

Multilayer Ceramic Chip Capacitor AEC-Q200 Type

MT series

MERITEK

FEATURE

- Operating temperature: -55°C ~ +125°C
- A wide selection of sized is available (0201 to 1812)
- High capacitance in given case size
- Capacitor with lead-free and soft termination (pure Tin)
- AEC-Q200 qualified



PART NUMBERING SYSTEM

MT 0603 XR 471 K 101
(1) (2) (3) (4) (5) (6)

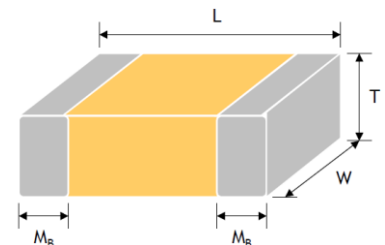


| No | Item | Code | Description | Series Reference |
|-----|----------------|------|---|--|
| (1) | Meritek Series | MT | Multilayer Ceramic Chip Capacitor | AEC-Q200 Type |
| (2) | Size | 0603 | EIA size or footprint | 0201, 0402, 0603, 0805, 1206, 1210, 1808, 1812 |
| (3) | Dielectric | XR | XR: X7R | CG: C0G |
| (4) | Capacitance | 471 | 471: $47 \times 10^1 \text{pF} = 470 \text{pF}$ | 0.1pF ~ 1.8μF |
| (5) | Tolerance | K | K: $\pm 10\%$ | See Tolerance Reference Table Below |
| (6) | Rated Voltage | 101 | 101: 100VDC | 10VDC ~ 1000VDC |

DIMENSIONS

| Size Inch (mm) | L (mm) | W (mm) | T (mm) | M _B min (mm) |
|----------------|-------------------------|-----------|---|-------------------------|
| 0201 (0603) | 0.60±0.03 | 0.30±0.03 | See Thickness Specification Reference Table below | 0.15±0.05 |
| 0402 (1005) | 1.00±0.10 | 0.50±0.10 | | 0.25±0.05/-0.10 |
| 0603 (1608) | 1.60±0.15 | 0.80±0.15 | | 0.40±0.15 |
| 0805 (2012) | 2.00±0.20 | 1.25±0.20 | | 0.50±0.20 |
| 1206 (3216) | 3.20±0.20 | 1.60±0.20 | | 0.60±0.20 |
| 1210 (3225) | 3.20±0.30 3.20±0.40* | 2.50±0.30 | | 0.75±0.35 |
| 1808 (4520) | 4.50±0.40 | 2.00±0.25 | | 0.75±0.35 |
| 1812 (4532) | 4.50±0.40 | 3.20±0.30 | | 0.75±0.35 |

Notes: * for $\geq 1\text{kV}$



THICKNESS SPECIFICATION REFERENCE

| Code | Thickness (mm) | Code | Thickness (mm) | Code | Thickness (mm) |
|------|------------------|------|-----------------|------|------------------|
| A | 0.60 ± 0.10 | I | 1.25 ± 0.20 | Q | 0.50 +0.02/-0.05 |
| B | 0.8 + 0.15/-0.10 | J | 1.15 ± 0.15 | R | 3.10 ± 0.30 |
| C | 1.25 ± 0.10 | K | 0.50 ± 0.20 | S | 0.80 ± 0.07 |
| D | 1.40 ± 0.15 | L | 0.30 ± 0.03 | T | 0.85 ± 0.10 |
| E | 1.60 ± 0.20 | M | 0.95 ± 0.10 | U | 0.50 ± 0.10 |
| F | 2.00 ± 0.20 | N | 0.50 ± 0.05 | V | 0.20 ± 0.02 |
| G | 2.50 ± 0.30 | O | 3.50 ± 0.20 | X | 0.80 ± 0.10 |
| H | 2.80 ± 0.30 | P | 1.60 +0.3/-0.10 | Z | 0.25 ± 0.03 |

Multilayer Ceramic Chip Capacitor AEC-Q200 Type

MT series

MERITEK

CAPACITANCE TOLERANCE REFERENCE

| Code | Description | Code | Description | Code | Description | Code | Description |
|------|-------------|------|-------------|------|-------------|------|-------------|
| A | ±0.05 pF | G | ±2 % | L | 0%~10% | Z | -20%~80% |
| B | ±0.10 pF | H | ±3 % | M | ±20 % | X | +10% ~ +20% |
| C | ±0.25 pF | I | -10%~0% | N | -5%~10% | - | - |
| D | ±0.50 pF | J | ±5 % | P | ±0.02 pF | - | - |
| F | ±1 % | K | ±10 % | Q | ±0.03 pF | - | - |

ELECTRICAL CHARACTERISTICS

| Item | Characteristics | Characteristics |
|-------------------------|---|--|
| Dielectric | C0G | X7R |
| Chip Size | 0201, 0402, 0603, 0805, 1206, 1210 | 0402, 0603, 0805, 1206, 1210, 1808, 1812 |
| Rated Voltage | 10V, 16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V, 1000V | |
| Capacitance | 0.1pF ~ 33nF | 100pF ~ 1.8μF |
| Cap. Tolerance | See Tolerance Reference Table | |
| Q / Dissipation Factor | See Dissipation Factor Table below | |
| Insulation Resistance | See Insulation Resistance Table below | |
| Operating Temperature | -55°C ~ 125°C | |
| Temperature Coefficient | ±30ppm/°C | ±15% |
| Termination | Cu / Ni / Sn (lead-free termination) | |

| Item | Characteristics | | | | |
|------------------------|--|---|--|---|--|
| Q / Dissipation Factor | C0G: Q≥1000 for Cap.≥30pF, Q≥400+20C for Cap.<30pF. X7R: | | | | |
| | Rated Voltage | D.F.≤ | Exception of D.F. ≤ | | |
| | ≥50V | 2.5% | 3.0% | 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF | |
| | | | 5.0% | 1210≥4.7μF | |
| | | | 10% | 0402≥0.1μF, 0603≥0.1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF | |
| | 35V | 3.5% | 10% | 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF | |
| | | | 5.0% | 0805≥1μF; 1210≥10μF | |
| | | | 7.0% | 0603≥0.33μF; 1206≥4.7μF | |
| | 25V | 3.5% | 10% | 0402≥0.10μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥6.8μF; 1210≥22μF | |
| | | | 12.5% | 0402≥0.47μF | |
| 5.0% | | | 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF | | |
| 16V | 3.5% | 10% | 0402≥0.22μF; 0603≥0.68μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF | | |
| | | 10% | 0402≥0.22μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF | | |
| 10V | 5.0% | 10% | 0402≥0.22μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF | | |
| | | 15% | 0402≥1μF | | |
| Insulation Resistance | I.R. : ≥10GΩ or RxC≥500Ω-F, whichever is smaller. Class II (X7R): | | | | |
| | Rated Voltage | I.R. | | | |
| | ≥100V | ≥10GΩ or RxC≥100Ω-F, whichever is smaller | All X7R | | |
| | 50V | | 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF | | |
| | 35V | | 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF | | |
| | 25V | | 0402≥1μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF | | |
| 16V | 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF | | | | |
| 10V | 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF | | | | |

Notes:

- Dissipation factor test condition: 30~70% related humidity. Precondition: Perform a heat treatment at 150±10°C for 1 hour, and then leave in ambient condition for 24±2 hours before measurement. For C0G Cap. ≤1000pF, apply 1.0±0.2Vrms, 1.0MHz±10%, at 25°C ambient temperature; for Cap.>1000pF, apply 1.0±0.2Vrms; For X7R Cap. apply 1.0±0.2Vrms, 1.0kHz±10%, at 25°C ambient temperature
- Insulation Resistance test condition: Apply rated voltage for max. 120 sec

Multilayer Ceramic Chip Capacitor AEC-Q200 Type

MT series

MERITEK

CAPACITANCE RANGE AND THICKNESS –COG

| Dimension | | 0201 | | | | 0402 | | | | 0603 | | | | | | 0805 | | | | | | | | | |
|-------------------|------|------|----|----|----|------|----|----|----|------|----|----|----|-----|-----|------|----|----|----|----|-----|-----|-----|-----|-----|
| Rated Voltage (V) | Code | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 100 | 200 | 250 | 10 | 16 | 25 | 50 | 100 | 200 | 250 | 500 | 630 |
| 0.1 | 0R1 | L | L | L | L | N | N | N | N | | | | | | | | | | | | | | | | |
| 0.2 | 0R2 | L | L | L | L | N | N | N | N | | | | | | | | | | | | | | | | |
| 0.3 | 0R3 | L | L | L | L | N | N | N | N | | | | | | | | | | | | | | | | |
| 0.4 | 0R4 | L | L | L | L | N | N | N | N | | | | | | | | | | | | | | | | |
| 0.5 | 0R5 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 1 | 1R0 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 1.2 | 1R2 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 1.5 | 1R5 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 1.8 | 1R8 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 2.2 | 2R2 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 2.7 | 2R7 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 3.3 | 3R3 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 3.9 | 3R9 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 4.7 | 4R7 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 5.6 | 5R6 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 6.8 | 6R8 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 8.2 | 8R2 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 10 | 100 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 12 | 120 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 15 | 150 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 18 | 180 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 22 | 220 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 27 | 270 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 33 | 330 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 39 | 390 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 47 | 470 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 56 | 560 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 68 | 680 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 82 | 820 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | X | X |
| 100 | 101 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | X | X | X |
| 120 | 121 | L | L | L | L | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | X | X | C |
| 150 | 151 | | | | | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | C | C | C |
| 180 | 181 | | | | | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | C | C | C |
| 220 | 221 | | | | | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | C | C | C |
| 270 | 271 | | | | | N | N | N | N | S | S | S | S | S | B | B | A | A | A | A | A | A | C | C | C |
| 330 | 331 | | | | | N | N | N | N | S | S | S | S | S | B | B | A | A | A | A | A | A | C | C | C |
| 390 | 391 | | | | | N | N | N | N | S | S | S | S | S | B | B | X | X | X | X | X | X | C | C | C |
| 470 | 471 | | | | | N | N | N | N | S | S | S | S | S | B | B | X | X | X | X | X | X | C | C | |
| 560 | 561 | | | | | N | N | N | N | S | S | S | S | S | | | X | X | X | X | X | X | C | C | |
| 680 | 681 | | | | | N | N | N | N | S | S | S | S | S | | | X | X | X | X | X | X | C | C | |
| 820 | 821 | | | | | N | N | N | N | S | S | S | S | S | | | X | X | X | X | X | X | C | C | |
| 1000 | 102 | | | | | N | N | N | N | S | S | S | S | S | | | X | X | X | X | X | X | C | C | |
| 1200 | 122 | | | | | | | | | B | B | B | B | | | | X | X | X | X | X | X | C | C | |
| 1500 | 152 | | | | | | | | | B | B | B | B | | | | X | X | X | X | X | X | C | C | |
| 1800 | 182 | | | | | | | | | B | B | B | B | | | | X | X | X | X | X | X | C | C | |
| 2200 | 222 | | | | | | | | | B | B | B | B | | | | X | X | X | X | X | X | C | C | |
| 2700 | 272 | | | | | | | | | B | B | B | B | | | | C | C | C | C | C | C | | | |
| 3300 | 332 | | | | | | | | | B | B | B | B | | | | C | C | C | C | C | C | | | |
| 3900 | 392 | | | | | | | | | | | | | | | | C | C | C | C | C | C | | | |
| 4700 | 472 | | | | | | | | | | | | | | | | C | C | C | C | C | C | | | |
| 5600 | 562 | | | | | | | | | | | | | | | | C | C | C | C | C | C | | | |
| 6800 | 682 | | | | | | | | | | | | | | | | C | C | C | C | C | C | | | |
| 8200 | 822 | | | | | | | | | | | | | | | | C | C | C | C | C | C | | | |
| 10000 | 103 | | | | | | | | | | | | | | | | C | C | C | C | C | C | | | |

Multilayer Ceramic Chip Capacitor AEC-Q200 Type

MT series

MERITEK

CAPACITANCE RANGE AND THICKNESS –COG

| Dimension | | 1206 | | | | | | | | | | 1210 | | | | | | | | | |
|-------------------|------|------|----|----|----|-----|-----|-----|-----|-----|------|------|----|----|----|-----|-----|-----|-----|-----|--|
| Rated Voltage (V) | | 10 | 16 | 25 | 50 | 100 | 200 | 250 | 500 | 630 | 1000 | 10 | 16 | 25 | 50 | 100 | 200 | 250 | 500 | 630 | |
| Cap.(pF) | Code | | | | | | | | | | | | | | | | | | | | |
| 1.2 | 1R2 | X | X | X | X | X | X | X | X | X | | | | | | | | | | | |
| 1.5 | 1R5 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | |
| 1.8 | 1R8 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | |
| 2.2 | 2R2 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | |
| 2.7 | 2R7 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | |
| 3.3 | 3R3 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | |
| 3.9 | 3R9 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | |
| 4.7 | 4R7 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | |
| 5.6 | 5R6 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | |
| 6.8 | 6R8 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | |
| 8.2 | 8R2 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | |
| 10 | 100 | X | X | X | X | X | X | X | X | X | X | M | M | M | M | M | M | M | M | M | |
| 12 | 120 | X | X | X | X | X | X | X | X | X | X | M | M | M | M | M | M | M | M | M | |
| 15 | 150 | X | X | X | X | X | X | X | X | X | X | M | M | M | M | M | M | M | M | M | |
| 18 | 180 | X | X | X | X | X | X | X | X | X | X | M | M | M | M | M | M | M | M | M | |
| 22 | 220 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | |
| 27 | 270 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | |
| 33 | 330 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | |
| 39 | 390 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | |
| 47 | 470 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | |
| 56 | 560 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | |
| 68 | 680 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | |
| 82 | 820 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | |
| 100 | 101 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | |
| 120 | 121 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | |
| 150 | 151 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | |
| 180 | 181 | X | X | X | X | X | X | X | X | X | E | M | M | M | M | M | M | M | M | M | |
| 220 | 221 | X | X | X | X | X | X | X | X | X | E | M | M | M | M | M | M | M | M | M | |
| 270 | 271 | X | X | X | X | X | X | M | M | M | E | M | M | M | M | M | M | M | M | M | |
| 330 | 331 | X | X | X | X | X | X | M | M | M | E | M | M | M | M | M | M | M | M | M | |
| 390 | 391 | X | X | X | X | X | X | M | M | M | E | M | M | M | M | M | M | M | M | M | |
| 470 | 471 | X | X | X | X | X | M | M | M | M | E | M | M | M | M | M | M | M | M | M | |
| 560 | 561 | X | X | X | X | X | M | C | C | C | E | M | M | M | M | M | M | M | M | M | |
| 680 | 681 | X | X | X | X | X | M | C | C | C | E | M | M | M | M | M | M | M | M | M | |
| 820 | 821 | X | X | X | X | X | M | E | E | E | E | M | M | M | M | M | M | M | M | M | |
| 1000 | 102 | X | X | X | X | X | M | E | E | E | E | M | M | M | M | M | C | C | C | C | |
| 1200 | 122 | X | X | X | X | X | M | E | E | E | | M | M | M | M | M | C | C | C | C | |
| 1500 | 152 | X | X | X | X | X | C | E | E | E | | M | M | M | M | M | C | C | C | C | |
| 1800 | 182 | X | X | X | X | X | C | E | E | E | | M | M | M | M | M | C | C | C | C | |
| 2200 | 222 | X | X | X | X | X | C | E | E | E | | M | M | M | M | M | C | C | C | C | |
| 2700 | 272 | X | X | X | X | X | C | E | | | | M | M | M | M | M | C | C | C | C | |
| 3300 | 332 | X | X | X | X | X | C | E | | | | M | M | M | M | M | C | C | C | C | |
| 3900 | 392 | X | X | X | X | X | C | E | | | | M | M | M | M | M | C | C | C | C | |
| 4700 | 472 | X | X | X | X | X | C | E | | | | M | M | M | M | M | E | E | | | |
| 5600 | 562 | X | X | X | X | X | | | | | | M | M | M | M | M | E | E | | | |
| 6800 | 682 | M | M | M | M | | | | | | | M | M | M | M | M | E | E | | | |
| 8200 | 822 | C | C | C | C | | | | | | | M | M | M | M | M | E | E | | | |
| 10000 | 103 | C | C | C | C | | | | | | | M | M | M | M | M | E | E | | | |
| 12000 | 123 | | | | | | | | | | | C | C | C | C | C | | | | | |
| 15000 | 153 | | | | | | | | | | | C | C | C | C | C | | | | | |
| 18000 | 183 | | | | | | | | | | | F | F | F | F | F | | | | | |
| 22000 | 223 | | | | | | | | | | | F | F | F | F | F | | | | | |
| 27000 | 273 | | | | | | | | | | | F | F | F | F | F | | | | | |
| 33000 | 333 | | | | | | | | | | | F | F | F | F | F | | | | | |

Multilayer Ceramic Chip Capacitor AEC-Q200 Type

MT series

MERITEK

CAPACITANCE RANGE AND THICKNESS -X7R

| Dimension | | 0402 | | | | 0603 | | | | | 0805 | | | | | | | | |
|-------------------|------|------|----|----|----|------|----|----|----|-----|------|----|----|----|-----|-----|-----|-----|-----|
| Rated Voltage (V) | | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 100 | 10 | 16 | 25 | 50 | 100 | 200 | 250 | 500 | 630 |
| Cap.(pF) | Code | | | | | | | | | | | | | | | | | | |
| 100 | 101 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 120 | 121 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 150 | 151 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 180 | 181 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 220 | 221 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 270 | 271 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 330 | 331 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 390 | 391 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 470 | 471 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 560 | 561 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 680 | 681 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 820 | 821 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 1000 | 102 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 1200 | 122 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 1500 | 152 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 1800 | 182 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 2200 | 222 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 2700 | 272 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 3300 | 332 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 3900 | 392 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 4700 | 472 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | C | C |
| 5600 | 562 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | C | C | C | C |
| 6800 | 682 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | C | C | C | C |
| 8200 | 822 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | C | C | C | C |
| 10000 | 103 | N | N | N | N | S | S | S | S | S | X | X | X | X | X | C | C | C | C |
| 12000 | 123 | | | | | S | S | S | S | | X | X | X | X | X | C | C | | |
| 15000 | 153 | | | | | S | S | S | S | | X | X | X | X | X | C | C | | |
| 18000 | 183 | | | | | S | S | S | S | | X | X | X | X | X | C | C | | |
| 22000 | 223 | | | | | S | S | S | S | | X | X | X | X | X | C | C | | |
| 27000 | 273 | | | | | S | S | S | S | | X | X | X | X | C | | | | |
| 33000 | 333 | | | | | S | S | S | B | | X | X | X | X | C | | | | |
| 39000 | 393 | | | | | S | S | S | B | | X | X | X | X | C | | | | |
| 47000 | 473 | | | | | S | S | S | B | | X | X | X | X | C | | | | |
| 56000 | 563 | | | | | S | S | S | B | | X | X | X | X | C | | | | |
| 68000 | 683 | | | | | S | S | S | B | | X | X | X | X | C | | | | |
| 82000 | 823 | | | | | S | S | S | B | | X | X | X | C | C | | | | |
| 100000 | 104 | | | | | S | S | S | B | | X | X | X | C | C | | | | |
| 120000 | 124 | | | | | | | | | | X | X | X | C | | | | | |
| 150000 | 154 | | | | | | | | | | C | C | C | C | | | | | |
| 180000 | 184 | | | | | | | | | | C | C | C | C | | | | | |
| 220000 | 224 | | | | | | | | | | C | C | C | I | | | | | |
| 270000 | 274 | | | | | | | | | | C | C | C | | | | | | |
| 330000 | 334 | | | | | | | | | | C | C | C | | | | | | |
| 390000 | 394 | | | | | | | | | | C | C | C | | | | | | |
| 470000 | 474 | | | | | | | | | | C | C | C | | | | | | |
| 560000 | 564 | | | | | | | | | | C | C | C | | | | | | |
| 680000 | 684 | | | | | | | | | | C | C | C | | | | | | |
| 820000 | 824 | | | | | | | | | | C | C | C | | | | | | |
| 1000000 | 105 | | | | | | | | | | C | C | | | | | | | |

Multilayer Ceramic Chip Capacitor AEC-Q200 Type

MT series

MERITEK

CAPACITANCE RANGE AND THICKNESS -X7R

| Dimension | | 1206 | | | | | | | | | 1210 | | | | | | | | 1808 | | | | 1812 | | | | |
|-------------------|------|------|----|----|----|-----|-----|-----|-----|-----|------|----|----|----|-----|-----|-----|------|------|-----|-----|-----|------|-----|-----|-----|---|
| Rated Voltage (V) | Code | 10 | 16 | 25 | 50 | 100 | 200 | 250 | 500 | 630 | 10 | 16 | 25 | 50 | 100 | 250 | 500 | 1000 | 50 | 100 | 200 | 250 | 50 | 100 | 200 | 250 | |
| Cap.(pF) | Code | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 101 | | | | | | C | C | C | C | | | | | | C | C | C | | | | | | | | | |
| 120 | 121 | | | | | | C | C | C | C | | | | | | C | C | C | | | | | | | | | |
| 150 | 151 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C | C | C | C | C | | | | | |
| 180 | 181 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C | C | C | C | C | | | | | |
| 220 | 221 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C | C | C | C | C | | | | | |
| 270 | 271 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C | C | C | C | C | C | C | C | C | C |
| 330 | 331 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C | C | C | C | C | C | C | C | C | C |
| 390 | 391 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C | C | C | C | C | C | C | C | C | C |
| 470 | 471 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C | C | C | C | C | C | C | C | C | C |
| 560 | 561 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C | C | C | C | C | C | C | C | C | C |
| 680 | 681 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C | C | C | C | C | C | C | C | C | C |
| 820 | 821 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C | C | C | C | C | C | C | C | C | C |
| 1000 | 102 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | C | C |
| 1200 | 122 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | C | C |
| 1500 | 152 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | C | C |
| 1800 | 182 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | C | C |
| 2200 | 222 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | C | C |
| 2700 | 272 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | C | C |
| 3300 | 332 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | C | C |
| 3900 | 392 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E | C | C | C | C | C | C | C | C | C |
| 4700 | 472 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E | C | C | C | C | C | C | C | C | C |
| 5600 | 562 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E | C | C | C | C | C | C | C | C | C |
| 6800 | 682 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E | C | C | C | C | C | C | C | C | C |
| 8200 | 822 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E | C | C | C | C | C | C | C | C | C |
| 10000 | 103 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E | C | C | C | C | C | C | C | C | C |
| 12000 | 123 | X | X | X | X | X | C | C | | | M | M | M | M | M | M | C | | E | E | E | E | C | C | C | C | C |
| 15000 | 153 | X | X | X | X | X | C | C | | | M | M | M | M | M | M | C | | E | E | E | E | C | C | C | C | C |
| 18000 | 183 | X | X | X | X | X | C | C | | | M | M | M | M | M | M | C | | E | E | E | E | C | C | C | C | C |
| 22000 | 223 | X | X | X | X | X | C | C | | | M | M | M | M | M | M | C | | E | E | E | E | C | C | C | C | C |
| 27000 | 273 | X | X | X | X | X | | | | | M | M | M | M | M | M | | | E | E | E | E | C | C | C | C | C |
| 33000 | 333 | X | X | X | X | X | | | | | M | M | M | M | M | M | | | E | E | E | E | C | C | C | C | C |
| 39000 | 393 | X | X | X | X | X | | | | | M | M | M | M | M | M | | | E | E | E | E | C | C | C | C | C |
| 47000 | 473 | X | X | X | X | X | | | | | M | M | M | M | M | C | | | E | E | E | E | C | C | C | C | C |
| 56000 | 563 | X | X | X | X | X | | | | | M | M | M | M | M | | | | E | E | E | E | C | C | C | C | C |
| 68000 | 683 | X | X | X | X | X | | | | | M | M | M | M | M | | | | E | E | E | E | C | C | C | C | C |
| 82000 | 823 | X | X | X | X | C | | | | | M | M | M | M | M | | | | E | E | E | E | C | C | C | C | C |
| 100000 | 104 | X | X | X | X | C | | | | | M | M | M | M | M | | | | E | E | E | E | C | C | C | C | C |
| 120000 | 124 | X | X | X | X | C | | | | | M | M | M | M | | | | | E | E | E | E | C | C | C | C | C |
| 150000 | 154 | M | M | M | M | E | | | | | M | M | M | M | | | | | E | E | E | E | C | C | C | C | C |
| 180000 | 184 | M | M | M | M | E | | | | | M | M | M | M | | | | | E | E | | | C | C | C | C | C |
| 220000 | 224 | M | M | M | M | E | | | | | M | M | M | M | | | | | E | E | | | C | C | C | C | C |
| 270000 | 274 | M | M | M | C | | | | | | | | | | | | | | | | | | | C | C | E | E |
| 330000 | 334 | M | M | M | C | | | | | | | | | | | | | | | | | | | C | C | E | E |
| 390000 | 394 | M | M | J | P | | | | | | | | | | | | | | | | | | | C | C | F | F |
| 470000 | 474 | J | J | J | P | | | | | | | | | | | | | | | | | | | C | C | | |
| 560000 | 564 | J | J | J | P | | | | | | | | | | | | | | | | | | | C | C | | |
| 680000 | 684 | J | J | J | P | | | | | | | | | | | | | | | | | | | C | C | | |
| 820000 | 824 | J | J | J | P | | | | | | | | | | | | | | | | | | | C | C | | |
| 1000000 | 105 | J | J | J | P | | | | | | | | | | | | | | | | | | | C | C | | |
| 1200000 | 125 | | | | | | | | | | | | | | | | | | | | | | | C | C | | |
| 1500000 | 155 | | | | | | | | | | | | | | | | | | | | | | | C | C | | |
| 1800000 | 185 | | | | | | | | | | | | | | | | | | | | | | | E | E | | |

Multilayer Ceramic Chip Capacitor AEC-Q200 Type

MT series

MERITEK

RELIABILITY TEST CONDITIONS AND REQUIREMENTS

| Test Item | Standard | Test Condition | Requirements | | | | | | | | | | |
|---------------------------------|-----------------------------|--|--|-----------|------|-----------------------------|-----------|-----------------------------|-----------|-----------------------------|------------|-----------------------------|---|
| Capacitance | - | C0G : Cap.≤1000pF: 1.0±0.2Vrms, 1MHz±10%. Cap.>1000pF: 1.0±0.2Vrms, 1KHz±10%. X7R : Apply 1.0±0.2Vrms, 1.0KHz±10%, at 25°C ambient temperature. | Within specification | | | | | | | | | | |
| Q/ D.F. (Dissipation Factor) | | | Q/D.F. : value within specification (See D.F. table above) | | | | | | | | | | |
| Insulation Resistance | - | Apply rated voltage for max. 120 sec | I.R. : within specification (See I.R. table above) | | | | | | | | | | |
| Dielectric Strength | - | To apply voltage : <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Rated Vol. (V)</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>≤100</td> <td>2.5 times of U_R</td> </tr> <tr> <td>100<V≤250</td> <td>2.0 times of U_R</td> </tr> <tr> <td>250<V≤500</td> <td>1.5 times of U_R</td> </tr> <tr> <td>630<V≤1000</td> <td>1.2 times of U_R</td> </tr> </tbody> </table> Duration: 1 ~ 5 sec. Charge and discharge current less than 50mA. | Rated Vol. (V) | Condition | ≤100 | 2.5 times of U _R | 100<V≤250 | 2.0 times of U _R | 250<V≤500 | 1.5 times of U _R | 630<V≤1000 | 1.2 times of U _R | No evidence of damage or flashover during test. |
| Rated Vol. (V) | Condition | | | | | | | | | | | | |
| ≤100 | 2.5 times of U _R | | | | | | | | | | | | |
| 100<V≤250 | 2.0 times of U _R | | | | | | | | | | | | |
| 250<V≤500 | 1.5 times of U _R | | | | | | | | | | | | |
| 630<V≤1000 | 1.2 times of U _R | | | | | | | | | | | | |
| Temperature Coefficient | - | With no electrical load, Operation temperature : -55~125°C | C0G: ΔC/C ≤±30ppm/°C X7R: ΔC/C ≤ 15%. | | | | | | | | | | |
| External Visual | MIL-STD-883 Method 2009 | Visual Inspection | No remarkable defect | | | | | | | | | | |
| Dimensions | JESD22 Method JB-100 | Caliper measurement | Within specification | | | | | | | | | | |
| Destructive Physical Analysis | EIA-469 | Per EIA-469 | No Defects or abnormalities | | | | | | | | | | |
| Mechanical Shock | MIL-STD-202 Method 213 | <ul style="list-style-type: none"> Peak value: 1500g's. Wave: 1/2 sine. Velocity: 15.4 ft/sec. Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks). | No remarkable damage Cap change: within specification Q/D.F. : value within specification (See D.F. table above) I.R. : within specification (See I.R. table above) | | | | | | | | | | |
| Vibration | MIL-STD-202 Method 204 | <ul style="list-style-type: none"> Vibration frequency : 10~2000 Hz/min (5g's for 20 min) Total amplitude : 1.5mm 12 cycles each of 3 orientations (36 times) | No remarkable damage Cap change: within specification Q/D.F. : Value within specification (See D.F. table above) I.R. : within specification (See I.R. table above) | | | | | | | | | | |
| ESD | AEC-Q200-002 | <ul style="list-style-type: none"> Per AEC-Q200-002 | No remarkable damage Cap change: within specification Q/D.F. : value within specification (See D.F. table above) I.R. : within specification (See I.R. table above) | | | | | | | | | | |
| Board Flex | AEC-Q200-005 | The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 3mm (2mm for X7R) and then the pressure shall be maintained for 5±1 sec. Measurement to be made after keeping at room temp. for 24±2 hrs. | No remarkable damage C0G: ΔC/C ≤5% or 0.5pF, whichever is larger X7R: ΔC/C ≤ 12.5%. | | | | | | | | | | |
| Terminal Strength | AEC-Q200-006 | <ul style="list-style-type: none"> Pressurizing force : 2N(0402), 5N(0603), 10N(0805), 17.7N(≥1206) Test time : 60±1 sec | No remarkable damage Cap change: within specification Q/D.F. : value within specification (See D.F. table above) | | | | | | | | | | |
| Beam Load Test | AEC-Q200-003 | <ul style="list-style-type: none"> Break strength test Beam speed : 2.5±0.25 mm/sec | The chip endure following force : Chip length ≤2.5mm : Thickness >0.5mm (20N), ≤0.5mm (8N). Chip length ≥3.2mm : Thickness ≥1.25mm (54.5N), <1.25mm (15N). | | | | | | | | | | |

Multilayer Ceramic Chip Capacitor AEC-Q200 Type

MT series

MERITEK

RELIABILITY TEST CONDITIONS AND REQUIREMENTS (CONTINUED)

| Test Item | Standard | Test Condition | Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|--|-----------|------------|---|------------|------|---|-------------|------|--|-------|-------------|--------------------------|--|-----|------|------|--|-----|------------|-----|---|----|------|-----|---|----|------|-----|---------------------|-----|-------------------------|-----|---|-----|-------------|----|------|-----|--|-----|---|----|------|-----|---|-----|----------|---------------|------|----------------|--|---|---|--|---|---|
| Solderability | J-STD-002 JESD22-B102E | <ul style="list-style-type: none"> Condition A Un-mounted chips 4hrs / 155°C, dry, then completely immersed for 5±0.5 sec in solder bath at 245±5°C. Condition B Un-mounted chips steam 8 hrs then completely immersed for 10±1sec in solder bath at 220 +5/-0°C. Condition C Un-mounted chips steam 8 hrs then completely immersed for 10±1 sec in solder bath at 260 +0/-5°C. | All terminations shall exhibit a continuous solder coating free from defects from a minimum of 95% of the critical surface area of any individual termination. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Resistance to Soldering Heat | MIL-STD-202 Method 210 | Solder temperature: 270±5°C, Dipping time: 10±1 sec Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp. | No remarkable damage. C0G: $ \Delta C/C \leq 2.5\%$ or 0.25pF, whichever is larger X7R: $ \Delta C/C \leq 7.5\%$. Q/D.F. : value within specification (See D.F. table above) I.R. : within specification (See I.R. table above) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Resistance to Solvents | MIL-STD-202 Method 215 | Temperature: 25±5°C. Time: 3 +0.5/-0 min. Solvent: Iso-propyl alcohol. | No remarkable damage Cap change: within specification Q/D.F. : value within specification (See D.F. table above) I.R. : within specification (See I.R. table above) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thermal Shock | MIL-STD-202 Method 107 | <p>Conduct 300 cycles according to the temperature and times below:</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temp.(°C)</th> <th>Time(min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C+0/-3</td> <td>15±3</td> </tr> <tr> <td>2</td> <td>+125°C+3/-0</td> <td>15±3</td> </tr> </tbody> </table> <p>Max. transfer time: 20 sec. Before initial measurement: Perform 150 +0/-10°C for 1 hr and then set for 24±2 hrs at room temp.</p> | Step | Temp.(°C) | Time(min.) | 1 | -55°C+0/-3 | 15±3 | 2 | +125°C+3/-0 | 15±3 | <p>No remarkable damage. C0G: $\Delta C/C \leq 2.5\%$ or 0.25pF, whichever is larger X7R: $\Delta C/C \leq 10.0\%$. Q/D.F. Value: C0G: $Q \geq 1000$ for Cap. $\geq 30\text{pF}$, $Q \geq 400+20C$ for Cap. $< 30\text{pF}$. X7R:</p> <table border="1"> <thead> <tr> <th>Rated</th> <th>D.F. \leq</th> <th colspan="2">Exception of D.F. \leq</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50</td> <td rowspan="3">3.0%</td> <td>6.0%</td> <td>0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td> </tr> <tr> <td>10%</td> <td>1210≥4.7μF</td> </tr> <tr> <td>20%</td> <td>0402≥0.1μF, 0603≥0.1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF</td> </tr> <tr> <td>35</td> <td>5.0%</td> <td>20%</td> <td>0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td> </tr> <tr> <td rowspan="4">25</td> <td rowspan="4">5.0%</td> <td>10%</td> <td>0805≥1μF; 1210≥10μF</td> </tr> <tr> <td>14%</td> <td>0603≥0.33μF; 1206≥4.7μF</td> </tr> <tr> <td>15%</td> <td>0402≥0.10μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥6.8μF; 1210≥22μF</td> </tr> <tr> <td>20%</td> <td>0402≥0.47μF</td> </tr> <tr> <td rowspan="2">16</td> <td rowspan="2">5.0%</td> <td>10%</td> <td>0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td> </tr> <tr> <td>15%</td> <td>0402≥0.22μF; 0603≥0.68μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td> </tr> <tr> <td rowspan="2">10</td> <td rowspan="2">7.5%</td> <td>15%</td> <td>0402≥0.22μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF</td> </tr> <tr> <td>20%</td> <td>0402≥1μF</td> </tr> </tbody> </table> <p>I.R. : $\geq 10G\Omega$ or $RxC \geq 500\Omega\text{-F}$, whichever is smaller. Class II (X7R)</p> <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>I.R.</th> </tr> </thead> <tbody> <tr> <td>100V : All X7R</td> <td rowspan="6">1GΩ or $RxC \geq 10\Omega\text{-F}$, whichever is smaller</td> </tr> <tr> <td>50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF</td> </tr> <tr> <td>35V : 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF</td> </tr> <tr> <td>25V : 0402≥1μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF</td> </tr> <tr> <td>16V : 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF</td> </tr> <tr> <td>10V : 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF</td> </tr> </tbody> </table> | Rated | D.F. \leq | Exception of D.F. \leq | | ≥50 | 3.0% | 6.0% | 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF | 10% | 1210≥4.7μF | 20% | 0402≥0.1μF, 0603≥0.1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF | 35 | 5.0% | 20% | 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF | 25 | 5.0% | 10% | 0805≥1μF; 1210≥10μF | 14% | 0603≥0.33μF; 1206≥4.7μF | 15% | 0402≥0.10μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥6.8μF; 1210≥22μF | 20% | 0402≥0.47μF | 16 | 5.0% | 10% | 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF | 15% | 0402≥0.22μF; 0603≥0.68μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF | 10 | 7.5% | 15% | 0402≥0.22μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF | 20% | 0402≥1μF | Rated Voltage | I.R. | 100V : All X7R | 1GΩ or $RxC \geq 10\Omega\text{-F}$, whichever is smaller | 50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF | 35V : 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF | 25V : 0402≥1μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF | 16V : 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF | 10V : 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF |
| Step | Temp.(°C) | Time(min.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | -55°C+0/-3 | 15±3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | +125°C+3/-0 | 15±3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated | D.F. \leq | Exception of D.F. \leq | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥50 | 3.0% | 6.0% | 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 10% | 1210≥4.7μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 20% | 0402≥0.1μF, 0603≥0.1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | 5.0% | 20% | 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | 5.0% | 10% | 0805≥1μF; 1210≥10μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 14% | 0603≥0.33μF; 1206≥4.7μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 15% | 0402≥0.10μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥6.8μF; 1210≥22μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 20% | 0402≥0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 5.0% | 10% | 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 15% | 0402≥0.22μF; 0603≥0.68μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 7.5% | 15% | 0402≥0.22μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 20% | 0402≥1μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated Voltage | I.R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100V : All X7R | 1GΩ or $RxC \geq 10\Omega\text{-F}$, whichever is smaller | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35V : 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25V : 0402≥1μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16V : 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10V : 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Temperature Exposure (Storage) | MIL-STD-202 Method 108 | Test temp. : 150±3°C. Unpowered. Test time: 1000 +24/-0 hrs. Measurement to be made after keeping at room temp. for 24±2 hrs. | No remarkable damage. C0G: $ \Delta C/C \leq 2.5\%$ or 0.25pF, whichever is larger X7R: $ \Delta C/C \leq 10.0\%$. Q/D.F. Value: See Thermal Shock D.F. Requirement I.R. Value: See Thermal Shock I.R. Requirement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Multilayer Ceramic Chip Capacitor AEC-Q200 Type

MT series

MERITEK

RELIABILITY TEST CONDITIONS AND REQUIREMENTS (CONTINUED)

| Test Item | Standard | Test Condition | Requirements | | | | | | |
|---|--|--|---|---------------|-----------|----------------|--|---|---|
| Temperature Cycling | JESD22 Method JA-104 | Conduct 1000 cycles according to the temperature and times below: | No remarkable damage. C0G: $ \Delta C/C \leq 2.5\%$ or $0.25\mu\text{F}$, whichever is larger X7R: $ \Delta C/C \leq 10.0\%$. Q/D.F. Value: See Thermal Shock D.F. Requirement I.R. Value: See Thermal Shock I.R. Requirement | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Step</th> <th>Temp.(°C)</th> <th>Time(min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C+0/-3</td> <td>15±3</td> </tr> <tr> <td>2</td> <td>+125°C+3/-0</td> <td>15±3</td> </tr> </tbody> </table> Before initial measurement: Perform 150 +0/-10°C for 1 hr and then set for 24±2 hrs at room temp. | | Step | Temp.(°C) | Time(min.) | 1 | -55°C+0/-3 | 15±3 |
| Step | Temp.(°C) | Time(min.) | | | | | | | |
| 1 | -55°C+0/-3 | 15±3 | | | | | | | |
| 2 | +125°C+3/-0 | 15±3 | | | | | | | |
| Moisture Resistance | MIL-STD-202 Method 106 | Test temp. : 25~65°C. Humidity: 80~100% RH. Test time: 10 cycles, t=24hrs/cycle. Measurement to be made after keeping at room temp. for 24±2 hrs. | No remarkable damage. C0G: $ \Delta C/C \leq 3.0\%$ or $0.30\mu\text{F}$, whichever is larger X7R: $ \Delta C/C \leq 12.5\%$. Q/D.F. of C0G: $Q \geq 350$ for Cap.>30pF, $Q \geq 275+2.5C$ for $10\text{pF} \leq \text{Cap.} \leq 30\text{pF}$, $Q \geq 200+10C$ for Cap. <10pF Q/D.F. of X7R: See Thermal Shock D.F. Requirement of X7R I.R. Value: See Thermal Shock I.R. Requirement | | | | | | |
| Biased Humidity | MIL-STD-202 Method 103 | Test temp. : 85±3°C. Humidity: 85±5%RH. Test time: 1000 +24/-0 hrs. To apply voltage: rated voltage (max. 100Vdc) and 1.3~1.5Vdc (add 100k Ω resistor). Before initial measurement (Class II only) : To apply test voltage for 1hr at test temperature and then set for 24±2 hrs at room temperature | No remarkable damage. C0G: $ \Delta C/C \leq 3.0\%$ or $0.30\mu\text{F}$, whichever is larger X7R: $ \Delta C/C \leq 12.5\%$. Q/D.F. Value: C0G: $Q \geq 200$ for Cap.≥30pF, $Q \geq 100+10/3C$ for Cap.<30pF Q/D.F. Value of X7R: See Thermal Shock D.F. Requirement of X7R I.R.: $\geq 1\text{G}\Omega$ or $\text{RxC} \geq 50\Omega\text{-F}$, whichever is smaller. Class II (X7R) for Rated Voltage Test | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>I.R.</th> </tr> </thead> <tbody> <tr> <td>100V : All X7R</td> <td rowspan="6">500MΩ or $\text{RxC} \geq 5\Omega\text{-F}$, whichever is smaller</td> </tr> <tr> <td>50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF</td> </tr> <tr> <td>35V : 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF</td> </tr> <tr> <td>25V : 0402≥1μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF</td> </tr> <tr> <td>16V : 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF</td> </tr> <tr> <td>10V : 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF</td> </tr> </tbody> </table> | | Rated Voltage | I.R. | 100V : All X7R | 500MΩ or $\text{RxC} \geq 5\Omega\text{-F}$, whichever is smaller | 50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF | 35V : 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF |
| Rated Voltage | I.R. | | | | | | | | |
| 100V : All X7R | 500MΩ or $\text{RxC} \geq 5\Omega\text{-F}$, whichever is smaller | | | | | | | | |
| 50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF | | | | | | | | | |
| 35V : 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF | | | | | | | | | |
| 25V : 0402≥1μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF | | | | | | | | | |
| 16V : 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF | | | | | | | | | |
| 10V : 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF | | | | | | | | | |
| Operational Life | MIL-STD-202 Method 108 | Test temp. : 125±3°C. To apply voltage: Full rated voltage. Test time: 1000 +24/-0 hrs. Before initial measurement (X7R only) : Apply rated voltage for 1 hr at 125°C and then set for 24±2 hrs at room temperature | No remarkable damage. C0G: $ \Delta C/C \leq 3.0\%$ or $0.30\mu\text{F}$, whichever is larger X7R: $ \Delta C/C \leq 12.5\%$. Q/D.F. Value of C0G: $Q \geq 350$ for Cap.>30pF, $Q \geq 275+2.5C$ for $10\text{pF} \leq \text{Cap.} \leq 30\text{pF}$, $Q \geq 200+10C$ for Cap. <10pF Q/D.F. Value of X7R: See Thermal Shock D.F. Requirement of X7R I.R.: $\geq 1\text{G}\Omega$ or $\text{RxC} \geq 50\Omega\text{-F}$, whichever is smaller. Class II (X7R) for Rated Voltage Test | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>I.R.</th> </tr> </thead> <tbody> <tr> <td>100V : All X7R</td> <td rowspan="6">1GΩ or $\text{RxC} \geq 10\Omega\text{-F}$, whichever is smaller</td> </tr> <tr> <td>50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF</td> </tr> <tr> <td>35V : 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF</td> </tr> <tr> <td>25V : 0402≥1μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF</td> </tr> <tr> <td>16V : 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF</td> </tr> <tr> <td>10V : 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF</td> </tr> </tbody> </table> | | Rated Voltage | I.R. | 100V : All X7R | 1GΩ or $\text{RxC} \geq 10\Omega\text{-F}$, whichever is smaller | 50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF | 35V : 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF |
| Rated Voltage | I.R. | | | | | | | | |
| 100V : All X7R | 1GΩ or $\text{RxC} \geq 10\Omega\text{-F}$, whichever is smaller | | | | | | | | |
| 50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF | | | | | | | | | |
| 35V : 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF | | | | | | | | | |
| 25V : 0402≥1μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF | | | | | | | | | |
| 16V : 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF | | | | | | | | | |
| 10V : 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF | | | | | | | | | |

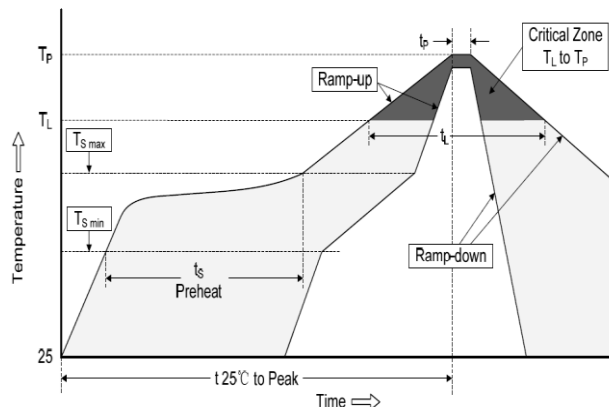
Multilayer Ceramic Chip Capacitor AEC-Q200 Type

MT series

MERITEK

RECOMMENDED SOLDERING PROFILES

| Reflow Condition | | |
|--|-------------------------------|-----------------|
| Pre Heat | Temp. Min $T_{s(min)}$ | 150°C |
| | Temp. Max $T_{s(max)}$ | 200°C |
| | Time (min. to max.) (t_s) | 60~120 seconds |
| $T_{s(max)}$ to T_L (Ramp-up rate) | | 3°C/second max. |
| Average ramp up rate (T_L) to peak | | 3°C/second max. |
| Reflow | Temp. (T_L) | 217°C |
| | Time (min. to max.) (t_L) | 60~150 seconds |
| Peak Temperature (T_P) | | 255°C ~260°C |
| Time within 5°C of actual peak Temperature (t_p) | | 30 seconds max. |
| Ramp-down Rate | | 6°C/second |



REEL DIMENSION AND QUANTITY (UNIT: PCS)

| Size | Thickness (mm) | Paper Tape (pcs) | | Plastic Tape (pcs) | |
|-------------|-----------------|------------------|----------|--------------------|----------|
| | | 7" reel | 13" reel | 7" reel | 13" reel |
| 0201(0603) | 0.30±0.05 | 15K | 70K | - | - |
| 0402 (1005) | 0.50±0.05 | 10K | 50K | - | - |
| | 0.50+0.02/-0.05 | 10K | 50K | - | - |
| 0603 (1608) | 0.50±0.20 | 10K | - | - | - |
| | 0.80±0.07 | 4K | 15K | - | - |
| 0805 (2012) | 0.80+0.15/-0.10 | 4K | 15K | - | - |
| | 0.60±0.10 | 4K | 15K | - | - |
| | 0.80±0.10 | 4K | 15K | - | - |
| | 0.95±0.10 | - | - | 3K | 10K |
| 1206 (3216) | 1.25±0.10 | - | - | 3K | - |
| | 0.80±0.10 | 4K | 15K | - | - |
| | 0.95±0.10 | - | - | 3K | 10K |
| | 1.25±0.10 | - | - | 3K | 10K |
| 1210 (3225) | 1.60±0.20 | - | - | 2K | - |
| | 0.95±0.10 | - | - | 3K | 10K |
| | 1.25±0.10 | - | - | 3K | 10K |
| | 2.00±0.20 | - | - | 1K | - |
| 1808 (4520) | 2.50±0.30 | - | - | 1K | - |
| | 1.25±0.10 | - | - | 2K | - |
| | 1.60±0.20 | - | - | 2K | - |
| 1812 (4532) | 2.00±0.20 | - | - | 1K | - |
| | 2.50±0.30 | - | - | 1K | - |
| | 1.25±0.10 | - | - | 1K | - |
| | 1.60±0.20 | - | - | 1K | - |
| 1825 (4563) | 2.00±0.20 | - | - | 1K | - |
| | 2.50±0.30 | - | - | 0.5K | - |
| | 2.80±0.30 | - | - | 0.5K | - |
| | 1.60±0.20 | - | - | 1K | - |
| 2220 (5750) | 2.00±0.20 | - | - | 1K | - |
| | 2.50±0.30 | - | - | 0.5K | - |
| | 2.80±0.30 | - | - | 0.5K | - |
| | 1.60±0.20 | - | - | 1K | - |
| 2225 (5763) | 2.00±0.20 | - | - | 1K | - |
| | 2.50±0.30 | - | - | 0.5K | - |
| | 2.80±0.30 | - | - | 0.5K | - |
| | 1.60±0.20 | - | - | 1K | - |

Multilayer Ceramic Chip Capacitor AEC-Q200 Type

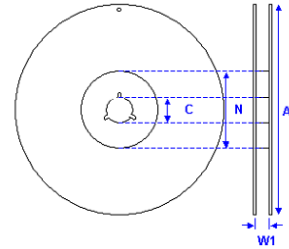
MT series

MERITEK

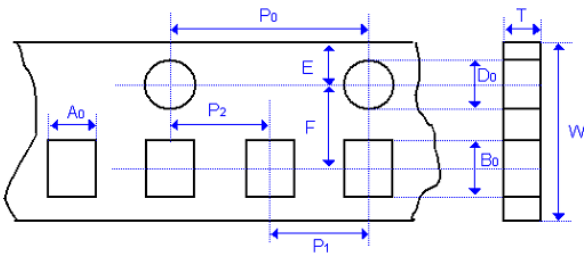
PACKAGE DIMENSION

Reel Dimension (mm)

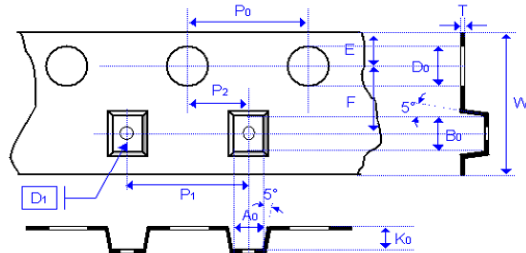
| Reel Size | 7" | 7" | 13" |
|-----------|----------------|----------------|---------------|
| C | 13.0 +0.5/-0.2 | 13.0 +0.5/-0.2 | 13.0+0.5/-0.2 |
| W1 | 8.4 +1.5/-0 | 12.4 +2.0/-0 | 8.4+1.5/-0 |
| A | 178.0 ±0.10 | 178.0 ±0.10 | 330.0±1.0 |
| N | 60.0 +1.0/-0 | 80.0±1.0 | 100±1.0 |



Paper Tape:



Plastic Tape:



Tape Dimension (mm)

| Size | 0201 | 0402 | 0603 | | 0805 | | 1206 | | | 1210 | |
|-------------------|------------|------------------------|---------------------|---------------------|------------|------------------------|------------|------------------------|----------------------------|--|-------------|
| Chip Size | 0.30 ±0.03 | 0.50±0.05 0.50±0.10 | 0.80 ±0.07 | 0.80±0.15 /-0.10 | 0.80 ±0.10 | 1.25±0.10 1.25±0.20 | 0.80 ±0.10 | 0.95±0.10 1.25±0.10 | 1.60±0.20 1.60±0.3/-0.1 | 0.95±0.10 1.25±0.10 1.60±0.20 2.00±0.20 | 2.50±0.30 |
| A ₀ | 0.38±0.05 | 0.62±0.05 | 1.00+0.05 /-0.10 | 1.02+0.05 /-0.10 | 1.50±0.10 | <1.65 | 2.00±0.10 | <2.00 | <2.00 | <3.05 | <3.10 |
| B ₀ | 0.68±0.05 | 1.12±0.05 | 1.80±0.10 | 1.80±0.10 | 2.30±0.10 | <2.40 | 3.50±0.10 | <3.60 | <3.70 | <3.80 | <4.00 |
| T | 0.42±0.05 | 0.60±0.05 | 0.95±0.05 | 0.97±0.05 | 0.95±0.05 | 0.23±0.05 | 0.95±0.05 | 0.23±0.05 | 0.23±0.05 | 0.23±0.05 | 0.23±0.05 |
| K ₀ | - | - | - | - | - | <2.50 | - | <2.50 | <2.50 | <2.50 | <3.50 |
| W | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 |
| P ₀ | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.100 | 4.00±0.10 |
| 10xP ₀ | 40.00±0.10 | 40.00±0.20 | 40.0±0.20 | 40.00±0.20 | 40.00±0.20 | 40.00±0.20 | 40.0±0.20 | 40.00±0.20 | 40.00±0.20 | 40.00±0.20 | 40.0±0.20 |
| P ₁ | 2.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| P ₂ | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 |
| D ₀ | 1.55±0.05 | 1.55±0.05 | 1.55±0.05 | 1.55±0.1/-0 | 1.55±0.05 | 1.50±0.1/-0 | 1.50±0.05 | 1.50±0.1/-0 | 1.50±0.1/-0 | 1.50±0.1/-0 | 1.50±0.1/-0 |
| D ₁ | - | - | - | - | - | 1.00±0.10 | - | 1.00±0.10 | 1.00±0.10 | 1.00±0.10 | 1.00±0.10 |
| E | 1.75±0.05 | 1.75±0.05 | 1.75±0.10 | 1.75±0.10 | 1.75±0.05 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 |
| F | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 |

| Size | 1808 | | 1812 | | 1825 | | 2220 | | 2225 | |
|-------------------|-------------------------------------|-------------|-------------------------------------|------------------|------------------------|------------------|-------------------------------------|------------------|------------------------|------------------|
| Chip Size | 1.25±0.10 1.40±0.15 1.60±0.20 | 2.00±0.20 | 1.25±0.10 1.60±0.20 2.00±0.20 | 2.50 ±0.30 | 1.60±0.20 2.00±0.20 | 2.50 ±0.30 | 1.40±0.15 1.60±0.20 2.00±0.20 | 2.50 ±0.30 | 1.60±0.20 2.00±0.20 | 2.50 ±0.30 |
| A ₀ | <2.50 | <2.50 | <3.90 | <3.90 | <6.80 | <6.80 | <5.80 | <5.80 | <6.80 | <6.80 |
| B ₀ | <5.30 | <5.30 | <5.30 | <5.30 | <5.30 | <5.30 | <6.50 | <6.50 | <6.50 | <6.50 |
| T | 0.25±0.05 | 0.25±0.05 | 0.25±0.05 | 0.25±0.05 | 0.30±0.10 | 0.30±0.10 | 0.30±0.10 | 0.30±0.10 | 0.30±0.10 | 0.30±0.10 |
| K ₀ | <2.50 | <2.50 | <3.0 | <2.50 | <3.10 | <2.50 | <3.10 | <2.50 | <3.10 | <3.10 |
| W | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 |
| P ₀ | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| 10xP ₀ | 40.0±0.20 | 40.0±0.20 | 40.0±0.20 | 40.00±0.2 | 40.00±0.2 | 40.00±0.2 | 40.0±0.20 | 40.0±0.20 | 40.0±0.20 | 40.0±0.20 |
| P ₁ | 4.00±0.10 | 4.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 |
| P ₂ | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 |
| D ₀ | 1.50±0.1/-0 | 1.50±0.1/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 |
| D ₁ | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 | 1.50+/-0.1 | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 |
| E | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75+/-0.1 | 1.75±0.1 | 1.75±0.10 | 1.75±0.1 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 |
| F | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 | 5.50+/-0.05 | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 |

APPLICATION NOTES

STORAGE

- To prevent the damage of solderability of terminations, the following storage conditions are recommended:
Indoors under 5°C~ 40°C and 20% ~ 70% RH.
No harmful gases containing sulfuric acid, ammonia, hydrogen sulfide or chlorine.
- Packaging should not be opened until the capacitors are required for use. If opened, the pack should be re-sealed as soon as is practicable. Taped product should be stored out of direct sunlight, which might promote deterioration in tape or adhesion performance. The product is recommended to be used within 12 months and checked the solderability before use.

HANDLING

- Chip capacitors are dense, hard, brittle, and abrasive materials. They are liable to suffer mechanical damage, in the form of cracks or chips. Chip Capacitors should be handled with care to avoid contamination or damage. To use vacuum or plastic tweezers to pick up or plastic tweezers is recommended for manual placement. Tape and reeled packages are suitable for automatic pick and placement machine.

PREHEAT

- In order to minimize the risk of thermal shock during soldering, a carefully controlled preheat is required. The rate of preheat should not exceed 3°C per second.

SOLDERING

- Use middy activated rosin RA and RMA fluxes do not use activated flux. The amount of solder in each solder joint should be controlled to prevent the damage of chip capacitors caused by the stress between solder, chips, and substrate.
- Hand soldering with temperature-controlled iron not exceeding 20 watts and diameter of tip less than 1.0 mm is recommended, tip of iron should not contact the ceramic body directly, and the temperature of iron should be set to not more than 260°C.

COOLING

- After soldering, cool the chips and the substrate gradually to room temperature. Natural cooling in air is recommended to minimize stress in the solder joint. A cooling rate not exceeding 4 per second should °C be used when forced cooling is necessary.

CLEANING

- All flux residues must be removed by using suitable electronic-grade vapor-cleaning solvents to eliminate contamination that could cause electrolytic surface corrosion. Good results can be obtained by using ultrasonic cleaning of the solvent. The choice of the proper system is depends upon many factors such as component mix, flux, and solder paste and assembly method. The ability of the cleaning system to remove flux residues and contamination from under the chips is very important.