

Automotive MLCC

General Specifications



GENERAL DESCRIPTION

AVX Corporation has supported the Automotive Industry requirements for Multilayer Ceramic Capacitors consistently for more than 25 years. Products have been developed and tested specifically for automotive applications and all manufacturing facilities are QS9000 and VDA 6.4 approved.

AVX is using AECQ200 as the qualification vehicle for this transition. A detailed qualification package is available on request and contains results on a range of part numbers.

HOW TO ORDER

| 0805 | 5 | A | 104 | K | 4 | T | 2 | A |
|---|---|--|--|--|---|---|---|--|
| Size 0402 0603 0805 1206 1210 1812 | Voltage 6.3V = 6 10V = Z 16V = Y 25V = 3 35V = D 50V = 5 100V = 1 200V = 2 500V = 7 | Dielectric NP0 = A X7R = C X8R = F | Capacitance Code (In pF) 2 Sig. Digits + Number of Zeros e.g. 10 F = 106 | Capacitance Tolerance B = ± 0.1pF (<10pF)* C = ± 0.25pF (<10pF)* D = ± 0.5pF (<10pF)* F = ± 1%* G = ± 2%* J = ± 5% (<=1µF) K = ± 10% M = ± 20% *NPO only | Failure Rate 4=Automotive | Terminations T = Plated Ni and Sn Z = FLEXITERM [®] ** U = Conductive Epo **X7R X8R only | Packaging 2 = 7" Reel 4 = 13" Reel | Special Code A = Std.Product |

Contact factory for availability of Tolerance Options for Specific Part Numbers.

NOTE: Contact factory for non-specified capacitance values
0402 case size available in T termination only.

COMMERCIAL VS AUTOMOTIVE MLCC PROCESS COMPARISON

| | Commercial | Automotive |
|--|--|---|
| Administrative | Standard Part Numbers. No restriction on who purchases these parts. | Specific Automotive Part Number. Used to control supply of product to Automotive customers. |
| Design | Minimum ceramic thickness of 0.020" | Minimum Ceramic thickness of 0.022" (0.56mm) on all X7R product. |
| Dicing | Side & End Margins = 0.003" min | Side & End Margins = 0.004" min Cover Layers = 0.003" min |
| Lot Qualification (Destructive Physical Analysis - DPA) | As per EIA RS469 | Increased sample plan stricter criteria. |
| Visual/Cosmetic Quality | Standard process and inspection | 100% inspection |
| Application Robustness | Standard sampling for accelerated wave solder on X7R dielectrics | Increased sampling for accelerated wave solder on X7R and NP0 followed by lot by lot reliability testing. |

All Tests have Accept/Reject Criteria 0/1

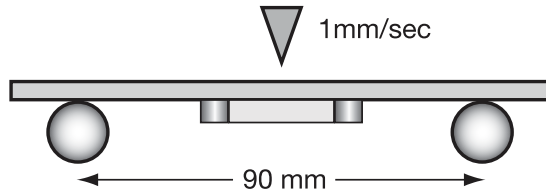
Automotive MLCC

NP0/X7R Dielectric

FLEXITERM FEATURES

a) Bend Test

The capacitor is soldered to the PC Board as shown:



Typical bend test results are shown below:

| Style | Conventional | Soft Term |
|-------|--------------|-----------|
| 0603 | >2mm | >5 |
| 0805 | >2mm | >5 |
| 1206 | >2mm | >5 |

a) Temperature Cycle testing

FLEXITERM[®] has the ability to withstand at least 1000 cycles between -55°C and +125°C

Automotive MLCC-NP0

Capacitance Range



| SIZE | | 0402 | | 0603 | | | | 0805 | | | | | 1206 | | | | | |
|-----------|------|-------------|-----|-------------|-----|------|------|-------------|-----|------|------|------|-------------|-----|------|------|------|------|
| Soldering | WVDC | Reflow/Wave | | Reflow/Wave | | | | Reflow/Wave | | | | | Reflow/Wave | | | | | |
| | | 25V | 50V | 25V | 50V | 100V | 200V | 25V | 50V | 100V | 200V | 250V | 25V | 50V | 100V | 200V | 250V | 500V |
| 0R5 | 0.5 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 1R0 | 1.0 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 1R2 | 1.2 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 1R5 | 1.5 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 1R8 | 1.8 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 2R2 | 2.2 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 2R7 | 2.7 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 3R3 | 3.3 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 3R9 | 3.9 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 4R7 | 4.7 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 5R6 | 5.6 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 6R8 | 6.8 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 8R2 | 8.2 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 100 | 10.0 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 120 | 12 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 150 | 15 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 180 | 18 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 220 | 22 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 270 | 27 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 330 | 33 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 390 | 39 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 470 | 47 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | J | J |
| 510 | 51 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | | |
| 560 | 56 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | | |
| 680 | 68 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | | |
| 820 | 82 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | | |
| 101 | 100 | C | C | G | G | G | G | J | J | J | N | N | J | J | J | J | | |
| 121 | 120 | | | G | G | G | | J | J | J | N | N | J | J | J | J | | |
| 151 | 150 | | | G | G | G | | J | J | J | N | N | J | J | J | J | | |
| 181 | 180 | | | G | G | G | | J | J | J | N | N | J | J | J | J | | |
| 221 | 220 | | | G | G | G | | J | J | J | N | N | J | J | J | J | | |
| 271 | 270 | | | G | G | G | | J | J | J | N | N | J | J | J | J | | |
| 331 | 330 | | | G | G | G | | J | J | J | N | N | J | J | J | J | | |
| 391 | 390 | | | G | G | | | J | J | J | | | J | J | J | J | | |
| 471 | 470 | | | G | G | | | J | J | J | | | J | J | J | J | | |
| 561 | 560 | | | G | G | | | J | J | J | | | J | J | J | J | | |
| 681 | 680 | | | G | G | | | J | J | J | | | J | J | J | J | | |
| 821 | 820 | | | | | | | J | J | J | | | J | J | J | J | | |
| 102 | 1000 | | | | | | | J | J | J | | | J | J | J | J | | |
| 122 | 1200 | | | | | | | | | | | | | | | | | |
| 152 | 1500 | | | | | | | | | | | | | | | | | |
| 182 | 1800 | | | | | | | | | | | | | | | | | |
| 222 | 2200 | | | | | | | | | | | | | | | | | |
| 272 | 2700 | | | | | | | | | | | | | | | | | |
| 332 | 3300 | | | | | | | | | | | | | | | | | |
| 392 | 3900 | | | | | | | | | | | | | | | | | |
| 472 | 4700 | | | | | | | | | | | | | | | | | |
| 103 | 10nF | | | | | | | | | | | | | | | | | |
| WVDC | | 25V | 50V | 25V | 50V | 100V | 200V | 25V | 50V | 100V | 200V | 250V | 25V | 50V | 100V | 200V | 250V | 500V |
| Size | | 0402 | | 0603 | | | | 0805 | | | | | 1206 | | | | | |

| Letter | A | C | E | G | J | K | M | N | P | Q | X | Y | Z |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Max. Thickness | 0.33 (0.013) | 0.56 (0.022) | 0.71 (0.028) | 0.90 (0.035) | 0.94 (0.037) | 1.02 (0.040) | 1.27 (0.050) | 1.40 (0.055) | 1.52 (0.060) | 1.78 (0.070) | 2.29 (0.090) | 2.54 (0.100) | 2.79 (0.110) |
| | PAPER | | | | | EMBOSSED | | | | | | | |

Automotive MLCC - X7R

Capacitance Range



| SIZE | 0402 | | | 0603 | | | | | | 0805 | | | | | 1206 | | | | | 1210 | | | | 1812 | | | 2220 | | | | | | | |
|------|-----------|-------------|------|------|-------------|------|-----|------|------|------|-------------|------|-----|------|------|-------------|------|------|-----|------|-------------|------|------|------|-------------|------|------|-------------|------|-----|------|------|-----|------|
| | Soldering | Reflow/Wave | | | Reflow/Wave | | | | | | Reflow/Wave | | | | | Reflow/Wave | | | | | Reflow Only | | | | Reflow Only | | | Reflow Only | | | | | | |
| WVDC | 16V | 25V | 50V | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 16V | 25V | 50V | 100V | 200V | 250V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 16V | 25V | 50V | 100V | 50V | 100V | 25V | 50V | 100V | | |
| 221 | Cap | 220 | C | C | C | | | | | | | | | C | | | | | | | | | | | | | | | | | | | | |
| 271 | (pF) | 270 | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 331 | | 330 | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 391 | | 390 | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 471 | | 470 | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 561 | | 560 | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 681 | | 680 | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 821 | | 820 | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102 | | 1000 | C | C | C | G | G | G | G | G | G | G | J | J | J | J | J | J | J | J | J | J | J | J | J | K | K | K | K | K | K | K | K | |
| 182 | | 1800 | C | C | C | G | G | G | G | G | G | G | J | J | J | J | J | J | J | J | J | J | J | J | J | K | K | K | K | K | K | K | K | |
| 222 | | 2200 | C | C | C | G | G | G | G | G | G | G | J | J | J | J | J | J | J | J | J | J | J | J | J | K | K | K | K | K | K | K | K | |
| 332 | | 3300 | C | C | C | G | G | G | G | G | G | G | J | J | J | J | J | J | J | J | J | J | J | J | J | K | K | K | K | K | K | K | K | |
| 472 | | 4700 | C | C | C | G | G | G | G | G | G | G | J | J | J | J | J | J | J | J | J | J | J | J | J | K | K | K | K | K | K | K | K | |
| 103 | Cap | 0.01 | C | C | C | G | G | G | G | G | G | G | J | J | J | J | J | J | J | J | J | J | J | J | K | K | K | K | K | K | K | K | | |
| 123 | (F) | 0.012 | C | | | G | G | G | G | G | | | J | J | J | N | N | N | J | J | J | J | J | J | | K | K | K | K | K | K | K | | |
| 153 | | 0.015 | C | | | G | G | G | G | G | | | J | J | J | N | N | N | J | J | J | J | J | J | | K | K | K | K | K | K | K | | |
| 183 | | 0.018 | C | | | G | G | G | G | G | | | J | J | J | N | N | N | J | J | J | J | J | J | | K | K | K | K | K | K | K | | |
| 223 | | 0.022 | C | | | G | G | G | G | G | | | J | J | J | N | N | N | J | J | J | J | J | J | | K | K | K | K | K | K | K | | |
| 273 | | 0.027 | C | | | G | G | G | G | J | | | J | J | J | N | N | N | J | J | J | J | J | J | | K | K | K | K | K | K | K | | |
| 333 | | 0.033 | C | | | G | G | G | G | J | | | J | J | J | N | N | N | J | J | J | J | J | J | | K | K | K | K | K | K | K | | |
| 473 | | 0.047 | | | | G | G | G | G | J | | | J | J | J | N | N | N | J | J | J | M | M | M | | K | K | K | K | K | K | K | | |
| 563 | | 0.056 | | | | G | G | G | G | J | | | J | J | J | N | | | J | J | J | M | M | M | | K | K | K | M | K | K | K | | |
| 683 | | 0.068 | | | | G | G | G | G | J | | | J | J | J | N | | | J | J | J | M | M | M | | K | K | K | M | K | K | K | | |
| 823 | | 0.082 | | | | G | G | G | G | J | | | J | J | J | N | | | J | J | J | M | M | M | | K | K | K | M | K | K | K | | |
| 104 | | 0.1 | | | | G | G | G | G | J | | | J | J | J | N | | | J | J | J | M | P | P | | K | K | K | M | K | K | K | | |
| 124 | | 0.12 | | | | G | | | | | | | J | J | N | N | | | J | J | M | M | Q | Q | | K | K | K | P | K | K | K | | |
| 154 | | 0.15 | | | | G | | | | | | | M | N | N | N | | | J | J | M | M | Q | Q | | K | K | K | P | K | K | K | | |
| 224 | | 0.22 | | | | G | | | | | | | M | N | N | N | | | J | M | M | Q | Q | Q | | M | M | M | P | M | M | M | | |
| 334 | | 0.33 | | | | | | | | | | | N | N | N | N | | | J | M | P | Q | | | | P | P | P | Q | X | X | X | | |
| 474 | | 0.47 | | | | | | | | | | | N | N | N | N | | | M | M | P | Q | | | | P | P | P | Q | X | X | X | | |
| 684 | | 0.68 | | | | | | | | | | | N | N | N | N | | | M | Q | Q | Q | Q | | | P | P | Q | X | X | X | X | | |
| 105 | | 1 | | | | | | | | | | | N | N | N | N | | | M | Q | Q | Q | Q | | | P | Q | Q | Z | X | X | Z | Z | |
| 155 | | 1.5 | | | | | | | | | | | N | N | | | | | Q | Q | Q | Q | Q | | | P | Q | Z | Z | X | X | Z | Z | |
| 225 | | 2.2 | | | | | | | | | | | N | N | | | | | Q | Q | Q | Q | Q | | | Z | Z | Z | Z | Z | Z | Z | Z | |
| 335 | | 3.3 | | | | | | | | | | | | | | | | | Q | Q | Q | Q | Q | | | X | Z | Z | Z | Z | Z | Z | Z | |
| 475 | | 4.7 | | | | | | | | | | | | | | | | | Q | Q | Q | Q | Q | | | X | Z | Z | Z | Z | Z | Z | Z | |
| 106 | | 10 | | | | | | | | | | | | | | | | | | | | | | | | Z | Z | Z | | Z | Z | Z | Z | |
| 226 | | 22 | | | | | | | | | | | | | | | | | | | | | | | | | Z | | | | | | | |
| WVDC | | | 16V | 25V | 50V | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 16V | 25V | 50V | 100V | 200V | 250V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 16V | 25V | 50V | 100V | 50V | 100V | 25V | 50V | 100V |
| Size | | | 0402 | | | 0603 | | | | | | 0805 | | | | | 1206 | | | | | 1210 | | | | 1812 | | | 2220 | | | | | |

| Letter | A | C | E | G | J | K | M | N | P | Q | X | Y | Z |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Max. Thickness | 0.33 (0.013) | 0.56 (0.022) | 0.71 (0.028) | 0.90 (0.035) | 0.94 (0.037) | 1.02 (0.040) | 1.27 (0.050) | 1.40 (0.055) | 1.52 (0.060) | 1.78 (0.070) | 2.29 (0.090) | 2.54 (0.100) | 2.79 (0.110) |
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The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at www.avx.com/disclaimer/ by reference and should be reviewed in full before placing any order.

Automotive MLCC - X8R

Capacitance Range



| SIZE | | 0603 | | 0805 | | 1206 | |
|-----------|-----------|-------------|-----|-------------|-----|-------------|-----|
| Soldering | | Reflow/Wave | | Reflow/Wave | | Reflow/Wave | |
| WVDC | WVDC | 25V | 50V | 25V | 50V | 25V | 50V |
| 271 | Cap 270 | G | G | | | | |
| 331 | (pF) 330 | G | G | J | J | | |
| 471 | 470 | G | G | J | J | | |
| 681 | 680 | G | G | J | J | | |
| 102 | 1000 | G | G | J | J | J | J |
| 152 | 1500 | G | G | J | J | J | J |
| 182 | 1800 | G | G | J | J | J | J |
| 222 | 2200 | G | G | J | J | J | J |
| 272 | 2700 | G | G | J | J | J | J |
| 332 | 3300 | G | G | J | J | J | J |
| 392 | 3900 | G | G | J | J | J | J |
| 472 | 4700 | G | G | J | J | J | J |
| 562 | 5600 | G | G | J | J | J | J |
| 682 | 6800 | G | G | J | J | J | J |
| 822 | 8200 | G | G | J | J | J | J |
| 103 | Cap 0.01 | G | G | J | J | J | J |
| 123 | (F) 0.012 | G | G | J | J | J | J |
| 153 | 0.015 | G | G | J | J | J | J |
| 183 | 0.018 | G | G | J | J | J | J |
| 223 | 0.022 | G | G | J | J | J | J |
| 273 | 0.027 | G | G | J | J | J | J |
| 333 | 0.033 | G | G | J | J | J | J |
| 393 | 0.039 | G | G | J | J | J | J |
| 473 | 0.047 | G | G | J | J | J | J |
| 563 | 0.056 | G | | N | N | M | M |
| 683 | 0.068 | G | | N | N | M | M |
| 823 | 0.082 | | | N | N | M | M |
| 104 | 0.1 | | | N | N | M | M |
| 124 | 0.12 | | | N | N | M | M |
| 154 | 0.15 | | | N | N | M | M |
| 184 | 0.18 | | | N | | M | M |
| 224 | 0.22 | | | N | | M | M |
| 274 | 0.27 | | | | | M | M |
| 334 | 0.33 | | | | | M | M |
| 394 | 0.39 | | | | | M | |
| 474 | 0.47 | | | | | M | |
| 684 | 0.68 | | | | | | |
| 824 | 0.82 | | | | | | |
| 105 | 1 | | | | | | |
| WVDC | WVDC | 25V | 50V | 25V | 50V | 25V | 50V |
| SIZE | | 0603 | | 0805 | | 1206 | |

| Letter | A | C | E | G | J | K | M | N | P | Q | X | Y | Z |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Max. Thickness | 0.33 (0.013) | 0.56 (0.022) | 0.71 (0.028) | 0.90 (0.035) | 0.94 (0.037) | 1.02 (0.040) | 1.27 (0.050) | 1.40 (0.055) | 1.52 (0.060) | 1.78 (0.070) | 2.29 (0.090) | 2.54 (0.100) | 2.79 (0.110) |
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单击下面可查看定价，库存，交付和生命周期等信息

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