

## Surface Mount Multilayer Ceramic Chip Capacitors for High Temperature Applications



### FEATURES

- Specialty: high temperature applications
- High operating temperature dielectric, up to +150 °C
- Maintains capacitance at high temperature for frequency stability
- Wet build process
- Reliable Noble Metal Electrode (NME) system
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
[5-2008]  
Available

### APPLICATIONS

- High temperature modules

### ELECTRICAL SPECIFICATIONS

#### Note

- Electrical characteristics at +25 °C unless otherwise specified.

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

**Capacitance Range:** 330 pF to 220 nF

**Voltage Range:** 25 V<sub>DC</sub> to 100 V<sub>DC</sub>

**Temperature Coefficient of Capacitance (TCC):**  
± 15 % from -55 °C to +150 °C

#### Dissipation Factor (DF):

25 V ratings: 3.5 % maximum at 1.0 V<sub>RMS</sub> and 1 kHz  
> 25 V ratings: 2.5 % maximum at 1.0 V<sub>RMS</sub> 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 Strength Test:

performed per method 103 of EIA-198-2-E  
Applied test voltage:  
≤ 100 V<sub>DC</sub>-rated: 250 % of rated voltage



QUICK REFERENCE DATA				
DIELECTRIC	CASE	MAXIMUM VOLTAGE (V)	CAPACITANCE	
			MINIMUM	MAXIMUM
X8R	0402	100	330 pF	6.8 nF
	0603	100	470 pF	33 nF
	0805	100	470 pF	100 nF
	1206	50	1.0 nF	220 nF
	1210	50	10 nF	220 nF

**Note**

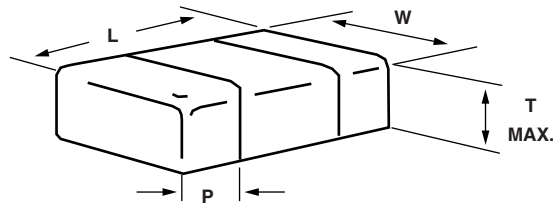
- Detail ratings see “Selection Chart”

ORDERING INFORMATION								
VJ0805	H	102	K	X	A	A	C	### <sup>(2)</sup>
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	DC VOLTAGE RATING <sup>(1)</sup>	MARKING <sup>(4)</sup>	PACKAGING	PROCESS CODE
0402 0603 0805 1206 1210	H = X8R	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. <b>Examples:</b> 102 = 1000 pF	J = ± 5 % K = ± 10 % M = ± 20 %	X = Ni barrier 100 % tin plated F, E = AgPd <sup>(3)(5)</sup>	X = 25 V A = 50 V B = 100 V	A = unmarked M = marked <b>Note</b> 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" / 13" reel / plastic tape P = 11 1/4" / 13" reel / paper tape O = 7" reel / flamed paper tape I = 11 1/4" / 13" reel / flamed paper tape <b>Note</b> “I” and “O” are used for “F” termination size 0603 / 0805 and “E” termination size 0402 / 0603 / 0805		

**Notes**

- (1) DC voltage rating should not be exceeded in application. Other application factors may affect the MLCC performance. Consult for questions: [mlcc@vishay.com](mailto:mlcc@vishay.com)
- (2) Process code may be added with up to three digits, used to control non-standard products and requirements.
- (3) Termination code “E” for conductive epoxy assembly.
- (4) Marking in reference to EIA198, see [www.vishay.com/doc?45028](http://www.vishay.com/doc?45028)
- (5) Termination code “F” not available for 0402, 0603 - 100 V, 0805 - 100 V.

ENVIRONMENTAL STATUS			
TERMINATION CODE	TERMINATION DESCRIPTION	RoHS COMPLIANT	VISHAY GREEN
X	Ni barrier 100 % tin plated matte finish	Yes	Yes
E	AgPd	Yes	Yes
F	AgPd	Yes	No

**DIMENSIONS** in inches (millimeters)


CASE CODE	STYLE	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 ± 0.006 (1.60 ± 0.15)	0.031 ± 0.006 (0.80 ± 0.15)	0.036 (0.92)	0.012 (0.30)	0.022 (0.55)
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)	0.030 (0.76)
1206	VJ1206	0.126 ± 0.010 (3.20 ± 0.25)	0.063 ± 0.010 (1.60 ± 0.25)	0.067 (1.70)	0.010 (0.25)	0.030 (0.76)
1210	VJ1210	0.126 ± 0.010 (3.20 ± 0.25)	0.098 ± 0.010 (2.50 ± 0.25)	0.067 (1.70)	0.010 (0.25)	0.030 (0.76)



SELECTION CHART														
DIELECTRIC		X8R												
STYLE		VJ0402			VJ0603			VJ0805			VJ1206 <sup>(1)</sup>		VJ1210 <sup>(1)</sup>	
CASE CODE		0402			0603			0805			1206		1210	
VOLTAGE (V <sub>DC</sub> )		25	50	100	25	50	100	25	50	100	25	50	25	50
VOLTAGE CODE		X	A	B	X	A	B	X	A	B	X	A	X	A
CAP. CODE	CAP.													
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				••	••		••	••	••	•	•	•	•
183	18 nF				••	••		••	••	••	•	•	•	•
223	22 nF				••			••	••	•	•	•	•	•
273	27 nF				••			••	•	•	•	•	•	•
333	33 nF				••			••	•		•	•	•	•
393	39 nF							••	•		•	•	•	•
473	47 nF							•	•		•	•	•	•
563	56 nF							•	•		•	•	•	•
683	68 nF							•			•	•	•	•
823	82 nF							•			•	•	•	•
104	100 nF							•			•	•	•	•
124	120 nF										•	•	•	•
154	150 nF										•		•	•
184	180 nF										•		•	
224	220 nF										•		•	
274	270 nF													
334	330 nF													
394	390 nF													

**Notes**

- <sup>(1)</sup> See soldering recommendations within this data book, or visit [www.vishay.com/doc245034](http://www.vishay.com/doc245034)
- Plastic tape, •• Paper tape
- RoHS-compliant

X8R PACKAGING QUANTITIES <sup>(1)</sup>					
CASE CODE	TAPE SIZE	7" REEL QUANTITIES		11 1/4" AND 13" REEL QUANTITIES	
		PACKAGING CODE		PACKAGING CODE	
		"C" / "O"	"T"	"P" / "I"	"R"
0402	8 mm	5000	n/a	10 000	n/a
0603	8 mm	4000	n/a	10 000	n/a
0805 <sup>(2)</sup>	8 mm	3000	3000	10 000	10 000
1206 <sup>(2)</sup>	8 mm	n/a	2500 / 3000	10 000	9000 / 10 000
1210 <sup>(2)</sup>	8 mm	n/a	2000 / 2500 / 3000	10 000	9000 / 10 000

**Notes**

- <sup>(1)</sup> Reference: EIA standard RS481 - "Taping of Surface Mount Components for Automatic Placement"
- <sup>(2)</sup> Packaging "C" / "P" / "O" / "I" and "T" / "R" or lower quantities can depend from product thickness



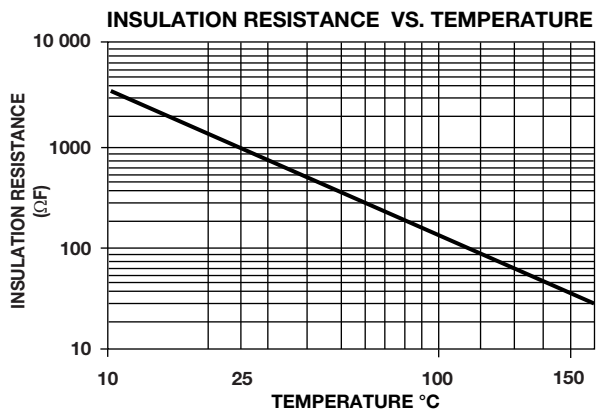
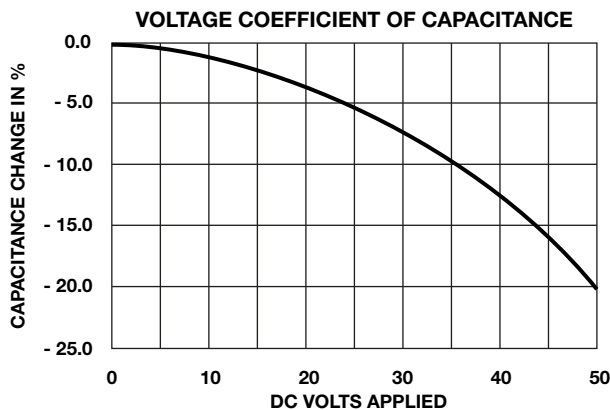
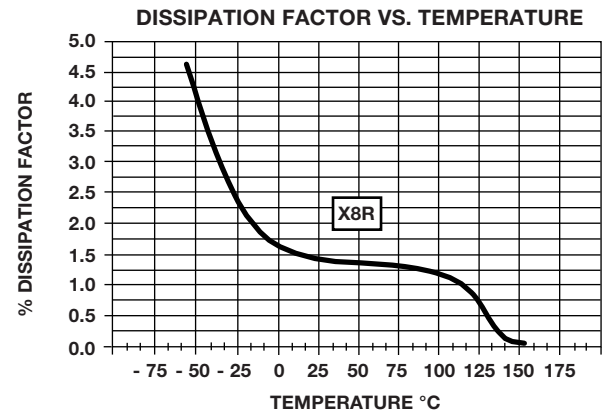
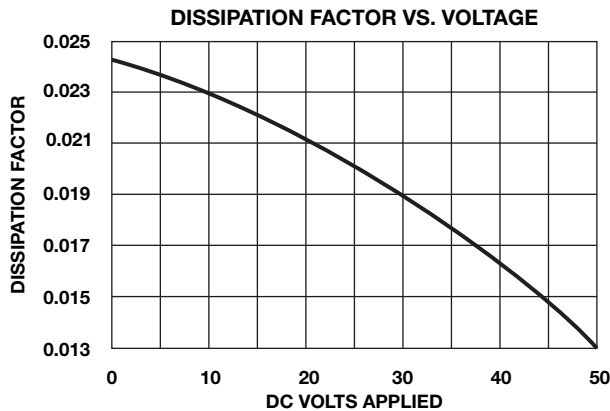
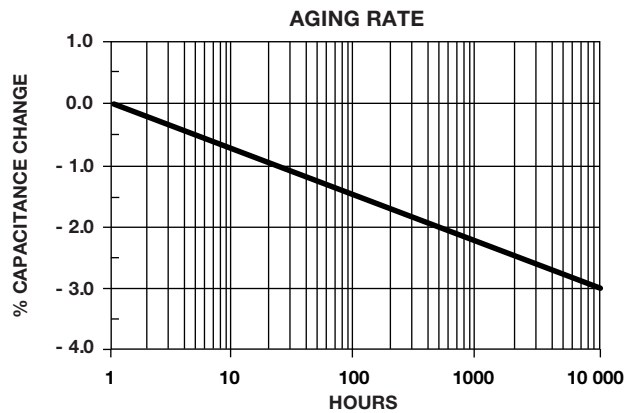
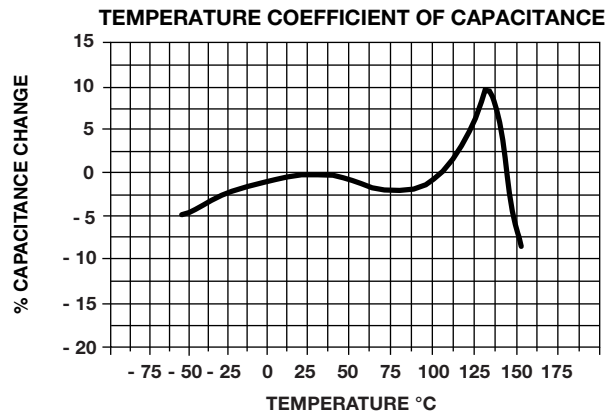
**STORAGE AND HANDLING CONDITIONS**

- (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 oxidation 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.

**X8R DIELECTRIC - TYPICAL PARAMETERS**





## **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.