

Surface Mount Multilayer Ceramic Chip Capacitors for Commercial Applications



FEATURES

- General purpose dielectric
- Excellent aging characteristics
- Ideal for decoupling and filtering
- Ideal for surge suppression and high voltage applications
- Wide range of case sizes, voltage ratings and capacitance values
- Surface mount, precious metal technology, wet built process
- Halogen-free according to IEC 61249-2-21



RoHS
COMPLIANT
HALOGEN
FREE

ELECTRICAL SPECIFICATIONS

Note: Electrical characteristics at + 25 °C unless otherwise specified

Operating Temperature: - 55 °C to + 150 °C

Capacitance Range: 100 pF to 1.8 μF

Voltage Rating: 10 Vdc to 1000 Vdc

Temperature Coefficient of Capacitance (TCC):

X7R: ± 15 % from - 55 °C to + 125 °C, with 0 Vdc applied
X5R: ± 15 % from - 55 °C to + 85 °C, with 0 Vdc applied ⁽⁴⁾

Dissipation Factor (DF):

≤ 25 V ratings: 3.5 % maximum at 1.0 V_{rms} and 1 kHz
> 25 V ratings: 2.5 % maximum 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
630/1000 Vdc: DWV at 150 % of rated voltage

ORDERING INFORMATION								
VJ0805 ⁽³⁾	Y	102	K	X	A	A	T	### ⁽²⁾⁽⁵⁾
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	Y = X7R G = X5R ⁽⁴⁾	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. Examples: 102 = 1000 pF	J = ± 5 % K = ± 10 % M = ± 20 %	X = Ni barrier 100 % tin plate matte finish F = AgPd B = Polymer 100 % tin plate matte finish ⁽⁶⁾	Q = 10 V J = 16 V X = 25 V A = 50 V B = 100 V C = 200 V E = 500 V P = 250 V L = 630 V G = 1000 V	A = Unmarked M = Marked Note: Marking is only available for 0805 and 1206 with termination code "X"	T = 7" reel/plastic tape C = 7" reel/paper tape R = 11 1/4" reel/plastic tape P = 11 1/4" reel/paper tape O = 7" reel/flamed paper tape I = 11 1/4"/13" reel/flamed paper tape Note: "I" and "O" is used for "F" termination paper taped size 0402/0603/0805	

Notes:

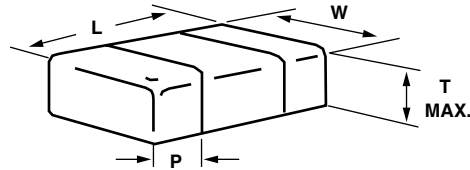
- (1) DC voltage rating should not be exceeded in application
- (2) Process Code may be added with up to three digits, used to control non-standard products and/or special requirements
- (3) Case size designator may be replaced by four digit drawing number used to control non-standard products and/or special requirements
- (4) Selected values for X5R, see selection chart
- (5) "A2" temporarily used to identify manufacturing plant for size ≥ 1812
- (6) Selected values available, contact mlcc@vishay.com for list of released ratings

VJ X7R Dielectric

Vishay Vitramon Surface Mount Multilayer Ceramic Chip Capacitors
for Commercial Applications



DIMENSIONS in inches [millimeters]



EIA STYLE	PART ORDERING NUMBER	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATION (P)	
					MINIMUM	MAXIMUM
0402	VJ0402	0.040 + 0.004/- 0.002 [1.00 + 0.10/- 0.05]	0.020 + 0.004/- 0.002 [0.50 + 0.10/- 0.05]	0.024 [0.60]	0.004 [0.10]	0.016 [0.41]
0603	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]
0805	VJ0805	0.079 ± 0.008 [2.00 ± 0.20]	0.049 ± 0.008 [1.25 ± 0.20]	0.057 [1.45]	0.010 [0.25]	0.028 [0.71]
1206	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]
1210	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	0.177 ± 0.010 [4.50 ± 0.25]	0.080 ± 0.010 [2.03 ± 0.25]	0.067 [1.70]	0.010 [0.25]	0.030 [0.76]
1812	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]
1825	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 ± 0.010 [5.08 ± 0.25]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]
-	VJ2225	0.220 ± 0.010 [5.59 ± 0.25]	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 [10.20 ± 0.38]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]

Note:

- Polymer terminations, "B" termination part number code, length dimensions, positive tolerances (including band width) above are allowed to increase by the following amounts:
0402/0603/3640 size, consult mlcc@vishay.com
0805/1210/1812/2220/2225 max. add length 0.0040"/0.10 mm
1206/1808 max. add length 0.0055"/0.14 mm



SELECTION CHART		X7R																													
DIELECTRIC		X7R																													
STYLE		VJ0402				VJ0603					VJ0805 ⁽²⁾						VJ1206						VJ1210 ⁽¹⁾								
EIA TYPE		0402				0603					0805						1206						1210								
VOLTAGE (Vdc)		16	25	50	100	16	25	50	100	200	10	16	25	50	100	200	16	25	50	100	200	250	500	630	16	25	50	100	200	500	630
CAP. CODE	CAP.																														
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	1000 pF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
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	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
333	0.033 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
393	0.039 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
473	0.047 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
563	0.056 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
683	0.068 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
823	0.082 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
104	0.10 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
124	0.12 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
154	0.15 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
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	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
155	1.5 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
185	1.8 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
225	2.2 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
275	2.7 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
335	3.3 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
395	3.9 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
475	4.7 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
565	5.6 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*
685	6.8 μF	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	*	*

Notes:

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

(2) X5R (- 55 °C to + 85 °C TCC: ± 15 %) for all 0805/10 V ratings

** Paper tape • Plastic tape

VJ X7R Dielectric



Vishay Vitramon Surface Mount Multilayer Ceramic Chip Capacitors
for Commercial Applications

SELECTION CHART																																	
DIELECTRIC		X7R																															
STYLE		VJ1808 ⁽¹⁾					VJ1812 ⁽¹⁾					VJ1825 ⁽¹⁾					VJ2220 ⁽¹⁾				VJ2225 ⁽¹⁾					VJ3640 ⁽¹⁾							
EIA TYPE		-					1812					1825					-				-					-							
VOLTAGE (Vdc)		50	100	200	500	1000	25	50	100	200	500	1000	25	50	100	200	500	1000	50	100	200	500	25	50	100	200	500	1000	25	50	100	200	500
CAP. CODE	CAP.																																
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	1000 pF				•	•					•																						
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	•	•	•	•	•					•	•	•	•	•	•	•																
333	0.033 µF	•	•	•							•	•	•	•	•	•	•																
393	0.039 µF	•	•	•							•	•	•	•	•	•	•																
473	0.047 µF	•	•	•							•	•	•	•	•	•	•																
563	0.056 µF	•	•	•							•	•	•	•	•	•	•																
683	0.068 µF	•	•	•							•	•	•	•	•	•	•																
823	0.082 µF	•	•	•							•	•	•	•	•	•	•																
104	0.10 µF	•	•	•							•	•	•	•	•	•	•																
124	0.12 µF	•	•								•	•	•	•	•	•	•																
154	0.15 µF	•	•								•	•	•	•	•	•	•																
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										•	•	•	•	•	•	•																
155	1.5 µF										•	•	•	•	•	•	•																
185	1.8 µF										•	•	•	•	•	•	•																
225	2.2 µF										•	•	•	•	•	•	•																
275	2.7 µF										•	•	•	•	•	•	•																
335	3.3 µF																																
395	3.9 µF																																
475	4.7 µF																																
565	5.6 µF																																
685	6.8 µF																																

Note:

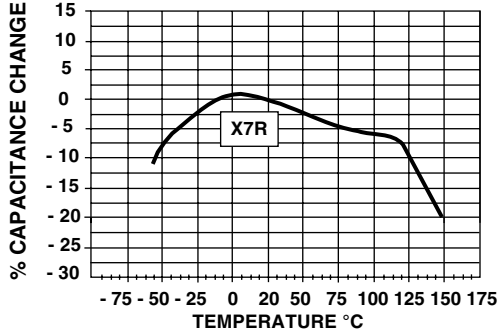
⁽¹⁾ See soldering recommendations within this data book, or visit www.vishay.com/doc?45034

- Plastic tape

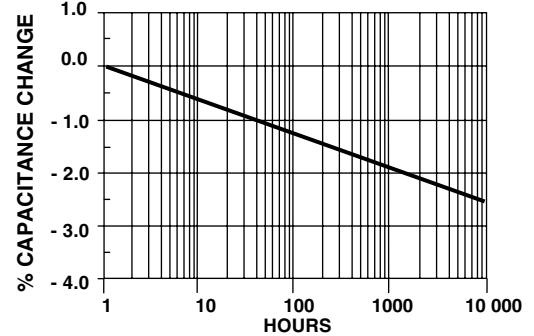


X7R DIELECTRIC - TYPICAL PARAMETERS

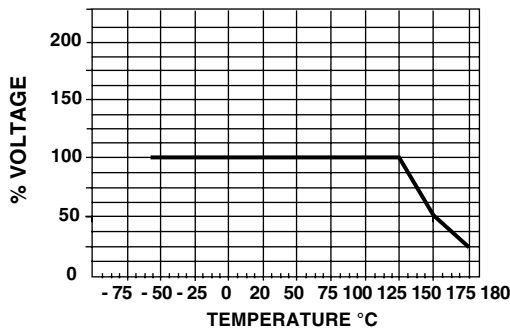
TYPICAL PARAMETER X7R
TEMPERATURE COEFFICIENT OF CAPACITANCE



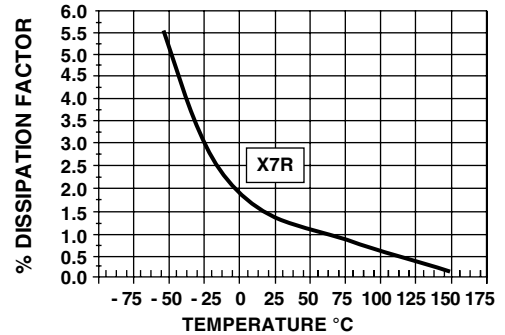
TYPICAL PARAMETER X7R
AGING RATE



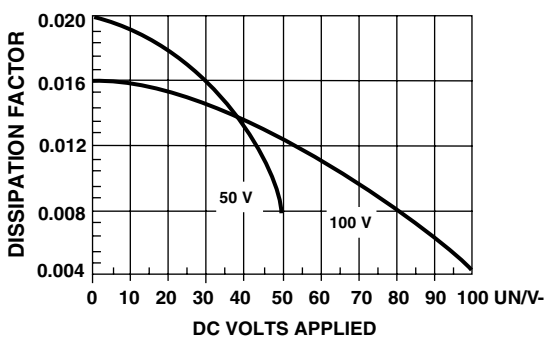
TYPICAL PARAMETER X7R
VOLTAGE VS. TEMPERATURE



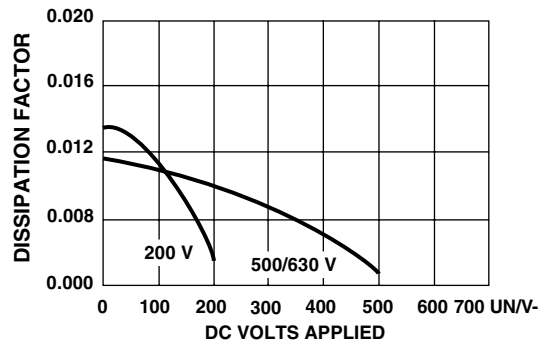
TYPICAL PARAMETER X7R
DISSIPATION FACTOR VS. TEMPERATURE



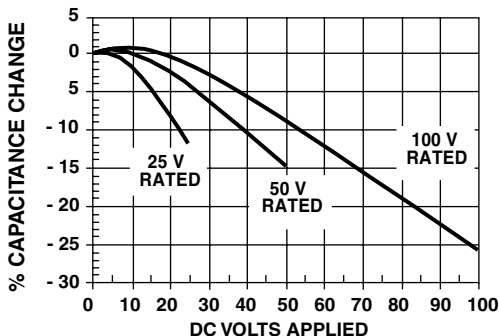
TYPICAL PARAMETER X7R
DISSIPATION FACTOR VS. VOLTAGE



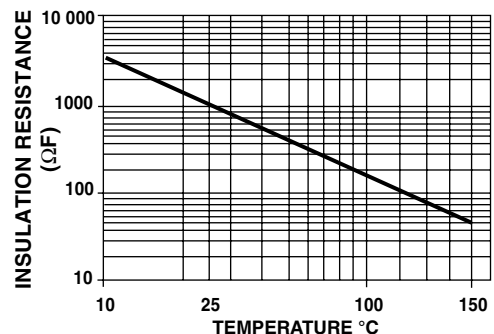
TYPICAL PARAMETER X7R
DISSIPATION FACTOR VS. VOLTAGE



TYPICAL PARAMETER X7R
VOLTAGE COEFFICIENT OF CAPACITANCE



TYPICAL PARAMETER X7R
MIN. INSULATION RESISTANCE VS. TEMPERATURE





Disclaimer

All product specifications and data are subject to change without notice.

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 herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

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.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.