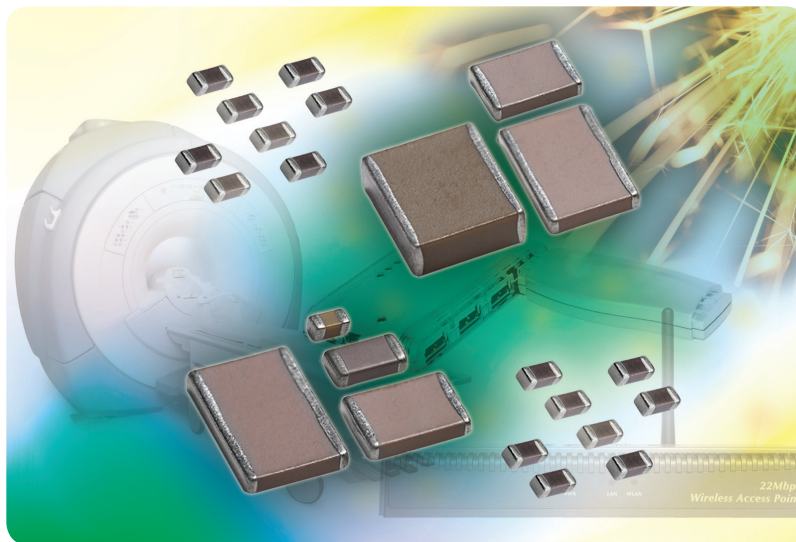




# MULTILAYER CERAMIC CHIP CAPACITORS

## Multilayer Ceramic Chip Capacitors



### PRODUCTS:

- Basic Commodity (BME Technology)
- Commercial (NME Technology)
- Automotive
- Board Flex Sensitive, Including Polymer Termination
- Surface Arc-Over Prevention for High Voltages
- Non-Magnetic Series
- High Reliability, Medical, and Military/Aerospace
- RF Capacitors

### RESOURCES

- For more information please visit <http://www.vishay.com/capacitors/ceramic-multilayer-smd/>
- For technical questions email [mlcc@vishay.com](mailto:mlcc@vishay.com)



# MULTILAYER CERAMIC CHIP CAPACITORS



Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance				
				[Min. V]	[Max. V]	[Min.]	[Max.]			
<b>Capacitors - MLCC</b>										
<b>VJ HVArc Guard®</b>	<b>FEATURES</b> <ul style="list-style-type: none"> <li>• Surface-mount multilayer ceramic chip capacitors</li> <li>• Prevents surface arc-over in high-voltage applications</li> <li>• Higher capacitance and smaller case sizes</li> <li>• Voltage breakdown as much as twice that of competitors' products</li> <li>• Available with polymer terminations in X7R for increased resistance to board flex cracking</li> <li>• Wet build process</li> <li>• Reliable Noble Metal Electrode (NME) system</li> <li>• Worldwide patent technology</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>• DC/DC converters (buck and boost)</li> <li>• Voltage multipliers for flyback converters</li> <li>• Power supplies</li> </ul>	0805	COG (NP0)	1000	1500	10 pF	390 pF			
		1206					1.5 nF			
		1210					2.7 nF			
		2220				470 pF	5.6 nF			
		2225					8.2 nF			
		0805	X7R	250	1000	220 pF	470 pF	3.3 nF		
		1206					47 nF			
		1210					82 nF			
		1808					100 nF			
		1812					270 nF			
<b>VJ Non-Magnetic</b>	<b>FEATURES</b> <ul style="list-style-type: none"> <li>• Surface-mount multilayer ceramic chip capacitors</li> <li>• Manufactured with non-magnetic materials: Copper / AgPd</li> <li>• Safety screened for magnetic properties</li> <li>• Wet build process</li> <li>• Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>• Magnetic resonance imaging (MRI)</li> <li>• Medical test and diagnostic equipment</li> <li>• Navigation and electronic test equipment</li> <li>• Audio amplifiers</li> </ul>	0402	COG (NP0)	10	100	0.5 pF	180 pF			
		0603					200	1.8 nF		
		0805					500	3.3 nF		
		1206					16	600	10 nF	
		1210						500	12 nF	
		1808					25	3000	10 pF	10 nF
		1812							22 nF	
		1825						1000	15 pF	39 nF
		2220							100 pF	47 nF
		2225							120 pF	56 nF
		0402	X5R	6.3	16	27 nF			100 nF	
		0603			6.3	120 nF	150 nF			
		0402	X7R	6.3	100	100 pF	22 nF			
		0603				270 pF	100 nF			
		0805				10	200	390 pF	390 nF	
		1206		16	500	680 pF	1.0 μF			
		1210				1.0 nF	1.0 μF			
		1808		25	3000	220 pF	270 nF			
		1812				270 pF	1.0 μF			
		1825			1000	10 nF	2.7 μF			
		2220				3000	1.0 nF	2.2 μF		
		2225				2000	5.6 nF	4.7 μF		
		3640	500			15 nF	6.8 μF			

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Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance				
				[Min. V]	[Max. V]	[Min.]	[Max.]			
VJ HIFREQ Series	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitor</li> <li>Made with a combination of design, materials, and tight process control to achieve very high field reliability</li> <li>Available with tin-lead terminations (min.4 % lead)</li> <li>Available with AgPd terminations for silver epoxy bonding</li> <li>Available with non-magnetic copper terminations for reflow soldering</li> <li>Excellent aging characteristics</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Broadband wireless communication</li> <li>Satellite communication</li> <li>WiFi (802.11) and WiMax (802.16)</li> <li>VoIP networks and cellular base stations</li> <li>Subscriber-based wireless devices</li> </ul>	0402	HIFREQ COG (NP0)	25	200	0.1 pF	82 pF			
		0603					470 pF			
		0805					1.5 nF			
VJ QUAD HIFREQ Series	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitor for high-frequency applications</li> <li>Case sizes 0505, 1111, 2525, and 3838</li> <li>Lead (Pb)-free termination code "X"</li> <li>Available with tin-lead termination code "L"</li> <li>Available with non-magnetic copper termination code "C" for reflow soldering</li> <li>Excellent aging characteristics</li> <li>Ultra-stable, high-Q dielectric material</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>MRI coils and generators</li> <li>RF instruments</li> <li>Lasers, CATV, UHF / microwave RF power amplifiers</li> <li>Filter networks, timing circuits</li> <li>Mixers, oscillators, impedance matching networks</li> </ul>	0505	HIFREQ COG (NP0)	200	250	0.1 pF	100 pF			
		1111					300	1500	0.2 pF	1000 pF
		2525					300	3600	1.0 pF	2700 pF
		3838					500	7200	1.0 pF	5100 pF
VJ Safety Certified Capacitors	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitor, safety certified</li> <li>Qualified to IEC 60384-14</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Power supplies</li> <li>Facsimile and telephone</li> <li>AC equipment and appliances</li> <li>Lightning strike and voltage surge protection</li> <li>EMI and AC line filtering</li> <li>Isolators</li> </ul>	2008	COG (NP0) (X1 / Y2)	250	250	10 pF	220 pF			
		2012					18 pF	470 pF		
		2220					47 pF	1.0 nF		
		2008	COG (NP0) (X2)				10 pF	390 pF		
		2012					18 pF	470 pF		
		2008	X7R (X1 / Y2)				82 pF	1.0 nF		
		2012					150 pF	1.2 nF		
		2220					270 pF	4.7 nF		
		2008	X7R (X2)				82 pF	2.7 nF		
		2012					150 pF	5.6 nF		
		2220					270 pF	12 nF		



# MULTILAYER CERAMIC CHIP CAPACITORS

Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance					
				[Min. V]	[Max. V]	[Min.]	[Max.]				
<b>VJ...SE</b> Source Energy Capacitor (SEC)	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitor</li> <li>Low-electrostrictive ceramic formulation for repeated charge and discharge cycles</li> <li>High pulse discharge currents</li> <li>Made with a combination of design, materials, and tight process control to achieve very high field reliability</li> <li>Available with tin-lead terminations (min. 4% lead)</li> <li>Excellent reliability and high-voltage performance</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Power supplies</li> <li>Converter</li> <li>Voltage multiplier</li> </ul>	1812	X7R	1000	1500	4.7 nF	27 nF				
		1825				10 nF	56 nF				
		2225				18 nF	100 nF				
		3040				33 nF	220 nF				
		3640				47 nF	330 nF				
		4044				100 nF	560 nF				
<b>VJ Controlled Discharge Capacitor (CDC)</b>	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitor with integrated resistor</li> <li>Low-electrostrictive ceramic formulation for repeated charge and discharge cycles</li> <li>High pulse discharge currents</li> <li>Made with a combination of design, materials, and tight process control to achieve very high field reliability</li> <li>Available with tin-lead terminations (min. 4% lead)</li> <li>Excellent reliability and high-voltage performance</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Detonation devices (munitions, pyrotechnic, blasting)</li> <li>Down hole drilling</li> <li>Electronic fuzing</li> </ul>	3040	X7R (Y5P)	1000	1500	33 nF	220 nF				
		3640				47 nF	330 nF				
		4044				100 nF	560 nF				
<b>VJ 31/34</b> Automotive Series	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>AEC-Q200-qualified with PPAP available</li> <li>C0G (NP0) offers ultra-stable dielectric and low power dissipation factor</li> <li>X7R operating temperature up to +150 °C, above +125 °C with derating</li> <li>X8R maintains capacitance at high temperature</li> <li>AgPd terminations available for silver epoxy bonding</li> <li>Polymer terminations in C0G (NP0)/X7R/X8R available for increased resistance to board flex cracking for size 0603 and larger</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Timing and tuning circuits</li> <li>Filtering and decoupling</li> <li>Sensor and scanner applications</li> <li>Power supplies</li> </ul>	0402	C0G (NP0)	50	25	100	1.0 pF	220 pF			
		0603						200	1.0 nF		
		0805						500	3.9 nF		
		1206						630	10 nF		
		1210							100 pF	12 nF	
		1812						3000	12 pF	22 nF	
		0402	X7R	16	50	100	120 pF	47 nF	120 pF		
		0603							200	150 nF	
		0805							500	330 pF	470 nF
		1206							630	220 pF	1.0 µF
		1210								390 pF	
		1812								10 nF	
		0402	X8R	25	50	100	330 pF	6.8 nF	330 pF		
		0603							470 pF	33 nF	
		0805							50	100 nF	
		1206								1.0 nF	220 nF
1210	10 nF	390 nF									

## MULTILAYER CERAMIC CHIP CAPACITORS



Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance	
				[Min. V]	[Max. V]	[Min.]	[Max.]
<b>VJ 31X RoHS Automotive Series</b>	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>AEC-Q200-qualified with PPAP available</li> <li>Compliant with ELV directive</li> <li>C0G (NP0) offers ultra-stable dielectric and low power dissipation factor</li> <li>X7R operating temperature up to +150 °C, above +125 °C with derating</li> <li>X8R maintains capacitance at high temperature</li> <li>Polymer terminations in C0G(NP0)/X7R/X8R available for increased resistance to board flex cracking for size 0603 and larger</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Timing and tuning circuits</li> <li>Filtering and decoupling</li> <li>Sensor and scanner applications</li> <li>Power supplies</li> </ul>	0402	C0G (NP0)	25	100	1.0 pF	220 pF
		0603			200		1.0 nF
		0805		50	500		3.9 nF
		1206			630		10 nF
		1210			100 pF		12 nF
		1812			3000		12 pF
		0402	X7R	16	100	120 pF	47 nF
		0603			200	330 pF	150 nF
		0805			250	470 nF	
		1206			1000	220 pF	1.0 μF
		1210		630	390 pF		
		1812		50	10 nF		
		0402	X8R	25	100	330 pF	6.8 nF
		0603				470 pF	33 nF
		0805				100 nF	
		1206			50	1.0 nF	220 nF
		1210			10 nF	220 nF	
		<b>GA.. 34G Automotive Series AgPd Termination</b>	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>AgPd termination for conductive epoxy assembly</li> <li>AEC-Q200-qualified with PPAP available</li> <li>Compliant with ELV directive</li> <li>Vishay “Green” product</li> <li>C0G (NP0) offers ultra-stable dielectric and low power dissipation factor</li> <li>X7R operating temperature up to +150 °C, above +125 °C with derating</li> <li>X8R maintains capacitance at high temperature</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Timing and tuning circuits</li> <li>Filtering and decoupling</li> <li>Sensor and scanner applications</li> <li>Power supplies</li> </ul>	0402	C0G (NP0)	25	100
0603	200			1.0 nF			
0805	50			500		3.9 nF	
1206				630		10 nF	
1210				100 pF		12 nF	
1812				3000		12 pF	22 nF
0402	X7R			16	100	120 pF	47 nF
0603					200	330 pF	150 nF
0805					250	470 nF	
1206					630	220 pF	1.0 μF
1210				390 pF			
1812				50	10 nF		
0402	X8R			25	100	330 pF	6.8 nF
0603						470 pF	33 nF
0805						100 nF	
1206					50	1.0 nF	220 nF
1210					10 nF	220 nF	

# MULTILAYER CERAMIC CHIP CAPACITORS



Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance			
				[Min. V]	[Max. V]	[Min.]	[Max.]		
<b>VJ OMD</b> <b>(Open-Mode Design)</b> <b>Commercial Series</b>	<b>FEATURES</b> <ul style="list-style-type: none"> <li>• Surface-mount multilayer ceramic chip capacitors</li> <li>• Reduce risk of shorts or leakage in board-flex-sensitive applications</li> <li>• Polymer terminations available for intensive board flex requirements</li> <li>• AgPd terminations available for silver epoxy bonding</li> <li>• High voltage breakdown compared to standard design</li> <li>• Wet build process</li> <li>• Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>• Demanding boardflex applications</li> <li>• Input/output filter capacitors</li> <li>• Snubber capacitor applications</li> <li>• Power supplies</li> </ul>	1206	COG (NP0)	50	1500	10 pF	4.7 nF		
		1210			2000		8.2 nF		
		1808			3000		18 nF		
		1812			1000		15 pF	33 nF	
		1825			X7R	16	630	470 pF	220 nF
		2220							270 pF
		2225					2000	390 pF	1.0 μF
		0805					630	470 pF	220 nF
		1206	X7R	16	630	470 pF	220 nF		
		1210					2000	270 pF	390 pF
		1808			3000	220 pF	18 nF		
		1812			50	100 pF	1.2 μF		
		1825			100	5.6 nF	1.5 μF		
		2220			50	1.0 nF	1.8 μF		
		2225			100	5.6 nF			
		<b>HV...HV</b> <b>High-Voltage Series</b>			<b>FEATURES</b> <ul style="list-style-type: none"> <li>• Surface-mount multilayer ceramic chip capacitor</li> <li>• Excellent reliability and thermal shock performance</li> <li>• High voltage breakdown compared to standard design</li> <li>• High-reliability serial electrode design</li> <li>• Protective surface coating may be required to prevent arcing over</li> <li>• Wet build process</li> <li>• Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>• Input filter capacitors</li> <li>• Output filter capacitors</li> <li>• Snubber capacitors reduce MOSFET voltage spikes</li> <li>• Filtering for switching power supplied</li> <li>• For lighting and other AC applications please contact : mlcc@vishay.com</li> </ul>	1812	X7R	3000	5000
1825	330 pF		10 nF						
2220	390 pF								
2225	470 pF		15 nF						

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Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance			
				[Min. V]	[Max. V]	[Min.]	[Max.]		
<b>VJ Commercial Series</b>	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>C0G (NP0) offers ultra-stable dielectric and low power dissipation</li> <li>Polymer terminations available with C0G (NP0)/X7R for board flex requirements for size 0603 and larger</li> <li>AgPd terminations available for silver epoxy bonding</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Timing and tuning circuits</li> <li>Filtering and decoupling</li> <li>Sensor and scanner applications</li> <li>Surge suppression</li> <li>Power supplies</li> </ul>	0402	C0G (NP0)	50	25	100	1.0 pF	220 pF	
		0603			200	1.0 nF			
		0805			500	4.7 nF			
		1206			630	10 nF			
		1210			630	56 pF	12 nF		
		1808			1000	18 pF	10 nF		
		1812			1000	39 pF	22 nF		
		1825			500	100 pF	39 nF		
		2220			1000	270 pF	47 nF		
		2225			1000	270 pF	56 nF		
		0402	X7R	16	50	100	120 pF	47 nF	
		0603				200	150 nF		
		0805				250	330 pF	470 nF	
		1206				630	1.0 μF		
		1210				630	390 pF	1.0 μF	
		1808				50	470 pF	270 nF	
		1812				1000	1.0 nF	1.0 μF	
		1825				25	10 nF	2.7 μF	
		2220				50	500	15 nF	2.2 μF
		2225				25	1000	33 nF	4.7 μF
3640	25	500	27 nF	6.8 μF					
<b>VJ High Q Dielectric Commercial Series</b>	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>High Q at high frequencies</li> <li>Low ESR and dissipation factor</li> <li>AgPd terminations available for silver epoxy bonding</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Timing and tuning circuits</li> <li>Filtering and decoupling</li> <li>Sensor applications</li> </ul>	0603	High-Q C0G (NP0)	50	100	1.0 pF	100 pF		
		0805					200	220 pF	
<b>X8R Dielectric VJ High Temperature</b>	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>High-operating-temperature dielectric</li> <li>Maintains capacitance at high temperature</li> <li>AgPd terminations available for silver epoxy bonding</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>High-temperature modules</li> </ul>	0402	X8R	25	100	470 pF	330 pF	6.8 nF	
		0603					33 nF		
		0805					100 nF		
		1206					1.0 nF	220 nF	
		1210					50	10 nF	220 nF





# MULTILAYER CERAMIC CHIP CAPACITORS

Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance		
				[Min. V]	[Max. V]	[Min.]	[Max.]	
VJ Hi-Rel Series	<b>FEATURES</b> <ul style="list-style-type: none"> <li>MIL-PRF-55681-qualified production line</li> <li>Available with group A and C screening</li> <li>Available with only group A screening</li> <li>Available with only voltage conditioning</li> <li>Available with tin-lead terminations (min. 4 % lead)</li> <li>AgPd terminations available for silver epoxy bonding</li> <li>Customized testing and certification available</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>System-critical medical applications</li> <li>Mission-critical military and aerospace applications</li> </ul>	0402	COG (NP0)	10	100	1.0 pF	180 nF	
		0603			200		1.5 nF	
		0805			500		3.3 nF	
		1206		16	600	10 nF		
		1210		25	500		22 pF	
		1808					39 pF	22 nF
		1812					100 pF	33 nF
		1825					120 pF	39 nF
		2220						
		2225						
		0402	X5R	6.3	16	27 nF	47 nF	
		0603			6.3	120 nF	150 nF	
		0402	X7R	6.3	100	100 pF	22 nF	
		0603				270 pF	100 nF	
		0805		10	200	150 pF	390 nF	
		1206		16	500	680 pF	1.0 μF	
		1210				1.0 nF	270 nF	
		1808				3.3 nF	1.0 μF	
		1812				25	500	2.7 μF
		1825						10 nF
2220	4.7 μF							
2225	15 nF	6.8 μF						
3640								
MIL-PRF-55681 (CDR)	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>Federal stock control number CAGE CODE 2770A</li> <li>MIL-PRF-55681-qualified products</li> <li>High reliability tested per MIL-PRF-55681</li> <li>Available with tin-lead terminations (min. 4 % lead)</li> <li>Available with lead (Pb)-free terminations</li> <li>Available with AgPd terminations for silver epoxy bonding</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Avionic systems</li> <li>Sonar systems</li> <li>Satellite systems</li> <li>Missiles applications</li> <li>Geographical information systems</li> <li>Global positioning systems</li> </ul>	CDR01 (0805)	BP	100	100	10 pF	180 pF	
			BX	50		120 pF	4.7 nF	
		CDR02 (1805)	BP	100		220 pF	270 pF	
			BX	50		3.9 nF	22 nF	
		CDR03 (1808)	BP	100		330 pF	1.0 nF	
			BX	50		12 nF	68 nF	
		CDR04 (1812)	BP	100	1.2 nF	3.3 nF		
			BX	50	39 nF	180 nF		
		CDR06 (2225)	BX	50	50	390 nF	470 nF	
		CDR31 (0805)	BP	50	100	1.0 pF	680 pF	
			BX			470 pF	18 nF	
		CDR32 (1206)	BP			1.0 pF	2.2 nF	
			BX			4.7 nF	39 nF	
		CDR33 (1210)	BP			1.0 nF	3.3 nF	
			BX			15 nF	100 nF	
		CDR34 (1812)	BP			2.2 nF	10 nF	
			BX			27 nF	180 nF	
		CDR35 (1825)	BP			4.7 nF	22 nF	
	BX	56 nF	470 nF					



## MULTILAYER CERAMIC CHIP CAPACITORS



Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance	
				[Min. V]	[Max. V]	[Min.]	[Max.]
MIL-PRF-123	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Space-level reliability</li> <li>Military-qualified products</li> <li>Federal stock control number, CAGE CODE 2770A</li> <li>High reliability tested per MIL-PRF-123</li> <li>Lead-bearing (min. 4 %) termination finish "Z"</li> <li>Guarded termination finish "S"</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> <li>Material categorization: for definitions of compliance</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Space systems</li> <li>Satellite systems</li> <li>Avionic systems</li> <li>Sonar systems</li> <li>Missiles applications</li> <li>Global positioning systems</li> </ul>	CKS51 (0805)	BP		100	1.0 pF	680 pF
		CKS55 (1206)	BP		100	1.0 pF	2200 pF
		CKS52 (1210)	BP		100	300 pF	3300 pF
		CKS53 (1808)	BP		100	300 pF	1000 pF
		CKS56 (1812)	BP		100	1200 pF	10 000 pF
		CKS57 (1825)	BP		100	3600 pF	22 000 pF
		CKS54 (2225)	BP		50	1100 pF	10 000 pF
		CKS51 (0805)	BX		100	330 pF	18 000 pF
		CKS55 (1206)	BX		100	4700 pF	39 000 pF
		CKS52 (1210)	BX		100	5600 pF	100 000 pF
		CKS53 (1808)	BX		100	5600 pF	100 000 pF
		CKS56 (1812)	BX		100	27 000 pF	56 000 pF
		CKS57 (1825)	BX		100	56 000 pF	470 000 pF
DSCC 03029	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>Made with a combination of design, materials, and tight process control to achieve very high field reliability</li> <li>US defense supply center approved</li> <li>Federal stock control number CAGE CODE 2770A</li> <li>Available with tin-lead terminations (min. 4 % lead)</li> <li>Available with AgPd terminations for silver epoxy bonding</li> <li>Excellent aging characteristic</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Broadband wireless communication</li> <li>Satellite communication</li> <li>WiFi (802.11) and WiMax (802.16)</li> <li>Subscriber-based wireless devices</li> <li>Microwave systems</li> </ul>	0402	BP	6.3	100	1.0 pF	180 pF
			BR				
			BX	8.2 nF			



# MULTILAYER CERAMIC CHIP CAPACITORS

Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance	
				[Min. V]	[Max. V]	[Min.]	[Max.]
DSCC 03028	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>Made with a combination of design, materials, and tight process control to achieve very high field reliability</li> <li>US defense supply center approved</li> <li>Federal stock control number CAGE CODE 2270A</li> <li>Available with tin-lead terminations (min. 4 % lead)</li> <li>Available with AgPd terminations for silver epoxy bonding</li> <li>Excellent aging characteristic</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Broadband wireless communication</li> <li>Satellite communication</li> <li>WiFi (802.11) and WiMax (802.16)</li> <li>Subscriber-based wireless devices</li> <li>Microwave systems</li> </ul>	0603	BP	6.3	100	1.0 pF	1.0 nF
			BR			100 pF	100 nF
			BX				
DSCC 05001	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>Made with a combination of design, materials, and tight process control to achieve very high field reliability</li> <li>US defense supply center approved</li> <li>Federal stock control number CAGE CODE 2270A</li> <li>Available with tin-lead terminations (min. 4 % lead)</li> <li>Available with AgPd terminations for silver epoxy bonding</li> <li>Excellent aging characteristic</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Broadband wireless communication</li> <li>Satellite communication</li> <li>WiFi (802.11) and WiMax (802.16)</li> <li>Subscriber-based wireless devices</li> <li>Microwave systems</li> </ul>	0805	BP	50	250	1.0 pF	100 pF
DSCC 05002	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>Made with a combination of design, materials, and tight process control to achieve very high field reliability</li> <li>US defense supply center approved</li> <li>Federal stock control number CAGE CODE 2270A</li> <li>Available with tin-lead terminations (min. 4 % lead)</li> <li>Available with AgPd terminations for silver epoxy bonding</li> <li>Excellent aging characteristic</li> <li>Wet build process</li> <li>Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Broadband wireless communication</li> <li>Satellite communication</li> <li>WiFi (802.11) and WiMax (802.16)</li> <li>Subscriber-based wireless devices</li> <li>Microwave systems</li> </ul>	0603	BP	50	250	1.0 pF	100 pF



# MULTILAYER CERAMIC CHIP CAPACITORS

Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance	
				[Min. V]	[Max. V]	[Min.]	[Max.]
DSCC 05003	<b>FEATURES</b> <ul style="list-style-type: none"> <li>• Surface-mount multilayer ceramic chip capacitors</li> <li>• Made with a combination of design, materials, and tight process control to achieve very high field reliability</li> <li>• US defense supply center approved</li> <li>• Federal stock control number CAGE CODE 2270A</li> <li>• Available with tin-lead terminations (min. 4 % lead)</li> <li>• Available with AgPd terminations for silver epoxy bonding</li> <li>• Excellent aging characteristic</li> <li>• Wet build process</li> <li>• Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>• Broadband wireless communication</li> <li>• Satellite communication</li> <li>• WiFi (802.11) and WiMax (802.16)</li> <li>• Subscriber-based wireless devices</li> <li>• Microwave systems</li> </ul>	0402	BP	50	100	1.0 pF	27 pF
DSCC 05006	<b>FEATURES</b> <ul style="list-style-type: none"> <li>• Surface-mount multilayer ceramic chip capacitors</li> <li>• Made with a combination of design, materials, and tight process control to achieve very high field reliability</li> <li>• US defense supply center approved</li> <li>• Federal stock control number CAGE CODE 2270A</li> <li>• Available with tin-lead terminations (min. 4 % lead)</li> <li>• Available with AgPd terminations for silver epoxy bonding</li> <li>• Excellent aging characteristic</li> <li>• Wet build process</li> <li>• Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>• Broadband wireless communication</li> <li>• Satellite communication</li> <li>• WiFi (802.11) and WiMax (802.16)</li> <li>• Subscriber-based wireless devices</li> <li>• Microwave systems</li> </ul>	0805	BP		200	1.0 pF	3.3 nF
			BR	10		220 nF	
							BX
DSCC 05007	<b>FEATURES</b> <ul style="list-style-type: none"> <li>• Surface-mount multilayer ceramic chip capacitors</li> <li>• Made with a combination of design, materials, and tight process control to achieve very high field reliability</li> <li>• US defense supply center approved</li> <li>• Federal stock control number CAGE CODE 2270A</li> <li>• Available with tin-lead terminations (min. 4 % lead)</li> <li>• Available with AgPd terminations for silver epoxy bonding</li> <li>• Excellent aging characteristic</li> <li>• Wet build process</li> <li>• Reliable Noble Metal Electrode (NME) system</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>• Broadband wireless communication</li> <li>• Satellite communication</li> <li>• WiFi (802.11) and WiMax (802.16)</li> <li>• Subscriber-based wireless devices</li> <li>• Microwave systems</li> </ul>	1206	BP	16	200	1.0 pF	6.8 nF
			BR	10	100	820 pF	560 nF



# MULTILAYER CERAMIC CHIP CAPACITORS

Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance		
				[Min. V]	[Max. V]	[Min.]	[Max.]	
<b>VJ....W1BC</b> Basic Commodity	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>Ultra-stable dielectric C0G (NP0)</li> <li>High capacitance per unit volume X5R/X7R/Y5V</li> <li>100 % matte tin terminations</li> <li>Dry sheet technology process</li> <li>Base Metal Electrode system (BME)</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Consumer electronics</li> <li>Telecommunications</li> <li>Mobile applications</li> <li>Data processing</li> </ul>	0402	C0G (NP0)	10	100	0.5 pF	1.0 nF	
		0603					3.3 nF	
		0805					12 nF	
		1206					39 nF	
		0402	X5R	6.3	50	1.5 pF	47 nF	10 µF
		0603					220 nF	22 µF
		0805					47 µF	
		1206					100 µF	
		1210					220 µF	
		0402	X7R	6.3	50	100 pF	1.0 µF	2.2 µF
		0603					10 µF	
		0805					10 µF	
		1206					22 µF	
		1210					47 µF	
		0402	Y5V	6.3	50	10 nF	1.0 µF	4.7 µF
		0603					10 µF	
		0805					10 µF	
1206	22 µF							
1210	100 µF							
<b>VJ....W1BC</b> High Q, Basic Commodity	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>Ultra-stable dielectric C0G (NP0)</li> <li>High Q and low ESR at high frequency</li> <li>100 % matte tin terminations</li> <li>Dry sheet technology process</li> <li>Base Metal Electrode system (BME)</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Mobile telecommunications</li> <li>WLAN applications</li> <li>RF modules</li> <li>Tuner</li> </ul>	0402	High Q C0G (NP0)	16	50	0.5 pF	470 pF	
		0603					100	3.3 nF
<b>VJ....W1BC</b> Ultra-High Q/ Low ESR, Basic Commodity	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>Ultra stable dielectric C0G (NP0)</li> <li>High Q and low ESR at high frequency</li> <li>100 % matte tin terminations</li> <li>Dry sheet technology process</li> <li>Base Metal Electrode system (BME)</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Mobile telecommunications</li> <li>WLAN applications</li> <li>RF modules</li> <li>Tuner</li> </ul>	0201	Ultra- High Q C0G (NP0)	10	25	0.1 µF	33 pF	
		0402					100	22 pF
		0603		50	250	0.3 pF	47 pF	
		0805					100 pF	



# MULTILAYER CERAMIC CHIP CAPACITORS

Series	Description	Case Size	TC and Dielectric	Voltage		Capacitance	
				[Min. V]	[Max. V]	[Min.]	[Max.]
VJ0201...W1BC Ultra-Small Series, Basic Commodity	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>Ultra-small size</li> <li>High capacitance per unit volume</li> <li>100 % matte tin terminations</li> <li>Dry sheet technology process</li> <li>Base Metal Electrode system (BME)</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Microwave modules</li> <li>Portable equipment (mobile phone, PDA)</li> <li>RF modules</li> </ul>	0201	C0G (NP0)	16	50	0.5 pF	120 pF
			X5R	6.3		100 pF	2.2 μF
			X7R	10		10 nF	
VJ06C4...W1BC MLCC Chip Array, Basic Commodity	<b>FEATURES</b> <ul style="list-style-type: none"> <li>Surface-mount multilayer ceramic chip capacitors</li> <li>4 capacitors per unit</li> <li>100 % matte tin terminations</li> <li>Dry sheet technology process</li> <li>Base Metal Electrode system (BME)</li> </ul> <b>APPLICATIONS</b> <ul style="list-style-type: none"> <li>Bypass for digital and analog signal lines</li> <li>Computer motherboards and peripherals</li> </ul>	0612	C0G (NP0)	50	50	10 pF	470 pF
			X7R	16		180 pF	100 nF
			Y5V	50		10 nF	



# MULTILAYER CERAMIC CHIP CAPACITORS

PART NUMBERING / ORDERING INFORMATION <sup>(7)</sup>									
VJ	0805	Y	102	K	X	A	A	C	2L
SERIES ID	CASE CODE <sup>(5)</sup>	DIELECTRIC	CAPACITANCE NOMINAL CODE	TOLERANCE CODE <sup>(1)</sup>	TERMINATION	DC VOLTAGE RATING	MARKING OPTION <sup>(2)</sup>	PACKAGING	PROCESS CODE <sup>(6)</sup>
VJ HV GA	0201 0402 0505 0603 06C4 <sup>(3)</sup> 0805 1111 1206 1210 1808 1812 1825 2008 2012 2220 2225 2525 3040 3640 3838 4044	A = C0G (NP0)  Y = X7R  G = X5R  H = X8R  Q = high Q  V = Y5V  L = ultra-high Q, low ESR  D = HIFREQ	Expressed in picofarad (pF). The first two digits are significant, the third is a multiplier. An "R" indicates a decimal point.  Example: 0R3 = 0.3 pF 4R7 = 4.7 pF 102 = 1000 pF 473 = 47 000 pF	V = ± 0.05 pF B = ± 0.10 pF C = ± 0.25 pF D = ± 0.50 pF F = ± 1 % G = ± 2 % H = ± 3 % J = ± 5 % K = ± 10 % M = ± 20 % Z = - 20 %/+ 80 %	X = Ni barrier 100 % matte tin plate finish  B = polymer 100 % matte tin plate finish  F, E = AgPd <sup>(4)</sup>  L = Ni barrier tin / lead plate min. 4 % lead  N = non-magnetic <sup>(7)</sup>  C = copper barrier 100 % matte tin plate finish (non-magnetic) <sup>(7)</sup>	Y = 6.3 V <sub>DC</sub> Q = 10 V <sub>DC</sub> J = 16 V <sub>DC</sub> X = 25 V <sub>DC</sub> Z = 35 V <sub>DC</sub> A = 50 V <sub>DC</sub> B = 100 V <sub>DC</sub> K = 150 V <sub>DC</sub> C = 200 V <sub>DC</sub> P = 250 V <sub>DC</sub> D = 300 V <sub>DC</sub> T = 400 V <sub>DC</sub> E = 500 V <sub>DC</sub> L = 630 V <sub>DC</sub> I = 800 V <sub>DC</sub> G = 1000 V <sub>DC</sub> R = 1500 V <sub>DC</sub> F = 2000 V <sub>DC</sub> O = 2500 V <sub>DC</sub> H = 3000 V <sub>DC</sub> W = 3600 V <sub>DC</sub> V = 4000 V <sub>DC</sub> M = 5000 V <sub>DC</sub> S = 7200 V <sub>DC</sub> S = 4 V <sub>DC</sub> only for VJ...W1BC series U = 250 V <sub>AC</sub>	A = unmarked  M = marking vendor ID + 2-character cap. code (size 0805 / 1206)  B = marking for automotive VJ...31 / VJ...31X vendor ID + date code (size 0805 / 1206)  Q = marking vendor ID + tolerance + 3-character cap. code (size 0505 / 1111 / 2525 / 3838)  S = marking for safety caps	T = 7" reel / plastic tape  C = 7" reel / paper tape  O = 7" reel / flamed paper tape used for AgPd termination 0402 / 0603 / 0805  J = 7" reel (low quantity)  E = 7" reel / plastic tape only used automotive VJ...31 / VJ...34  R = 11 1/4" / 13" reel / plastic tape  P = 11 1/4" / 13" reel / paper tape  I = 11 1/4" / 13" reel / flamed paper tape used for AgPd termination 0402 / 0603 / 0805  M = 11 1/4" / 13" reel / plastic tape only used automotive VJ...31 / VJ...34  W = waffle pack	00, 54 = standard  31, 34, 31X, 34G = automotive  4X, 5H = open mode  HV = high voltage  5Z, 5ZL = HVArc Guard®  X1, X2 = safety caps  SE = Source Energy Capacitor (SEC)  8R = Controlled Discharge Capacitor (CDC)  2L, 2M, 2MP, 68, 5G = high-rel.  W1BC = basic commodity

**Notes**

- (1) For details see individual datasheets
- (2) Marking option is not available in process code W1BC
- (3) Chip array size 0612 including 4 capacitors VJ06C4...W1BC, only Basic Commodity Series
- (4) Termination code "E" for conductive epoxy assembly, contact [mlcc@vishay.com](mailto:mlcc@vishay.com) for availability
- (5) Case size designator may be replaced by a four-digit drawing number
- (6) Customer-specific process codes are also possible
- (7) For non-magnetic termination, "C" is recommended for solder assembly, and "N" for conductive epoxy assembly



# MULTILAYER CERAMIC CHIP CAPACITORS

## PART NUMBERING/ORDERING INFORMATION MILITARY PRODUCTS <sup>(1)</sup>

CDR31	BX	103	A	K	Z	P	A	T
MILITARY STYLE	DIELECTRIC	CAPACITANCE	DC VOLTAGE RATING	TOLERANCE CODE	TERMINATION	FAILURE RATE	MARKING OPTION	PACKAGING
CDR01 CDR02 CDR03 CDR04 CDR06 CDR31 CDR32 CDR33 CDR34	BP BX	Expressed in picofarad (pF). The first two digits are significant, the third is a multiplier. An "R" indicates a decimal point. Example: 4R7 = 4.7 pF 102 = 1000 pF	A = 50 V B = 100 V	C = $\pm 0.25$ pF D = $\pm 0.50$ pF F = $\pm 1$ % J = $\pm 5$ % K = $\pm 10$ % M = $\pm 20$ %	M = Silver palladium  Y = Ni barrier 100 % tin plate matte finish  W = Ni barrier 100 % tin plate matte finish  Z = Ni barrier 100 % tin/lead plate min. 4 %  U = Ni barrier - solder coated min. 4 % lead	M = 1.0 % P = 0.1 % R = 0.01 % S = 0.001 %  Consult factory for failure rate status	A = Unmarked	T = 7" reel / plastic tape  J = 7" reel (low qty.)  C = 7" reel / paper tape  R = 11 1/4" / 13" reel / plastic tape  P = 11 1/4" / 13" reel / paper tape  B = bulk

### Notes

- For details of ratings, see individual datasheet

## PART NUMBERING/ORDERING INFORMATION DSCC PRODUCTS <sup>(1)</sup>

03028-	BX	102	A	K	Z	C	J
DSCC STYLE	DIELECTRIC	CAPACITANCE	DC VOLTAGE RATING	TOLERANCE CODE	TERMINATION	GROUP TESTING	PACKAGING
03028- 03029- 05006- 05007-	BP BX BR	Expressed in picofarad (pF). The first two digits are significant, the third is a multiplier. An "R" indicates a decimal point. Example: 4R7 = 4.7 pF 102 = 1000 pF	X = 10 V Y = 16 V Z = 25 V A = 50 V B = 100 V C = 200 V	C = $\pm 0.25$ pF D = $\pm 0.50$ pF F = $\pm 1$ % G = $\pm 2$ % J = $\pm 5$ % K = $\pm 10$ % M = $\pm 20$ %	M = silver palladium  Z = Ni barrier tin / lead plate min. 4 % lead  U = Ni barrier - solder coated min. 4 % lead	C = Full group C L = 2000 h life test only M = 1000 h life test only H = Low-voltage humidity test only - = Group A test only	T = 7" reel / plastic tape  J = 7" reel (low qty.) C = 7" reel / paper tape O = 7" reel / flamed paper tape R = 11 1/4" / 13" reel / plastic tape P = 11 1/4" / 13" reel / paper tape I = 11 1/4" / 13" reel / flamed paper tape B = bulk

### Notes

- For details of ratings, see individual datasheet





# MULTILAYER CERAMIC CHIP CAPACITORS

PART NUMBERING/ORDERING INFORMATION DSCC PRODUCTS <sup>(1)</sup>						
05001-	4R7	A	C	Z	C	J
DSCC STYLE	CAPACITANCE	DC VOLTAGE RATING	TOLERANCE CODE	TERMINATION	GROUP TESTING	PACKAGING
05001- 05002- 05003-	Expressed in picofarad (pF). The first two digits are significant, the third is a multiplier. An "R" indicates a decimal point. Example: 4R7 = 4.7 pF	A = 50 V B = 100 V C = 200 V K = 250 V	B = ± 0.10 pF C = ± 0.25 pF D = ± 0.50 pF F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % M = ± 20 %	M = Silver palladium  Z = Ni barrier tin/lead plate min. 4 % lead	C = full group C L = 2000 h life test only M = 1000 h life test only H = low-voltage humidity test only - = group A test only	T = 7" reel/plastic tape J = 7" reel/(low qty.) C = 7" reel/paper tape O = 7" reel/flamed paper tape R = 11 1/4"/13" reel/plastic tape P = 11 1/4"/13" reel/paper tape I = 11 1/4"/13" reel/flamed paper tape B = Bulk

**Notes**

- For details of ratings, see individual datasheet
- Contact [mlcc@vishay.com](mailto:mlcc@vishay.com) for availability

PART NUMBERING / ORDERING INFORMATION MIL-PRF-123							
M123A	10	BX	B	103	K	Z	T
MILITARY STYLE	SLASH SHEET	DIELECTRIC	DC VOLTAGE RATING	CAPACITANCE	TOLERANCE CODE	TERMINATION	PACKAGING
MIL-PRF-123	10: CKS51 (0805) 11: CKS52 (1210) 12: CKS53 (1808) 13: CKS54 (2225) 21: CKS55 (1206) 22: CKS56 (1812) 23: CKS57 (1825)	BP BX	B = 50 V C = 100 V	Expressed in picofarad (pF). The first two digits are significant, the third is a multiplier. "R" denotes decimal place. Examples: 1R0 = 1.0 pF 103 = 10 000 pF 104 = 100 000 pF	B = ± 0.10 pF C = ± 0.25 pF D = ± 0.50 pF F = ± 1 % J = ± 5 % K = ± 10 % M = ± 20 % For BP: B, C, D, J, K For BX: K, M	Z = Ni barrier with tin / lead plate min. 4 % lead S = guarded termination	Plastic tape: T = 7" reel R = 11 1/4" / 13" reel  Low quantity: J = 7" reel  Bulk packaging: B = bulk

**Notes**

- For details of ratings, see individual datasheet
- Contact [mlcc@vishay.com](mailto:mlcc@vishay.com) for availability

**Notes**

- (1) For details of ratings, see individual datasheet



# MULTILAYER CERAMIC CHIP CAPACITORS

## Links and Promotional Information

### PRODUCT SHEETS

**RF Applications**

HiFREQ:..... [www.vishay.com/doc?45071](http://www.vishay.com/doc?45071)  
QUAD HiFREQ: ..... [www.vishay.com/doc?45221](http://www.vishay.com/doc?45221)

**COMMODITY APPLICATIONS:**

VJ...W1BC High Q:..... [www.vishay.com/doc?49751](http://www.vishay.com/doc?49751)  
VJ...W1BC Ultra-High Q/Low ESR:..... [www.vishay.com/doc?49022](http://www.vishay.com/doc?49022)  
VJ0201...W1BC: ..... [www.vishay.com/doc?49706](http://www.vishay.com/doc?49706)  
VJ06C4...W1BC Chip Array:..... [www.vishay.com/doc?49714](http://www.vishay.com/doc?49714)

**HIGH-VOLTAGE APPLICATIONS:**

HVArc Guard®:..... [www.vishay.com/doc?49667](http://www.vishay.com/doc?49667)

**BOARDFLEX SENSITIVE APPLICATIONS:**

VJ OMD Series: ..... [www.vishay.com/doc?49614](http://www.vishay.com/doc?49614)

**AUTOMOTIVE APPLICATIONS:**

Automotive Instructional Guide: ..... [www.vishay.com/doc?49794](http://www.vishay.com/doc?49794)

## TECH NOTES

**VISHAY BASIC COMMODITY SERIES:**

Test procedures and requirements:..... [www.vishay.com/doc?28545](http://www.vishay.com/doc?28545)  
Soldering and footprint:..... [www.vishay.com/doc?45017](http://www.vishay.com/doc?45017)

**VISHAY VITRAMON:**

End Terminations:..... [www.vishay.com/doc?45063](http://www.vishay.com/doc?45063)  
Soldering recommendations: ..... [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034)

## LEAD (PB)-FREE INFORMATION

How to get lead (Pb)-free: ..... [www.vishay.com/how/leadfree](http://www.vishay.com/how/leadfree)  
Capacitor lead (Pb)-free matrix: ..... [www.vishay.com/doc?49322](http://www.vishay.com/doc?49322)

# MULTILAYER CERAMIC CHIP CAPACITORS



## SEMICONDUCTORS

### *MOSFETs Segment*

#### MOSFETs

- Low-Voltage TrenchFET® Power MOSFETs
- Medium-Voltage Power MOSFETs
- High-Voltage Planar MOSFETs
- High-Voltage Superjunction MOSFETs
- Automotive-Grade MOSFETs

#### ICs

- Power Management and Power Control ICs
- Smart Load Switches
- Analog Switches and Multiplexers

### *Diodes Segment*

#### Rectifiers

- Schottky Rectifiers
- Ultrafast Recovery Rectifiers
- Standard and Fast Recovery Rectifiers
- High-Power Rectifiers/Diodes
- Bridge Rectifiers

#### Small-Signal Diodes

- Schottky and Switching Diodes
- Zener Diodes
- Tuner/Capacitance Diodes
- Bandswitching Diodes
- RF PIN Diodes

#### Protection Diodes

- TVS Diodes or TRANSZORB®  
(unidirectional, bidirectional)
- ESD Protection Diodes (including arrays)

#### Thyristors/SCRs

- Phase-Control Thyristors
- Fast Thyristors

#### IGBTs

#### Power Modules

- Input Modules (diodes and thyristors)
- Output and Switching Modules (contain MOSFETs, IGBTs, and diodes)
- Custom Modules

### *Optoelectronic Components Segment*

#### Infrared Emitters and Detectors

#### Optical Sensors

#### Infrared Remote Control Receivers

#### Optocouplers

- Phototransistor, Photodarlington
- Linear
- Phototriac
- High-Speed
- IGBT and MOSFET Driver

#### Solid-State Relays

#### LEDs and 7-Segment Displays

#### Infrared Data Transceiver Modules

#### Custom Products

## PASSIVE COMPONENTS

### *Resistors and Inductors Segment*

#### Film Resistors

- Metal Film Resistors
- Thin Film Resistors
- Thick Film Resistors
- Power Thick Film Resistors
- Metal Oxide Film Resistors
- Carbon Film Resistors

#### Wirewound Resistors

- Vitreous, Cemented, and Housed Resistors
- Braking and Neutral Grounding Resistors
- Custom Load Banks

#### Power Metal Strip® Resistors

- Battery Management Shunts
- Crowbar and Steel Blade Resistors

#### Thermo Fuses

#### Chip Fuses

#### Pyrotechnic Initiators/Igniters

#### Variable Resistors

- Cermet Variable Resistors
- Wirewound Variable Resistors
- Conductive Plastic Variable Resistors
- Contactless Potentiometers
- Hall Effect Position Sensors
- Precision Magnetic Encoders

#### Networks/Arrays

#### Non-Linear Resistors

- NTC Thermistors
- PTC Thermistors
- Varistors

#### Magnetics

- Inductors
- Wireless Charging Coils
- Transformers

#### Connectors

### *Capacitors Segment*

#### Tantalum Capacitors

- Molded Chip Tantalum Capacitors
- Molded Chip Polymer Tantalum Capacitors
- Coated Chip Tantalum Capacitors
- Solid Through-Hole Tantalum Capacitors
- Wet Tantalum Capacitors

#### Ceramic Capacitors

- Multilayer Chip Capacitors
- Multilayer Chip RF Capacitors
- Disc Capacitors

#### Film Capacitors

#### Power Capacitors

#### Heavy-Current Capacitors

#### Aluminum Capacitors

#### ENYCAP™ Energy Storage Capacitors