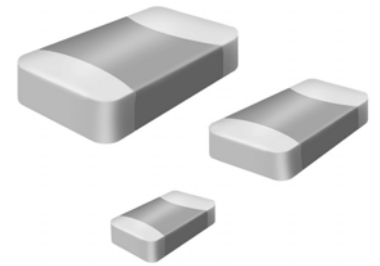


# Multilayer Ceramic Chip Capacitors Products – NPO, X7R, Y5V

## HOW TO ORDER

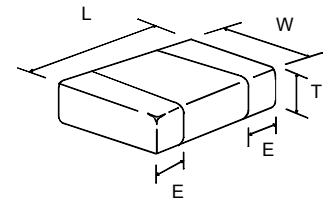
|             |          |            |          |            |          |          |   |
|-------------|----------|------------|----------|------------|----------|----------|---|
| <b>0603</b> | <b>N</b> | <b>101</b> | <b>J</b> | <b>500</b> | <b>N</b> | <b>I</b> |   |
|             |          |            |          |            |          |          | <b>Packaging Code</b>                         |
|             |          |            |          |            |          |          | T = 7" reel/paper tape      B = Bulk          |
|             |          |            |          |            |          |          | <b>Termination</b>                            |
|             |          |            |          |            |          |          | N = Ag/Ni/SnPb      L = Ag/Ni/Sn              |
|             |          |            |          |            |          |          | B = Cu/Ni/SnPb      C = Cu/Ni/Sn              |
|             |          |            |          |            |          |          | <b>Voltage (VDCW)</b>                         |
|             |          |            |          |            |          |          | 100 = 10V      500 = 50V      251 = 250V      |
|             |          |            |          |            |          |          | 160 = 16V      101 = 100V      501 = 500V     |
|             |          |            |          |            |          |          | 250 = 25V      201 = 200V      102 = 1000V    |
|             |          |            |          |            |          |          | <b>Capacitance Tolerance (EIA Code)</b>       |
|             |          |            |          |            |          |          | B = ±0.1pF      F = ±1%      K = ±10%         |
|             |          |            |          |            |          |          | C = ±0.25pF      G = ±2%      M = ±20%        |
|             |          |            |          |            |          |          | D = ±0.50pF      J = ±5%      Z = -20+80%     |
|             |          |            |          |            |          |          | <b>Capacitance</b>                            |
|             |          |            |          |            |          |          | Two significant digits followed by # of zeros |
|             |          |            |          |            |          |          | (e.g. 101 = 100pF, 102 = 1000pF, 103 = 10nF)  |
|             |          |            |          |            |          |          | <b>Dielectric</b>                             |
|             |          |            |          |            |          |          | N = COG (NPO)      B = X7R      F = Y5V       |
|             |          |            |          |            |          |          | <b>Size Code</b>                              |
|             |          |            |          |            |          |          | 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<br>1.00±0.05             | 0.063±0.004<br>1.60±0.10 | 0.080±0.006<br>2.00±0.15 | 0.125±0.006<br>3.20±0.15 | 0.125±0.012<br>3.20±0.30 | 0.180±0.015<br>4.50±0.40 | 0.180±0.015<br>4.50±0.40 |
| Width (W)       | 0.020±0.002<br>0.50±0.05             | 0.03±0.004<br>0.80±0.07  | 0.050±0.006<br>1.25±0.15 | 0.063±0.006<br>1.60±0.15 | 0.100±0.008<br>2.50±0.20 | 0.081±0.010<br>2.03±0.25 | 0.125±0.012<br>3.20±0.30 |
| Termination (E) | .010+0.002/-0.004<br>0.25+0.05/-0.10 | 0.015±0.006<br>0.40±0.15 | 0.020±0.008<br>0.50±0.20 | 0.025±0.008<br>0.60±0.20 | 0.030±0.010<br>0.75±0.25 | 0.030±0.010<br>0.75±0.25 | 0.030±0.010<br>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<br>±1%, ±2%, ±5%, ±10%                         | ±5%, ±10%, ±20%                                     | ±20%, -20+80%                                       |
| Dissipation Factor      | >30pF, 0.1% Max   | 6.3V: 5.0%<br>10V & 16V: 3.5%<br>25V & 50V: 2.5%    | 6.3V: 5.0%<br>10V & 16V: 3.5%<br>25V & 50V: 2.5%    |
| T.C.C.                  | 0±30ppm/°C  | 0±15ppm/°C  | +30%/-80ppm/°C                                      |
| Test Parameters (@25°C) | ≤100pF      1.0±0.2Vrms, 1MHz±10%<br>>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,<br>whichever is less                     | +25°C, 10GΩ min or 500Ω-F min,<br>whichever is less | +25°C, 10GΩ min or 500Ω-F min,<br>whichever is less |

# MLCC Products – NPO Type

## 10 Volts – 50 Volts

| DIELECTRIC   |              | NPO  |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |      |    |    |    |
|--------------|--------------|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|
| EIA Cap Code | SIZE<br>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  | -       | -   | -       | -   | -       | -   | -       | -   | -       | -   |



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# 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    | 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    | 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    | 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    | 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    | 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    | 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    | 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    | C    |      |   |   |   |
| 472        | 4700   | S    | B   | B   | B   |     | B    | B   | B   | B   | G    | G    |      | C   | C   | C   | C    |      | 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    | C    |      |   |   |   |
| 682        | 6800   | S    | B   |     |     |     | B    | B   | B   | B   | G    |      |      | C   | C   | C   | C    |      | 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    |      |      |   |   |   |
| 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 |             |          |         |          |         |          |         |          |

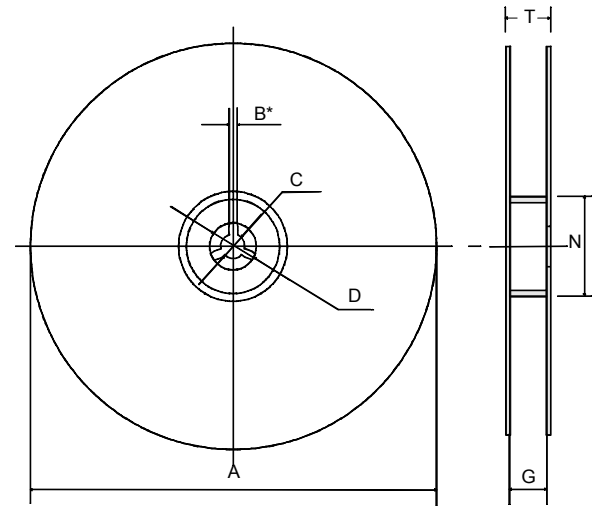
# MLCC Products – Packaging

## 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 | Plastic Tape | 3,000/Reel |
| 1808 | 1.35~1.05 | Plastic Tape | 3,000/Reel |
|      | 1.05~0.85 | Plastic Tape | 3,000/Reel |
| 1812 | 2.15~1.85 | Plastic Tape | 1,000/Reel |
|      | 1.35~1.05 | Plastic Tape | 1,000/Reel |

## REEL FOR TAPING

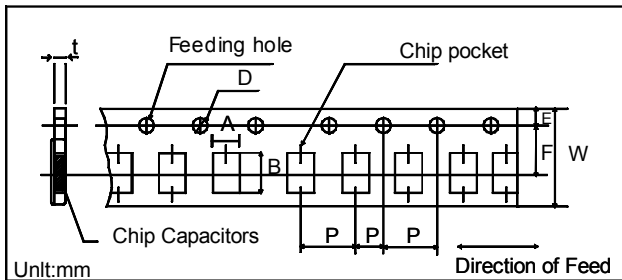
Taping is in accordance with EIA RS-481 or IEC 286-3



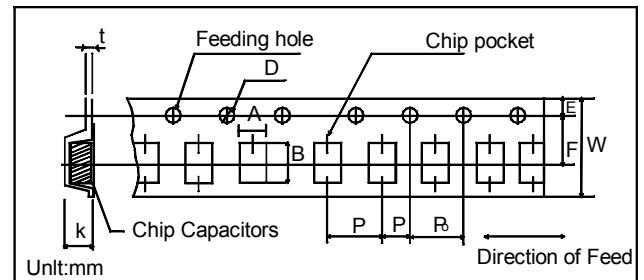
Unit: mm

| 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 <sub>1</sub>   | 4.0 ± 0.1    |
| P <sub>2</sub>   | 2.0 ± 0.05   |
| P <sub>0</sub>   | 4.0 ± 0.1    |
| ∅P               | 1.5 + 0.1 -0 |
| t <sub>1</sub>   | 1.2 maximum  |

#### PLASTIC TAPE

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