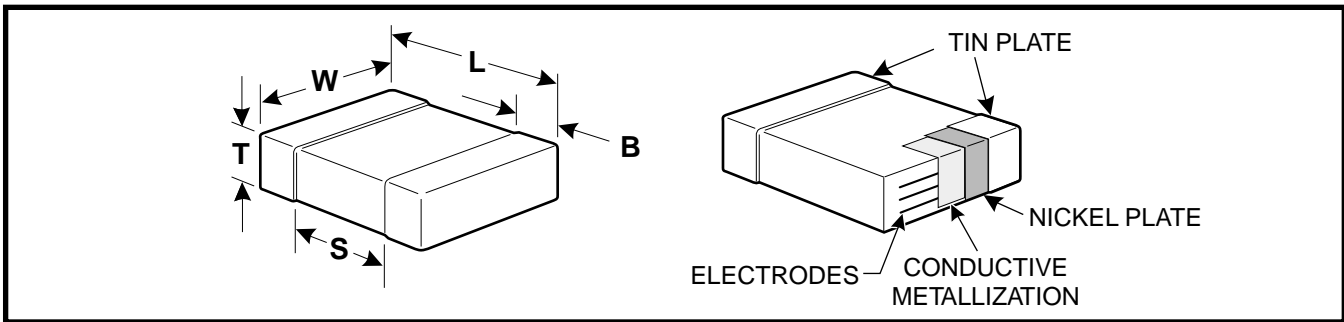


FEATURES

- COG (NP0), X7R, X5R, Z5U and Y5V Dielectrics
- 10, 16, 25, 50, 100 and 200 Volts
- Standard End Metallization: Tin-plate over nickel barrier
- Available Capacitance Tolerances: ± 0.10 pF; ± 0.25 pF; ± 0.5 pF; $\pm 1\%$; $\pm 2\%$; $\pm 5\%$; $\pm 10\%$; $\pm 20\%$; and $+80\%$ - 20%
- Tape and reel packaging per EIA481-1. (See page 61 for specific tape and reel information.) Bulk Cassette packaging (0402, 0603, 0805 only) per IEC60286-6 and EIAJ 7201.

CAPACITOR OUTLINE DRAWINGS



DIMENSIONS—MILLIMETERS AND (INCHES)

| EIA SIZE CODE | METRIC SIZE CODE (Ref only) | L # LENGTH | W # WIDTH | B BANDWIDTH | S MIN. SEPARATION | MOUNTING TECHNIQUE |
|---------------|-----------------------------|------------------------------|------------------------------|-------------------------------|-------------------|--------------------------------|
| 0402* | 1005 | 1.0 (.04) \pm .05 (.002) | 0.5 (.02) \pm .05 (.002) | 0.20 (0.008)-0.40 (0.016) | 0.3 (.012) | Solder Reflow |
| 0603* | 1608 | 1.6 (.063) \pm 0.15 (.006) | 0.8 (.032) \pm 0.15 (.006) | 0.35 (.014) \pm 0.15 (.006) | 0.7 (.028) | Solder Wave † or Solder Reflow |
| 0805* | 2012 | 2.0 (.079) \pm 0.2 (.008) | 1.25 (.049) \pm 0.2 (.008) | 0.5 (.02) \pm .25 (.010) | 0.75 (.030) | |
| 1206* | 3216 | 3.2 (.126) \pm 0.2 (.008) | 1.6 (.063) \pm 0.2 (.008) | 0.5 (.02) \pm .25 (.010) | N/A | |
| 1210* | 3225 | 3.2 (.126) \pm 0.2 (.008) | 2.5 (.098) \pm 0.2 (.008) | 0.5 (.02) \pm .25 (.010) | N/A | Solder Reflow |
| 1812 | 4532 | 4.5 (.177) \pm 0.3 (.012) | 3.2 (.126) \pm 0.3 (.012) | 0.6 (.024) \pm .35 (.014) | N/A | |
| 1825* | 4564 | 4.5 (.177) \pm 0.3 (.012) | 6.4 (.252) \pm 0.4 (.016) | 0.6 (.024) \pm .35 (.014) | N/A | |
| 2220 | 5650 | 5.6 (.220) \pm 0.4 (.016) | 5.0 (.197) \pm 0.4 (.016) | 0.6 (.024) \pm .35 (.014) | N/A | |
| 2225 | 5664 | 5.6 (.220) \pm 0.4 (.016) | 6.3 (.248) \pm 0.4 (.016) | 0.6 (.024) \pm .35 (.014) | N/A | |

See pages 48-52 for thickness dimensions.

* Note: Indicates EIA Preferred Case Sizes (Tightened tolerances apply for 0402, 0603, and 0805 packaged in bulk cassette, see page 65.)

#Note: These thicknesses are EIA maximums. Most chips are considerably thinner. Consult factory for details. Also, some extended values may be slightly thicker than EIA maximums.

† For extended value 1210 case size - solder reflow only.

CAPACITOR ORDERING INFORMATION (Standard Chips - For Military see page 55)

CERAMIC SIZE CODE SPECIFICATION C - Standard

CAPACITANCE CODE Expressed in Picofarads (pF)
First two digits represent significant figures.
Third digit specifies number of zeros. (Use 9 for 1.0 through 9.9pF. Use 8 for 0.5 through 0.99pF)
(Example: 2.2pF = 229 or 0.50 pF = 508)

CAPACITANCE TOLERANCE

| | |
|-------------------|--------------------------------|
| B - ± 0.10 pF | J - $\pm 5\%$ |
| C - ± 0.25 pF | K - $\pm 10\%$ |
| D - ± 0.5 pF | M - $\pm 20\%$ |
| F - $\pm 1\%$ | P - (GMV) - special order only |
| G - $\pm 2\%$ | Z - $+80\%$, -20% |

END METALLIZATION
C-Standard (Tin-plated nickel barrier)

FAILURE RATE LEVEL
A- Not Applicable

TEMPERATURE CHARACTERISTIC
Designated by Capacitance Change Over Temperature Range

| |
|---|
| G - COG (NP0) (± 30 PPM/ $^{\circ}$ C) |
| R - X7R ($\pm 15\%$) (-55° C + 125° C) |
| P - X5R ($\pm 15\%$) (-55° C + 85° C) |
| U - Z5U ($+22\%$, -56%) ($+10^{\circ}$ C + 85° C) |
| V - Y5V ($+22\%$, -82%) (-30° C + 85° C) |

VOLTAGE

| | |
|----------|----------|
| 1 - 100V | 3 - 25V |
| 2 - 200V | 4 - 16V |
| 5 - 50V | 8 - 10V |
| | 9 - 6.3V |

*** Part Number Example: C0805C103K5RAC* (14 digits - no spaces)**

X7R CAPACITANCE RANGE – 1210, 1812, 1825, 2220, 2225

| CAP. PF | CAP. CODE | CAP. TOL. | C1210* | | | | | | | C1812* | | | C1825* | | | C2220 | | | C2225 | | | |
|-----------|-----------|-----------|--------|-----|-----|-----|-----|------|------|--------|------|------|--------|------|------|-------|------|------|-------|------|------|----|
| | | | 6.3V | 10V | 16V | 25V | 50V | 100V | 200V | 50V | 100V | 200V | 50V | 100V | 200V | 50V | 100V | 200V | 50V | 100V | 200V | |
| 2200 | 222 | K,M,J | FB | FB | FB | FB | FB | FB | FB | | | | | | | | | | | | | |
| 2700 | 272 | K,M,J | FB | FB | FB | FB | FB | FB | FB | | | | | | | | | | | | | |
| 3300 | 332 | K,M,J | FB | FB | FB | FB | FB | FB | FB | | | | | | | | | | | | | |
| 3900 | 392 | K,M,J | FB | FB | FB | FB | FB | FB | FB | | | | | | | | | | | | | |
| 4700 | 472 | K,M,J | FB | FB | FB | FB | FB | FB | FB | | | | | | | | | | | | | |
| 5600 | 562 | K,M,J | FB | FB | FB | FB | FB | FB | FB | | | | | | | | | | | | | |
| 6800 | 682 | K,M,J | FB | FB | FB | FB | FB | FB | FB | GB | GB | GB | | | | | | | | | | |
| 8200 | 822 | K,M,J | FB | FB | FB | FB | FB | FB | FB | GB | GB | GB | | | | | | | | | | |
| 10,000 | 103 | K,M,J | FB | FB | FB | FB | FB | FB | FB | GB | GB | GB | | | | | | | | | | |
| 12,000 | 123 | K,M,J | FB | FB | FB | FB | FB | FB | FB | GB | GB | GB | | | | | | | | | | |
| 15,000 | 153 | K,M,J | FB | FB | FB | FB | FB | FB | FB | GB | GB | GB | | | | | | | | | | |
| 18,000 | 183 | K,M,J | FB | FB | FB | FB | FB | FB | FB | GB | GB | GB | | | | | | | | | | |
| 22,000 | 223 | K,M,J | FB | FB | FB | FB | FB | FB | FB | GB | GB | GB | HB | HB | HB | | | | | | | |
| 27,000 | 273 | K,M,J | FB | FB | FB | FB | FB | FB | FB | GB | GB | GB | HB | HB | HB | | | | | | | |
| 33,000 | 333 | K,M,J | FB | FB | FB | FB | FB | FB | FB | GB | GB | GB | HB | HB | HB | | | | | | | |
| 39,000 | 393 | K,M,J | FB | FB | FB | FB | FB | FB | FB | GB | GB | GB | HB | HB | HB | | | | | | | |
| 47,000 | 473 | K,M,J | FB | FB | FB | FB | FB | FB | FB | GB | GB | GB | HB | HB | HB | | | | | KC | KC | KC |
| 56,000 | 563 | K,M,J | FB | FB | FB | FB | FB | FB | FB | FC | GB | GB | GB | HB | HB | HB | | | | KC | KC | KC |
| 68,000 | 683 | K,M,J | FB | FB | FB | FB | FB | FB | FB | FC | GB | GB | GB | HB | HB | HB | | | | KC | KC | KC |
| 82,000 | 823 | K,M,J | FB | FB | FB | FB | FB | FC | FC | FC | GB | GB | GB | HB | HB | HB | | | | KC | KC | KC |
| 100,000 | 104 | K,M,J | FB | FB | FB | FB | FB | FD | FD | FG | GB | GB | GB | HB | HB | HB | | | | KC | KC | KC |
| 120,000 | 124 | K,M,J | FB | FB | FB | FB | FB | FD | FD | | GB | GB | GB | HB | HB | HB | | | | KC | KC | KC |
| 150,000 | 154 | K,M,J | FC | FC | FC | FC | FC | FD | FD | | GB | GB | GE | HB | HB | HB | | | | KC | KC | KC |
| 180,000 | 184 | K,M,J | FC | FC | FC | FC | FC | FD | FD | | GB | GB | GG | HB | HB | HB | | | | KC | KC | KC |
| 220,000 | 224 | K,M,J | FC | FC | FC | FC | FC | FD | FD | | GB | GB | | HB | HB | HB | | | | KC | KC | KC |
| 270,000 | 274 | K,M,J | FC | FC | FC | FC | FC# | FD# | FD# | | GB | GH | | HB | HB | HB | JC | JC | JC | KB | KC | KC |
| 330,000 | 334 | K,M,J | FD | FD | FD | FD | FD# | FD# | FD# | | GB | GH | | HB | HB | HB | JC | JC | JC | KB | KC | KC |
| 390,000 | 394 | K,M,J | FD | FD | FD | FD | FD# | FD# | FD# | | GB | | | HB | HB | HD | JC | JC | JC | KB | KC | KC |
| 470,000 | 474 | K,M,J | FD | FD | FD | FD | FD# | FD# | FD# | | GB | | | HB | HB | HD | JC | JC | JC | KB | KC | KD |
| 560,000 | 564 | K,M,J | FD | FD | FD | FD | FD# | FD# | FD# | | GC | | | HB | HD | HD | JC | JC | JC | KB | KC | |
| 680,000 | 684 | K,M,J | FD | FD | FD | FD | FD# | FD# | FD# | | GC | | | HB | HD | HD | JC | JC | JD | KB | KC | |
| 820,000 | 824 | K,M,J | FF | FF | FF | FF | FF# | FF# | FF# | | GE | | | HB | | | JC | JC | | KB | KC | |
| 1,000,000 | 105 | K,M,J | FH | FH | FH | FH | FH# | FH# | FH# | | GE | | | HB | | | JC | JC | | KB | KD | |
| 1,200,000 | 125 | K,M,J | FH | FH | FH | FH | | | | | | | | HB | | | JC | JC | | KB | | |
| 1,500,000 | 155 | K,M,J | FH | FH | FH | FH | | | | | | | | HB | | | JC | JC | | KB | | |
| 1,800,000 | 185 | K,M,J | FH | FH | FH | FH | | | | | | | | HD | | | JD | JD | | KD | | |
| 2,200,000 | 225 | K,M,J | FJ | FJ | FJ | FJ | | | | | | | HF | | | | JF | JF | | KD | | |

* Indicates EIA preferred chip sizes.
 NOTE: For non-standard capacitance values or voltages, contact your local KEMET sales representative.
 50 Volt Ceramic Chips can be used for 63 volt applications.
 # Extended Range Values — Cap and DF measured @ 0.5 Vms.

X5R CAPACITANCE RANGE

| CAP. pF | CAP. CODE | CAP. TOL. | C0402* | | C0603* | | C0805* | | C1206* | | | | C1210* | | | | | | | | | |
|------------|-----------|-----------|--------|-----|--------|-----|--------|-----|--------|-----|-----|-----|--------|-----|-----|-----|-----|--|--|-----|-----|-----|
| | | | 6.3V | 10V | 6.3V | 10V | 6.3V | 10V | 6.3V | 10V | 16V | 25V | 6.3V | 10V | 16V | 25V | 50V | | | | | |
| 12,000 | 123 | K,M | BB | BB | | | | | | | | | | | | | | | | | | |
| 15,000 | 153 | K,M | BB | BB | | | | | | | | | | | | | | | | | | |
| 18,000 | 183 | K,M | BB | BB | | | | | | | | | | | | | | | | | | |
| 22,000 | 223 | K,M | BB | BB | | | | | | | | | | | | | | | | | | |
| 27,000 | 273 | K,M | BB | BB | | | | | | | | | | | | | | | | | | |
| 33,000 | 333 | K,M | BB | BB | | | | | | | | | | | | | | | | | | |
| 39,000 | 393 | K,M | BB | BB | | | | | | | | | | | | | | | | | | |
| 47,000 | 473 | K,M | BB | BB | | | | | | | | | | | | | | | | | | |
| 56,000 | 563 | K,M | BB | BB | | | | | | | | | | | | | | | | | | |
| 68,000 | 683 | K,M | BB | BB | | | | | | | | | | | | | | | | | | |
| 82,000 | 823 | K,M | BB | BB | | | | | | | | | | | | | | | | | | |
| 100,000 | 104 | K,M | BB | BB | | | | | | | | EB | | | | | | | | | | |
| 120,000 | 124 | K,M | | | | | | | | | | EC | | | | | | | | | | |
| 150,000 | 154 | K,M | | | | | | | | | | EC | | | | | | | | | | |
| 180,000 | 184 | K,M | | | | | | | | | | EC | | | | | | | | | | |
| 220,000 | 224 | K,M | | | | | | | | | | EC | | | | | | | | | | |
| 270,000 | 274 | K,M | | | CC | CC | | | | | | EB | | | | | | | | | | |
| 330,000 | 334 | K,M | | | CC | CC | | | | | | EB | | | | | | | | | | |
| 390,000 | 394 | K,M | | | CC | CC | | | | | | EB | | | | | | | | | | |
| 470,000 | 474 | K,M | | | CC | CC | | | | | | EC | | | | | | | | | | |
| 560,000 | 564 | K,M | | | CC | CC | | | | | | EE | | | | | | | | | | |
| 680,000 | 684 | K,M | | | CC | CC | | | | | | EE | | | | | | | | | | |
| 820,000 | 824 | K,M | | | CC | CC | | | | | | EF | | | | | | | | | | |
| 1,000,000 | 105 | K,M | | | CC | CC | | | | | | EH | | | | | | | | FH+ | FH+ | FH+ |
| 1,200,000 | 125 | K,M | | | CC | CC | | | | | | EC | | | | | | | | FD+ | FD+ | FD+ |
| 1,500,000 | 155 | K,M | | | CC | CC | DD | DD | EC | EC | EC | EC | | | | | | | | FD+ | FD+ | FD+ |
| 1,800,000 | 185 | K,M | | | CC | CC | DH | DH | EC | EC | EC | EC | | | | | | | | FD+ | FD+ | FD+ |
| 2,200,000 | 225 | K,M | | | CC | CC | DD | DD | EE | EE | EE | EE | | | | | | | | FG+ | FG+ | FG+ |
| 2,700,000 | 275 | K,M | | | | | DH | DD | EF | EF | EF | EF | | | | | | | | FG+ | FG+ | FG+ |
| 3,300,000 | 335 | K,M | | | | | DE | DE | EH | EH | EH | EH | | | | | | | | FH+ | FH+ | FH+ |
| 4,700,000 | 475 | K,M | | | | | DE | DH | EH | EH | EH | EH | | | | | | | | FK+ | FK+ | FK+ |
| 6,800,000 | 685 | K,M | | | | | DH | DH | EH | EH | EH | EH | | | | | | | | FK+ | FK+ | FK+ |
| 8,200,000 | 825 | K,M | | | | | DH | DH | EH | EH | EH | EH | | | | | | | | FK+ | FK+ | FK+ |
| 10,000,000 | 106 | K,M | | | | | DH | DH | EH | EH | EH | EH | | | | | | | | FK+ | FK+ | FK+ |
| 12,000,000 | 126 | K,M | | | | | | | EH | EH | EH | EH | | | | | | | | FF+ | FF+ | FF+ |
| 15,000,000 | 156 | K,M | | | | | | | EH | EH | EH | EH | | | | | | | | FF+ | FF+ | FF+ |
| 18,000,000 | 186 | K,M | | | | | | | EH | EH | EH | EH | | | | | | | | FG+ | FG+ | FG+ |
| 22,000,000 | 226 | K,M | | | | | | | EH | EH | EH | EH | | | | | | | | FG+ | FG+ | FG+ |

NOTE: For non-standard capacitance values or voltages, contact your local KEMET sales representative.
 + Reflow only

See page 54 for Thickness Code Reference Chart.

THICKNESS CODE REFERENCE CHART PACKAGING QTY BASED ON FINISHED CHIP THICKNESS SPECIFICATIONS

| Thickness Code | Chip Size | Chip Thickness Range (mm) | Qty per Reel 7" Plastic | Qty per Reel 13" Plastic | Qty per Reel 7" Paper | Qty per Reel 13" Paper | Qty per Bulk Cassette |
|----------------|-----------|---------------------------|-------------------------|--------------------------|-----------------------|------------------------|-----------------------|
| AA | 0201 | .30 ± .03 | N/A | N/A | 15,000 | N/A | N/A |
| BB | 0402 | .50 ± .05 | N/A | N/A | 10,000 | 50,000 | 50,000 |
| CB | 0603 | .80 ± .07 | N/A | N/A | 4,000 | 10,000 | 15,000 |
| CC | 0603 | .80 ± .10 | N/A | N/A | 4,000 | 10,000 | N/A |
| DB | 0805 | .60 ± .10 | N/A | N/A | N/A | N/A | 10,000 |
| DC | 0805 | .78 ± .10 | 4,000 | 10,000 | 4,000 | 10,000 | N/A |
| DD | 0805 | .90 ± .10 | 4,000 | 10,000 | N/A | N/A | N/A |
| DE | 0805 | 1.00 ± .10 | 2,500 | 10,000 | N/A | N/A | N/A |
| DF | 0805 | 1.10 ± .10 | 2,500 | 10,000 | N/A | N/A | N/A |
| DG | 0805 | 1.25 ± .15 | 2,500 | 10,000 | N/A | N/A | N/A |
| DH | 0805 | 1.25 ± .20 | 2,500 | 10,000 | N/A | N/A | N/A |
| EB | 1206 | .78 ± .10 | 4,000 | 10,000 | 4,000 | 10,000 | N/A |
| EC | 1206 | .90 ± .10 | 4,000 | 10,000 | N/A | N/A | N/A |
| ED | 1206 | 1.00 ± .10 | 2,500 | 10,000 | N/A | N/A | N/A |
| EE | 1206 | 1.10 ± .10 | 2,500 | 10,000 | N/A | N/A | N/A |
| EF | 1206 | 1.20 ± .15 | 2,500 | 10,000 | N/A | N/A | N/A |
| EG | 1206 | 1.60 ± .15 | 2,000 | 8,000 | N/A | N/A | N/A |
| EH | 1206 | 1.60 ± .20 | 2,000 | 8,000 | N/A | N/A | N/A |
| EJ | 1206 | 1.70 ± .20 | 2,000 | 8,000 | N/A | N/A | N/A |
| FB | 1210 | .78 ± .10 | 4,000 | 10,000 | N/A | N/A | N/A |
| FC | 1210 | .90 ± .10 | 4,000 | 10,000 | N/A | N/A | N/A |
| FD | 1210 | .95 ± .10 | 4,000 | 10,000 | N/A | N/A | N/A |
| FE | 1210 | 1.00 ± .10 | 2,500 | 10,000 | N/A | N/A | N/A |
| FF | 1210 | 1.10 ± .10 | 2,500 | 10,000 | N/A | N/A | N/A |
| FG | 1210 | 1.25 ± .15 | 2,500 | 10,000 | N/A | N/A | N/A |
| FH | 1210 | 1.55 ± .15 | 2,000 | 8,000 | N/A | N/A | N/A |
| FJ | 1210 | 1.85 ± .15 | 2,000 | 8,000 | N/A | N/A | N/A |
| FK | 1210 | 2.10 ± .20 | 2,000 | 8,000 | N/A | N/A | N/A |
| GB | 1812 | 1.00 ± .10 | 1,000 | 4,000 | N/A | N/A | N/A |
| GC | 1812 | 1.10 ± .10 | 1,000 | 4,000 | N/A | N/A | N/A |
| GD | 1812 | 1.25 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| GE | 1812 | 1.30 ± .10 | 1,000 | 4,000 | N/A | N/A | N/A |
| GF | 1812 | 1.50 ± .10 | 1,000 | 4,000 | N/A | N/A | N/A |
| GG | 1812 | 1.55 ± .10 | 1,000 | 4,000 | N/A | N/A | N/A |
| GH | 1812 | 1.40 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| GJ | 1812 | 1.70 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| HB | 1825 | 1.10 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| HD | 1825 | 1.30 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| HE | 1825 | 1.40 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| HF | 1825 | 1.50 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| JB | 2220 | 1.00 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| JC | 2220 | 1.10 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| JD | 2220 | 1.30 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| JE | 2220 | 1.40 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| JF | 2220 | 1.50 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| KB | 2225 | 1.00 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| KC | 2225 | 1.10 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| KD | 2225 | 1.30 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |
| KE | 2225 | 1.40 ± .15 | 1,000 | 4,000 | N/A | N/A | N/A |

This chart refers to ceramic chip thickness codes on pages 50-53.