

Surface Mount Multilayer Ceramic Chip Capacitors for High Temperature Applications Up to 150 °C



FEATURES

- Specialty: high temperature applications
- High operating temperature dielectric: 150 °C
- Maintains capacitance at high temperature for frequency stability
- Wet build process
- Reliable Noble Metal Electrode (NME) system
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
[5-2008]
Available

APPLICATIONS

- High temperature modules

ELECTRICAL SPECIFICATIONS

Note

- Electrical characteristics at +25 °C unless otherwise specified.

Operating Temperature: -55 °C to +150 °C

Capacitance Range: 330 pF to 220 nF

Voltage Range: 25 V_{DC} to 100 V_{DC}

Temperature Coefficient of Capacitance (TCC):
± 15 % from -55 °C to +150 °C

Dissipation Factor (DF):

25 V ratings: 3.5 % maximum at 1.0 V_{RMS} and 1 kHz
> 25 V ratings: 2.5 % maximum at 1.0 V_{RMS} and 1 kHz

Aging Rate: 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 voltage:
≤ 100 V_{DC}-rated: 250 % of rated voltage



| QUICK REFERENCE DATA | | | | |
|----------------------|------|---------------------|-------------|---------|
| DIELECTRIC | CASE | MAXIMUM VOLTAGE (V) | CAPACITANCE | |
| | | | MINIMUM | MAXIMUM |
| X8R | 0402 | 100 | 330 pF | 6.8 nF |
| | 0603 | 100 | 470 pF | 33 nF |
| | 0805 | 100 | 470 pF | 100 nF |
| | 1206 | 50 | 1.0 nF | 220 nF |
| | 1210 | 50 | 10 nF | 220 nF |

Note

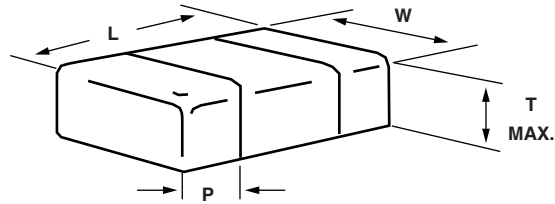
- Detail ratings see “Selection Chart”

| ORDERING INFORMATION | | | | | | | | |
|--------------------------------------|------------|---|---------------------------------------|---|-----------------------------------|---|-----------|--------------------|
| VJ0805 | H | 102 | K | X | A | A | C | ### ⁽²⁾ |
| CASE CODE | DIELECTRIC | CAPACITANCE NOMINAL CODE | CAPACITANCE TOLERANCE | TERMINATION | DC VOLTAGE RATING ⁽¹⁾ | MARKING ⁽⁴⁾ | PACKAGING | PROCESS CODE |
| 0402 0603 0805 1206 1210 | H = X8R | Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. Examples: 102 = 1000 pF | J = ± 5 % K = ± 10 % M = ± 20 % | X = Ni barrier 100 % tin plated F, E = AgPd ⁽³⁾⁽⁵⁾ | X = 25 V A = 50 V B = 100 V | A = unmarked M = marked Note Marking is only available for 0805 and 1206 with termination code “X” | | |
| | | | | | | T = 7" reel / plastic tape C = 7" reel / paper tape R = 11 1/4" / 13" reel / plastic tape P = 11 1/4" / 13" reel / paper tape O = 7" reel / flamed paper tape I = 11 1/4" / 13" reel / flamed paper tape Note “I” and “O” are used for “F” termination size 0603 / 0805 and “E” termination size 0402 / 0603 / 0805 | | |

Notes

- (1) DC voltage rating should not be exceeded in application. Other application factors may affect the MLCC performance. Consult for questions: mlcc@vishay.com
- (2) Process code may be added with up to three digits, used to control non-standard products and requirements
- (3) Termination code “E” for conductive epoxy assembly
- (4) Marking in reference to EIA198, see www.vishay.com/doc?45028
- (5) Termination code “F” not available for 0402, 0603 - 100 V, 0805 - 100 V

| ENVIRONMENTAL STATUS | | | |
|----------------------|--|----------------|--------------|
| TERMINATION CODE | TERMINATION DESCRIPTION | RoHS COMPLIANT | VISHAY GREEN |
| X | Ni barrier 100 % tin plated matte finish | Yes | Yes |
| E | AgPd | Yes | Yes |
| F | AgPd | Yes | No |

DIMENSIONS in inches (millimeters)


| CASE CODE | STYLE | LENGTH (L) | WIDTH (W) | MAXIMUM THICKNESS (T) | TERMINATION (P) | |
|-----------|--------|---|---|-----------------------|-----------------|-----------------|
| | | | | | MINIMUM | MAXIMUM |
| 0402 | VJ0402 | 0.040 + 0.004/- 0.002 (1.00 + 0.10/- 0.05) | 0.020 + 0.004/- 0.002 (0.50 + 0.10/- 0.05) | 0.024 (0.60) | 0.004 (0.10) | 0.016 (0.41) |
| 0603 | VJ0603 | 0.063 ± 0.006 (1.60 ± 0.15) | 0.031 ± 0.006 (0.80 ± 0.15) | 0.036 (0.92) | 0.012 (0.30) | 0.022 (0.55) |
| 0805 | VJ0805 | 0.079 ± 0.008 (2.00 ± 0.20) | 0.049 ± 0.008 (1.25 ± 0.20) | 0.057 (1.45) | 0.010 (0.25) | 0.030 (0.76) |
| 1206 | VJ1206 | 0.126 ± 0.010 (3.20 ± 0.25) | 0.063 ± 0.010 (1.60 ± 0.25) | 0.067 (1.70) | 0.010 (0.25) | 0.030 (0.76) |
| 1210 | VJ1210 | 0.126 ± 0.010 (3.20 ± 0.25) | 0.098 ± 0.010 (2.50 ± 0.25) | 0.067 (1.70) | 0.010 (0.25) | 0.030 (0.76) |



| SELECTION CHART | | | | | | | | | | | | | | |
|----------------------------|--------|--------|----|-----|--------|----|-----|--------|----|-----|-----------------------|----|-----------------------|----|
| DIELECTRIC | | X8R | | | | | | | | | | | | |
| STYLE | | VJ0402 | | | VJ0603 | | | VJ0805 | | | VJ1206 ⁽¹⁾ | | VJ1210 ⁽¹⁾ | |
| CASE CODE | | 0402 | | | 0603 | | | 0805 | | | 1206 | | 1210 | |
| VOLTAGE (V _{DC}) | | 25 | 50 | 100 | 25 | 50 | 100 | 25 | 50 | 100 | 25 | 50 | 25 | 50 |
| VOLTAGE CODE | | X | A | B | X | A | B | X | A | B | X | A | X | A |
| CAP. CODE | CAP. | | | | | | | | | | | | | |
| 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 | | | | •• | •• | | •• | •• | •• | • | • | • | • |
| 153 | 15 nF | | | | •• | •• | | •• | •• | •• | • | • | • | • |
| 183 | 18 nF | | | | •• | •• | | •• | •• | •• | • | • | • | • |
| 223 | 22 nF | | | | •• | | | •• | •• | • | • | • | • | • |
| 273 | 27 nF | | | | •• | | | •• | • | • | • | • | • | • |
| 333 | 33 nF | | | | •• | | | •• | • | | • | • | • | • |
| 393 | 39 nF | | | | | | | •• | • | | • | • | • | • |
| 473 | 47 nF | | | | | | | • | • | | • | • | • | • |
| 563 | 56 nF | | | | | | | • | • | | • | • | • | • |
| 683 | 68 nF | | | | | | | • | | | • | • | • | • |
| 823 | 82 nF | | | | | | | • | | | • | • | • | • |
| 104 | 100 nF | | | | | | | • | | | • | • | • | • |
| 124 | 120 nF | | | | | | | | | | • | • | • | • |
| 154 | 150 nF | | | | | | | | | | • | | • | • |
| 184 | 180 nF | | | | | | | | | | • | | • | |
| 224 | 220 nF | | | | | | | | | | • | | • | |
| 274 | 270 nF | | | | | | | | | | | | | |
| 334 | 330 nF | | | | | | | | | | | | | |
| 394 | 390 nF | | | | | | | | | | | | | |

Notes

- ⁽¹⁾ See soldering recommendations within this data book, or visit www.vishay.com/doc245034
- Plastic tape, •• Paper tape
- RoHS-compliant

| X8R PACKAGING QUANTITIES ⁽¹⁾ | | | | | |
|---|-----------|--------------------|--------------------|---------------------------------|---------------|
| CASE CODE | TAPE SIZE | 7" REEL QUANTITIES | | 11 1/4" AND 13" REEL QUANTITIES | |
| | | PACKAGING CODE | | PACKAGING CODE | |
| | | "C" / "O" | "T" | "P" / "I" | "R" |
| 0402 | 8 mm | 5000 | n/a | 10 000 | n/a |
| 0603 | 8 mm | 4000 | n/a | 10 000 | n/a |
| 0805 ⁽²⁾ | 8 mm | 3000 | 3000 | 10 000 | 10 000 |
| 1206 ⁽²⁾ | 8 mm | n/a | 2500 / 3000 | 10 000 | 9000 / 10 000 |
| 1210 ⁽²⁾ | 8 mm | n/a | 2000 / 2500 / 3000 | 10 000 | 9000 / 10 000 |

Notes

- ⁽¹⁾ Reference: EIA standard RS481 - "Taping of Surface Mount Components for Automatic Placement"
- ⁽²⁾ Packaging "C" / "P" / "O" / "I" and "T" / "R" or lower quantities can depend from product thickness



STORAGE AND HANDLING CONDITIONS

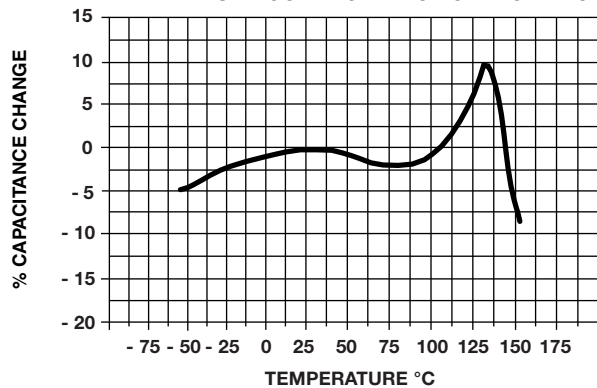
- (1) Store the components at 5 °C to 40 °C ambient temperature and ≤ 70 % relative humidity conditions.
- (2) The product is recommended to be used within a time-frame of 2 years after shipment.
Check solderability in case extended shelf life beyond the expiry date is needed.

Precautions:

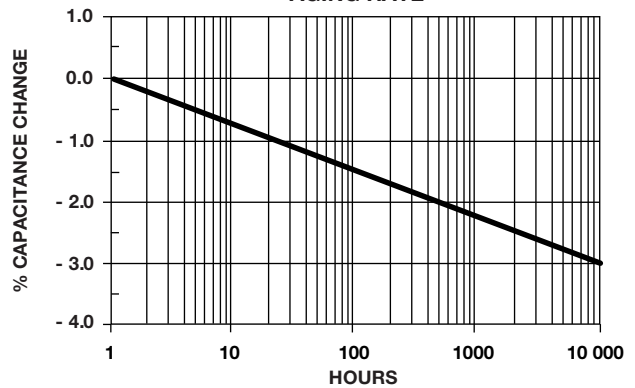
- a. Do not store products in an environment containing corrosive elements, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. This may cause corrosion or oxidation of the terminations, which can easily lead to poor soldering.
- b. Store products on the shelf and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

X8R DIELECTRIC - TYPICAL PARAMETERS

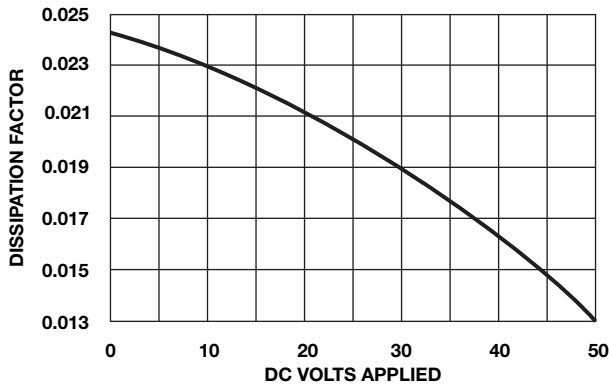
TEMPERATURE COEFFICIENT OF CAPACITANCE



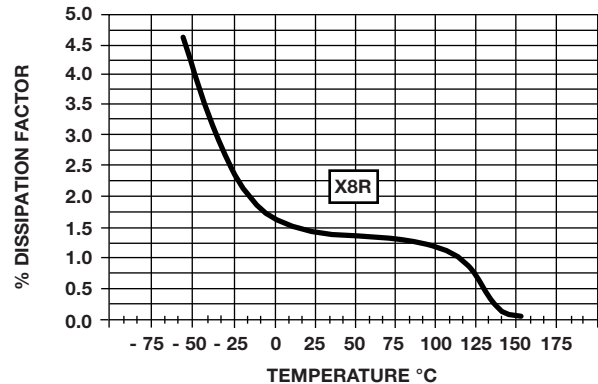
AGING RATE



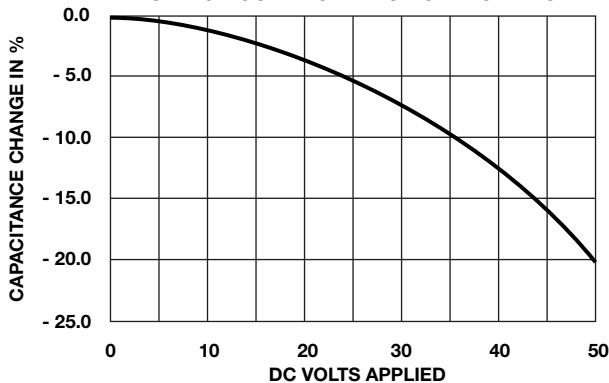
DISSIPATION FACTOR VS. VOLTAGE



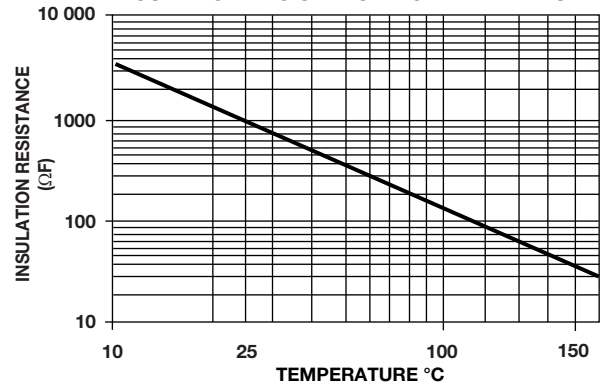
DISSIPATION FACTOR VS. TEMPERATURE



VOLTAGE COEFFICIENT OF CAPACITANCE



INSULATION RESISTANCE VS. TEMPERATURE





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.