Surface Mount Multilayer Ceramic Chip Capacitors  
DSCC Qualified Type 03029

FEATURES
• US defense supply center approved
• Federal stock control number, CAGE CODE 2770A
• Small case size (0402)
• Stable BP, BR and BX dielectrics
• Excellent aging characteristics
• Lead (Pb)-free termination code “M”
• Tin / lead termination code “Z” and “U”
• Wet build process
• Reliable Noble Metal Electrode (NME) system
• Made with a combination of design, materials and tight process control to achieve very high field reliability
• Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Note
* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

APPLICATIONS
• Broadband wireless communication
• Satellite communication
• WiFi (802.11) and WiMax (802.16)
• Subscriber based wireless devices
• Microwave systems

ELECTRICAL SPECIFICATIONS

Note
• Electrical characteristics at +25 °C unless otherwise specified

Operating Temperature: -55 °C to +125 °C

 Capacitance Range:
BP: 1.0 pF to 180 pF
BR: 100 pF to 10 nF
BX: 100 pF to 8.2 nF

Voltage Range: 6.3 VDC to 100 VDC

Temperature Coefficient of Capacitance (TCC):
BP: 0 ppm/°C ± 30 ppm/°C from -55 °C to +125 °C with zero (0) VDC applied
BR: ± 15 % from -55 °C to +125 °C with 100 % rated VDC applied
BX: ± 15 % from -55 °C to +125 °C with (0) VDC applied

Dissipation Factor (DF):
BP: 0.15 % max. at 1.0 VRMS and 1 MHz for values ≤ 1000 pF
0.15 % max. at 1.0 VRMS and 1 kHz for values > 1000 pF
BR, BX:
≤ 25 V: ± 3.5 % max. at 1.0 VRMS and 1 kHz
≥ 50 V: ± 2.5 % max. at 1.0 VRMS and 1 kHz

Aging Rate:
BP: 0 % maximum per decade
BR, BX: 1 % maximum per decade

Insulation Resistance (IR):
at +25 °C and rated voltage 100 000 MΩ minimum or 1000 Ω, whichever is less
at +125 °C and rated voltage 10 000 MΩ minimum or 100 Ω, whichever is less

Dielectric Strength Test:
performed per method 103 of EIA-198-2-E. 
Applied test voltages
≤ 200 VDC-rated: 250 % of rated voltage

For technical questions, contact: mlcc@vishay.com
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QUICK REFERENCE DATA

<table>
<thead>
<tr>
<th>DIELECTRIC</th>
<th>CASE</th>
<th>MAXIMUM VOLTAGE (V)</th>
<th>CAPACITANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP</td>
<td>0402</td>
<td>100</td>
<td>1.0 pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>180 pF</td>
</tr>
<tr>
<td>BR</td>
<td>0402</td>
<td>50</td>
<td>100 pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 nF</td>
</tr>
<tr>
<td>BX</td>
<td>0402</td>
<td>50</td>
<td>100 pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8.2 nF</td>
</tr>
</tbody>
</table>

Note
- Detail ratings see “Selection Chart”

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>DSCC NUMBER</th>
<th>DIELECTRIC</th>
<th>NOMINAL CODE</th>
<th>DC VOLTAGE RATING (1)</th>
<th>CAPACITANCE TOLERANCE</th>
<th>TERMINATION</th>
<th>GROUP C TESTING OPTION (2)</th>
<th>PACKAGING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BP</td>
<td>0402</td>
<td>W = 6.3 V</td>
<td>C = ± 0.25 pF</td>
<td>M = silver palladium</td>
<td>C = full group C</td>
<td>C = 7” reel / paper tape</td>
</tr>
<tr>
<td></td>
<td>BR</td>
<td>0402</td>
<td>X = 10 V</td>
<td>D = ± 0.5 pF</td>
<td>Z = Ni barrier with tin / lead plate min.</td>
<td>L = 2000 h life test only</td>
<td>O = 7” reel / flamed paper tape</td>
</tr>
<tr>
<td></td>
<td>BX</td>
<td>0402</td>
<td>Y = 16 V</td>
<td>F = ± 1 %</td>
<td>J = ± 10 %</td>
<td>M = 1000 h life test only</td>
<td>J = 7” reel (low quantity)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Z = 25 V</td>
<td>G = ± 2 %</td>
<td>K = ± 20 %</td>
<td>H = low voltage humidity test only</td>
<td>P = 11 1/4” / 13” reel / paper tape</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A = 50 V</td>
<td>J = ± 5 %</td>
<td>M = ± 20 %</td>
<td>- = no group C testing</td>
<td>I = 11 1/4” / 13” reel / flamed paper tape</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>B = 100 V</td>
<td>K = ± 10 %</td>
<td>U = Ni barrier solder coated</td>
<td>B = bulk</td>
<td>Note: “I” and “O” are used for “M” termination code</td>
</tr>
</tbody>
</table>

Note
- DC voltage rating should not be exceeded in application. Other application factors may affect the MLCC performance.
- Consult for questions: mlcc@vishay.com
- To receive data package, add “P” to the end of the part number. For example, 03029-BX102BJZCTP. Group C will be completed and data included with shipment.

DIMENSIONS in inches (millimeters)

<table>
<thead>
<tr>
<th>PART ORDERING NUMBER</th>
<th>LENGTH (L)</th>
<th>WIDTH (W)</th>
<th>MAXIMUM THICKNESS (T)</th>
<th>TERMINATION PAD (P)</th>
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<tbody>
<tr>
<td>03029-</td>
<td>0.040 ± 0.004</td>
<td>0.020 ± 0.004</td>
<td>0.024</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(1.02 ± 0.10)</td>
<td>(0.51 ± 0.10)</td>
<td>(0.61)</td>
<td>(0.10)</td>
</tr>
</tbody>
</table>

Note
- Metric equivalents are given for general information only
<table>
<thead>
<tr>
<th>DIELECTRIC</th>
<th>BP</th>
<th>BR</th>
<th>BX</th>
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<tbody>
<tr>
<td>STYLE 03029</td>
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</tr>
<tr>
<td>CASE CODE 0402</td>
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</tr>
</tbody>
</table>

**VOLTAGE (VDC)**
- 6.3
- 10
- 16
- 25
- 50
- 100
- W
- X
- Y
- Z
- A
- B

**VOLTAGE CODE**
- W
- X
- Y
- Z
- A

**CAP. CODE**
- 1R0 1.0 pF
- 1R2 1.2 pF
- 1R5 1.5 pF
- 1R8 1.8 pF
- 2R2 2.2 pF
- 2R4 2.4 pF
- 2R7 2.7 pF
- 3R0 3.0 pF
- 3R3 3.3 pF
- 3R6 3.6 pF
- 3R9 3.9 pF
- 4R7 4.7 pF
- 5R1 5.1 pF
- 5R6 5.6 pF
- 6R2 6.2 pF
- 6R8 6.8 pF
- 7R5 7.5 pF
- 8R2 8.2 pF
- 9R1 9.1 pF
- 100 10 pF
- 110 11 pF
- 120 12 pF
- 130 13 pF
- 150 15 pF
- 160 16 pF
- 180 18 pF
- 200 20 pF
- 220 22 pF
- 240 24 pF
- 270 27 pF
- 300 30 pF
- 330 33 pF
- 360 36 pF
- 390 39 pF
- 430 43 pF
- 470 47 pF
- 510 51 pF
- 560 56 pF
- 620 62 pF
- 680 68 pF
- 750 75 pF
- 820 82 pF
- 910 91 pF

**Notes**
- RoHS-compliant except when supplied with lead (Pb)-containing termination, code “Z”
- Not RoHS-compliant

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For technical questions, contact: mlcc@vishay.com

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### SELECTION CHART

<table>
<thead>
<tr>
<th>DIELECTRIC</th>
<th>BP</th>
<th>BR</th>
<th>BX</th>
</tr>
</thead>
<tbody>
<tr>
<td>STYLE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CASE CODE</td>
<td>03029</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOLTAGE (V_{dc})</td>
<td>6.3</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>VOLTAGE CODE</td>
<td>W</td>
<td>X</td>
<td>Y</td>
</tr>
<tr>
<td>CAP. CODE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Notes
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- Not RoHS-compliant

### DSCC PACKAGING QUANTITIES (1)

<table>
<thead>
<tr>
<th>CASE CODE</th>
<th>TAPE SIZE</th>
<th>7&quot; REEL QUANTITIES</th>
<th>11 1/4&quot; AND 13&quot; REEL QUANTITIES</th>
<th>BULK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PACKAGING CODE</td>
<td>PACKAGING CODE</td>
<td>PACKAGING CODE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“C”/”O”</td>
<td>“J”</td>
<td>“P”/”I”</td>
</tr>
<tr>
<td>0402</td>
<td>8 mm</td>
<td>5000</td>
<td>1000</td>
<td>10 000</td>
</tr>
</tbody>
</table>

#### Note
(1) Reference: EIA standard RS 481 - “Taping of Surface Mount Components for Automatic Placement”

### STORAGE AND HANDLING CONDITIONS

1. Store the components at 5 °C to +40 °C ambient temperature and ≤ 70 % relative humidity conditions.
2. The product is recommended to be used within a time-frame of 2 years after shipment. Check solderability in case extended shelf life beyond the expiry date is needed.

#### Precautions:
- a. Do not store products in an environment containing corrosive elements, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. This may cause corrosion or oxidation of the terminations, which can easily lead to poor soldering.
- b. Store products on the shelf and avoid exposure to moisture or dust.
- c. Do not expose products to excessive shock, vibration, direct sunlight and so on.
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