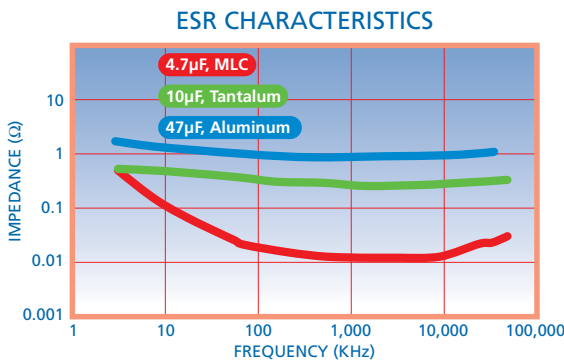
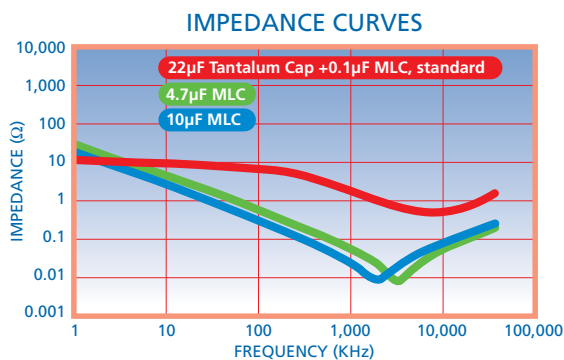


# High Capacitance Chip X7R & X5R

A range of High Capacitance value BME MLC chip capacitors, in stable Class II dielectrics X7R & X5R, with a spread of capacitance values offered up to 100 $\mu$ F. Comparable circuit designs can be achieved at typically a third to a fifth of the capacitance values because of the low ESR characteristics these parts exhibit. As a consequence they are also ideal to replace Tantalum and Low ESR Electrolytic Capacitors without polarity concerns. They find application as power supply bypass capacitors, smoothing capacitors, input/output filters in DC-DC Converters and in digital circuits and LCD modules. Parts are RoHS Compliant and suitable for reflow soldering process.

## Comparison with other dielectric capacitors



## Dimensions and Tolerances - inches/mm

| Size |              | L                                    | W                                    | MB                                   |
|------|--------------|--------------------------------------|--------------------------------------|--------------------------------------|
| 0402 | inches<br>mm | 0.040 $\pm$ 0.004<br>1.02 $\pm$ 0.10 | 0.020 $\pm$ 0.004<br>0.51 $\pm$ 0.10 | 0.010 $\pm$ 0.004<br>0.25 $\pm$ 0.10 |
| 0603 | inches<br>mm | 0.063 $\pm$ 0.006<br>1.60 $\pm$ 0.15 | 0.032 $\pm$ 0.006<br>0.81 $\pm$ 0.15 | 0.014 $\pm$ 0.010<br>0.36 $\pm$ 0.25 |
| 0805 | inches<br>mm | 0.080 $\pm$ 0.008<br>2.00 $\pm$ 0.20 | 0.050 $\pm$ 0.008<br>1.30 $\pm$ 0.20 | 0.020 $\pm$ 0.010<br>0.51 $\pm$ 0.25 |
| 1206 | inches<br>mm | 0.126 $\pm$ 0.008<br>3.20 $\pm$ 0.20 | 0.063 $\pm$ 0.008<br>1.60 $\pm$ 0.20 | 0.020 $\pm$ 0.010<br>0.51 $\pm$ 0.30 |
| 1210 | inches<br>mm | 0.126 $\pm$ 0.012<br>3.20 $\pm$ 0.31 | 0.100 $\pm$ 0.012<br>2.50 $\pm$ 0.31 | 0.024 $\pm$ 0.012<br>0.61 $\pm$ 0.31 |
| 1812 | inches<br>mm | 0.180 $\pm$ 0.016<br>4.60 $\pm$ 0.41 | 0.125 $\pm$ 0.012<br>3.20 $\pm$ 0.31 | 0.035 $\pm$ 0.020<br>0.90 $\pm$ 0.51 |

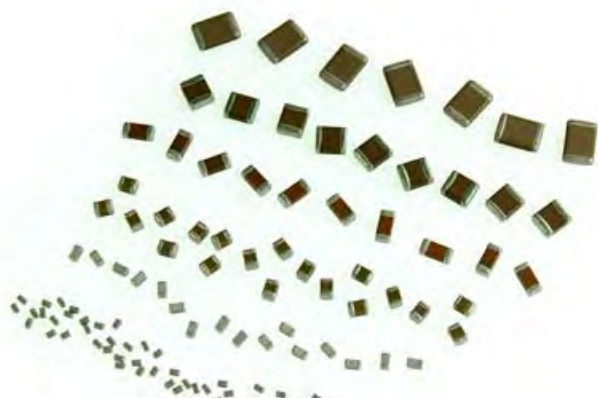
| Dielectric Characteristics       | X7R (BB) Stable  | X5R (BW) Stable  |
|----------------------------------|--|--|
| Operating temperature range:     | -55°C to 125°C   | -55°C to 85°C  |
| Temperature coefficient:         | $\pm$ 15% $\Delta$ C Max.  | $\pm$ 15% $\Delta$ C Max.  |
| Dissipation factor:              | 3.5% max except:<br>0402 $\geq$ 0.1 $\mu$ F = 5%,<br>0603 $\geq$ 0.22 $\mu$ F = 10%,<br>0805 $\geq$ 1.0 $\mu$ F = 5%,<br>0805 $\geq$ 2.2 $\mu$ F = 10%,<br>1206 $\geq$ 2.2 $\mu$ F = 10%,<br>1210 $\geq$ 4.7 $\mu$ F = 5%,<br>1210 $\geq$ 22 $\mu$ F = 10% | 5% max except:<br>0402 $\geq$ 1.0 $\mu$ F = 10%,<br>0603 $\geq$ 1.0 $\mu$ F = 10%,<br>0805 $\geq$ 4.7 $\mu$ F = 10%,<br>1206 $\geq$ 4.7 $\mu$ F = 10%,<br>1210 $\geq$ 10 $\mu$ F = 10% |
| Insulation resistance @25°C:     | >10G $\Omega$ or >100 $\Omega$ F whichever is less   | >10G $\Omega$ or >100 $\Omega$ F whichever is less   |
| Dielectric withstanding voltage: | 250%   | 250%   |
| Aging Rate:                      | X7R 3.5% typical   | X5R 5% typical   |
| Test parameters @ 25°C:          | 1KHz, 1.0 $\pm$ 0.2 VRMS   | 1KHz, 1.0 $\pm$ 0.2 VRMS<br>120Hz, 0.5 $\pm$ 0.1 VRMS for 22 $\mu$ F, 47 $\mu$ F & 100 $\mu$ F   |

## How to Order - High Capacitance Chip Capacitors

| 1206                     | W   | 476   | K  | 6R3   | N  | X080  | T   |
|--------------------------|---|---|--|---|--|---|---|
| <b>SIZE</b><br>See Chart | <b>DIELECTRIC</b><br>BB* = X7R<br>BW* = X5R | <b>CAPACITANCE</b><br>Value in Picofarads.<br>Two significant figures, followed by number of zeros:<br>476 = 47 $\mu$ F<br>(47,000,000pF) | <b>TOLERANCE</b><br>K = $\pm$ 10%<br>M = $\pm$ 20% | <b>VOLTAGE-VDCW</b><br>Two significant figures, followed by number of zeros. R denotes decimal point:<br>6R3 = 6.3V<br>501 = 500V | <b>TERMINATION</b><br>N = Nickel Barrier (100%tin)<br>Y = Nickel Barrier (90%tin 10% lead)<br>NG = Nickel Barrier Gold Flash | <b>THICKNESS OPTION</b><br>Blank = Standard thickness<br>X = special thickness, specified in inches:<br>X085 = 0.085" | <b>PACKING</b><br>No suffix = Bulk<br>T = Tape & Reel |
|                          | * Formally B & W codes                      |   |  |   |  |   |   |

**Note:** BME parts available with added high reliability test. Consult factory.

# High Capacitance Chip X7R & X5R



- For dielectric characteristics see page 44.
- Nickel Barrier terminations with tin, tin/lead or gold flash
- Capacitance tolerances available:  $\pm 10\%$ ,  $\pm 20\%$
- Available with high reliability screening. Contact sales office for details

**Note:** Capacitance values are shown below as 3 digit code:  
2 significant figures followed by the no. of zeros  
e.g. 183 = 18,000pF.

## Capacitance values

| Size                | 0402                            |                     | 0603          |                          | 0805                     |                   | 1206                     |             | 1210           |              |                |              | 1812           |     |
|---------------------|---------------------------------|---------------------|---------------|--------------------------|--------------------------|-------------------|--------------------------|-------------|----------------|--------------|----------------|--------------|----------------|-----|
| Tmax inches:<br>mm: | 0.024<br>0.61                   |                     | 0.035<br>0.89 |                          | 0.054<br>1.37            |                   | 0.072*<br>1.83           |             | 0.085*<br>2.16 |              | 0.110*<br>2.79 |              | 0.110*<br>2.79 |     |
| Dielectric          | X7R                             | X5R                 | X7R           | X5R                      | X7R                      | X5R               | X7R                      | X5R         | X7R            | X5R          | X7R            | X5R          | X7R            | X5R |
| 4V                  |                                 |                     |               | 226†                     |                          |                   |                          | 107†        |                |              |                |              |                | -   |
| 6.3V                | 224                             | 105<br>225†<br>475† |               | 475<br>106†              |                          | 226†              |                          | 476†        |                | 476†         | 476†           | 107†         |                | -   |
| 10V                 |                                 | 474                 | 225           | 475<br>106†              | 106†                     | 106               | 226†                     | 226†        |                | 226†         |                | 476†         |                | -   |
| 16V                 | 153<br>223<br>333<br>473<br>104 | 224<br>474<br>105   | 105           | 225<br>475               | 474<br>105<br>225<br>475 | 475<br>106        | 106                      | 106<br>226† | 475†<br>106†   |              |                | 226†         |                | -   |
| 25V                 | 682<br>103<br>473               | 104<br>224          | 474<br>105    | 224<br>474<br>105<br>225 | 105<br>225<br>475        | 225<br>475        | 225<br>475<br>106        | 475<br>106  | 335†<br>475†   | 475†<br>106† | 226†           |              |                | -   |
| 35V                 |                                 |                     |               |                          |                          |                   |                          |             |                | 225†<br>475† |                |              |                | -   |
| 50V                 | 103                             | 104                 | 224<br>474    | 104<br>474<br>105        | 224<br>474<br>105        | 224<br>474<br>105 | 474<br>105<br>225<br>475 | 475         | 105            |              | 475†           | 475†<br>106† |                | -   |
| 100V                |                                 |                     | 104           |                          | 224                      |                   | 105                      |             | 105<br>225     |              |                |              | 105<br>225     | -   |

\* Denotes non standard chip thickness. Order code needs to have an 'X' inserted together with the dimension in inches -e.g. X072 where dimension is 0.072".

† Denotes only available in  $\pm 20\%$  capacitance tolerance

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