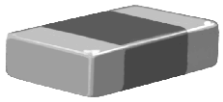
Surface Mount Multilayer Ceramic Chip Capacitors for Commercial Applications



FEATURES

- C0G is an ultra-stable dielectric offering a Temperature Coefficient of Capacitance (TCC) of 0 ± 30 ppm/°C
- Low Dissipation Factor (DF)
- Ideal for critical timing and tuning applications
- Ideal for snubber and surge suppression applications
- Surface mount, precious metal technology, wet build process
- Halogen-free according to IEC 61249-2-21

RoHS COMPLIANT HALOGEN FREE

ELECTRICAL SPECIFICATIONS

Note: Electrical characteristics at + 25 °C unless otherwise specified

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

Capacitance Range: 1.0 pF to 0.056 µF

Voltage Rating: 10 Vdc to 1000 Vdc

Temperature Coefficient of Capacitance (TCC):
0 ± 30 ppm/°C from - 55 °C to + 125 °C

Dissipation Factor (DF):
0.1 % maximum at 1.0 V_{rms} and 1 kHz for values > 1000 pF
0.1 % maximum at 1.0 V_{rms} and 1 MHz 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

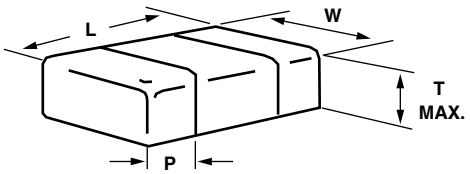
Dielectric Withstanding Voltage (DWV):
This is the maximum voltage the capacitors are tested for a 1 to 5 second period and the charge/discharge current does not exceed 50 mA
≤ 200 Vdc : DWV at 250 % of rated voltage
500 Vdc: DWV at 200 % of rated voltage
630/1000 Vdc: DWV at 150 % of rated voltage

ORDERING INFORMATION

VJ0805	A	102	K	X	A	A	T	### (2)(4)
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	DC VOLTAGE RATING (1)	MARKING	PACKAGING	PROCESS CODE
0402 0603 0805 1206 1210 1808 1812 1825 2220 2225	A = C0G (NP0)	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. An "R" indicates a decimal point. **Examples:** 102 = 1000 pF 1R8 = 1.8 pF	B = ± 0.10 pF C = ± 0.25 pF D = ± 0.5 pF F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % **Note:** B, C, D < 10 pF F, G, J, K ≥ 10 pF	X = Ni barrier 100 % tin plate matte finish F = AgPd B = Polymer 100 % tin plate matte finish (5)	X = 25 V A = 50 V B = 100 V C = 200 V E = 500 V L = 630 V G = 1000 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" reel/plastic tape P = 11 1/4" reel/paper tape O = 7" reel/flamed paper tape I = 11 1/4"/13" reel/flamed paper tape **Note:** "I" and "O" is used for "F" termination paper taped size 0402/0603/0805	

Notes:
(1) DC voltage rating should not be exceeded in application
(2) Process Code may be added with up to three digits, used to control non-standard products and/or special requirements
(3) Case size designator may be replaced by a four digit drawing number used to control non-standard products and/or requirements
(4) "A2" temporarily used to identify manufacturing plant for size ≥ 1812
(5) Selected values available, contact mlcc@vishay.com for list of released ratings

DIMENSIONS in inches [millimeters]



EIA STYLE	PART ORDERING NUMBER	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 ± 0.005 [1.60 ± 0.12]	0.031 ± 0.005 [0.80 ± 0.12]	0.037 [0.94]	0.012 [0.30]	0.018 [0.46]
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 ± 0.008 [3.20 ± 0.20]	0.063 ± 0.008 [1.60 ± 0.20]	0.067 [1.70]	0.010 [0.25]	0.028 [0.71]
1210	VJ1210	0.126 ± 0.008 [3.20 ± 0.20]	0.098 ± 0.008 [2.50 ± 0.20]	0.067 [1.70]	0.010 [0.25]	0.028 [0.71]
-	VJ1808	0.177 ± 0.010 [4.50 ± 0.25]	0.080 ± 0.010 [2.03 ± 0.25]	0.067 [1.70]	0.010 [0.25]	0.030 [0.76]
1812	VJ1812	0.177 ± 0.010 [4.50 ± 0.25]	0.126 ± 0.008 [3.20 ± 0.20]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]
1825	VJ1825	0.177 ± 0.010 [4.50 ± 0.25]	0.252 ± 0.010 [6.40 ± 0.25]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]
-	VJ2220	0.220 ± 0.008 [5.59 ± 0.20]	0.200 ± 0.010 [5.08 ± 0.25]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]
-	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 terminations, “B” termination part number code, length dimensions, positive tolerances (including band width) above are allowed to increase by the following amounts:
  0402/0603 size, consult mlcc@vishay.com
  0805/1210/1812/2220/2225 max. add length 0.0040"/0.10 mm
  1206/1808 max. add length 0.0055"/0.14 mm

SELECTION CHART

DIELECTRIC		C0G (NP0)																			
STYLE		VJ0402			VJ0603			VJ0805				VJ1206					VJ1210 (1)				
EIA TYPE		0402			0603			0805				1206					1210				
VOLTAGE (Vdc)		25	50	100	50	100	200	50	100	200	500	50	100	200	500	630	50	100	200	500	630
CAP. CODE	CAP.																				
1R0	1.0 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
1R2	1.2 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
1R5	1.5 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
1R8	1.8 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
2R2	2.2 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
2R7	2.7 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
3R3	3.3 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
3R9	3.9 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
4R7	4.7 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
5R6	5.6 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
6R8	6.8 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
8R2	8.2 pF	••	••	••	••	••	••	••	••	••	••	••	••	••	••	••					
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	1000 pF							••	••			•	•	•	•	•	•	•	•	•	•
122	1200 pF							••	•			•	•	•			•	•	•	•	•
152	1500 pF							••	•			•	•	•			•	•	•	•	•
182	1800 pF							•				•	•	•			•	•	•	•	•
222	2200 pF							•				•	•	•			•	•	•		
272	2700 pF							•				•	•	•			•	•	•		
332	3300 pF							•				•	•	•			•	•	•		
392	3900 pF							•				•	•				•	•	•		
472	4700 pF											•	•				•	•	•		
562	5600 pF											•					•	•	•		
682	6800 pF											•					•	•			
822	8200 pF											•					•				
103	0.010 µF											•					•				
123	0.012 µF																•				
153	0.015 µF																				
183	0.018 µF																				
223	0.022 µF																				
273	0.027 µF																				
333	0.033 µF																				
393	0.039 µF																				
473	0.047 µF																				
563	0.056 µF																				

Note:

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

•• Paper tape • Plastic tape

SELECTION CHART

DIELECTRIC		C0G (NP0)																						
STYLE		VJ1808 (1)					VJ1812 (1)					VJ1825 (1)				VJ2220 (1)					VJ2225 (1)			
EIA TYPE		-					1812					1825				-					-			
VOLTAGE (Vdc)		50	100	200	500	1000	50	100	200	500	1000	50	100	200	500	50	100	200	500	1000	50	100	200	500
CAP. CODE	CAP.																							
1R0	1.0 pF																							
1R2	1.2 pF																							
1R5	1.5 pF																							
1R8	1.8 pF																							
2R2	2.2 pF																							
2R7	2.7 pF																							
3R3	3.3 pF																							
3R9	3.9 pF																							
4R7	4.7 pF																							
5R6	5.6 pF																							
6R8	6.8 pF																							
8R2	8.2 pF																							
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	1000 pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•								•	•
122	1200 pF	•	•	•	•		•	•	•	•	•	•	•	•	•						•	•	•	•
152	1500 pF	•	•	•	•		•	•	•	•	•	•	•	•	•						•	•	•	•
182	1800 pF	•	•	•	•		•	•	•	•	•	•	•	•	•						•	•	•	•
222	2200 pF	•	•	•			•	•	•	•	•	•	•	•	•				•	•	•	•	•	•
272	2700 pF	•	•	•			•	•	•	•		•	•	•	•				•	•	•	•	•	•
332	3300 pF	•	•	•			•	•	•	•		•	•	•	•				•	•	•	•	•	•
392	3900 pF	•	•	•			•	•	•	•		•	•	•	•				•	•	•	•	•	•
472	4700 pF	•	•	•			•	•	•	•		•	•	•	•			•	•		•	•	•	•
562	5600 pF	•	•	•			•	•	•			•	•	•	•			•	•		•	•	•	•
682	6800 pF	•	•	•			•	•	•			•	•	•	•	•	•	•			•	•	•	•
822	8200 pF	•	•				•	•	•			•	•	•	•	•	•	•			•	•	•	•
103	0.010 µF	•					•	•	•			•	•	•	•	•	•	•			•	•	•	•
123	0.012 µF						•	•	•			•	•	•		•	•	•			•	•	•	•
153	0.015 µF						•	•				•	•	•		•	•				•	•	•	
183	0.018 µF						•					•	•	•		•	•				•	•	•	
223	0.022 µF						•					•	•	•		•	•				•	•	•	
273	0.027 µF											•	•	•		•					•	•	•	
333	0.033 µF											•	•			•					•	•	•	
393	0.039 µF											•									•	•	•	
473	0.047 µF																				•	•		
563	0.056 µF																				•			

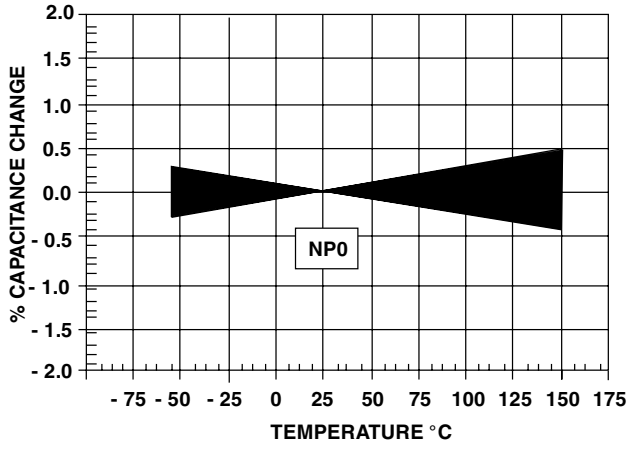
Note:

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

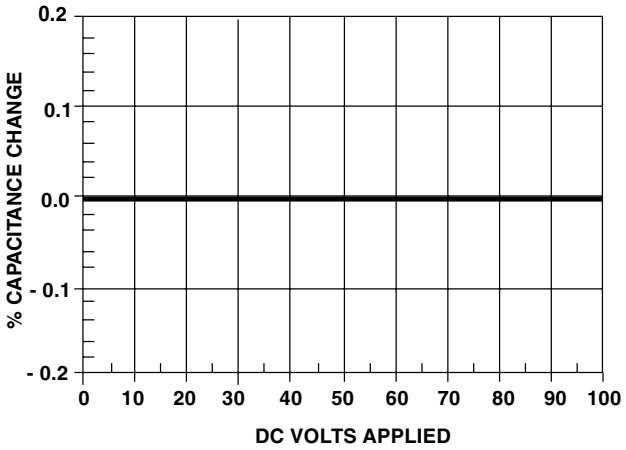
• Plastic tape

C0G (NP0) DIELECTRIC - TYPICAL PARAMETERS

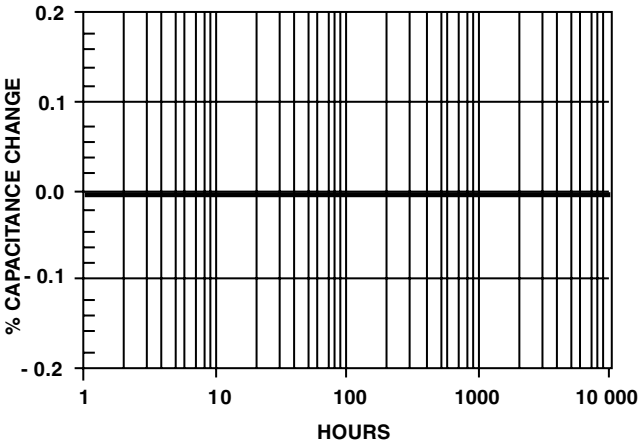
TYPICAL PARAMETER C0G (NP0)
TEMPERATURE COEFFICIENT OF CAPACITANCE



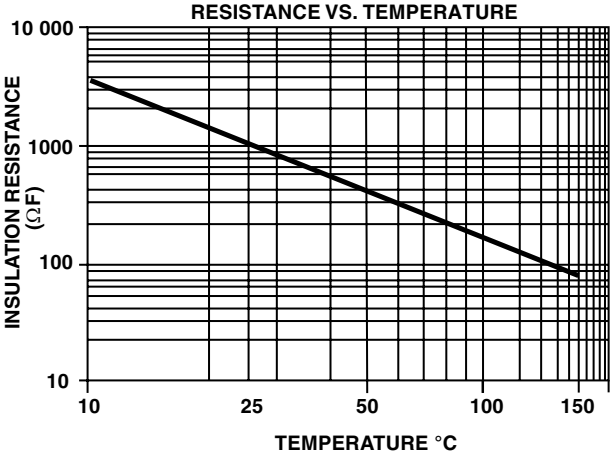
TYPICAL PARAMETER C0G (NP0)
VOLTAGE COEFFICIENT OF CAPACITANCE



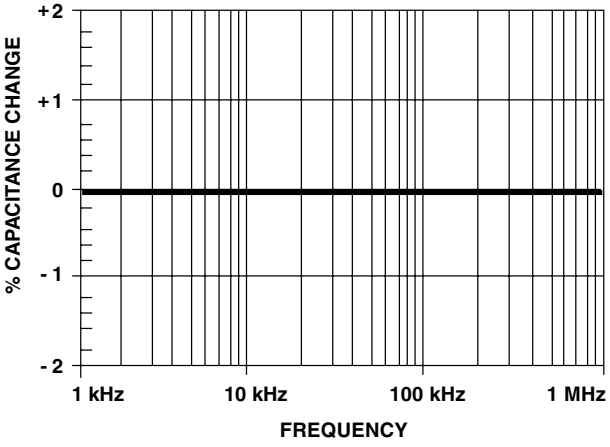
TYPICAL PARAMETER C0G (NP0)
AGING RATE



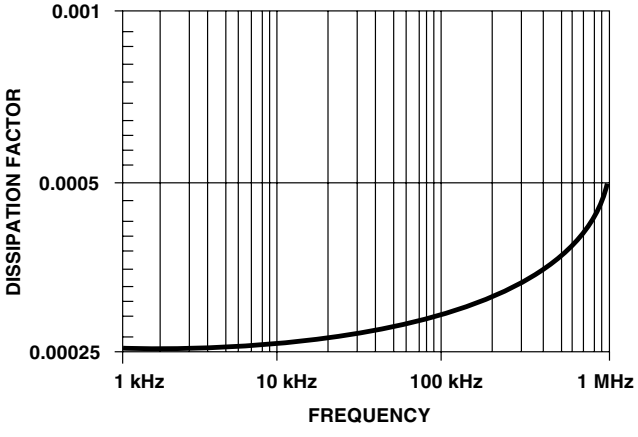
TYPICAL PARAMETER C0G (NP0)
MINIMUM INSULATION
RESISTANCE VS. TEMPERATURE



TYPICAL PARAMETER C0G (NP0)
CHANGE OF CAPACITANCE WITH FREQUENCY



TYPICAL PARAMETER C0G (NP0)
CHANGE OF CAPACITANCE WITH FREQUENCY



Disclaimer

All product specifications and data are subject to change without notice.

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 herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

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.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.