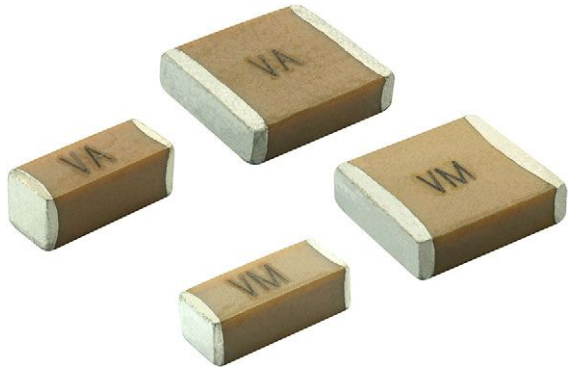
Surface Mount Multilayer Ceramic Chip Capacitors for Safety Certified Applications



FEATURES

- Approved IEC 60384-14
- Specialty: safety certified capacitors
- AEC-Q200 qualified available with PPAP for size 2008 and 2220
- Wet build process
- Reliable Noble Metal Electrode (NME) system
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

Pb-free

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

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 (1): 100 pF to 4.7 nF

Capacitance Range X2 (1): 100 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):
C < 100 pF: 8 % maximum
C ≥ 100 pF: 2.5 % maximum

Note

(1) **Test conditions per IEC 60384-14:**
Voltage: 1.0 V_{RMS}
C < 100 pF at 1 MHz
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: min. 1500 V_{AC}
X2: min. 1075 V_{DC}

Peak Impulse Voltage:
X1 / Y2: 5000 V
X2: 2500 V

Voltage Rating DC:
X1 / Y2: 2000 V_{DC}
X2: 1500 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 / Y2)	2008	250	100 pF	1.0 nF
	2220	250	270 pF	4.7 nF
X7R (X2)	2008	250	100 pF	2.7 nF
	2220	250	270 pF	12 nF

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	Y	102	K	X	U	S	T	### (1)(2)
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	AC VOLTAGE RATING	MARKING	PACKAGING	PROCESS CODE
2008 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)	T = 7" reel / plastic tape	X1 = X1 / Y2 X2 = X2 Vishay automotive grade per customer request add “A”: X1A = X1 / Y2 X2A = X2

Notes

(1) Process code must be added to control products and requirements

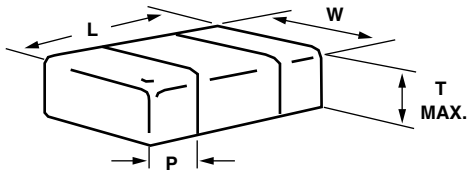
(2) Vishay automotive grade “X1A” and “X2A” only for size 2008 and 2220

- Detail ratings see “Selection Chart”

PART MARKING

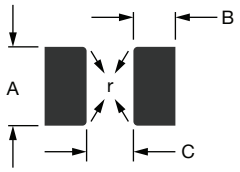
MARKING	1ST DIGIT MANUFACTURER	2ND DIGIT DIELECTRIC AND RATING
VA	V = Vishay	A = X7R, X1 / Y2
VM		M = X7R, X2

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)
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)
2008	2.70	1.50	3.60	0.5
2220	5.80	1.50	4.20	0.5

Note

(1) Radius optional

SELECTION CHART

DIELECTRIC		X7R (X1 / Y2)		X7R (X2)	
STYLE		VJ2008 (1)	VJ2220 (1)	VJ2008 (1)	VJ2220 (1)
CASE CODE		2008	2220	2008	2220
VOLTAGE (V_{AC})		250	250	250	250
VOLTAGE CODE		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
		PACKAGING CODE "T"
2008	12 mm	2000
2220	12 mm	1000

Note

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

APPROVALS

VDE approval mark (update 2016-06-24):

X1 / Y2-capacitor:	40037440	82 pF to 4700 pF	250 V_{AC}
X2-capacitor:	40037440	82 pF to 12 000 pF	250 V_{AC}

DIN EN 60384-14 (VDE 0565-1-1):2014-04; EN 60384-14:2013-08; IEC 60384-14 (ed.4)

CSA / cCSAus approval mark:

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.

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VJ2220Y472KXUSTX1 VJ2008Y102KXUSTX1 VJ2008Y471KXUSTX1 VJ2220Y103KXUSTX2 VJ2220Y222KXUSTX1 VJ2012Y471KXUSTX1 VJ2220Y332KXUSTX1 VJ2008Y272KXUSTX2 VJ2220Y471KXUSTX1 VJ2220Y472MXUSTX1