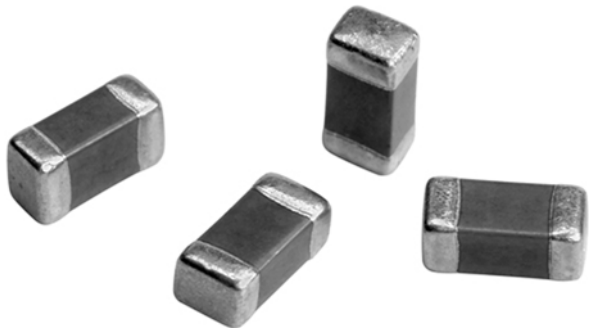
# Surface Mount Multilayer Ceramic Chip Capacitors for Commodity Applications



## FEATURES

- Available from 0402 to 1210 body sizes
- Ultra stable C0G (NP0) dielectric
- High capacitance in X5R, X7R, Y5V
- For high frequency applications
- Ni-barrier with 100 % tin terminations
- Dry sheet technology process
- Noble Metal Electrode system (NME): for certain C0G (NP0) values
- Base Metal Electrode system (BME): for X5R, X7R, Y5V and certain C0G (NP0) values
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

## APPLICATIONS

- Consumer electronics
- Telecommunications
- Data processing
- Mobile applications

## ELECTRICAL SPECIFICATIONS

**Operating Temperature:**

C0G (NP0): -55 °C to +125 °C
X5R: -55 °C to +85 °C
X7R: -55 °C to +125 °C
Y5V: -25 °C to +85 °C

**Capacitance Range:**

C0G (NP0): 0.5 pF to 39 nF
X5R: 47 nF to 100 µF
X7R: 100 pF to 47 µF
Y5V: 10 nF to 100 µF

**Voltage Range:**

C0G (NP0): 10 $V_{DC}$ to 100 $V_{DC}$
X5R: 6.3 $V_{DC}$ to 50 $V_{DC}$
X7R: 10 $V_{DC}$ to 100 $V_{DC}$
Y5V: 6.3 $V_{DC}$ to 100 $V_{DC}$

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

C0G (NP0): 0 ppm/°C ± 30 ppm/°C from -55 °C to +125 °C
X5R: ± 15 % from -55 °C to +85 °C without voltage applied
X7R: ± 15 % from -55 °C to +125 °C without voltage applied
Y5V: + 30 % / - 80 % from -25 °C to +85 °C without voltage applied

**Insulation Resistance (IR) at $U_R$:**

≥ 10 GΩ or R x C ≥ 500 Ω x F whichever is less

**Test Conditions for Capacitance Tolerance:**

preconditioning for X5R, X7R, Y5V MLCC: perform a heat treatment at +150 °C ± 10 °C for 1 h, then leave in ambient condition for 24 h ± 2 h before measurement

**Test Conditions for Capacitance and DF Measurement:**

measured at conditions of 30 % to 70 % related humidity.

C0G (NP0): Apply 1.0 $V_{RMS}$ ± 0.2 $V_{RMS}$, 1.0 MHz ± 10 % for caps ≤ 1000 pF, at +25 °C ambient temperature
Apply 1.0 $V_{RMS}$ ± 0.2 $V_{RMS}$, 1.0 kHz ± 10 % for caps > 1000 pF, at +25 °C ambient temperature

X5R / X7R: Caps ≤ 10 µF apply 1.0 $V_{RMS}$ ± 0.2 $V_{RMS}$, 1.0 kHz ± 10 %, at +25 °C ambient temperature (1)
Caps > 10 µF apply 0.5 $V_{RMS}$ ± 0.2 $V_{RMS}$, 120 Hz ± 20 %, at +25 °C ambient temperature

Y5V: Caps ≤ 10 µF apply 1.0 $V_{RMS}$ ± 0.2 $V_{RMS}$, 1.0 kHz ± 10 %, at +20 °C ambient temperature
Caps > 10 µF apply 0.5 $V_{RMS}$ ± 0.2 $V_{RMS}$, 120 Hz ± 20 %, at +20 °C ambient temperature

**Note**

(1) Test conditions: 0.5 $V_{RMS}$ ± 0.2 $V_{RMS}$, 1 kHz ± 10 %
X7R: 0603: ≥ 2.2 µF / 10 V
0805: 10 µF (6.3 V and 10 V)
X5R: 0402: ≥ 4.7 µF / 6.3 V and ≥ 2.2 µF / 10 V
0603: 10 µF / 6.3 V

**Aging Rate:**

C0G (NP0): 0 % per decade
X5R: 6.3 $V_{DC}$ / 10 $V_{DC}$: 3 % maximum per decade
16 $V_{DC}$ / 25 $V_{DC}$: 2 % maximum per decade
X7R: ≤ 10 $V_{DC}$: 1.5 % maximum per decade
≥ 16 $V_{DC}$: 1 % maximum per decade
Y5V: 6.3 $V_{DC}$: 12.5 % maximum per decade
10 $V_{DC}$ / 16 $V_{DC}$: 9 % maximum per decade
≥ 25 $V_{DC}$: 7 % maximum per decade

**Dielectric Strength Test:**

this is the maximum voltage the capacitors are tested 1 s to 5 s period and the charge / discharge current does not exceed 50 mA.
≤ 100 $V_{DC}$: 250 % of rated voltage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**Dissipation Factor (DF):**

C0G (NP0): Cap. < 30 pF: Q ≥ 400 + 20C
Cap. ≥ 30 pF: Q ≥ 1000

X5R, X7R:

| RATED VOLTAGE | D.F. ≤ | EXCEPTION OF D.F. ≤ | |
|---|---|---|---|
| ≥ 50 V | 2.5 % | 3 % | 0603 ≥ 0.047 µF; 0805 ≥ 0.18 µF; 1206 ≥ 0.47 µF |
| | | 5 % | 1210 ≥ 4.7 µF |
| | | 10 % | 0603 ≥ 1 µF; 0805 ≥ 1 µF; 1206 ≥ 2.2 µF; 1210 ≥ 10 µF |
| 25 V | 3.5 % | 5 % | 0805 ≥ 1 µF; 1210 ≥ 10 µF |
| | | 7 % | 0603 ≥ 0.33 µF; 1206 ≥ 4.7 µF |
| | | 10 % | 0402 ≥ 0.10 µF; 0603 ≥ 0.47 µF; 0805 ≥ 2.2 µF; 1206 ≥ 6.8 µF; 1210 ≥ 22 µF |
| 16 V | 3.5 % | 5 % | 0402 ≥ 0.033 µF; 0603 ≥ 0.15 µF; 0805 ≥ 0.68 µF; 1206 ≥ 2.2 µF; 1210 ≥ 4.7 µF |
| | | 10 % | 0402 ≥ 0.22 µF; 0603 ≥ 0.68 µF; 0805 ≥ 2.2 µF; 1206 ≥ 4.7 µF; 1210 ≥ 22 µF |
| 10 V | 5 % | 10 % | 0402 ≥ 0.33 µF; 0603 ≥ 0.33 µF; 0805 ≥ 2.2 µF; 1206 ≥ 2.2 µF; 1210 ≥ 22 µF |
| | | 15 % | 0402 ≥ 1 µF |
| 6.3 V | 10 % | 15 % | 0402 ≥ 1 µF; 0603 ≥ 10 µF; 0805 ≥ 4.7 µF; 1206 ≥ 47 µF; 1210 ≥ 100 µF |
| | | 20 % | 0402 ≥ 2.2 µF |

Y5V:

| RATED VOLTAGE | D.F. ≤ | EXCEPTION OF D.F. ≤ | |
|---|---|---|---|
| ≥ 50 V | 5 % | 7 % | 0603 ≥ 0.1 µF; 0805 ≥ 0.47 µF; 1206 ≥ 4.7 µF |
| 35 V | 7 % | - | - |
| 25 V | 5 % | 7 % | 0402 ≥ 0.047 µF; 0603 ≥ 0.1 µF; 0805 ≥ 0.33 µF; 1206 ≥ 1 µF; 1210 ≥ 4.7 µF |
| | | 9 % | 0402 ≥ 0.068 µF; 0603 ≥ 0.47 µF; 1206 ≥ 4.7 µF; 1210 ≥ 22 µF |
| 16 V C < 1.0 µF | 7 % | 9 % | 0402 ≥ 0.068 µF; 0603 ≥ 0.68 µF |
| | | 12.5 % | 0402 ≥ 0.22 µF |
| 16 V C ≥ 1.0 µF | 9 % | 12.5 % | 0603 ≥ 2.2 µF; 0805 ≥ 3.3 µF; 1206 ≥ 10 µF; 1210 ≥ 22 µF |
| 10 V | 12.5 % | 20 % | 0402 ≥ 0.47 µF |
| 6.3 V | 20 % | - | - |

## QUICK REFERENCE DATA

| DIELECTRIC | CASE | MAXIMUM VOLTAGE (V) | CAPACITANCE | |
|---|---|---|---|---|
| | | | MINIMUM | MAXIMUM |
| C0G (NP0) | 0402 | 100 | 0.5 pF | 1.0 nF |
| | 0603 | 100 | 0.5 pF | 3.3 nF |
| | 0805 | 100 | 0.5 pF | 12 nF |
| | 1206 | 100 | 1.5 pF | 39 nF |
| X5R | 0402 | 25 | 47 nF | 10 µF |
| | 0603 | 25 | 220 nF | 22 µF |
| | 0805 | 25 | 1.5 µF | 47 µF |
| | 1206 | 25 | 1.5 µF | 100 µF |
| | 1210 | 16 | 1.5 µF | 100 µF |
| X7R | 0402 | 50 | 100 pF | 220 nF |
| | 0603 | 100 | 100 pF | 2.2 µF |
| | 0805 | 100 | 100 pF | 10 µF |
| | 1206 | 100 | 150 pF | 22 µF |
| | 1210 | 100 | 1.0 nF | 47 µF |
| Y5V | 0402 | 50 | 10 nF | 1.0 µF |
| | 0603 | 50 | 10 nF | 4.7 µF |
| | 0805 | 100 | 10 nF | 10 µF |
| | 1206 | 100 | 10 nF | 22 µF |
| | 1210 | 100 | 10 nF | 100 µF |

**Note**

- Detail ratings see “Selection Chart”


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## ORDERING INFORMATION

| VJ0402 | Y | 101 | J | X | Q | C | W1BC |
|---|---|---|---|---|---|---|---|
| SIZE CODE | DIELECTRIC | CAPACITANCE | TOLERANCE | TERMINATION | VOLTAGE (1) | PACKAGING | PROCESS CODE FOR BASIC COMMODITY |
| 0402<br>0603<br>0805<br>1206<br>1210 | A = C0G (NP0)<br>G = X5R<br>Y = X7R<br>V = Y5V | Two significant digits followed by the number of zeros:<br>1R0 = 1.0 pF<br>101 = 100 pF<br>102 = 1000 pF<br>152 = 1500 pF<br>103 = 10 000 pF<br>104 = 100 000 pF | **C0G (NP0)**<br>Cap. < 10 pF:<br>B = ± 0.10 pF<br>C = ± 0.25 pF<br>D = ± 0.50 pF<br><br>Cap. ≥ 10 pF:<br>F = ± 1 %<br>G = ± 2 %<br>J = ± 5 %<br>K = ± 10 %<br><br>**X5R / X7R**<br>J = ± 5 % (2)(3)<br>K = ± 10 %<br>M = ± 20 %<br><br>**Y5V**<br>M = ± 20 %<br>Z = - 20 % / + 80 % | X = Ni barrier 100 % matte tin | S = 4 V<br>Y = 6.3 V<br>Q = 10 V<br>J = 16 V<br>X = 25 V<br>Z = 35 V<br>A = 50 V<br>B = 100 V | C = 7" reel / paper tape<br>P = 13" reel / paper tape<br>T = 7" reel / plastic tape<br>R = 13" reel / plastic tape | |

**Notes**

- Detail rating see “Selection Chart”

(1) DC voltage rating should not be exceeded in application. Other application factors may affect the MLCC performance. Consult for questions: mlcc@vishay.com

(2) Not all values, see selection chart X7R size 0603, 0805 and 1206

(3) No 5 % tolerance for X5R



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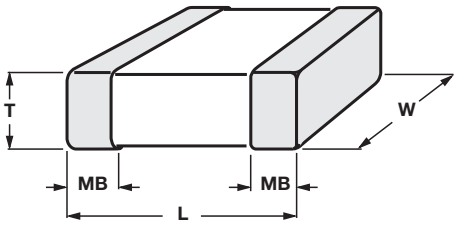
## DIMENSIONS in inches (millimeters)




| SIZE CODE | THICKNESS SYMBOL | SOLDERING METHOD (1) | L | W | T | MB |
|---|---|---|---|---|---|---|
| 0402 (1005) | N | R | 0.040 ± 0.002 (1.00 ± 0.05) | 0.020 ± 0.002 (0.50 ± 0.05) | 0.020 ± 0.002 (0.50 ± 0.05) | 0.010 + 0.002 / - 0.004 (0.25 + 0.05 / - 0.10) |
| | E | R | 0.040 ± 0.008 (1.00 ± 0.20) | 0.020 ± 0.008 (0.50 ± 0.20) | 0.020 ± 0.008 (0.50 ± 0.20) | |
| 0603 (1608) | S | R / W | 0.063 ± 0.004 (1.60 ± 0.10) | 0.030 ± 0.004 (0.80 ± 0.10) | 0.030 ± 0.0028 (0.80 ± 0.07) | 0.016 ± 0.006 (0.40 ± 0.15) |
| | X | R / W | 0.063 + 0.006 / - 0.004 (1.60 + 0.15 / - 0.10) | 0.030 + 0.006 / - 0.004 (0.80 + 0.15 / - 0.10) | 0.030 + 0.006 / - 0.004 (0.80 + 0.15 / - 0.10) | |
| | X' | R / W | 0.063 ± 0.008 (1.60 ± 0.20) | 0.030 ± 0.008 (0.80 ± 0.20) | 0.030 ± 0.008 (0.80 ± 0.20) | |
| 0805 (2012) | A | R / W | 0.080 ± 0.006 (2.00 ± 0.15) | 0.050 ± 0.004 (1.25 ± 0.10) | 0.024 ± 0.004 (0.60 ± 0.10) | 0.020 ± 0.008 (0.50 ± 0.20) |
| | B | R / W | | | 0.030 ± 0.004 (0.80 ± 0.10) | |
| | D | R | | | 0.049 ± 0.004 (1.25 ± 0.10) | |
| | I | R | 0.080 ± 0.008 (2.00 ± 0.20) | 0.050 ± 0.008 (1.25 ± 0.20) | 0.049 ± 0.008 (1.25 ± 0.20) | |
| 1206 (3216) | B | R / W | 0.126 ± 0.006 (3.20 ± 0.15) | 0.063 ± 0.006 (1.60 ± 0.15) | 0.030 ± 0.004 (0.80 ± 0.10) | 0.024 ± 0.008 (0.60 ± 0.20) |
| | C | R | | | 0.037 ± 0.004 (0.95 ± 0.10) | |
| | D | R | | | 0.049 ± 0.004 (1.25 ± 0.10) | |
| | J | R | 0.126 ± 0.008 (3.20 ± 0.20) | | 0.045 ± 0.006 (1.15 ± 0.15) | |
| | G | R | | 0.063 ± 0.008 (1.60 ± 0.20) | 0.063 ± 0.008 (1.60 ± 0.20) | |
| | P | R | 0.126 + 0.012 / - 0.004 (3.20 + 0.30 / - 0.10) | 0.063 + 0.012 / - 0.004 (1.60 + 0.30 / - 0.10) | 0.063 + 0.012 / - 0.004 (1.60 + 0.30 / - 0.10) | |
| 1210 (3225) | C | R | 0.126 ± 0.012 (3.20 ± 0.30) | 0.098 ± 0.008 (2.50 ± 0.20) | 0.037 ± 0.004 (0.95 ± 0.10) | 0.060 ± 0.010 (0.75 ± 0.25) |
| | D | R | | | 0.049 ± 0.004 (1.25 ± 0.10) | |
| | G | R | 0.126 ± 0.016 (3.20 ± 0.40) | 0.098 ± 0.012 (2.50 ± 0.30) | 0.063 ± 0.008 (1.60 ± 0.20) | |
| | K | R | | | 0.078 ± 0.008 (2.00 ± 0.20) | |
| | M | R | | | 0.098 ± 0.012 (2.50 ± 0.30) | |

**Note**

(1) "R" = Reflow soldering process; "W" = Wave soldering process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## SELECTION CHART

| DIELECTRIC | | C0G (NP0) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STYLE | | VJ0402 | | | | | VJ0603 | | | | | VJ0805 | | | | | VJ1206 | | | | |
| SIZE CODE | | 0402 | | | | | 0603 | | | | | 0805 | | | | | 1206 | | | | |
| VOLTAGE ($V_{DC}$) | | 10 | 16 | 25 | 50 | 100 | 10 | 16 | 25 | 50 | 100 | 10 | 16 | 25 | 50 | 100 | 10 | 16 | 25 | 50 | 100 |
| VOLTAGE CODE | | Q | J | X | A | B | Q | J | X | A | B | Q | J | X | A | B | Q | J | X | A | B |
| CAP. CODE | CAP. | | | | | | | | | | | | | | | | | | | | |
| 0R5 | 0.5 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | | | | | |
| 1R0 | 1.0 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | | | | | |
| 1R2 | 1.2 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | | | | | |
| 1R5 | 1.5 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 1R8 | 1.8 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 2R2 | 2.2 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 2R7 | 2.7 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 3R3 | 3.3 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 3R9 | 3.9 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 4R7 | 4.7 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 5R6 | 5.6 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 6R8 | 6.8 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 8R2 | 8.2 pF | N (1) | N (1) | N (1) | N (1) | N (1) | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 100 | 10 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 120 | 12 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 150 | 15 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 180 | 18 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 220 | 22 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 270 | 27 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 330 | 33 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 390 | 39 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 470 | 47 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 560 | 56 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 680 | 68 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 820 | 82 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 101 | 100 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 121 | 120 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 151 | 150 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 181 | 180 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 221 | 220 pF | N | N | N | N | N | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 271 | 270 pF | N | N | N | N | | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 331 | 330 pF | N | N | N | N | | S | S | S | S | S | A | A | A | A | A | B | B | B | B | B |
| 391 | 390 pF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B | B | B | B | B | B |
| 471 | 470 pF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B | B | B | B | B | B |
| 561 | 560 pF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B | B | B | B | B | B |
| 681 | 680 pF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B | B | B | B | B | B |
| 821 | 820 pF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B | B | B | B | B | B |

**Notes**

- Letters indicate product thickness, see packaging quantities

(1) Indicate product with Ag/Ni/Sn termination



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## SELECTION CHART

| DIELECTRIC | | C0G (NP0) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STYLE | | VJ0402 | | | | | VJ0603 | | | | | VJ0805 | | | | | VJ1206 | | | | |
| SIZE CODE | | 0402 | | | | | 0603 | | | | | 0805 | | | | | 1206 | | | | |
| VOLTAGE ($V_{DC}$) | | 10 | 16 | 25 | 50 | 100 | 10 | 16 | 25 | 50 | 100 | 10 | 16 | 25 | 50 | 100 | 10 | 16 | 25 | 50 | 100 |
| VOLTAGE CODE | | Q | J | X | A | B | Q | J | X | A | B | Q | J | X | A | B | Q | J | X | A | B |
| CAP. CODE | CAP. | | | | | | | | | | | | | | | | | | | | |
| 102 | 1.0 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B | B | B | B | B | B |
| 122 | 1.2 nF | | | | | | X | X | X | X | | B | B | B | B | B | B | B | B | B | B |
| 152 | 1.5 nF | | | | | | X | X | X | X | | B | B | B | B | B | B | B | B | B | B |
| 182 | 1.8 nF | | | | | | X | X | X | X | | B | B | B | B | B | B | B | B | B | B |
| 222 | 2.2 nF | | | | | | X | X | X | X | | B | B | B | B | B | B | B | B | B | B |
| 272 | 2.7 nF | | | | | | X | X | X | X | | D | D | D | D | D | B | B | B | B | B |
| 332 | 3.3 nF | | | | | | X | X | X | X | | D | D | D | D | D | B | B | B | B | B |
| 392 | 3.9 nF | | | | | | | | | | | D | D | D | D | D | B | B | B | B | B |
| 472 | 4.7 nF | | | | | | | | | | | D | D | D | D | D | B | B | B | B | B |
| 562 | 5.6 nF | | | | | | | | | | | D | D | D | D | | B | B | B | B | B |
| 682 | 6.8 nF | | | | | | | | | | | D | D | D | D | | C | C | C | C | C |
| 822 | 8.2 nF | | | | | | | | | | | D | D | D | D | | D | D | D | D | D |
| 103 | 10 nF | | | | | | | | | | | D | D | D | D | | D | D | D | D | D |
| 123 | 12 nF | | | | | | | | | | | D (1) | D (1) | | | | D (1) | D (1) | | | |
| 153 | 15 nF | | | | | | | | | | | | | | | | D (1) | D (1) | | | |
| 183 | 18 nF | | | | | | | | | | | | | | | | D (1) | D (1) | | | |
| 223 | 22 nF | | | | | | | | | | | | | | | | D (1) | D (1) | | | |
| 273 | 27 nF | | | | | | | | | | | | | | | | D (1) | D (1) | | | |
| 333 | 33 nF | | | | | | | | | | | | | | | | D (1) | D (1) | | | |
| 393 | 39 nF | | | | | | | | | | | | | | | | G (1) | G (1) | | | |
| 473 | 47 nF | | | | | | | | | | | | | | | | | | | | |
| 563 | 56 nF | | | | | | | | | | | | | | | | | | | | |
| 683 | 68 nF | | | | | | | | | | | | | | | | | | | | |
| 823 | 82 nF | | | | | | | | | | | | | | | | | | | | |
| 104 | 100 nF | | | | | | | | | | | | | | | | | | | | |

**Notes**

- Letters indicate product thickness, see packaging quantities

(1) Indicate product with Ag/Ni/Sn termination



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## SELECTION CHART

| DIELECTRIC | | X5R | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STYLE | | VJ0402 | | | | | VJ0603 | | | | | VJ0805 | | | | |
| SIZE CODE | | 0402 | | | | | 0603 | | | | | 0805 | | | | |
| VOLTAGE ($V_{DC}$) | | 6.3 V | 10 V | 16 V | 25 V | 50 V | 6.3 V | 10 V | 16 V | 25 V | 50 V | 6.3 V | 10 V | 16 V | 25 V | 50 V |
| VOLTAGE CODE | | Y | Q | J | X | A | Y | Q | J | X | A | Y | Q | J | X | A |
| CAP. CODE | CAP. | | | | | | | | | | | | | | | |
| 473 | 47 nF | | | N | | | | | | | | | | | | |
| 563 | 56 nF | | N | | | | | | | | | | | | | |
| 683 | 68 nF | | N | N | | | | | | | | | | | | |
| 823 | 82 nF | N | N | N | | | | | | | | | | | | |
| 104 | 100 nF | N | N | N | N | | | | | | | | | | | |
| 124 | 120 nF | | | | | | | | | | | | | | | |
| 154 | 150 nF | | N | | N | | | | | | | | | | | |
| 184 | 180 nF | | | | | | | | | | | | | | | |
| 224 | 220 nF | N | N | N | N | | | | X | X | | | | | | |
| 274 | 270 nF | | | | | | | X | X | | | | | | | |
| 334 | 330 nF | N | N | | | | | X | X | X | | | | | | |
| 394 | 390 nF | | | | | | | X | X | | | | | | | |
| 474 | 470 nF | N | N | | | | | X | X | X | | | | | | |
| 564 | 560 nF | | | | | | | | | | | | | | | |
| 684 | 680 nF | N | N | | | | | X | X | X | | | | | | |
| 824 | 820 nF | | | | | | X | X | X | | | | | | | |
| 105 | 1.0 µF | N | N | N | | | X | X | X | X | X | | | | | |
| 155 | 1.5 µF | | | | | | X | | | | | I | I | I | | |
| 225 | 2.2 µF | N | N | | | | X | X | X | X | | I | I | I | I | |
| 335 | 3.3 µF | | | | | | | | | | | I | I | I | I | |
| 475 | 4.7 µF | E | | | | | X | X | X | | | I | I | I | I | |
| 106 | 10 µF | E | | | | | X' | X | | | | I | I | I | I | |
| 226 | 22 µF | | | | | | X' (1) | | | | | I (1) | I (1) | | | |
| 476 | 47 µF | | | | | | | | | | | I (1) | | | | |
| 686 | 68 µF | | | | | | | | | | | | | | | |
| 107 | 100 µF | | | | | | | | | | | | | | | |

**Notes**

- Letters indicate product thickness, see packaging quantities

(1) Not in 10 % (code “K”) tolerance

## SELECTION CHART

| DIELECTRIC | | X5R | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| STYLE | | VJ1206 | | | | | VJ1210 | | | | |
| SIZE CODE | | 1206 | | | | | 1210 | | | | |
| VOLTAGE ($V_{DC}$) | | 6.3 V | 10 V | 16 V | 25 V | 50 V | 6.3 V | 10 V | 16 V | 25 V | 50 V |
| VOLTAGE CODE | | Y | Q | J | X | A | Y | Q | J | X | A |
| CAP. CODE | CAP. | | | | | | | | | | |
| 105 | 1.0 µF | | | | | | | | | | |
| 155 | 1.5 µF | | J | J | | | | K | K | | |
| 225 | 2.2 µF | | J | J | P | | | K | K | | |
| 335 | 3.3 µF | | P | P | P | | | | | | |
| 475 | 4.7 µF | P | P | P | P | P (1) | | K | K | K | |
| 685 | 6.8 µF | P | P | | | | | | | | |
| 106 | 10 µF | P | P | P | P | | | K | K | K | M |
| 226 | 22 µF | P | P | P | | | M | M | M | M | |
| 476 | 47 µF | P (1) | P (1) | | | | M | M | M | | |
| 107 | 100 µF | P (1) | | | | | M (1) | M (1) | | | |

**Notes**

- Letters indicate product thickness, see packaging quantities

(1) Not in 10 % (code “K”) tolerance



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## SELECTION CHART

| DIELECTRIC | | X7R | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STYLE | | VJ0402 | | | | | VJ0603 | | | | | VJ0805 | | | | |
| SIZE CODE | | 0402 | | | | | 0603 | | | | | 0805 | | | | |
| VOLTAGE ($V_{DC}$) | | 10 V | 16 V | 25 V | 50 V | 100 V | 10 V | 16 V | 25 V | 50 V | 100 V | 10 V | 16 V | 25 V | 50 V | 100 V |
| VOLTAGE CODE | | Q | J | X | A | B | Q | J | X | A | B | Q | J | X | A | B |
| CAP. CODE | CAP. | | | | | | | | | | | | | | | |
| 101 | 100 pF | N | N | N | N | | S (1) | S (1) | S (1) | S (1) | S (1) | B (1) | B (1) | B (1) | B (1) | B (1) |
| 121 | 120 pF | N | N | N | N | | S (1) | S (1) | S (1) | S (1) | S (1) | B (1) | B (1) | B (1) | B (1) | B (1) |
| 151 | 150 pF | N | N | N | N | | S (1) | S (1) | S (1) | S (1) | S (1) | B (1) | B (1) | B (1) | B (1) | B (1) |
| 181 | 180 pF | N | N | N | N | | S (1) | S (1) | S (1) | S (1) | S (1) | B (1) | B (1) | B (1) | B (1) | B (1) |
| 221 | 220 pF | N | N | N | N | | S (1) | S (1) | S (1) | S (1) | S (1) | B (1) | B (1) | B (1) | B (1) | B (1) |
| 271 | 270 pF | N | N | N | N | | S (1) | S (1) | S (1) | S (1) | S (1) | B (1) | B (1) | B (1) | B (1) | B (1) |
| 331 | 330 pF | N | N | N | N | | S (1) | S (1) | S (1) | S (1) | S (1) | B (1) | B (1) | B (1) | B (1) | B (1) |
| 391 | 390 pF | N | N | N | N | | S (1) | S (1) | S (1) | S (1) | S (1) | B (1) | B (1) | B (1) | B (1) | B (1) |
| 471 | 470 pF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 561 | 560 pF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 681 | 680 pF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 821 | 820 pF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 102 | 1.0 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 122 | 1.2 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 152 | 1.5 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 182 | 1.8 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 222 | 2.2 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 272 | 2.7 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 332 | 3.3 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 392 | 3.9 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 472 | 4.7 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 562 | 5.6 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 682 | 6.8 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 822 | 8.2 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 103 | 10 nF | N | N | N | N | | S | S | S | S | S | B | B | B | B | B |
| 123 | 12 nF | N | N | N | | | S | S | S | S | | B | B | B | B | B |
| 153 | 15 nF | N | N | N | | | S | S | S | S | | B | B | B | B | B |
| 183 | 18 nF | N | N | N | | | S | S | S | S | | B | B | B | B | B |
| 223 | 22 nF | N | N | N | | | S | S | S | S | | B | B | B | B | B |
| 273 | 27 nF | N | N | N | | | S | S | S | S | | B | B | B | B | D |
| 333 | 33 nF | N | N | N | | | S | S | S | X | | B | B | B | B | D |
| 393 | 39 nF | N | N | N | | | S | S | S | X | | B | B | B | B | D |
| 473 | 47 nF | N | N | N | | | S | S | S | X | | B | B | B | B | D |
| 563 | 56 nF | N | N | | | | S | S | S | X | | B | B | B | B | D |
| 683 | 68 nF | N | N | | | | S | S | S | X | | B | B | B | B | D |
| 823 | 82 nF | N | N | | | | S | S | S | X | | B | B | B | B | D |
| 104 | 100 nF | N | N | N | | | S | S | S | X | | B | B | B | B / D | D |
| 124 | 120 nF | | | | | | S | S | X | | | B | B | B | D | |
| 154 | 150 nF | | | | | | S | S | X | | | D | D | D | D | |
| 184 | 180 nF | | | | | | S | S | X | | | D | D | D | D | |
| 224 | 220 nF | N (2) | N | | | | S | S | X | | | D | D | D | D | |
| 274 | 270 nF | | | | | | X | X | X | | | D | D | D | | |
| 334 | 330 nF | | | | | | X | X | X | | | D | D | D | I | |
| 394 | 390 nF | | | | | | X | X | X | | | D | D | D | | |
| 474 | 470 nF | | | | | | X | X | X | | | D | D | D | I | |
| 564 | 560 nF | | | | | | X | X | | | | D | D | D | | |
| 684 | 680 nF | | | | | | X | X | | | | D | D | D | | |
| 824 | 820 nF | | | | | | X | X | | | | D | D | D | | |
| 105 | 1.0 µF | | | | | | X | X | X (1) | | | D | D | D | I (1) | |
| 155 | 1.5 µF | | | | | | | | | | | I | I (1) | I (1) | | |
| 225 | 2.2 µF | | | | | | X (1) | | | | | I | I | I | | |
| 335 | 3.3 µF | | | | | | | | | | | | | | | |
| 475 | 4.7 µF | | | | | | | | | | | I (1) | I (1) | | | |
| 685 | 6.8 µF | | | | | | | | | | | | | | | |
| 106 | 10 µF | | | | | | | | | | | I (1) | | | | |
| 156 | 15 µF | | | | | | | | | | | | | | | |
| 226 | 22 µF | | | | | | | | | | | | | | | |
| 336 | 33 µF | | | | | | | | | | | | | | | |
| 476 | 47 µF | | | | | | | | | | | | | | | |
| 686 | 68 µF | | | | | | | | | | | | | | | |

**Notes**

- Letters indicate product thickness, see packaging quantities

(1) Not in 5 % (code “J”) tolerance

(2) Only in 10 % (code “K”) tolerance



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## SELECTION CHART

| DIELECTRIC | | X7R | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| STYLE | | VJ1206 | | | | | VJ1210 | | | | |
| SIZE CODE | | 1206 | | | | | 1210 | | | | |
| VOLTAGE ($V_{DC}$) | | 10 V | 16 V | 25 V | 50 V | 100 V | 10 V | 16 V | 25 V | 50 V | 100 V |
| VOLTAGE CODE | | Q | J | X | A | B | Q | J | X | A | B |
| CAP. CODE | CAP. | | | | | | | | | | |
| 101 | 100 pF | | | | | | | | | | |
| 121 | 120 pF | | | | | | | | | | |
| 151 | 150 pF | B (1) | B (1) | B (1) | B (1) | B (1) | | | | | |
| 181 | 180 pF | B (1) | B (1) | B (1) | B (1) | B (1) | | | | | |
| 221 | 220 pF | B (1) | B (1) | B (1) | B (1) | B (1) | | | | | |
| 271 | 270 pF | B (1) | B (1) | B (1) | B (1) | B (1) | | | | | |
| 331 | 330 pF | B (1) | B (1) | B (1) | B (1) | B (1) | | | | | |
| 391 | 390 pF | B (1) | B (1) | B (1) | B (1) | B (1) | | | | | |
| 471 | 470 pF | B | B | B | B | B | | | | | |
| 561 | 560 pF | B | B | B | B | B | | | | | |
| 681 | 680 pF | B | B | B | B | B | | | | | |
| 821 | 820 pF | B | B | B | B | B | | | | | |
| 102 | 1.0 nF | B | B | B | B | B | C | C | C | C | C |
| 122 | 1.2 nF | B | B | B | B | B | C | C | C | C | C |
| 152 | 1.5 nF | B | B | B | B | B | C | C | C | C | C |
| 182 | 1.8 nF | B | B | B | B | B | C | C | C | C | C |
| 222 | 2.2 nF | B | B | B | B | B | C | C | C | C | C |
| 272 | 2.7 nF | B | B | B | B | B | C | C | C | C | C |
| 332 | 3.3 nF | B | B | B | B | B | C | C | C | C | C |
| 392 | 3.9 nF | B | B | B | B | B | C | C | C | C | C |
| 472 | 4.7 nF | B | B | B | B | B | C | C | C | C | C |
| 562 | 5.6 nF | B | B | B | B | B | C | C | C | C | C |
| 682 | 6.8 nF | B | B | B | B | B | C | C | C | C | C |
| 822 | 8.2 nF | B | B | B | B | B | C | C | C | C | C |
| 103 | 10 nF | B | B | B | B | B | C | C | C | C | C |
| 123 | 12 nF | B | B | B | B | B | C | C | C | C | C |
| 153 | 15 nF | B | B | B | B | B | C | C | C | C | C |
| 183 | 18 nF | B | B | B | B | B | C | C | C | C | C |
| 223 | 22 nF | B | B | B | B | B | C | C | C | C | C |
| 273 | 27 nF | B | B | B | B | B | C | C | C | C | C |
| 333 | 33 nF | B | B | B | B | B | C | C | C | C | C |
| 393 | 39 nF | B | B | B | B | B | C | C | C | C | C |
| 473 | 47 nF | B | B | B | B | B | C | C | C | C | C |
| 563 | 56 nF | B | B | B | B | B | C | C | C | C | C |
| 683 | 68 nF | B | B | B | B | B | C | C | C | C | C |
| 823 | 82 nF | B | B | B | B | D | C | C | C | C | C |
| 104 | 100 nF | B | B | B | B | D | C | C | C | C | C |
| 124 | 120 nF | B | B | B | B | D | C | C | C | C | C |
| 154 | 150 nF | C | C | C | C | G | C | C | C | C | D |
| 184 | 180 nF | C | C | C | C | G | C | C | C | C | D |
| 224 | 220 nF | C | C | C | C | G | C | C | C | C | D |
| 274 | 270 nF | C | C | C | D | G | C | C | C | C | G |
| 334 | 330 nF | C | C | C | D | G | C | C | C | D | G |
| 394 | 390 nF | C | C | J | P | G | C | C | C | D | M |
| 474 | 470 nF | J | J | J | P | G | C | C | C | D | M |
| 564 | 560 nF | J | J | J | P | P | D | D | D | D | M |
| 684 | 680 nF | J | J | J | P | P | D | D | D | D | K |
| 824 | 820 nF | J | J | J | P | P | D | D | D | D | K |
| 105 | 1.0 µF | J | J | J | P | P | D | D | D | D | K |
| 155 | 1.5 µF | J | J | P | | | | | | | M |
| 225 | 2.2 µF | J | J | P | P (1) | | | K | G | | M |
| 335 | 3.3 µF | P | P | P | | | | | G (1) | | |
| 475 | 4.7 µF | P | P | P | P (1) | | K | K | K (1) | M (1) | |
| 685 | 6.8 µF | | | | | | | | | | |
| 106 | 10 µF | P | P (1) | P (1) | | | K | K | K (1) | M (1) | |
| 156 | 15 µF | | | | | | | | | | |
| 226 | 22 µF | P (1) | | | | | | M (2) | M (2) | | |
| 336 | 33 µF | | | | | | | | | | |
| 476 | 47 µF | | | | | | M (1) | | | | |
| 686 | 68 µF | | | | | | | | | | |
| 107 | 100 µF | | | | | | | | | | |

**Notes**

- Letters indicate product thickness, see packaging quantities

(1) Not in 5 % (code “J”) tolerance

(2) Only in 20 % (code “M”) tolerance



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## SELECTION CHART

| DIELECTRIC | | Y5V | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STYLE | | VJ0402 | | | | | | VJ0603 | | | | | VJ0805 | | | | |
| SIZE CODE | | 0402 | | | | | | 0603 | | | | | 0805 | | | | |
| VOLTAGE ($V_{DC}$) | | 6.3 V | 10 V | 16 V | 25 V | 50 V | 100 V | 10 V | 16 V | 25 V | 50 V | 100 V | 10 V | 16 V | 25 V | 50 V | 100 V |
| VOLTAGE CODE | | Y | Q | J | X | A | B | Q | J | X | A | B | Q | J | X | A | B |
| CAP. CODE | CAP. | | | | | | | | | | | | | | | | |
| 102 | 1.0 nF | | | | | | | | | | | | | | | | |
| 122 | 1.2 nF | | | | | | | | | | | | | | | | |
| 152 | 1.5 nF | | | | | | | | | | | | | | | | |
| 182 | 1.8 nF | | | | | | | | | | | | | | | | |
| 222 | 2.2 nF | | | | | | | | | | | | | | | | |
| 272 | 2.7 nF | | | | | | | | | | | | | | | | |
| 332 | 3.3 nF | | | | | | | | | | | | | | | | |
| 392 | 3.9 nF | | | | | | | | | | | | | | | | |
| 472 | 4.7 nF | | | | | | | | | | | | | | | | |
| 562 | 5.6 nF | | | | | | | | | | | | | | | | |
| 682 | 6.8 nF | | | | | | | | | | | | | | | | |
| 822 | 8.2 nF | | | | | | | | | | | | | | | | |
| 103 | 10 nF | | N | N | N | N | | S | S | S | S | | A | A | A | A | B |
| 123 | 12 nF | | N | N | N | N | | S | S | S | S | | A | A | A | A | |
| 153 | 15 nF | | N | N | N | N | | S | S | S | S | | A | A | A | A | B |
| 183 | 18 nF | | N | N | N | N | | S | S | S | S | | A | A | A | A | |
| 223 | 22 nF | | N | N | N | N | | S | S | S | S | | A | A | A | A | B |
| 273 | 27 nF | | N | N | N | N | | S | S | S | S | | A | A | A | A | |
| 333 | 33 nF | | N | N | N | N | | S | S | S | S | | A | A | A | A | B |
| 393 | 39 nF | | N | N | N | | | S | S | S | S | | A | A | A | A | |
| 473 | 47 nF | | N | N | N | | | S | S | S | S | | A | A | A | A | B |
| 563 | 56 nF | | N | N | N [(1)] | | | S | S | S | S | | A | A | A | A | |
| 683 | 68 nF | | N | N | N | | | S | S | S | S | | A | A | A | A | B |
| 823 | 82 nF | | N | N | | | | S | S | S | S | | A | A | A | A | |
| 104 | 100 nF | | N | N | N | | | S | S | S | S | | A | A | A | A | B |
| 154 | 150 nF | | N | | | | | S | S | S | S | | A | A | A | A | |
| 224 | 220 nF | N | N | | | | | S | S | S | S | | A | A | A | A | |
| 334 | 330 nF | N | N | | | | | S | S | S | | | B | B | B | B | |
| 474 | 470 nF | N | N | | | | | S | S | X | S | | B | B | B | B | |
| 684 | 680 nF | N | | | | | | S | X | | | | B | B | D | D | |
| 105 | 1.0 µF | N | N | | | | | S | X | X | | | B | B | D | D | |
| 155 | 1.5 µF | | | | | | | S | | | | | D | D | | | |
| 225 | 2.2 µF | | | | | | | S | X | | | | D | D | I | | |
| 335 | 3.3 µF | | | | | | | | | | | | D | D | | | |
| 475 | 4.7 µF | | | | | | | X | | | | | D | D | I | | |
| 685 | 6.8 µF | | | | | | | | | | | | I | | | | |
| 106 | 10 µF | | | | | | | | | | | | I | I | | | |
| 226 | 22 µF | | | | | | | | | | | | | | | | |
| 336 | 33 µF | | | | | | | | | | | | | | | | |
| 476 | 47 µF | | | | | | | | | | | | | | | | |
| 686 | 68 µF | | | | | | | | | | | | | | | | |
| 107 | 100 µF | | | | | | | | | | | | | | | | |

**Notes**

- Letters indicate product thickness, please see packaging quantities

(1) Not in 20 % (code “M”) tolerance



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| SELECTION CHART | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DIELECTRIC | | Y5V | | | | | | | | | | | | |
| STYLE | | VJ1206 | | | | | | VJ1210 | | | | | | |
| SIZE CODE | | 1206 | | | | | | 1210 | | | | | | |
| VOLTAGE ($V_{DC}$) | | 10 V | 16 V | 25 V | 35 V | 50 V | 100 V | 6.3 V | 10 V | 16 V | 25 V | 35 V | 50 V | 100 V |
| VOLTAGE CODE | | Q | J | X | Z | A | B | Y | Q | J | X | Z | A | B |
| CAP. CODE | CAP. | | | | | | | | | | | | | |
| 102 | 1.0 nF | | | | | | | | | | | | | |
| 122 | 1.2 nF | | | | | | | | | | | | | |
| 152 | 1.5 nF | | | | | | | | | | | | | |
| 182 | 1.8 nF | | | | | | | | | | | | | |
| 222 | 2.2 nF | | | | | | | | | | | | | |
| 272 | 2.7 nF | | | | | | | | | | | | | |
| 332 | 3.3 nF | | | | | | | | | | | | | |
| 392 | 3.9 nF | | | | | | | | | | | | | |
| 472 | 4.7 nF | | | | | | | | | | | | | |
| 562 | 5.6 nF | | | | | | | | | | | | | |
| 682 | 6.8 nF | | | | | | | | | | | | | |
| 822 | 8.2 nF | | | | | | | | | | | | | |
| 103 | 10 nF | B | B | B | | B | B | | | | | | | C |
| 123 | 12 nF | B | B | B | | B | | | | | | | | |
| 153 | 15 nF | B | B | B | | B | B | | | | | | | C |
| 183 | 18 nF | B | B | B | | B | | | | | | | | |
| 223 | 22 nF | B | B | B | | B | B | | | | | | | C |
| 273 | 27 nF | B | B | B | | B | | | | | | | | |
| 333 | 33 nF | B | B | B | | B | B | | | | | | | C |
| 393 | 39 nF | B | B | B | | B | | | | | | | | |
| 473 | 47 nF | B | B | B | | B | B | | | | | | | C |
| 563 | 56 nF | B | B | B | | B | | | | | | | | |
| 683 | 68 nF | B | B | B | | B | B | | | | | | | C |
| 823 | 82 nF | B | B | B | | B | | | | | | | | |
| 104 | 100 nF | B | B | B | | B | B | | C | C | C | | C | C |
| 154 | 150 nF | B | B | B | | B | C | | C | C | C | | C | C |
| 224 | 220 nF | B | B | B | | B | C | | C | C | C | | C | C |
| 334 | 330 nF | B | B | B | | B | | | C | C | C | | C | C |
| 474 | 470 nF | B | B | B | | B | | | C | C | C | | C | |
| 684 | 680 nF | B | B | B | | B | | | C | C | C | | C | |
| 105 | 1.0 µF | C | C | C | | C | | | C | C | C | | C | |
| 155 | 1.5 µF | C | C | C | | | | | C | C | C | | | |
| 225 | 2.2 µF | C | C | C | | J (1) | | | C | C | C | | G | |
| 335 | 3.3 µF | J | J | J | | | | | C | C | C | | | |
| 475 | 4.7 µF | J | J | J | J | P | | | C | C | D | | G | |
| 685 | 6.8 µF | J | J | | | | | | C | C | D | | | |
| 106 | 10 µF | J | J | P | | | | | D | D | G | K | | |
| 226 | 22 µF | P | | | | | | | K | K | | | | |
| 336 | 33 µF | | | | | | | | | | | | | |
| 476 | 47 µF | | | | | | | K | K | | | | | |
| 686 | 68 µF | | | | | | | | | | | | | |
| 107 | 100 µF | | | | | | | M | | | | | | |

**Notes**

- Letters indicate product thickness, please see packaging quantities

(1) Not in 20 % (code “M”) tolerance



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## PACKAGING QUANTITIES

| SIZE CODE (inch / mm) | MAX. THICKNESS (mm) | THICKNESS SYMBOL | PAPER TAPE | | PLASTIC TAPE | |
|---|---|---|---|---|---|---|
| | | | 7" REEL (C) | 13" REEL (P) | 7" REEL (T) | 13" REEL (R) |
| 0402 (1002) | 0.55 | N | 10K | 50K | | |
| | 0.70 | E | 10K | | | |
| 0603 (1608) | 0.87 | S | 4K | 15K | | |
| | 0.95 | X | 4K | 15K | | |
| | 1.00 | X' | 4K | 15K | | |
| 0805 (2012) | 0.75 | A | 4K | 15K | | |
| | 0.95 | B | 4K | 15K | | |
| | 1.40 | D | | | 3K | 10K |
| | 1.45 | I | | | 3K | 10K |
| 1206 (3216) | 0.95 | B | 4K | 15K | | |
| | 1.05 | C | | | 3K | 10K |
| | 1.30 | J | | | 3K | 10K |
| | 1.35 | D | | | 3K | 10K |
| | 1.80 | G | | | 2K | |
| | 1.90 | P | | | 2K | |
| 1210 (3225) | 1.05 | C | | | 3K | 10K |
| | 1.35 | D | | | 3K | 10K |
| | 1.80 | G | | | 2K | |
| | 2.20 | K | | | 1K | |
| | 2.80 | M | | | 1K | |


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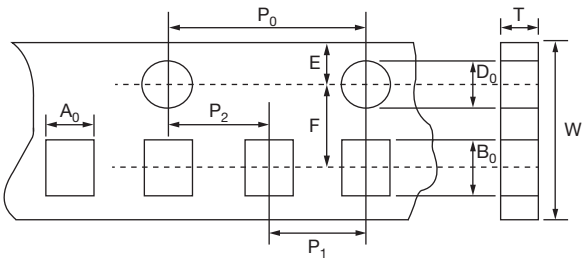
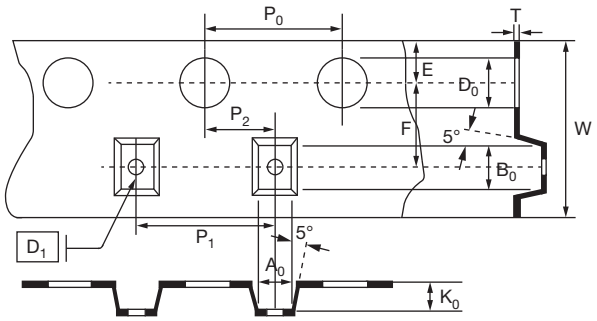
## TAPE AND REEL SPECIFICATION




Dimensions of paper tape




Dimensions of plastic tape

| **DIMENSIONS PAPER TAPE** in millimeters | | | | | | |
|---|---|---|---|---|---|---|
| **SIZE CODE** | **0402** | | **0603** | **0805** | | **1206** |
| **THICKNESS** | **N** | **E** | **S, X, X'** | **A** | **B** | **B** |
| $A_0$ | 0.62 ± 0.05 | 0.70 ± 0.10 | 1.02 ± 0.05 | 1.50 ± 0.10 | 1.50 ± 0.10 | 2.00 ± 0.10 |
| $B_0$ | 1.12 ± 0.05 | 1.20 ± 0.10 | 1.80 ± 0.05 | 2.30 ± 0.10 | 2.30 ± 0.10 | 3.50 ± 0.10 |
| T | 0.60 ± 0.05 | 0.70 ± 0.10 | 0.95 ± 0.05 | 0.75 ± 0.05 | 0.95 ± 0.05 | 0.95 ± 0.05 |
| $K_0$ | - | - | - | - | - | - |
| W | 8.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 |
| $P_0$ | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 |
| 10 x $P_0$ | 40.0 ± 0.10 | 40.0 ± 0.10 | 40.0 ± 0.10 | 40.0 ± 0.10 | 40.0 ± 0.10 | 40.0 ± 0.10 |
| $P_1$ | 2.00 ± 0.05 | 2.00 ± 0.05 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 |
| $P_2$ | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 |
| $D_0$ | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.50 ± 0.05 |
| $D_1$ | - | - | - | - | - | - |
| E | 1.75 ± 0.05 | 1.75 ± 0.05 | 1.75 ± 0.05 | 1.75 ± 0.05 | 1.75 ± 0.05 | 1.75 ± 0.10 |
| F | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 |

| **DIMENSIONS PLASTIC TAPE** in millimeters | | | | | | |
|---|---|---|---|---|---|---|
| **SIZE CODE** | **0805** | **1206** | | **1210** | | |
| **THICKNESS** | **D, I** | **C, J, D** | **G, P** | **C, D** | **G, K** | **M** |
| $A_0$ | < 1.57 | < 1.85 | < 1.95 | < 2.97 | < 2.97 | < 2.97 |
| $B_0$ | < 2.40 | < 3.46 | < 3.67 | < 3.73 | < 3.73 | < 3.73 |
| T | 0.23 ± 0.05 | 0.23 ± 0.05 | 0.23 ± 0.05 | 0.23 ± 0.05 | 0.23 ± 0.05 | 0.23 ± 0.05 |
| $K_0$ | < 2.50 | < 2.50 | < 2.50 | < 2.50 | < 2.50 | < 3.00 |
| W | 8.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 |
| $P_0$ | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 |
| 10 x $P_0$ | 40.0 ± 0.10 | 40.0 ± 0.10 | 40.0 ± 0.10 | 40.0 ± 0.10 | 40.0 ± 0.10 | 40.0 ± 0.10 |
| $P_1$ | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 |
| $P_2$ | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 |
| $D_0$ | 1.50 ± 0.05 | 1.50 ± 0.05 | 1.50 ± 0.05 | 1.50 ± 0.05 | 1.50 ± 0.05 | 1.50 ± 0.05 |
| $D_1$ | 1.00 ± 0.10 | 1.00 ± 0.10 | 1.00 ± 0.10 | 1.00 ± 0.10 | 1.00 ± 0.10 | 1.00 ± 0.10 |
| E | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 |
| F | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 |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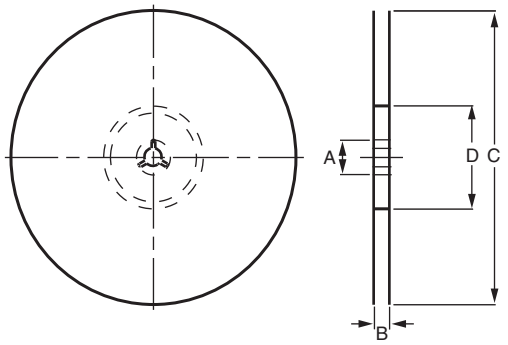
## REEL SPECIFICATION



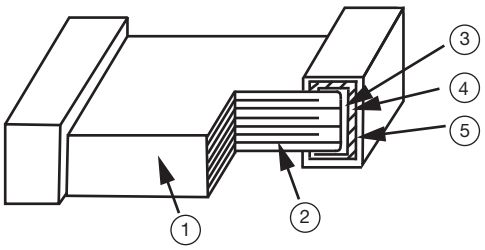

| REEL DIMENSIONS in millimeters | | |
|---|---|---|
| SYMBOL | 7" REEL | 13" REEL |
| A | 13.0 ± 0.5 | 13.0 ± 0.5 |
| B | 9.0 ± 1.0 | 9.0 ± 1.0 |
| C | 178.0 ± 1.0 | 330.0 ± 1.0 |
| D | 60.0 ± 1.0 | 100.0 ± 1.0 |

## CONSTRUCTION

| NO. | NAME | | C0G (NP0) [1] | C0G (NP0) / X5R / X7R / Y5V |
|---|---|---|---|---|
| 1 | Ceramic material | | $BaTiO_3$ based | |
| 2 | Inner electrode | | AgPd alloy | Ni |
| 3 | Termination | Inner layer | Ag | Cu |
| 4 | | Middle layer | Ni | |
| 5 | | Outer layer | Sn (matt) | |

**Note**

[1] C0G (NP0) items are with Ag/Ni/Sn terminations, please see selection chart




## STORAGE AND HANDLING CONDITIONS

(1) To store products at 5 °C to 40 °C ambient temperature and 20 % to 70 % relative humidity conditions.

(2) The product is recommended to be used within one year after shipment. Check solderability in case of shelf life extension is needed.

Cautions:

a. Do not store products in a corrosive environment such as sulfide, chloride gas, or acid. It may cause oxidization of electrode, which easily be resulted in poor soldering.

b. To store products on the shelf and avoid exposure to moisture.

c. Do not expose products to excessive shock, vibration, direct sunlight and so on.



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**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.**

Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

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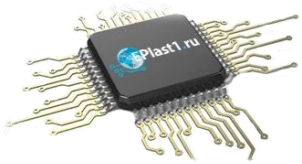
- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




**Как с нами связаться**

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**Факс:** 8 (812) 320-02-42
**Электронная почта:** org@eplast1.ru
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