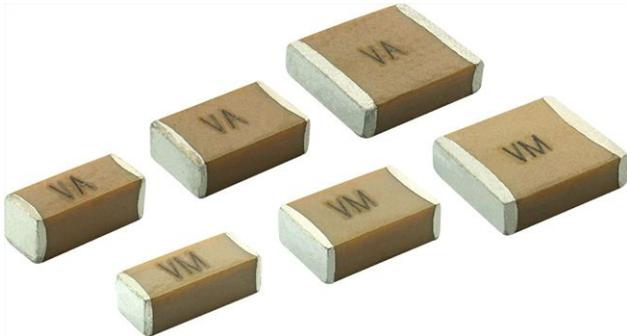




Surface Mount Multilayer Ceramic Chip Capacitors for Safety Certified Applications



FEATURES

- Approved IEC 60384-14
- Specialty: safety certified capacitors
- 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)

APPLICATIONS

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

ELECTRICAL SPECIFICATIONS

Note

- Electrical characteristics at +25 °C unless otherwise specified

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

Capacitance Range X1 / Y2 (1): 82 pF to 4.7 nF

Capacitance Range X2 (1): 82 pF to 12 nF

Voltage Range: 250 V_{AC}

Temperature Coefficient of Capacitance (TCC):
± 15 % from -55 °C to +125 °C, with 0 V_{DC} applied

Dissipation Factor (DF) (1):
2.5 % maximum at 1.0 V_{RMS} at 1 kHz
or per IEC 60384-14 at 1.0 V_{RMS} at 10 kHz

Note

- (1) **Test conditions per IEC 60384-14:**
Voltage: 1 V_{RMS}
Capacitance: C ≤ 100 pF at 1 MHz and C > 100 pF at 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

Voltage Proof Test:

X1 / Y2: 1500 V_{AC} (RMS), 60 s ± 1 s
X2: 1075 V_{DC}, 60 s ± 1 s

Peak Impulse Voltage:

X1 / Y2: 5000 V
X2: 2500 V

Climatic Category According to EN60068-1:
55/125/21



QUICK REFERENCE DATA				
DIELECTRIC	CASE	MAXIMUM VOLTAGE (V _{AC})	CAPACITANCE	
			MINIMUM	MAXIMUM
X7R (X1 / Y2)	2008	250	82 pF	1.0 nF
	2012	250	150 pF	1.2 nF
	2220	250	270 pF	4.7 nF
X7R (X2)	2008	250	82 pF	2.7 nF
	2012	250	150 pF	5.6 nF
	2220	250	270 pF	12 nF

Notes

- Detail ratings see “Selection Chart”
- Size 2008 and 2012 are compatible with 1808 and 1812 solderlands and full conform with the IEC-60384-14 requirements for creepage distance

ORDERING INFORMATION								
VJ2008	Y	102	K	X	U	S	T	### (1)
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	AC VOLTAGE RATING	MARKING	PACKAGING	PROCESS CODE
2008 2012 2220	Y = X7R	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. Examples: 102 = 1000 pF	K = ± 10 % M = ± 20 %	X = Ni barrier 100 % tin plated	U = 250 V _{AC}	S = marked (see Part Marking table below)		X1 = X1 / Y2 X2 = X2
							T = 7" reel / plastic tape R = 11 1/4" / 13" reel / plastic tape	

Notes

- (1) Process code must be added to control products and requirements
- Detail ratings see “Selection Chart”

PART MARKING		
MARKING	1 ST DIGIT MANUFACTURER	2 ND DIGIT DIELECTRIC AND RATING
VA	V = Vishay	A = X7R, X1 / Y2
VM		M = X7R, X2

DIMENSIONS 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)
2012	VJ2012	0.200 ± 0.010 (5.08 ± 0.25)	0.126 ± 0.008 (3.20 ± 0.20)	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)



SELECTION CHART							
DIELECTRIC		X7R (X1 / Y2)			X7R (X2)		
STYLE		VJ2008 ⁽¹⁾	VJ2012 ⁽¹⁾	VJ2220 ⁽¹⁾	VJ2008 ⁽¹⁾	VJ2012 ⁽¹⁾	VJ2220 ⁽¹⁾
CASE CODE		2008	2012	2220	2008	2012	2220
VOLTAGE (V _{AC})		250	250	250	250	250	250
VOLTAGE CODE		U	U	U	U	U	U
CAP. CODE	CAP.						
100	10 pF						
220	22 pF						
330	33 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						•

Notes

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

• RoHS-compliant

PACKAGING QUANTITIES ⁽¹⁾			
CASE CODE	TAPE SIZE	7" REEL QUANTITIES	11 1/4" AND 13" REEL QUANTITIES
		PACKAGING CODE "T"	PACKAGING CODE "R"
2008	12 mm	2000	10 000
2012	12 mm	1000	4000
2220	12 mm	1000	4000

Note

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



APPROVALS				
IEC 60384-14 - Safety tests CB test certificates:				
X1 / Y2-capacitor:	DE1-52193	82 pF to 4700 pF	250 V _{AC}	
X2-capacitor:	DE1-52193	82 pF to 12 000 pF	250 V _{AC}	
DIN EN 60384-14 (VDE 0565 Teil 1-1):2006-04; EN 60384-14:2005-08; IEC 60384-14 (ed.3)				
X1 / Y2-capacitor:	70001064	82 pF to 4700 pF	250 V~	
X2-capacitor:	70001064	82 pF to 12 000 pF	250 V~	
CAN/CSA-E60384-14:09 and ANSI/UL 60384-14-2009				

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 oxidization 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.