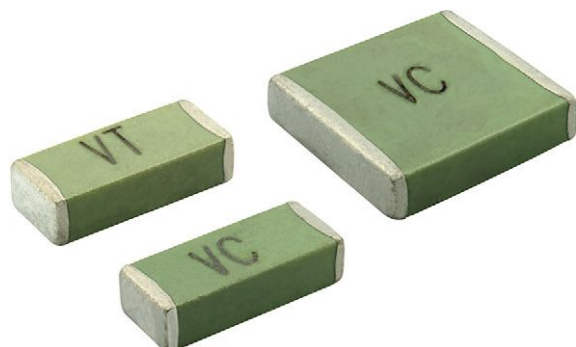




## Surface Mount Multilayer Ceramic Chip Capacitors for Safety Certified Applications



### FEATURES

- Approved IEC 60384-14
- Specialty: safety certified capacitors
- AEC-Q200 qualified available with PPAP
- Wet build process
- Reliable Noble Metal Electrode (NME) system
- Flexible termination “W” for improved bending capability performance <sup>(1)</sup>
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### Note

<sup>(1)</sup> “W” flexible termination under qualification

### APPLICATIONS

- Power supplies
- EMI and AC line filtering
- EV charging systems
- AC equipment and appliances
- Lighting strike and voltage surge protection
- Isolators
- Facsimile and telephone

### ELECTRICAL SPECIFICATIONS

#### Note

- Electrical characteristics at +25 °C unless otherwise specified

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

**Capacitance Range X1 / Y2 <sup>(1)</sup>:** 10 pF to 1.0 nF

**Capacitance Range X2 <sup>(1)</sup>:** 10 pF to 390 pF

**Voltage Range:** 250 V<sub>AC</sub>

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

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

**Dissipation Factor (DF) <sup>(1)</sup>:** 0.1 % maximum

#### Note

<sup>(1)</sup> **Test conditions per IEC 60384-14:**  
1.0 V<sub>RMS</sub> at 1 MHz

#### 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

#### Voltage Proof Test:

X1 / Y2: min. 1500 V<sub>AC</sub>

X2: min. 1075 V<sub>DC</sub>

#### Peak Impulse Voltage:

X1 / Y2: 5000 V

X2: 2500 V

#### Voltage Rating DC:

X1 / Y2: 2000 V<sub>DC</sub>

X2: 1500 V<sub>DC</sub>

#### Climatic Category According to EN 60068-1:

55/125/21



# VJ Safety Certified Capacitors C0G (NP0)

Vishay Vitramon

QUICK REFERENCE DATA				
DIELECTRIC	CASE	MAXIMUM VOLTAGE (V <sub>AC</sub> )	CAPACITANCE	
			MINIMUM	MAXIMUM
C0G (NP0) (X1 / Y2)	2008	250	10 pF	220 pF
	2220	250	47 pF	1.0 nF
C0G (NP0) (X2)	2008	250	10 pF	390 pF

**Notes**

- Detail ratings see “Selection Chart”
- Size 2008 is compatible with 1808 solderlands and full conform with the IEC-60384-14 requirements for creepage distance

ORDERING INFORMATION								
VJ2008	A	101	K	X	U	S	T	### (2)
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	AC VOLTAGE RATING	MARKING	PACKAGING	PROCESS CODE
2008 2220	A = C0G (NP0)	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. <b>Examples:</b> 101 = 100 pF	J = ± 5 % K = ± 10 %	X = Ni barrier 100 % matte tin plate finish W = Ni barrier with flexible layer, 100 % matte tin plate finish (1)	U = 250 V <sub>AC</sub>	S = marked (see Part Marking table below)	T = 7" reel / plastic tape	X1 = X1 / Y2 X2 = X2 Vishay automotive grade per customer request add "A": X1A = X1 / Y2 X2A = X2

**Notes**

- Detail ratings see “Selection Chart”
- (1) “W” flexible termination under qualification
- (2) Process code must be added to control products and requirements

PART MARKING		
MARKING	1 <sup>ST</sup> DIGIT MANUFACTURER	2 <sup>ND</sup> DIGIT DIELECTRIC AND RATING
VC	V = Vishay	C = C0G / NP0, X1 / Y2 - “X” termination option
VT		T = C0G / NP0, X2 - “X” termination option
VD		D = C0G / NP0, X1 / Y2 - “W” termination option
VU		T = C0G / NP0, X2 - “W” termination option



# VJ Safety Certified Capacitors C0G (NP0)

Vishay Vitramon

DIMENSIONS FOR "X" TERMINATION OPTION in inches (millimeters)						
CASE CODE	PART ORDERING NUMBER	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATION (P)	
					MINIMUM	MAXIMUM
2008	VJ2008	0.200 ± 0.010 (5.08 ± 0.25)	0.080 ± 0.010 (2.03 ± 0.25)	0.086 (2.18)	0.010 (0.25)	0.030 (0.76)
2220	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)

DIMENSIONS FOR "W" TERMINATION OPTION in inches (millimeters)						
CASE CODE	PART ORDERING NUMBER	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATION (P)	
					MINIMUM	MAXIMUM
2008	VJ2008	0.200 - 0.010 / + 0.020 (5.08 - 0.25 / + 0.50)	0.080 ± 0.010 (2.03 ± 0.25)	0.086 (2.18)	0.010 (0.25)	0.030 (0.76)
2220	VJ2220	0.220 - 0.008 / + 0.018 (5.59 - 0.20 / + 0.45)	0.200 ± 0.010 (5.08 ± 0.25)	0.086 (2.18)	0.010 (0.25)	0.030 (0.76)

**Note**

- "W" flexible termination under qualification

RECOMMENDED SOLDERING PAD DIMENSIONS in millimeters				
CASE CODE	A	B	C	r <sup>(1)</sup>
2008	2.70	1.50	3.60	0.5
2220	5.80	1.50	4.20	0.5

**Note**

- <sup>(1)</sup> Radius optional



# VJ Safety Certified Capacitors C0G (NP0)

Vishay Vitramon

SELECTION CHART				
DIELECTRIC		C0G (NP0) (X1 / Y2)		C0G (NP0) (X2)
STYLE		VJ2008 <sup>(1)</sup>	VJ2220 <sup>(1)</sup>	VJ2008 <sup>(1)</sup>
CASE CODE		2008	2220	2008
VOLTAGE (V <sub>AC</sub> )		250	250	250
VOLTAGE CODE		U	U	U
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			

**Note**

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

PACKAGING QUANTITIES <sup>(1)</sup>		
CASE CODE	TAPE SIZE	7" REEL QUANTITIES
		PACKAGING CODE "T"
2008	12 mm	2000
2220	12 mm	1000



**Note**

<sup>(1)</sup> Reference: EIA standard RS481 - "Taping of Surface Mount Components for Automatic Placement"



# VJ Safety Certified Capacitors C0G (NP0)

Vishay Vitramon

APPROVALS				
VDE approval mark (update 2016-06-23):				
X1 / Y2-capacitor:	40036706	10 pF to 1000 pF	250 V <sub>AC</sub>	
X2-capacitor:	40036706	10 pF to 470 pF	250 V <sub>AC</sub>	
DIN EN 60384-14 (VDE 0565-1-1):2014-04; EN 60384-14:2013-08; IEC 60384-14 (ed.4)				
CAN / cSAus approval mark (update 2020-05-05):				
X1 / Y2-capacitor:	70001064	10 pF to 1000 pF	250 V~	
X2-capacitor:	70001064	10 pF to 470 pF	250 V~	
CAN / CSA-E60384-14:14 and ANSI / UL 60384-14-2017				

GENERAL CERTIFICATES	
# Quality management system according to ISO/IATF 16949	Yes
# Quality management system according to ISO 9001	Yes
# Environmental certification according to ISO 14001	Yes
# Health and safety system according to OHSAS 18001	Yes

STORAGE AND HANDLING CONDITIONS
<p>(1) Store the components at 5 °C to 40 °C ambient temperature and ≤ 70 % relative humidity conditions.</p> <p>(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.</p> <p>Precautions:</p> <ul style="list-style-type: none"> <li>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 oxidization of the terminations, which can easily lead to poor soldering.</li> <li>b. Store products on the shelf and avoid exposure to moisture or dust.</li> <li>c. Do not expose products to excessive shock, vibration, direct sunlight and so on.</li> </ul>



## 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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

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.