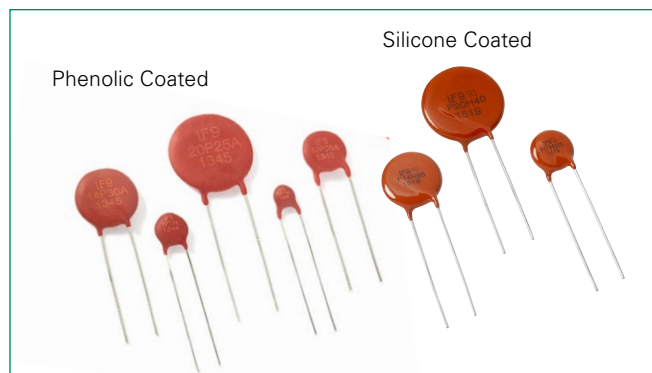



### AUMOV® Varistor Series



#### Agency Approvals

Agency	Agency File Number
	E320116 (only 14VAC to 42VAC for Epoxy coated)

**Note:** All Phenolic coating parts and Silicone coating parts are qualified to AEC-Q200 (Table 10).

#### Additional Information



Datasheet



Resources



Samples

#### Applications

- Body Electronics Systems
- Powertrain Systems
- Infotainment Systems
- Automotive Control Module Protection
- Motor or inductive load transient suppression

#### Description

The Littelfuse AUMOV® Varistor Series of low voltage, high surge current, radial leaded varistors provides an ideal circuit protection for load dump, jump start voltage transient conditions specifically for automotive applications.

The maximum peak surge current rating is rated up to 5kA (8/20  $\mu$ s pulse) to protect sensitive infotainment systems from voltage transients. This AEC-Q200 (Table 10) qualified series is available in five disc sizes: 5mm, 7mm, 10mm, 14mm and 20mm; it features a wide VDC voltage range from 16V to 825V.

#### Features

- Breakthrough in low voltage varistor design provides high peak surge current rating
- Phenolic and Silicone coating meet the stringent quality requirements of AEC-Q200 (Table 10)
- Reduced footprint and volume required for surge protection
- Optional phenolic coating for higher operating temperature up to 125°C
- High peak surge current rating up to 5kA (8/20  $\mu$ s pulse)
- Wide operating voltage range: 14VAC to 625VAC and 16VDC to 825VDC
- Five disc sizes available: 5, 7, 10, 14, and 20mm
- High resistance to thermal cycles for phenolic coating
- High energy absorption particularly for automotive load dump and jump start
- Lead-free, Halogen-Free and RoHS compliant
- Silicone coating option: High operating temperature combined with high isolation voltage capability: 125°C and 2500V, respectively

#### Absolute Maximum Ratings

• For ratings of individual members of a series, see Device Ratings and Specifications chart

	Low Voltage Series	Units
<b>Continuous:</b>		
Steady State Applied Voltage:		
AC Voltage Range ( $V_{MIACIRMS}$ )	14 to 625	V
DC Voltage Range ( $V_{MIDC}$ )	16 to 825	V
<b>Transient:</b>		
Non-Repetitive Surge Current, 8/20 $\mu$ s Waveform ( $I_{TM}$ )	400 to 5,000	A
Non-Repetitive Energy Capability, 2ms Waveform ( $W_{TM}$ )	1.0 to 140	J
Operating Ambient Temperature Range ( $T_A$ ) for Epoxy coated	-40 to +85	°C
Operating Ambient Temperature Range ( $T_A$ ) for Phenolic coated and Silicone coated	-40 to +125	°C
Storage Temperature Range ( $T_{STG}$ ) for Epoxy coated	-40 to +125	°C
Storage Temperature Range ( $T_{STG}$ ) for Phenolic coated and Silicone coated	-40 to +150	°C
Temperature Coefficient ( $\alpha V$ ) of Clamping Voltage ( $V_C$ ) at Specified Test Current	< 0.01 %	°C
Hi-Pot Encapsulation (Isolation Voltage Capability) for Epoxy coated	2500	V
Hi-Pot Encapsulation (Isolation Voltage Capability) for Phenolic coated	500	V
Hi-Pot Encapsulation (Isolation Voltage Capability) for Silicone coated	2500	V
Temperature Cycling (-40C to +125C) for Epoxy coated	5	Cycles
Temperature Cycling (-40C to +125C) for Phenolic and Silicone coated	1000	Cycles

**CAUTION:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.





### AUMOV® Varistor Series Device Ratings & Specifications cont...

Phenolic Coated Models		Silicone Coated Models		Size Disc Dia. (mm)	Max Continuous Voltage		Varistor Voltage at 1mA			Maximum Clamping Voltage		Max Peak Current (8 x 20µs, 1 pulse)	Energy Rating (2ms, 1 pulse)	Energy (Load Dump, 10 pulses)*	Jump Start DC V <sub>jump</sub> (5 min)	Typical Capacitance f = 1MHz	
Part Number (Base part)	Branding	Part Number (Base part)	Branding		V <sub>RMS</sub>	V <sub>DC</sub>	Min	Nom	Max	V <sub>C</sub>	I <sub>PK</sub>	I <sub>TM</sub>	W <sub>TM</sub>	(J)	(J)	(V)	(pF)
					(V)	(V)	(V)	(V)	(V)	(V)	(A)	(A)	(J)				
V10P550AUTO	10P550A	V10H550AUTO	10H550A	10	550	745	819	910	1001	1500	25	3500	98	-	-	100	
V14P550AUTO	14P550A	V14H550AUTO	14H550A	14	550	745	819	910	1001	1500	50	6500	210	-	-	180	
V20P550AUTO	20P550A	V20H550AUTO	20H550A	20	550	745	819	910	1001	1500	100	10000	450	-	-	300	
V10P625AUTO	10P625A	V10H625AUTO	10H625A	10	625	825	900	1000	1100	1650	25	3500	110	-	-	90	
V14P625AUTO	14P625A	V14H625AUTO	14H625A	14	625	825	900	1000	1100	1650	50	6500	235	-	-	160	
V20P625AUTO	20P625A	V20H625AUTO	20H625A	20	625	825	900	1000	1100	1650	100	10000	490	-	-	250	

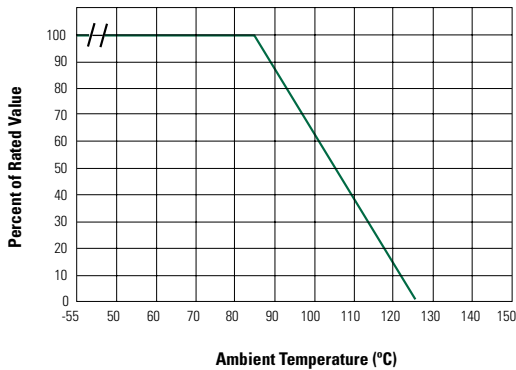
**Note:**

1. Average power dissipation of transients not to exceed 0.2W, 0.25W, 0.4W, 0.6W or 1W for model sizes 5mm, 7mm, 10mm, 14mm and 20mm, respectively.
2. \*Energy rating (auto load dump) for impulse duration of 40ms minimum to one half of peak current, 60sec interval ISO7637-2 pulse 5a and ISO16750-2 Table 5A.
3. The shift of V<sub>nom</sub> (Varistor Voltage) may be to +/-15% for Load dump or Jump Start test.
4. The ratings and specifications of Silicone coated options are the same as the Phenolic coating, except the isolation voltage capability (Hi-Pot Encapsulation) is 2500V.

### Current Energy and Power Dissipation Ratings

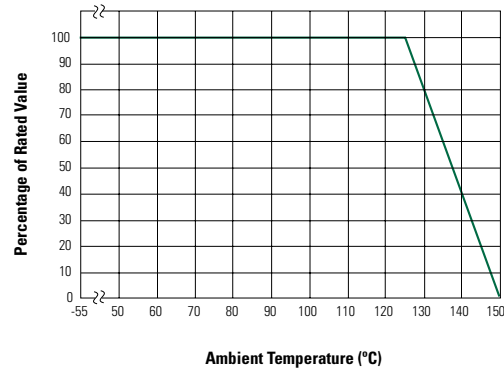
#### Figure 1A - Power Derating for Epoxy Coated

For applications exceeding 85°C ambient temperature, the peak surge current and energy ratings must be reduced as shown below.

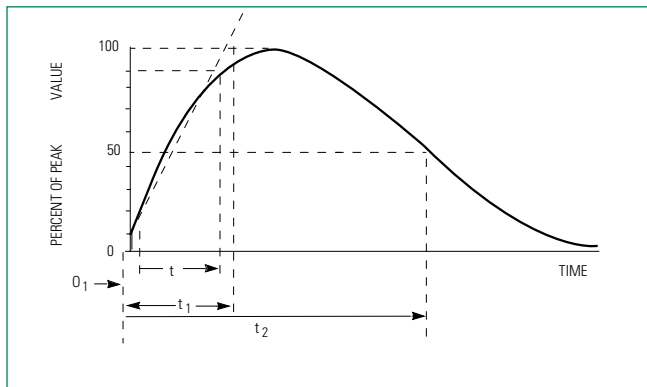


#### Figure 1B - Power Derating for Phenolic Coated and Silicone Coated

For applications exceeding 125°C ambient temperature, the peak surge current and energy ratings must be reduced as shown below.



### Fig. 2 Peak Pulse Current Test Waveform for Clamping Voltage



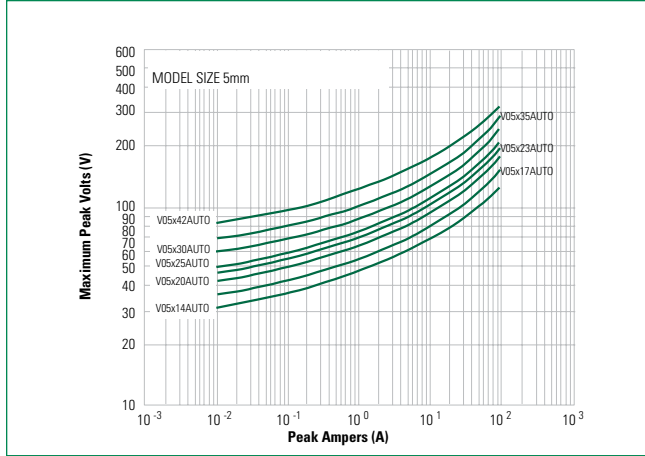
- 0<sub>1</sub> = Virtual Origin of Wave
- t = Time from 10% to 90% of Peak
- t<sub>1</sub> = Virtual Front Time = 1.25 x t
- t<sub>2</sub> = Virtual Time to Half-Value (Impulse Duration)

**Example** - For an 8/20 µs Current Waveform:

- 8µs = t<sub>1</sub> = Virtual Front Time
- 20µs = t<sub>2</sub> = Virtual Time to Half-Value

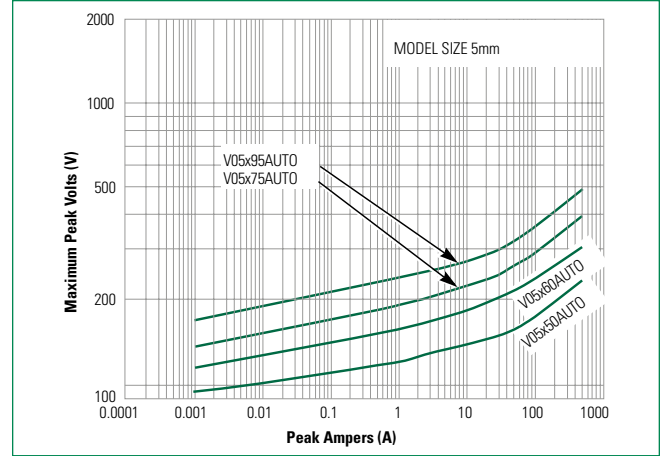
**Maximum Clamping Voltage for 5mm Parts**

V05x14AUTO - V05x42AUTO



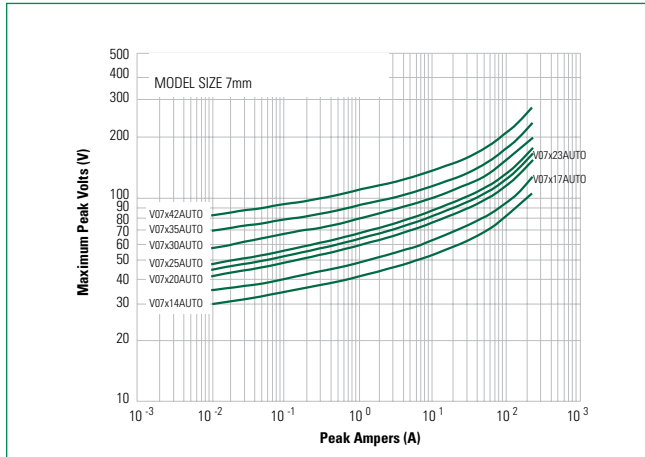
**Maximum Clamping Voltage for 5mm Parts**

V05x50AUTO - V05x95AUTO



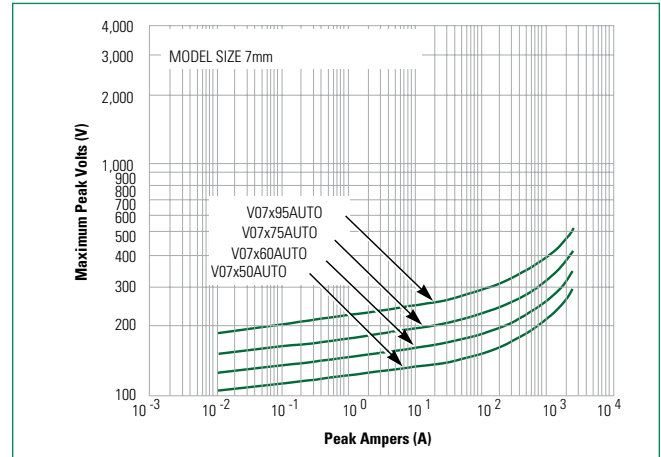
**Maximum Clamping Voltage for 7mm Parts**

V07x14AUTO - V07x42AUTO



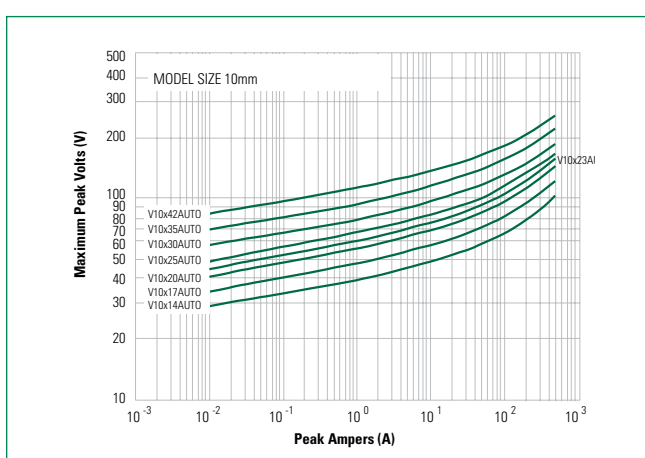
**Maximum Clamping Voltage for 7mm Parts**

V07x50AUTO - V07x95AUTO



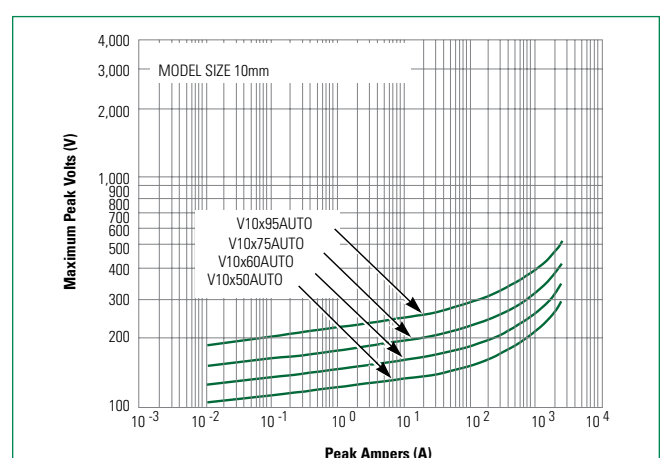
**Maximum Clamping Voltage for 10mm Parts**

V10x14AUTO - V10x42AUTO



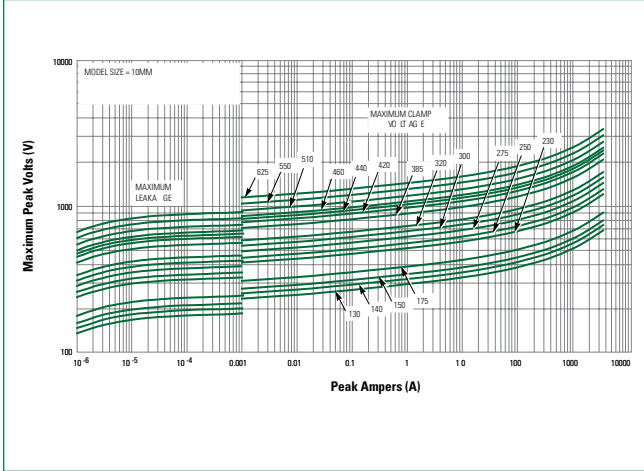
**Maximum Clamping Voltage for 10mm Parts**

V10x50AUTO - V10x95AUTO



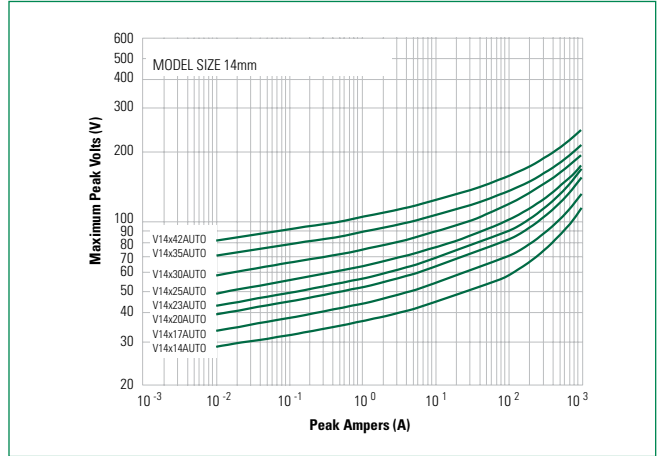
**Maximum Clamping Voltage for 10mm Parts**

V10x130AUTO - V10x625AUTO



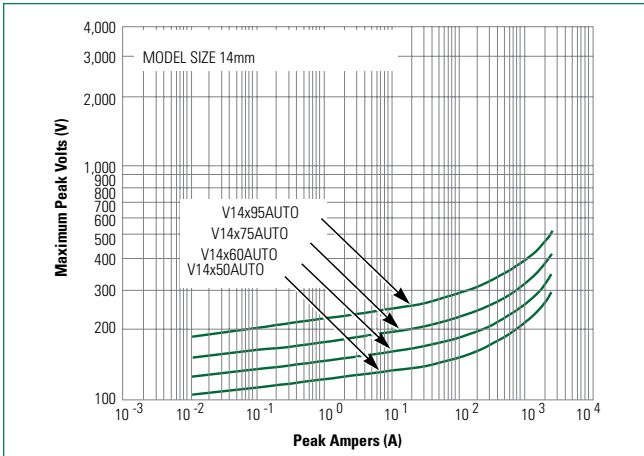
**Maximum Clamping Voltage for 14mm Parts**

V14x14AUTO - V14x42AUTO



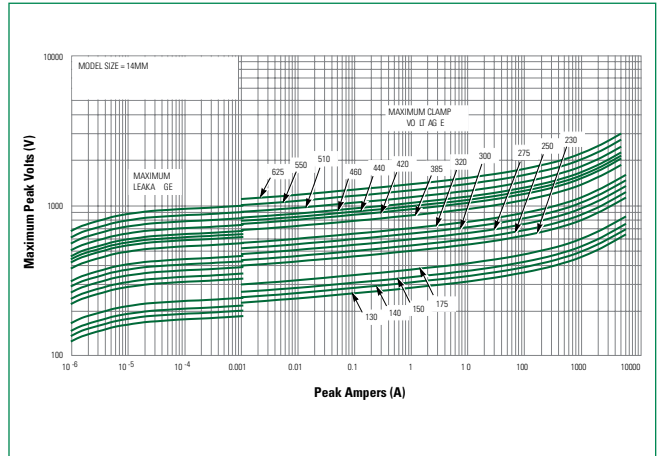
**Maximum Clamping Voltage for 14mm Parts**

V14x50AUTO - V14x95AUTO



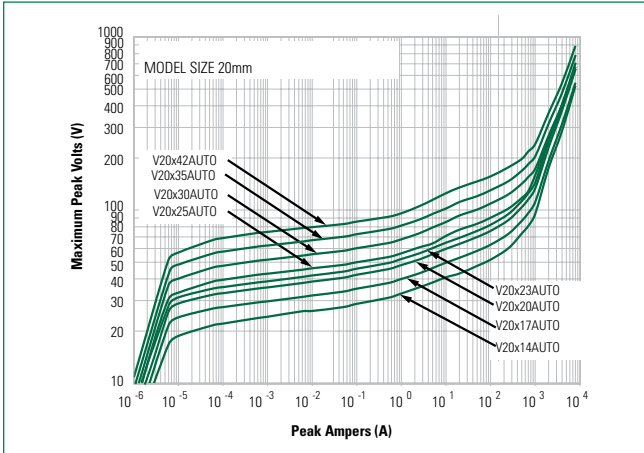
**Maximum Clamping Voltage for 14mm Parts**

V14x130AUTO - V14x625AUTO



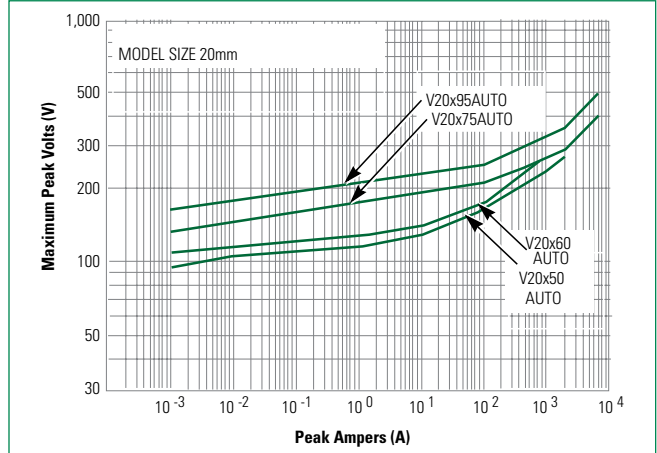
**Maximum Clamping Voltage for 20mm Parts**

V20x14AUTO - V20x42AUTO



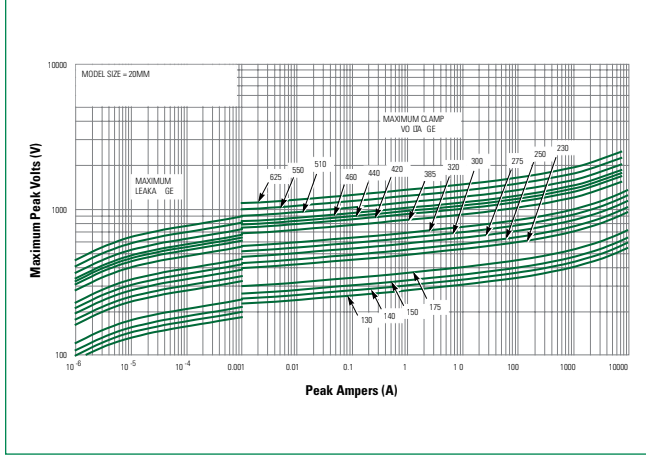
**Maximum Clamping Voltage for 20mm Parts**

V20x50AUTO - V20x95AUTO



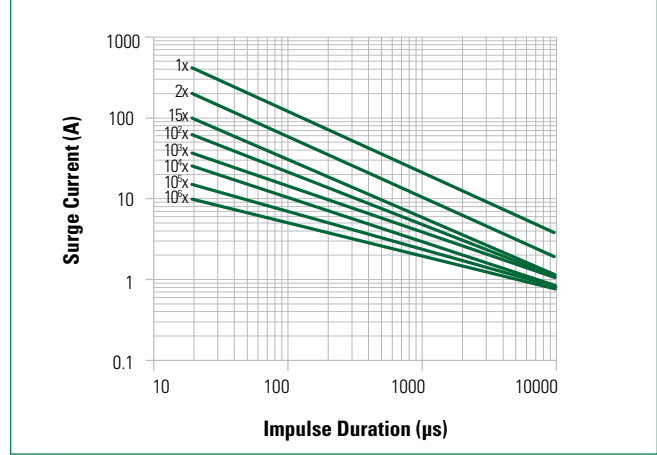
**Maximum Clamping Voltage for 20mm Parts**

V20x130AUTO - V20x625AUTO



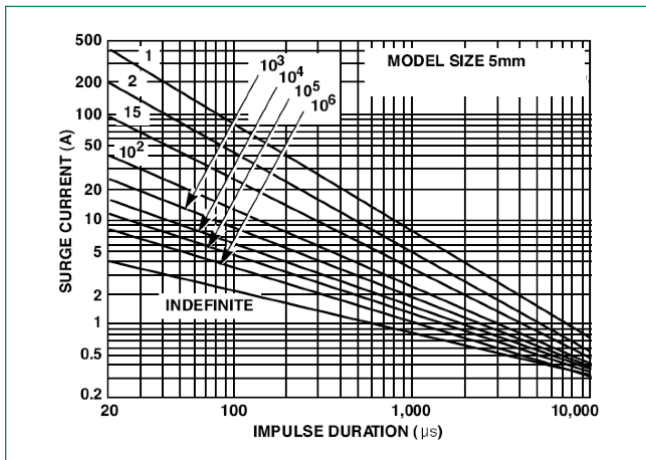
**Repetitive Surge Capability for 5mm Parts**

V05x14AUTO - V05x42AUTO



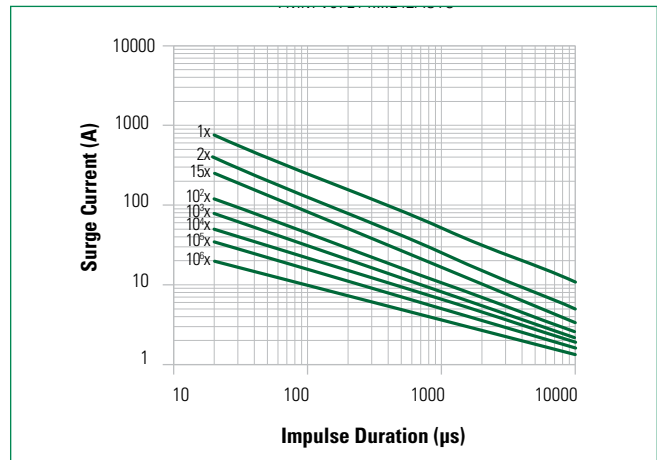
**Repetitive Surge Capability for 5mm Parts**

V05x50AUTO - V05x95AUTO



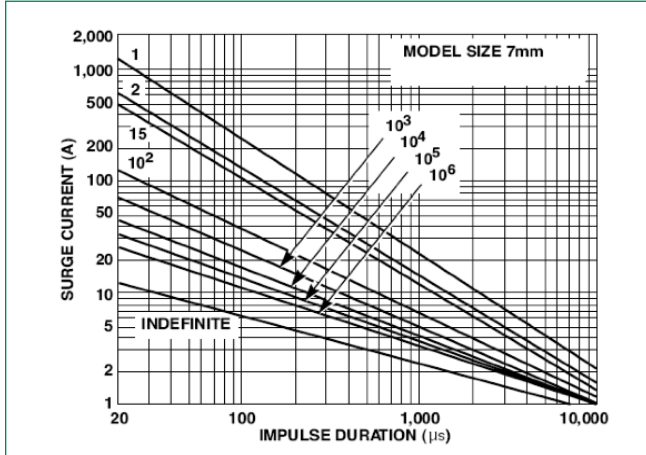
**Repetitive Surge Capability for 7mm Parts**

V07x14AUTO - V07x42AUTO



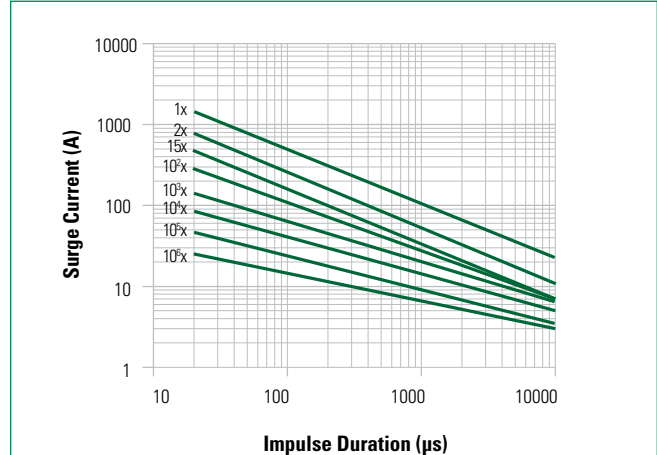
**Repetitive Surge Capability for 7mm Parts**

V07x50AUTO - V07x95AUTO



**Repetitive Surge Capability for 10mm Parts**

V10x14AUTO - V10x42AUTO

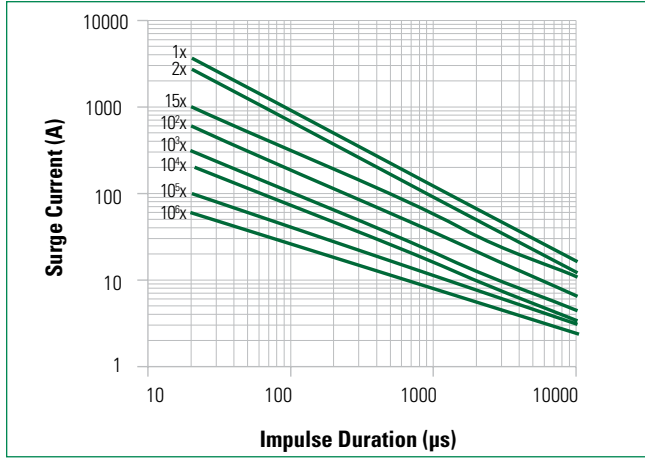


**NOTE:**

1. If pulse ratings are exceeded, a shift of  $V_{NDCP}$  (at specified current) of more than +/-10% could result. This type of shift, which normally results in a decrease of  $V_{NDCP}$ , may result in the device not meeting the original published specifications, but does not prevent the device from continuing to function, and to provide ample protection.
2. Repetitive surge capability is qualified and tested based on 8/20µs current waveform (not combination waveform) and UL1449 40.7.3 (Edition 4) test condition.

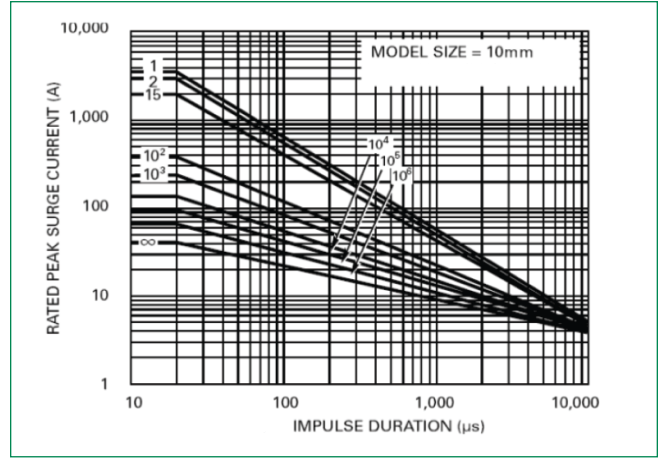
**Repetitive Surge Capability for 10mm Parts**

V10x50AUTO - V10x95AUTO



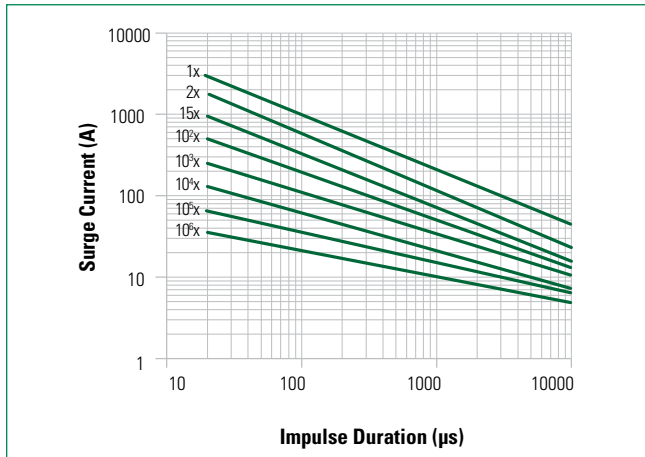
**Repetitive Surge Capability for 10mm Parts**

V10x130AUTO - V10x625AUTO



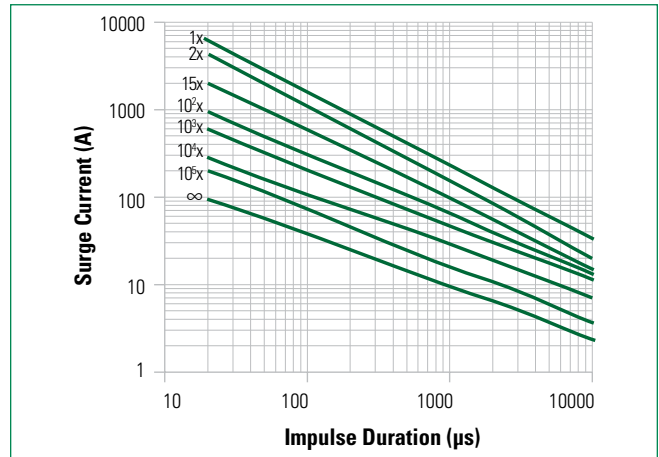
**Repetitive Surge Capability for 14mm Parts**

V14x14AUTO - V14x42AUTO



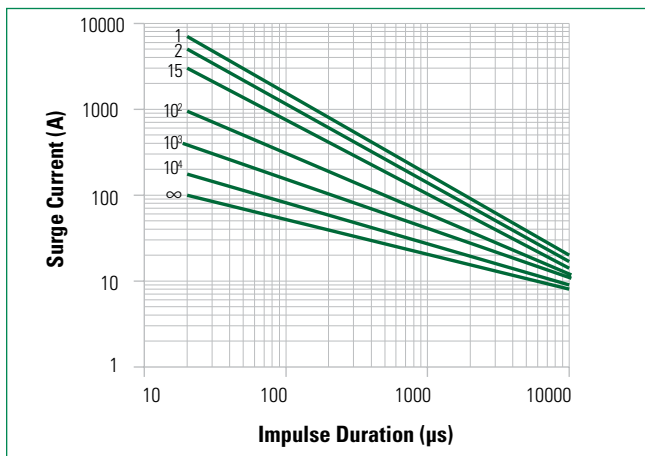
**Repetitive Surge Capability for 14mm Parts**

V14x50AUTO - V14x95AUTO



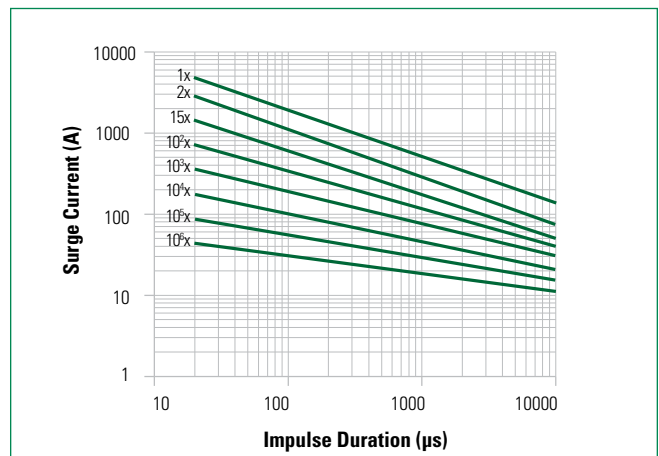
**Repetitive Surge Capability for 14mm Parts**

V14x130AUTO - V14x625AUTO



**Repetitive Surge Capability for 20mm Parts**

V020x14AUTO - V20x42AUTO



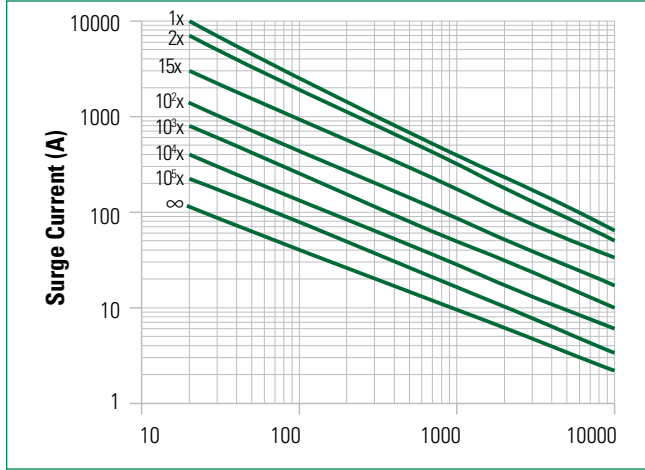
**NOTE:**

1. If pulse ratings are exceeded, a shift of  $V_{NDIC}$  (at specified current) of more than +/-10% could result. This type of shift, which normally results in a decrease of  $V_{NDIC}$ , may result in the device not meeting the original published specifications, but does not prevent the device from continuing to function, and to provide ample protection.
2. Repetitive surge capability is qualified and tested based on 8/20us current waveform (not combination waveform) and UL1449 40.7.3 (Edition 4) test condition.



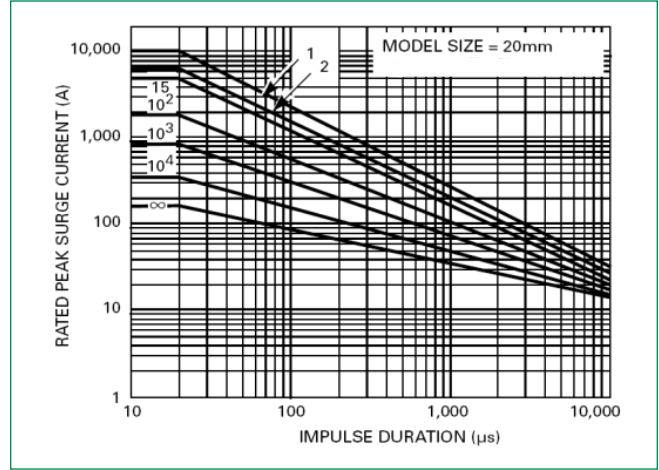
**Repetitive Surge Capability for 20mm Parts**

V20x50AUTO - V20x95AUTO



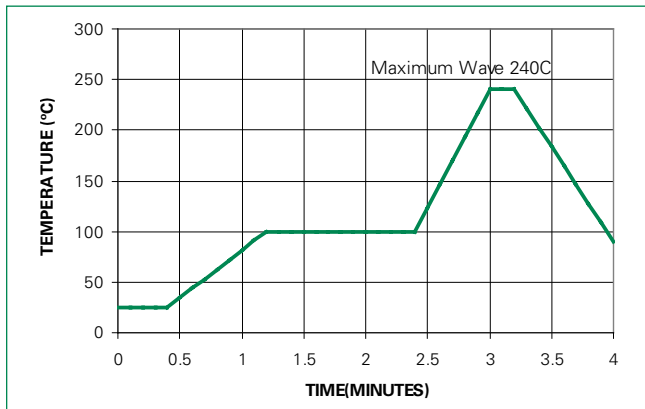
**Repetitive Surge Capability for 20mm Parts**

V20x130AUTO - V20x625AUTO



**Wave Solder Profile**

**Non Lead-free Profile**



**Lead-free Profile**



**Physical Specifications**

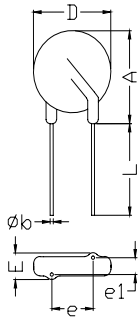
<b>Lead Material</b>	Copper Clad Steel Wire
<b>Soldering Characteristics</b>	Solderability per MIL-STD-202, Method 208
<b>Insulating Material</b>	Cured, flame retardant epoxy polymer meets UL94V-0 requirements
<b>Device Labeling</b>	Marked with LF, voltage and date code

**Environmental Specifications**

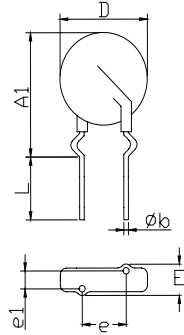
<b>Humidity Aging</b>	+85°C, 85% RH, 1000 hours +/-10% typical voltage change
<b>Temperature Cycling Shock</b>	-40°C to 125°C, 5 cycles for Epoxy coating; -40°C to 125°C, 1000 cycles for Phenolic and Silicone coating; +/-10% typical voltage change
<b>Solvent Resistance</b>	MIL-STD-202, Method 215
<b>Moisture Sensitivity</b>	Level 1, J-STD-020

### Product Dimensions (mm)

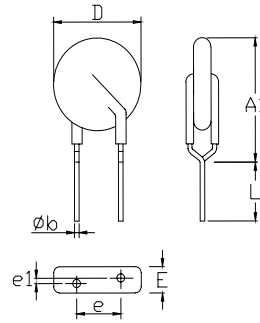
Straight Lead



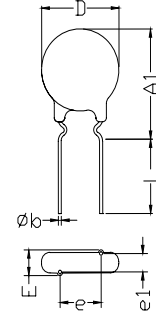
Outer Crimp Lead



In-Line (Under Crimp) Lead



Inner Crimp Lead

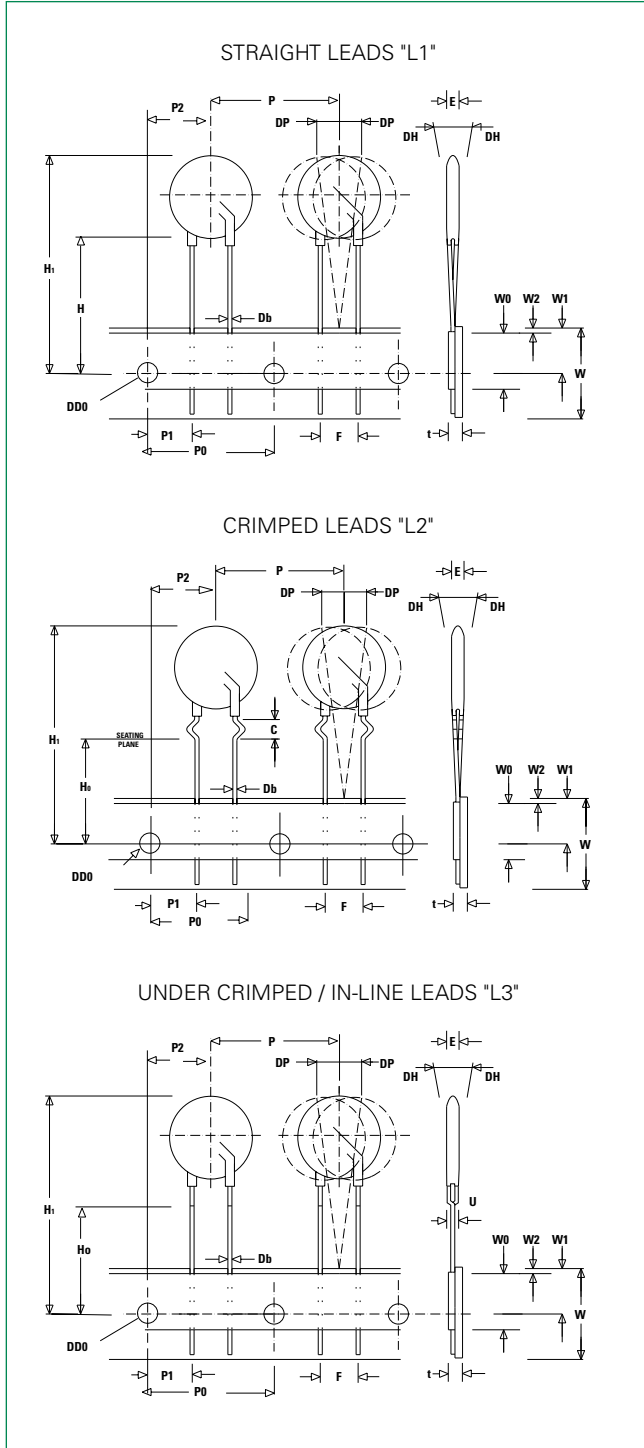


Dimension	V <sub>RMS</sub> Voltage Model	5mm Size		7mm Size		10mm Size		14mm Size		20mm Size	
		Min. mm (in)	Max. mm (in)	Min. mm (in)	Max. mm (in)	Min. mm (in)	Max. mm (in)	Min. mm (in)	Max. mm (in)	Min. mm (in)	Max. mm (in)
A	11 - 320	-	10 (0.394)	-	12 (0.472)	-	16 (0.630)	-	20 (0.787)	-	26.5 (1.043)
	385 - 625	-	10.5 (0.413)	-	13 (0.512)	-	17.0 (0.689)	-	20.5 (0.807)	-	28.0 (1.102)
A1	All	-	13 (0.512)	-	15 (0.591)	-	19.5 (0.768)	-	22.5 (0.886)	-	29 (1.142)
ØD	All	-	7 (0.276)	-	9 (0.354)	-	12.5 (0.492)	-	17 (0.669)	-	23 (0.906)
e	11 - 95	4 (0.157)	6 (0.236)	4 (0.157)	6 (0.236)	6.5 (0.256)	8.5 (0.335)	6.5 (0.256)	8.5 (0.335)	6.5 (0.256)	8.5 (0.335)
	130 - 625	-	-	-	-	-	-	-	-	9.0 (0.354)	11.0 (0.433)
e <sub>1</sub>	11 - 30	1 (0.039)	3 (0.118)	1 (0.039)	3 (0.118)	1 (0.039)	3 (0.118)	1 (0.039)	3 (0.118)	1 (0.039)	3 (0.118)
	35 - 320	1.5 (0.059)	3.5 (0.138)	1.5 (0.059)	3.5 (0.138)	1.5 (0.059)	3.5 (0.138)	1.5 (0.059)	3.5 (0.138)	1.5 (0.059)	3.5 (0.138)
	385 - 625	2.5 (0.098)	5.5 (0.217)	2.5 (0.098)	5.5 (0.217)	2.5 (0.098)	5.5 (0.217)	2.5 (0.098)	5.5 (0.217)	2.5 (0.098)	5.5 (0.217)
E	11 - 30	-	5.0 (0.197)	-	5.0 (0.197)	-	5.0 (0.197)	-	5.0 (0.197)	-	5.0 (0.197)
	35 - 320	-	5.6 (0.220)	-	5.6 (0.220)	-	5.6 (0.220)	-	5.6 (0.220)	-	5.6 (0.220)
	385 - 510	-	7.3 (0.287)	-	7.3 (0.287)	-	7.3 (0.287)	-	7.3 (0.287)	-	7.3 (0.287)
	550 - 625	-	8.3 (0.327)	-	8.3 (0.327)	-	8.3 (0.327)	-	8.3 (0.327)	-	8.3 (0.327)
Øb	All	0.585 (0.023)	0.685 (0.027)	0.585 (0.023)	0.685 (0.027)	0.76 (0.030)	0.86 (0.034)	0.76 (0.030)	0.86 (0.034)	0.76 (0.030)	0.86 (0.034)
L	All	25.4 (1.00)	-	25.4 (1.00)	-	25.4 (1.00)	-	25.4 (1.00)	-	25.4 (1.00)	-
L <sub>TRIM</sub>	All	2.41 (0.095)	4.69 (0.185)	2.41 (0.095)	4.69 (0.185)	2.41 (0.095)	4.69 (0.185)	2.41 (0.095)	4.69 (0.185)	2.41 (0.095)	4.69 (0.185)

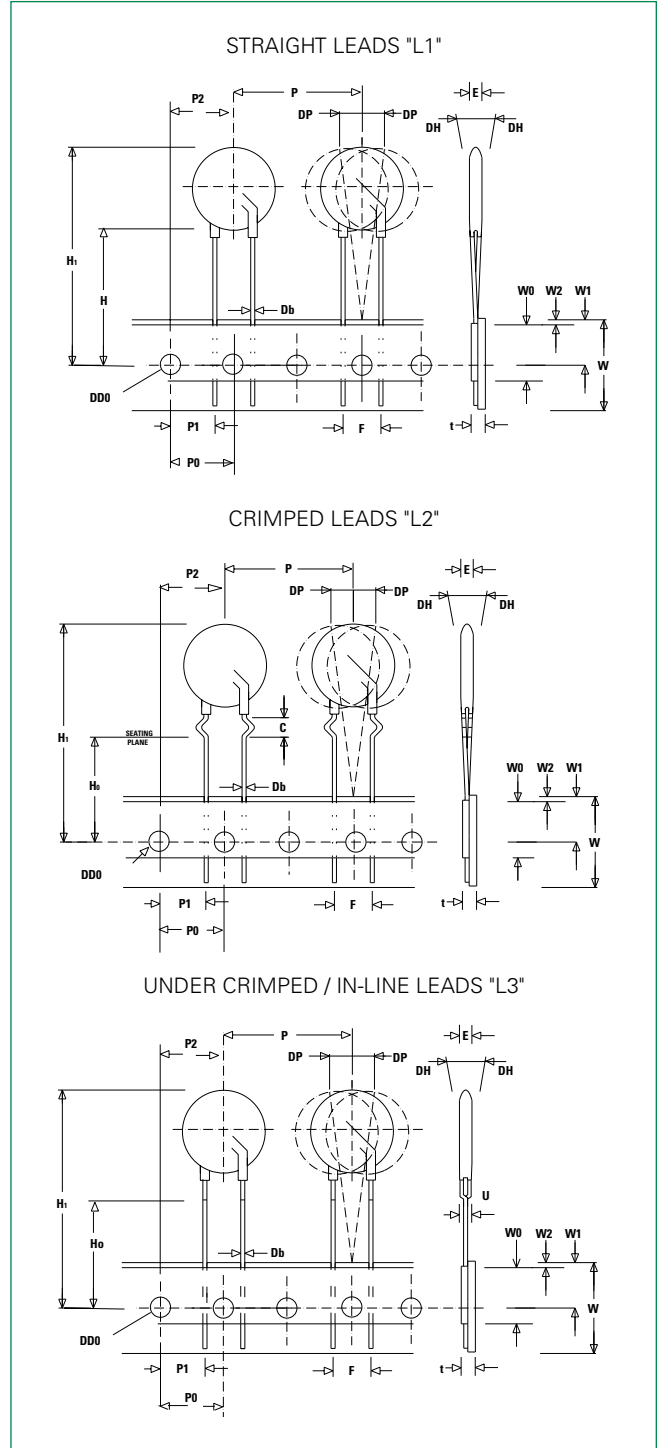
Note: Dimensions in millimetres, (Inches) is typical.

**Tape and Reel Specifications**

5 and 7mm Devices



10, 14 and 20mm Devices



Refer to next page for dimension measurement specifics.

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).

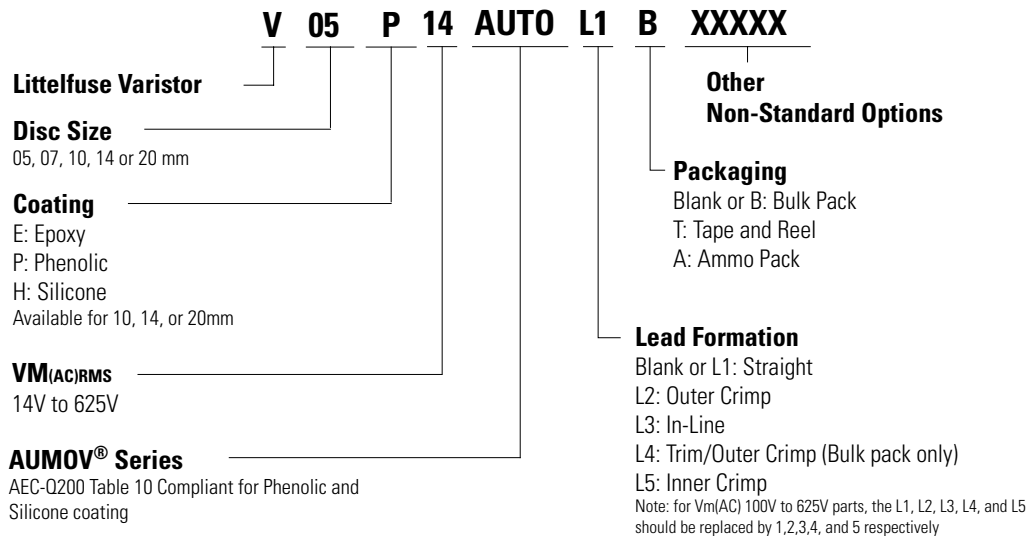
### Tape and Reel Specifications (continued)

Symbol	Description	Model Size					
		5mm	7mm	10mm	14mm	20mm	
						(11Vac to 95Vac voltage)	≥115 Vac Voltage
<b>P</b>	Pitch of Component	12.7 +/- 1.0	12.7 +/- 1.0	25.4 +/- 1.0	25.4 +/- 1.0	25.4 +/- 1.0	25.4 +/- 1.0
<b>P<sub>0</sub></b>	Feed Hole Pitch	12.7 +/- 0.2	12.7 +/- 0.2	12.7 +/- 0.2	12.7 +/- 0.2	12.7 +/- 0.2	12.7 +/- 0.2
<b>P<sub>1</sub></b>	Feed Hole Center to Pitch	3.85 +/- 0.7	3.85 +/- 0.7	8.85 +/- 0.7	8.85 +/- 0.7	8.85 +/- 0.7	7.70 +/- 0.7
<b>P<sub>2</sub></b>	Hole Center to Component Center	6.35 +/- 1.0	6.35 +/- 1.0	12.7 +/- 0.7	12.7 +/- 0.7	12.7 +/- 0.7	12.7 +/- 0.7
<b>F</b>	Lead to Lead Distance	5.0 +/- 1.0	5.0 +/- 1.0	7.5 +/- 1.0	7.5 +/- 1.0	7.5 +/- 1.0	10 +/- 1.0
<b>h</b>	Component Alignment	2.0 Max	2.0 Max	2.0 Max	2.0 Max	2.0 Max	2.0 Max
<b>W</b>	Tape Width	18.0 +1.0 / -0.5	18.0 +1.0 / -0.5	18.0 +1.0 / -0.5	18.0 +1.0 / -0.5	18.0 +1.0 / -0.5	18.0 +1.0 / -0.5
<b>W<sub>0</sub></b>	Hold Down Tape Width	12.0 +/- 0.3	12.0 +/- 0.3	12.0 +/- 0.3	12.0 +/- 0.3	12.0 +/- 0.3	12.0 +/- 0.3
<b>W<sub>1</sub></b>	Hole Position	9.0 +0.75 / -0.50	9.0 +0.75 / -0.50	9.0 +0.75 / -0.50	9.0 +0.75 / -0.50	9.0 +0.75 / -0.50	9.0 +0.75 / -0.50
<b>W<sub>2</sub></b>	Hold Down Tape Position	0.5 Max	0.5 Max	0.5 Max	0.5 Max	0.5 Max	0.5 Max
<b>H</b>	Height from Tape Center to Component Base	18.0 +2.0 / -0.0	18.0 +2.0 / -0.0	18.0 +2.0 / -0.0	18.0 +2.0 / -0.0	18.0 +2.0 / -0.0	18.0 +2.0 / -0.0
<b>H<sub>0</sub></b>	Seating Plane Height	16.0 +/- 0.5	16.0 +/- 0.5	16.0 +/- 0.5	16.0 +/- 0.5	16.0 +/- 0.5	16.0 +/- 0.5
<b>H<sub>1</sub></b>	Component Height	29.0 Max	32.0 Max	36.0 Max	40.0 Max	46.5 Max	46.5 Max
<b>D<sub>0</sub></b>	Feed Hole Diameter	4.0 +/- 0.2	4.0 +/- 0.2	4.0 +/- 0.2	4.0 +/- 0.2	4.0 +/- 0.2	4.0 +/- 0.2
<b>t</b>	Total Tape Thickness	0.7 +/- 0.2	0.7 +/- 0.2	0.7 +/- 0.2	0.7 +/- 0.2	0.7 +/- 0.2	0.7 +/- 0.2
<b>U</b>	Undercrimp Width	8.0 Max	8.0 Max	8.0 Max	8.0 Max	8.0 Max	8.0 Max
<b>p</b>	Component Alignment	3° Max	3° Max	3° Max	3° Max	3° Max	3° Max

**Notes:**

1. Radial devices on tape are supplied with crimped leads, straight leads, or under-crimped leads
2. Leads are offset by product dimension e1
3. Conforms to ANSI and EIA specifications
4. Can be supplied to IEC Publication 286-2
5. 10mm parts are available on tape and reel up to 510 VAC only
6. 14mm and 20mm parts are available on tape and reel up to 550 VAC only

### Part Numbering System



**Disclaimer Notice** - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).