

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_{RMS} at 100 kHz
- High voltage breakdown compared to standard design
- 100 % voltage conditioning available up to 630 V_{DC} rating (process code "5H")
Contact mlcc@vishay.com for higher voltages.
- Polymer termination available for intensive board flex requirements
- 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

- Demanding boardflex applications
- Input filter capacitors
- Output filter capacitors
- Snubber capacitors reduce MOSFET voltage spikes
- Filtering for switching power supplies
- For lighting and other AC applications please contact: mlcc@vishay.com

ELECTRICAL SPECIFICATIONS

COG (NP0)	
GENERAL SPECIFICATION	
Note Electrical characteristics at +25 °C unless otherwise specified	
Operating Temperature: -55 °C to +125 °C	
Capacitance Range: 10 pF to 47 nF	
Voltage Range: 50 V _{DC} to 3000 V _{DC}	
Temperature Coefficient of Capacitance (TCC): 0 ppm/°C ± 30 ppm/°C from -55 °C to +125 °C	
Dissipation Factor (DF): 0.1 % maximum at 1.0 V _{RMS} and 1 MHz for values ≤ 1000 pF 0.1 % maximum at 1.0 V _{RMS} and 1 kHz for values > 1000 pF	
Insulating Resistance: 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	
Aging Rate: 0 % maximum per decade	
Dielectric Strength Test: performed per method 103 of EIA 198-2-E Applied test voltages	
≤ 200 V _{DC} -rated:	250 % of rated voltage
500 V _{DC} -rated:	200 % of rated voltage
630 V _{DC} / 1000 V _{DC} -rated:	150 % of rated voltage
1500 V _{DC} to 3000 V _{DC} -rated:	120 % of rated voltage

X7R	
GENERAL SPECIFICATION	
Note Electrical characteristics at +25 °C unless otherwise specified	
Operating Temperature: -55 °C to +125 °C	
Capacitance Range: 100 pF to 1.8 μF	
Voltage Range: 16 V _{DC} to 3000 V _{DC}	
Temperature Coefficient of Capacitance (TCC): ± 15 % from -55 °C to +125 °C, with 0 V _{DC} applied	
Dissipation Factor (DF): < 50 V ratings 3.5 % maximum at 1.0 V _{RMS} and 1 kHz ≥ 50 V ratings 2.5 % maximum at 1.0 V _{RMS} and 1 kHz	
Insulating Resistance: 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	
Aging Rate: 1 % maximum per decade	
Dielectric Strength Test: performed per method 103 of EIA 198-2-E Applied test voltages	
≤ 250 V _{DC} -rated:	250 % of rated voltage
500 V _{DC} -rated:	min. 150 % of rated voltage
630 V _{DC} / 1000 V _{DC} -rated:	150 % of rated voltage
1500 V _{DC} to 3000 V _{DC} -rated:	120 % of rated voltage



QUICK REFERENCE DATA

DIELECTRIC	CASE	MAXIMUM VOLTAGE (V)	CAPACITANCE	
			MINIMUM	MAXIMUM
C0G (NP0)	1206	1500	10 pF	4.7 nF
	1210	2000	10 pF	8.2 nF
	1808	3000	10 pF	8.2 nF
	1812	3000	10 pF	18 nF
	1825	1000	15 pF	33 nF
	2220	1000	270 pF	39 nF
	2225	1000	270 pF	47 nF
X7R	0805	630	470 pF	220 nF
	1206	2000	270 pF	680 nF
	1210	2000	390 pF	1.0 μ F
	1808	3000	220 pF	18 nF
	1812	3000	100 pF	1.2 μ F
	1825	2000	5.6 nF	1.5 μ F
	2220	3000	1.0 nF	1.8 μ F
	2225	2000	5.6 nF	1.8 μ F

Note

- Detail ratings see "Selection Chart"

ORDERING INFORMATION

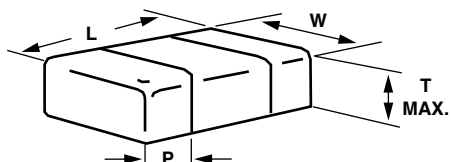
VJ1210	Y	474	J	X	A	A	T	# (2)
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION (4)	DC VOLTAGE RATING (1)	MARKING	PACKAGING	PROCESS CODE
0805 1206 1210 1808 1812 1825 2220 2225	A = C0G (NP0) Y = X7R	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. An "R" indicates a decimal point. Examples 474 = 470 000 pF	F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % M = ± 20 % Note C0G (NP0): F, G, J, K X7R: J, K, M	X = Ni barrier 100 % tin plated matte finish E = AgPd (3) B = polymer 100 % tin plated matte finish	J = 16 V X = 25 V A = 50 V B = 100 V C = 200 V P = 250 V E = 500 V L = 630 V G = 1000 V R = 1500 V F = 2000 V H = 3000 V	A = unmarked C = 7" reel / paper tape T = 7" reel / plastic tape P = 11 1/4" / 13" reel / paper tape R = 11 1/4" / 13" reel / plastic tape O = 7" reel / flamed paper tape I = 11 1/4" / 13" reel / flamed paper tape Note "I" and "O" are used for "E" termination size 0805		4X = OMD cap 5H = OMD cap 100 % voltage conditioning

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 with 2 digits has to be added.
- (3) Termination code "E" is for conductive epoxy assembly.
- (4) Other termination options contact mlcc@vishay.com for availability.

ENVIRONMENTAL STATUS

TERMINATION CODE	TERMINATION DESCRIPTION	RoHS COMPLIANT	VISHAY GREEN
X	Ni barrier 100 % tin plated matte finish	Yes	Yes
E	AgPd	Yes	Yes
B	Polymer layer, 100 % tin plated matte finish	Yes	No

DIMENSIONS in inches (millimeters)


CASE CODE	STYLE	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATION PAD (P)	
					MINIMUM	MAXIMUM
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)	0.028 (0.71)
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)	0.028 (0.71)
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)	0.028 (0.71)
1808	VJ1808	0.180 ± 0.012 (4.57 ± 0.30)	0.080 ± 0.010 (2.03 ± 0.25)	0.086 (2.18)	0.010 (0.25)	0.030 (0.76)
1812	VJ1812	0.177 ± 0.012 (4.50 ± 0.30)	0.126 ± 0.008 (3.20 ± 0.20)	0.086 (2.18)	0.010 (0.25)	0.030 (0.76)
1825	VJ1825	0.177 ± 0.012 (4.50 ± 0.30)	0.252 ± 0.010 (6.40 ± 0.25)	0.086 (2.18)	0.010 (0.25)	0.030 (0.76)
2220	VJ2220	0.220 ± 0.010 (5.59 ± 0.25)	0.200 ± 0.010 (5.08 ± 0.25)	0.086 (2.18)	0.010 (0.25)	0.030 (0.76)
2225	VJ2225	0.220 ± 0.010 (5.59 ± 0.25)	0.250 ± 0.010 (6.35 ± 0.25)	0.086 (2.18)	0.010 (0.25)	0.030 (0.76)

Note

- Polymer (B-termination) have increased dimensions:
length 0.006" (0.15 mm)



SELECTION CHART																										
DIELECTRIC		C0G (NP0)																								
STYLE		VJ1206 ⁽¹⁾							VJ1210 ⁽¹⁾								VJ1808 ⁽¹⁾									
CASE CODE		1206							1210								1808									
VOLTAGE (V _{DC})		50	100	200	500	630	1000	1500	50	100	200	500	630	1000	1500	2000	50	100	200	500	630	1000	1500	2000	3000	
VOLTAGE CODE		A	B	C	E	L	G	R	A	B	C	E	L	G	R	F	A	B	C	E	L	G	R	F	H	
CAP. CODE	CAP.																									
100	10 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
120	12 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
150	15 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
180	18 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
220	22 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
270	27 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
330	33 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
390	39 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	
470	47 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	
560	56 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	
680	68 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	
820	82 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	
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																									
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																									

Notes

• RoHS-compliant

⁽¹⁾ See soldering recommendations within this data book, or visit: www.vishay.com/doc?45034



SELECTION CHART																
DIELECTRIC		C0G (NP0)														
STYLE		VJ1812 ⁽¹⁾									VJ1825 ⁽¹⁾					
CASE CODE		1812									1825					
VOLTAGE (V _{DC})		50	100	200	500	630	1000	1500	2000	3000	50	100	200	500	630	1000
VOLTAGE CODE		A	B	C	E	L	G	R	F	H	A	B	C	E	L	G
CAP. CODE	CAP.															
100	10 pF	•	•	•	•	•	•	•	•	•						
120	12 pF	•	•	•	•	•	•	•	•	•						
150	15 pF	•	•	•	•	•	•	•	•	•					•	•
180	18 pF	•	•	•	•	•	•	•	•	•					•	•
220	22 pF	•	•	•	•	•	•	•	•	•					•	•
270	27 pF	•	•	•	•	•	•	•	•	•					•	•
330	33 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
390	39 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
470	47 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
560	56 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
680	68 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
820	82 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
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	•	•								•	•	•			
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															

Notes

• RoHS-compliant

⁽¹⁾ See soldering recommendations within this data book, or visit: www.vishay.com/doc?45034



SELECTION CHART													
DIELECTRIC		C0G (NP0)											
STYLE		VJ2220 ⁽¹⁾						VJ2225 ⁽¹⁾					
CASE CODE		2220						2225					
VOLTAGE (V _{bc})		50	100	200	500	630	1000	50	100	200	500	630	1000
VOLTAGE CODE		A	B	C	E	L	G	A	B	C	E	L	G
CAP. CODE	CAP.												
100	10 pF												
120	12 pF												
150	15 pF												
180	18 pF												
220	22 pF												
270	27 pF												
330	33 pF												
390	39 pF												
470	47 pF												
560	56 pF												
680	68 pF												
820	82 pF												
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	•	•	•				•	•	•	•		
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												

Notes

• RoHS-compliant

⁽¹⁾ See soldering recommendations within this data book, or visit: www.vishay.com/doc?45034



SELECTION CHART																	
DIELECTRIC		X7R															
STYLE		VJ0805 ⁽¹⁾								VJ1206 ⁽¹⁾							
CASE CODE		0805								1206							
VOLTAGE (V _{DC})		16	25	50	100	200	500	630		16	25	50	100	200	500	630	1000
VOLTAGE CODE		J	X	A	B	C	E	L		J	X	A	B	C	E	L	G
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	••	••	••	•	•				•	•	•	•	•	•	•	•
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	•	•	•	•	•				•	•	•	•	•	•	•	•
474	470 nF	•	•	•	•	•				•	•	•	•	•	•	•	•
564	560 nF	•	•	•	•	•				•	•	•	•	•	•	•	•
684	680 nF	•	•	•	•	•				•	•	•	•	•	•	•	•
824	820 nF	•	•	•	•	•				•	•	•	•	•	•	•	•
105	1.0 µF																
125	1.2 µF																
155	1.5 µF																
185	1.8 µF																
225	2.2 µF																

Notes

• RoHS-compliant

•• Paper tape • Plastic tape

⁽¹⁾ See soldering recommendations within this data book, or visit: www.vishay.com/doc?45034



SELECTION CHART																
DIELECTRIC		X7R														
STYLE		VJ1210 ⁽¹⁾										VJ1808 ⁽¹⁾				
CASE CODE		1210										1808				
VOLTAGE (V _{DC})		16	25	50	100	200	500	630	1000	1500	2000	630	1000	1500	2000	3000
VOLTAGE CODE		J	X	A	B	C	E	L	G	R	F	L	G	R	F	H
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	•	•	•	•	•	•	•				•	•			
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	•	•	•	•											
474	470 nF	•	•	•	•											
564	560 nF	•	•	•												
684	680 nF	•	•	•												
824	820 nF	•	•													
105	1.0 μF	•														
125	1.2 μF															
155	1.5 μF															
185	1.8 μF															
225	2.2 μF															

Notes

• RoHS-compliant

⁽¹⁾ See soldering recommendations within this data book, or visit: www.vishay.com/doc?45034



Notes

■ RoHS-compliant

(1) See soldering recommendations within this data book, or visit: www.vishay.com/doc?45034



SELECTION CHART

DIELECTRIC		X7R															
STYLE		VJ2220 ⁽¹⁾								VJ2225 ⁽¹⁾							
CASE CODE		2220								2225							
VOLTAGE (V _{DC})		50	100	200	250	500	630	1000	2000	3000	100	200	500	630	1000	1500	2000
VOLTAGE CODE		A	B	C	P	E	L	G	F	H	B	C	E	L	G	R	F
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	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
153	15 nF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
183	18 nF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
203	20 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	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
474	470 nF	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
564	560 nF	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
684	680 nF	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
824	820 nF	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
105	1.0 µF	•	•								•	•	•				
125	1.2 µF	•	•								•	•	•				
155	1.5 µF	•	•								•	•	•				
185	1.8 µF	•									•	•	•				
225	2.2 µF																

Notes

• RoHS-compliant

⁽¹⁾ See soldering recommendations within this data book, or visit: www.vishay.com/doc?45034

COG (NP0) CAPACITORS - TYPICAL PARAMETERS




X7R DIELECTRIC - TYPICAL PARAMETERS

RATED VOLTAGE VS. TEMPERATURE



DISSIPATION FACTOR VS. TEMPERATURE



VOLTAGE COEFFICIENT OF CAPACITANCE



DISSIPATION FACTOR VS. VOLTAGE



IMPEDANCE VS. FREQUENCY 500 V/630 V



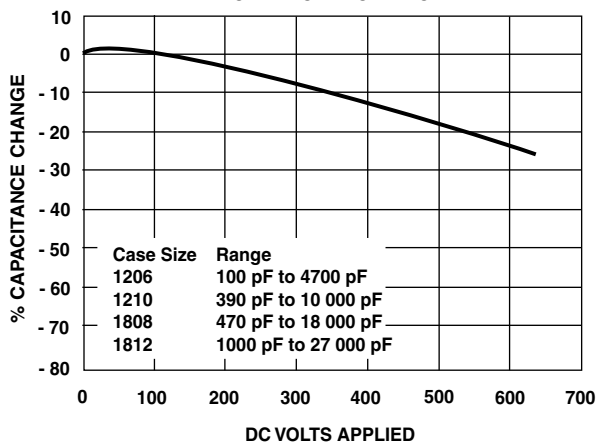
IMPEDANCE VS. FREQUENCY 2000 V





X7R DIELECTRIC - TYPICAL PARAMETERS

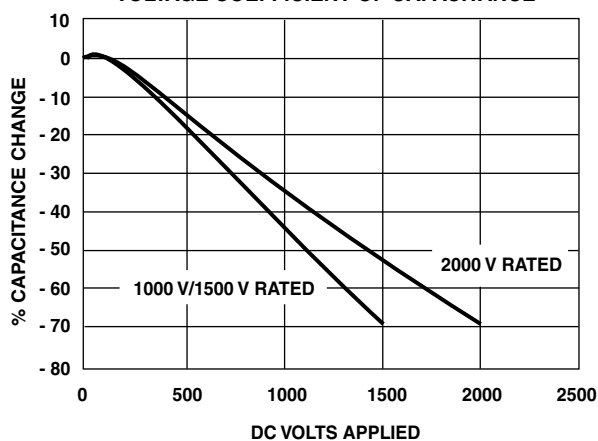
VOLTAGE COEFFICIENT OF CAPACITANCE
LOWER CAPACITANCE



VOLTAGE COEFFICIENT OF CAPACITANCE
HIGHER CAPACITANCE



VOLTAGE COEFFICIENT OF CAPACITANCE



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 or from the terminations at one end of the MLCC 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 of 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 terminated 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



STANDARD PACKAGING QUANTITIES (1)(2)(3)					
CASE CODE	TAPE SIZE	7" REEL QUANTITIES		11 1/4" AND 13" REEL QUANTITIES	
		PAPER TAPE PACKAGING CODE "C" / "O"	PLASTIC TAPE PACKAGING CODE "T"	PAPER TAPE PACKAGING CODE "P" / "I"	PLASTIC TAPE PACKAGING CODE "R"
0805 ⁽⁴⁾	8 mm	3000	3000	10 000	10 000
1206 ⁽⁴⁾	8 mm	n/a	2500 / 3000	n/a	9000 / 10 000
1210 ⁽⁴⁾	8 mm	n/a	2000 / 2500 / 3000	n/a	9000 / 10 000
1808 ⁽⁴⁾	12 mm	n/a	2000	n/a	10 000
1812 ⁽⁴⁾	12 mm	n/a	1000	n/a	4000
1825	12 mm	n/a	1000	n/a	4000
2220	12 mm	n/a	1000	n/a	4000
2225	12 mm	n/a	1000	n/a	4000

Notes

- (1) Vishay Vitramon uses embossed plastic, and punch paper carrier tapes. Paper tape is not available for case sizes ≥ 1206 or for component thickness $> 0.035"$ (0.89 mm)
- (2) Reference: EIA standard RS 481 - "Taping of Surface Mount Components for Automatic Placement"
- (3) n/a = not available
- (4) Packaging code "C / O", "P / I" and 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.



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.

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.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.