

## Surface Mount Multilayer Ceramic Capacitors for Pulse Current Applications



### FEATURES

- Low electrostrictive ceramic formulation for repeated charge and discharge cycles
- High pulse discharge currents
- Excellent reliability and high voltage performance
- Available with tin / lead barrier termination (code "L")
- Wet built process
- Reliable Noble Metal Electrode (NME) system
- Made with a combination of design, materials and tight process control to achieve very high field reliability
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



Available  
**RoHS\***  
Available  
**HALOGEN  
FREE**

### Note

\* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

### APPLICATIONS

- Power supplies
- Converters
- Voltage multipliers

### ELECTRICAL SPECIFICATIONS

#### Note

- Electrical characteristics at +25 °C unless otherwise specified

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

**Capacitance Range:** 4.7 nF to 560 nF

**Voltage Range:** 1000 V<sub>DC</sub>, 1500 V<sub>DC</sub>

**Temperature Coefficient of Capacitance (TCC):**  
X7R: ± 15 % from -55 °C to +125 °C, with 0 V<sub>DC</sub> applied

**Dissipation Factor (DF):**  
2.5 % max. 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 voltages:  
1000 V<sub>DC</sub> / 1500 V<sub>DC</sub>-rated: min. 120 % of rated voltage

DIMENSIONS in inches [millimeters]						
CASE CODE	PART ORDERING NUMBER	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATION (P)	
					MINIMUM	MAXIMUM
1812	VJ1812	0.177 ± 0.012 [4.50 ± 0.30]	0.126 ± 0.008 [3.20 ± 0.20]	0.086 [2.18]	0.010 [0.25]	0.035 [0.90]
1825	VJ1825	0.177 ± 0.012 [4.50 ± 0.30]	0.252 ± 0.010 [6.40 ± 0.25]	0.086 [2.18]	0.010 [0.25]	0.035 [0.90]
2225	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]	0.037 [0.95]
3040	VJ3040	0.300 ± 0.015 [7.62 ± 0.38]	0.400 ± 0.015 [10.20 ± 0.38]	0.100 [2.54]	0.010 [0.25]	0.039 [1.00]
3640	VJ3640	0.360 ± 0.015 [9.14 ± 0.38]	0.400 ± 0.015 [10.20 ± 0.38]	0.120 [3.05]	0.130 <sup>(1)</sup> [3.30]	0.010 [0.25]
4044	VJ4044	0.400 ± 0.015 [10.16 ± 0.38]	0.440 ± 0.015 [11.17 ± 0.38]	0.120 [3.05]	0.020 [0.50]	0.040 [1.00]

**Note**

<sup>(1)</sup> Thickness used for 3640 - 1500 V - 220 nF and 270 nF

QUICK REFERENCE DATA				
DIELECTRIC	CASE	MAXIMUM VOLTAGE (V)	CAPACITANCE	
			MINIMUM	MAXIMUM
X7R (X5P)	1812	1500	4.7 nF	27 nF
	1825	1500	10 nF	56 nF
	2225	1500	18 nF	100 nF
	3040	1500	33 nF	220 nF
	3640	1500	47 nF	330 nF
	4044	1500	100 nF	560 nF

**Note**

- Detail ratings see "Selection Chart"

ORDERING INFORMATION								
VJ3640	Y	184	K	X	R	A	T	SE
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	DC VOLTAGE RATING <sup>(1)</sup>	MARKING	PACKAGING <sup>(3)</sup>	PROCESS CODE <sup>(2)</sup>
1812 1825 2225 3040 3640 4044	Y = X7R	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. <b>Examples:</b> 184 = 180 000 pF	J = ± 5 % K = ± 10 % M = ± 20 %	X = Ni barrier 100 % tin matte plated L = Ni barrier with tin lead plated finish min. 4 % lead	G = 1000 V R = 1500 V	A = unmarked	T = 7" reel / plastic tape J = 7" reel / plastic tape (low quantity)	

**Notes**

- <sup>(1)</sup> DC voltage rating should not be exceeded in application  
<sup>(2)</sup> Process code with 2 digits has to be added  
<sup>(3)</sup> All types of packaging may not be available for all case sizes, see table end of this datasheet



SELECTION CHART													
DIELECTRIC		X7R											
STYLE		VJ1812 <sup>(1)</sup>		VJ1825 <sup>(1)</sup>		VJ2225 <sup>(1)</sup>		VJ3040 <sup>(1)</sup>		VJ3640 <sup>(1)</sup>		VJ4044 <sup>(1)</sup>	
CASE CODE		1812		1825		2225		3040		3640		4044	
VOLTAGE (V <sub>DC</sub> )		1000	1500	1000	1500	1000	1500	1000	1500	1000	1500	1000	1500
VOLTAGE CODE		G	R	G	R	G	R	G	R	G	R	G	R
CAP. CODE	CAP.												
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											•	
474	470 nF											•	
564	560 nF											•	
684	680 nF												
824	820 nF												
105	1000 nF												

**Notes**

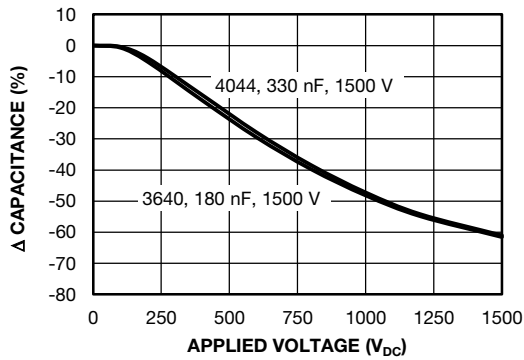
• RoHS-compliant except when supplied with lead (Pb)-containing termination, code "L"

• Plastic tape

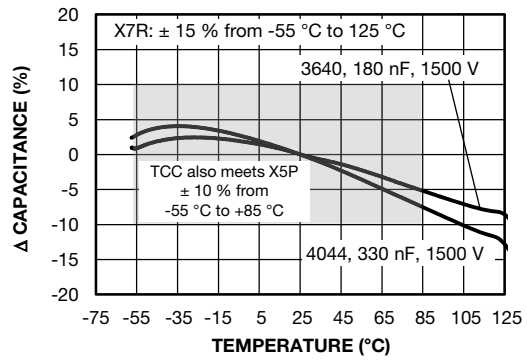
<sup>(1)</sup> See soldering recommendations within this data book, or visit [www.vishay.com/doc?45034](http://www.vishay.com/doc?45034)

## TYPICAL PARAMETERS

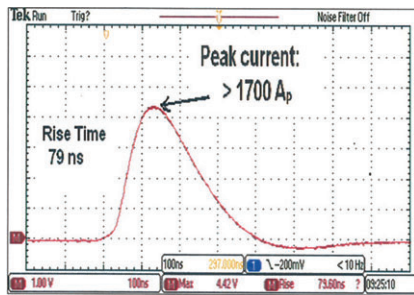
**VOLTAGE COEFFICIENT OF CAPACITANCE**



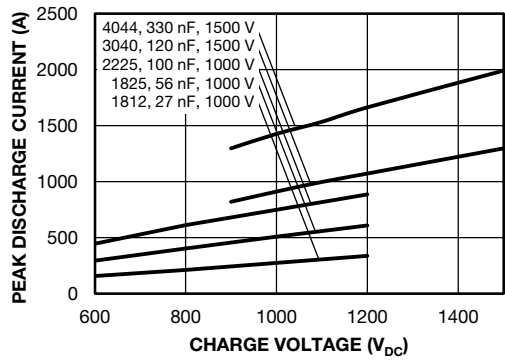
**TEMPERATURE COEFFICIENT OF CAPACITANCE**



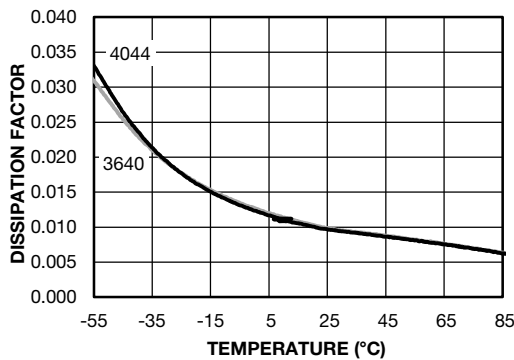
**DISCHARGE PULSE OF 330 nF, 4044 SEC**



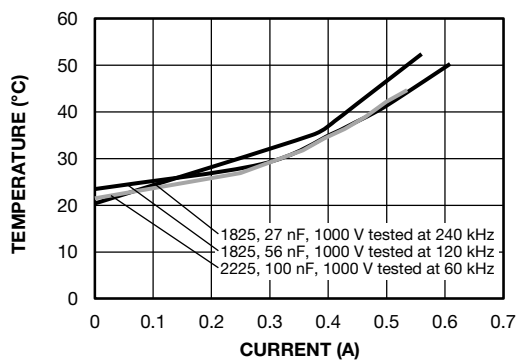
**DISCHARGE CURRENT VS. CHARGE VOLTAGE**



**DISSIPATION FACTOR VS. TEMPERATURE**



**TEMPERATURE VS. RIPPLE CURRENT**





<b>STANDARD PACKAGING QUANTITIES</b>			
CASE CODE	TAPE SIZE	7" REEL QUANTITIES	
		PLASTIC TAPE PACKAGING CODE "T"	LOW QUANTITY PACKAGING CODE "J"
1812	12 mm	1000	500
1825	12 mm	500	250
2225	12 mm	500	250
3040	16 mm	500	n/a
3640	16 mm	350	n/a
4044	24 mm	300	n/a

**Notes**

- Reference: EIA standard RS 481 - "Taping of Surface Mount Components for Automatic Placement"
- n/a = not available

<b>STORAGE AND HANDLING CONDITIONS</b>
<p>(1) Store the components at 5 °C to 40 °C ambient temperature and ≤ 70 % relative humidity conditions.</p> <p>(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.</p> <p>Precautions:</p> <ul style="list-style-type: none"> <li>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.</li> <li>b. Store products on the shelf and avoid exposure to moisture or dust.</li> <li>c. Do not expose products to excessive shock, vibration, direct sunlight and so on.</li> </ul>



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