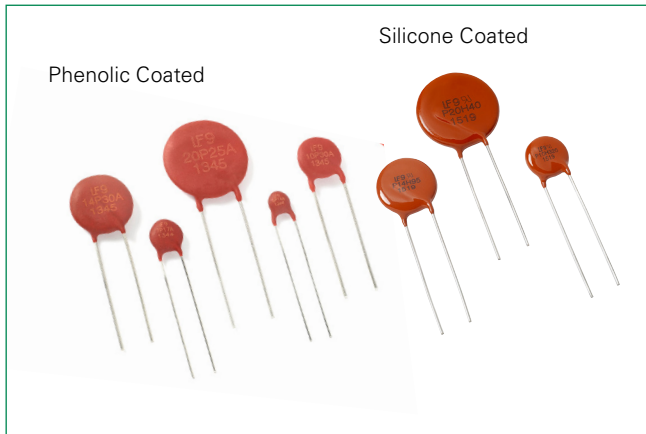


# AUMOV® Series

## Radial Leaded Varistors



### Description

The AUMOV® Varistor Series is designed for automotive applications requiring load dump, jump start and surge voltage transient protection.

### Features & Benefits

- Phenolic and Silicone coating meet the stringent quality requirements of AEC-Q200 (Table 10)
- High peak surge current rating up to 10kA (8/20 μs pulse)
- Wide operating voltage range: 14VAC to 625VAC and 16VDC to 825VDC
- Five disc sizes available: 5, 7, 10, 14, and 20mm
- High energy absorption particularly for automotive load dump and jump start
- Lead-free, Halogen-Free and RoHS compliant

### Additional Information



Resources



Accessories



Samples

### Agency Approvals

Agency	Agency File Number
	E320116 (14Vac to 42Vac: Epoxy coated parts. 130Vac to 625Vac: both Silicone and Phenolic coated 10mm, 14mm and 20mm parts.)

### Applications

- Body Electronics Systems
- Powertrain Systems
- Electric Cars On-Board-Charger.
- Automotive Control Module Protection
- Motor or inductive load transient suppression

### 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 ( $V_{M(AC)RMS}$ )	14 to 625	V
DC Voltage Range ( $V_{M(DC)}$ )	16 to 825	V
<b>Transient:</b>		
Non-Repetitive Surge Current, 8/20μs Waveform ( $I_{TM}$ )	400 to 10,000	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® Series

## Radial Leaded Varistors

### AUMOV® Varistor Series Device Ratings & Specifications

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)	V <sub>DC</sub> (V)	Min (V)	Nom (V)	Max (V)	V <sub>C</sub> (V)	I <sub>PK</sub> (A)	I <sub>TM</sub> (A)	W <sub>TM</sub> (J)	(J)	(V)	(pF)
V05P14AUTO	5P14A	-	-	5	14	16	19.8	22	24.2	43	1	400	1	6	25	1100
V07P14AUTO	7P14A	-	-	7	14	16	19.8	22	24.2	43	2.5	800	2.2	12	25	2450
V10P14AUTO	10P14A	V10H14AUTO	10H14A	10	14	16	19.8	22	24.2	43	5	1500	5	25	25	4650
V14P14AUTO	14P14A	V14H14AUTO	14H14A	14	14	16	19.8	22	24.2	43	10	3000	10	50	25	10200
V20P14AUTO	20P14A	V20H14AUTO	20H14A	20	14	16	19.8	22	24.2	43	20	5000	28	100	25	22200
V05P17AUTO	5P17A	-	-	5	17	20	24.3	27	29.7	53	1	400	1.4	6	30	950
V07P17AUTO	7P17A	-	-	7	17	20	24.3	27	29.7	53	2.5	800	2.8	12	30	2100
V10P17AUTO	10P17A	V10H17AUTO	10H17A	10	17	20	24.3	27	29.7	53	5	1500	6.5	25	30	3900
V14P17AUTO	14P17A	V14H17AUTO	14H17A	14	17	20	24.3	27	29.7	53	10	3000	13	50	30	8700
V20P17AUTO	20P17A	V20H17AUTO	20H17A	20	17	20	24.3	27	29.7	53	20	5000	35	100	30	18750
V05P20AUTO	5P20A	-	-	5	20	26	29.7	33	36.3	65	1	400	2	6	35	790
V07P20AUTO	7P20A	-	-	7	20	26	29.7	33	36.3	65	2.5	800	4.2	12	35	1620
V10P20AUTO	10P20A	V10H20AUTO	10H20A	10	20	26	29.7	33	36.3	65	5	1500	10	25	35	3495
V14P20AUTO	14P20A	V14H20AUTO	14H20A	14	20	26	29.7	33	36.3	65	10	3000	20	50	35	9290
V20P20AUTO	20P20A	V20H20AUTO	20H20A	20	20	26	29.7	33	36.3	65	20	5000	58	100	35	13000
V05P23AUTO	5P23A	-	-	5	23	28	32.4	36	39.6	71	1	400	2.2	6	38	720
V07P23AUTO	7P23A	-	-	7	23	28	32.4	36	39.6	71	2.5	800	5	12	38	1500
V10P23AUTO	10P23A	V10H23AUTO	10H23A	10	23	28	32.4	36	39.6	71	5	1500	12	25	38	3300
V14P23AUTO	14P23A	V14H23AUTO	14H23A	14	23	28	32.4	36	39.6	71	10	3000	23	50	38	8000
V20P23AUTO	20P23A	V20H23AUTO	20H23A	20	23	28	32.4	36	39.6	71	20	5000	70	100	38	12500
V05P25AUTO	5P25A	-	-	5	25	28	35.1	39	42.9	77	1	400	2.5	6	40	750
V07P25AUTO	7P25A	-	-	7	25	28	35.1	39	42.9	77	2.5	800	5.5	12	40	1500
V10P25AUTO	10P25A	V10H25AUTO	10H25A	10	25	28	35.1	39	42.9	77	5	1500	13	25	40	2900
V14P25AUTO	14P25A	V14H25AUTO	14H25A	14	25	28	35.1	39	42.9	77	10	3000	25	50	40	6200
V20P25AUTO	20P25A	V20H25AUTO	20H25A	20	25	28	35.1	39	42.9	77	20	5000	77	100	40	13500
V05P30AUTO	5P30A	-	-	5	30	34	42.3	47	51.7	93	1	400	3.1	6	45	650
V07P30AUTO	7P30A	-	-	7	30	34	42.3	47	51.7	93	2.5	800	7	12	45	1350
V10P30AUTO	10P30A	V10H30AUTO	10H30A	10	30	34	42.3	47	51.7	93	5	1500	15.5	25	45	2550
V14P30AUTO	14P30A	V14H30AUTO	14H30A	14	30	34	42.3	47	51.7	93	10	3000	32	50	45	5550
V20P30AUTO	20P30A	V20H30AUTO	20H30A	20	30	34	42.3	47	51.7	93	20	5000	90	100	45	12000
V05P35AUTO	5P35A	-	-	5	35	45	50.4	56	61.6	110	1	400	4	6	50	500
V07P35AUTO	7P35A	-	-	7	35	45	50.4	56	61.6	110	2.5	800	9	12	50	1100
V10P35AUTO	10P35A	V10H35AUTO	10H35A	10	35	45	50.4	56	61.6	110	5	1500	20	25	50	2100
V14P35AUTO	14P35A	V14H35AUTO	14H35A	14	35	45	50.4	56	61.6	110	10	3000	40	50	50	5000
V20P35AUTO	20P35A	V20H35AUTO	20H35A	20	35	45	50.4	56	61.6	110	20	5000	115	100	50	10000
V05P42AUTO	5P42A	-	-	5	42	50	61.2	68	74.8	135	1	400	5	6	55	500
V07P42AUTO	7P42A	-	-	7	42	50	61.2	68	74.8	135	2.5	800	11	12	55	1000
V10P42AUTO	10P42A	V10H42AUTO	10H42A	10	42	50	61.2	68	74.8	135	5	1500	25	25	55	1850
V14P42AUTO	14P42A	V14H42AUTO	14H42A	14	42	50	61.2	68	74.8	135	10	3000	50	50	55	4000
V20P42AUTO	20P42A	V20H42AUTO	20H42A	20	42	50	61.2	68	74.8	135	20	5000	140	100	55	8500
V05P50AUTO	5P50A	-	-	5	50	65	73.8	82	90.2	135	5	400	2	-	-	350
V07P50AUTO	7P50A	-	-	7	50	65	73.8	82	90.2	135	10	1200	4	-	-	800
V10P50AUTO	10P50A	V10H50AUTO	10H50A	10	50	65	73.8	82	90.2	135	25	2500	8	-	-	1400
V14P50AUTO	14P50A	V14H50AUTO	14H50A	14	50	65	73.8	82	90.2	145	50	4500	15	-	-	3000
V20P50AUTO	20P50A	V20H50AUTO	20H50A	20	50	65	73.8	82	90.2	145	100	6500	25	-	-	6000
V05P60AUTO	5P60A	-	-	5	60	85	90	100	110	165	5	400	2.5	-	-	310
V07P60AUTO	7P60A	-	-	7	60	85	90	100	110	165	10	1200	5	-	-	700
V10P60AUTO	10P60A	V10H60AUTO	10H60A	10	60	85	90	100	110	165	25	2500	10	-	-	1200
V14P60AUTO	14P60A	V14H60AUTO	14H60A	14	60	85	90	100	110	175	50	4500	20	-	-	2500
V20P60AUTO	20P60A	V20H60AUTO	20H60A	20	60	85	90	100	110	175	100	6500	30	-	-	5200



# AUMOV® Series

## Radial Leded Varistors

### 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)	V <sub>DC</sub> (V)	Min (V)	Nom (V)	Max (V)	V <sub>C</sub> (V)	I <sub>PK</sub> (A)	I <sub>TM</sub> (A)	W <sub>TM</sub> (J)	(J)	(V)	(pF)
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

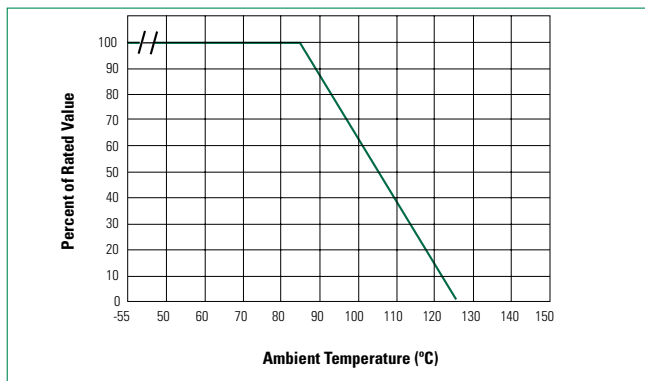
**Note:**

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 Vnom (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.

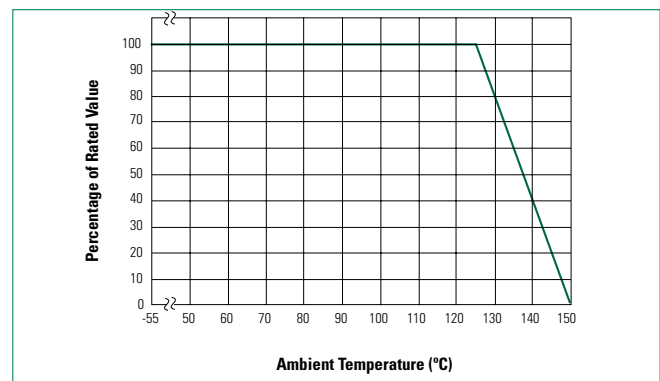
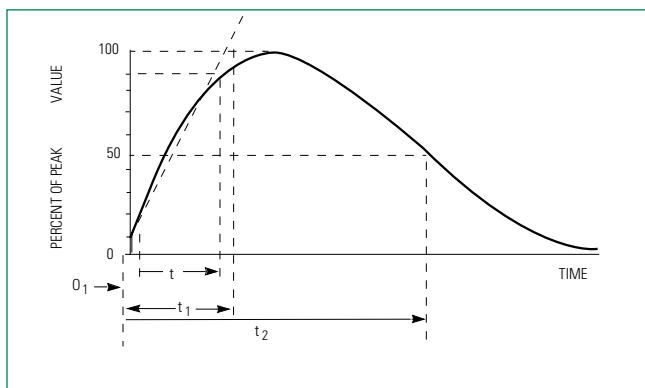


Fig. 2 Peak Pulse Current Test Waveform for Clamping Voltage



- $O_1$  = Virtual Origin of Wave
- $t$  = Time from 10% to 90% of Peak
- $t_1$  = Virtual Front Time =  $1.25 \times t$
- $t_2$  = Virtual Time to Half-Value (Impulse Duration)

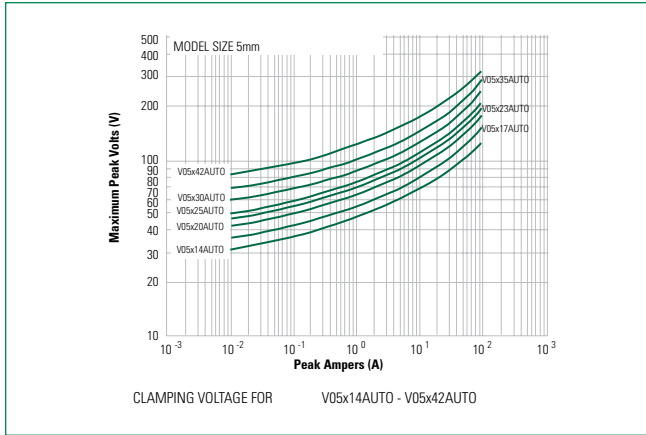
**Example** - For an 8/20 µs Current Waveform:

- $8\mu s = t_1$  = Virtual Front Time
- $20\mu s = t_2$  = Virtual Time to Half-Value

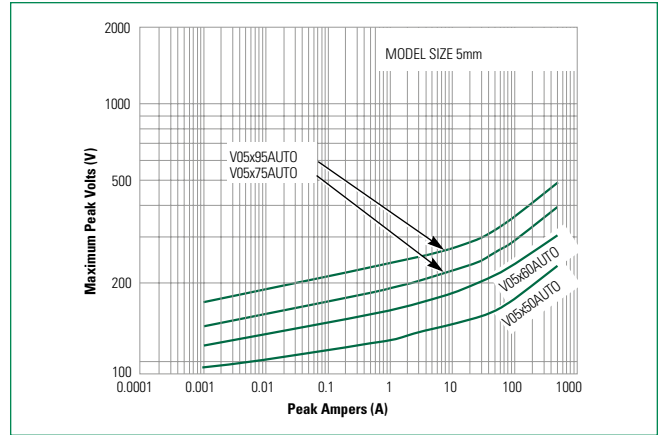
# AUMOV® Series

## Radial Leaded Varistors

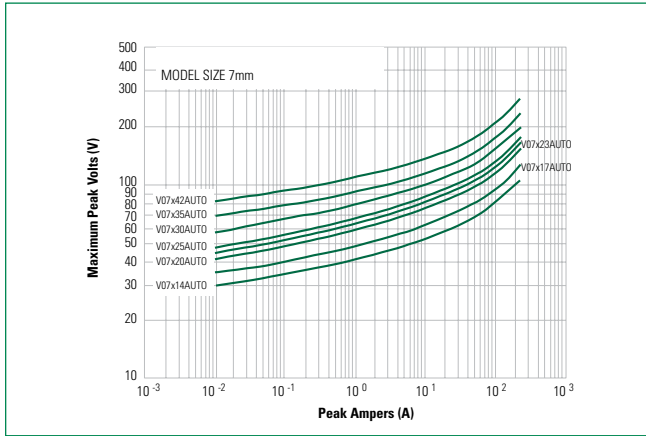
**Maximum Clamping Voltage for 5mm Parts**  
V05x14AUTO - V05x42AUTO



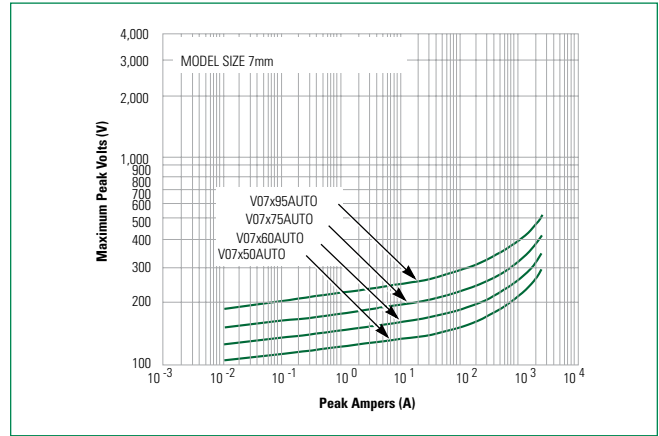
**Maximum Clamping Voltage for 5mm Parts**  
V05x50AUTO - V05x95AUTO



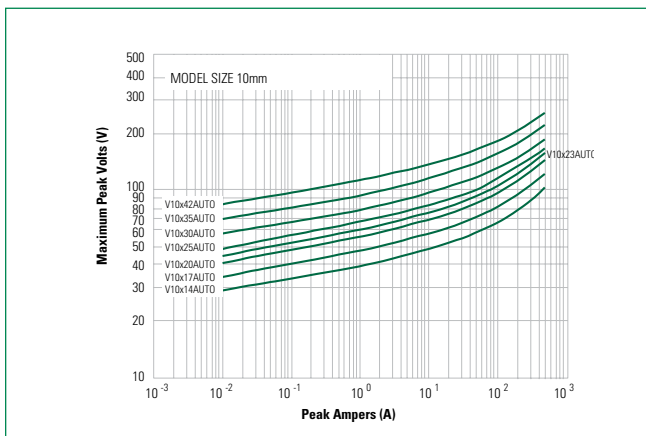
**Maximum Clamping Voltage for 7mm Parts**  
V07x14AUTO - V07x42AUTO



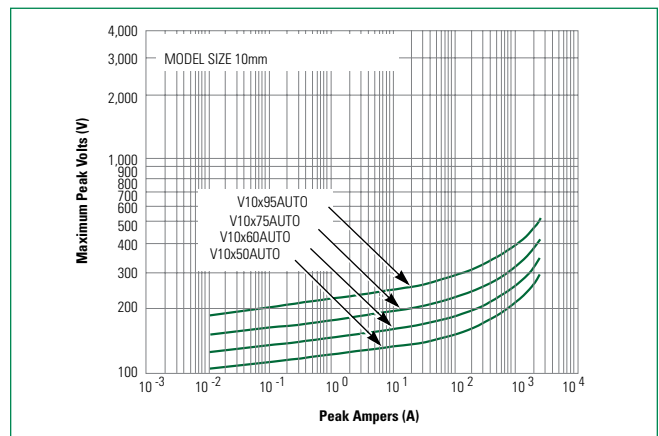
**Maximum Clamping Voltage for 7mm Parts**  
V07x50AUTO - V07x95AUTO



**Maximum Clamping Voltage for 10mm Parts**  
V10x14AUTO - V10x42AUTO



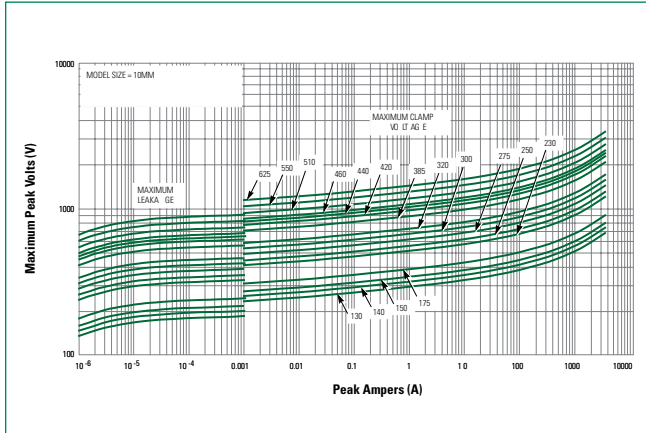
**Maximum Clamping Voltage for 10mm Parts**  
V10x50AUTO - V10x95AUTO



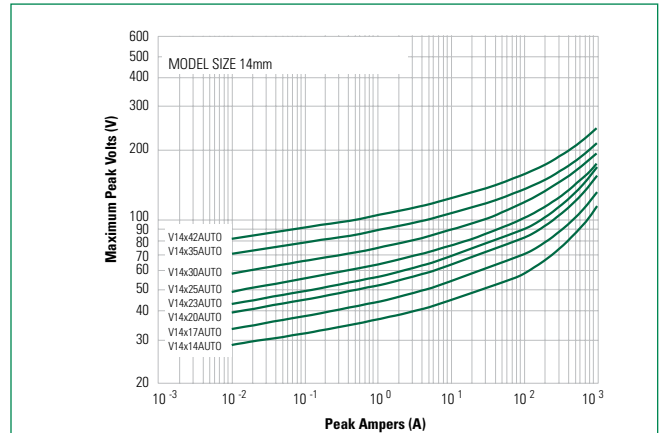
# AUMOV® Series

## Radial Leded Varistors

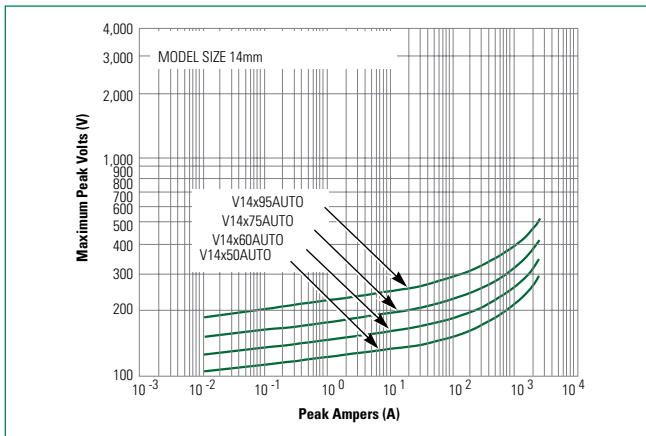
**Maximum Clamping Voltage for 10mm Parts**  
V10x130AUTO - V10x625AUTO



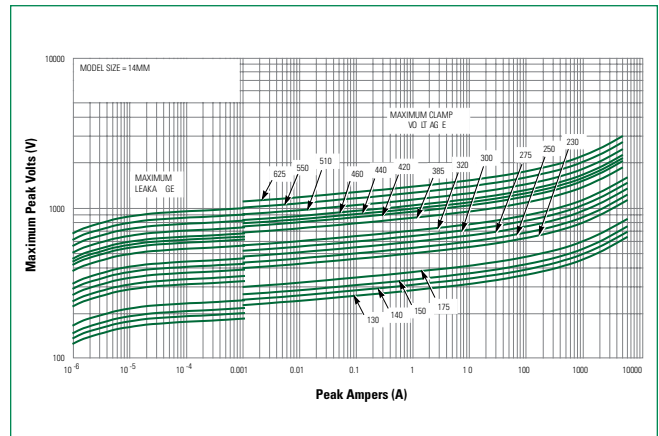
**Maximum Clamping Voltage for 14mm Parts**  
V14x14AUTO - V14x42AUTO



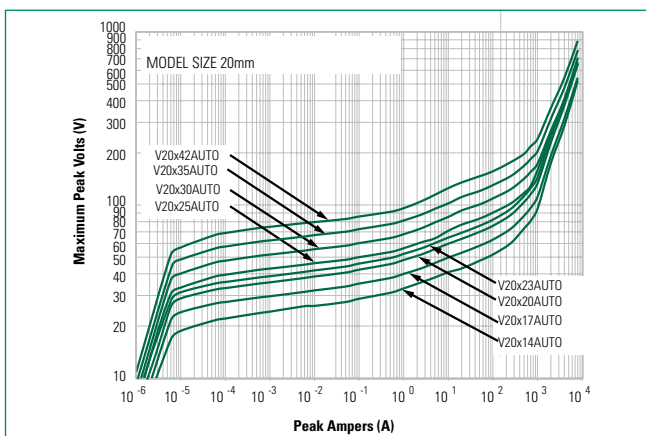
**Maximum Clamping Voltage for 14mm Parts**  
V14x50AUTO - V14x95AUTO



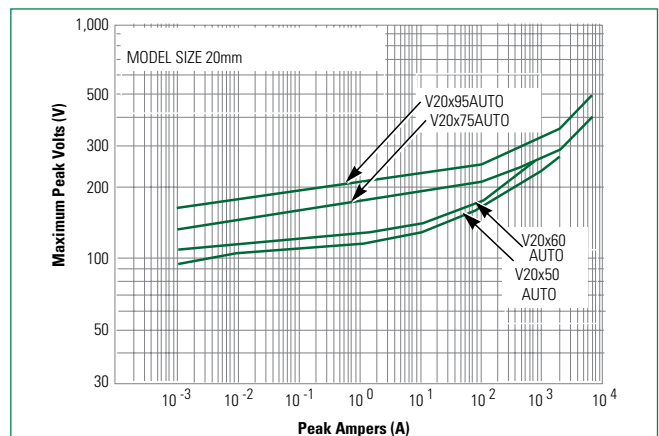
**Maximum Clamping Voltage for 14mm Parts**  
V14x130AUTO - V14x625AUTO



**Maximum Clamping Voltage for 20mm Parts**  
V20x14AUTO - V20x42AUTO



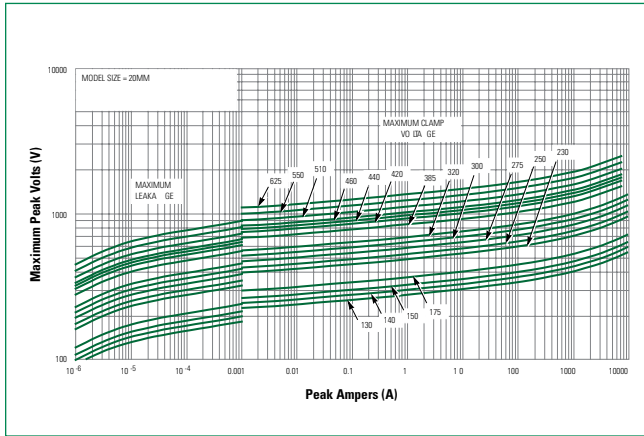
**Maximum Clamping Voltage for 20mm Parts**  
V20x50AUTO - V20x95AUTO



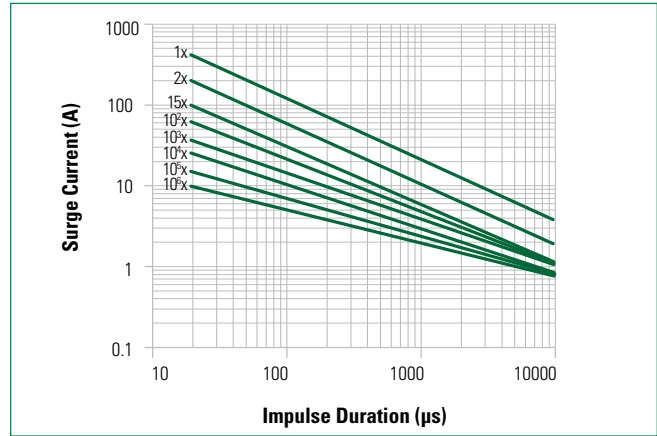
# AUMOV® Series

## Radial Leded Varistors

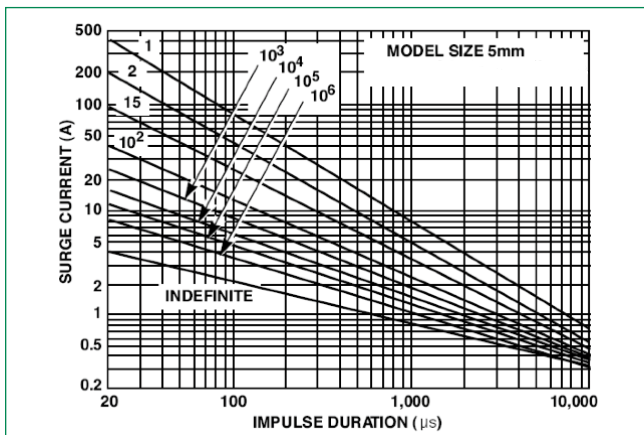
**Maximum Clamping Voltage for 20mm Parts**  
V20x130AUTO - V20x625AUTO



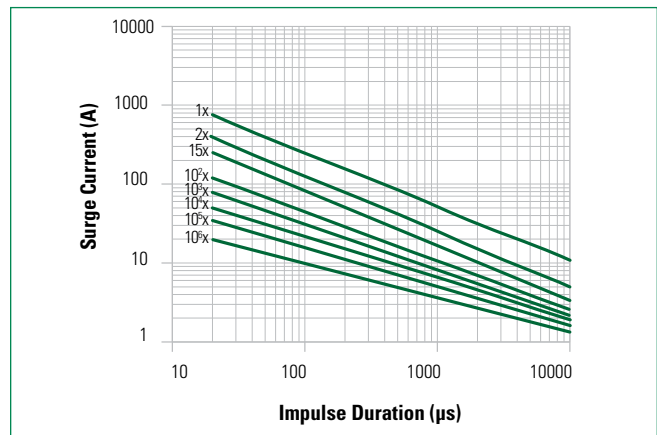
**Repetitive Surge Capability for 5mm Parts**  
V05x14AUTO - V05x42AUTO



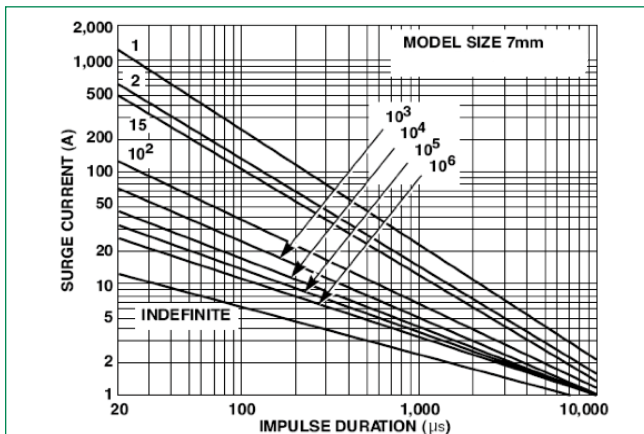
**Repetitive Surge Capability for 5mm Parts**  
V05x50AUTO - V05x95AUTO



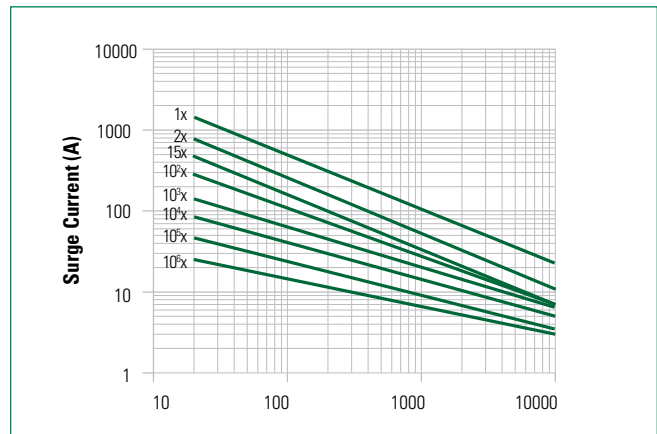
**Repetitive Surge Capability for 7mm Parts**  
V07x14AUTO - V07x42AUTO



**Repetitive Surge Capability for 7mm Parts**  
V07x50AUTO - V07x95AUTO



**Repetitive Surge Capability for 10mm Parts**  
V10x14AUTO - V10x42AUTO



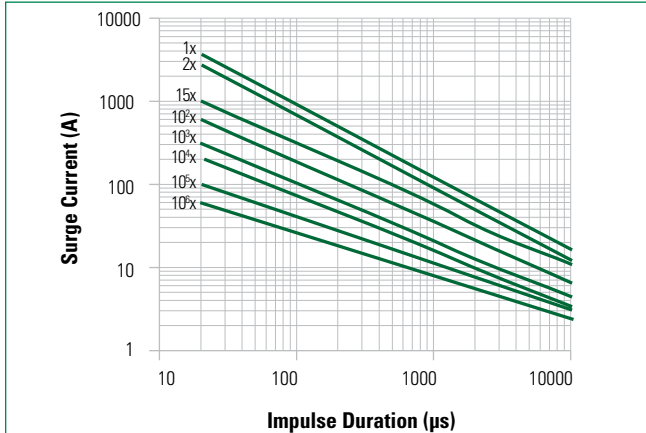
**Note:**

- If pulse ratings are exceeded, a shift of  $V_{NDC1}$  (at specified current) of more than +/-10% could result. This type of shift, which normally results in a decrease of  $V_{NDC1}$ , 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.
- 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.

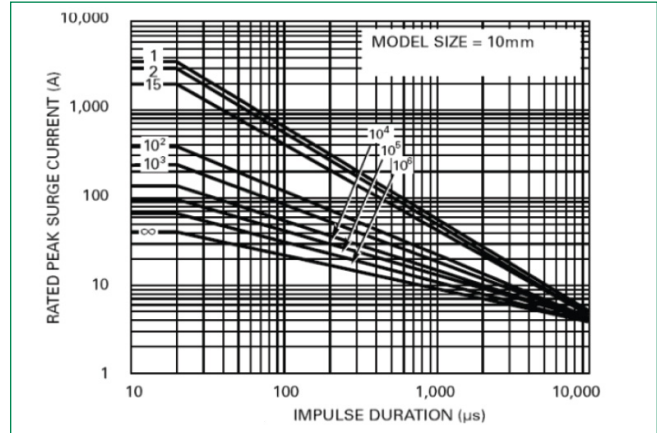
# AUMOV® Series

## Radial Leded Varistors

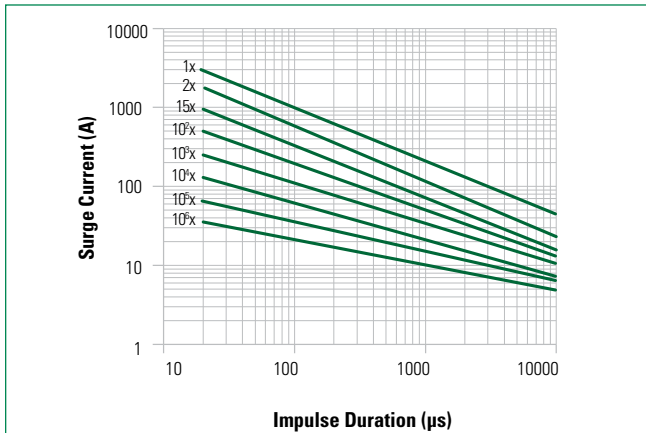
**Repetitive Surge Capability for 10mm Parts**  
V10x50AUTO - V10x95AUTO



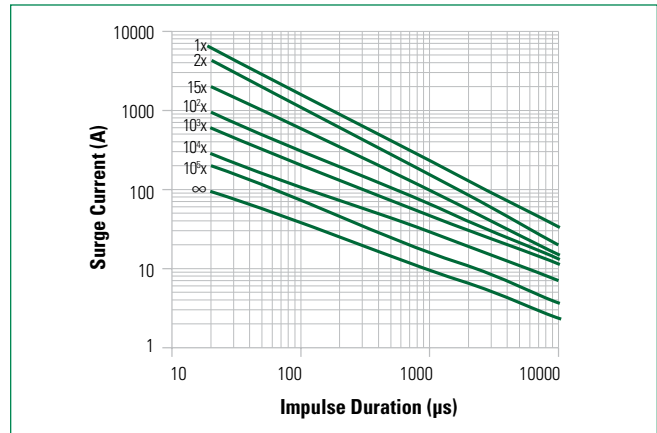
**Repetitive Surge Capability for 10mm Parts**  
V10x130AUTO - V10x625AUTO



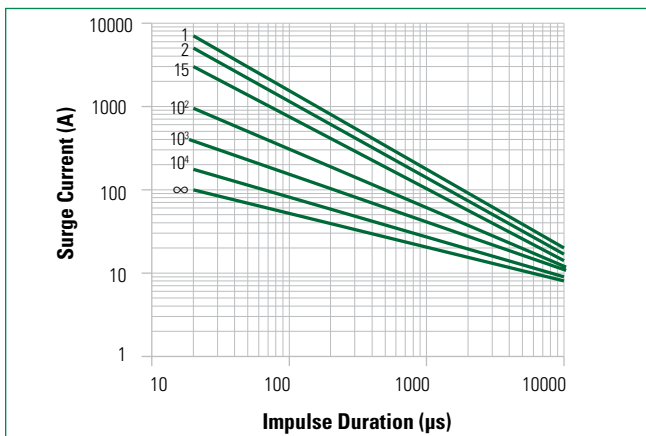
**Repetitive Surge Capability for 14mm Parts**  
V14x14AUTO - V14x42AUTO



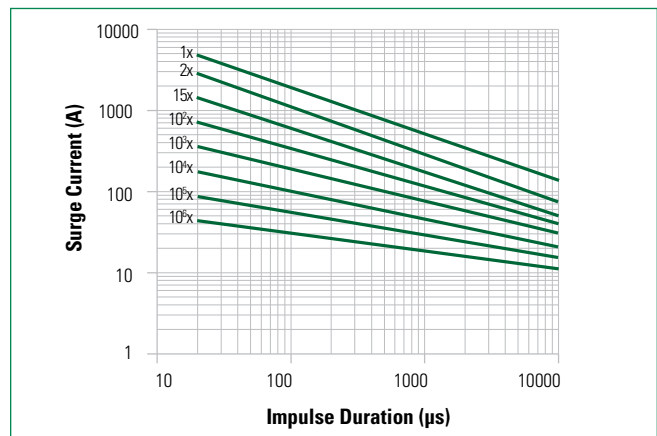
**Repetitive Surge Capability for 14mm Parts**  
V14x50AUTO - V14x95AUTO



**Repetitive Surge Capability for 14mm Parts**  
V14x130AUTO - V14x625AUTO



**Repetitive Surge Capability for 20mm Parts**  
V020x14AUTO - V20x42AUTO



**Note:**

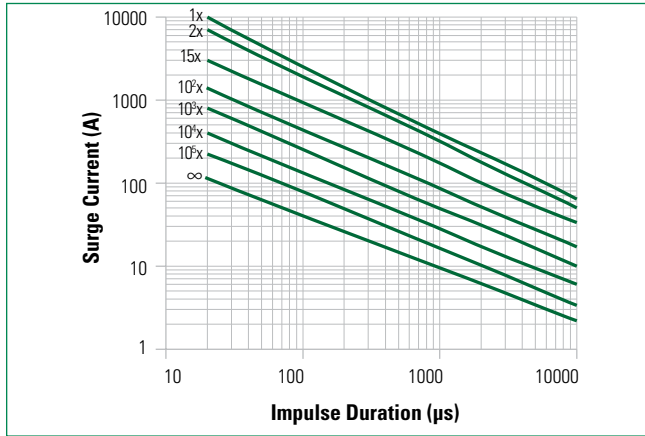
1. If pulse ratings are exceeded, a shift of  $V_{NBDCI}$  (at specified current) of more than +/-10% could result. This type of shift, which normally results in a decrease of  $V_{NBDCI}$  may result in the device not meeting the original published specifications, but does not prevent the device from 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.



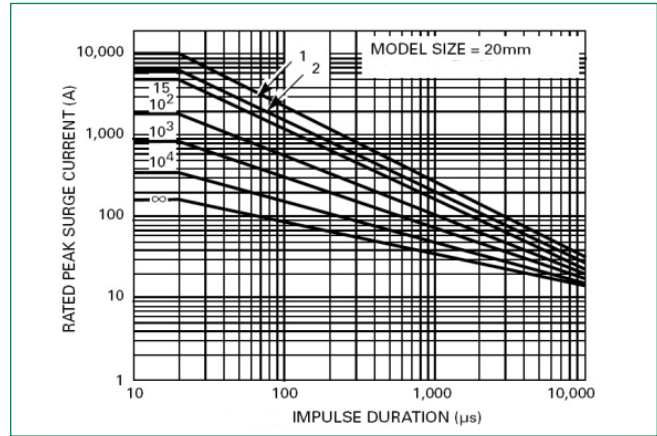
# AUMOV® Series

## Radial Leaded Varistors

**Repetitive Surge Capability for 20mm Parts**  
V20x50AUTO - V20x95AUTO

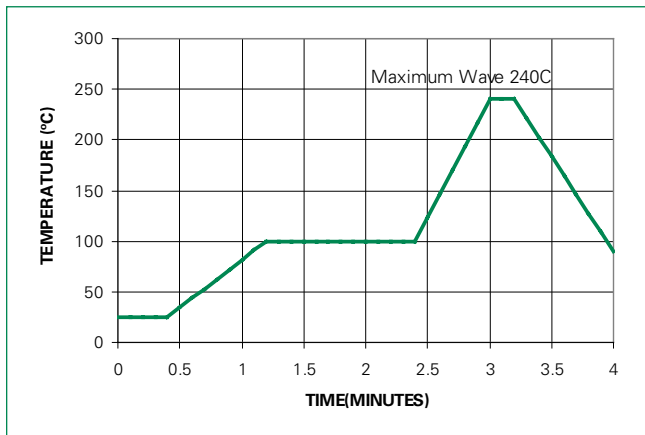


**Repetitive Surge Capability for 20mm Parts**  
V20x130AUTO - V20x625AUTO

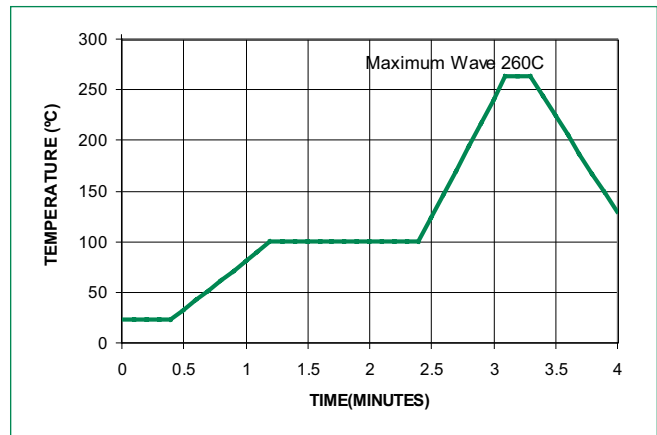


### Wave Solder Profile

**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

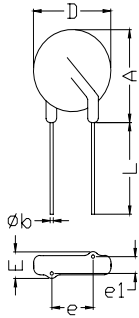
<b>Humidity Aging</b>	+/-10% typical voltage change
<b>Temperature Cycling Shock</b>	-40°C to 85°C, 5 cycles for Epoxy coating; -40°C to 125°C, 1000 cycles for Phenolic and Silicone coating; +/-10% typical voltage change
<b>Solvent Resistance</b>	MIL-STD-202, Method 215
<b>Moisture Sensitivity</b>	Level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

# AUMOV® Series

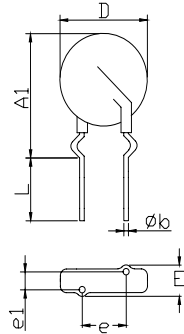
## Radial Leaded Varistors

### Product Dimensions (mm)

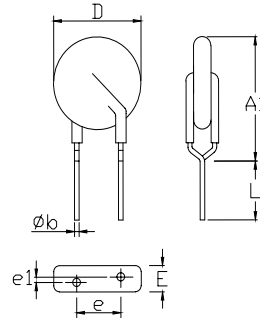
Straight Lead



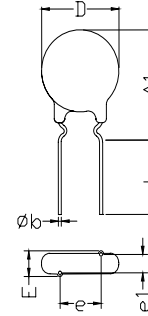
Outer Crimp Lead



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	6	4	6	6.5	8.5	6.5	8.5	6.5	8.5
	130 - 625	(0.157)	(0.236)	(0.157)	(0.236)	(0.256)	(0.335)	(0.256)	(0.335)	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.

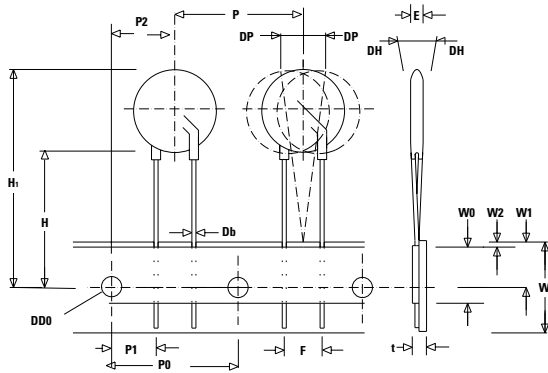
# AUMOV® Series

## Radial Ledged Varistors

### Tape and Reel Specifications

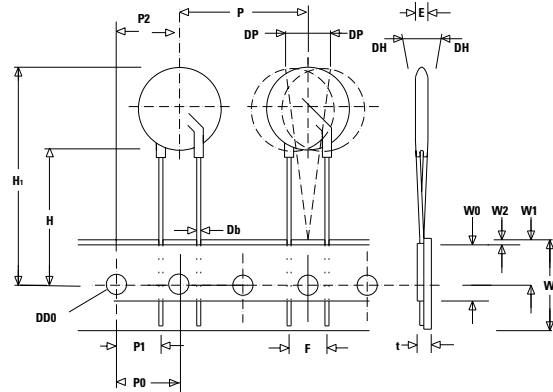
5 and 7mm Devices

STRAIGHT LEADS "L1"

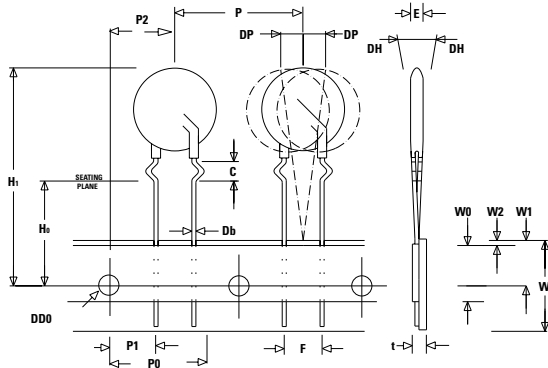


10, 14 and 20mm Devices

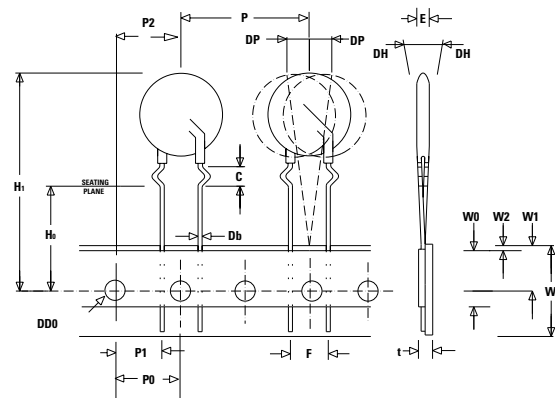
STRAIGHT LEADS "L1"



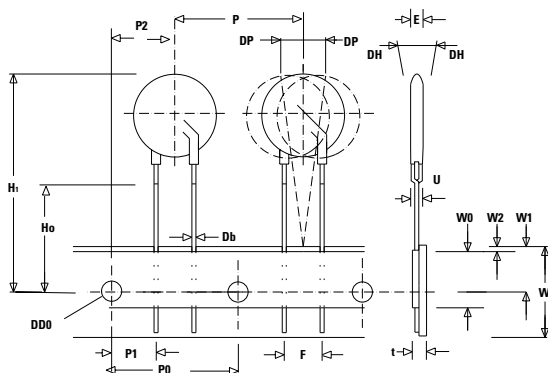
CRIMPED LEADS "L2"



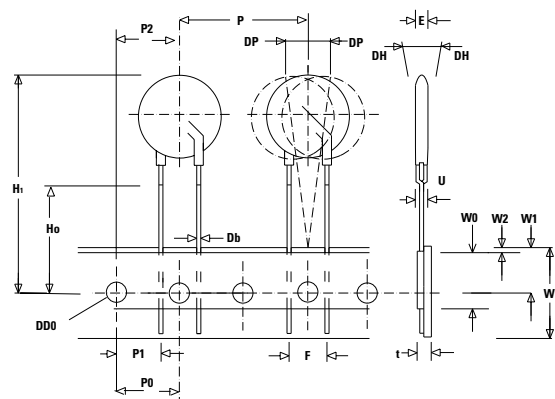
CRIMPED LEADS "L2"



UNDER CRIMPED / IN-LINE LEADS "L3"



UNDER CRIMPED / IN-LINE LEADS "L3"



Refer to next page for dimension measurement specifics.