

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



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



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 | 7 % | 9 % | 0402 ≥ 0.068 μF; 0603 ≥ 0.68 μF |
| C < 1.0 μF | | 12.5 % | 0402 ≥ 0.22 μF |
| 16 V | 9 % | 12.5 % | 0603 ≥ 2.2 μF; 0805 ≥ 3.3 μF; 1206 ≥ 10 μF; 1210 ≥ 22 μF |
| C ≥ 1.0 μF | | 20 % | 0402 ≥ 0.47 μF |
| 10 V | 12.5 % | 20 % | - |
| 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"



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

| 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



| SELECTION CHART | | | | | | | | | | | | | | | | | | | | | |
|----------------------------|--------|------------------|------------------|------------------|------------------|------------------|--------|----|----|----|-----|--------|----|----|----|-----|--------|----|----|----|-----|
| DIELECTRIC | | COG (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



| SELECTION CHART | | | | | | | | | | | | | | | | | | | | | |
|----------------------------|--------|-----------|----|----|----|-----|--------|----|----|----|-----|------------------|------------------|----|----|-----|------------------|------------------|----|----|-----|
| DIELECTRIC | | COG (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



| 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



| 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



| 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



| 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



| 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



| 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 | |

TAPE AND REEL SPECIFICATION



Dimensions of paper tape

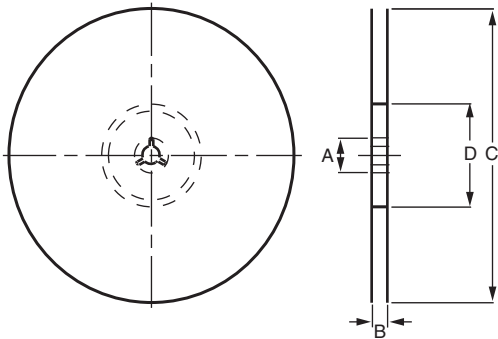


Dimensions of plastic tape

| 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 |

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 | COG (NP0) ⁽¹⁾ | COG (NP0) / X5R / X7R / Y5V |
|-----|------------------|--------------------------|-----------------------------|
| 1 | Ceramic material | BaTiO ₃ based | |
| 2 | Inner electrode | AgPd alloy | Ni |
| 3 | Termination | Inner layer | Cu |
| 4 | | Middle layer | Ni |
| 5 | | Outer layer | Sn (matt) |

Note

⁽¹⁾ COG (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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