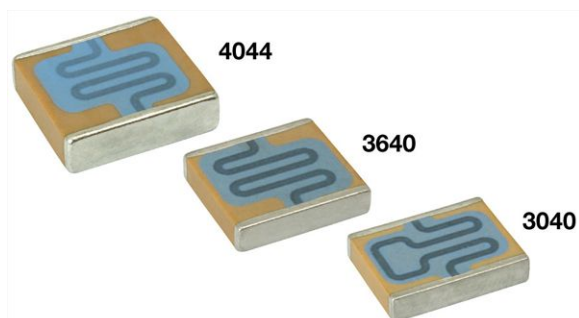




Surface Mount Multilayer Ceramic Chip Capacitors with Integrated Resistor for High Pulse Current Applications



FEATURES

- Integrated resistor on the surface of the capacitor
- 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
- Resistor glass overglaze contains lead
- Material categorization: For definitions of compliance please see 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

- Detonation devices (munitions, pyrotechnic, blasting)
- Down hole drilling
- Electronic fuzing

ELECTRICAL SPECIFICATIONS

Note

- Electrical characteristics at + 25 °C unless otherwise specified

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

Capacitance Range: 33 nF to 560 nF

Voltage Range: 1000 V_{DC} to 1500 V_{DC}

Temperature Coefficient of Capacitance (TCC):

X5P: ± 10 % from - 55 °C to + 85 °C, with 0 V_{DC} applied

X7R: ± 15 % from - 55 °C to + 125 °C, with 0 V_{DC} applied

Parallel Resistor: 500 MΩ ± 30 %

Dissipation Factor (DF):

2.5 % maximum at 1.0 V_{RMS} and 1 kHz

Aging Rate: 1 % maximum per decade

Insulation Resistance (IR):

At + 25 °C without resistor: 100 000 MΩ minimum or 1000 ΩF, whichever is less.

At + 125 °C without resistor: 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_{DC}/1500 V_{DC}-rated: 120 % of rated voltage

**QUICK REFERENCE DATA**

DIELECTRIC	CASE	MAXIMUM VOLTAGE (V)	CAPACITANCE	
			MINIMUM	MAXIMUM
X7R (X5P)	3040	1500	33 nF	220 nF
	3640	1500	47 nF	330 nF
	4044	1500	100 nF	560 nF

Note

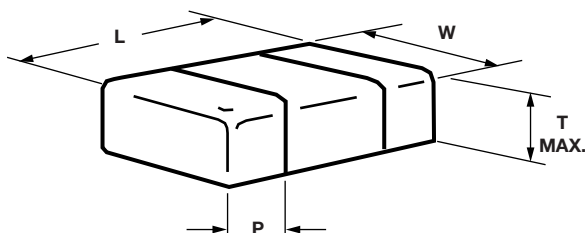
- Detail ratings see "Selection Chart"

ORDERING INFORMATION

VJ3640 ⁽³⁾	Y	184	K	X	R	A	T	8R ⁽²⁾
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	DC VOLTAGE RATING ⁽¹⁾	MARKING	PACKAGING	PROCESS CODE
3040 3640 4044	Y = X7R (X5P)	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. Examples: 184 = 180 nF 334 = 330 nF	J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$	X = Ni barrier 100 % tin plate matte finish L = Ni barrier with tin lead plated finish min. 4 % lead	G = 1000 V R = 1500 V	A = Unmarked	T = 7" reel/plastic tape	

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
- ⁽²⁾ Process Code must be added to control special requirements
- ⁽³⁾ Size designator may be replaced by four digit drawing number used to control non-standard products and/or special requirements

DIMENSIONS in inches [millimeters]

CASE CODE	PART ORDERING NUMBER	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATION (P)	
					MINIMUM	MAXIMUM
3040	VJ3040	0.300 $\pm$ 0.015 [7.62 $\pm$ 0.38]	0.400 $\pm$ 0.015 [10.20 $\pm$ 0.38]	0.100 [2.54]	0.010 [0.25]	0.030 [0.76]
3640	VJ3640	0.360 $\pm$ 0.015 [9.14 $\pm$ 0.38]	0.400 $\pm$ 0.015 [10.20 $\pm$ 0.38]	0.120 [3.05]	0.010 [0.25]	0.030 [0.76]
4044	VJ4044	0.400 $\pm$ 0.015 [10.16 $\pm$ 0.38]	0.440 $\pm$ 0.015 [11.17 $\pm$ 0.38]	0.120 [3.05]	0.020 [0.50]	0.040 [1.00]

SELECTION CHART							
DIELECTRIC		X7R (X5P)					
STYLE		VJ3040 ⁽¹⁾		VJ3640 ⁽¹⁾		VJ4044 ⁽¹⁾	
CASE CODE		3040		3640		4044	
VOLTAGE (V _{DC})		1000	1500	1000	1500	1000	1500
VOLTAGE CODE		G	R	G	R	G	R
CAP. CODE	CAP.						
223	0.022 μ F						
273	0.027 μ F						
333	0.033 μ F		•				
393	0.039 μ F		•				
473	0.047 μ F		•		•		
563	0.056 μ F	•	•		•		
683	0.068 μ F	•	•		•		
823	0.082 μ F	•	•		•		
104	0.10 μ F	•	•	•	•		•
124	0.12 μ F	•	•	•	•		•
154	0.15 μ F	•		•	•	•	•
184	0.18 μ F	•		•	•	•	•
224	0.22 μ F	•		•		•	•
274	0.27 μ F			•		•	•
334	0.33 μ F			•		•	•
394	0.39 μ F					•	
474	0.47 μ F					•	
564	0.56 μ F					•	
684	0.68 μ F						
824	0.82 μ F						
105	1.0 μ F						
125	1.2 μ F						
155	1.5 μ F						
185	1.8 μ F						
225	2.2 μ F						
275	2.7 μ F						
335	3.3 μ F						

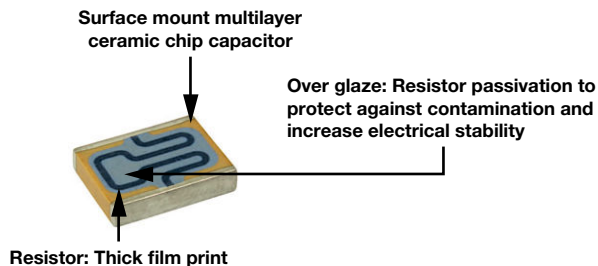
Notes

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

• Plastic tape

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

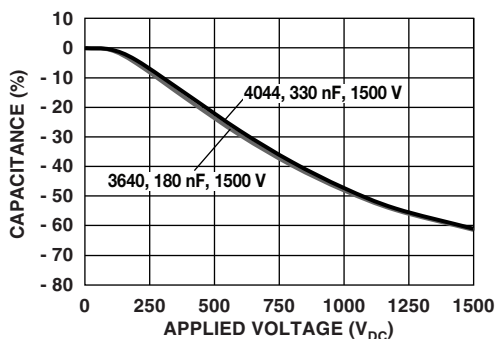
CONSTRUCTION



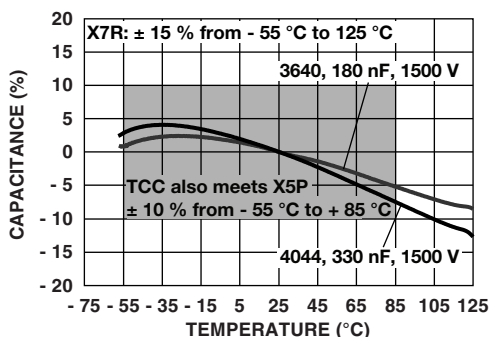


TYPICAL PARAMETERS

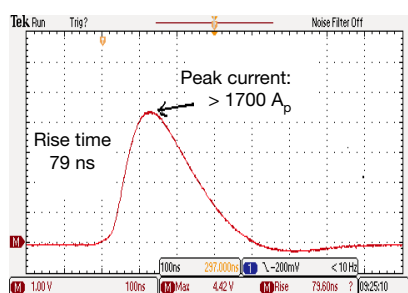
VOLTAGE COEFFICIENT OF CAPACITANCE



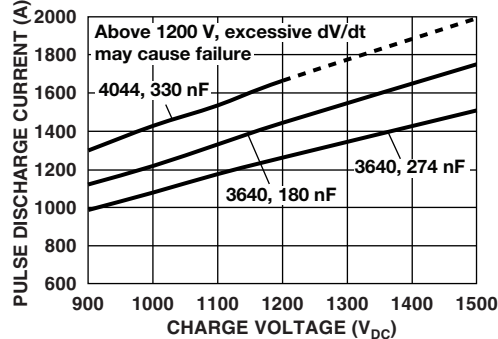
TEMPERATURE COEFFICIENT OF CAPACITANCE



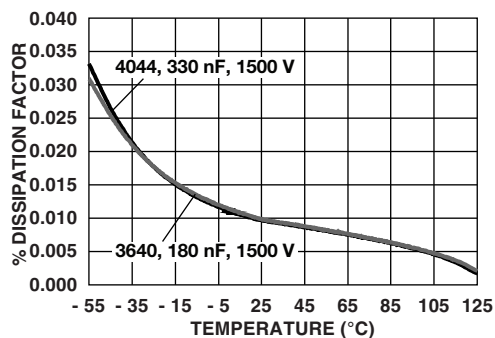
DISCHARGE PULSE OF 4044 CDC



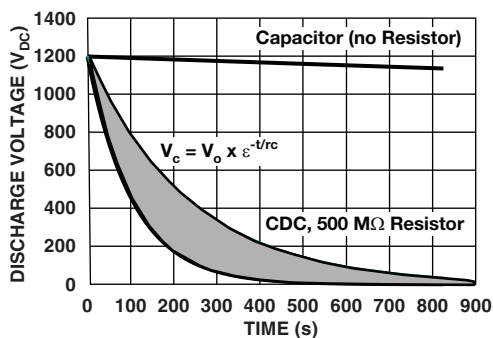
DISCHARGE CURRENT VS. CHARGE VOLTAGE



DISSIPATION FACTOR VS. TEMPERATURE



SELF DISCHARGE VS. TIME





STANDARD PACKAGING QUANTITIES (1)(2)(3)		
CASE CODE	TAPE SIZE	7" REEL QUANTITIES
		PLASTIC TAPE PACKAGING CODE "T"
3040	16 mm	500
3640	16 mm	500
4044	24 mm	300

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

STORAGE AND HANDLING CONDITIONS

(1) Store the components at 5 °C to + 40 °C ambient temperature and ≤ 70 % related 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:

- 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.
- Store products on the shelf and avoid exposure to moisture or dust.
- Do not expose products to excessive shock, vibration, direct sunlight and so on.



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.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.