# AGC SERIES
# AUTOMOTIVE GRADE CHIP CAPACITORS

VENKEL LTD.



## FEATURES:

- AEC-Q200 certified/qualified
- Capacitance range: 0.1pF to 10uF
- Voltage range: 10V to 1000V DC
- Terminations: 100% matte Tin (Sn)
- 3mm minimum bending strength specification

RoHS Compliant | REACH Compliant | HF Halogen FREE | Conflict Minerals FREE 3TG

## PART NUMBER STRUCTURE

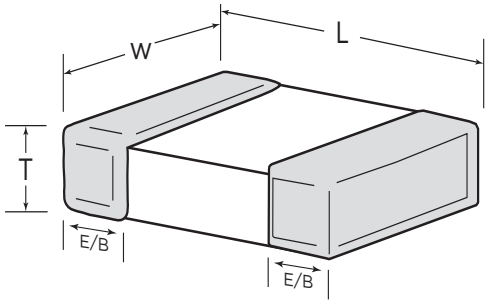
| AGC | 1206 | X7R | 500 | - | 473 | K | N | P |
|---|---|---|---|---|---|---|---|---|
| **Series** | **Size**<br>0201<br>0402<br>0603<br>0805<br>1206<br>1210 | **Temperature Characteristic (Dielectric)**<br>C0G/NP0<br>X7R | **Rated Voltage**<br>1st two digits are significant followed by number of zeroes.<br>100 = 10 VDC<br>160 = 16 VDC<br>250 = 25 VDC<br>500 = 50 VDC<br>101 = 100 VDC<br>201 = 200 VDC<br>251 = 250 VDC<br>501 = 500 VDC<br>631 = 630 VDC<br>102 = 1000 VDC | | **Capacitance (picofarads)**<br>1st two digits are significant, followed by number of zeroes. R denotes decimal<br>**e.g:**<br>101 = 100pF<br>104 = 100nF<br>6R8 = 6.8pF | **Tolerance**<br>* A = ±0.05pF<br>* B = ±0.1pF<br>* C = ±0.25pF<br>* D = ±0.5pF<br>F ±1%<br>G = ±2%<br>J = ±5%<br>K = ±10%<br>M = ±20%<br>* For values below 10pF only. | **Termination**<br>N = 100% Matte Tin over Nickel over a conductive Polymer | **Packaging**<br>E = Embossed Tape (7" reel)<br>U = Embossed Tape (13" reel)<br>P = Paper Tape (7" reel)<br>R = Paper Tape (13" reel) |

**Example P/N:** AGC1206X7R500-473KNP

Standard termination finish is 100% matte Tin (Sn) over Nickel.

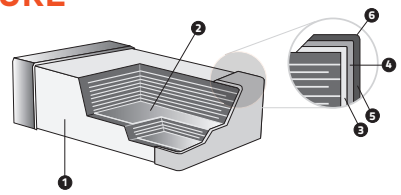
## DIMENSIONS

Unit: inches (mm)




| SIZE | L | W | T | E/B |
|---|---|---|---|---|
| 0201 | 0.024 ± 0.001 (0.60 ± 0.03) | 0.012 ± 0.001 (0.30 ± 0.03) | 0.012 ± 0.001 (0.30 ± 0.03) | 0.006 ± 0.002 (0.15 ± 0.05) |
| 0402 | 0.039 ± 0.002 (1.00 ± 0.05) | 0.020 ± 0.002 (0.5 ± 0.05) | 0.020 ± 0.002 (0.5 ± 0.05) | 0.010 +0.002/-0.004) (0.25 +0.05/-0.10) |
| 0603 | 0.063 ± 0.004 (1.6 ± 0.10) | 0.031 ± 0.004 (0.8 ± 0.10) | 0.031 ± 0.003 (0.8 ± 0.07) | 0.016 ± 0.006 (0.40 ± 0.15) |
| | 0.063 + 0.006/-0.004 (1.6 +0.15/-0.10) | 0.031 + 0.006/-0.004 (0.8 + 0.15/-0.10) | 0.031 + 0.006/-0.004 (0.8 + 0.15/-0.10) | |
| 0805 | 0.079 ± 0.006 (2.0 ± 0.15) | 0.049 ± 0.004 (1.25 ± 0.10) | 0.024 ± 0.004 (0.60 ± 0.10) | 0.020 ± 0.008 (0.50 ± 0.20) |
| | | | 0.031 ± 0.004 (0.80 ± 0.10) | |
| | | | 0.049 ± 0.004 (1.25 ± 0.10) | |
| | 0.079 ± 0.008 (2.0 ± 0.20) | 0.049 ± 0.008 (1.25 ± 0.20) | 0.049 ± 0.008 (1.25 ± 0.20) | |
| 1206 | 0.126 ± 0.006 (3.2 ± 0.15) | 0.063 ± 0.006 (1.6 ± 0.15) | 0.031 ± 0.004 (0.80 ± 0.10) | 0.024 ± 0.008 (0.60 ± 0.20) |
| | | | 0.037 ± 0.004 (0.95 ± 0.10) | |
| | | | 0.049 ± 0.004 (1.25 ± 0.10) | |
| | 0.126 ± 0.008 (3.2 ± 0.20) | | 0.045 ± 0.006 (1.15 ± 0.15) | |
| | | 0.063 ± 0.008 (1.6 ± 0.20) | 0.063 ± 0.008 (1.60 ± 0.20) | |
| | 0.126 + 0.012/-0.004 (3.2 + 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 | 0.126 ± 0.012 (3.2 ± 0.30) | 0.098 ± 0.008 (2.5 ± 0.20) | 0.037 ± 0.004 (0.95 ± 0.10) | 0.030 ± 0.010 (0.75 ± 0.25) |
| | | | 0.049 ± 0.004 (1.25 ± 0.10) | |
| | 0.126 ± 0.016 (3.2 ± 0.40) | 0.098 ± 0.012 (2.5 ± 0.30) | 0.063 ± 0.008 (1.60 ± 0.20) | |
| | | | 0.079 ± 0.008 (2.00 ± 0.20) | |
| | | | 0.098 ± 0.012 (2.50 ± 0.30) | |

## STRUCTURE

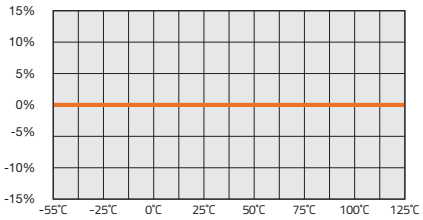



| | | | |
|---|---|---|---|
| 1 | Ceramic Body (dielectric) | 4 | Silver Polymer |
| 2 | Inner Electrode | 5 | Nickel Plating |
| 3 | Inner Termination | 6 | 100% Matte Tin (Sn) |

## ELECTRICAL SPECIFICATION & RANGE

### C0G/NPO

Typical Capacitance Change vs. Temperature




**Operating Temperature Range:**
-55°C to +125°C
**Temperature Coefficient:**
0 ±30PPM/°C
**Temperature Voltage Coefficient:**
0 ±30PPM/°C
**Insulation Resistance:**
>1000Ω-F or 100GΩ, for values ≤ 0.047uF
(whichever is less at 25°C, WDCV).
For Capacitance values > 0.047uF, the 500 Ω-F rule applies.
(The IR at 125°C is 10% of the value at 25°C)

**Ageing:** None

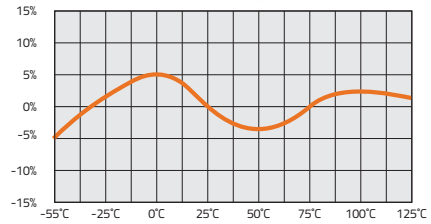
**Withstanding Voltage:** >2.5 times VDCW

**Capacitance Tolerance:** **A**,B,C,D,F,G,J,K

**Dissipation Factor:** 0.1% max

### X7R

Typical Capacitance Change vs. Temperature




**Operating Temperature Range:**
-55°C to +125°C
**Temperature Coefficient:**
0 ±15%Δ°C MAX.
**Temperature Voltage Coefficient:**
X7R not applicable

**Insulation Resistance:**
>100Ω-F or 1GΩ, whichever is less at 25°C, VDCW. (10,000Ω at 125°C)

**Ageing:**
2.5% per decade hour, typical
**Withstanding Voltage:**
>2.5 times VDCW
**Capacitance Tolerance:**
J,K,M

| Rated Voltage | Insulation Resistance |
|---|---|
| 100V: All X7R; 1210≥3.3μF | 1GΩ or 100Ω-F Whichever is smaller |
| 50V: 0402>0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF | |
| 35V:0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF | |
| 25V:0402≥0.22μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF;1210≥10μF | |
| 16V: 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF; 1206≥10μF; 1210≥47μF | |
| 10V: 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥47μF | |
| 6.3V ; 4V ; Size 1812 | |

| Rated Voltage | D.F.≤ | Exception of D.F.≤ | |
|---|---|---|---|
| ≥100V | ≤2.5% | ≤3% | 1206≥0.47μF |
| | | ≤5% | 0805›0.1μF; 0603≥0.068μF; 1206>1μF; 1210≥2.2μF |
| | | ≤10% | 0805›0.22μF; 1210≥3.3μF |
| 50V | ≤2.5% | ≤3% | 0201(50V); 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF |
| | | ≤5% | 0201≥0.01μF; 1210≥4.7μF |
| | | ≤10% | 0402≥0.012μF; 0603>0.1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF |
| 35V | ≤3.5% | ≤10% | 0603≥1μF; 0805≥2.2μFF; 1206≥2.2μF; 1210≥10μF |
| 25V | ≤3.5% | ≤5% | 0201≥0.01μF; 0805≥1μF; 1210≥10μF |
| | | ≤7% | 0603≥0.33μF |
| | | ≤10% | 0201≥0.01μF; 0402≥0.10μF & (0402/X7R≥0.056μF); 0603≥0.47μF; 0805≥2.2μF;1206≥4.7μF;1210≥22μF |
| | | ≤12.5% | 0402≥0.47μF |
| 16V | ≤3.5% | ≤5% | 0201≥0.01μF; 0402≥0.33μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF |
| | | ≤10% | 0201≥0.01μF; (0201/X7R≥0.022μF); 0402≥0.22μF; 0603≥0.68μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF |
| 10V | ≤5% | ≤10% | 0201≥0.012μF; 0402≥0.33μF(0402/X7R≥0.22μF); 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF; 01R5 |
| | | ≤15% | 201≥0.1μF; 0402≥1μF |
| 6.3V | ≤10% | ≤15% | 0201≥0.1μF; 0402≥1μF(0402/X6S≥0.47μF); 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF |
| | | ≤20% | 0402≥2.2μF |
| 4V | ≤15% | - | - |

## VOLTAGE AND CAPACITANCE RANGE

### C0G (NP0) DIELECTRIC (0201 - 0402)

Values that are typically available. (Thickness in mm).

| Size (inches) | | 0201 | | | | | 0402 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| VDCW (MAX) | | 10V | 16V | 25V | 50V | 100V | 10V | 16V | 25V | 50V | 100V |
| CAPACITANCE CODE | CAPACITANCE VALUE | | | | | | | | | | |
| 0R1 | 0.1pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 0R2 | 0.2pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 0R3 | 0.3pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 0R4 | 0.4pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 0R5 | 0.5pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 0R6 | 0.6pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 0R7 | 0.7pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 0R8 | 0.8pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 0R9 | 0.9pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 1R0 | 1.0pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 1R2 | 1.2pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 1R5 | 1.5pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 1R8 | 1.8pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 2R2 | 2.2pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 2R7 | 2.7pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 3R3 | 3.3pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 3R9 | 3.9pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 4R7 | 4.7pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 5R6 | 5.6pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 6R8 | 6.8pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 8R2 | 8.2pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 100 | 10pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 120 | 12pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 150 | 15pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 180 | 18pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 220 | 22pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 270 | 27pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 330 | 33pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 390 | 39pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 470 | 47pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 560 | 56pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 680 | 68pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 820 | 82pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 101 | 100pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 121 | 120pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 151 | 150pF | | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 181 | 180pF | | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 221 | 220pF | | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 271 | 270pF | | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 331 | 330pF | | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 391 | 390pF | | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 471 | 470pF | | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 561 | 560pF | | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 681 | 680pF | | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 821 | 820pF | | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 102 | 1000pF | | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 122 | 1200pF | | | | | | | | | | |
| 152 | 1500pF | | | | | | | | | | |
| 182 | 1800pF | | | | | | | | | | |
| 222 | 2200pF | | | | | | | | | | |
| 272 | 2700pF | | | | | | | | | | |
| 332 | 3300pF | | | | | | | | | | |

**Note:** Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

## VOLTAGE AND CAPACITANCE RANGE

### C0G (NP0) DIELECTRIC (0603)

Values that are typically available. (Thickness in mm).

| Size (inches) | | 0603 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| VDCW (MAX) | | 10V | 16V | 25V | 50V | 100V | 200V | 250V |
| CAPACITANCE CODE | CAPACITANCE VALUE | | | | | | | |
| 0R1 | 0.1pF | | | | | | | |
| 0R2 | 0.2pF | | | | | | | |
| 0R3 | 0.3pF | | | | | | | |
| 0R4 | 0.4pF | | | | | | | |
| 0R5 | 0.5pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 0R6 | 0.6pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 0R7 | 0.7pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 0R8 | 0.8pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 0R9 | 0.9pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 1R0 | 1.0pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 1R2 | 1.2pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 1R5 | 1.5pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 1R8 | 1.8pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 2R2 | 2.2pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 2R7 | 2.7pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 3R3 | 3.3pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 3R9 | 3.9pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 4R7 | 4.7pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 5R6 | 5.6pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 6R8 | 6.8pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 8R2 | 8.2pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 100 | 10pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 120 | 12pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 150 | 15pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 180 | 18pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 220 | 22pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 270 | 27pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 330 | 33pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 390 | 39pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 470 | 47pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 560 | 56pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 680 | 68pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 820 | 82pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 101 | 100pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 121 | 120pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 151 | 150pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 181 | 180pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 221 | 220pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 |
| 271 | 270pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 |
| 331 | 330pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 |
| 391 | 390pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 |
| 471 | 470pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 |
| 561 | 560pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 |
| 681 | 680pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 |
| 821 | 820pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 |
| 102 | 1000pF | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | | |
| 122 | 1200pF | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | | |
| 152 | 1500pF | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | | |
| 182 | 1800pF | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | | |
| 222 | 2200pF | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | | | |
| 272 | 2700pF | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | | | |
| 332 | 3300pF | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | 0.80+0.15/-0.10 | | | |

**Note:** Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

## VOLTAGE AND CAPACITANCE RANGE

### C0G (NP0) DIELECTRIC (0805)

Values that are typically available. (Thickness in mm).

| SIZE (INCHES) | | 0805 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CAPACITANCE CODE | CAPACITANCE VALUE | VDCW (MAX) | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 630V |
| 0R5 | 0.5pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 0R6 | 0.6pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 0R7 | 0.7pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 0R8 | 0.8pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 0R9 | 0.9pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 1R0 | 1.0pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 1R2 | 1.2pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 1R5 | 1.5pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 1R8 | 1.8pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 2R2 | 2.2pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 2R7 | 2.7pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 3R3 | 3.3pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 3R9 | 3.9pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 4R7 | 4.7pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 5R6 | 5.6pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 6R8 | 6.8pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 8R2 | 8.2pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 100 | 10pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 120 | 12pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 150 | 15pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 180 | 18pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 220 | 22pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 270 | 27pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 330 | 33pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 390 | 39pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 470 | 47pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 560 | 56pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 680 | 68pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 |
| 820 | 82pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.80±0.10 | 0.80±0.10 |
| 101 | 100pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 121 | 120pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 |
| 151 | 150pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 181 | 180pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 221 | 220pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 271 | 270pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 331 | 330pF | | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 0.60±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 391 | 390pF | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 471 | 470pF | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 |
| 561 | 560pF | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 |
| 681 | 680pF | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 |
| 821 | 820pF | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 |
| 102 | 1000pF | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 |
| 122 | 1200pF | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 |
| 152 | 1500pF | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 |
| 182 | 1800pF | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 |
| 222 | 2200pF | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 |
| 272 | 2700pF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 | | |
| 332 | 3300pF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 | | |
| 392 | 3900pF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 | | |
| 472 | 4700pF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | 1.25±0.20 | | |
| 562 | 5600pF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |
| 682 | 6800pF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |
| 822 | 8200pF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |
| 103 | 0.010uF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |
| 123 | 0.012uF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |
| 153 | 0.015uF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |
| 183 | 0.018uF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |
| 223 | 0.022uF | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |

**Note:** Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

## VOLTAGE AND CAPACITANCE RANGE

### C0G (NP0) DIELECTRIC (1206)

Values that are typically available. (Thickness in mm).

| SIZE (INCHES) | | 1206 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| VDCW (MAX) | | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 630V | 1000V |
| 1R0 | 1.0pF | | | | | | | | | | |
| 1R2 | 1.2pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | |
| 1R5 | 1.5pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 1R8 | 1.8pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 2R2 | 2.2pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 2R7 | 2.7pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 3R3 | 3.3pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 3R9 | 3.9pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 4R7 | 4.7pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 5R6 | 5.6pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 6R8 | 6.8pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 8R2 | 8.2pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 100 | 10pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 120 | 12pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 150 | 15pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 180 | 18pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 220 | 22pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 |
| 270 | 27pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 |
| 330 | 33pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 |
| 390 | 39pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 |
| 470 | 47pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 |
| 560 | 56pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 |
| 680 | 68pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 |
| 820 | 82pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 |
| 101 | 100pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 |
| 121 | 120pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 |
| 151 | 150pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 |
| 181 | 180pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.60±0.20 |
| 221 | 220pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.60±0.20 |
| 271 | 270pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 331 | 330pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 391 | 390pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 471 | 470pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 561 | 560pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.60±0.20 |
| 681 | 680pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.60±0.20 |
| 821 | 820pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.95±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 |
| 102 | 1000pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.95±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 |
| 122 | 1200pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.95±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | |
| 152 | 1500pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | |
| 182 | 1800pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | |
| 222 | 2200pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | |
| 272 | 2700pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | |
| 332 | 3300pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | |
| 392 | 3900pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | |
| 472 | 4700pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | |
| 562 | 5600pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.60±0.20 | 1.60±0.20 | | | |
| 682 | 6800pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 | 1.60±0.20 | | | |
| 822 | 8200pF | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.60±0.20 | 1.60±0.20 | | | |
| 103 | 0.010uF | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.60±0.20 | 1.60±0.20 | | | |

CAPACITANCE CODE — CAPACITANCE VALUE

**Note:** Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

## VOLTAGE AND CAPACITANCE RANGE

### C0G (NP0) DIELECTRIC (1210)

Values that are typically available. (Thickness in mm).

| SIZE (INCHES) | | | 1210 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VDCW (MAX) | | | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 630V | 1000V |
| CAPACITANCE CODE | | CAPACITANCE VALUE | | | | | | | | | | |
| 100 | | 10pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 120 | | 12pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 150 | | 15pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 180 | | 18pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 220 | | 22pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 270 | | 27pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 330 | | 33pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 390 | | 39pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 470 | | 47pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 560 | | 56pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 680 | | 68pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 820 | | 82pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 |
| 101 | | 100pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 |
| 121 | | 120pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 |
| 151 | | 150pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 |
| 181 | | 180pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 |
| 221 | | 220pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 271 | | 270pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 331 | | 330pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 391 | | 390pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 471 | | 470pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 561 | | 560pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 681 | | 680pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 821 | | 820pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 |
| 102 | | 1000pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.60±0.20 |
| 122 | | 1200pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 2.00±0.20 |
| 152 | | 1500pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 2.00±0.20 |
| 182 | | 1800pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 2.00±0.20 |
| 222 | | 2200pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 2.00±0.20 |
| 272 | | 2700pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 2.00±0.20 |
| 332 | | 3300pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 2.00±0.20 |
| 392 | | 3900pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 2.00±0.20 |
| 472 | | 4700pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | 2.00±0.20 |
| 562 | | 5600pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | 2.00±0.20 |
| 682 | | 6800pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | 2.00±0.20 |
| 822 | | 8200pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | 1.60±0.20 | 2.00±0.20 |
| 103 | | 0.010µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 | 1.60±0.20 | 2.00±0.20 | 2.00±0.20 | 2.50±0.30 |
| 123 | | 0.012µF | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 2.00±0.20 | 2.00±0.20 | 2.50±0.30 | 2.50±0.30 | 2.50±0.30 |
| 153 | | 0.015µF | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 2.00±0.20 | 2.00±0.20 | 2.50±0.30 | 2.50±0.30 | 2.50±0.30 |
| 183 | | 0.018µF | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | | | | | |
| 223 | | 0.022µF | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | | | | | |
| 273 | | 0.027µF | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | | | | | |
| 333 | | 0.033µF | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | | | | | |
| 393 | | 0.039µF | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | | | | | |
| 473 | | 0.047µF | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | 2.00±0.20 | | | | | |

**Note:** Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

## VOLTAGE AND CAPACITANCE RANGE

### X7R DIELECTRIC (0201, 0402)

Values that are typically available. (Thickness in mm).

| SIZE (INCHES) | | | 0201 | | | | 0402 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| VDCW (MAX) | | | 10V | 16V | 25V | 50V | 10V | 16V | 25V | 50V |
| CAPACITANCE CODE | | CAPACITANCE VALUE | | | | | | | | |
| 101 | | 100pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 121 | | 120pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 151 | | 150pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 181 | | 180pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 221 | | 220pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 271 | | 270pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 331 | | 330pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 391 | | 390pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 471 | | 470pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 561 | | 560pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 681 | | 680pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 821 | | 820pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 102 | | 1000pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 122 | | 1200pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 152 | | 1500pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 182 | | 1800pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 222 | | 2200pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 272 | | 2700pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 332 | | 3300pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 392 | | 3900pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 472 | | 4700pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 562 | | 5600pF | 0.30±0.03 | 0.30±0.03 | 0.30±0.03 | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 682 | | 6800pF | 0.30±0.03 | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 822 | | 8200pF | 0.30±0.03 | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 103 | | 0.010µF | 0.30±0.03 | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 |
| 123 | | 0.012µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 153 | | 0.015µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 183 | | 0.018µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 223 | | 0.022µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 273 | | 0.027µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 333 | | 0.033µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 393 | | 0.039µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 473 | | 0.047µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 563 | | 0.056µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 683 | | 0.068µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 823 | | 0.082µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 104 | | 0.10µF | | | | | 0.50±0.05 | 0.50±0.05 | 0.50±0.05 | |
| 124 | | 0.12µF | | | | | | | | |
| 154 | | 0.15µF | | | | | | | | |
| 184 | | 0.18µF | | | | | | | | |
| 224 | | 0.22µF | | | | | | | | |
| 334 | | 0.33µF | | | | | | | | |

**Note:** Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

## VOLTAGE AND CAPACITANCE RANGE

### X7R DIELECTRIC (0603, 0805)

Values that are typically available. (Thickness in mm).

| SIZE (INCHES) | | | 0603 | | | | | 0805 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAPACITANCE CODE | CAPACITANCE VALUE | VDCW (MAX) | 10V | 16V | 25V | 50V | 100V | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 630V |
| 101 | 100pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 121 | 120pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 151 | 150pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 181 | 180pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 221 | 220pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 271 | 270pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 331 | 330pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 391 | 390pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 471 | 470pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 561 | 560pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 681 | 680pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 821 | 820pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 102 | 1000pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 122 | 1200pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 152 | 1500pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 182 | 1800pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 222 | 2200pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 272 | 2700pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 332 | 3300pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 392 | 3900pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 |
| 472 | 4700pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 |
| 562 | 5600pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 682 | 6800pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 822 | 8200pF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 103 | 0.010µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 123 | 0.012µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | | |
| 153 | 0.015µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | | |
| 183 | 0.018µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | | |
| 223 | 0.022µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | | |
| 273 | 0.027µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | |
| 333 | 0.033µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | |
| 393 | 0.039µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | |
| 473 | 0.047µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | |
| 563 | 0.056µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | |
| 683 | 0.068µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | |
| 823 | 0.082µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | |
| 104 | 0.10µF | | 0.80±0.07 | 0.80±0.07 | 0.80±0.07 | 0.80+0.15/-0.1 | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | |
| 124 | 0.12µF | | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | | | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | | |
| 154 | 0.15µF | | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | | |
| 184 | 0.18µF | | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | | |
| 224 | 0.22µF | | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | | |
| 274 | 0.27µF | | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | | | | | |
| 334 | 0.33µF | | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | 0.80+0.15/-0.1 | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | | | | | |
| 394 | 0.39µF | | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | | | | | |
| 474 | 0.47µF | | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | | | | | |
| 564 | 0.56µF | | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | | | |
| 684 | 0.68µF | | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | | | | | |
| 824 | 0.82µF | | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | | | |
| 105 | 1µF | | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.20 | | | | | |

## VOLTAGE AND CAPACITANCE RANGE

### X7R DIELECTRIC (1206)

Values that are typically available. (Thickness in mm).

| SIZE (INCHES) | | 1206 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| VDCW (MAX) | | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 630V |
| CAPACITANCE CODE | CAPACITANCE VALUE | | | | | | | | | |
| 101 | 100pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 121 | 120pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 151 | 150pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 181 | 180pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 221 | 220pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 271 | 270pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 331 | 330pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 391 | 390pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 471 | 470pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 561 | 560pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 681 | 680pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 821 | 820pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 102 | 1000pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 122 | 1200pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 152 | 1500pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 182 | 1800pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 222 | 2200pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 272 | 2700pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 332 | 3300pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 392 | 3900pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 472 | 4700pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 562 | 5600pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 682 | 6800pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 822 | 8200pF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 103 | 0.010µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 123 | 0.012µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | | |
| 153 | 0.015µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | | |
| 183 | 0.018µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | | |
| 223 | 0.022µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | 1.25±0.10 | | |
| 273 | 0.027µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | | | | |
| 333 | 0.033µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | | | | |
| 393 | 0.039µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | | | | |
| 473 | 0.047µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | | | | |
| 563 | 0.056µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | | | | |
| 683 | 0.068µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | | | | |
| 823 | 0.082µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | |
| 104 | 0.10µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | |
| 124 | 0.12µF | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 0.80±0.10 | 1.25±0.10 | | | | |
| 154 | 0.15µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 | | | | |
| 184 | 0.18µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 | | | | |
| 224 | 0.22µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.60±0.20 | | | | |
| 274 | 0.27µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | | | | | |
| 334 | 0.33µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | | | | | |
| 394 | 0.39µF | 0.95±0.10 | 0.95±0.10 | 1.15±0.15 | 1.60±0.3/-0.1 | | | | | |
| 474 | 0.47µF | 1.15±0.15 | 1.15±0.15 | 1.15±0.15 | 1.60±0.3/-0.1 | | | | | |
| 564 | 0.56µF | 1.15±0.15 | 1.15±0.15 | 1.15±0.15 | 1.60±0.3/-0.1 | | | | | |
| 684 | 0.68µF | 1.15±0.15 | 1.15±0.15 | 1.15±0.15 | 1.60±0.3/-0.1 | | | | | |
| 824 | 0.82µF | 1.15±0.15 | 1.15±0.15 | 1.15±0.15 | 1.60±0.3/-0.1 | | | | | |
| 105 | 1µF | 1.15±0.15 | 1.15±0.15 | 1.15±0.15 | 1.60±0.3/-0.1 | | | | | |
| 225 | 2.2µF | | | | 1.60±0.3/-0.1 | 1.60±0.3/-0.1 | | | | |
| 475 | 4.7µF | | | | | | | | | |
| 106 | 10µF | | | | | | | | | |

## VOLTAGE AND CAPACITANCE RANGE

### X7R DIELECTRIC (1210)

Values that are typically available. (Thickness in mm).

| SIZE (INCHES) | | | 1210 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| VDCW (MAX) | | | 10V | 16V | 25V | 50V | 100V | 250V | 500V | 1000V |
| CAPACITANCE CODE | | CAPACITANCE VALUE | | | | | | | | |
| 101 | | 100pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 121 | | 120pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 151 | | 150pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 181 | | 180pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 221 | | 220pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 271 | | 270pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 331 | | 330pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 391 | | 390pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 471 | | 470pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 561 | | 560pF | | | | | | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 |
| 681 | | 680pF | | | | | | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 |
| 821 | | 820pF | | | | | | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 |
| 102 | | 1000pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 |
| 122 | | 1200pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 |
| 152 | | 1500pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 |
| 182 | | 1800pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 |
| 222 | | 2200pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 |
| 272 | | 2700pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 |
| 332 | | 3300pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.25±0.10 |
| 392 | | 3900pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.60±0.20 |
| 472 | | 4700pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.60±0.20 |
| 562 | | 5600pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.60±0.20 |
| 682 | | 6800pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.60±0.20 |
| 822 | | 8200pF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.60±0.20 |
| 103 | | 0.010µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | 1.60±0.20 |
| 123 | | 0.012µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | |
| 153 | | 0.015µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | |
| 183 | | 0.018µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | |
| 223 | | 0.022µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | |
| 273 | | 0.027µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | |
| 333 | | 0.033µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | |
| 393 | | 0.039µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | |
| 473 | | 0.047µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | | |
| 563 | | 0.056µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | | |
| 683 | | 0.068µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | | |
| 823 | | 0.082µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | | |
| 104 | | 0.10µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | | |
| 124 | | 0.12µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | | | |
| 154 | | 0.15µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | | | |
| 184 | | 0.18µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | | | |
| 224 | | 0.22µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | | | |
| 274 | | 0.27µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | | | | |
| 334 | | 0.33µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | | | | |
| 394 | | 0.39µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | | | | |
| 474 | | 0.47µF | 0.95±0.10 | 0.95±0.10 | 0.95±0.10 | 1.25±0.10 | | | | |
| 564 | | 0.56µF | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |
| 684 | | 0.68µF | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |
| 824 | | 0.82µF | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |
| 105 | | 1µF | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | 1.25±0.10 | | | | |
| 155 | | 1.5µF | | 2.00±0.20 | | | | | | |
| 225 | | 2.2µF | | 2.00±0.20 | | 2.50±0.30 | 2.50±0.30 | | | |
| 475 | | 4.7µF | | | | 2.50±0.30 | 2.50±0.30 | | | |
| 106 | | 10µF | | | | 2.50±0.30 | | | | |

## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>1.</td><td>Visual and Mechanical</td><td>* Visual Inspection<br>* Measurement by precision caplipers</td><td>* No remarkable defect.<br>* Dimensions to conform to individual specification sheet.</td></tr>
<tr><td>2.</td><td>Electrical Characterization - Capacitance</td><td>Q/D.F. (Dissipation Factor)<br>Test Temp: Room Temperature.<br><br>Class I: (NP0)<br><br>Cap≤1000pF, 1.0±0.2Vrms, 1MHz±10%<br>Cap>1000pF, 1.0±0.2Vrms, 1KHz±10%<br><br>Class II: (X7R)<br>Cap<10μF, 1.0±0.2Vrms, 1KHz±10%<br>Cap≥10μF, 0.5±0.2Vrms, 120Hz±20%<br><br>.</td><td>* Capacitance within the specified tolerance.<br>* Q/D.F. value:<br>NP0: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C.<br>X7R:
<table>
<tr><th>RATED VOL.</th><th>D.F.≤</th><th colspan="2">EXCEPTION OF D.F.≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>1206≥0.47μF</td></tr>
<tr><td>≤5%</td><td>0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr>
<tr><td>≤10%</td><td>0805>0.22μF; 1210≥3.3μF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>0201(50V);0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
<tr><td>≤5%</td><td>0201≥0.01uF;1210≥3.3μF</td></tr>
<tr><td>≤10%</td><td>0402≥0.012μF; 0603>0.1μF; 0805≥0.47μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>35V</td><td>≤3.5%</td><td>≤10%</td><td>0603≥1μF; 0805≥2.2μF ;1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
<tr><td>≤7%</td><td>0603≥0.33μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td>≤12.5%</td><td>0402≥0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.022μF; 0402≥0.15uF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td rowspan="2">6.3V</td><td rowspan="2">≤10%</td><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>≤20%</td><td>0402≥2.2μF</td></tr>
<tr><td>4V</td><td>≤15%</td><td>-</td><td>_</td></tr>
</table></td></tr>
<tr><td>3.</td><td>Electrical Characterization- Insulation Resistance</td><td>Test Temp: Room Temperature.<br>To apply rated voltage(500V max.) for max. 120sec.</td><td>* IR. ≥10GΩ or RxC≥500Ω-F whichever is smaller.<br>Class II (X7R)
<table>
<tr><th>Rated Voltage</th><th>Insulation Resistance</th></tr>
<tr><td>100V: All X7R</td><td rowspan="6">10GΩ or<br>RxC ≥100Ω-F<br>whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>25V: 0402≥1μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr>
<tr><td>16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF: 1206≥10μF; 1210≥47μF</td></tr>
<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td><td rowspan="2"></td></tr>
<tr><td>Rated Voltage</td><td>Insulation Resistance</td></tr>
<tr><td>100V: 1210≥3.3μF</td><td rowspan="8">RxC ≥50Ω-F</td></tr>
<tr><td>50V: 0402≥0.1μF; 0603≥2.2μF; 0805≥10μF; 1206≥10μF</td></tr>
<tr><td>35V: 0603≥1μF</td></tr>
<tr><td>25V: 0201≥0.1μF; 0402≥2.2μF; 0603≥10μF; 0805≥10μF; 1206≥22μF</td></tr>
<tr><td>16V: 0201≥0.22μF; 0402≥1μF; 0603≥10μF</td></tr>
<tr><td>10V: 0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥47μF</td></tr>
<tr><td>6.3V: 0201≥0.1μF; 0402≥1μF; 0603≥4.7μF; 0805≥47μF; 1206≥10μF</td></tr>
<tr><td>4V: 0603≥22μF; 0805≥47μF; 1206≥100μF</td></tr>
</table></td></tr>
</table>

## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>3.</td><td>Electrical Characterization-Dielectric Strength</td><td>* To apply voltage:<br><br>≤100V: ≥250% of rated voltage.<br>200V ~ 300V: ≥200% of rated voltage.<br>400V ~ 450V: ≥120% of rated voltage.<br>500V ~ 999V: ≥150% of rated voltage.<br>1000V ~ 3000V: ≥120% of rated voltage.<br>*Duration: 1 to 5 sec.<br>*Charge & discharge current less than 50mA.<br>*Temperature Coefficient (with no electrical load)<br>*Operation Temperature: -55-125°C at 25°C</td><td>* No evidence of damage or flash over during test.<br><br>*Temperature Coefficient<br>Capacitance Change: NPO: Within ±30ppm/°C<br>X7R: Within ±15%</td></tr>
<tr><td>4.</td><td>High Temperature Exposure (Storage)<br><br>MIL-STD-202<br>Method 108</td><td>* Test temp: 150±3°C<br>* Unpowered<br>* Test time: 1000+24/-0 hrs.<br>* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable damage.<br>* Cap change: NPO: within ±2.5% or ±0.25pF whichever is larger.<br>X7R: within ±10%<br>*Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C.<br>X7R:
<table>
<tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th>EXCEPTION OF D.F. ≤</th><th></th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>1206≥0.47μF</td></tr>
<tr><td>≤7.5%</td><td>0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr>
<tr><td>≤20%</td><td>0805>0.22μF; 1210≥3.3μF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>0201(50V): 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.01μF: 1210≥3.3μF</td></tr>
<tr><td>≤20%</td><td>0402≥0.012μF: 0603≥0.1μF; 0805≥0.47μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>35V</td><td>≤5%</td><td>≤20%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤5%</td><td>≤10%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
<tr><td>≤14%</td><td>0603≥0.33μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td>≤20%</td><td>0402≥0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.22μF; 0402≥0.33μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤7.5%</td><td>≤15%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr>
<tr><td>≤20%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>4V</td><td>≤20%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥ 10GΩ or RxC≥500Ω-F whichever is smaller<br><br>Class II (X7R)
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: All X7R; 1210≥3.3μF</td><td rowspan="7">1GΩ or RxC ≥10Ω-F whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>25V: 0201≥0.1μF; 0402≥0.22μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr>
<tr><td>16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF: 1206≥10μF; 1210≥47μF</td></tr>
<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td></tr>
</table></td></tr>
</table>

## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>5.</td><td>Temperature Cycling<br><br>JESD22<br>Method JA-104</td><td>* Conduct 1000 cycles according to the temperatures and time.<br><br>
<table>
<tr><th>STEP</th><th>TEMP. (°C)</th><th>TIME (MIN.)</th></tr>
<tr><td>1</td><td>-55°C +0/-3</td><td>5±1</td></tr>
<tr><td>2</td><td>+125°C +3/-0</td><td>5±1</td></tr>
</table>
<br>* Before initial measurement (X7R only): Perform 150+0/-10°CFOR 1hr and then set for 24±2 hrs at room temp.<br>* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable damage.<br>* Cap change: NPO: within ±2.5% or ±0.25pF whichever is larger.<br>X7R: within ±10%<br>*Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C.<br>X7R:
<table>
<tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th colspan="2">EXCEPTION OF D.F. ≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>1206≥0.47μF</td></tr>
<tr><td>≤7.5%</td><td>0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr>
<tr><td>≤20%</td><td>0805>0.22μF; 1210≥3.3μF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>0201(50V): 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.01μF: 1210≥3.3μF</td></tr>
<tr><td>≤20%</td><td>0402≥0.012μF: 0603≥0.1μF; 0805≥0.47μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>35V</td><td>≤5%</td><td>≤20%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤5%</td><td>≤10%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
<tr><td>≤14%</td><td>0603≥0.33μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td>≤20%</td><td>0402≥0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.22μF; 0402≥0.33μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤7.5%</td><td>≤15%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr>
<tr><td>≤20%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>4V</td><td>≤20%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥ 10GΩ or RxC≥500Ω-F whichever is smaller<br><br>Class II (X7R)
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: All X7R; 1210≥3.3μF</td><td rowspan="6">1GΩ or RxC ≥10Ω-F whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>25V: 0201≥0.1μF; 0402≥0.22μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr>
<tr><td>16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF: 1206≥10μF; 1210≥47μF</td></tr>
<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td></tr>
</table>
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</table>

## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>6.</td><td>Moisture Resistance<br><br>MIL-STD-202<br>Method 106</td><td>* Test temp.: 25-65°C<br><br>* Humidity: 80-100% RH<br><br>* Test time: 10 cycles, t=24hrs/cycle.<br><br>* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable damage.<br>* Cap change: NPO: within ±3.0% or ±0.30pF whichever is larger.<br>X7R: within ±12.5%<br>*Q/D.F. value:<br>NPO: More than 30pF Q≥350; 10pF≤Cap<30pF, Q≥275+2.5C.<br>Less than 10pF Q≥200+10C<br>X7R:
<table>
<tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th colspan="2">EXCEPTION OF D.F. ≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>1206≥0.47μF</td></tr>
<tr><td>≤7.5%</td><td>0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr>
<tr><td>≤20%</td><td>0805>0.22μF; 1210≥3.3μF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>0201(50V): 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.01μF: 1210≥3.3μF</td></tr>
<tr><td>≤20%</td><td>0402≥0.012μF: 0603≥0.1μF; 0805≥0.47μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>35V</td><td>≤5%</td><td>≤20%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤5%</td><td>≤10%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
<tr><td>≤14%</td><td>0603≥0.33μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td>≤20%</td><td>0402≥0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.022μF; 0402≥0.033μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤7.5%</td><td>≤15%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr>
<tr><td>≤20%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>4V</td><td>≤20%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥ 10GΩ or RxC≥500Ω-F whichever is smaller<br><br>Class II (X7R)
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: All X7R; 1210≥3.3μF</td><td rowspan="6">1GΩ or RxC ≥10Ω-F whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>25V: 0201≥0.1μF; 0402≥0.22μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr>
<tr><td>16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF: 1206≥10μF; 1210≥47μF</td></tr>
<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td><td></td></tr>
</table></td></tr>
</table>

## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>7.</td><td>Biased Humidity<br><br>MIL-STD-202<br>Method 103</td><td>* Test temp.: 85±3°C<br><br>* Humidity: 85% RH<br><br>* Test time: 1000+24/-0 hrs.<br><br>* To apply voltage: rated voltage and 1.3-1.5Vdc. (add 100k ohm resistor).<br><br>* Before initial measurement (Class II only): To apply test voltage for 1hr at test temp. and then set for 24±2hrs at room temp.<br><br>* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable damage.<br>* Cap change: NPO: within ±3.0% or ±0.30pF whichever is larger.<br>X7R: within ±12.5%<br>*Q/D.F. value:<br>NPO: Cap≥30pF, Q≥200; Cap<30pF, Q≥100+10/3C.<br>X7R:
<table>
<tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th colspan="2">EXCEPTION OF D.F. ≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>1206≥0.47μF</td></tr>
<tr><td>≤7.5%</td><td>0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr>
<tr><td>≤20%</td><td>0805>0.22μF; 1210≥3.3μF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>0201(50V): 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.01μF: 1210≥3.3μF</td></tr>
<tr><td>≤20%</td><td>0402≥0.012μF: 0603≥0.1μF; 0805≥0.47μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>35V</td><td>≤5%</td><td>≤20%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤5%</td><td>≤10%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
<tr><td>≤14%</td><td>0603≥0.33μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td>≤20%</td><td>0402≥0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.022μF; 0402≥0.033μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤7.5%</td><td>≤15%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr>
<tr><td>≤20%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>4V</td><td>≤20%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥ 1GΩ or RxC≥50Ω-F whichever is smaller<br>Class II (X7R) for rated voltage test
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: All X7R; 1210≥3.3μF</td><td rowspan="7">500MΩ or RxC ≥5Ω-F whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
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<tr><td>16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF: 1206≥10μF; 1210≥47μF</td></tr>
<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td></tr>
</table>
Class II (X7R) for 1.3-1.5Vdc
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: All X7R; 1210≥3.3μF</td><td rowspan="7">1GΩ or RxC ≥10Ω-F whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>25V: 0201≥0.1μF; 0402≥0.22μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr>
<tr><td>16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF: 1206≥10μF; 1210≥47μF</td></tr>
<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td></tr>
</table></td></tr>
</table>

## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>8.</td><td>Operational Life<br><br>MIL-STD-202<br>Method 108</td><td>* Test temp.: 125±3°C<br><br>* To apply voltage:<br>(1) 10V≤Ur≤250V: 200% of rated voltage.<br>(2) 150% of rated voltage:<br>a) 500V<br>b) 0603/X7R/50V/Cap.≥0.1μF<br>c) 0805/X7R/50V/Cap.≥0.68μF<br>d) 1206/X7R/100V/Cap.≥1.0μF<br>e) 1210/X7R/50V&100V/Cap.≥2.2μF<br>(3) 630V≤Ur≤1000V: 120% of rated voltage.<br><br>* Test time: 1000+24/-0 hrs.<br><br>* Before initial measurement (X7R only): To apply test voltage for 1hr at 125°C. Remove and let set for 24±2 hrs at room temp.<br><br>* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable damage.<br>* Cap change: NPO: within ±3.0% or ±0.30pF whichever is larger.<br>X7R: within ±12.5%<br>*Q/D.F. value:<br>NPO: More than 30pF Q≥350; 10pF≤Cap<30pF, Q≥275+2.5C.<br>Less than 10pF Q≥200+10C<br>X7R:
<table>
<tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th colspan="2">EXCEPTION OF D.F. ≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>1206≥0.47μF</td></tr>
<tr><td>≤7.5%</td><td>0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr>
<tr><td>≤20%</td><td>0805>0.22μF; 1210≥3.3μF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>0201(50V): 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.01μF: 1210≥3.3μF</td></tr>
<tr><td>≤20%</td><td>0402≥0.012μF: 0603≥0.1μF; 0805≥0.47μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>35V</td><td>≤5%</td><td>≤20%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤5%</td><td>≤10%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
<tr><td>≤14%</td><td>0603≥0.33μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td>≤20%</td><td>0402≥0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.022μF; 0402≥0.033μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤7.5%</td><td>≤15%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr>
<tr><td>≤20%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>4V</td><td>≤20%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥ 1GΩ or RxC≥50Ω-F whichever is smaller<br>Class II (X7R)
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: All X7R; 1210≥3.3μF</td><td rowspan="6">1GΩ or<br>RxC ≥10Ω-F whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>25V: 0201≥0.1μF; 0402≥0.22μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr>
<tr><td>16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF: 1206≥10μF; 1210≥47μF</td></tr>
<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td></tr>
</table></td></tr>
<tr><td>9.</td><td>External Visual<br><br>MIL-STD-883<br>Method 2009</td><td>* Visual Inspection</td><td>* No remarkable defect.</td></tr>
<tr><td>10.</td><td>Physical Dimension<br><br>JESD22<br>Method JB-100</td><td>* Using by calipers</td><td>* Within the specified dimensions</td></tr>
</table>

## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>11.</td><td>Resistance to Solvents<br><br>MIL-STD-202<br>Method 215</td><td>* Temperature.: 25±5°C<br><br>* Time: 3+0.5/-0 min.<br><br>* Solvent: Iso-propyl alcohol.</td><td>* No remarkable damage.<br>* Cap.: within the specified tolerance.<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C.<br>X7R:
<table>
<tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th colspan="2">EXCEPTION OF D.F. ≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>1206≥0.47μF</td></tr>
<tr><td>≤5%</td><td>0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr>
<tr><td>≤10%</td><td>0805>0.22μF; 1210≥3.3μF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>0201(50V): 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
<tr><td>≤5%</td><td>0201≥0.01μF: 1210≥3.3μF</td></tr>
<tr><td>≤10%</td><td>0402≥0.012μF: 0603≥0.1μF; 0805≥0.47μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>35V</td><td>≤3.5%</td><td>≤10%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
<tr><td>≤7%</td><td>0603≥0.33μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td>≤12.5%</td><td>0402≥0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.022μF; 0402≥0.15μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td rowspan="2">6.3V</td><td rowspan="2">≤10%</td><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>≤20%</td><td>0402≥2.2μF</td></tr>
<tr><td>4V</td><td>≤15%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥ 10GΩ or RxC≥500Ω-F whichever is smaller<br>Class II (X7R)
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: All X7R</td><td rowspan="6">10GΩ or RxC ≥100Ω-F whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>25V: 0402≥1μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr>
<tr><td>16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF: 1206≥10μF; 1210≥47μF</td></tr>
<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td><td></td></tr>
</table>
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: 1210≥3.3μF</td><td rowspan="7">RxC ≥50Ω-F.</td></tr>
<tr><td>50V: 0402≥0.1μF; 0603≥2.2μF; 0805≥10μF; 1206≥10μF</td></tr>
<tr><td>35V: 0603≥1μF</td></tr>
<tr><td>25V: 0201≥0.1μF; 0402≥2.2μF; 0603≥10μF; 0805≥10μF; 1206≥22μF</td></tr>
<tr><td>16V: 0201≥0.22μF; 0402≥1μF; 0603≥10μF</td></tr>
<tr><td>10V: 0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥47μF</td></tr>
<tr><td>6.3V: 0201≥0.1μF; 0402≥1μF; 0603≥4.7μF; 0805≥47μF; 1206≥10μF</td></tr>
<tr><td>4V: 0603≥22μF; 0805≥47μF; 1206≥100μF</td><td></td></tr>
</table></td></tr>
</table>

## RELIABILITY TEST CONDITIONS & REQUIREMENTS

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<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>12.</td><td>Mechanical Shock<br><br>MIL-STD-202<br>Method 213</td><td>* Peak value: 1500g's<br><br>* Wave: 1/2 sine.<br><br>* Velocity: 15.4 ft/sec<br><br>* Three shocks in each direction should be applied along 3 mutually perpindicular axis of the test speicmen (18 shocks)</td><td>* No remarkable damage.<br>* Cap.: within the specified tolerance.<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C.<br>X7R:
<table>
<tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th colspan="2">EXCEPTION OF D.F. ≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>1206≥0.47μF</td></tr>
<tr><td>≤5%</td><td>0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr>
<tr><td>≤10%</td><td>0805>0.22μF; 1210≥3.3μF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>0201(50V): 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
<tr><td>≤5%</td><td>0201≥0.01μF: 1210≥3.3μF</td></tr>
<tr><td>≤10%</td><td>0402≥0.012μF: 0603≥0.1μF; 0805≥0.47μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>35V</td><td>≤3.5%</td><td>≤10%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
<tr><td>≤7%</td><td>0603≥0.33μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td>≤12.5%</td><td>0402≥0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.022μF; 0402≥0.15μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td rowspan="2">6.3V</td><td rowspan="2">≤10%</td><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>≤20%</td><td>0402≥2.2μF</td></tr>
<tr><td>4V</td><td>≤15%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥ 10GΩ or RxC≥500Ω-F whichever is smaller<br>Class II (X7R)
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: All X7R</td><td rowspan="6">10GΩ or<br>RxC ≥100Ω-F whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>25V: 0402≥1μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr>
<tr><td>16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF: 1206≥10μF; 1210≥47μF</td></tr>
<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td><td></td></tr>
</table>
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: 1210≥3.3μF</td><td rowspan="7">RxC ≥50Ω-F.</td></tr>
<tr><td>50V: 0402≥0.1μF; 0603≥2.2μF; 0805≥10μF; 1206≥10μF</td></tr>
<tr><td>35V: 0603≥1μF</td></tr>
<tr><td>25V: 0201≥0.1μF; 0402≥2.2μF; 0603≥10μF; 0805≥10μF; 1206≥22μF</td></tr>
<tr><td>16V: 0201≥0.22μF; 0402≥1μF; 0603≥10μF</td></tr>
<tr><td>10V: 0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥47μF</td></tr>
<tr><td>6.3V: 0201≥0.1μF; 0402≥1μF; 0603≥4.7μF; 0805≥47μF; 1206≥10μF</td></tr>
<tr><td>4V: 0603≥22μF; 0805≥47μF; 1206≥100μF</td><td></td></tr>
</table></td></tr>
</table>

## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>13.</td><td>Vibration<br><br>MIL-STD-202<br>Method 204</td><td>* Vibration frequency: 10-2000Hz/min. (5g's for 20min)<br><br>* Total amplitude: 1.5mm.<br><br>* 12 cycles each of 3 orientations (36 times)</td><td>* No remarkable damage.<br>* Cap.: within the specified tolerance.<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C.<br>X7R:
<table>
<tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th colspan="2">EXCEPTION OF D.F. ≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>1206≥0.47μF</td></tr>
<tr><td>≤5%</td><td>0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr>
<tr><td>≤10%</td><td>0805>0.22μF; 1210≥3.3μF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>0201(50V): 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
<tr><td>≤5%</td><td>0201≥0.01μF: 1210≥3.3μF</td></tr>
<tr><td>≤10%</td><td>0402≥0.012μF: 0603≥0.1μF; 0805≥0.47μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>35V</td><td>≤3.5%</td><td>≤10%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
<tr><td>≤7%</td><td>0603≥0.33μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td>≤12.5%</td><td>0402≥0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.022μF; 0402≥0.15μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td rowspan="2">6.3V</td><td rowspan="2">≤10%</td><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>≤20%</td><td>0402≥2.2μF</td></tr>
<tr><td>4V</td><td>≤15%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥ 10GΩ or RxC≥500Ω-F whichever is smaller<br>Class II (X7R) for rated voltage test
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: All X7R</td><td rowspan="6">10GΩ or RxC ≥100Ω-F whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>25V: 0402≥1μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr>
<tr><td>16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF: 1206≥10μF; 1210≥47μF</td></tr>
<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td><td></td></tr>
</table>
Class II (X7R) for 1.3-1.5Vdc
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: 1210≥3.3μF</td><td rowspan="6">RxC ≥50Ω-F.</td></tr>
<tr><td>50V: 0402≥0.1μF; 0603≥2.2μF; 0805≥10μF; 1206≥10μF</td></tr>
<tr><td>35V: 0603≥1μF</td></tr>
<tr><td>25V: 0201≥0.1μF; 0402≥2.2μF; 0603≥10μF; 0805≥10μF; 1206≥22μF</td></tr>
<tr><td>16V: 0201≥0.22μF; 0402≥1μF; 0603≥10μF</td></tr>
<tr><td>10V: 0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥47μF</td></tr>
<tr><td>6.3V: 0201≥0.1μF; 0402≥1μF; 0603≥4.7μF; 0805≥47μF; 1206≥10μF</td><td></td></tr>
<tr><td>4V: 0603≥22μF; 0805≥47μF; 1206≥100μF</td><td></td></tr>
</table></td></tr>
</table>

## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>14.</td><td>Resistance to Soldering Heat<br><br>MIL-STD-202<br>Method 210</td><td>* Solder temperature: 260±5°C<br><br>* Dipping time: 10±1 sec<br><br>* Before initial measurement (X7R only): Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp.<br><br>* Measurement to be made after keeping at room temp. for 24±2 hrs</td><td>* No remarkable damage.<br>* Cap. change: NPO: within ±2.5% or 0.25pF whichever is larger<br>X7R: within ±7.5%<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C.<br>X7R:
<table>
<tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th colspan="2">EXCEPTION OF D.F. ≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>1206≥0.47μF</td></tr>
<tr><td>≤5%</td><td>0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr>
<tr><td>≤10%</td><td>0805>0.22μF; 1210≥3.3μF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>0201(50V): 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
<tr><td>≤5%</td><td>0201≥0.01μF: 1210≥3.3μF</td></tr>
<tr><td>≤10%</td><td>0402≥0.012μF: 0603≥0.1μF; 0805≥0.47μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>35V</td><td>≤3.5%</td><td>≤10%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
<tr><td>≤7%</td><td>0603≥0.33μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td>≤12.5%</td><td>0402≥0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.022μF; 0402≥0.15μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td rowspan="2">6.3V</td><td rowspan="2">≤10%</td><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>≤20%</td><td>0402≥2.2μF</td></tr>
<tr><td>4V</td><td>≤15%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥ 10GΩ or RxC≥500Ω-F whichever is smaller<br>Class II (X7R)
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: All X7R</td><td rowspan="6">10GΩ or RxC ≥100Ω-F whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
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<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td><td></td></tr>
</table>
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: 1210≥3.3μF</td><td rowspan="7">RxC ≥50Ω-F.</td></tr>
<tr><td>50V: 0402≥0.1μF; 0603≥2.2μF; 0805≥10μF; 1206≥10μF</td></tr>
<tr><td>35V: 0603≥1μF</td></tr>
<tr><td>25V: 0201≥0.1μF; 0402≥2.2μF; 0603≥10μF; 0805≥10μF; 1206≥22μF</td></tr>
<tr><td>16V: 0201≥0.22μF; 0402≥1μF; 0603≥10μF</td></tr>
<tr><td>10V: 0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥47μF</td></tr>
<tr><td>6.3V: 0201≥0.1μF; 0402≥1μF; 0603≥4.7μF; 0805≥47μF; 1206≥10μF</td></tr>
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## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>15.</td><td>Thermal Shock<br><br>MIL-STD-202<br>Method 107</td><td>* Conduct 300 cycles according to the temperatures and time.<br><br><table><tr><th>STEP</th><th>TEMP. (°C)</th><th>TIME (MIN.)</th></tr><tr><td>1</td><td>-55°C +0/-3</td><td>15±3</td></tr><tr><td>2</td><td>+125°C +3/-0</td><td>15±3</td></tr></table><br>* Before initial measurement (X7R only): Perform 150+0/-10°C for 1hr and then set for 24±2 hrs at room temp.<br><br>* Measurement to be made after keeping at room temp. for 24±2 hrs.<br><br>* Max. transfer time: 20 sec.</td><td>* No remarkable damage.<br>* Cap change: NPO: within ±2.5% or ±0.25pF whichever is larger.<br>X7R: within ±10%<br>*Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C.<br>X7R:<br><table><tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th colspan="2">EXCEPTION OF D.F. ≤</th></tr><tr><td rowspan="3">≥100V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>1206≥0.47μF</td></tr><tr><td>≤7.5%</td><td>0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr><tr><td>≤20%</td><td>0805>0.22μF; 1210≥3.3μF</td></tr><tr><td rowspan="3">50V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>0201(50V): 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr><tr><td>≤10%</td><td>0201≥0.01μF: 1210≥3.3μF</td></tr><tr><td>≤20%</td><td>0402≥0.012μF: 0603≥0.1μF; 0805≥0.47μF; 1206≥2.2μF; 1210≥10μF</td></tr><tr><td>35V</td><td>≤5%</td><td>≤20%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr><tr><td rowspan="4">25V</td><td rowspan="4">≤5%</td><td>≤10%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr><tr><td>≤14%</td><td>0603≥0.33μF</td></tr><tr><td>≤15%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr><tr><td>≤20%</td><td>0402≥0.47μF</td></tr><tr><td rowspan="2">16V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr><tr><td>≤15%</td><td>0201≥0.022μF; 0402≥0.033μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr><tr><td rowspan="2">10V</td><td rowspan="2">≤7.5%</td><td>≤15%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr><tr><td>≤20%</td><td>0201≥0.1μF; 0402≥1μF</td></tr><tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr><tr><td>4V</td><td>≤20%</td><td>---</td><td>---</td></tr></table><br>* I.R.: ≥ 10GΩ or RxC≥500Ω-F whichever is smaller<br><br>Class II (X7R)<br><table><tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr><tr><td>100V: All X7R; 1210≥3.3μF</td><td rowspan="6">1GΩ or<br>RxC ≥10Ω-F whichever is smaller</td></tr><tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr><tr><td>35V: 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr><tr><td>25V: 0201≥0.1μF; 0402≥0.22μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr><tr><td>16V: 0201≥0.1μF; 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF: 1206≥10μF; 1210≥47μF</td></tr><tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr><tr><td>6.3V: 4V; Size≥1812</td></tr></table></td></tr>
<tr><td>16.</td><td>Solerability<br><br>J-STD-002<br>JESD22-B102E</td><td>* Condition A<br>Un-mounted chips 4hrs/155°C* dry then completely immersed for 5±.5 sec in solder bath at 235±5°C.<br><br>* Condition B<br>Un-mounted chips steam 8hrs then completely immersed for 10±1 sec in solder bath at 215±5/-0°C.<br><br>* Condition C<br>Un-mounted chips steam 8hrs then completely immersed for 10±1 sec in solder bath at 260±0/-5°C.</td><td>* All terminations shall exhibit a continuous solder coating free from defects from a minimum of 95% of the critical surface area of any individual termination.</td></tr>
</table>

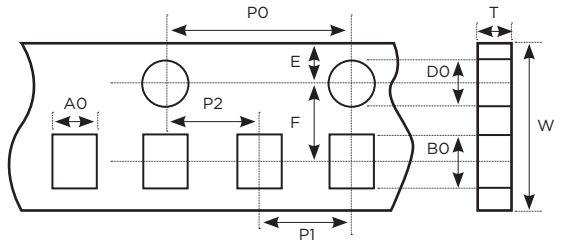
## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>17.</td><td>ESD<br><br>AEC-Q200-002</td><td>* Per AEC-Q200-002</td><td>
* No remarkable damage.<br>
* Cap. change: within the specified tolerance.<br>
* Q/D.F. value:<br>
NPO: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C.<br>
X7R:
<table>
<tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th colspan="2">EXCEPTION OF D.F. ≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>1206≥0.47μF</td></tr>
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<tr><td>35V</td><td>≤3.5%</td><td>≤10%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
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<tr><td rowspan="2">10V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td rowspan="2">6.3V</td><td rowspan="2">≤10%</td><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>≤20%</td><td>0402≥2.2μF</td></tr>
<tr><td>4V</td><td>≤15%</td><td>---</td><td>---</td></tr>
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* I.R.: ≥ 10GΩ or RxC≥500Ω-F whichever is smaller<br>
Class II (X7R)
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: All X7R</td><td rowspan="6">10GΩ or<br>RxC ≥100Ω-F whichever is smaller</td></tr>
<tr><td>50V: 0402≥0.01μF; 0603≥1μF; 0805≥1μF; 1206≥4.7μF; 1210≥4.7μF</td></tr>
<tr><td>35V: 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td>25V: 0402≥1μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr>
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<tr><td>10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF: 1206≥4.7μF; 1210≥47μF</td></tr>
<tr><td>6.3V: 4V; Size≥1812</td><td></td></tr>
</table>
<table>
<tr><th>RATED VOLTAGE</th><th>INSULATION RESISTANCE</th></tr>
<tr><td>100V: 1210≥3.3μF</td><td rowspan="7">RxC ≥50Ω-F.</td></tr>
<tr><td>50V: 0402≥0.1μF; 0603≥2.2μF; 0805≥10μF; 1206≥10μF</td></tr>
<tr><td>35V: 0603≥1μF</td></tr>
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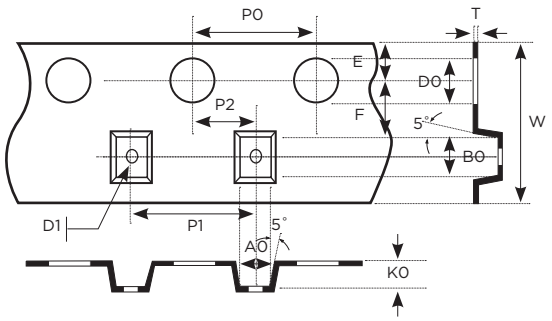
## RELIABILITY TEST CONDITIONS & REQUIREMENTS

<table>
<tr><th></th><th>ITEM</th><th>AEC-Q200 TEST CONDITION</th><th>REQUIREMENTS</th></tr>
<tr><td>18.</td><td>Terminal Strength<br><br>AEC-Q200-006</td><td>* Pressurizing force: 2N (0201 & 0402), 10N(0603), 18N(≥0805).<br><br>* Test time: 60±1 sec.</td><td>* No remarkable damage or removal of the terminations.<br>* Capacitance within the specified tolerance.<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C.<br>X7R:
<table>
<tr><th>RATED VOLTAGE</th><th>D.F. ≤</th><th colspan="2">EXCEPTION OF D.F. ≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>1206≥0.47μF</td></tr>
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<tr><td rowspan="3">50V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>0201(50V): 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr>
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<tr><td>35V</td><td>≤3.5%</td><td>≤10%</td><td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr>
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<tr><td>≤10%</td><td>0201≥0.1μF; 0402≥0.056μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
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<tr><td rowspan="2">16V</td><td rowspan="2">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF; 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.022μF; 0402≥0.15μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>0201≥0.012μF; 0402≥0.15μF; 0603≥0.33μF; 0805≥2.2μF;1206≥2.2μF;1210≥22μF</td></tr>
<tr><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF</td></tr>
<tr><td rowspan="2">6.3V</td><td rowspan="2">≤10%</td><td>≤15%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr>
<tr><td>≤20%</td><td>0402≥2.2μF</td></tr>
<tr><td>4V</td><td>≤15%</td><td>---</td><td>---</td></tr>
</table></td></tr>
<tr><td>19.</td><td>Board Flex<br><br>AEC-Q200-005</td><td>* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 3mm (2mm for X7R) and then the pressure shall be maintained for 60±1 sec.<br><br>* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable damage<br><br>* Cap change: NPO: within ±5% or ±0.5pF whichever is larger.<br>X7R: within ±12.5%<br>(This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test.)</td></tr>
<tr><td>20.</td><td>Beam Load Test<br><br>AEC-Q200-003</td><td>* Break strength test<br><br>* Beam speed: 2.5±.25mm/sec</td><td>* The chip endures following force<br>(1) Chip length ≤2.5mm: Thickness>0.5mm (20N), ≤0.5mm (8N)<br>(2) Chip length ≥3.2mm: Thickness≥1.25mm (54.5N), <1.25mm (15N)</td></tr>
<tr><td>21.</td><td>Destructive Physical Analysis<br><br>EIA-469</td><td>* Per EIA-469</td><td>* No defects or abnormalities.</td></tr>
</table>

## TAPE AND REEL SPECIFICATIONS

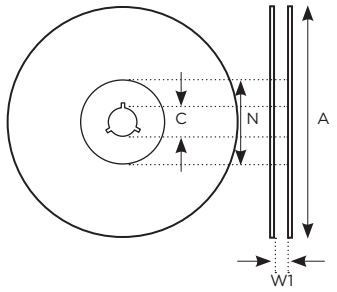



PAPER TAPE DIMENSIONS




PLASTIC TAPE DIMENSIONS

| SIZE | 0201 | 0402 | 0603 | 0805 | | | 1206 | | | 1210 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Thickness (mm) | 0.30±0.03 | 0.50±0.05 | 0.80±0.07/ 0.80+0.15/-0.1 | 0.60±0.10 | 0.80±0.10 | 1.25±0.10/ 1.25±0.20 | 0.80±0.10 | 0.95±0.10/ 1.15±0.15/ 1.25±0.10 | 1.60±0.20/ 1.60+0.30/-0.1 | 0.95±0.10/ 1.25±0.10/ 1.60±0.20/ 2.00±0.20 | 2.50±0.30 |
| A0 | 0.40±0.10 | 0.70±0.20 | 1.05±0.30 | 1.50±0.20 | 1.50±0.20 | < 1.80 | 1.90±0.50 | < 2.00 | <2.30 | < 3.05 | < 3.20 |
| B0 | 0.70±0.10 | 1.20±0.20 | 1.80±0.30 | 2.30±0.20 | 2.30±0.20 | < 2.70 | 3.50±0.50 | < 3.70 | < 4.00 | < 3.80 | <4.00 |
| T | ≤0.55 | ≤0.80 | ≤1.20 | ≤1.15 | ≤1.20 | 0.23±0.1 | ≤1.20 | 0.23±0.1 | 0.23±0.1 | 0.23±0.1 | 0.23±0.1 |
| K0 | - | - | - | - | - | < 2.50 | - | < 2.50 | < 2.50 | < 2.50 | < 3.20 |
| W | 8.00±0.30 | 8.00±0.30 | 8.00±0.30 | 8.00±0.30 | 8.00±0.30 | 8.00±0.30 | 8.00±0.30 | 8.00±0.30 | 8.00±0.30 | 8.00±0.30 | 8.00±0.30 |
| P0 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| P1 | 2.00±0.05 | 2.00±0.05 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| P2 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 |
| D0 | 1.50+0.1/-0 | 1.50+0.1/-0 | 1.50+0.1/-0 | 1.50+0.1/-0 | 1.50+0.1/-0 | 1.50+0.1/-0 | 1.50+0.1/-0 | 1.50+0.1/-0 | 1.50+0.1/-0 | 1.50+0.1/-0 | 1.50+0.1/-0 |
| D1 | - | - | - | - | - | 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 | 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 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 |




REEL DIMENSIONS

| SIZE | 0201, 0402, 0603, 0805, 1206, 1210 | |
|---|---|---|
| Reel Size | 7" | 13" |
| C | 13.0±0.5 | 13.0±0.5 |
| W1 | 10.0±1.5 | 10.0±1.5 |
| A | 178.0±2.0 | 330.0±2.0 |
| N | 60.0+1.0/-0 | 50 min |

| SIZE | THICKNESS | PAPER TAPE | | PLASTIC TAPE | |
|---|---|---|---|---|---|
| | | 7" REEL | 13" REEL | 7" REEL | 13" REEL |
| 0201 | 0.30±0.03 | 15K | 70K | - | - |
| 0402 | 0.50±0.05 | 10K | 50K | - | - |
| 0603 | 0.80±0.07 | 4K | 15K | - | - |
| | 0.80+0.15/-0.1 | 4K | 15K | - | - |
| 0805 | 0.60±0.10 | 4K | 15K | - | - |
| | 0.80±0.10 | 4K | 15K | - | - |
| | 1.25±0.10 | - | - | 3K | 10K |
| | 1.25±0.20 | - | - | 3K | 10K |
| 1206 | 0.80±0.10 | 4K | 15K | - | - |
| | 0.95±0.10 | - | - | 3K | 10K |
| | 1.15±0.15 | - | - | 3K | 10K |
| | 1.25±0.10 | - | - | 3K | 10K |
| | 1.60±0.20 | - | - | 2K | 10K |
| | 1.60+0.30/-0.1 | - | - | 2K | 9K |
| 1210 | 0.95±0.10 | - | - | 3K | 10K |
| | 1.25±0.10 | - | - | 3K | 10K |
| | 1.60±0.20 | - | - | 2K | 8K |
| | 2.00±0.20 | - | - | 1K | 6K |
| | 2.50±0.30 | - | - | 1K | 6K |

# Unikeyic Electronics

Global Electronic Components Distributor

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## VENKEL:

CTL0805FGR1T-CT C0201X5R100-474MNP C0805X7R201-121MNP-CT C0805X7R501-102KNP
CR0402-16W-3831FT CR1206-8W-1104FT SMAJ15CAS4-EVL TFCR1206-8W-E-2001BT
C0402X5R250-104MNP-CT C0603C0G500-390JNP-CT C1206Y5V160-106MNE-CT
C0402C0G250-9R1DNP-CT C0402Z5U250-103MNP-CT C0603C0G250-270KNE-CT C0805X5R250-225KNE
CR0603-16W-8250FT C0402C0G250-271FNP C0402HQN500-150FNP C0603X7R101-182KNP-CT
C0201X5R6R3-333KNP-CT C0603Y5V250-104MNE-CT CR1206-4W-7153FT C0603C0G500-8R2CNE-CT
C0805X5R500-106KNE C0805X5R500-225KNE-CT CR0201-20W-302JT CR0402-16W-9531FT
C0402C0G500-151JNE C0402X7R250-822KNE-CT C2220X7R500-106MNE