

## Surface Mount Multilayer Ceramic Chip Capacitors for High Reliability Applications



### FEATURES

- Surface-mount, precious metal technology wet build process
- Made with a combination of design, materials and tight process control to achieve very high field reliability
- Periodic testing to MIL-PRF-55681 guidelines to maintain a high level of quality
- Available with group A and C screening, process code "2L"
- Available with group A screening only, process code "68"
- Available with Voltage Conditioning only, process code "5G"
- Customized certification available on request to meet your quality requirements
- Available with tin-lead barrier terminations order code "L"
- 100 % voltage conditioned



Available  
**RoHS\***  
COMPLIANT

### APPLICATIONS

- Implantable medical devices
- System critical capacitor applications in non-implantable medical devices
- Mission critical military, aerospace and space applications

### ELECTRICAL SPECIFICATIONS

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

**Operating Temperature:**

C0G: - 55 °C to + 125 °C

**Capacitance Range:** 0.5 pF to 0.056 µF

**Voltage Rating:** 10 Vdc to 600 Vdc

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

C0G: 0 ± 30 ppm/°C from - 55 °C to + 125 °C

**Dissipation Factor:**

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

0.1 % max. at 1.0 V<sub>rms</sub> and 1 MHz for values ≤ 1000 pF

**Aging Rate:** 1 % 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, 600 Vdc: DWV at 200 % of rated voltage.

\* Pb containing terminations are not RoHS compliant, exemptions may apply

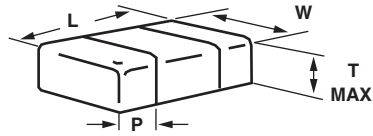


# VJ High Rel C0G (NP0)

Surface Mount Multilayer Ceramic Chip Capacitors  
for High Reliability Applications

Vishay Vitramon

## DIMENSIONS in inches [millimeters]



PART ORDERING NUMBER	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATION PAD (P)	
				MINIMUM	MAXIMUM
VJ0402	0.040 ± 0.004 [1.00 ± 0.10]	0.020 ± 0.004 [0.50 ± 0.010]	0.024 [0.61]	0.004 [0.10]	0.016 [0.41]
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]
VJ0805	0.079 ± 0.008 [2.00 ± 0.20]	0.049 ± 0.008 [1.25 ± 0.20]	0.053 [1.35]	0.010 [0.25]	0.028 [0.71]
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]
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	0.180 ± 0.010 [4.57 ± 0.25]	0.080 ± 0.010 [2.03 ± 0.25]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]
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]
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 ± 0.008 [5.08 ± 0.20]	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]

## ORDERING INFORMATION

VJ1206	A	102	J	L	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	C = ± 0.25 pF D = ± 0.5 pF F = ± 1 % G = ± 2 % H = ± 3 % J = ± 5 % K = ± 10 % <b>Note:</b> C, D < 10 pF F, G, H, ≥ 10 pF J, K, ≥ 10 pF	X = Ni barrier 100 % tin plated F = AgPd L = Ni barrier with tin lead plated min. 4 % lead	Q = 10 V J = 16 V X = 25 V A = 50 V B = 100 V C = 200 V E = 500 V N = 600 V	A = Unmarked	C = 7" reel/ paper tape T = 7" reel/ plastic tape P = 11 1/4" reel/ paper tape R = 11 1/4" reel/ plastic tape B = Bulk W = Waffle tray (Paper tape for 0402 and 0603 only)	2L = High Rel group A and C screening 68 = High Rel group A screening only 5G = Voltage Conditioning only

### Notes:

(1) DC voltage rating should not be exceeded in application

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





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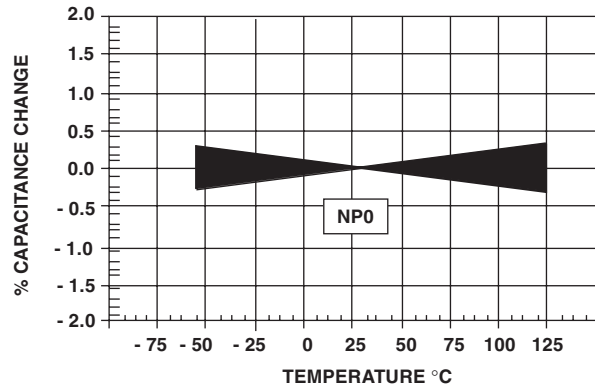
HIGH REL C0G (NP0)																										
EIA CODE		1808 <sup>(1)</sup>					1812 <sup>(1)</sup>					1825 <sup>(1)</sup>					2220 <sup>(1)</sup>					2225 <sup>(1)</sup>				
VOLTAGE (Vdc)		25	50	100	200	500	25	50	100	200	500	25	50	100	200	500	25	50	100	200	500	25	50	100	200	500
VOLTAGE CODE		X	A	B	C	E	X	A	B	C	E	X	A	B	C	E	X	A	B	C	E	X	A	B	C	E
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	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																	•	•			•	•	•	•	
683	0.068 μF																					•	•	•	•	

**Note:**

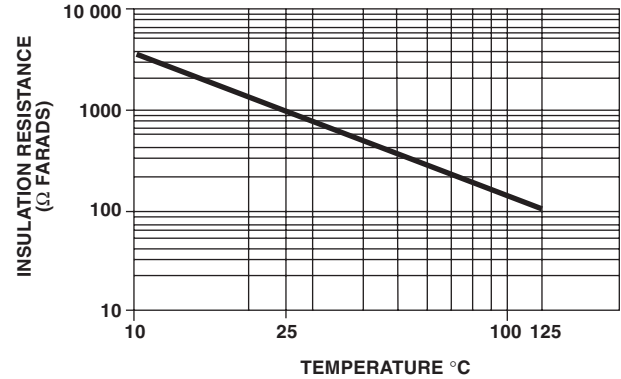
<sup>(1)</sup> See soldering recommendations within this data book, or visit [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034)

## HIGH REL COG (NP0) DIELECTRIC - TYPICAL PARAMETERS

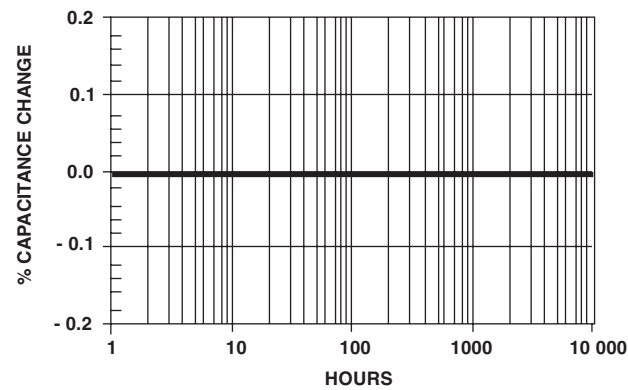
TEMPERATURE COEFFICIENT OF CAPACITANCE



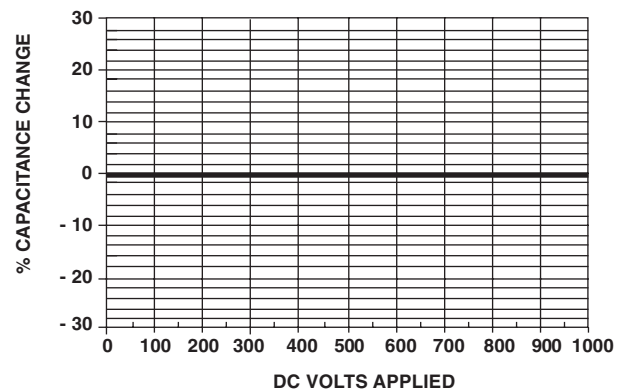
MINIMUM INSULATION RESISTANCE VS. TEMPERATURE



AGING RATE - NP0



VOLTAGE COEFFICIENT OF CAPACITANCE - 1000 V RATED



## STANDARD PACKAGING QUANTITIES (1) (2) (3)

BODY SIZE	TAPE SIZE	7" REEL QUANTITIES		11 1/4" AND 13" REEL QUANTITIES		BULK QUANTITIES	
		PAPER TAPE PACKAGING CODE "C"	PLASTIC TAPE PACKAGING CODE "T"	PAPER TAPE PACKAGING CODE "P"	PLASTIC TAPE PACKAGING CODE "R"	VIAL PACKAGING CODE "B"	WAFFLE PACKAGING CODE "W"
0402	8 mm	5000	N/a	10 000	N/a	5000	N/a
0603	8 mm	4000	N/a	10 000	N/a	5000	N/a
0805 <sup>(4)</sup>	8 mm	3000	3000	10 000	10 000	5000	N/a
1206	8 mm	N/a	3000	N/a	10 000	5000	N/a
1210	8 mm	N/a	3000	N/a	10 000	5000	N/a
1808	12 mm	N/a	3000	N/a	10 000	1000	N/a
1812	12 mm	N/a	1000	N/a	5000	1000	N/a
1825	12 mm	N/a	1000	N/a	5000	1000	1000
2220	12 mm	N/a	1000	N/a	5000	N/a	1000
2225	12 mm	N/a	1000	N/a	5000	N/a	1000

**Notes:**

- (1) Vishay Vitramon uses embossed plastic carrier tape
- (2) REFERENCE: EIA Standard RS 481 - "Taping of Surface Mount Components for Automatic Placement"
- (3) N/a = Not available
- (4) Packaging "C/P" and "T/R" depend on product thickness



## Disclaimer

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

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