

## Surface Mount Multilayer Ceramic Chip Capacitors High Frequency DSCC Qualified Type 05003



### FEATURES

- US Defense Supply Center approved
- Federal stock control number, CAGE CODE SHV71
- Case size 0402
- High frequency
- Excellent aging characteristics
- Tin/lead termination code “Z”
- Lead (Pb)-free terminations code “M”
- Surface mount, 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**  
Available

### Note

- \* Lead (Pb)-containing terminations are not RoHS-compliant. Exemptions may apply.

### APPLICATIONS

- Broadband wireless communication
- Satellite communication
- WiFi (802.11) and WiMax (802.16)
- VoIP networks and cellular base stations
- Subscriber based wireless devices

### ELECTRICAL SPECIFICATIONS

#### Note

- Electrical characteristics at 25 °C unless otherwise specified

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

**Capacitance Range:** 1.0 pF to 27 pF

**Voltage Rating:** 50 V<sub>DC</sub> to 100 V<sub>DC</sub>

#### Temperature Coefficient of Capacitance (TCC):

BP: 0 ppm/°C ± 30 ppm/°C from - 55 °C to + 125 °C with zero (0) V<sub>DC</sub> applied

#### Dissipation Factor (DF):

BP: 0.05 % max. at 1.0 V<sub>RMS</sub> and 1 MHz

**Aging Rate:** 0 % maximum per decade

#### Insulation Resistance (IR):

At + 25 °C and rated voltage 100 000 MΩ minimum or 1000 ΩF, whichever is less

At + 125 °C and rated voltage 10 000 MΩ minimum or 100 ΩF, whichever is less

#### Dielectric Strength Test:

Performed per method 103 of EIA-198-2-E.

Applied test voltages

≤ 250 V<sub>DC</sub>-rated: 200 % of rated voltage

| QUICK REFERENCE DATA |           |                     |             |         |
|----------------------|-----------|---------------------|-------------|---------|
| DIELECTRIC           | CASE CODE | MAXIMUM VOLTAGE (V) | CAPACITANCE |         |
|                      |           |                     | MINIMUM     | MAXIMUM |
| BP                   | 0402      | 100                 | 1.0 pF      | 27 pF   |

| ORDERING INFORMATION                   |  |                                  |   |   |   |  |
|--|--|----------------------------------|---|---|---|--|
| 05003-                                 | 1R0  | B                                | C   | Z   | -   | C  |
| DSCC NUMBER                            | CAPACITANCE NOMINAL CODE   | DC VOLTAGE RATING <sup>(1)</sup> | CAPACITANCE TOLERANCE   | TERMINATION   | GROUP C <sup>(2)</sup> TESTING OPTION   | PACKAGING  |
| 0603<br>Case size<br>High<br>Frequency | Expressed in picofarads (pF) The first two digits are significant, the third is a multiplier. An "R" indicates a decimal point.<br>Examples:<br>1R0 = 1.0 pF | A = 50 V<br>B = 100 V            | B = ± 0.1 pF<br>C = ± 0.25 pF<br>D = ± 0.50 pF<br>F = ± 1 %<br>G = ± 2 %<br>J = ± 5 %<br>K = ± 10 %<br>M = ± 20 %<br><b>Note:</b><br>B, C, D<br>≤ 6.2 pF<br>B, C, J, K, M<br>6.8 pF to 9.1 pF<br>F, G, J, K, M<br>≥ 10 pF | M = Silver Palladium<br>Z = Ni barrier with tin/lead plate<br>min. 4 % lead | C = Full Group C<br>L = 2000 h life test only<br>M = 1000 h life test only<br>H = Low voltage humidity test only<br>- = Group A test only | C = 7" reel/paper tape<br>O = 7" reel/flamed paper tape<br>J = 7" reel (low quantity)<br>P = 11 1/4"/13" reel/paper tape<br>I = 11 1/4"/13" reel/flamed paper tape<br>B = Bulk<br><b>Note:</b><br>"I" and "O" is used for "M" termination code |

**Notes**

- <sup>(1)</sup> DC voltage rating should not be exceeded in application  
<sup>(2)</sup> Selecting one of the group C options with life testing may extend the delivery time

| DIMENSIONS in inches (millimeters) |                                |                                |                       |                      |                 |
|------------------------------------|--------------------------------|--------------------------------|-----------------------|----------------------|-----------------|
|                                    |                                |                                |                       |                      |                 |
| PART ORDERING NUMBER               | LENGTH (L)                     | WIDTH (W)                      | MAXIMUM THICKNESS (T) | TERMINATIONS PAD (P) |                 |
|                                    |                                |                                |                       | MINIMUM              | MAXIMUM         |
| 05003-                             | 0.040 ± 0.004<br>(1.00 ± 0.10) | 0.020 ± 0.004<br>(0.50 ± 0.10) | 0.024<br>(0.60)       | 0.004<br>(0.10)      | 0.016<br>(0.41) |



| SELECTION CHART            |        |       |     |               |
|----------------------------|--------|-------|-----|---------------|
| DIELECTRIC                 |        | BP    |     |               |
| STYLE                      |        | 05003 |     | TOLERANCE     |
| CASE CODE                  |        | 0402  |     |               |
| VOLTAGE (V <sub>DC</sub> ) |        | 50    | 100 |               |
| VOLTAGE CODE               |        | A     | B   |               |
| CAP. CODE                  | CAP.   |       |     |               |
| 1R0                        | 1.0 pF | ••    | ••  | B, C          |
| 1R1                        | 1.1 pF | ••    | ••  | B, C, D       |
| 1R2                        | 1.2 pF | ••    | ••  | B, C, D       |
| 1R3                        | 1.3 pF | ••    | ••  | B, C, D       |
| 1R5                        | 1.5 pF | ••    | ••  | B, C, D       |
| 1R6                        | 1.6 pF | ••    | ••  | B, C, D       |
| 1R7                        | 1.7 pF | ••    | ••  | B, C, D       |
| 1R8                        | 1.8 pF | ••    | ••  | B, C, D       |
| 2R0                        | 2.0 pF | ••    | ••  | B, C, D       |
| 2R1                        | 2.1 pF | ••    | ••  | B, C, D       |
| 2R2                        | 2.2 pF | ••    | ••  | B, C, D       |
| 2R4                        | 2.4 pF | ••    | ••  | B, C, D       |
| 2R7                        | 2.7 pF | ••    | ••  | B, C, D       |
| 3R0                        | 3.0 pF | ••    | ••  | B, C, D       |
| 3R3                        | 3.3 pF | ••    | ••  | B, C, D       |
| 3R6                        | 3.6 pF | ••    | ••  | B, C, D       |
| 3R9                        | 3.9 pF | ••    | ••  | B, C, D       |
| 4R3                        | 4.3 pF | ••    | ••  | B, C, D       |
| 4R7                        | 4.7 pF | ••    | ••  | B, C, D       |
| 5R1                        | 5.1 pF | ••    | ••  | B, C, D       |
| 5R6                        | 5.6 pF | ••    | ••  | B, C, D       |
| 6R2                        | 6.2 pF | ••    | ••  | B, C, D       |
| 6R8                        | 6.8 pF | ••    | ••  | B, C, J, K, M |
| 7R5                        | 7.5 pF | ••    | ••  | B, C, J, K, M |
| 8R2                        | 8.2 pF | ••    | ••  | B, C, J, K, M |
| 9R1                        | 9.1 pF | ••    | ••  | B, C, J, K, M |
| 100                        | 10 pF  | ••    | ••  | F, G, J, K, M |
| 110                        | 11 pF  | ••    | ••  | F, G, J, K, M |
| 120                        | 12 pF  | ••    | ••  | F, G, J, K, M |
| 130                        | 13 pF  | ••    | ••  | F, G, J, K, M |
| 150                        | 15 pF  | ••    | ••  | F, G, J, K, M |
| 180                        | 18 pF  | ••    | ••  | F, G, J, K, M |
| 200                        | 20 pF  | ••    | ••  | F, G, J, K, M |
| 220                        | 22 pF  | ••    | ••  | F, G, J, K, M |
| 240                        | 24 pF  | ••    | ••  | F, G, J, K, M |
| 270                        | 27 pF  | ••    | ••  | F, G, J, K, M |

**Note**

•• paper carrier tape



| <b>DSCC PACKAGING QUANTITIES (1)</b> |           |                        |                    |                                   |                         |
|--------------------------------------|-----------|------------------------|--------------------|-----------------------------------|-------------------------|
| CASE CODE                            | TAPE SIZE | 7" REEL QUANTITIES     |                    | 11 1/4" AND 13" REEL QUANTITIES   | BULK                    |
|                                      |           | PACKAGING CODE "C"/"O" | PACKAGING CODE "J" | PAPER TAPE PACKAGING CODE "P"/"I" | VIAL PACKAGING CODE "B" |
| 0402                                 | 8 mm      | 4000                   | 1000               | 10 000                            | 100                     |

**Note**

(1) Reference: EIA Standard RS 481 - "Taping of Surface Mount Components for Automatic Placement"

| <b>STORAGE AND HANDLING CONDITIONS</b>  |
|---|
| <p>(1) Store the components at 5 °C to + 40 °C ambient temperature and ≤ 70 % related humidity conditions.</p> <p>(2) The product is recommended to be used within a time-frame of 2 years after shipment.<br/>Check solderability in case extended shelf life beyond the expiry date is needed.</p> <p>Precautions:</p> <ul style="list-style-type: none"> <li>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 oxidization of the terminations, which can easily lead to poor soldering.</li> <li>b. Store products on the shelf and avoid exposure to moisture or dust.</li> <li>c. Do not expose products to excessive shock, vibration, direct sunlight and so on.</li> </ul> |



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