



Surface Mount Multilayer Ceramic Chip Capacitors for Safety Certified Applications



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

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

APPLICATIONS

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

LINKS TO ADDITIONAL RESOURCES



Packages



Technical Notes



Related Documents



Calculators

ELECTRICAL SPECIFICATIONS

Note

- Electrical characteristics at +25 °C unless otherwise specified

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

Capacitance Range X1 (1):

X7R: 270 pF to 4.7 nF

Voltage Range: 305 V_{AC}

Temperature Coefficient of Capacitance (TCC):

X7R: ± 15 % from -55 °C to +125 °C, with 0 V_{DC} applied

Dissipation Factor (DF) (1):

X7R: 2.5 % maximum

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

Note

- (1) Test conditions per IEC 60384-14:
X7R: 1.0 V_{RMS} at 1 kHz

Aging Rate:

X7R: 1 % maximum per decade

Voltage Proof Test:

X1: min. 1500 V_{AC}

Meet 2600 V_{AC}/60 s

Peak Impulse Voltage:

X1: 5000 V

Voltage Rating DC:

X1: 2000 V_{DC}

Climatic Category According to EN 60068-1:

55 / 125 / 21



QUICK REFERENCE DATA				
DIELECTRIC	CASE	MAXIMUM VOLTAGE (V _{AC})	CAPACITANCE	
			MINIMUM	MAXIMUM
X7R (X1)	2220	305	270 pF	4.7 nF

Note

- Detail ratings see “Selection Chart”

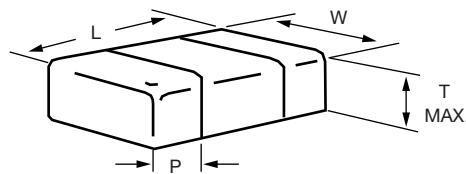
ORDERING INFORMATION								
VJ2220	Y	102	K	X	3	S	T	### ⁽¹⁾
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	AC VOLTAGE RATING	MARKING	PACKAGING	PROCESS CODE
2220	Y = X7R	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. Examples: 101 = 100 pF 102 = 1000 pF 103 = 10 000 pF	X7R: K = ± 10 % M = ± 20 %	X = Ni barrier 100 % matte tin plate finish	3 = 305 V _{AC}	S = marked (see Part Marking table below)	T = 7" reel / plastic tape	X1 = X1

Notes

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

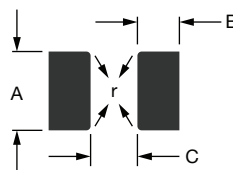
PART MARKING		
MARKING	1 ST DIGIT MANUFACTURER	2 ND DIGIT DIELECTRIC AND RATING
V3	V = Vishay	3 = X7R, X1 - “X” termination option

DIMENSIONS FOR “X” TERMINATION OPTION in inches (millimeters)



CASE CODE	PART ORDERING NUMBER	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATION (P)	
					MINIMUM	MAXIMUM
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)

RECOMMENDED SOLDERING PAD DIMENSIONS in millimeters



CASE CODE	A	B	C	r ⁽¹⁾
2220	5.80	1.50	4.20	0.5

Note

- (1) Radius optional



SELECTION CHART		
DIELECTRIC		X7R (X1)
STYLE		VJ2220 ⁽¹⁾
CASE CODE		2220
VOLTAGE (V _{AC})		305
VOLTAGE CODE		3
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	

Note


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



PACKAGING QUANTITIES (1)		
CASE CODE	TAPE SIZE	7" REEL QUANTITIES
		PACKAGING CODE "T"
2220	12 mm	1000

Note

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

APPROVALS FOR X7R				
VDE approval mark 2026-02-17				
X1-capacitor:	X termination	40061661	270 pF to 4700 pF	305 V _{AC}
DIN EN IEC 60384-14 (VDE 0565-1-1):2024-10; EN IEC 60384-14:2023				

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 ISO 45001	Yes

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.



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