

# High Voltage MLC Chips FLEXITERM®



For 600V to 3000V Applications



High value, low leakage and small size are difficult parameters to obtain in capacitors for high voltage systems. AVX special high voltage MLC chips capacitors meet these performance characteristics and are designed for applications such as snubbers in high frequency power converters, resonators in SMPS, and high voltage coupling/DC blocking. These high voltage chip designs exhibit low ESRs at high frequencies.

To make high voltage chips, larger physical sizes than are normally encountered are necessary. These larger sizes require that special precautions be taken in applying these chips in surface mount assemblies. In response to this, and to follow from the success of the FLEXITERM® range of low voltage parts, AVX is delighted to offer a FLEXITERM® high voltage range of capacitors, FLEXITERM®.

The FLEXITERM® layer is designed to enhance the mechanical flexure and temperature cycling performance of a standard ceramic capacitor, giving customers a solution where board flexure or temperature cycle damage are concerns.

## HOW TO ORDER

| 1808                                                         | A                                                                              | C                       | 272                                                                                                     | K                                                                                                                                                 | A          | Z                                                              | 1                                                    | A                            |
|--------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------------------------|------------------------------------------------------|------------------------------|
| AVX Style                                                    | Voltage                                                                        | Temperature Coefficient | Capacitance Code<br>(2 significant digits + no. of zeros)<br>Examples:                                  | Capacitance Tolerance<br>C0G: J = $\pm 5\%$<br>K = $\pm 10\%$<br>M = $\pm 20\%$<br>X7R: K = $\pm 10\%$<br>M = $\pm 20\%$<br>Z = $+80\%$ , $-20\%$ | Test Level | Termination*<br>Z = FLEXITERM®<br>100% Tin<br>(RoHS Compliant) | Packaging<br>1 = 7" Reel<br>3 = 13" Reel<br>9 = Bulk | Special Code<br>A = Standard |
| 0805<br>1206<br>1210<br>1808<br>1812<br>1825<br>2220<br>2225 | 600V/630V = C<br>1000V = A<br>1500V = S<br>2000V = G<br>2500V = W<br>3000V = H | C0G = A<br>X7R = C      | 10 pF = 100<br>100 pF = 101<br>1,000 pF = 102<br>22,000 pF = 223<br>220,000 pF = 224<br>1 $\mu$ F = 105 |                                                                                                                                                   |            |                                                                |                                                      |                              |
| ***                                                          |                                                                                |                         |                                                                                                         |                                                                                                                                                   |            |                                                                |                                                      |                              |

Notes: Capacitors with X7R dielectrics are not intended for applications across AC supply mains or AC line filtering with polarity reversal. Contact plant for recommendations. Contact factory for availability of Termination and Tolerance options for Specific Part Numbers.

\*\*\* AVX offers nonstandard chip sizes. Contact factory for details.



## DIMENSIONS

millimeters (inches)

| SIZE                      | 0805                                   | 1206                                   | 1210*                                  | 1808*                                  | 1812*                                  | 1825*                                  | 2220*                                 | 2225*                                  |
|---------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|---------------------------------------|----------------------------------------|
| (L) Length                | 2.01 $\pm$ 0.20<br>(0.079 $\pm$ 0.008) | 3.20 $\pm$ 0.20<br>(0.126 $\pm$ 0.008) | 3.20 $\pm$ 0.20<br>(0.126 $\pm$ 0.008) | 4.57 $\pm$ 0.25<br>(0.180 $\pm$ 0.010) | 4.50 $\pm$ 0.30<br>(0.177 $\pm$ 0.012) | 4.50 $\pm$ 0.30<br>(0.177 $\pm$ 0.012) | 5.7 $\pm$ 0.40<br>(0.224 $\pm$ 0.016) | 5.72 $\pm$ 0.25<br>(0.225 $\pm$ 0.010) |
| (W) Width                 | 1.25 $\pm$ 0.20<br>(0.049 $\pm$ 0.008) | 1.60 $\pm$ 0.20<br>(0.063 $\pm$ 0.008) | 2.50 $\pm$ 0.20<br>(0.098 $\pm$ 0.008) | 2.03 $\pm$ 0.25<br>(0.080 $\pm$ 0.010) | 3.20 $\pm$ 0.20<br>(0.126 $\pm$ 0.008) | 6.40 $\pm$ 0.30<br>(0.252 $\pm$ 0.012) | 5.0 $\pm$ 0.40<br>(0.197 $\pm$ 0.016) | 6.35 $\pm$ 0.25<br>(0.250 $\pm$ 0.010) |
| (T) Thickness<br>Max.     | 1.30<br>(0.051)                        | 1.52<br>(0.060)                        | 1.70<br>(0.067)                        | 2.03<br>(0.080)                        | 2.54<br>(0.100)                        | 2.54<br>(0.100)                        | 3.30<br>(0.130)                       | 2.54<br>(0.100)                        |
| (t) terminal min.<br>max. | 0.50 $\pm$ 0.25<br>(0.020 $\pm$ 0.010) | 0.25 (0.010)<br>0.75 (0.030)           | 0.25 (0.010)<br>0.75 (0.030)           | 0.25 (0.010)<br>1.02 (0.040)           | 0.25 (0.010)<br>1.02 (0.040)           | 0.25 (0.010)<br>1.02 (0.040)           | 0.25 (0.010)<br>1.02 (0.040)          | 0.25 (0.010)<br>1.02 (0.040)           |

\*Reflow Soldering Only



# High Voltage MLC Chips FLEXITERM®



## For 600V to 5000V Applications

### C0G Dielectric

#### Performance Characteristics

|                                                   |                                                                                            |
|---------------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>Capacitance Range</b>                          | 10 pF to 0.018 $\mu$ F<br>(25°C, 1.0 $\pm$ 0.2 Vrms at 1kHz, for $\leq$ 1000 pF use 1 MHz) |
| <b>Capacitance Tolerances</b>                     | $\pm$ 5%, $\pm$ 10%, $\pm$ 20%                                                             |
| <b>Dissipation Factor</b>                         | 0.1% max. (+25°C, 1.0 $\pm$ 0.2 Vrms, 1kHz, for $\leq$ 1000 pF use 1 MHz)                  |
| <b>Operating Temperature Range</b>                | -55°C to +125°C                                                                            |
| <b>Temperature Characteristic</b>                 | 0 $\pm$ 30 ppm/°C (0 VDC)                                                                  |
| <b>Voltage Ratings</b>                            | 600, 630, 1000, 1500, 2000, 2500, 3000, 4000 & 5000 VDC (+125°C)                           |
| <b>Insulation Resistance</b> (+25°C, at 500 VDC)  | 100K M $\Omega$ min. or 1000 M $\Omega$ - $\mu$ F min., whichever is less                  |
| <b>Insulation Resistance</b> (+125°C, at 500 VDC) | 10K M $\Omega$ min. or 100 M $\Omega$ - $\mu$ F min., whichever is less                    |
| <b>Dielectric Strength</b>                        | Minimum 120% rated voltage for 5 seconds at 50 mA max. current                             |

### HIGH VOLTAGE C0G CAPACITANCE VALUES

| VOLTAGE              | 0805          | 1206             | 1210              | 1808              | 1812              | 1825                     | 2220                     | 2225                     |
|----------------------|---------------|------------------|-------------------|-------------------|-------------------|--------------------------|--------------------------|--------------------------|
| 600/630 min.<br>max. | 10pF<br>330pF | 10 pF<br>1200 pF | 100 pF<br>2700 pF | 100 pF<br>3300 pF | 100 pF<br>5600 pF | 1000 pF<br>0.012 $\mu$ F | 1000 pF<br>0.012 $\mu$ F | 1000 pF<br>0.018 $\mu$ F |
| 1000 min.<br>max.    | 10pF<br>180pF | 10 pF<br>560 pF  | 10 pF<br>1500 pF  | 100 pF<br>2200 pF | 100 pF<br>3300 pF | 100 pF<br>8200 pF        | 1000 pF<br>0.010 $\mu$ F | 1000 pF<br>0.010 $\mu$ F |
| 1500 min.<br>max.    | —<br>—        | 10 pF<br>270 pF  | 10 pF<br>680 pF   | 10 pF<br>820 pF   | 10 pF<br>1800 pF  | 100 pF<br>4700 pF        | 100 pF<br>4700 pF        | 100 pF<br>5600 pF        |
| 2000 min.<br>max.    | —<br>—        | 10 pF<br>120 pF  | 10 pF<br>270 pF   | 10 pF<br>330 pF   | 10 pF<br>1000 pF  | 100 pF<br>1800 pF        | 100 pF<br>2200 pF        | 100 pF<br>2700 pF        |
| 2500 min.<br>max.    | —<br>—        | —<br>—           | —<br>—            | 10 pF<br>180 pF   | 10 pF<br>470 pF   | 10 pF<br>1200 pF         | 100 pF<br>1500 pF        | 100 pF<br>1800 pF        |
| 3000 min.<br>max.    | —<br>—        | —<br>—           | —<br>—            | 10 pF<br>120 pF   | 10 pF<br>330 pF   | 10 pF<br>820 pF          | 10 pF<br>1000 pF         | 10 pF<br>1200 pF         |
| 4000 min.<br>max.    | —<br>—        | —<br>—           | —<br>—            | 10 pF<br>47 pF    | 10 pF<br>150 pF   | 10 pF<br>330 pF          | 10 pF<br>470 pF          | 10 pF<br>560 pF          |
| 5000 min.<br>max.    | —<br>—        | —<br>—           | —<br>—            | —<br>—            | —<br>—            | —<br>—                   | 10 pF<br>220 pF          | 10 pF<br>270 pF          |

### X7R Dielectric

#### Performance Characteristics

|                                                   |                                                                           |
|---------------------------------------------------|---------------------------------------------------------------------------|
| <b>Capacitance Range</b>                          | 10 pF to 0.33 $\mu$ F (25°C, 1.0 $\pm$ 0.2 Vrms at 1kHz)                  |
| <b>Capacitance Tolerances</b>                     | $\pm$ 10%; $\pm$ 20%; +80%, -20%                                          |
| <b>Dissipation Factor</b>                         | 2.5% max. (+25°C, 1.0 $\pm$ 0.2 Vrms, 1kHz)                               |
| <b>Operating Temperature Range</b>                | -55°C to +125°C                                                           |
| <b>Temperature Characteristic</b>                 | $\pm$ 15% (0 VDC)                                                         |
| <b>Voltage Ratings</b>                            | 600, 630, 1000, 1500, 2000, 2500, 3000, 4000 & 5000 VDC (+125°C)          |
| <b>Insulation Resistance</b> (+25°C, at 500 VDC)  | 100K M $\Omega$ min. or 1000 M $\Omega$ - $\mu$ F min., whichever is less |
| <b>Insulation Resistance</b> (+125°C, at 500 VDC) | 10K M $\Omega$ min. or 100 M $\Omega$ - $\mu$ F min., whichever is less   |
| <b>Dielectric Strength</b>                        | Minimum 120% rated voltage for 5 seconds at 50 mA max. current            |

### HIGH VOLTAGE X7R MAXIMUM CAPACITANCE VALUES

| VOLTAGE              | 0805            | 1206                     | 1210                     | 1808                     | 1812                     | 1825                           | 2220                           | 2225                           |
|----------------------|-----------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------------|--------------------------------|--------------------------------|
| 600/630 min.<br>max. | 100pF<br>6800pF | 1000 pF<br>0.022 $\mu$ F | 1000 pF<br>0.056 $\mu$ F | 1000 pF<br>0.068 $\mu$ F | 1000 pF<br>0.120 $\mu$ F | 0.010 $\mu$ F<br>0.270 $\mu$ F | 0.010 $\mu$ F<br>0.270 $\mu$ F | 0.010 $\mu$ F<br>0.330 $\mu$ F |
| 1000 min.<br>max.    | 100pF<br>1500pF | 100 pF<br>6800 pF        | 1000 pF<br>0.015 $\mu$ F | 1000 pF<br>0.018 $\mu$ F | 1000 pF<br>0.039 $\mu$ F | 1000 pF<br>0.100 $\mu$ F       | 1000 pF<br>0.120 $\mu$ F       | 1000 pF<br>0.150 $\mu$ F       |
| 1500 min.<br>max.    | —<br>—          | 100 pF<br>2700 pF        | 100 pF<br>5600 pF        | 100 pF<br>6800 pF        | 100 pF<br>0.015 $\mu$ F  | 1000 pF<br>0.056 $\mu$ F       | 1000 pF<br>0.056 $\mu$ F       | 1000 pF<br>0.068 $\mu$ F       |
| 2000 min.<br>max.    | —<br>—          | 10 pF<br>1500 pF         | 100 pF<br>3300 pF        | 100 pF<br>2300 pF        | 100 pF<br>8200 pF        | 100 pF<br>0.022 $\mu$ F        | 1000 pF<br>0.027 $\mu$ F       | 1000 pF<br>0.033 $\mu$ F       |
| 2500 min.<br>max.    | —<br>—          | —<br>—                   | —<br>—                   | 10 pF<br>2200 pF         | 10 pF<br>5600 pF         | 100 pF<br>0.015 $\mu$ F        | 100 pF<br>0.018 $\mu$ F        | 100 pF<br>0.022 $\mu$ F        |
| 3000 min.<br>max.    | —<br>—          | —<br>—                   | —<br>—                   | 10 pF<br>1800 pF         | 10 pF<br>2200 pF         | 100 pF<br>0.010 pF             | 100 pF<br>0.012 $\mu$ F        | 100 pF<br>0.015 $\mu$ F        |

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