

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 V_{DC} to 100 V_{DC}

Temperature Coefficient of Capacitance (TCC):

BP: 0 ppm/°C ± 30 ppm/°C from -55 °C to +125 °C with zero (0) V_{DC} applied

BP: 0 ppm/°C ± 30 ppm/°C from -55 °C to +125 °C with 100 % rated V_{DC} applied

BR: ± 15 % from -55 °C to +125 °C with zero (0) V_{DC} applied

BR: +15 %, -40 % from -55 °C to +125 °C with 100 % rated V_{DC} applied

BX: ± 15 % from -55 °C to +125 °C with zero (0) V_{DC} applied

BX: +15 %, -25 % from -55 °C to +125 °C with 100 % rated V_{DC} applied

Dissipation Factor (DF):

BP:

0.15 % max. at 1.0 V_{RMS} and 1 MHz for values ≤ 1000 pF
0.15 % max. at 1.0 V_{RMS} and 1 kHz for values > 1000 pF

BR, BX:

≤ 25 V: ± 3.5 % max. at 1.0 V_{RMS} and 1 kHz

≥ 50 V: ± 2.5 % max. at 1.0 V_{RMS} 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 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

≤ 200 V_{DC}-rated: 250 % of rated voltage

| QUICK REFERENCE DATA | | | | |
|----------------------|------|---------------------|-------------|---------|
| DIELECTRIC | CASE | MAXIMUM VOLTAGE (V) | CAPACITANCE | |
| | | | MINIMUM | MAXIMUM |
| BP | 0402 | 100 | 1.0 pF | 180 pF |
| BR | 0402 | 50 | 100 pF | 10 nF |
| BX | 0402 | 50 | 100 pF | 8.2 nF |

Note

- Detail ratings see "Selection Chart"

| ORDERING INFORMATION | | | | | | | |
|--------------------------|------------------|--|--|---|---|--|--|
| 03029- DSCC NUMBER | BX DIELECTRIC | 102 CAPACITANCE NOMINAL CODE | B DC VOLTAGE RATING ⁽¹⁾ | J CAPACITANCE TOLERANCE | Z TERMINATION | - GROUP C TESTING OPTION ⁽²⁾ | C PACKAGING |
| Case code 0402 | BP BR BX | Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. An "R" indicates a decimal point. Examples: 1R8 = 1.8 pF 101 = 100 pF | W = 6.3 V X = 10 V Y = 16 V Z = 25 V A = 50 V B = 100 V | C = ± 0.25 pF D = ± 0.5 pF F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % M = ± 20 % Note: C, D < 10 pF (BP) F, G, J, K, M ≥ 10 pF (BP) J, K, M (BR, BX) | M = silver palladium Z = Ni barrier with tin / lead plate min. 4 % lead U = Ni barrier solder coated (min. of 4 % lead) | C = full group C L = 2000 h life test only M = 1000 h life test only H = low voltage humidity test only - = no group C testing | C = 7" reel / paper tape O = 7" reel / flamed paper tape J = 7" reel (low quantity) P = 11 1/4" / 13" reel / paper tape I = 11 1/4" / 13" reel / flamed paper tape B = bulk Note: "I" and "O" are used for "M" termination code |

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) | | | | | |
|------------------------------------|--------------------------------|--------------------------------|-----------------------|---------------------|-----------------|
| | | | | | |
| PART ORDERING NUMBER | LENGTH (L) | WIDTH (W) | MAXIMUM THICKNESS (T) | TERMINATION PAD (P) | |
| | | | | MINIMUM | MAXIMUM |
| 03029- | 0.040 ± 0.004 (1.02 ± 0.10) | 0.020 ± 0.004 (0.51 ± 0.10) | 0.024 (0.61) | 0.004 (0.10) | 0.016 (0.41) |

Note

- Metric equivalents are given for general information only



| SELECTION CHART | | | | | | | | | | | | | | | | | |
|----------------------------|--------|-------|----|----|----|----|-----|-----|----|----|----|----|-----|----|----|----|----|
| DIELECTRIC | | BP | | | | | | BR | | | | | BX | | | | |
| STYLE | | 03029 | | | | | | | | | | | | | | | |
| CASE CODE | | 0402 | | | | | | | | | | | | | | | |
| VOLTAGE (V _{DC}) | | 6.3 | 10 | 16 | 25 | 50 | 100 | 6.3 | 10 | 16 | 25 | 50 | 6.3 | 10 | 16 | 25 | 50 |
| VOLTAGE CODE | | W | X | Y | Z | A | B | W | X | Y | Z | A | W | X | Y | Z | A |
| CAP. CODE | CAP. | | | | | | | | | | | | | | | | |
| 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



| SELECTION CHART | | | | | | | | | | | | | | | | | |
|----------------------------|--------|-------|----|----|----|----|-----|-----|----|----|----|----|-----|----|----|----|----|
| DIELECTRIC | | BP | | | | | BR | | | | | BX | | | | | |
| STYLE | | 03029 | | | | | | | | | | | | | | | |
| CASE CODE | | 0402 | | | | | | | | | | | | | | | |
| VOLTAGE (V _{DC}) | | 6.3 | 10 | 16 | 25 | 50 | 100 | 6.3 | 10 | 16 | 25 | 50 | 6.3 | 10 | 16 | 25 | 50 |
| VOLTAGE CODE | | W | X | Y | Z | A | B | W | X | Y | Z | A | W | X | Y | Z | A |
| CAP. CODE | CAP. | | | | | | | | | | | | | | | | |
| 101 | 100 pF | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | |
| 121 | 120 pF | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | |
| 151 | 150 pF | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | |
| 181 | 180 pF | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | |
| 221 | 220 pF | | | | | | | • | • | • | • | • | • | • | • | • | |
| 271 | 270 pF | | | | | | | • | • | • | • | • | • | • | • | • | |
| 331 | 330 pF | | | | | | | • | • | • | • | • | • | • | • | • | |
| 391 | 390 pF | | | | | | | • | • | • | • | • | • | • | • | • | |
| 471 | 470 pF | | | | | | | • | • | • | • | • | • | • | • | • | |
| 561 | 560 pF | | | | | | | • | • | • | • | • | • | • | • | • | |
| 681 | 680 pF | | | | | | | • | • | • | • | • | • | • | • | • | |
| 821 | 820 pF | | | | | | | • | • | • | • | • | • | • | • | • | |
| 102 | 1.0 nF | | | | | | | • | • | • | • | • | • | • | • | • | |
| 122 | 1.2 nF | | | | | | | • | • | • | • | • | • | • | • | • | |
| 152 | 1.5 nF | | | | | | | • | • | • | • | • | • | • | • | • | |
| 182 | 1.8 nF | | | | | | | • | • | • | • | • | • | • | • | | |
| 222 | 2.2 nF | | | | | | | • | • | • | • | • | • | • | • | | |
| 272 | 2.7 nF | | | | | | | • | • | • | • | • | • | • | • | | |
| 332 | 3.3 nF | | | | | | | • | • | • | • | • | • | • | • | | |
| 392 | 3.9 nF | | | | | | | • | • | • | • | • | • | • | • | | |
| 472 | 4.7 nF | | | | | | | • | • | • | • | | • | • | • | | |
| 562 | 5.6 nF | | | | | | | • | • | • | | | • | • | • | | |
| 682 | 6.8 nF | | | | | | | • | • | • | | | • | • | • | | |
| 822 | 8.2 nF | | | | | | | • | • | • | | | • | • | • | | |
| 103 | 10 nF | | | | | | | • | • | • | | | | | | | |
| 123 | 12 nF | | | | | | | | | | | | | | | | |

Notes

- RoHS-compliant except when supplied with lead (Pb)-containing termination, code "Z"
- Not RoHS-compliant

| DSCC PACKAGING QUANTITIES ⁽¹⁾ | | | | | |
|--|-----------|--------------------|------|---------------------------------|---------------------|
| CASE CODE | TAPE SIZE | 7" REEL QUANTITIES | | 11 1/4" AND 13" REEL QUANTITIES | BULK |
| | | PACKAGING CODE | | PACKAGING CODE | VIAL PACKAGING CODE |
| | | "C" / "O" | "J" | "P" / "I" | "B" |
| 0402 | 8 mm | 5000 | 1000 | 10 000 | 100 |

Note

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

| STORAGE AND HANDLING CONDITIONS |
|---|
| <p>(1) Store the components at 5 °C to +40 °C ambient temperature and ≤ 70 % relative humidity conditions.</p> <p>(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.</p> <p>Precautions:</p> <ul style="list-style-type: none"> 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. 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. |



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.