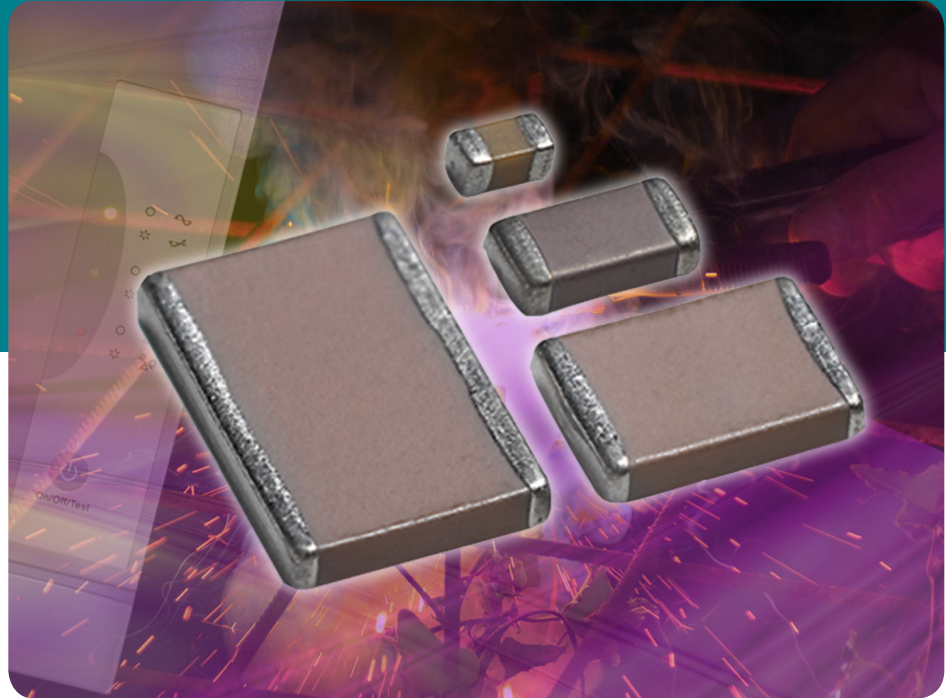




# OPEN-MODE DESIGN CAPACITORS

VJ OMD Series



## OMD Capacitors Available with Polymer Terminations

### KEY BENEFITS

- Reduces the risk of shorts or low insulation resistance (IR) due to board-flex cracks
- Available with polymer terminations for intensive board flex requirements
- Features higher voltage breakdowns than standard designs with voltage ranges from 16 V<sub>DC</sub> to 3000 V<sub>DC</sub>
- Provides high-frequency filtering for switching power supplies
- Available with 100 % voltage condition

### APPLICATIONS

- Buck and boost DC/DC converters
- Voltage multipliers for flyback converters
- High-frequency filtering in power supplies for medical, computer, motor control, and telecommunications systems

## Surface Mount Multilayer Ceramic Chip Capacitor Solutions for Boardflex Sensitive Applications

### FEATURES

- Open Mode Design (OMD) reduces risk of shorts or leakage in board flex applications.
- Excellent reliability and thermal shock performance
- Efficient low-power consumption, ripple current capable to 1.2 A<sub>RMS</sub> at 100 kHz
- High voltage breakdown compared to standard design (process code "5H")
- 100% voltage conditioning available up to 630 V<sub>DC</sub> rating
- Contact [mlcc@vishay.com](mailto:mlcc@vishay.com) for higher voltages.
- Polymer termination available for intensive board flex requirements
- Wet build process
- Reliable Noble Metal Electrode (NME) system
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition



RoHS COMPLIANT HALOGEN FREE



### APPLICATIONS

- Demanding boardflex applications
- Input filter capacitors
- Output filter capacitors
- Snubber capacitors reduce MOSFET voltage spikes
- High frequency filtering for switching power supplies
- For lighting and other AC applications please contact: [mlcc@vishay.com](mailto:mlcc@vishay.com)

### ELECTRICAL SPECIFICATIONS

<b>COG (NPO)</b>	<b>GENERAL SPECIFICATION</b>
	<b>Note</b> Electrical characteristics at + 25 °C unless otherwise specified
	<b>Operating Temperature:</b> - 55 °C to + 125 °C
	<b>Capacitance Range:</b> 10 pF to 47 nF
	<b>Voltage Range:</b> 50 V <sub>DC</sub> to 3000 V <sub>DC</sub>
	<b>Temperature Coefficient of Capacitance (TCC):</b> 0 ppm/°C ± 30 ppm/°C from - 55 °C to + 125 °C
	<b>Dissipation Factor (DF):</b> 0.1 % maximum at 1.0 V <sub>RMS</sub> and 1 MHz for values ≤ 1000 pF 0.1 % maximum at 1.0 V <sub>RMS</sub> and 1 kHz for values > 1000 pF
	<b>Insulating Resistance:</b> At + 25 °C 100,000 MΩ min. or 1000 ΩF whichever is less At + 125 °C 10,000 MΩ min. or 100 ΩF whichever is less
	<b>Aging Rate:</b> 0 % maximum per decade
	<b>Dielectric Strength Test:</b> Performed per method 103 of EIA 198-2-E Applied test voltages ≤ 200 V <sub>DC</sub> -rated: 250 % of rated voltage 500 V <sub>DC</sub> -rated: 200 % of rated voltage 630 V <sub>DC</sub> /1000 V <sub>DC</sub> -rated: 150 % of rated voltage 1500 V <sub>DC</sub> to 3000 V <sub>DC</sub> -rated: 120 % of rated voltage

### X7R

<b>GENERAL SPECIFICATION</b>
<b>Note</b> Electrical characteristics at + 25 °C unless otherwise specified
<b>Operating Temperature:</b> - 55 °C to + 125 °C
<b>Capacitance Range:</b> 100 pF to 1.8 μF
<b>Voltage Range:</b> 16 V <sub>DC</sub> to 3000 V <sub>DC</sub>
<b>Temperature Coefficient of Capacitance (TCC):</b> ± 15 % from - 55 °C to + 125 °C, with 0 V <sub>DC</sub> applied
<b>Dissipation Factor (DF):</b> ≥ 50 V ratings: 3.5 % maximum at 1.0 V <sub>RMS</sub> and 1 kHz ≤ 50 V ratings: 2.5 % maximum at 1.0 V <sub>RMS</sub> and 1 kHz
<b>Insulating Resistance:</b> At + 25 °C 100,000 MΩ min. or 1000 ΩF whichever is less At + 125 °C 10,000 MΩ min. or 100 ΩF whichever is less
<b>Aging Rate:</b> 1 % maximum per decade
<b>Dielectric Strength Test:</b> Performed per method 103 of EIA 198-2-E Applied test voltages ≤ 250 V <sub>DC</sub> -rated: 250 % of rated voltage 500 V <sub>DC</sub> -rated: min. 150 % of rated voltage 630 V <sub>DC</sub> /1000 V <sub>DC</sub> -rated: 150 % of rated voltage 1500 V <sub>DC</sub> to 3000 V <sub>DC</sub> -rated: 120 % of rated voltage

ORDERING INFORMATION		Y	474	J	X	A	T	# (2)
CASE CODE	DIELECTRIC CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	VOLTAGE RATING (1)	MARKING	PACKAGING	PROCESS CODE	
0805 1206 1210 1808 1825 2220 2225	A = COG (NPO) Y = X7R	F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % M = ± 20 % N = ± 50 % COG (NPO): F, G, J, K, X7R, M	X = Ni barrier 100 % tin plated matte finish F, E = AgPd (5) 100 % tin plated matte finish N = Non-magnetic	J = 16 V X = 25 V A = 50 V B = 100 V C = 250 V E = 500 V L = 630 V R = 1500 V H = 3000 V	A = Unmarked C = 7" reel/paper tape T = 7" reel/paper tape P = 11.1/4" / 13" reel/paper tape R = 11.1/4" / 13" reel/plastic tape O = 7" reel/flamed paper tape <b>Note:</b> "I" and "O" are used for "F", "E" termination size 0805	4X = OMD cap 5H = OMD cap (100 % conditioning)		

**Notes** (1) DC voltage rating should not be exceeded in application. Other application factors may affect the MLCC performance.

(2) Consult for questions: [mlcc@vishay.com](mailto:mlcc@vishay.com)

(3) Process code with 2 digits has to be added

(4) Termination code "E" is for conductive epoxy assembly. Contact: [mlcc@vishay.com](mailto:mlcc@vishay.com) for availability.

### BOARDFLEX SENSITIVE APPLICATIONS - SOLUTION:

A predominant failure mode in multilayer ceramic chip capacitors is cracking caused by board flexure. Cracks can then create a path for current to pass from one electrode through the dielectric to an opposing electrode. This may subsequently result in capacitance loss, leakage - low insulation Resistance (IR) - and/or more seriously, high current shorts. A short circuit condition in the surface mounted capacitors can cause further failures or downstream components. Vishay's Open Mode Design Capacitors (VJ OMD - Cap series) reduce the risk of these destructive conditions through MLCC designs that prevent board flexure cracks reaching the opposing electrode.

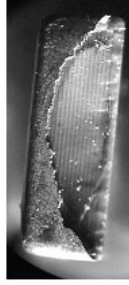
VJ OMD - Cap MLCCs reduce the risk of early field failures associated with board flex cracks. However, it is important to note that even in the open mode designs the presence of flexure related cracks can cause capacitance loss leading to localized stresses on the parts, eventually, depending on the application environment, including such factors and high voltage pulse frequency and thermal cycling this may lead to internal breakdown of the component.

### POLYMER TERMINATION

Polymer termination provides additional protection against board flexure damage by absorbing greater mechanical and thermal stresses. Components can be packaged, transported, stored and handled the same standard termination product. Wave and reflow soldering of MLCC does not require modification to equipment and/or process. Polymer termination greatly reduces the risk of mechanical cracking however it does not completely eliminate.

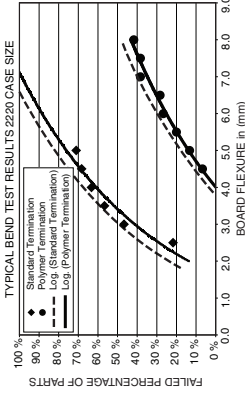
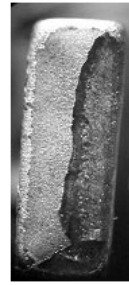
### STANDARD TERMINATION

Exposed Electrodes = Electrical short



### OMD CAP PLUS POLYMER TERMINATION

No Exposed Electrodes = No Electrical short



Revision 11-Aug-10

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For technical questions, contact [mlcc.specials@vishay.com](mailto:mlcc.specials@vishay.com)