 100 nF |        |      |        |     |     |      |        |     |     |      | •      |     |     |      | •      | •   | •   |      |
| 124                        | 120 nF |        |      |        |     |     |      |        |     |     |      |        |     |     |      | •      |     |     |      |
| 154                        | 150 nF |        |      |        |     |     |      |        |     |     |      |        |     |     |      | •      |     |     |      |
| 184                        | 180 nF |        |      |        |     |     |      |        |     |     |      |        |     |     |      | •      |     |     |      |
| 224                        | 220 nF |        |      |        |     |     |      |        |     |     |      |        |     |     |      | •      |     |     |      |
| 274                        | 270 nF |        |      |        |     |     |      |        |     |     |      |        |     |     |      | •      |     |     |      |
| 334                        | 330 nF |        |      |        |     |     |      |        |     |     |      |        |     |     |      |        |     |     |      |

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

• Available in plastic carrier tape only

•• Only available in paper carrier tape

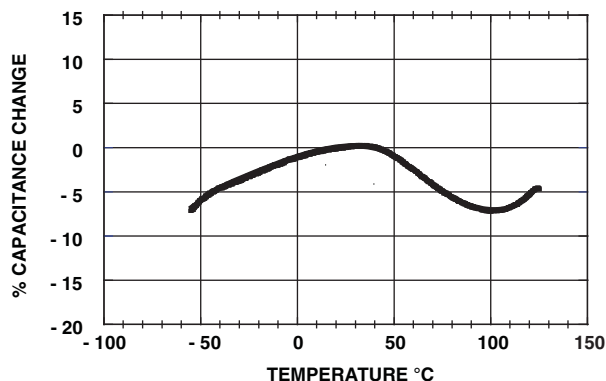
■ RoHS-compliant

**HVArc Guard® C0G (NP0) DIELECTRIC - TYPICAL PARAMETERS**


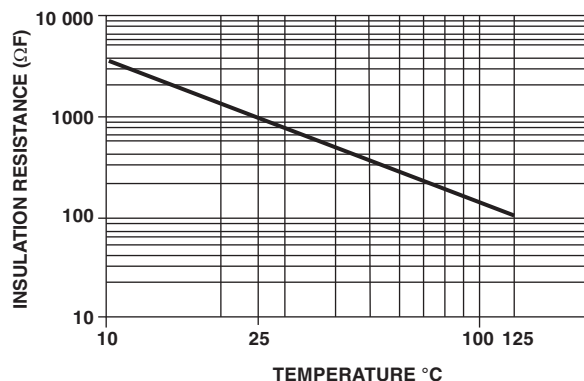


# HVArc Guard® X7R DIELECTRIC - TYPICAL PARAMETERS

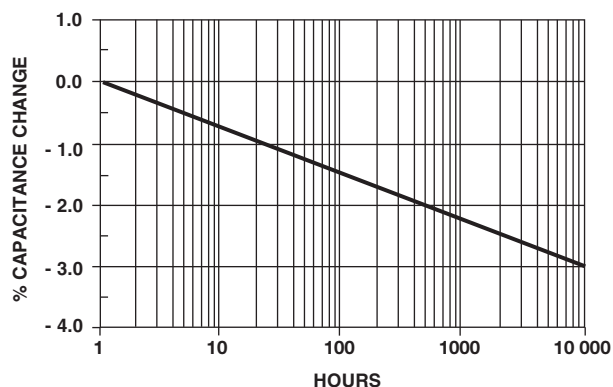
TEMPERATURE COEFFICIENT OF CAPACITANCE



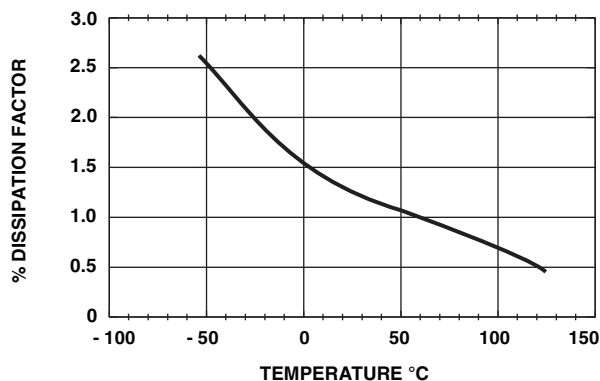
MINIMUM INSULATION RESISTANCE VS. TEMPERATURE



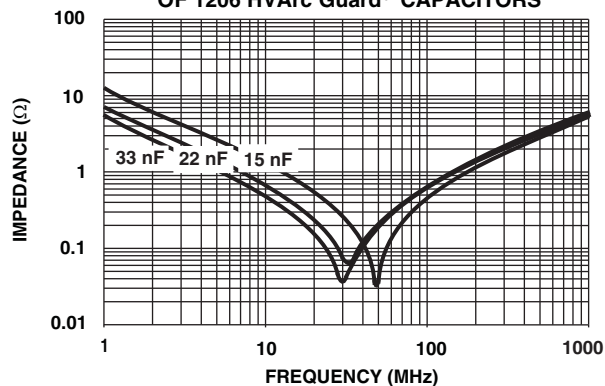
AGING RATE

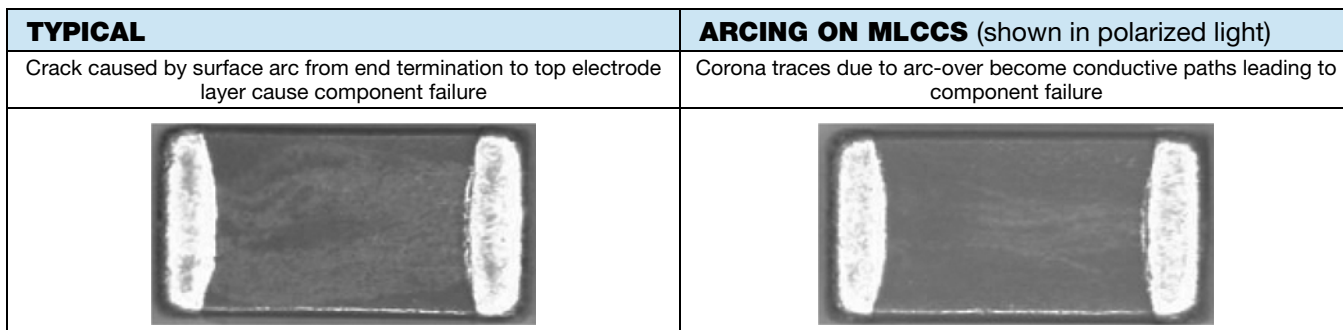
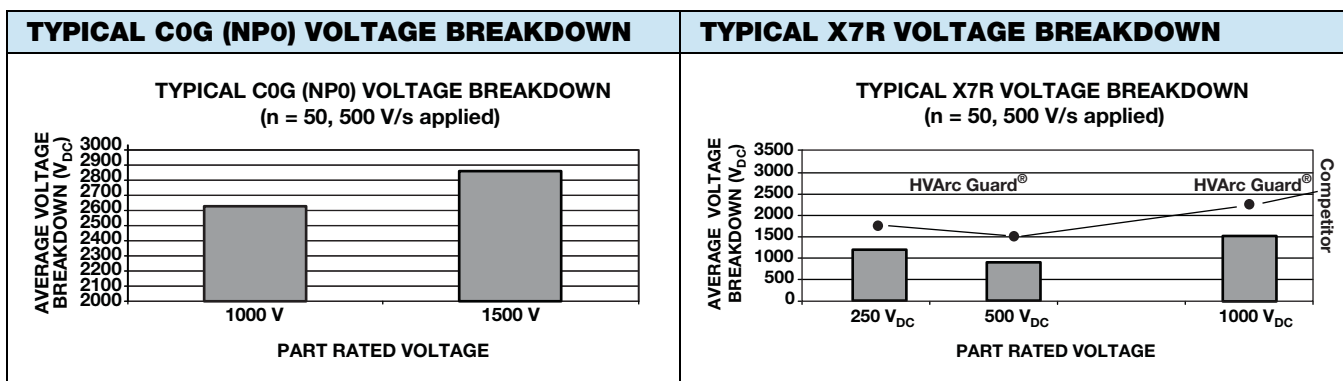


DISSIPATION FACTOR VS. TEMPERATURE



IMPEDANCE VS. FREQUENCY OF 1206 HVArc Guard® CAPACITORS





| STANDARD PACKAGING QUANTITIES (1)(2)(3)(4)(5) |           |                                   |                                 |                                   |                                 |
|-----------------------------------------------|-----------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|
| CASE CODE                                     | TAPE SIZE | 7" REEL QUANTITIES                |                                 | 11 1/4" AND 13" REEL QUANTITIES   |                                 |
|                                               |           | PAPER TAPE PACKAGING CODE "C"/"O" | PLASTIC TAPE PACKAGING CODE "T" | PAPER TAPE PACKAGING CODE "P"/"I" | PLASTIC TAPE PACKAGING CODE "R" |
| 0805                                          | 8 mm      | 3000                              | 3000                            | 10 000                            | 10 000                          |
| 1206 <sup>(6)</sup>                           | 8 mm      | n/a                               | 2500                            | n/a                               | 10 000                          |
| 1210 <sup>(6)</sup>                           | 8 mm      | n/a                               | 2500                            | n/a                               | 10 000                          |
| 1808                                          | 12 mm     | n/a                               | 2000                            | n/a                               | 10 000                          |
| 1812                                          | 12 mm     | n/a                               | 1000                            | n/a                               | 4000                            |
| 2220                                          | 12 mm     | n/a                               | 1000                            | n/a                               | 4000                            |
| 2225                                          | 12 mm     | n/a                               | 1000                            | n/a                               | 4000                            |

**Notes**

- (1) Vishay Vitramon uses embossed plastic carrier tape and punch paper carrier tape
- (2) Paper tape is not available for case sizes > 1206 or for component thickness > 0.035" (0.89 mm)
- (3) 11 1/4" reel is standard for large quantities. 13" is maybe used for large "T" dimension parts
- (4) Reference: EIA standard RS 481 - "Taping of Surface Mount Components for Automatic Placement"
- (5) n/a = not available
- (6) Packaging quantity can vary with product thickness  
Contact [mlcc@vishay.com](mailto:mlcc@vishay.com) with respect to specific part number requirements

| STORAGE AND HANDLING CONDITIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(1) Store the components at 5 °C to + 40 °C ambient temperature and ≤ 70 % related humidity conditions.</p> <p>(2) The product is recommended to be used within a time-frame of 2 years after shipment.<br/>Check solderability in case extended shelf life beyond the expiry date is needed.</p> <p>Precautions:</p> <ol style="list-style-type: none"> <li>a. Do not store products in an environment containing corrosive elements, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. This may cause corrosion or oxidation of the terminations, which can easily lead to poor soldering.</li> <li>b. Store products on the shelf and avoid exposure to moisture or dust.</li> <li>c. Do not expose products to excessive shock, vibration, direct sunlight and so on.</li> </ol> |



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

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

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

## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9