Surface Mount Multilayer
Ceramic Chip Capacitors for High Frequency

FEATURES
• Case size 0402, 0603, 0805
• High frequency
• Ultra-stable dielectric material
• Non-magnetic copper termination “C”
• Lead (Pb)-free terminations code “X”
• Tin/lead termination code “L”
• 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

APPLICATIONS
• RF and microwave
• Broadband communication
• Satellite communication
• Base stations
• Medical instrumentation and test
• Military devices (radar, communication, etc.)
• Wireless devices

ELECTRICAL SPECIFICATIONS

Note
• Electrical characteristics at 25 °C unless otherwise specified

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

 Capacitance Range:
0402: 0.1 pF to 82 pF
0603: 0.1 pF to 470 pF
0805: 0.1 pF to 1.5 nF

Voltage Rating: 25 VDC to 250 VDC

Temperature Coefficient of Capacitance (TCC):
C0G (D): 0 ppm/°C ± 30 ppm/°C from -55 °C to +125 °C with zero (0) VDC applied

Dissipation Factor (DF):
C0G (D): 0.05 % max. at 1.0 VRMS and 1 MHz for values ≤ 1000 pF
C0G (D): 0.05 % max. at 1.0 VRMS and 1 kHz for values > 1000 pF

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:
≤ 200 VDC-rated: min. 250 % of rated voltage
> 200 VDC-rated: min. 200 % of rated voltage

For technical questions, contact: mlccrf@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>
<th>MINIMUM</th>
<th>MAXIMUM</th>
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<tr>
<td>D = HIFREQ</td>
<td>0402</td>
<td>200</td>
<td>0.1 pF</td>
<td>82 pF</td>
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<td>250</td>
<td>0.1 pF</td>
<td>470 pF</td>
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<tr>
<td></td>
<td>0805</td>
<td>250</td>
<td>0.1 pF</td>
<td>1.5 nF</td>
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Note
- For values below 0.4 pF, contact mlccrf@vishay.com

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>VJ0603</th>
<th>D</th>
<th>1R0</th>
<th>B</th>
<th>X</th>
<th>B</th>
<th>A</th>
<th>C</th>
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<tbody>
<tr>
<td>CASE CODE</td>
<td>DIELECTRIC CAPACITANCE NOMINAL CODE</td>
<td>CAPACITANCE TOLERANCE</td>
<td>TERMINATION</td>
<td>DC VOLTAGE RATING (1)</td>
<td>MARKING</td>
<td>PACKAGING</td>
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<td>0402</td>
<td>D = HIFREQ</td>
<td>Expessed in picofarads (pF).</td>
<td>V = ± 0.05 pF</td>
<td>X = 25 V</td>
<td>A = no marking</td>
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<tr>
<td>0603</td>
<td>E = AgPd (2)</td>
<td>B = ± 0.10 pF</td>
<td>F = ± 1 %</td>
<td>C = 25 V</td>
<td>A = low quantity</td>
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<tr>
<td>0805</td>
<td>L = Ni barrier</td>
<td>C = non-magnetic copper barrier</td>
<td>G = ± 2 %</td>
<td>B = 100 V</td>
<td>B = bulk</td>
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Notes
- (1) DC voltage rating should not be exceeded in application
- (2) Termination code “E” is for conductive epoxy assembly

ENVIRONMENTAL STATUS

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<thead>
<tr>
<th>TERMINATION CODE</th>
<th>TERMINATION DESCRIPTION</th>
<th>RoHS COMPLIANT</th>
<th>VISHAY GREEN</th>
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<td>C</td>
<td>Non-magnetic copper barrier 100 % tin plated matte finish</td>
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<td>Yes</td>
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<td>X</td>
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</tr>
<tr>
<td>E</td>
<td>AgPd</td>
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<td>Yes</td>
</tr>
<tr>
<td>L</td>
<td>Ni barrier 100 % tin plated matte finish min. 4 % lead</td>
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DIMENSIONS in inches (millimeters)

<table>
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<th>STYLE</th>
<th>LENGTH (L)</th>
<th>WIDTH (W)</th>
<th>MAXIMUM THICKNESS (T)</th>
<th>TERMINATIONS PAD (P)</th>
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<tr>
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<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
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<tr>
<td>0402</td>
<td>VJ0402</td>
<td>0.040 ± 0.004</td>
<td>0.020 ± 0.004</td>
<td>0.021</td>
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<tr>
<td>0603</td>
<td>VJ0603</td>
<td>0.063 ± 0.006</td>
<td>0.031 ± 0.005</td>
<td>0.037</td>
<td>0.012</td>
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<tr>
<td>0805</td>
<td>VJ0805</td>
<td>0.079 ± 0.008</td>
<td>0.049 ± 0.008</td>
<td>0.057</td>
<td>0.010</td>
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Note
- (1) For Cu termination “C” add 0.01 mm to maximum pad terminations

Revision: 28-Apr-15

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### SELECTION CHART

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<th>200</th>
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<td>0R2 0.2 pF</td>
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<td>**</td>
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<td>0R3 0.3 pF</td>
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<td>0R6 0.6 pF</td>
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<tr>
<td>0R7 0.7 pF</td>
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<td>0R8 0.8 pF</td>
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<td>0R9 0.9 pF</td>
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<td>1R7 1.7 pF</td>
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<td>5R1 5.1 pF</td>
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<tr>
<td>7R5 7.5 pF</td>
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<tr>
<td>8R2 8.2 pF</td>
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<tr>
<td>9R1 9.1 pF</td>
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</tr>
<tr>
<td>100 10 pF</td>
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<td>**</td>
<td>F, G, J, K, M</td>
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<tr>
<td>110 11 pF</td>
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<td>220 22 pF</td>
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**Notes**

- RoHS-compliant except when supplied with lead (Pb)-containing termination, code “L”
- Paper carrier
- For values below 0.4 pF and tolerance ± 0.05 pF, contact mlccrf@vishay.com
### SELECTION CHART

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<th>DIELECTRIC (VISHAY CODE)</th>
<th>C0G (D)</th>
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<table>
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<th>25</th>
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<table>
<thead>
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<th>C</th>
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<tr>
<td>0R3</td>
<td>0.3 pF</td>
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<td>0R4</td>
<td>0.4 pF</td>
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<td>0.5 pF</td>
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</tbody>
</table>

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**Revision:** 28-Apr-15

**Document Number:** 45071

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## SELECTION CHART

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</table>

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<table>
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<tr>
<th>DIELECTRIC (VISHAY CODE)</th>
<th>C0G (D)</th>
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</table>

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HIGH FREQ DIELECTRIC - TYPICAL PARAMETERS

TEMPERATURE COEFFICIENT OF CAPACITANCE

MIN. INSULATION RESISTANCE VS. TEMPERATURE

AGING RATE

VOLTAGE COEFFICIENT OF CAPACITANCE

TYPICAL Q VALUE VS. FREQUENCY

TYPICAL ESR VS. FREQUENCY

TYPICAL SRF/PRF VS. CAPACITANCE

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HIGH FREQ DIELECTRIC - TYPICAL PARAMETERS

TYPICAL Q VALUE VS. FREQUENCY
SIZE 0603

TYPICAL ESR VS. FREQUENCY
SIZE 0603

TYPICAL SRF/PRF VS. CAPACITANCE
SIZE 0603

TYPICAL Q VALUE VS. FREQUENCY
SIZE 0805

TYPICAL ESR VS. FREQUENCY
SIZE 0805

TYPICAL SRF/PRF VS. CAPACITANCE
SIZE 0805
**STANDARD PACKAGING QUANTITIES**

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<th>TAPE SIZE</th>
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<th>11 1/4&quot; AND 13&quot; REEL QUANTITIES</th>
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<td>PLASTIC TAPE</td>
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<td>PACKAGING CODE</td>
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<td></td>
<td>“C”/“O”</td>
<td>“T”</td>
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<td></td>
<td>LOW QUANTITY</td>
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**Notes**

(1) Vishay Vitramon uses embossed plastic carrier tape
(2) REFERENCE: EIA standard RS 481 - “Taping of Surface Mount Components for Automatic Placement”
(3) n/a = not available
(4) Packaging “C”/“P”/“O”/“I” and “T”/“R” or lower quantities can depend from product thickness
(5) Paper/plastic tape used by availability

**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 (1 year for copper).
   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 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.
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