

## Surface Mount Multilayer Ceramic Chip Capacitors for Commercial Applications



### FEATURES

- C0G is an ultra-stable dielectric offering a Temperature Coefficient of Capacitance (TCC) of  $0 \pm 30$  ppm/°C
- Low Dissipation Factor (DF)
- Ideal for critical timing and tuning applications
- Ideal for snubber and surge suppression applications
- Protective surface coating of high voltage capacitors maybe required to prevent surface arcing.
- Surface mount, precious metal technology, wet build process



### ELECTRICAL SPECIFICATIONS

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

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

**Capacitance Range:** 1.0 pF to 0.056 μF

**Voltage Rating:** 10 Vdc to 1000 Vdc

**Temperature Coefficient of Capacitance (TCC):**

$0 \pm 30$  ppm/°C from -55 °C to +125 °C

**Dissipation Factor (DF):**

0.1 % maximum at 1.0 V<sub>rms</sub> and 1 kHz for values > 1000 pF

0.1 % maximum at 1.0 V<sub>rms</sub> 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)
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. <b>Examples:</b> 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 % <b>Note:</b> B, C, D < 10 pF F, G, J, K ≥ 10 pF	X = Ni barrier 100 % tin plated F = AgPd	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 <b>Note:</b> Marking is only available for 0805 and 1206	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 <b>Note:</b> "I" and "O" is used for "F" termination paper taped	

**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

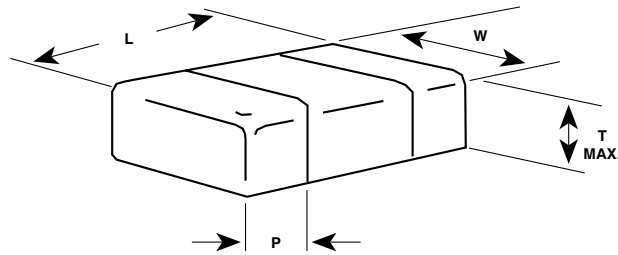
(3) Case size designator may be replaced by a four digit drawing number used to control non-standard products and/or requirements



# VJ C0G (NP0) Dielectric

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## 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]	0.036 [0.92]	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]

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SELECTION CHART																					
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](http://www.vishay.com/doc?45034)

\*\* Paper tape • Plastic tape



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SELECTION CHART																									
STYLE		VJ1808 <sup>(1)</sup>					VJ1812 <sup>(1)</sup>					VJ1825 <sup>(1)</sup>				VJ2220 <sup>(1)</sup>					VJ2225 <sup>(1)</sup>				
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.																								
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1R2	1.2 pF																								
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1R8	1.8 pF																								
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3R3	3.3 pF																								
3R9	3.9 pF																								
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- Plastic tape

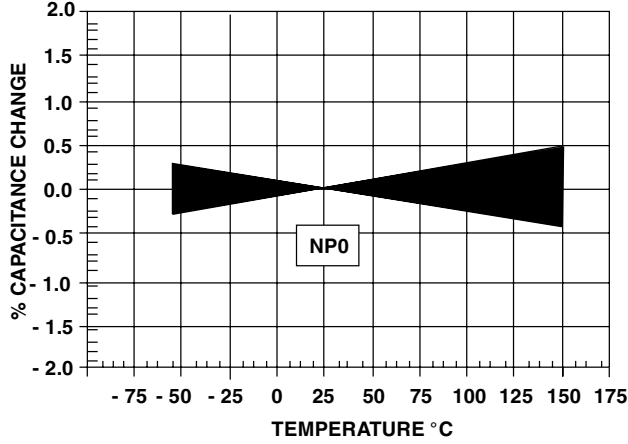
# VJ C0G (NP0) Dielectric



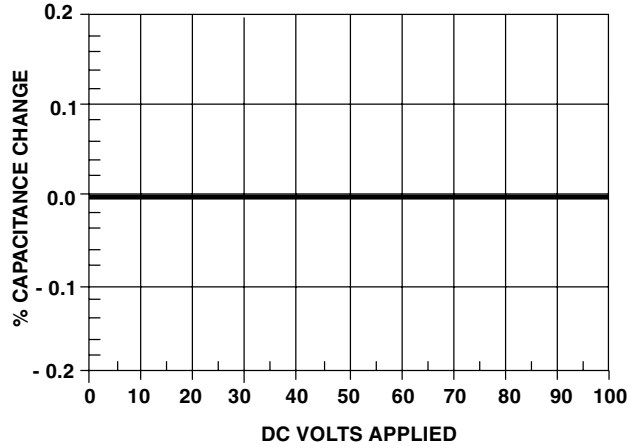
Vishay Vitramon Surface Mount Multilayer Ceramic Chip Capacitors  
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## C0G (NP0) DIELECTRIC - TYPICAL PARAMETERS

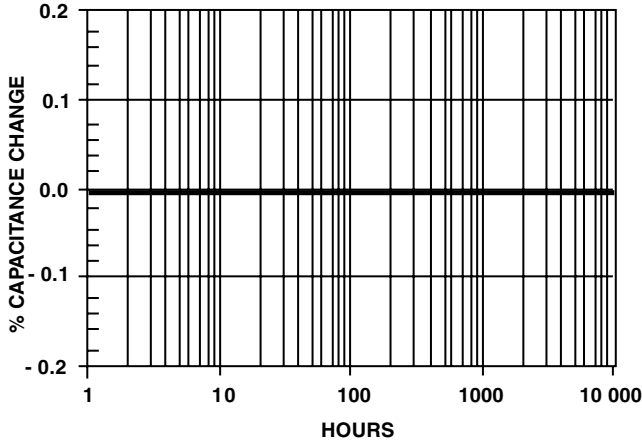
TYPICAL PARAMETER C0G (NP0)  
TEMPERATURE COEFFICIENT OF CAPACITANCE



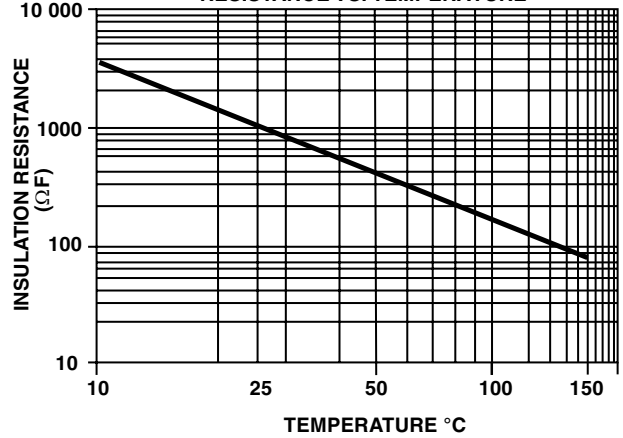
TYPICAL PARAMETER C0G (NP0)  
VOLTAGE COEFFICIENT OF CAPACITANCE



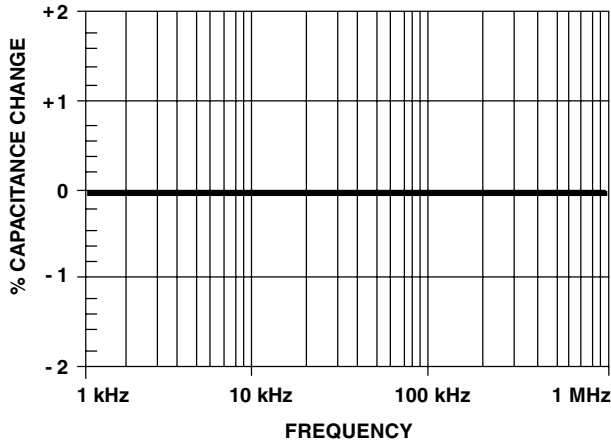
TYPICAL PARAMETER C0G (NP0)  
AGING RATE



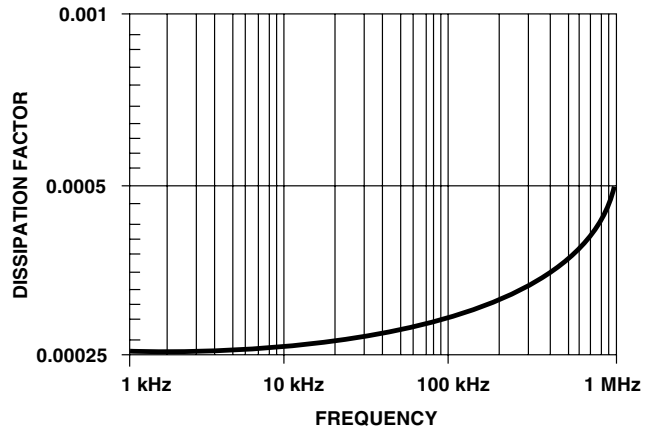
TYPICAL PARAMETER C0G (NP0)  
MINIMUM INSULATION  
RESISTANCE VS. TEMPERATURE



TYPICAL PARAMETER C0G (NP0)  
CHANGE OF CAPACITANCE WITH FREQUENCY



TYPICAL PARAMETER C0G (NP0)  
CHANGE OF CAPACITANCE WITH FREQUENCY





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