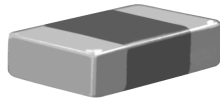


Surface Mount Multilayer Ceramic Chip Capacitors for High Reliability Applications



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 (Life at elevated ambient temperature X5R at + 85 °C)
- 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


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:

X5R: - 55 °C to + 125 °C

X7R: - 55 °C to + 125 °C

Capacitance Range: 100 pF to 6.8 μF

Voltage Rating: 6.3 Vdc to 500 Vdc

Temperature Coefficient of Capacitance (TCC):

X5R: ± 15 % from - 55 °C to + 125 °C, with 0 Vdc applied

X7R: ± 15 % from - 55 °C to + 125 °C, with 0 Vdc applied

Dissipation Factor:

6.3 V, 10 V ratings: 5 % max. at 1.0 V_{rms} and 1 kHz

16 V, 25 V ratings: 3.5 % max. at 1.0 V_{rms} and 1 kHz

≥ 50 V ratings: 2.5 % max. at 1.0 V_{rms} and 1 kHz

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 Vdc: DWV at 200 % of rated voltage

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

VJ High Rel X7R/X5R



Vishay Vitramon Surface Mount Multilayer Ceramic Chip Capacitors
for High Reliability Applications

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 ± 0.008 [5.59 ± 0.20]	0.250 ± 0.010 [6.35 ± 0.25]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]
VJ3640	0.360 ± 0.015 [9.14 ± 0.38]	0.400 ± 0.015 [10.2 ± 0.38]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]

ORDERING INFORMATION								
VJ1206	Y	104	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 3640	G = X5R Y = X7R	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. Examples: 104 = 100 000 pF	J = ± 5 % K = ± 10 % M = ± 20 %	X = Ni barrier 100 % tin plated F = AgPd L = Ni barrier with tin lead plated finish min. 4 % lead	Y = 6.3 V Q = 10 V J = 16 V X = 25 V A = 50 V K = 75 V B = 100 V C = 200 V E = 500 V P = 250 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 only 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



VJ High Rel X7R/X5R

Surface Mount Multilayer Ceramic Chip Capacitors Vishay Vitramon
for High Reliability Applications

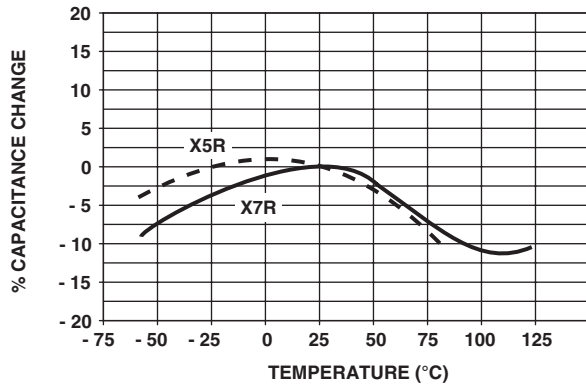
HIGH REL X7R/X5R																																
EIA CODE		0402						0603						0805						1206					1210 ⁽¹⁾							
VOLTAGE (Vdc)		6.3	10	16	25	50	100	6.3	10	16	25	50	100	10	16	25	50	100	200	16	25	50	100	200	500	16	25	50	75	100	200	500
VOLTAGE CODE		Y	Q	J	X	A	B	Y	Q	J	X	A	B	Q	J	X	A	B	C	J	X	A	B	C	E	J	X	A	K	B	C	E
CAP. CODE	CAP.																															
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	1000pF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
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	X5R	X5R	X5R				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
333	0.033 μF	X5R	X5R	X5R				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
393	0.039 μF	X5R						•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
473	0.047 μF	X5R						•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
563	0.056 μF	X5R						•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
683	0.068 μF	X5R						•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
823	0.082 μF	X5R						•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
104	0.10 μF	X5R						•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
124	0.12 μF							X5R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
154	0.15 μF							X5R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
184	0.18 μF								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
224	0.22 μF								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
274	0.27 μF								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
334	0.33 μF								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
394	0.39 μF								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
474	0.47 μF								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
564	0.56 μF								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
684	0.68 μF								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
824	0.82 μF								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
105	1.0 μF								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
125	1.2 μF								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

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

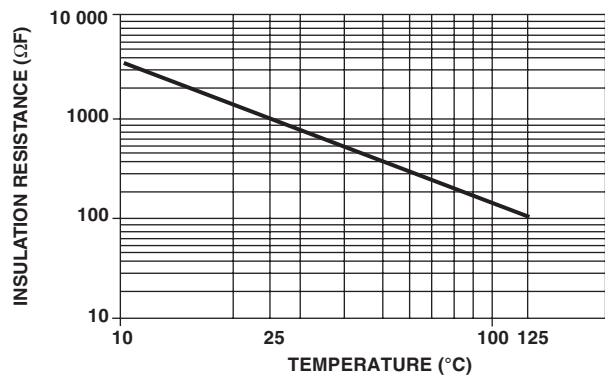


HIGH REL X7R/X5R - TYPICAL PARAMETERS

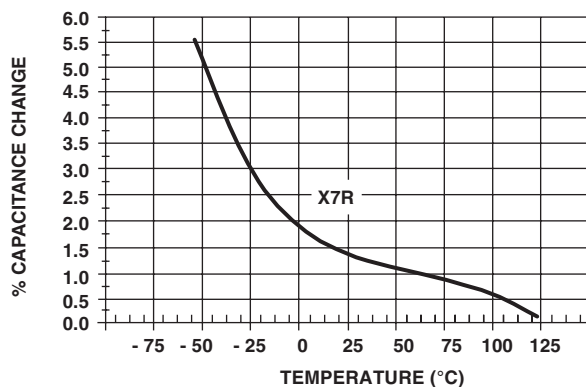
TEMPERATURE COEFFICIENT OF CAPACITANCE



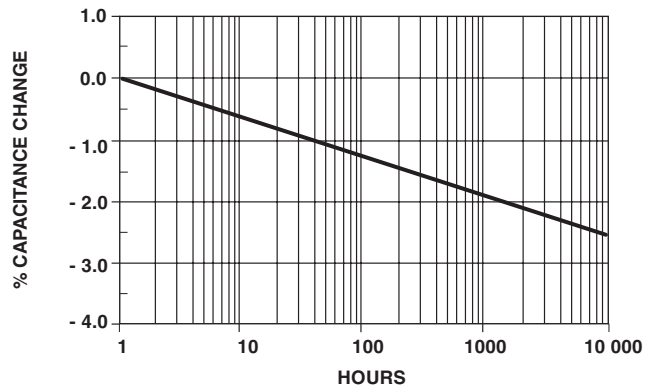
MINIMUM INSULATION RESISTANCE VS. TEMPERATURE



DISSIPATION FACTOR VS. TEMPERATURE



AGING RATE - X7R



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"	PLASTIC TAPE PACKAGING CODE "J"	PAPER TAPE PACKAGING CODE "P"	PLASTIC TAPE PACKAGING CODE "R"	VIAL PACKAGING CODE "B"	WAFFLE PACKAGING CODE "W"
0402	8 mm	5000	N/a	N/a	10 000	N/a	5000	N/a
0603	8 mm	4000	N/a	N/a	10 000	N/a	5000	N/a
0805 (4)	8 mm	3000	3000	N/a	10 000	10 000	5000	N/a
1206	8 mm	N/a	3000	N/a	N/a	10 000	5000	N/a
1210	8 mm	N/a	3000	N/a	N/a	10 000	5000	N/a
1808	12 mm	N/a	3000	N/a	N/a	10 000	1000	N/a
1812	12 mm	N/a	1000	N/a	N/a	5000	1000	N/a
1825	12 mm	N/a	1000	N/a	N/a	5000	1000	1000
2220	12 mm	N/a	1000	N/a	N/a	5000	N/a	1000
2225	12 mm	N/a	1000	N/a	N/a	5000	N/a	1000
3640	16 mm	N/a	1000	500	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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