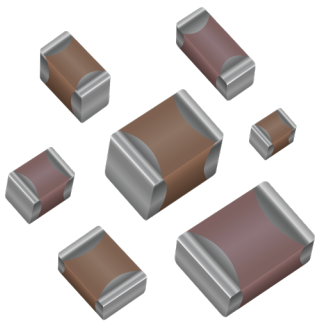


# MLCC Tin/Lead Termination "B" (LD Series)



## C0G (NP0) – General Specifications



AVX Corporation will support those customers for commercial and military Multilayer Ceramic Capacitors with a termination consisting of 5% minimum lead. This termination is indicated by the use of a "B" in the 12th position of the AVX Catalog Part Number. This fulfills AVX's commitment to providing a full range of products to our customers. AVX has provided in the following pages a full range of values that we are currently offering in this special "B" termination. Please contact the factory if you require additional information on our MLCC Tin/Lead Termination "B" products.

Not RoHS Compliant

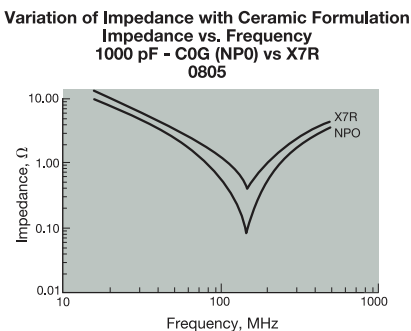
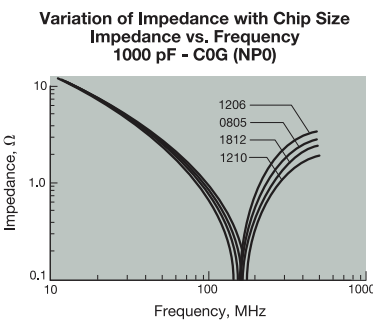
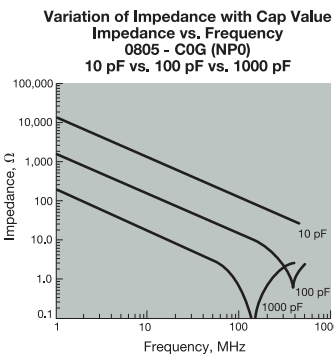
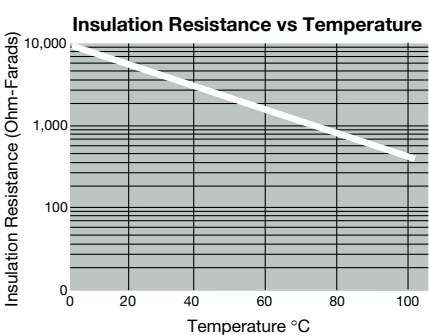
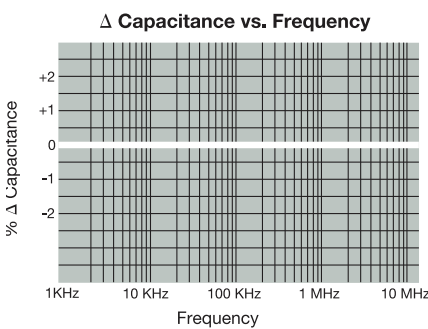
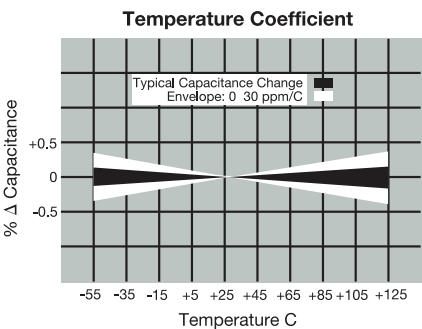
### PART NUMBER (SEE PAGE 4 FOR COMPLETE PART NUMBER EXPLANATION)

| LD05                                                                                                                                                | 5                                                                                                   | A                                              | 101                             | J                                                                                                                                             | A                  | B                                                                      | 2                                                                 | A                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------|-------------------------------------------------------------------|------------------|
| Size                                                                                                                                                | Voltage                                                                                             | Dielectric                                     | Capacitance Code (In pF)        | Capacitance Tolerance                                                                                                                         | Failure Rate       | Terminations                                                           | Packaging                                                         | Special Code     |
| LD02 - 0402<br>LD03 - 0603<br>LD04 - 0504*<br>LD05 - 0805<br>LD06 - 1206<br>LD10 - 1210<br>LD12 - 1812<br>LD13 - 1825<br>LD14 - 2225<br>LD20 - 2220 | 6.3V = 6<br>10V = Z<br>16V = Y<br>25V = 3<br>35V = D<br>50V = 5<br>100V = 1<br>200V = 2<br>500V = 7 | C0G (NP0) = A<br>X7R = C<br>X5R = D<br>X8R = F | 2 Sig. Digits + Number of Zeros | B = ±10 pF (<10pF)<br>C = ±.25 pF (<10pF)<br>D = ±.50 pF (<10pF)<br>F = ±1% (≥ 10 pF)<br>G = ±2% (≥ 10 pF)<br>J = ±5%<br>K = ±10%<br>M = ±20% | A = Not Applicable | B = 5% min lead<br>X = FLEXITERM® with 5% min lead**<br><br>**X7R only | 2 = 7" Reel<br>4 = 13" Reel<br><br>Contact Factory For Multiples* | A = Std. Product |

\*LD04 has the same CV ranges as LD03.

See FLEXITERM® section for CV options

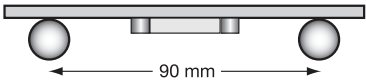
NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.  
Contact factory for non-specified capacitance values.



# MLCC Tin/Lead Termination “B”

## C0G (NP0) – Specifications and Test Methods



| Parameter/Test                 |                       | NP0 Specification Limits                                                                                  | Measuring Conditions                                                                                                                                                                                                                            |                    |
|--------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Operating Temperature Range    |                       | -55°C to +125°C                                                                                           | Temperature Cycle Chamber                                                                                                                                                                                                                       |                    |
| Capacitance                    |                       | Within specified tolerance                                                                                | Freq.: 1.0 MHz $\pm$ 10% for cap $\leq$ 1000 pF<br>1.0 kHz $\pm$ 10% for cap $>$ 1000 pF<br>Voltage: 1.0Vrms $\pm$ .2V                                                                                                                          |                    |
| Q                              |                       | $<30$ pF: $Q \geq 400+20 \times \text{Cap Value}$<br>$\geq 30$ pF: $Q \geq 1000$                          |                                                                                                                                                                                                                                                 |                    |
| Insulation Resistance          |                       | 100,000M $\Omega$ or 1000M $\Omega$ - $\mu$ F,<br>whichever is less                                       | Charge device with rated voltage for<br>60 $\pm$ 5 secs @ room temp/humidity                                                                                                                                                                    |                    |
| Dielectric Strength            |                       | No breakdown or visual defects                                                                            | Charge device with 250% of rated voltage for<br>1-5 seconds, w/charge and discharge current<br>limited to 50 mA (max)<br>Note: Charge device with 150% of rated voltage<br>for 500V devices.                                                    |                    |
| Resistance to Flexure Stresses | Appearance            | No defects                                                                                                | Deflection: 2mm<br>Test Time: 30 seconds<br>1mm/sec<br>                                                                                                      |                    |
|                                | Capacitance Variation | $\pm 5\%$ or $\pm 5$ pF, whichever is greater                                                             |                                                                                                                                                                                                                                                 |                    |
|                                | Q                     | Meets Initial Values (As Above)                                                                           |                                                                                                                                                                                                                                                 |                    |
|                                | Insulation Resistance | $\geq$ Initial Value $\times$ 0.3                                                                         |                                                                                                                                                                                                                                                 |                    |
| Solderability                  |                       | $\geq 95\%$ of each terminal should be covered<br>with fresh solder                                       | Dip device in eutectic solder at 230 $\pm$ 5°C<br>for 5.0 $\pm$ 0.5 seconds                                                                                                                                                                     |                    |
| Resistance to Solder Heat      | Appearance            | No defects, $<25\%$ leaching of either end terminal                                                       | Dip device in eutectic solder at 260°C for 60<br>seconds. Store at room temperature for 24 $\pm$ 2<br>hours before measuring electrical properties.                                                                                             |                    |
|                                | Capacitance Variation | $\leq \pm 2.5\%$ or $\pm 25$ pF, whichever is greater                                                     |                                                                                                                                                                                                                                                 |                    |
|                                | Q                     | Meets Initial Values (As Above)                                                                           |                                                                                                                                                                                                                                                 |                    |
|                                | Insulation Resistance | Meets Initial Values (As Above)                                                                           |                                                                                                                                                                                                                                                 |                    |
|                                | Dielectric Strength   | Meets Initial Values (As Above)                                                                           |                                                                                                                                                                                                                                                 |                    |
| Thermal Shock                  | Appearance            | No visual defects                                                                                         | Step 1: -55°C $\pm$ 2°                                                                                                                                                                                                                          | 30 $\pm$ 3 minutes |
|                                | Capacitance Variation | $\leq \pm 2.5\%$ or $\pm 25$ pF, whichever is greater                                                     | Step 2: Room Temp                                                                                                                                                                                                                               | $\leq$ 3 minutes   |
|                                | Q                     | Meets Initial Values (As Above)                                                                           | Step 3: +125°C $\pm$ 2°                                                                                                                                                                                                                         | 30 $\pm$ 3 minutes |
|                                | Insulation Resistance | Meets Initial Values (As Above)                                                                           | Step 4: Room Temp                                                                                                                                                                                                                               | $\leq$ 3 minutes   |
|                                | Dielectric Strength   | Meets Initial Values (As Above)                                                                           | Repeat for 5 cycles and measure after<br>24 hours at room temperature                                                                                                                                                                           |                    |
| Load Life                      | Appearance            | No visual defects                                                                                         | Charge device with twice rated voltage in test<br>chamber set at 125°C $\pm$ 2°C<br>for 1000 hours (+48, -0).<br><br>Remove from test chamber and stabilize at room<br>temperature for 24 hours<br>before measuring.                            |                    |
|                                | Capacitance Variation | $\leq \pm 3.0\%$ or $\pm .3$ pF, whichever is greater                                                     |                                                                                                                                                                                                                                                 |                    |
|                                | Q                     | $\geq 30$ pF: $Q \geq 350$<br>$\geq 10$ pF, $<30$ pF: $Q \geq 275 + 5C/2$<br>$<10$ pF: $Q \geq 200 + 10C$ |                                                                                                                                                                                                                                                 |                    |
|                                | Insulation Resistance | $\geq$ Initial Value $\times$ 0.3 (See Above)                                                             |                                                                                                                                                                                                                                                 |                    |
|                                | Dielectric Strength   | Meets Initial Values (As Above)                                                                           |                                                                                                                                                                                                                                                 |                    |
| Load Humidity                  | Appearance            | No visual defects                                                                                         | Store in a test chamber set at 85°C $\pm$ 2°C/ 85% $\pm$<br>5% relative humidity for 1000 hours<br>(+48, -0) with rated voltage applied.<br><br>Remove from chamber and stabilize at room<br>temperature for 24 $\pm$ 2 hours before measuring. |                    |
|                                | Capacitance Variation | $\leq \pm 5.0\%$ or $\pm .5$ pF, whichever is greater                                                     |                                                                                                                                                                                                                                                 |                    |
|                                | Q                     | $\geq 30$ pF: $Q \geq 350$<br>$\geq 10$ pF, $<30$ pF: $Q \geq 275 + 5C/2$<br>$<10$ pF: $Q \geq 200 + 10C$ |                                                                                                                                                                                                                                                 |                    |
|                                | Insulation Resistance | $\geq$ Initial Value $\times$ 0.3 (See Above)                                                             |                                                                                                                                                                                                                                                 |                    |
|                                | Dielectric Strength   | Meets Initial Values (As Above)                                                                           |                                                                                                                                                                                                                                                 |                    |

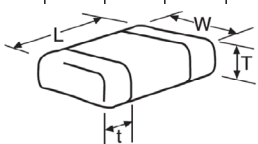
MLCC Tin/Lead Termination “B”

C0G (NP0) – Capacitance Range



PREFERRED SIZES ARE SHADED

| SIZE           |             | LD02                           |                 |                 | LD03                           |                 |                 |                 | LD05                           |                 |                 |                 |                 | LD06                           |      |    |     |     |     |
|----------------|-------------|--------------------------------|-----------------|-----------------|--------------------------------|-----------------|-----------------|-----------------|--------------------------------|-----------------|-----------------|-----------------|-----------------|--------------------------------|------|----|-----|-----|-----|
| Soldering      |             | Reflow/Wave                    |                 |                 | Reflow/Wave                    |                 |                 |                 | Reflow/Wave                    |                 |                 |                 |                 | Reflow/Wave                    |      |    |     |     |     |
| Packaging      |             | All Paper                      |                 |                 | All Paper                      |                 |                 |                 | Paper/Embossed                 |                 |                 |                 |                 | Paper/Embossed                 |      |    |     |     |     |
| (L) Length     | mm<br>(in.) | 1.00 ± 0.10<br>(0.040 ± 0.004) |                 |                 | 1.60 ± 0.15<br>(0.063 ± 0.006) |                 |                 |                 | 2.01 ± 0.20<br>(0.079 ± 0.008) |                 |                 |                 |                 | 3.20 ± 0.20<br>(0.126 ± 0.008) |      |    |     |     |     |
| (W) Width      | mm<br>(in.) | 0.50 ± 0.10<br>(0.020 ± 0.004) |                 |                 | 0.81 ± 0.15<br>(0.032 ± 0.006) |                 |                 |                 | 1.25 ± 0.20<br>(0.049 ± 0.008) |                 |                 |                 |                 | 1.60 ± 0.20<br>(0.063 ± 0.008) |      |    |     |     |     |
| (t) Terminal   | mm<br>(in.) | 0.25 ± 0.15<br>(0.010 ± 0.006) |                 |                 | 0.35 ± 0.15<br>(0.014 ± 0.006) |                 |                 |                 | 0.50 ± 0.25<br>(0.020 ± 0.010) |                 |                 |                 |                 | 0.50 ± 0.25<br>(0.020 ± 0.010) |      |    |     |     |     |
| Cap<br>(pF)    | WVDC        | 16                             | 25              | 50              | 16                             | 25              | 50              | 100             | 16                             | 25              | 50              | 100             | 200             | 16                             | 25   | 50 | 100 | 200 | 500 |
|                | 0.5         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 1.0         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 1.2         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 1.5         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 1.8         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 2.2         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 2.7         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 3.3         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 3.9         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 4.7         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 5.6         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 6.8         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 8.2         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                |             | 10                             | C               | C               | C                              | G               | G               | G               | G                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
| 12             |             | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
| 15             |             | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
| 18             |             | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
| 22             |             | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 27          | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 33          | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 39          | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 47          | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 56          | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 68          | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 82          | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 100         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 120         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 150         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 180         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | J   |
|                | 220         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | J               | J                              | J    | J  | J   | J   | M   |
|                | 270         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | M               | J                              | J    | J  | J   | J   | M   |
|                | 330         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | M               | J                              | J    | J  | J   | J   | M   |
|                | 390         | C                              | C               | C               | G                              | G               | G               | G               | J                              | J               | J               | J               | M               | J                              | J    | J  | J   | J   | M   |
|                | 470         | C                              | C               | C               | G                              | G               | G               |                 | J                              | J               | J               | J               | M               | J                              | J    | J  | J   | J   | M   |
|                | 560         |                                |                 |                 | G                              | G               | G               |                 | J                              | J               | J               | J               | M               | J                              | J    | J  | J   | J   | M   |
|                | 680         |                                |                 |                 | G                              | G               | G               |                 | J                              | J               | J               | J               |                 | J                              | J    | J  | J   | J   | P   |
|                | 820         |                                |                 |                 | G                              | G               | G               |                 | J                              | J               | J               | J               |                 | J                              | J    | J  | J   | M   |     |
|                | 1000        |                                |                 |                 | G                              | G               | G               |                 | J                              | J               | J               | J               |                 | J                              | J    | J  | J   | J   | Q   |
|                | 1200        |                                |                 |                 |                                | G               |                 |                 | J                              | J               | J               |                 |                 | J                              | J    | J  | J   | J   | Q   |
|                | 1500        |                                |                 |                 |                                |                 |                 |                 | J                              | J               | J               |                 |                 | J                              | J    | J  | M   | Q   |     |
|                | 1800        |                                |                 |                 |                                |                 |                 |                 | J                              | J               | J               |                 |                 | J                              | J    | M  | M   |     |     |
|                | 2200        |                                |                 |                 |                                |                 |                 |                 | J                              | J               | N               |                 |                 | J                              | J    | M  | P   |     |     |
|                | 2700        |                                |                 |                 |                                |                 |                 |                 | J                              | J               | N               |                 |                 | J                              | J    | M  | P   |     |     |
|                | 3300        |                                |                 |                 |                                |                 |                 |                 | J                              | J               |                 |                 |                 | J                              | J    | M  | P   |     |     |
|                | 3900        |                                |                 |                 |                                |                 |                 |                 | J                              | J               |                 |                 |                 | J                              | J    | M  | P   |     |     |
|                | 4700        |                                |                 |                 |                                |                 |                 |                 | J                              | J               |                 |                 |                 | J                              | J    | M  | P   |     |     |
|                | 5600        |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 | J                              | J    | M  |     |     |     |
|                | 6800        |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 | M                              | M    |    |     |     |     |
| Cap<br>(pF)    | 8200        |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 | M                              | M    |    |     |     |     |
|                | 0.010       |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | 0.012       |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | 0.015       |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | 0.018       |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | 0.022       |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | 0.027       |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | 0.033       |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | 0.039       |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | 0.047       |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | 0.068       |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | 0.082       |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | 0.1         |                                |                 |                 |                                |                 |                 |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |
|                | WVDC        | 16                             | 25              | 50              | 16                             | 25              | 50              | 100             | 16                             | 25              | 50              | 100             | 200             | 16                             | 25   | 50 | 100 | 200 | 500 |
|                | SIZE        |                                | LD02            |                 |                                | LD03            |                 |                 |                                | LD05            |                 |                 |                 |                                | LD06 |    |     |     |     |
| Letter         |             | A                              | C               | E               | G                              | J               | K               | M               | N                              | P               | Q               | X               | Y               | Z                              |      |    |     |     |     |
| Max. Thickness |             | 0.33<br>(0.013)                | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.90<br>(0.035)                | 0.94<br>(0.037) | 1.02<br>(0.040) | 1.27<br>(0.050) | 1.40<br>(0.055)                | 1.52<br>(0.060) | 1.78<br>(0.070) | 2.29<br>(0.090) | 2.54<br>(0.100) | 2.79<br>(0.110)                |      |    |     |     |     |
|                |             | PAPER                          |                 |                 |                                |                 | EMBOSSED        |                 |                                |                 |                 |                 |                 |                                |      |    |     |     |     |



The Important Information/Disclaimer is incorporated in these specifications by reference and should be reviewed in full before placing any order.

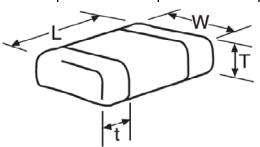
MLCC Tin/Lead Termination “B”

C0G (NP0) – Capacitance Range



PREFERRED SIZES ARE SHADED

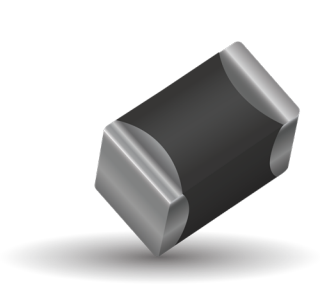
| SIZE           |             | LD10                           |                 |                 |                 |                 | LD12                           |                 |                 |                 |                 | LD13                           |                 |                 | LD14                           |     |     |
|----------------|-------------|--------------------------------|-----------------|-----------------|-----------------|-----------------|--------------------------------|-----------------|-----------------|-----------------|-----------------|--------------------------------|-----------------|-----------------|--------------------------------|-----|-----|
| Soldering      |             | Reflow Only                    |                 |                 |                 |                 | Reflow Only                    |                 |                 |                 |                 | Reflow Only                    |                 |                 | Reflow Only                    |     |     |
| Packaging      |             | Paper/Embossed                 |                 |                 |                 |                 | All Embossed                   |                 |                 |                 |                 | All Embossed                   |                 |                 | All Embossed                   |     |     |
| (L) Length     | mm<br>(in.) | 3.20 ± 0.20<br>(0.126 ± 0.008) |                 |                 |                 |                 | 4.50 ± 0.30<br>(0.177 ± 0.012) |                 |                 |                 |                 | 4.50 ± 0.30<br>(0.177 ± 0.012) |                 |                 | 5.72 ± 0.25<br>(0.225 ± 0.010) |     |     |
| (W) Width      | mm<br>(in.) | 2.50 ± 0.20<br>(0.098 ± 0.008) |                 |                 |                 |                 | 3.20 ± 0.20<br>(0.126 ± 0.008) |                 |                 |                 |                 | 6.40 ± 0.40<br>(0.252 ± 0.016) |                 |                 | 6.35 ± 0.25<br>(0.250 ± 0.010) |     |     |
| (t) Terminal   | mm<br>(in.) | 0.50 ± 0.25<br>(0.020 ± 0.010) |                 |                 |                 |                 | 0.61 ± 0.36<br>(0.024 ± 0.014) |                 |                 |                 |                 | 0.61 ± 0.36<br>(0.024 ± 0.014) |                 |                 | 0.64 ± 0.39<br>(0.025 ± 0.015) |     |     |
|                | WVDC        | 25                             | 50              | 100             | 200             | 500             | 25                             | 50              | 100             | 200             | 500             | 50                             | 100             | 200             | 50                             | 100 | 200 |
| Cap (pF)       | 0.5         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 1.0         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 1.2         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 1.5         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 1.8         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 2.2         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 2.7         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 3.3         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 3.9         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 4.7         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 5.6         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 6.8         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 8.2         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 10          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 12          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 15          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 18          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 22          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 27          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 33          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 39          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 47          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 56          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 68          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 82          |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 100         |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 120         |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 150         |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 180         |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 220         |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 270         |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 330         |                                |                 |                 |                 | J               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 390         |                                |                 |                 |                 | M               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 470         |                                |                 |                 |                 | M               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 560         | J                              | J               | J               | J               | M               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 680         | J                              | J               | J               | J               | M               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 820         | J                              | J               | J               | J               | M               |                                |                 |                 |                 |                 |                                |                 |                 |                                |     |     |
|                | 1000        | J                              | J               | J               | J               | M               | K                              | K               | K               | K               | M               | M                              | M               | M               | M                              | M   | P   |
|                | 1200        | J                              | J               | J               | J               | M               | K                              | K               | K               | K               | M               | M                              | M               | M               | M                              | M   | P   |
|                | 1500        | J                              | J               | J               | M               | M               | K                              | K               | K               | K               | M               | M                              | M               | M               | M                              | M   | P   |
|                | 1800        | J                              | J               | J               | M               |                 | K                              | K               | K               | K               | M               | M                              | M               | M               | M                              | M   | P   |
|                | 2200        | J                              | J               | J               | Q               |                 | K                              | K               | K               | K               | P               | M                              | M               | M               | M                              | M   | P   |
|                | 2700        | J                              | J               | J               | Q               |                 | K                              | K               | K               | P               | Q               | M                              | M               | M               | M                              | M   | P   |
|                | 3300        | J                              | J               | J               |                 |                 | K                              | K               | K               | P               | Q               | M                              | M               | M               | M                              | M   | P   |
|                | 3900        | J                              | J               | M               |                 |                 | K                              | K               | K               | P               | Q               | M                              | M               | M               | M                              | M   | P   |
|                | 4700        | J                              | J               | M               |                 |                 | K                              | K               | K               | P               | Q               | M                              | M               | M               | M                              | M   | P   |
|                | 5600        | J                              | J               |                 |                 |                 | K                              | K               | M               | P               | X               | M                              | M               | M               | M                              | M   | P   |
|                | 6800        | J                              | J               |                 |                 |                 | K                              | K               | M               |                 | X               | M                              | M               | M               | M                              | M   | P   |
|                | 8200        | J                              | J               |                 |                 |                 | K                              | M               | M               |                 |                 | M                              | M               |                 | M                              | M   | P   |
| Cap (pF)       | 0.010       | J                              | J               |                 |                 |                 | K                              | M               | M               |                 |                 | M                              | M               |                 | M                              | M   | P   |
|                | 0.012       | J                              | J               |                 |                 |                 | K                              | M               |                 |                 |                 | M                              | M               |                 | M                              | M   | P   |
|                | 0.015       |                                |                 |                 |                 |                 | M                              | M               |                 |                 |                 | M                              | M               |                 | M                              | M   | Y   |
|                | 0.018       |                                |                 |                 |                 |                 | M                              | M               |                 |                 |                 | P                              | M               |                 | M                              | M   | Y   |
|                | 0.022       |                                |                 |                 |                 |                 | M                              | M               |                 |                 |                 | P                              |                 |                 | M                              | Y   | Y   |
|                | 0.027       |                                |                 |                 |                 |                 | M                              | M               |                 |                 |                 | P                              |                 |                 | P                              | Y   | Y   |
|                | 0.033       |                                |                 |                 |                 |                 | M                              | M               |                 |                 |                 | P                              |                 |                 | P                              |     |     |
|                | 0.039       |                                |                 |                 |                 |                 | M                              | M               |                 |                 |                 | P                              |                 |                 | P                              |     |     |
|                | 0.047       |                                |                 |                 |                 |                 | M                              | M               |                 |                 |                 | P                              |                 |                 | P                              |     |     |
|                | 0.068       |                                |                 |                 |                 |                 | M                              | M               |                 |                 |                 |                                |                 |                 | P                              |     |     |
|                | 0.082       |                                |                 |                 |                 |                 | M                              | M               |                 |                 |                 |                                |                 |                 | Q                              |     |     |
|                | 0.1         |                                |                 |                 |                 |                 |                                |                 |                 |                 |                 |                                |                 |                 | Q                              |     |     |
|                | WVDC        | 25                             | 50              | 100             | 200             | 500             | 25                             | 50              | 100             | 200             | 500             | 50                             | 100             | 200             | 50                             | 100 | 200 |
| SIZE           |             | LD10                           |                 |                 |                 |                 | LD12                           |                 |                 |                 |                 | LD13                           |                 |                 | LD14                           |     |     |
| Letter         |             | A                              | C               | E               | G               | J               | K                              | M               | N               | P               | Q               | X                              | Y               | Z               |                                |     |     |
| Max. Thickness |             | 0.33<br>(0.013)                | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.90<br>(0.035) | 0.94<br>(0.037) | 1.02<br>(0.040)                | 1.27<br>(0.050) | 1.40<br>(0.055) | 1.52<br>(0.060) | 1.78<br>(0.070) | 2.29<br>(0.090)                | 2.54<br>(0.100) | 2.79<br>(0.110) |                                |     |     |
|                | PAPER       |                                |                 |                 |                 |                 | EMBOSSED                       |                 |                 |                 |                 |                                |                 |                 |                                |     |     |



# MLCC Tin/Lead Termination “B”



## X8R – General Specifications



AVX Corporation will support those customers for commercial and military Multilayer Ceramic Capacitors with a termination consisting of 5% minimum lead. This termination is indicated by the use of a “B” in the 12th position of the AVX Catalog Part Number. This fulfills AVX’s commitment to providing a full range of products to our customers. AVX has provided in the following pages a full range of values that we are currently offering in this special “B” termination. Please contact the factory if you require additional information on our MLCC Tin/Lead Termination “B” products.

Not RoHS Compliant

### PART NUMBER (SEE PAGE 4 FOR COMPLETE PART NUMBER EXPLANATION)

| LD05                                                                                                                                                | 5                                                                                                   | F          | 101                             | J                                                                                                                                              | A                  | B                                                                      | 2                                                                        | A                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------|
| Size                                                                                                                                                | Voltage                                                                                             | Dielectric | Capacitance Code (In pF)        | Capacitance Tolerance                                                                                                                          | Failure Rate       | Terminations                                                           | Packaging                                                                | Special Code     |
| LD02 - 0402<br>LD03 - 0603<br>LD04 - 0504*<br>LD05 - 0805<br>LD06 - 1206<br>LD10 - 1210<br>LD12 - 1812<br>LD13 - 1825<br>LD14 - 2225<br>LD20 - 2220 | 6.3V = 6<br>10V = Z<br>16V = Y<br>25V = 3<br>35V = D<br>50V = 5<br>100V = 1<br>200V = 2<br>500V = 7 | X8R = F    | 2 Sig. Digits + Number of Zeros | B = ±.10 pF (<10pF)<br>C = ±.25 pF (<10pF)<br>D = ±.50 pF (<10pF)<br>F = ±1% (≥ 10 pF)<br>G = ±2% (≥ 10 pF)<br>J = ±5%<br>K = ±10%<br>M = ±20% | A = Not Applicable | B = 5% min lead<br>X = FLEXITERM® with 5% min lead**<br><br>**X7R only | 2 = 7" Reel<br>4 = 13" Reel<br><br><b>Contact Factory For Multiples*</b> | A = Std. Product |

LD04 has the same CV ranges as LD03.

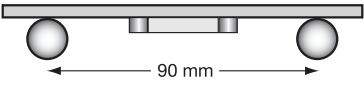
See FLEXITERM® section for CV options

NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.  
Contact factory for non-specified capacitance values.

# MLCC Tin/Lead Termination “B”

## X8R – Specifications and Test Methods



| Parameter/Test                       |                          | X8R Specification Limits                                                         | Measuring Conditions                                                                                                                                                                                                                                            |                    |
|--------------------------------------|--------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Operating Temperature Range          |                          | -55°C to +150°C                                                                  | Temperature Cycle Chamber                                                                                                                                                                                                                                       |                    |
| Capacitance                          |                          | Within specified tolerance                                                       | Freq.: 1.0 kHz $\pm$ 10%<br>Voltage: 1.0Vrms $\pm$ .2V                                                                                                                                                                                                          |                    |
| Dissipation Factor                   |                          | $\leq$ 2.5% for $\geq$ 50V DC rating<br>$\leq$ 3.5% for 25V DC and 16V DC rating |                                                                                                                                                                                                                                                                 |                    |
| Insulation Resistance                |                          | 100,000M $\Omega$ or 1000M $\Omega$ - $\mu$ F,<br>whichever is less              | Charge device with rated voltage for<br>120 $\pm$ 5 secs @ room temp/humidity                                                                                                                                                                                   |                    |
| Dielectric Strength                  |                          | No breakdown or visual defects                                                   | Charge device with 250% of rated voltage for<br>1-5 seconds, w/charge and discharge current<br>limited to 50 mA (max)<br>Note: Charge device with 150% of rated voltage<br>for 500V devices.                                                                    |                    |
| Resistance to<br>Flexure<br>Stresses | Appearance               | No defects                                                                       | Deflection: 2mm<br>Test Time: 30 seconds<br>                                                                                                                                 |                    |
|                                      | Capacitance<br>Variation | $\leq \pm 12\%$                                                                  |                                                                                                                                                                                                                                                                 |                    |
|                                      | Dissipation<br>Factor    | Meets Initial Values (As Above)                                                  |                                                                                                                                                                                                                                                                 |                    |
|                                      | Insulation<br>Resistance | $\geq$ Initial Value x 0.3                                                       |                                                                                                                                                                                                                                                                 |                    |
| Solderability                        |                          | $\geq$ 95% of each terminal should be covered<br>with fresh solder               | Dip device in eutectic solder at 230 $\pm$ 5°C<br>for 5.0 $\pm$ 0.5 seconds                                                                                                                                                                                     |                    |
| Resistance to<br>Solder Heat         | Appearance               | No defects, <25% leaching of either end terminal                                 | Dip device in eutectic solder at 260°C for 60<br>seconds. Store at room temperature for 24 $\pm$ 2<br>hours before measuring electrical properties.                                                                                                             |                    |
|                                      | Capacitance<br>Variation | $\leq \pm 7.5\%$                                                                 |                                                                                                                                                                                                                                                                 |                    |
|                                      | Dissipation<br>Factor    | Meets Initial Values (As Above)                                                  |                                                                                                                                                                                                                                                                 |                    |
|                                      | Insulation<br>Resistance | Meets Initial Values (As Above)                                                  |                                                                                                                                                                                                                                                                 |                    |
|                                      | Dielectric<br>Strength   | Meets Initial Values (As Above)                                                  |                                                                                                                                                                                                                                                                 |                    |
| Thermal Shock                        | Appearance               | No visual defects                                                                | Step 1: -55°C $\pm$ 2°                                                                                                                                                                                                                                          | 30 $\pm$ 3 minutes |
|                                      | Capacitance<br>Variation | $\leq \pm 7.5\%$                                                                 | Step 2: Room Temp                                                                                                                                                                                                                                               | $\leq$ 3 minutes   |
|                                      | Dissipation<br>Factor    | Meets Initial Values (As Above)                                                  | Step 3: +125°C $\pm$ 2°                                                                                                                                                                                                                                         | 30 $\pm$ 3 minutes |
|                                      | Insulation<br>Resistance | Meets Initial Values (As Above)                                                  | Step 4: Room Temp                                                                                                                                                                                                                                               | $\leq$ 3 minutes   |
|                                      | Dielectric<br>Strength   | Meets Initial Values (As Above)                                                  | Repeat for 5 cycles and measure after<br>24 $\pm$ 2 hours at room temperature                                                                                                                                                                                   |                    |
| Load Life                            | Appearance               | No visual defects                                                                | Charge device with 1.5 rated voltage ( $\leq$ 10V) in<br>test chamber set at 150°C $\pm$ 2°C<br>for 1000 hours (+48, -0)<br><br>Remove from test chamber and stabilize at room<br>temperature for 24 $\pm$ 2 hours before measuring.                            |                    |
|                                      | Capacitance<br>Variation | $\leq \pm 12.5\%$                                                                |                                                                                                                                                                                                                                                                 |                    |
|                                      | Dissipation<br>Factor    | $\leq$ Initial Value x 2.0 (See Above)                                           |                                                                                                                                                                                                                                                                 |                    |
|                                      | Insulation<br>Resistance | $\geq$ Initial Value x 0.3 (See Above)                                           |                                                                                                                                                                                                                                                                 |                    |
|                                      | Dielectric<br>Strength   | Meets Initial Values (As Above)                                                  |                                                                                                                                                                                                                                                                 |                    |
| Load<br>Humidity                     | Appearance               | No visual defects                                                                | Store in a test chamber set at 85°C $\pm$ 2°C/ 85% $\pm$<br>5% relative humidity for 1000 hours<br>(+48, -0) with rated voltage applied.<br><br>Remove from chamber and stabilize at room<br>temperature and humidity for<br>24 $\pm$ 2 hours before measuring. |                    |
|                                      | Capacitance<br>Variation | $\leq \pm 12.5\%$                                                                |                                                                                                                                                                                                                                                                 |                    |
|                                      | Dissipation<br>Factor    | $\leq$ Initial Value x 2.0 (See Above)                                           |                                                                                                                                                                                                                                                                 |                    |
|                                      | Insulation<br>Resistance | $\geq$ Initial Value x 0.3 (See Above)                                           |                                                                                                                                                                                                                                                                 |                    |
|                                      | Dielectric<br>Strength   | Meets Initial Values (As Above)                                                  |                                                                                                                                                                                                                                                                 |                    |

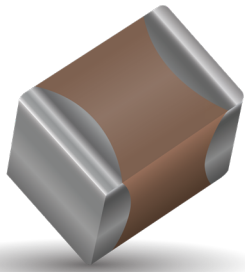
MLCC Tin/Lead Termination “B”  
X8R – Capacitance Range



| SIZE           |                 |                 | LD03            |                 |                 | LD05            |                 |                 | LD06            |                 |                 |                 |                 |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                |                 | 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            | Cap             | 8200            | G               | G               | J               | J               | J               | J               |                 |                 |                 |                 |                 |
| 103            | (μF)            | 0.01            | G               | G               | J               | J               | J               | J               |                 |                 |                 |                 |                 |
| 123            |                 | 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           |                 |                 | 25V             | 50V             | 25V             | 50V             | 25V             | 50V             |                 |                 |                 |                 |                 |
| SIZE           |                 |                 | LD03            |                 |                 | LD05            |                 |                 | LD06            |                 |                 |                 |                 |
| Letter         | A               | C               | E               | G               | J               | K               | M               | N               | P               | Q               | X               | Y               | Z               |
| Max. Thickness | 0.33<br>(0.013) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.90<br>(0.035) | 0.94<br>(0.037) | 1.02<br>(0.040) | 1.27<br>(0.050) | 1.40<br>(0.055) | 1.52<br>(0.060) | 1.78<br>(0.070) | 2.29<br>(0.090) | 2.54<br>(0.100) | 2.79<br>(0.110) |
|                | PAPER           |                 |                 |                 |                 | EMBOSSED        |                 |                 |                 |                 |                 |                 |                 |

# MLCC Tin/Lead Termination "B"

## X7R – General Specifications



AVX Corporation will support those customers for commercial and military Multilayer Ceramic Capacitors with a termination consisting of 5% minimum lead. This termination is indicated by the use of a "B" in the 12th position of the AVX Catalog Part Number. This fulfills AVX's commitment to providing a full range of products to our customers. AVX has provided in the following pages a full range of values that we are currently offering in this special "B" termination. Please contact the factory if you require additional information on our MLCC Tin/Lead Termination "B" products.

**Not RoHS Compliant**

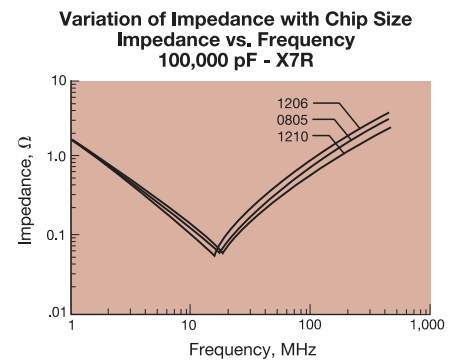
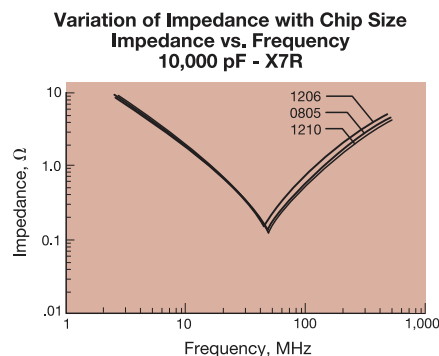
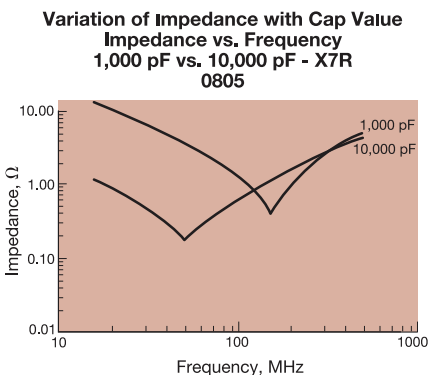
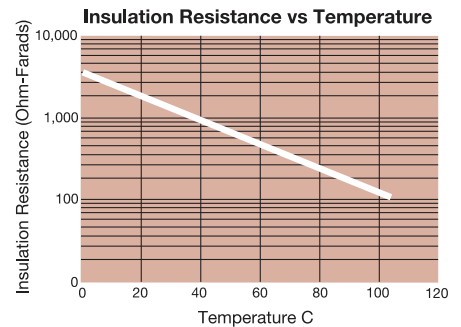
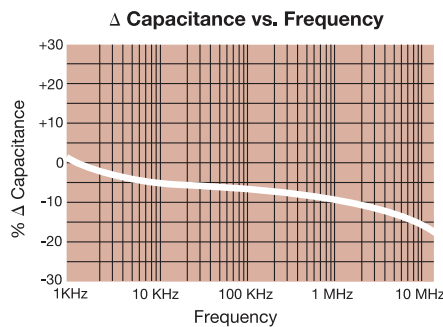
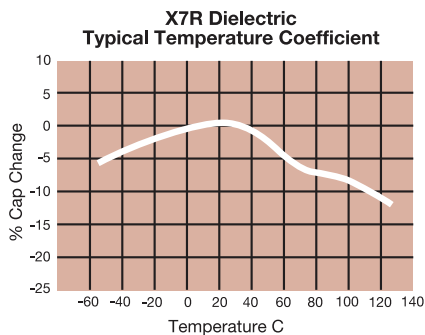
### PART NUMBER (SEE PAGE 4 FOR COMPLETE PART NUMBER EXPLANATION)

| LD05                                                                                                                                 | 5                                                                                                   | C                 | 101                             | J                                                                                                                                                                                                    | A                   | B                                                                      | 2                                                                        | A                   |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------|
| <b>Size</b>                                                                                                                          | <b>Voltage</b>                                                                                      | <b>Dielectric</b> | <b>Capacitance Code (In pF)</b> | <b>Capacitance Tolerance</b>                                                                                                                                                                         | <b>Failure Rate</b> | <b>Terminations</b>                                                    | <b>Packaging</b>                                                         | <b>Special Code</b> |
| LD03 - 0603<br>LD04 - 0504*<br>LD05 - 0805<br>LD06 - 1206<br>LD10 - 1210<br>LD12 - 1812<br>LD13 - 1825<br>LD14 - 2225<br>LD20 - 2220 | 6.3V = 6<br>10V = Z<br>16V = Y<br>25V = 3<br>35V = D<br>50V = 5<br>100V = 1<br>200V = 2<br>500V = 7 | X7R = C           | 2 Sig. Digits + Number of Zeros | B = $\pm 10$ pF (<10pF)<br>C = $\pm 25$ pF (<10pF)<br>D = $\pm 50$ pF (<10pF)<br>F = $\pm 1\%$ ( $\geq 10$ pF)<br>G = $\pm 2\%$ ( $\geq 10$ pF)<br>J = $\pm 5\%$<br>K = $\pm 10\%$<br>M = $\pm 20\%$ | A = Not Applicable  | B = 5% min lead<br>X = FLEXITERM® with 5% min lead**<br><br>**X7R only | 2 = 7" Reel<br>4 = 13" Reel<br><br><b>Contact Factory For Multiples*</b> | A = Std. Product    |

\*LD04 has the same CV ranges as LD03.

See FLEXITERM® section for CV options

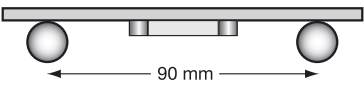
NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.  
Contact factory for non-specified capacitance values.



# MLCC Tin/Lead Termination “B”

## X7R – Specifications and Test Methods



| Parameter/Test                 |                       | X7R Specification Limits                                                                                                                                 | Measuring Conditions                                                                                                                                                                                                                                |                    |
|--------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Operating Temperature Range    |                       | -55°C to +125°C                                                                                                                                          | Temperature Cycle Chamber                                                                                                                                                                                                                           |                    |
| Capacitance                    |                       | Within specified tolerance                                                                                                                               | Freq.: 1.0 kHz $\pm$ 10%<br>Voltage: 1.0Vrms $\pm$ .2V                                                                                                                                                                                              |                    |
| Dissipation Factor             |                       | $\leq$ 10% for $\geq$ 50V DC rating<br>$\leq$ 12.5% for 25V DC rating<br>$\leq$ 12.5% for 25V and 16V DC rating<br>$\leq$ 12.5% for $\leq$ 10V DC rating |                                                                                                                                                                                                                                                     |                    |
| Insulation Resistance          |                       | 100,000M $\Omega$ or 1000M $\Omega$ - $\mu$ F, whichever is less                                                                                         | Charge device with rated voltage for 120 $\pm$ 5 secs @ room temp/humidity                                                                                                                                                                          |                    |
| Dielectric Strength            |                       | No breakdown or visual defects                                                                                                                           | Charge device with 250% of rated voltage for 1-5 seconds, w/charge and discharge current limited to 50 mA (max)<br>Note: Charge device with 150% of rated voltage for 500V devices.                                                                 |                    |
| Resistance to Flexure Stresses | Appearance            | No defects                                                                                                                                               | Deflection: 2mm<br>Test Time: 30 seconds<br>1mm/sec<br>                                                                                                          |                    |
|                                | Capacitance Variation | $\leq \pm 12\%$                                                                                                                                          |                                                                                                                                                                                                                                                     |                    |
|                                | Dissipation Factor    | Meets Initial Values (As Above)                                                                                                                          |                                                                                                                                                                                                                                                     |                    |
|                                | Insulation Resistance | $\geq$ Initial Value x 0.3                                                                                                                               |                                                                                                                                                                                                                                                     |                    |
| Solderability                  |                       | $\geq$ 95% of each terminal should be covered with fresh solder                                                                                          | Dip device in eutectic solder at 230 $\pm$ 5°C for 5.0 $\pm$ 0.5 seconds                                                                                                                                                                            |                    |
| Resistance to Solder Heat      | Appearance            | No defects, <25% leaching of either end terminal                                                                                                         | Dip device in eutectic solder at 260°C for 60 seconds. Store at room temperature for 24 $\pm$ 2 hours before measuring electrical properties.                                                                                                       |                    |
|                                | Capacitance Variation | $\leq \pm 7.5\%$                                                                                                                                         |                                                                                                                                                                                                                                                     |                    |
|                                | Dissipation Factor    | Meets Initial Values (As Above)                                                                                                                          |                                                                                                                                                                                                                                                     |                    |
|                                | Insulation Resistance | Meets Initial Values (As Above)                                                                                                                          |                                                                                                                                                                                                                                                     |                    |
|                                | Dielectric Strength   | Meets Initial Values (As Above)                                                                                                                          |                                                                                                                                                                                                                                                     |                    |
| Thermal Shock                  | Appearance            | No visual defects                                                                                                                                        | Step 1: -55°C $\pm$ 2°                                                                                                                                                                                                                              | 30 $\pm$ 3 minutes |
|                                | Capacitance Variation | $\leq \pm 7.5\%$                                                                                                                                         | Step 2: Room Temp                                                                                                                                                                                                                                   | $\leq$ 3 minutes   |
|                                | Dissipation Factor    | Meets Initial Values (As Above)                                                                                                                          | Step 3: +125°C $\pm$ 2°                                                                                                                                                                                                                             | 30 $\pm$ 3 minutes |
|                                | Insulation Resistance | Meets Initial Values (As Above)                                                                                                                          | Step 4: Room Temp                                                                                                                                                                                                                                   | $\leq$ 3 minutes   |
|                                | Dielectric Strength   | Meets Initial Values (As Above)                                                                                                                          | Repeat for 5 cycles and measure after 24 $\pm$ 2 hours at room temperature                                                                                                                                                                          |                    |
| Load Life                      | Appearance            | No visual defects                                                                                                                                        | Charge device with 1.5 rated voltage ( $\leq$ 10V) in test chamber set at 125°C $\pm$ 2°C for 1000 hours (+48, -0)<br><br>Remove from test chamber and stabilize at room temperature for 24 $\pm$ 2 hours before measuring.                         |                    |
|                                | Capacitance Variation | $\leq \pm 12.5\%$                                                                                                                                        |                                                                                                                                                                                                                                                     |                    |
|                                | Dissipation Factor    | $\leq$ Initial Value x 2.0 (See Above)                                                                                                                   |                                                                                                                                                                                                                                                     |                    |
|                                | Insulation Resistance | $\geq$ Initial Value x 0.3 (See Above)                                                                                                                   |                                                                                                                                                                                                                                                     |                    |
|                                | Dielectric Strength   | Meets Initial Values (As Above)                                                                                                                          |                                                                                                                                                                                                                                                     |                    |
| Load Humidity                  | Appearance            | No visual defects                                                                                                                                        | Store in a test chamber set at 85°C $\pm$ 2°C/ 85% $\pm$ 5% relative humidity for 1000 hours (+48, -0) with rated voltage applied.<br><br>Remove from chamber and stabilize at room temperature and humidity for 24 $\pm$ 2 hours before measuring. |                    |
|                                | Capacitance Variation | $\leq \pm 12.5\%$                                                                                                                                        |                                                                                                                                                                                                                                                     |                    |
|                                | Dissipation Factor    | $\leq$ Initial Value x 2.0 (See Above)                                                                                                                   |                                                                                                                                                                                                                                                     |                    |
|                                | Insulation Resistance | $\geq$ Initial Value x 0.3 (See Above)                                                                                                                   |                                                                                                                                                                                                                                                     |                    |
|                                | Dielectric Strength   | Meets Initial Values (As Above)                                                                                                                          |                                                                                                                                                                                                                                                     |                    |

MLCC Tin/Lead Termination “B”



X7R – Capacitance Range

PREFERRED SIZES ARE SHADED

| SIZE           |              | LD02            |              |              | LD03            |              |              |              |              |              | LD05            |              |              |    |    |    | LD06            |     |     |    |    |    |    |     |     |     |
|----------------|--------------|-----------------|--------------|--------------|-----------------|--------------|--------------|--------------|--------------|--------------|-----------------|--------------|--------------|----|----|----|-----------------|-----|-----|----|----|----|----|-----|-----|-----|
| Soldering      |              | Reflow/Wave     |              |              | Reflow/Wave     |              |              |              |              |              | Reflow/Wave     |              |              |    |    |    | Reflow/Wave     |     |     |    |    |    |    |     |     |     |
| Packaging      |              | All Paper       |              |              | All Paper       |              |              |              |              |              | Paper/Embossed  |              |              |    |    |    | Paper/Embossed  |     |     |    |    |    |    |     |     |     |
| (L) Length     | mm           | 1.00 ± 0.10     |              |              | 1.60 ± 0.15     |              |              |              |              |              | 2.01 ± 0.20     |              |              |    |    |    | 3.20 ± 0.20     |     |     |    |    |    |    |     |     |     |
|                | (in.)        | (0.040 ± 0.004) |              |              | (0.063 ± 0.006) |              |              |              |              |              | (0.079 ± 0.008) |              |              |    |    |    | (0.126 ± 0.008) |     |     |    |    |    |    |     |     |     |
| (W) Width      | mm           | 0.50 ± 0.10     |              |              | 0.81 ± 0.15     |              |              |              |              |              | 1.25 ± 0.20     |              |              |    |    |    | 1.60 ± 0.20     |     |     |    |    |    |    |     |     |     |
|                | (in.)        | (0.020 ± 0.004) |              |              | (0.032 ± 0.006) |              |              |              |              |              | (0.049 ± 0.008) |              |              |    |    |    | (0.063 ± 0.008) |     |     |    |    |    |    |     |     |     |
| (t) Terminal   | mm           | 0.25 ± 0.15     |              |              | 0.35 ± 0.15     |              |              |              |              |              | 0.50 ± 0.25     |              |              |    |    |    | 0.50 ± 0.25     |     |     |    |    |    |    |     |     |     |
|                | (in.)        | (0.010 ± 0.006) |              |              | (0.014 ± 0.006) |              |              |              |              |              | (0.020 ± 0.010) |              |              |    |    |    | (0.020 ± 0.010) |     |     |    |    |    |    |     |     |     |
| WVDC           |              | 16              | 25           | 50           | 6.3             | 10           | 16           | 25           | 50           | 100          | 200             | 6.3          | 10           | 16 | 25 | 50 | 100             | 200 | 6.3 | 10 | 16 | 25 | 50 | 100 | 200 | 500 |
| Cap (pF)       | 100          |                 |              |              |                 |              |              |              |              |              |                 |              |              |    |    |    |                 |     |     |    |    |    |    |     |     |     |
|                | 150          |                 |              |              |                 |              |              |              |              |              |                 |              |              |    |    |    |                 |     |     |    |    |    |    |     |     |     |
|                | 220          |                 |              | C            |                 |              |              |              |              |              |                 |              |              |    |    |    |                 |     |     |    |    |    |    |     |     |     |
|                | 330          |                 |              | C            |                 |              |              |              | G            | G            | G               |              | J            | J  | J  | J  | J               | J   |     |    |    |    |    |     |     | K   |
|                | 470          |                 |              | C            |                 |              |              |              | G            | G            | G               |              | J            | J  | J  | J  | J               | J   |     |    |    |    |    |     |     | K   |
|                | 680          |                 |              | C            |                 |              |              |              | G            | G            | G               |              | J            | J  | J  | J  | J               | J   |     |    |    |    |    |     |     | K   |
|                | 1000         |                 |              | C            |                 |              |              |              | G            | G            | G               |              | J            | J  | J  | J  | J               | J   |     |    |    |    |    |     |     | K   |
|                | 1500         |                 |              | C            |                 |              |              |              | G            | G            |                 |              | J            | J  | J  | J  | J               | J   |     | J  | J  | J  | J  | J   | J   | M   |
|                | 2200         |                 |              | C            |                 |              |              |              | G            | G            |                 |              | J            | J  | J  | J  | J               | J   |     | J  | J  | J  | J  | J   | J   | M   |
|                | 3300         |                 | C            | C            |                 |              |              |              | G            | G            |                 |              | J            | J  | J  | J  | J               | J   |     | J  | J  | J  | J  | J   | J   | M   |
|                | 4700         |                 | C            | C            |                 |              |              |              | G            | G            |                 |              | J            | J  | J  | J  | J               | J   |     | J  | J  | J  | J  | J   | J   | M   |
|                | 6800         | C               | C            |              |                 |              |              |              | G            | G            |                 |              | J            | J  | J  | J  | J               | J   |     | J  | J  | J  | J  | J   | J   | P   |
| Cap (µF)       | 0.010        | C               | C            |              |                 |              |              |              | G            | G            | G               |              | J            | J  | J  | J  | J               | J   |     | J  | J  | J  | J  | J   | J   | P   |
|                | 0.015        | C               |              |              |                 |              |              |              | G            | G            |                 |              | J            | J  | J  | J  | J               | J   |     | J  | J  | J  | J  | J   | M   |     |
|                | 0.022        | C               |              |              |                 |              |              |              | G            | G            |                 |              | J            | J  | J  | J  | J               | N   |     | J  | J  | J  | J  | J   | M   |     |
|                | 0.033        | C               |              |              |                 |              |              |              | G            | G            |                 |              | J            | J  | J  | J  | N               |     |     | J  | J  | J  | J  | J   | M   |     |
|                | 0.047        |                 |              |              |                 |              |              |              | G            | G            | G               |              | J            | J  | J  | J  | N               |     |     | J  | J  | J  | J  | J   | M   |     |
|                | 0.068        |                 |              |              |                 |              |              |              | G            | G            | G               |              | J            | J  | J  | J  | N               |     |     | J  | J  | J  | J  | J   | P   |     |
|                | 0.10         |                 | C*           |              |                 |              |              |              | G            | G            | G               |              | J            | J  | J  | J  | N               |     |     | J  | J  | J  | J  | P   | P   |     |
|                | 0.15         |                 |              |              |                 |              |              |              | G            | G            |                 |              | J            | J  | J  | N  | N               |     |     | J  | J  | J  | J  | Q   |     |     |
|                | 0.22         |                 |              |              |                 |              |              |              | G            |              |                 |              | J            | J  | N  | N  | N               |     |     | J  | J  | J  | J  | Q   |     |     |
|                | 0.33         |                 |              |              |                 |              |              |              |              |              |                 |              | N            | N  | N  | N  | N               |     |     | J  | J  | M  | P  | Q   |     |     |
|                | 0.47         |                 |              |              |                 |              |              |              | J*           |              |                 |              | N            | N  | N  | N  | N               |     |     | M  | M  | M  | P  | Q   |     |     |
|                | 0.68         |                 |              |              |                 |              |              |              |              |              |                 |              | N            | N  | N  |    |                 |     |     | M  | M  | Q  | Q  | Q   |     |     |
|                | 1.0          |                 |              |              |                 |              | J*           | J*           |              |              |                 |              | N            | N  | N* |    |                 |     |     | M  | M  | Q  | Q  | Q   |     |     |
|                | 1.5          |                 |              |              |                 |              |              |              |              |              |                 |              |              |    |    |    |                 |     |     | P  | Q  | Q  |    |     |     |     |
|                | 2.2          |                 |              |              |                 |              | J*           |              |              |              |                 |              |              |    | P* |    |                 |     |     | Q  | Q  | Q  |    |     |     |     |
|                | 3.3          |                 |              |              |                 |              |              |              |              |              |                 |              |              |    |    |    |                 |     |     |    |    |    |    |     |     |     |
|                | 4.7          |                 |              |              |                 |              |              |              |              |              |                 |              |              | P* | P* |    |                 |     |     | Q* | Q* | Q* |    |     |     |     |
|                | 10           |                 |              |              |                 |              |              |              |              |              |                 |              |              |    |    |    |                 |     |     | Q* | Q* | Q  |    |     |     |     |
|                | 22           |                 |              |              |                 |              |              |              |              |              |                 |              |              |    |    |    |                 |     |     | Q* |    |    |    |     |     |     |
|                | 47           |                 |              |              |                 |              |              |              |              |              |                 |              |              |    |    |    |                 |     |     |    |    |    |    |     |     |     |
| 100            |              |                 |              |              |                 |              |              |              |              |              |                 |              |              |    |    |    |                 |     |     |    |    |    |    |     |     |     |
| WVDC           |              | 16              | 25           | 50           | 6.3             | 10           | 16           | 25           | 50           | 100          | 200             | 6.3          | 10           | 16 | 25 | 50 | 100             | 200 | 6.3 | 10 | 16 | 25 | 50 | 100 | 200 | 500 |
| SIZE           |              | LD02            |              |              | LD03            |              |              |              |              |              | LD05            |              |              |    |    |    | LD06            |     |     |    |    |    |    |     |     |     |
| 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        |                 |              |              |                 | EMBOSS       |              |              |              |              |                 |              |              |    |    |    |                 |     |     |    |    |    |    |     |     |     |

= Under Development

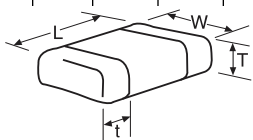
MLCC Tin/Lead Termination “B”



X7R – Capacitance Range

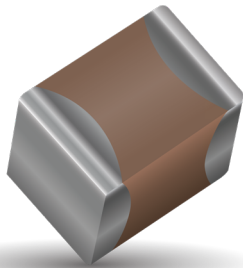
PREFERRED SIZES ARE SHADED

| SIZE           |             | LD10                           |                 |                 |                 |                 |     |                 | LD12                           |                 |                 |                 | LD13                           |                 | LD20                           |    |     |     | LD14                           |     |
|----------------|-------------|--------------------------------|-----------------|-----------------|-----------------|-----------------|-----|-----------------|--------------------------------|-----------------|-----------------|-----------------|--------------------------------|-----------------|--------------------------------|----|-----|-----|--------------------------------|-----|
| Soldering      |             | Reflow Only                    |                 |                 |                 |                 |     |                 | Reflow Only                    |                 |                 |                 | Reflow Only                    |                 | Reflow Only                    |    |     |     | Reflow Only                    |     |
| Packaging      |             | Paper/Embossed                 |                 |                 |                 |                 |     |                 | All Embossed                   |                 |                 |                 | All Embossed                   |                 | All Embossed                   |    |     |     | All Embossed                   |     |
| (L) Length     | mm<br>(in.) | 3.20 ± 0.20<br>(0.126 ± 0.008) |                 |                 |                 |                 |     |                 | 4.50 ± 0.30<br>(0.177 ± 0.012) |                 |                 |                 | 4.50 ± 0.30<br>(0.177 ± 0.012) |                 | 5.70 ± 0.50<br>(0.224 ± 0.020) |    |     |     | 5.72 ± 0.25<br>(0.225 ± 0.010) |     |
| (W) Width      | mm<br>(in.) | 2.50 ± 0.20<br>(0.098 ± 0.008) |                 |                 |                 |                 |     |                 | 3.20 ± 0.20<br>(0.126 ± 0.008) |                 |                 |                 | 6.40 ± 0.40<br>(0.252 ± 0.016) |                 | 5.00 ± 0.40<br>(0.197 ± 0.016) |    |     |     | 6.35 ± 0.25<br>(0.250 ± 0.010) |     |
| (t) Terminal   | mm<br>(in.) | 0.50 ± 0.25<br>(0.020 ± 0.010) |                 |                 |                 |                 |     |                 | 0.61 ± 0.36<br>(0.024 ± 0.014) |                 |                 |                 | 0.61 ± 0.36<br>(0.024 ± 0.014) |                 | 0.64 ± 0.39<br>(0.025 ± 0.015) |    |     |     | 0.64 ± 0.39<br>(0.025 ± 0.015) |     |
| WVDC           |             | 10                             | 16              | 25              | 50              | 100             | 200 | 500             | 50                             | 100             | 200             | 500             | 50                             | 100             | 25                             | 50 | 100 | 200 | 50                             | 100 |
| Cap (pF)       | 100         |                                |                 |                 |                 |                 |     |                 |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 150         |                                |                 |                 |                 |                 |     |                 |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 220         |                                |                 |                 |                 |                 |     |                 |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 330         |                                |                 |                 |                 |                 |     |                 |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 470         |                                |                 |                 |                 |                 |     |                 |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 680         |                                |                 |                 |                 |                 |     |                 |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 1000        |                                |                 |                 |                 |                 |     |                 |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 1500        | J                              | J               | J               | J               | J               | J   | M               |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 2200        | J                              | J               | J               | J               | J               | J   | M               |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 3300        | J                              | J               | J               | J               | J               | J   | M               |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 4700        | J                              | J               | J               | J               | J               | J   | M               |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 6800        | J                              | J               | J               | J               | J               | J   | M               |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
| Cap (µF)       | 0.010       | J                              | J               | J               | J               | J               | J   | M               | K                              | K               | K               | K               | M                              | M               |                                | X  | X   | X   | M                              | P   |
|                | 0.015       | J                              | J               | J               | J               | J               | J   | P               | K                              | K               | K               | P               | M                              | M               |                                | X  | X   | X   | M                              | P   |
|                | 0.022       | J                              | J               | J               | J               | J               | J   | Q               | K                              | K               | K               | P               | M                              | M               |                                | X  | X   | X   | M                              | P   |
|                | 0.033       | J                              | J               | J               | J               | J               | J   | Q               | K                              | K               | K               | X               | M                              | M               |                                | X  | X   | X   | M                              | P   |
|                | 0.047       | J                              | J               | J               | J               | J               | J   |                 | K                              | K               | K               | Z               | M                              | M               |                                | X  | X   | X   | M                              | P   |
|                | 0.068       | J                              | J               | J               | J               | J               | M   |                 | K                              | K               | K               | Z               | M                              | M               |                                | X  | X   | X   | M                              | P   |
|                | 0.10        | J                              | J               | J               | J               | J               | M   |                 | K                              | K               | K               | Z               | M                              | M               |                                | X  | X   | X   | M                              | P   |
|                | 0.15        | J                              | J               | J               | J               | M               | Z   |                 | K                              | K               | P               |                 | M                              | M               |                                | X  | X   | X   | M                              | P   |
|                | 0.22        | J                              | J               | J               | J               | P               | Z   |                 | K                              | K               | P               |                 | M                              | M               |                                | X  | X   | X   | M                              | P   |
|                | 0.33        | J                              | J               | J               | J               | Q               |     |                 | K                              | M               | X               |                 | M                              | M               |                                | X  | X   | X   | M                              | P   |
|                | 0.47        | M                              | M               | M               | M               | Q               |     |                 | K                              | P               |                 |                 | M                              | M               |                                | X  | X   | X   | M                              | P   |
|                | 0.68        | M                              | M               | P               | X               | X               |     |                 | M                              | Q               |                 |                 | M                              | P               |                                | X  | X   |     | M                              | P   |
|                | 1.0         | N                              | N               | P               | X               | Z               |     |                 | M                              | X               |                 |                 | M                              | P               |                                | X  | X   |     | M                              | P   |
|                | 1.5         | N                              | N               | Z               | Z               | Z               |     |                 | Z                              | Z               |                 |                 | M                              |                 |                                | X  | X   |     | M                              | X   |
|                | 2.2         | X                              | X               | Z               | Z               | Z               |     |                 | Z                              | Z               |                 |                 |                                |                 |                                | X  | X   |     | M                              |     |
|                | 3.3         | X                              | X               | Z               | Z               |                 |     |                 | Z                              |                 |                 |                 |                                |                 |                                | X  | Z   |     |                                |     |
|                | 4.7         | X                              | X               | Z               | Z               |                 |     |                 | Z                              |                 |                 |                 |                                |                 |                                | X  | Z   |     |                                |     |
|                | 10          | Z                              | Z               | Z               | Z               |                 |     |                 |                                |                 |                 |                 |                                |                 |                                | Z  | Z   |     |                                |     |
|                | 22          | Z                              | Z               |                 |                 |                 |     |                 |                                |                 |                 |                 |                                |                 | Z                              |    |     |     |                                |     |
|                | 47          |                                |                 |                 |                 |                 |     |                 |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
|                | 100         |                                |                 |                 |                 |                 |     |                 |                                |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |
| WVDC           |             | 10                             | 16              | 25              | 50              | 100             | 200 | 500             | 50                             | 100             | 200             | 500             | 50                             | 100             | 25                             | 50 | 100 | 200 | 50                             | 100 |
| SIZE           |             | LD10                           |                 |                 |                 |                 |     |                 | LD12                           |                 |                 |                 | LD13                           |                 | LD20                           |    |     |     | LD14                           |     |
| Letter         |             | A                              | C               | E               | G               | J               |     | K               | M                              | N               | P               | Q               | X                              | Y               | Z                              |    |     |     |                                |     |
| Max. Thickness |             | 0.33<br>(0.013)                | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.90<br>(0.035) | 0.94<br>(0.037) |     | 1.02<br>(0.040) | 1.27<br>(0.050)                | 1.40<br>(0.055) | 1.52<br>(0.060) | 1.78<br>(0.070) | 2.29<br>(0.090)                | 2.54<br>(0.100) | 2.79<br>(0.110)                |    |     |     |                                |     |
|                |             | PAPER                          |                 |                 |                 |                 |     |                 | EMBOSSED                       |                 |                 |                 |                                |                 |                                |    |     |     |                                |     |



# MLCC Tin/Lead Termination “B”

## X5R – General Specifications



AVX Corporation will support those customers for commercial and military Multilayer Ceramic Capacitors with a termination consisting of 5% minimum lead. This termination is indicated by the use of a “B” in the 12th position of the AVX Catalog Part Number. This fulfills AVX’s commitment to providing a full range of products to our customers. AVX has provided in the following pages a full range of values that we are currently offering in this special “B” termination. Please contact the factory if you require additional information on our MLCC Tin/Lead Termination “B” products.

Not RoHS Compliant

### PART NUMBER (SEE PAGE 4 FOR COMPLETE PART NUMBER EXPLANATION)

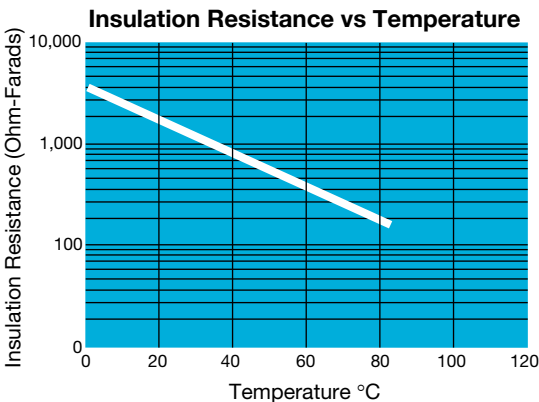
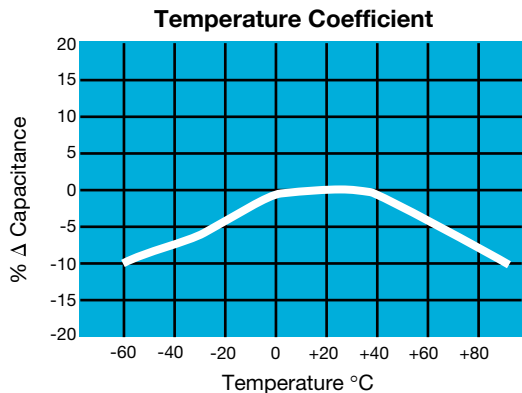
| LD05                                                                                                                                                | 5                                                                                                   | D          | 101                             | J                                                                                                                                           | A                  | B                                                                      | 2                                                                        | A                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------|
| Size                                                                                                                                                | Voltage                                                                                             | Dielectric | Capacitance Code (In pF)        | Capacitance Tolerance                                                                                                                       | Failure Rate       | Terminations                                                           | Packaging                                                                | Special Code     |
| LD02 - 0402<br>LD03 - 0603<br>LD04 - 0504*<br>LD05 - 0805<br>LD06 - 1206<br>LD10 - 1210<br>LD12 - 1812<br>LD13 - 1825<br>LD14 - 2225<br>LD20 - 2220 | 6.3V = 6<br>10V = Z<br>16V = Y<br>25V = 3<br>35V = D<br>50V = 5<br>100V = 1<br>200V = 2<br>500V = 7 | X5R = D    | 2 Sig. Digits + Number of Zeros | B = ±10 pF (<10pF)<br>C = ±25 pF (<10pF)<br>D = ±50 pF (<10pF)<br>F = ±1% (≥ 10 pF)<br>G = ±2% (≥ 10 pF)<br>J = ±5%<br>K = ±10%<br>M = ±20% | A = Not Applicable | B = 5% min lead<br>X = FLEXITERM® with 5% min lead**<br><br>**X7R only | 2 = 7" Reel<br>4 = 13" Reel<br><br><b>Contact Factory For Multiples*</b> | A = Std. Product |

\*LD04 has the same CV ranges as LD03.

See FLEXITERM® section for CV options

NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.  
Contact factory for non-specified capacitance values.

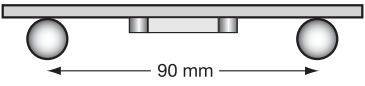
### TYPICAL ELECTRICAL CHARACTERISTICS



# MLCC Tin/Lead Termination "B"

## X5R – Specifications and Test Methods



| Parameter/Test                       |                       | X5R Specification Limits                                                                                                                                       | Measuring Conditions                                                                                                                                                                                                                                                                                                                          |                    |
|--------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Operating Temperature Range          |                       | -55°C to +85°C                                                                                                                                                 | Temperature Cycle Chamber                                                                                                                                                                                                                                                                                                                     |                    |
| Capacitance                          |                       | Within specified tolerance                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                               |                    |
| Dissipation Factor                   |                       | $\leq 2.5\%$ for $\geq 50V$ DC rating<br>$\leq 3.0\%$ for 25V, 35V DC rating<br>$\leq 12.5\%$ Max. for 16V DC rating and lower Contact<br>Factory for DF by PN | Freq.: 1.0 kHz $\pm 10\%$<br>Voltage: 1.0Vrms $\pm .2V$<br>For Cap > 10 $\mu F$ , 0.5Vrms @ 120Hz                                                                                                                                                                                                                                             |                    |
| Insulation Resistance                |                       | 10,000M $\Omega$ or 500M $\Omega$ - $\mu F$ ,<br>whichever is less                                                                                             | Charge device with rated voltage for<br>120 $\pm 5$ secs @ room temp/humidity                                                                                                                                                                                                                                                                 |                    |
| Dielectric Strength                  |                       | No breakdown or visual defects                                                                                                                                 | Charge device with 250% of rated voltage for<br>1-5 seconds, w/charge and discharge current<br>limited to 50 mA (max)                                                                                                                                                                                                                         |                    |
| Resistance to<br>Flexure<br>Stresses | Appearance            | No defects                                                                                                                                                     | Deflection: 2mm<br>Test Time: 30 seconds<br>                                                                                                                                                                                                               |                    |
|                                      | Capacitance Variation | $\leq \pm 12\%$                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                               |                    |
|                                      | Dissipation Factor    | Meets Initial Values (As Above)                                                                                                                                |                                                                                                                                                                                                                                                                                                                                               |                    |
|                                      | Insulation Resistance | $\geq$ Initial Value x 0.3                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                               |                    |
| Solderability                        |                       | $\geq 95\%$ of each terminal should be covered<br>with fresh solder                                                                                            | Dip device in eutectic solder at 230 $\pm 5^\circ C$<br>for 5.0 $\pm 0.5$ seconds                                                                                                                                                                                                                                                             |                    |
| Resistance to<br>Solder Heat         | Appearance            | No defects, <25% leaching of either end terminal                                                                                                               | Dip device in eutectic solder at 260°C for 60<br>seconds. Store at room temperature for 24 $\pm 2$<br>hours before measuring electrical properties.                                                                                                                                                                                           |                    |
|                                      | Capacitance Variation | $\leq \pm 7.5\%$                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                               |                    |
|                                      | Dissipation Factor    | Meets Initial Values (As Above)                                                                                                                                |                                                                                                                                                                                                                                                                                                                                               |                    |
|                                      | Insulation Resistance | Meets Initial Values (As Above)                                                                                                                                |                                                                                                                                                                                                                                                                                                                                               |                    |
|                                      | Dielectric Strength   | Meets Initial Values (As Above)                                                                                                                                |                                                                                                                                                                                                                                                                                                                                               |                    |
| Thermal Shock                        | Appearance            | No visual defects                                                                                                                                              | Step 1: -55°C $\pm 2^\circ$                                                                                                                                                                                                                                                                                                                   | 30 $\pm 3$ minutes |
|                                      | Capacitance Variation | $\leq \pm 7.5\%$                                                                                                                                               | Step 2: Room Temp                                                                                                                                                                                                                                                                                                                             | $\leq 3$ minutes   |
|                                      | Dissipation Factor    | Meets Initial Values (As Above)                                                                                                                                | Step 3: +85°C $\pm 2^\circ$                                                                                                                                                                                                                                                                                                                   | 30 $\pm 3$ minutes |
|                                      | Insulation Resistance | Meets Initial Values (As Above)                                                                                                                                | Step 4: Room Temp                                                                                                                                                                                                                                                                                                                             | $\leq 3$ minutes   |
|                                      | Dielectric Strength   | Meets Initial Values (As Above)                                                                                                                                | Repeat for 5 cycles and measure after<br>24 $\pm 2$ hours at room temperature                                                                                                                                                                                                                                                                 |                    |
| Load Life                            | Appearance            | No visual defects                                                                                                                                              | Charge device with 1.5X rated voltage in test<br>chamber set at 85°C $\pm 2^\circ C$ for 1000 hours<br>(+48, -0). Note: Contact factory for *optional<br>specification part numbers that are tested at<br>$< 1.5X$ rated voltage.<br><br>Remove from test chamber and stabilize at room<br>temperature for 24 $\pm 2$ hours before measuring. |                    |
|                                      | Capacitance Variation | $\leq \pm 12.5\%$                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                               |                    |
|                                      | Dissipation Factor    | $\leq$ Initial Value x 2.0 (See Above)                                                                                                                         |                                                                                                                                                                                                                                                                                                                                               |                    |
|                                      | Insulation Resistance | $\geq$ Initial Value x 0.3 (See Above)                                                                                                                         |                                                                                                                                                                                                                                                                                                                                               |                    |
|                                      | Dielectric Strength   | Meets Initial Values (As Above)                                                                                                                                |                                                                                                                                                                                                                                                                                                                                               |                    |
| Load<br>Humidity                     | Appearance            | No visual defects                                                                                                                                              | Store in a test chamber set at 85°C $\pm 2^\circ C$ / 85% $\pm$<br>5% relative humidity for 1000 hours<br>(+48, -0) with rated voltage applied.<br><br>Remove from chamber and stabilize at room<br>temperature and humidity for<br>24 $\pm 2$ hours before measuring.                                                                        |                    |
|                                      | Capacitance Variation | $\leq \pm 12.5\%$                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                               |                    |
|                                      | Dissipation Factor    | $\leq$ Initial Value x 2.0 (See Above)                                                                                                                         |                                                                                                                                                                                                                                                                                                                                               |                    |
|                                      | Insulation Resistance | $\geq$ Initial Value x 0.3 (See Above)                                                                                                                         |                                                                                                                                                                                                                                                                                                                                               |                    |
|                                      | Dielectric Strength   | Meets Initial Values (As Above)                                                                                                                                |                                                                                                                                                                                                                                                                                                                                               |                    |

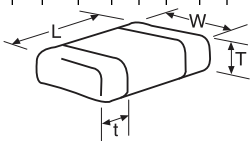
MLCC Tin/Lead Termination “B”

X5R – Capacitance Range



PREFERRED SIZES ARE SHADED

| SIZE         |       | LD02            |     |    |    |    | LD03            |   |     |    |    | LD05            |    |    |     |    | LD06            |    |    |    |     | LD10            |    |    |    |    | LD12 |     |    |    |    |    |    |     |    |    |    |
|--------------|-------|-----------------|-----|----|----|----|-----------------|---|-----|----|----|-----------------|----|----|-----|----|-----------------|----|----|----|-----|-----------------|----|----|----|----|------|-----|----|----|----|----|----|-----|----|----|----|
| Soldering    |       | Reflow/Wave     |     |    |    |    | Reflow/Wave     |   |     |    |    | Reflow/Wave     |    |    |     |    | Reflow/Wave     |    |    |    |     | Reflow/Wave     |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
| Packaging    |       | All Paper       |     |    |    |    | All Paper       |   |     |    |    | Paper/Embossed  |    |    |     |    | Paper/Embossed  |    |    |    |     | Paper/Embossed  |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
| (L) Length   | mm    | 1.00 ± 0.10     |     |    |    |    | 1.60 ± 0.15     |   |     |    |    | 2.01 ± 0.20     |    |    |     |    | 3.20 ± 0.20     |    |    |    |     | 3.20 ± 0.20     |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | (in.) | (0.040 ± 0.004) |     |    |    |    | (0.063 ± 0.006) |   |     |    |    | (0.079 ± 0.008) |    |    |     |    | (0.126 ± 0.008) |    |    |    |     | (0.126 ± 0.008) |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
| (W) Width    | mm    | 0.50 ± 0.10     |     |    |    |    | 0.81 ± 0.15     |   |     |    |    | 1.25 ± 0.20     |    |    |     |    | 1.60 ± 0.20     |    |    |    |     | 2.50 ± 0.20     |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | (in.) | (0.020 ± 0.004) |     |    |    |    | (0.032 ± 0.006) |   |     |    |    | (0.049 ± 0.008) |    |    |     |    | (0.063 ± 0.008) |    |    |    |     | (0.098 ± 0.008) |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
| (t) Terminal | mm    | 0.25 ± 0.15     |     |    |    |    | 0.35 ± 0.15     |   |     |    |    | 0.50 ± 0.25     |    |    |     |    | 0.50 ± 0.25     |    |    |    |     | 0.50 ± 0.25     |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | (in.) | (0.010 ± 0.006) |     |    |    |    | (0.014 ± 0.006) |   |     |    |    | (0.020 ± 0.010) |    |    |     |    | (0.020 ± 0.010) |    |    |    |     | (0.020 ± 0.010) |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
| WVDC         |       | 4               | 6.3 | 10 | 16 | 25 | 50              | 4 | 6.3 | 10 | 16 | 25              | 35 | 50 | 6.3 | 10 | 16              | 25 | 35 | 50 | 6.3 | 10              | 16 | 25 | 35 | 50 | 4    | 6.3 | 10 | 16 | 25 | 35 | 50 | 6.3 | 10 | 25 | 50 |
| Cap (pF)     | 100   |                 |     |    |    |    |                 |   |     |    |    |                 |    |    |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 150   |                 |     |    |    |    |                 |   |     |    |    |                 |    |    |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 220   |                 |     |    |    |    | C               |   |     |    |    |                 |    |    |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 330   |                 |     |    |    |    | C               |   |     |    |    |                 |    |    |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 470   |                 |     |    |    |    | C               |   |     |    |    |                 |    |    |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 680   |                 |     |    |    |    | C               |   |     |    |    |                 |    |    |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 1000  |                 |     |    |    |    | C               |   |     |    |    |                 |    |    |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 1500  |                 |     |    |    |    | C               |   |     |    |    |                 |    |    |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 2200  |                 |     |    |    |    | C               |   |     |    |    |                 |    |    |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 3300  |                 |     |    |    |    | C               |   |     |    |    |                 |    |    |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 4700  |                 |     |    |    |    | C               |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 6800  |                 |     |    |    |    | C               |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
| Cap (µF)     | 0.010 |                 |     |    |    |    | C               |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 0.015 |                 |     |    |    |    | C               |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 0.022 |                 |     |    |    |    | C               |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 0.033 |                 |     |    |    |    | C               |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 0.047 |                 |     |    |    |    | C               |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 0.068 |                 |     |    |    |    | C               |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 0.10  |                 |     |    |    |    | C               |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 0.15  |                 |     |    |    |    | C               |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 0.22  |                 |     |    |    |    | C*              |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 0.33  |                 |     |    |    |    | C*              |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 0.47  |                 |     |    |    |    | C*              |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 0.68  |                 |     |    |    |    | C*              |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 1.0   |                 |     |    |    |    | C*              |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 1.5   |                 |     |    |    |    | C*              |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 2.2   |                 |     |    |    |    | C*              |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 3.3   |                 |     |    |    |    | C*              |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |
|              | 4.7   |                 |     |    |    |    | C*              |   |     |    |    |                 |    | G  |     |    |                 |    |    |    |     |                 |    |    |    |    |      |     |    |    |    |    |    |     |    |    |    |



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

\*Optional Specifications – Contact factory

NOTE: Contact factory for non-specified capacitance values

# Mouser Electronics

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[LD023C332KAB2A](#) [LD063C225KAB2A](#) [LD061A1R0CAB2A](#) [LD101C274KAB2A](#) [LD061C103JAB2A](#)  
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