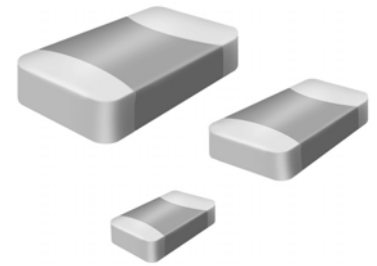


Multilayer Ceramic Chip Capacitors Products – NPO, X7R, Y5V

HOW TO ORDER

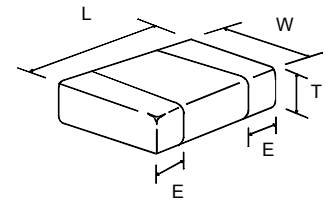
| | | | | | | | |
|-------------|----------|------------|----------|------------|----------|----------|---|
| 0603 | N | 101 | J | 500 | N | T | |
| | | | | | | | Packaging Code |
| | | | | | | | T = 7" reel/paper tape B = Bulk |
| | | | | | | | Termination |
| | | | | | | | N = Ag/Ni/SnPb L = Ag/Ni/Sn B = Cu/Ni/SnPb C = Cu/Ni/Sn |
| | | | | | | | Voltage (VDCW) |
| | | | | | | | 100 = 10V 500 = 50V 251 = 250V 160 = 16V 101 = 100V 501 = 500V 250 = 25V 201 = 200V 102 = 1000V |
| | | | | | | | Capacitance Tolerance (EIA Code) |
| | | | | | | | B = ±0.1pF F = ±1% K = ±10% C = ±0.25pF G = ±2% M = ±20% D = ±0.50pF J = ±5% Z = -20+80% |
| | | | | | | | Capacitance |
| | | | | | | | Two significant digits followed by # of zeros (e.g. 101 = 100pF, 102 = 1000pF, 103 = 10nF) |
| | | | | | | | Dielectric |
| | | | | | | | N = COG (NPO) B = X7R F = Y5V |
| | | | | | | | Size Code |
| | | | | | | | 0402 0805 1210 1812 0603 1206 1804 |



APPLICATIONS

- * LC and RC tuned circuit
- * Filtering, Timing, & Blocking
- * Coupling & Bypassing
- * Frequency discriminating
- * Decoupling

SCHEMATIC



| | NPO | X7R | Y5V |
|------------------------------|-----|--|------------------------------|
| * Ultra-stable | | * Semi-stable High K | * High volumetric efficiency |
| * Low dissipation factor | | * High volumetric efficiency | * Non-polar construction |
| * Tight tolerance available | | * Highly reliable in high temp. applications | * General purpose, High K |
| * Good frequency performance | | * High insulation resistance | |
| * No aging of capacitance | | | |

DIMENSIONS

| Size | 0402 | 0603 | 0805 | 1206 | 1210 | 1808 | 1812 |
|-----------------|--------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Length (L) | .040±0.0002 1.00±0.05 | 0.063±0.004 1.60±0.10 | 0.080±0.006 2.00±0.15 | 0.125±0.006 3.20±0.15 | 0.125±0.012 3.20±0.30 | 0.180±0.015 4.50±0.40 | 0.180±0.015 4.50±0.40 |
| Width (W) | 0.020±0.002 0.50±0.05 | 0.03±0.004 0.80±0.07 | 0.050±0.006 1.25±0.15 | 0.063±0.006 1.60±0.15 | 0.100±0.008 2.50±0.20 | 0.081±0.010 2.03±0.25 | 0.125±0.012 3.20±0.30 |
| Termination (E) | .010+0.002/-0.004 0.25+0.05/-0.10 | 0.015±0.006 0.40±0.15 | 0.020±0.008 0.50±0.20 | 0.025±0.008 0.60±0.20 | 0.030±0.010 0.75±0.25 | 0.030±0.010 0.75±0.25 | 0.030±0.010 0.75±0.25 |

ELECTRICAL RATING

| Dielectric | NPO (COG) | X7R (BME) | Y5V |
|-------------------------|---|---|---|
| Capacitance Range | 0.5pF ~ 10nF | 100pF ~ 1µF | 10nF ~ 10µF |
| Capacitance Tolerance | ±0.1pF, ±0.25pF, ±0.50pF ±1%, ±2%, ±5%, ±10% | ±5%, ±10%, ±20% | ±20%, -20+80% |
| Dissipation Factor | >30pF, 0.1% Max | 6.3V: 5.0% 10V & 16V: 3.5% 25V & 50V: 2.5% | 6.3V: 5.0% 10V & 16V: 3.5% 25V & 50V: 2.5% |
| T.C.C. | 0±30ppm/°C | 0±15ppm/°C | +30%/-80%ppm/°C |
| Test Parameters (@25°C) | ≤100pF 1.0±0.2Vrms, 1MHz±10% >1000pF 1.0±0.2Vrms, 1KHz±10% | 1.0±0.2Vrms, 1KHz±10% | 1.0±0.2Vrms, 1KHz±10% |
| Operating Temperature | -55 ~ +125°C @ 25°C | -55 ~ +125°C @ 25°C | -25 ~ +85°C @ 20°C |
| Insulation Resistance | +25°C, 10GΩ min or 500Ω-F min, whichever is less | +25°C, 10GΩ min or 500Ω-F min, whichever is less | +25°C, 10GΩ min or 500Ω-F min, whichever is less |

MLCC Products – NPO Type

10 Volts – 50 Volts

| DIELECTRIC | | NPO | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|--------------|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|
| EIA Cap Code | SIZE VDCW | 0402 | | | | 0603 | | | | 0805 | | | | 1206 | | | | 1210 | | | | 1812 | | | |
| | | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 |
| 0R5 | 0.5pF | N | N | N | N | S | S | S | S | A | A | A | A | | | | | | | | | | | | |
| 1R0 | 1 | N | N | N | N | S | S | S | S | A | A | A | A | | | | | | | | | | | | |
| 1R2 | 1.2 | N | N | N | N | S | S | S | S | A | A | A | A | | | | | | | | | | | | |
| 1R5 | 1.5 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 1R8 | 1.8 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 2R2 | 2.2 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 2R7 | 2.7 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 3R3 | 3.3 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 3R9 | 3.9 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 4R7 | 4.7 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 5R6 | 5.6 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 6R8 | 6.8 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 8R2 | 8.2 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 100 | 10pF | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 120 | 12 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 150 | 15 | N | N | N | N | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 180 | 18 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 220 | 22 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 270 | 27 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 330 | 33 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 390 | 39 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 470 | 47 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 560 | 56 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 680 | 68 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 820 | 82 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 101 | 100pF | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 121 | 120 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 151 | 150 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 181 | 180 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 221 | 220 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 271 | 270 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 331 | 330 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | | | | |
| 391 | 390 | | | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | | | | |
| 471 | 470 | | | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | | | | |
| 561 | 560 | | | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | | | | |
| 681 | 680 | | | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | | | | |
| 821 | 820 | | | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | | | | |
| 102 | 1000pF | | | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 122 | 1200 | | | | | | | | | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 152 | 1500 | | | | | | | | | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 182 | 1800 | | | | | | | | | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 222 | 2200 | | | | | | | | | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 272 | 2700 | | | | | | | | | D | D | D | D | B | B | B | B | C | C | C | C | D | D | D | D |
| 332 | 3300 | | | | | | | | | D | D | D | D | B | B | B | B | C | C | C | C | D | D | D | D |
| 392 | 3900 | | | | | | | | | D | D | D | D | B | B | B | B | C | C | C | C | D | D | D | D |
| 472 | 4700 | | | | | | | | | D | D | D | D | B | B | B | B | C | C | C | C | D | D | D | D |
| 562 | 5600 | | | | | | | | | D | D | D | D | B | B | B | B | C | C | C | C | D | D | D | D |
| 682 | 6800 | | | | | | | | | D | D | D | D | C | C | C | C | C | C | C | C | D | D | D | D |
| 822 | 8200 | | | | | | | | | D | D | D | D | C | C | C | C | C | C | C | C | D | D | D | D |
| 103 | .010μF | | | | | | | | | D | D | D | D | D | D | D | D | | | | | D | D | D | D |
| 123 | 12000 | | | | | | | | | | | | | D | D | D | D | | | | | | | | |
| 153 | 15000 | | | | | | | | | | | | | D | D | D | D | | | | | | | | |
| 183 | 18000 | | | | | | | | | | | | | D | D | D | D | | | | | | | | |
| 223 | 22000 | | | | | | | | | | | | | D | D | D | D | | | | | | | | |
| 273 | 27000 | | | | | | | | | | | | | D | D | D | D | | | | | | | | |
| 333 | 33000 | | | | | | | | | | | | | D | D | D | D | | | | | | | | |
| 393 | 0.39μF | | | | | | | | | | | | | G | G | G | G | | | | | | | | |

* Variations of size, capacitance, voltage, and 13" reel are available upon request.

MLCC Products – NPO Type

100 Volts – 3000 Volts

| DIELECTRIC | | NPO | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|--------|------|-----|-----|-----|-----|------|-----|-----|-----|------|------|-----|-----|-----|-----|------|------|-----|-----|-----|------|------|------|------|------|------|------|---|
| EIA CODE | SIZE | 0603 | | | | | 0805 | | | | | 1206 | | | | | 1210 | | | | | 1812 | | | | | 1808 | | |
| | VDCW | 100 | 100 | 200 | 250 | 500 | 100 | 200 | 250 | 500 | 1000 | 2000 | 100 | 200 | 250 | 500 | 1000 | 2000 | 100 | 200 | 250 | 500 | 1000 | 2000 | 3000 | 1000 | 2000 | 3000 | |
| 0R5 | 0.5pF | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 1R0 | 1 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 1R2 | 1.2 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 1R5 | 1.5 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 1R8 | 1.8 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 2R2 | 2.2 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 2R7 | 2.7 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 3R3 | 3.3 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 3R9 | 3.9 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 4R7 | 4.7 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 5R6 | 5.6 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 6R8 | 6.8 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 8R2 | 8.2 | S | A | A | A | A | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 100 | 10pF | S | A | A | A | A | B | B | B | B | B | B | C | C | C | C | C | C | D | D | D | D | D | D | | C | C | C | |
| 120 | 12 | S | A | A | A | A | B | B | B | B | B | B | C | C | C | C | C | C | D | D | D | D | D | D | | C | C | C | |
| 150 | 15 | S | A | A | A | A | B | B | B | B | B | B | C | C | C | C | C | C | D | D | D | D | D | D | | C | C | C | |
| 180 | 18 | S | A | A | A | A | B | B | B | B | B | B | C | C | C | C | C | C | D | D | D | D | D | D | | C | C | C | |
| 220 | 22 | S | A | A | A | A | B | B | B | B | B | B | C | C | C | C | C | C | D | D | D | D | D | D | | C | C | C | |
| 270 | 27 | S | A | A | A | A | B | B | B | B | B | B | C | C | C | C | C | C | D | D | D | D | D | D | | C | C | C | |
| 330 | 33 | S | A | A | A | A | B | B | B | B | B | B | C | C | C | C | C | C | D | D | D | D | D | D | | C | C | C | |
| 390 | 39 | S | A | A | A | A | B | B | B | B | B | B | C | C | C | C | C | C | D | D | D | D | D | D | | C | C | C | |
| 470 | 47 | S | A | A | A | A | B | B | B | B | B | B | C | C | C | C | C | C | D | D | D | D | D | D | | C | C | C | |
| 560 | 56 | S | A | A | A | A | B | B | B | B | B | B | C | C | C | C | C | C | D | D | D | D | D | D | | C | C | C | |
| 680 | 68 | S | A | A | A | A | B | B | B | B | B | B | C | C | C | C | C | C | D | D | D | D | D | D | | C | C | C | |
| 820 | 82 | S | A | A | A | A | B | B | B | B | B | B | | C | C | C | C | C | D | D | D | D | D | D | | C | K | C | |
| 101 | 100pF | S | A | A | A | A | C | B | B | B | B | C | | C | C | C | C | C | D | D | D | D | D | D | D | C | K | C | |
| 121 | 120 | S | A | C | C | C | C | B | B | B | B | C | | C | C | C | C | C | D | D | D | D | D | D | D | D | K | K | C |
| 151 | 150 | S | A | C | C | C | D | B | B | B | B | | | C | C | C | C | C | D | D | D | D | D | D | D | D | K | K | |
| 181 | 180 | S | A | D | D | | | B | B | B | B | | | C | C | C | C | C | D | D | D | D | D | D | D | D | K | K | |
| 221 | 220 | S | A | | | | | B | B | B | B | | | C | C | C | C | C | D | D | D | D | D | D | D | D | K | | |
| 271 | 270 | S | A | | | | | B | B | B | C | | | C | C | C | C | C | | D | D | D | D | D | D | D | K | | |
| 331 | 330 | S | A | | | | | B | B | B | C | | | C | C | C | C | D | | D | D | D | D | D | D | D | K | | |
| 391 | 390 | | B | | | | | B | B | B | C | | | C | C | C | C | D | | D | D | D | D | D | D | D | | | |
| 471 | 470 | | B | | | | | B | C | C | | | | C | C | C | C | D | | D | D | D | D | D | D | D | | | |
| 561 | 560 | | B | | | | | B | | | | | | C | C | C | C | | | D | D | D | D | D | D | D | | | |
| 681 | 680 | | | | | | | B | | | | | | C | C | C | C | | | D | D | D | D | D | D | D | | | |
| 821 | 820 | | | | | | | B | | | | | | C | C | C | C | | | D | D | D | D | D | D | D | | | |
| 102 | 1000pF | | | | | | | B | | | | | | C | C | C | C | | | D | D | D | D | D | D | D | | | |
| 122 | 1200 | | | | | | | B | | | | | | C | D | D | | | | D | D | D | D | D | D | D | | | |
| 152 | 1500 | | | | | | | C | | | | | | C | D | D | | | | D | D | D | D | D | D | D | | | |
| 182 | 1800 | | | | | | | C | | | | | | C | D | D | | | | D | D | D | D | D | D | D | | | |
| 222 | 2200 | | | | | | | | | | | | | C | D | D | | | | D | D | D | D | D | D | D | | | |
| 272 | 2700 | | | | | | | | | | | | | C | D | D | | | | D | D | D | D | D | D | D | | | |
| 332 | 3300 | | | | | | | | | | | | | C | | | | | | D | | | | | | | | | |
| 392 | 3900 | | | | | | | | | | | | | | | | | | | D | | | | | | | | | |
| 472 | 4700 | | | | | | | | | | | | | | | | | | | D | | | | | | | | | |
| 562 | 5600 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 682 | 6800 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 822 | 8200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103 | .010μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* Variations of size, capacitance, voltage, and 13" reel are available upon request.

TAPE/REEL PACKAGE TYPE, QUANTITY, AND AVAILABILITY

| Thickness in mm | 0402 | | 0603 | | 0805 | | 1206 | | 1210 | | 1808 | | 1812 | |
|-----------------------|------|-------|-------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|
| | Type | Qty | Type | Qty | Type | Qty | Type | Qty | Type | Qty | Type | Qty | Type | Qty |
| A = 0.65 + 0.05/-0.15 | - | - | - | - | Paper | 4K | Paper | 4K | | | - | - | - | - |
| B = 0.85 + 0.5/-0.15 | - | - | - | - | Paper | 4K | Paper | 4K | | | - | - | - | - |
| C = 1.00 + 0.05/-0.15 | - | - | - | - | Plastic | 3K | Plastic | 3K | Plastic | 3K | Plastic | 2K | - | - |
| D = 1.2 + 0.15 | - | - | - | - | Plastic | 3K | Plastic | 3K | Plastic | 3K | Plastic | 2K | Plastic | 1K |
| G = 1.60 + 0.05/-0.15 | - | - | - | - | - | - | Plastic | 2K | Plastic | 2K | Plastic | 1K | Plastic | 1K |
| K = 2.00 + 0.2 | - | - | - | - | - | - | - | - | Plastic | 2K | Plastic | 1K | Plastic | 1K |
| M = 2.5 + 0.3 | - | - | - | - | - | - | - | - | Plastic | 1K | - | - | Plastic | 1K |
| N = 0.5 + 0.05 | | Paper | | 10K | | | | | | | | | | |
| S = 0.8 + 0.07 | - | - | Paper | 4K | - | - | - | - | - | - | - | - | - | - |



570 West Lambert Road, Suite M, Brea, CA 92821
 TEL: 714-255-9186 ♦ FAX: 714-255-9291

MLCC Products – X7R Type

10 Volts – 50 Volts

| DIELECTRIC | | X7R | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----------|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|
| EIA Cap Code | SIZE VDCW | 0402 | | | | 0603 | | | | 0805 | | | | 1206 | | | | 1210 | | | | 1812 | | | |
| | | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 |
| 101 | 100pF | N | N | N | N | S | S | S | S | B | B | B | B | | | | | | | | | | | | |
| 121 | 120 | N | N | N | N | S | S | S | S | B | B | B | B | | | | | | | | | | | | |
| 151 | 150 | N | N | N | N | S | S | S | S | B | B | B | B | | | | | | | | | | | | |
| 181 | 180 | N | N | N | N | S | S | S | S | B | B | B | B | | | | | | | | | | | | |
| 221 | 220 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | | | | | | | | |
| 271 | 270 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | | | | | | | | |
| 331 | 330 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | | | | | | | | |
| 391 | 390 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | | | | | | | | |
| 471 | 470 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | | | | | | | | |
| 561 | 560 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | | | | | | | | |
| 681 | 680 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | | | | | | | | |
| 821 | 820 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 102 | 1000pF | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 122 | 1200 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 152 | 1500 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 182 | 1800 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 222 | 2200 | N | N | N | N | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 272 | 2700 | N | N | N | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 332 | 3300 | N | N | N | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 392 | 3900 | N | N | N | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 472 | 4700 | N | N | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 562 | 5600 | N | N | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 682 | 6800 | N | N | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 822 | 8200 | N | N | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 103 | .010μF | N | N | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 123 | .012 | N | N | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 153 | .015 | N | N | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 183 | .018 | | | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 223 | .022 | | | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 273 | .027 | | | | | S | S | S | S | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 333 | .033 | | | | | S | S | S | | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 393 | .039 | | | | | S | S | S | | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 473 | .047 | | | | | S | S | S | | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 563 | .056 | | | | | S | S | S | | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 683 | .068 | | | | | S | S | S | | B | B | B | B | B | B | B | B | C | C | C | C | D | D | D | D |
| 823 | .082 | | | | | S | S | | | B | B | B | D | B | B | B | B | C | C | C | C | D | D | D | D |
| 104 | .100μF | | | | | S | S | | | B | B | B | D | B | B | B | B | C | C | C | C | D | D | D | D |
| 154 | .150 | | | | | | | | | D | D | D | | C | C | C | C | C | C | C | D | D | D | D | |
| 184 | .180 | | | | | | | | | D | D | D | | C | C | C | C | C | C | C | D | D | D | D | |
| 224 | .220 | | | | | | | | | D | D | D | | C | C | C | C | C | C | C | D | D | D | D | |
| 334 | .330 | | | | | | | | | | | | | C | C | C | | C | C | C | C | D | D | D | D |
| 474 | .470 | | | | | | | | | | | | | | | | C | C | C | | D | D | D | D | |
| 684 | .680 | | | | | | | | | | | | | | | | | | | | D | D | D | D | |
| 824 | .820 | | | | | | | | | | | | | | | | | | | | D | D | D | D | |
| 105 | 1.00μF | | | | | | | | | | | | | | | | | | | | D | D | D | D | |

* Variations of size, capacitance, voltage, and 13" reel are available upon request.

TAPE/REEL PACKAGE TYPE, QUANTITY, AND AVAILABILITY

| Thickness in mm | 0402 – 0603 | | 0805 – 1206 | | 1210 | | 1808 | | 1812 | |
|-----------------------|-------------|----------|-------------|----------|---------|----------|---------|----------|---------|----------|
| | Type | Quantity | Type | Quantity | Type | Quantity | Type | Quantity | Type | Quantity |
| A = 0.65 + 0.05/-0.15 | | | Paper | 4K/Reel | | | | | | |
| B = 0.85 + 0.5/-0.15 | | | Paper | 4K/Reel | | | | | | |
| C = 1.00 + 0.05/-0.15 | | | Plastic | 3K/Reel | Plastic | 3K/Reel | Plastic | 3K/Reel | | |
| D = 1.2 ± 0.15 | | | Plastic | 3K/Reel | Plastic | 3K/Reel | Plastic | 3K/Reel | Plastic | 1K/Reel |
| F = 1.40 + 0.05/-0.15 | | | Plastic | 2K/Reel | Plastic | 2K/Reel | Plastic | 1K/Reel | Plastic | 1K/Reel |
| G = 1.60 + 0.05/-0.15 | | | Plastic | 2K/Reel | Plastic | 2K/Reel | Plastic | 1K/Reel | Plastic | 1K/Reel |
| S = 0.8 ± 0.07 | Paper | 4K/Reel | | | | | | | | |
| N = 0.5 ± 0.05 | Paper | 10K/Reel | | | | | | | | |

MLCC Products – X7R Type

100 Volts – 3000 Volts

| DIELECTRIC | | X7R | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|--------|------|-----|-----|-----|-----|------|-----|-----|-----|------|------|------|-----|-----|-----|------|------|-----|-----|-----|------|------|------|------|------|------|---|---|---|
| EIA | SIZE | 0603 | | | | | 0805 | | | | | 1206 | | | | | 1210 | | | | | 1812 | | | | | 1808 | | | |
| CODE | VDCW | 100 | 100 | 200 | 250 | 500 | 100 | 200 | 250 | 500 | 1000 | 1000 | 2000 | 100 | 200 | 250 | 500 | 1000 | 100 | 200 | 250 | 500 | 1000 | 2000 | 1000 | 1500 | 3000 | | | |
| 101 | 100pF | S | B | B | B | B | | | | | | | | | | | | | | | | | | | | | | | | |
| 121 | 120 | S | B | B | B | B | | | | | | | | | | | | | | | | | | | | | | | | |
| 151 | 150 | S | B | B | B | B | | | | | | | | | | | | | | | | | | | | | | | | |
| 181 | 180 | S | B | B | B | B | B | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 221 | 220 | S | B | B | B | B | B | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 271 | 270 | S | B | B | B | B | B | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 331 | 330 | S | B | B | B | B | B | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 391 | 390 | S | B | B | B | B | B | B | B | B | B | B | B | | | | | | | | | | | | | | | | | |
| 471 | 470 | S | B | B | B | B | B | B | B | B | B | B | B | | | | | | | | | | | | D | D | C | C | C | |
| 561 | 560 | S | B | B | B | B | B | B | B | B | B | B | B | C | | | | | | | | | | | | D | D | C | C | C |
| 681 | 680 | S | B | B | B | B | B | B | B | B | B | B | B | C | | | | | | | | | | | | D | D | C | C | C |
| 821 | 820 | S | B | B | B | B | B | B | B | B | B | B | G | G | | | | | | | | | | | | D | D | C | C | C |
| 102 | 1000pF | S | B | B | B | B | B | B | B | B | B | G | G | C | C | C | C | C | D | D | D | D | D | D | D | D | C | C | K | |
| 122 | 1200 | S | B | B | B | B | B | B | B | B | B | G | G | C | C | C | C | C | D | D | D | D | D | D | D | D | C | C | K | |
| 152 | 1500 | S | B | B | B | B | B | B | B | B | B | G | | C | C | C | C | C | D | D | D | D | D | D | D | D | C | C | | |
| 182 | 1800 | S | B | B | B | B | B | B | B | B | B | G | | C | C | C | C | C | D | D | D | D | D | D | D | D | C | C | | |
| 222 | 2200 | S | B | B | B | B | B | B | B | B | B | C | G | C | C | C | C | C | D | D | D | D | D | D | D | D | C | C | | |
| 272 | 2700 | S | B | B | B | | B | B | B | B | D | G | | C | C | C | C | C | D | D | D | D | D | D | D | D | C | D | | |
| 332 | 3300 | S | B | B | B | | B | B | B | B | G | G | | C | C | C | C | D | D | D | D | D | D | D | D | D | C | D | | |
| 392 | 3900 | S | B | B | B | | B | B | B | B | G | G | | C | C | C | C | | D | D | D | D | D | D | D | D | C | | | |
| 472 | 4700 | S | B | B | B | | B | B | B | B | G | G | | C | C | C | C | | D | D | D | D | D | D | D | D | C | | | |
| 562 | 5600 | S | B | | | | B | B | B | B | G | | | C | C | C | C | | D | D | D | D | D | D | D | D | C | | | |
| 682 | 6800 | S | B | | | | B | B | B | B | G | | | C | C | C | C | | D | D | D | D | D | D | D | D | C | | | |
| 822 | 8200 | S | B | | | | B | B | B | C | | | | C | C | C | C | | D | D | D | D | D | D | D | D | | | | |
| 103 | .010μF | S | B | | | | B | B | B | C | | | | C | C | C | C | | D | D | D | D | D | D | D | | | | | |
| 123 | .012 | S | B | | | | B | B | B | | | | | C | C | C | C | | D | D | D | D | | | | | | | | |
| 153 | .015 | S | B | | | | B | C | C | | | | | C | C | C | C | | D | D | D | D | | | | | | | | |
| 183 | .018 | | B | | | | B | C | C | | | | | C | C | C | C | | D | D | D | D | | | | | | | | |
| 223 | .022 | | | | | | B | C | C | | | | | C | C | C | D | | D | D | D | D | | | | | | | | |
| 273 | .027 | | | | | | B | C | C | | | | | C | C | C | | | D | D | D | D | | | | | | | | |
| 333 | .033 | | | | | | B | | | | | | | C | C | C | | | D | D | D | D | | | | | | | | |
| 393 | 0.39 | | | | | | B | | | | | | | C | C | C | | | D | D | D | D | | | | | | | | |
| 473 | .047 | | | | | | B | | | | | | | C | D | D | | | D | D | D | D | | | | | | | | |
| 563 | .056 | | | | | | B | | | | | | | C | | | | | D | D | D | | | | | | | | | |
| 683 | .068 | | | | | | C | | | | | | | C | | | | | D | D | D | | | | | | | | | |
| 823 | .082 | | | | | | C | | | | | | | C | | | | | D | D | D | | | | | | | | | |
| 104 | .100μF | | | | | | D | | | | | | | C | | | | | D | D | D | | | | | | | | | |
| 124 | .120 | | | | | | D | | | | | | | C | | | | | D | D | D | | | | | | | | | |
| 154 | .150 | | | | | | | | | | | | | C | | | | | D | | | | | | | | | | | |
| 184 | .180 | | | | | | | | | | | | | C | | | | | D | | | | | | | | | | | |
| 224 | .220 | | | | | | | | | | | | | C | | | | | D | | | | | | | | | | | |
| 334 | .330 | | | | | | | | | | | | | | | | | | D | | | | | | | | | | | |
| 474 | .470 | | | | | | | | | | | | | | | | | | D | | | | | | | | | | | |
| 684 | .680 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 824 | .820 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105 | 1.00μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* Variations of size, capacitance, voltage, and 13" reel are available upon request.

TAPE/REEL PACKAGE TYPE, QUANTITY, AND AVAILABILITY

| Thickness in mm | 0603-0805-1206 | | 1210 | | 1808 | | 1812 | |
|-----------------------|----------------|----------|---------|----------|---------|----------|---------|----------|
| | Type | Quantity | Type | Quantity | Type | Quantity | Type | Quantity |
| A = 0.65 + 0.05/-0.15 | Paper | 4K/Reel | | | | | | |
| B = 0.85 + 0.5/-0.15 | Paper | 4K/Reel | | | | | | |
| C = 1.00 + 0.05/-0.15 | Plastic | 3K/Reel | Plastic | 3K/Reel | Plastic | 3K/Reel | | |
| D = 1.2 + 0.15 | Plastic | 3K/Reel | Plastic | 3K/Reel | Plastic | 3K/Reel | Plastic | 1K/Reel |
| F = 1.40 + 0.05/-0.15 | Plastic | 2K/Reel | Plastic | 2K/Reel | Plastic | 1K/Reel | Plastic | 1K/Reel |
| G = 1.60 + 0.05/-0.15 | Plastic | 2K/Reel | Plastic | 2K/Reel | Plastic | 1K/Reel | Plastic | 1K/Reel |
| K = 2.00 ± 0.2 | | | | | Plastic | 1K/Reel | Plastic | 1K/Reel |
| S = 0.8 ± 0.07 | | | | | | | | |
| N = 0.5 ± 0.05 | | | | | | | | |

MLCC Products – Y5V Type

10 Volts – 50 Volts

| DIELECTRIC | | Y5V | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|--------|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|
| EIA Cap Code | SIZE | 0402 | | | | 0603 | | | | 0805 | | | | 1206 | | | | 1210 | | | | 1812 | | | |
| | VDCW | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 |
| 103 | .010µF | N | N | N | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 123 | .012 | N | N | N | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 153 | .015 | N | N | N | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 183 | .018 | N | N | N | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 223 | .022 | N | N | N | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 273 | .027 | N | N | N | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 333 | .033 | N | N | N | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 393 | .039 | N | N | N | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 473 | .047 | N | N | N | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 563 | .056 | N | N | | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 683 | .068 | N | N | | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 823 | .082 | N | N | | | S | S | S | S | A | A | A | A | B | B | B | B | | | | | | | | |
| 104 | .100µF | N | N | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | D | D | D | D |
| 154 | .150 | | | | | S | S | S | S | A | A | A | A | B | B | B | B | C | C | C | C | D | D | D | D |
| 224 | .220 | | | | | S | S | S | | A | A | A | A | B | B | B | B | C | C | C | C | D | D | D | D |
| 334 | .330 | | | | | S | S | | | B | B | B | | B | B | B | B | C | C | C | C | D | D | D | D |
| 474 | .470 | | | | | S | S | | | B | B | B | | B | B | B | B | C | C | C | | D | D | D | D |
| 684 | .680 | | | | | S | | | | B | B | | | B | B | B | | C | C | C | | D | D | D | D |
| 105 | 1.00µF | | | | | S | | | | B | B | | | C | C | C | | C | C | C | | D | D | D | D |
| 155 | 1.50 | | | | | | | | | | | | | C | C | C | | | | | | | | | |
| 225 | 2.20 | | | | | | | | | | | | | C | C | C | | | | | | | | | |
| 335 | 3.30 | | | | | | | | | | | | | D | D | D | | | | | | | | | |
| 475 | 4.75 | | | | | | | | | | | | | D | D | D | | | | | | | | | |
| 106 | 10µF | | | | | | | | | | | | | | | | | | | | | | | | |

* Variations of size, capacitance, voltage, and 13" reel are available upon request.

100 Volts – 500 Volts

| DIELECTRIC | | Y5V | | | | | | | | | | | |
|--------------|--------|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|
| EIA Cap Code | SIZE | 0805 | | | | 1206 | | | | 1812 | | | |
| | VDCW | 100 | 200 | 250 | 500 | 100 | 200 | 250 | 500 | 100 | 200 | 250 | 500 |
| 103 | .010µF | B | | | | B | B | B | B | | | | |
| 123 | .012 | B | | | | B | B | B | B | | | | |
| 153 | .015 | B | | | | B | B | B | B | | | | |
| 183 | .018 | B | | | | B | B | B | B | | | | |
| 223 | .022 | B | | | | B | B | B | B | | | | |
| 273 | .027 | B | | | | B | B | B | B | | | | |
| 333 | .033 | B | | | | B | B | B | B | | | | |
| 393 | .039 | B | | | | B | B | B | B | | | | |
| 473 | .047 | B | | | | B | B | B | | | | | |
| 563 | .056 | B | | | | B | B | B | | | | | |
| 683 | .068 | B | | | | B | B | B | | | | | |
| 823 | .082 | B | | | | C | C | C | | | | | |
| 104 | .100µF | B | | | | C | C | C | | D | D | D | |
| 154 | .150 | | | | | C | | | | D | D | D | |
| 224 | .220 | | | | | C | | | | D | D | D | |
| 334 | .330 | | | | | | | | | D | D | D | |
| 474 | .470 | | | | | | | | | D | D | D | |

* Variations of size, capacitance, voltage, and 13" reel are available upon request.

TAPE/REEL PACKAGE TYPE, QUANTITY, AND AVAILABILITY

| Thickness in mm | 0402 – 0603 | | 0805 – 1206 | | 1210 | | 1808 | | 1812 | |
|-----------------------|-------------|----------|-------------|----------|---------|----------|---------|----------|---------|----------|
| | Type | Quantity | Type | Quantity | Type | Quantity | Type | Quantity | Type | Quantity |
| A = 0.65 + 0.05/-0.15 | | | Paper | 4K/Reel | | | | | | |
| B = 0.85 + 0.5/-0.15 | | | Paper | 4K/Reel | | | | | | |
| C = 1.00 + 0.05/-0.15 | | | Plastic | 3K/Reel | Plastic | 3K/Reel | Plastic | 3K/Reel | | |
| D = 1.2 + 0.15 | | | Plastic | 3K/Reel | Plastic | 3K/Reel | Plastic | 3K/Reel | Plastic | 1K/Reel |
| F = 1.40 + 0.05/-0.15 | | | Plastic | 2K/Reel | Plastic | 2K/Reel | Plastic | 1K/Reel | Plastic | 1K/Reel |
| G = 1.60 + 0.05/-0.15 | | | Plastic | 2K/Reel | Plastic | 2K/Reel | Plastic | 1K/Reel | Plastic | 1K/Reel |
| K = 2.00+0.2mm | | | | | | | | | Plastic | 1K/Reel |
| S = 0.8 + 0.07 | Paper | 4K/Reel | | | | | | | | |
| N = 0.5 + 0.05 | Paper | 10K/Reel | | | | | | | | |

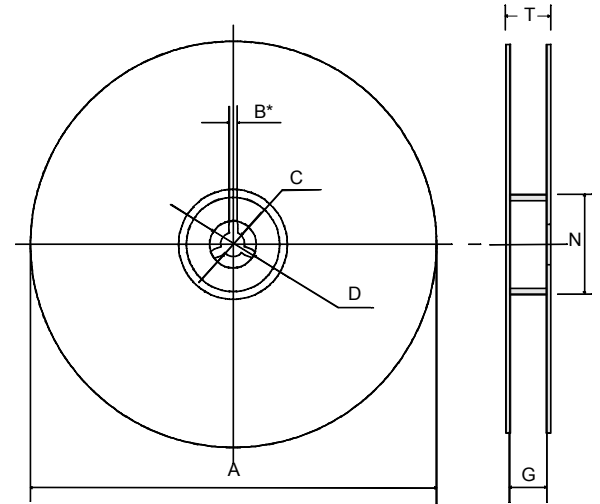
MLCC Products – Packaging

PACKAGING ON TAPE AND REEL

| Size | T (mm) | Tape | Quantity |
|------|-----------|--------------|------------|
| 0603 | 0.90~0.70 | Paper Tape | 4,000/Reel |
| 0805 | 0.70~0.50 | Paper Tape | 4,000/Reel |
| | 0.90~0.70 | Paper Tape | 4,000/Reel |
| | 1.05~0.85 | Plastic Tape | 3,000/Reel |
| 1206 | 1.35~1.05 | Plastic Tape | 3,000/Reel |
| | 0.90~0.70 | Paper Tape | 4,000/Reel |
| | 1.05~0.85 | Plastic Tape | 3,000/Reel |
| 1210 | 1.35~1.05 | Plastic Tape | 3,000/Reel |
| | 1.05~0.85 | Paper Tape | 3,000/Reel |
| 1808 | 1.35~1.05 | Plastic Tape | 3,000/Reel |
| | 1.05~0.85 | Paper Tape | 3,000/Reel |
| 1812 | 2.15~1.85 | Plastic Tape | 1,000/Reel |
| | 1.35~1.05 | Paper Tape | 1,000/Reel |

REEL FOR TAPING

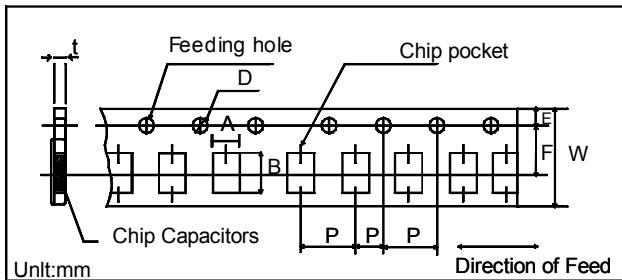
Taping is in accordance with EIA RS-481 or IEC 286-3



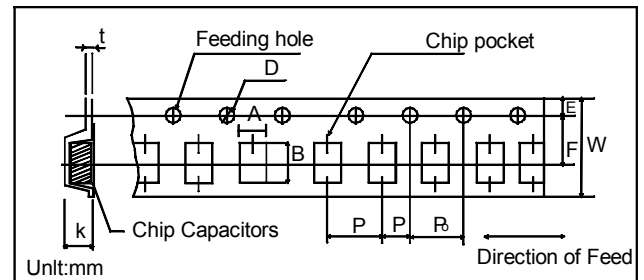
Unit: mm

| Symbol | A | N | C | D | B | G | T |
|-----------|-----------|--------|-----------|---------|---------|-----------|---------|
| Dimension | 178 ± 2.0 | 50 min | 130 ± 0.5 | 20 min. | 2.0±0.5 | 10.0± 1.5 | 14.9max |

1. PAPER TAPE DIMENSIONS



2. PLASTIC TAPE DIMENSIONS



PAPER TAPE

| Dimensions in mm | |
|------------------|--------------|
| W | 8.0 ± 0.3 |
| F | 3.5 ± 0.05 |
| E | 1.75 ± 0.1 |
| P ₁ | 4.0 ± 0.1 |
| P ₂ | 2.0 ± 0.05 |
| P ₀ | 4.0 ± 0.1 |
| ∅P | 1.5 + 0.1 -0 |
| t ₁ | 1.2 maximum |

PLASTIC TAPE

| Dimension in mm | |
|-----------------|--------------|
| W | 8.0 ± 0.3 |
| F | 3.5 ± 0.05 |
| E | 1.75 ± 0.1 |
| P ₁ | 4.0 ± 0.1 |
| P ₂ | 2.0 ± 0.05 |
| P ₀ | 4.0 ± 0.1 |
| ∅P | 1.5 + 0.1 -0 |
| t ₁ | 0.3 maximum |
| K | 2.0 maximum |