

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 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 |
| | | 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"



| 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 | 0.049 ± 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.



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.

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

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А