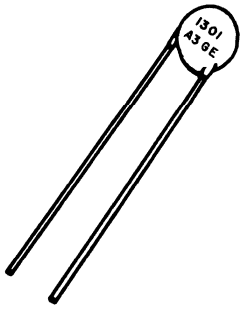
ELECTRONIC INNOVATIONS IN ACTION

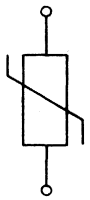
GE-MOV™
Metal Oxide Varistors
130-300 VOLTS RMS A.C. 175-405 VOLTS D.C.

MINI-MOV VARISTOR SERIES

Description:

General Electric metal oxide varistors are voltage dependent, symmetrical resistors which perform in a manner similar to back-to-back zener diodes in circuit protective functions and offer advantages in performance and economics. When exposed to high energy voltage transients, the varistor impedance changes from a very high standby value to a very low conducting value thus clamping the transient voltage to a safe level. The dangerous energy of the incoming high voltage pulse is absorbed by the MINI-MOV™ varistor, thus protecting voltage sensitive circuit components.





Electrical Symbol

Features*:

- Excellent Clamping
- High Discharge Current Capability (>75 Amps)
- Fast Response (<50 nanoseconds)
- Compact and Lightweight High Energy Capability
- Wide Operating Temperature Range
- Low Temperature Coefficient
- Low Standby Drain
- Easily Installed

*Refer to rating table for individual product capabilities

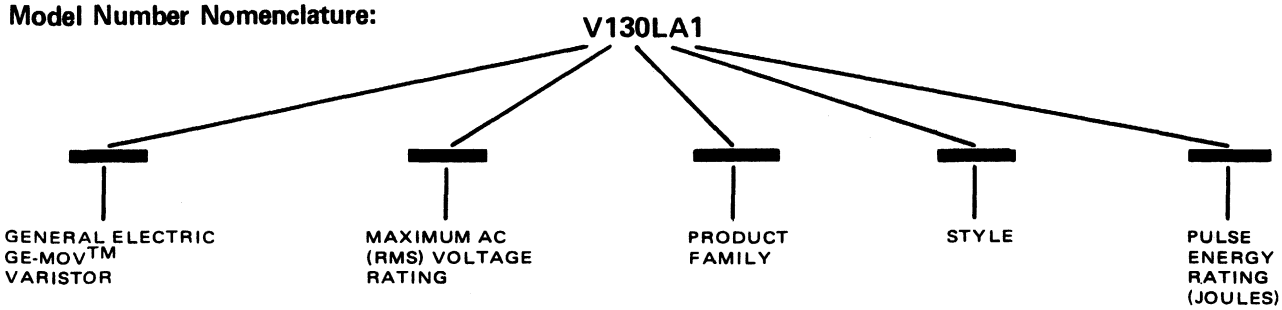
Benefits:

- Promotes System Cost Reduction
- Improves Circuit, Component and System Reliability
- Increases Product Safety
- Eliminates Follow-On Current
- Reduces System Size and Weight Requirements
- Extends Contact Life
- Protects Circuit Insulation

Applications:

- Component and System Voltage Transient Protection in:
  - Inductive Switching Circuits
  - Transformer Switching Circuits
  - Semiconductor Reverse Recovery (Voltage)
- Contact Arc Suppression
- Reduction of Lightning Effects
- Solid State Relay Protection

Model Number Nomenclature:



Maximum Electrical Ratings:

Maximum Energy, Power and Peak Current	See Rating Table
Storage Temperature, T_{STG}	−40°C to +125°C
Operating Surface Temperature, T_S	115°C
Operating Ambient Temperature (without derating)	85°C
Maximum Voltage Temperature Coefficient	-0.05%/°C

Mechanical Ratings:

Insulation Resistance – Megohms	> 1000
Hipot Encapsulation – Volts D.C. for 1 Minute	2500
Solderability	Per Mil Std 202D Method 208B

MAXIMUM RATINGS: **CHARACTERISTICS:**

Model Number	Max. (1) RMS Input Voltage	Recurrent (1) Peak Idle Voltage	DC Input Voltage	Energy (2)	Average Power (2) Dissipation	Peak Current For tp < 6μs	Varistor Peak Voltage (3) @ 0.1 mA AC (Peak)		Maximum Thermal Resistance Body-to-Air	Capacitance (Typical)
							Min.	Max.		
	Volts	Volts	Volts	Joules	Watts	Amperes	Volts	Volts	°C/W	Picofarads
V130LA1 V130LA2	130	184	175	1 2	0.24 0.24	75 150	184	254	125 125	105 105
V150LA1 V150LA2	150	212	200	1 2	0.24 0.24	75 150	212	282	125 125	105 105
V250LA2 V250LA4	250	354	330	2 4	0.28 0.28	75 150	354	472	110 110	58 58
V275LA2 V275LA4	275	389	375	2 4	0.28 0.28	75 150	389	548	110 110	53 53
V300LA2 V300LA4	300	424	405	2 4	0.28 0.28	75 150	424	576	110 110	50 50

Notes: (1) Sinusoidal voltage assumed as normal input conditions. If nonsinusoidal wave input is present, peak voltage input values should be used to select model. (2) See Figure 2. (3) 0.1 mA standby current based upon 60 Hz sinusoidal input.

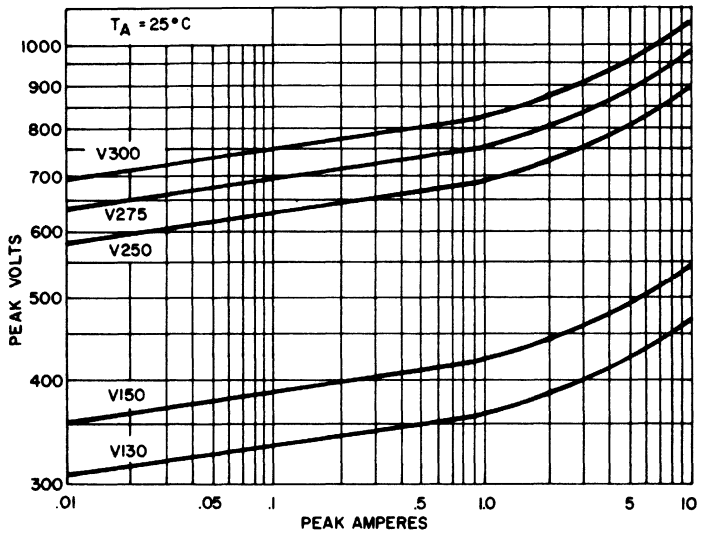
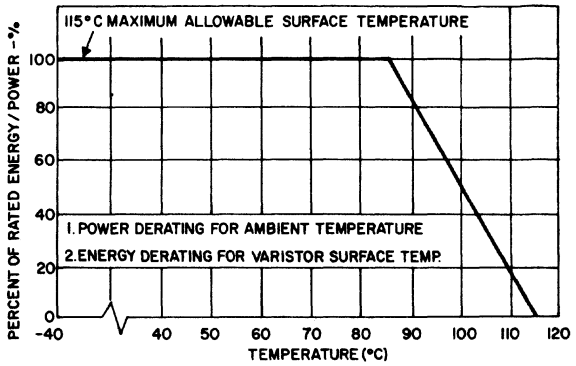


FIGURE 1 MAXIMUM VOLT-AMPERE CHARACTERISTICS

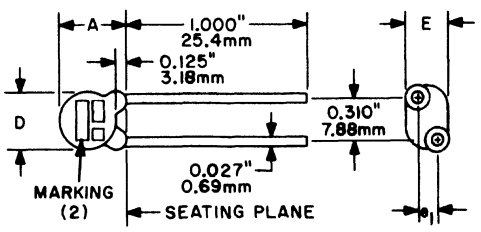


The average power input over the periodic time base resulting from successive voltage transients must be equal to, or less than, the Mini-MOV varistor's rated average power dissipation at the specified ambient temperature. When this condition is met, the selected Mini-MOV varistor has an energy rating high enough to suppress a voltage transient of the specified energy level at its operating surface temperature.

FIGURE 2 POWER AND ENERGY RATINGS VS TEMPERATURE

Dimension Table:

Model	A MAX.		D MAX.		E MAX.		e_1 MAX.	
	In.	MM	In.	MM	In.	MM	In.	MM
V130LA1	.460	11.69	.335	8.51	.190	4.83	.100	2.54
V130LA2	.460	11.69	.335	8.51	.190	4.83	.100	2.54
V150LA1	.460	11.69	.335	8.51	.190	4.83	.100	2.54
V150LA2	.460	11.69	.335	8.51	.190	4.83	.100	2.54
V250LA2	.460	11.69	.335	8.51	.270	6.86	.175	4.45
V250LA4	.460	11.69	.335	8.51	.270	6.86	.175	4.45
V275LA2	.460	11.69	.335	8.51	.295	7.50	.200	5.08
V275LA4	.460	11.69	.335	8.51	.295	7.50	.200	5.08
V300LA2	.460	11.69	.335	8.51	.295	7.50	.200	5.08
V300LA4	.460	11.69	.335	8.51	.295	7.50	.200	5.08



(ALL DIMENSIONS SHOWN ARE MAXIMUMS EXCEPT LEAD LENGTH WHICH IS A MINIMUM)

NOTE:
1) Lead spacing dimensions as measured within 0.050 inches (1.27 mm) of seating plane.
2) Marking will consist of an abbreviated catalog number, date code, and logo. Example: V130LA1 would be marked 1301 A2GE.

GE-MOV™

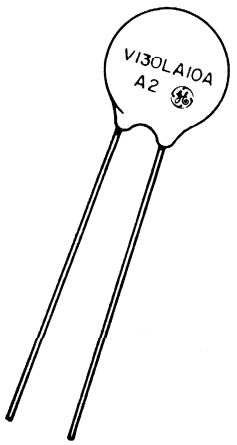
Metal Oxide Varistors

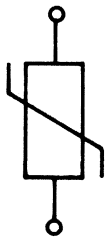
95-1000 Volts RMS AC 130-675 Volts DC

GE-MOV VARISTOR SERIES

Description:

General Electric metal oxide varistors are voltage dependent, symmetrical resistors which perform in a manner similar to back-to-back zener diodes in circuit protective functions and offer advantages in performance and economics. When exposed to high energy voltage transients, the varistor impedance changes from a very high standby value to a very low conducting value thus clamping the transient voltage to a safe level. The dangerous energy of the incoming high voltage pulse is absorbed by the GE-MOV varistor, thus protecting your voltage sensitive circuit components.





Electrical Symbol

Features:*

- Excellent Clamping (as low as 1.8 @ 10 Amps)
- Wide Range of Voltage Ratings (95–1000 Volts RMS) (130–675 Volts DC)
- Discharge Current Capability as high as 2000 Amps
- Energy Dissipation Up To 160 Watt-Seconds (Joules)
- Low Standby Drain
- Wide Operating Temperature Range
- Low Temperature Coefficient
- Fast Response (< 50 Nanoseconds)

*Refer to rating table for individual product capabilities.

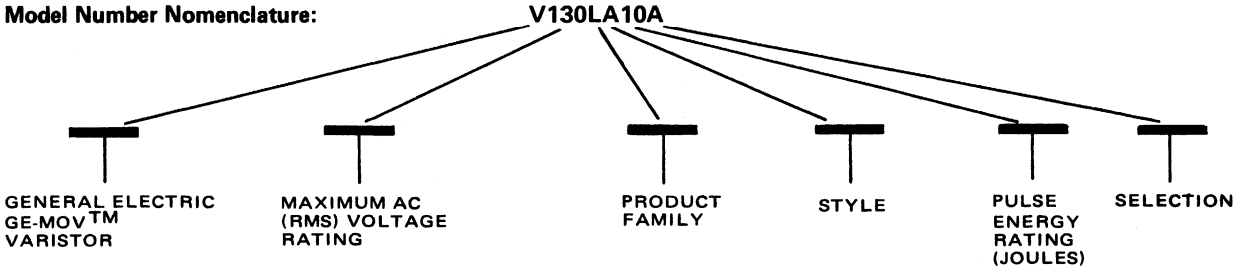
Benefits:

- Promotes System Cost Reduction
- Improves Circuit, Component and System Reliability
- Increases Product Safety
- Eliminates Follow-On Current
- Reduces System Size and Weight Requirements
- Extends Contact Life
- Protects Circuit Insulation

Applications:

- Component and System Voltage Transient Protection in:
  - Inductive Switching Circuits
  - Transformer Switching Circuits
  - Regenerative Loads
  - Switching Magnetic Amplifiers
  - Semiconductor Reverse Recovery (Voltage)
- Contact Arc Suppression
- Reduction of Lighting Effects

Model Number Nomenclature:

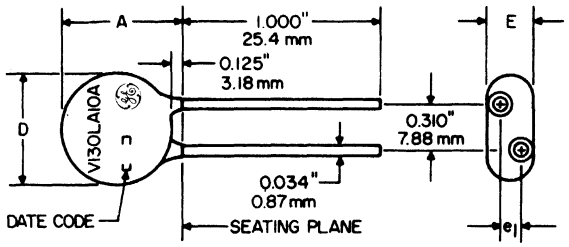


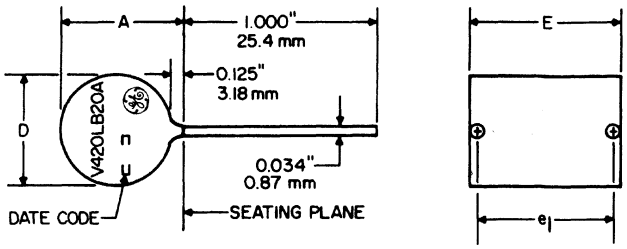
Maximum Electrical Ratings:

Maximum Energy, Power and Peak Current . . . . . See Rating Table
Storage Temperature, T_{STG} . . . . . −40°C to +125°C
Operating Surface Temperature, T_S . . . . . 115°C
Operating Ambient Temperature (without derating) . . . . . 85°C
Maximum Voltage Temperature Coefficient . . . . . −0.05%/°C

Mechanical Ratings:

Insulation Resistance – Megohms . . . . . >1000
Hipot Encapsulation – Volts D.C. for 1 Minute 2500
Solderability . . . . . Per Mil Std 202D Method 208B





MODEL	A MAX. IN.	A MAX. MM	D MAX. IN.	D MAX. MM	E MAX. IN.	E MAX. MM	e| MAX. IN.	e| MAX. MM
V95LA7	.745	18.93	.620	15.75	.230	5.85	.110	2.80
V130LA10	.745	18.93	.620	15.75	.230	5.85	.110	2.80
V130LA20	1.005	25.53	.880	22.36	.230	5.85	.170	4.32
V150LA10	.745	18.93	.620	15.75	.230	5.85	.110	2.80
V150LA20	1.005	25.53	.880	22.36	.230	5.85	.170	4.32
V250LA15	.745	18.93	.620	15.75	.290	7.37	.170	4.32
V250LA20	.745	18.93	.620	15.75	.290	7.37	.170	4.32
V250LA40	1.005	25.53	.880	22.36	.290	7.37	.180	4.58
V275LA15	.745	18.93	.620	15.75	.290	7.37	.170	4.32
V275LA20	.745	18.93	.620	15.75	.290	7.37	.170	4.32
V275LA40	1.005	25.53	.880	22.36	.290	7.37	.180	4.58

NOTE:
1) Lead spacing dimensions as measured within 0.050 inches (1.27 mm) of seating plane
2) All dimensions shown are maximums except lead length which is a minimum

MODEL	A MAX. IN.	A MAX. MM	D MAX. IN.	D MAX. MM	E MAX. IN.	E MAX. MM	e| MAX. IN.	e| MAX. MM
V420LB20	.745	18.93	.620	15.75	.395	10.04	.345	8.76
V420LB40	.745	18.93	.880	22.36	.395	10.04	.370	9.40
V460LB20	.745	18.93	.620	15.75	.395	10.04	.345	8.76
V460LB40	1.005	25.53	.880	22.36	.395	10.04	.370	9.40
V480LB20	.745	18.93	.620	15.75	.395	10.04	.345	8.76
V480LB40	.745	18.93	.620	15.75	.395	10.04	.345	8.76
V480LB80	1.005	25.53	.880	22.36	.395	10.04	.370	9.40
V510LB20	.745	18.93	.620	15.75	.395	10.04	.345	8.76
V510LB40	.745	18.93	.620	15.75	.395	10.04	.345	8.76
V510LB80	1.005	25.53	.880	22.36	.395	10.04	.370	9.40
V550LB20	.745	18.93	.620	15.75	.700	17.78	.615	15.63
V550LB40	.745	18.93	.620	15.75	.700	17.78	.615	15.63
V550LB80	1.005	25.53	.880	22.36	.750	19.05	.640	16.26
V575LB20	.745	18.93	.620	15.75	.700	17.78	.615	15.63
V575LB40	.745	18.93	.620	15.75	.700	17.78	.615	15.63
V575LB80	1.005	25.53	.880	22.36	.750	19.05	.640	16.26
V1000LB80	.745	18.93	.620	15.75	.700	17.78	.615	15.63
V1000LB160	1.005	25.53	.880	22.36	.750	19.05	.640	16.26

FIGURE 1. DIMENSION TABLE

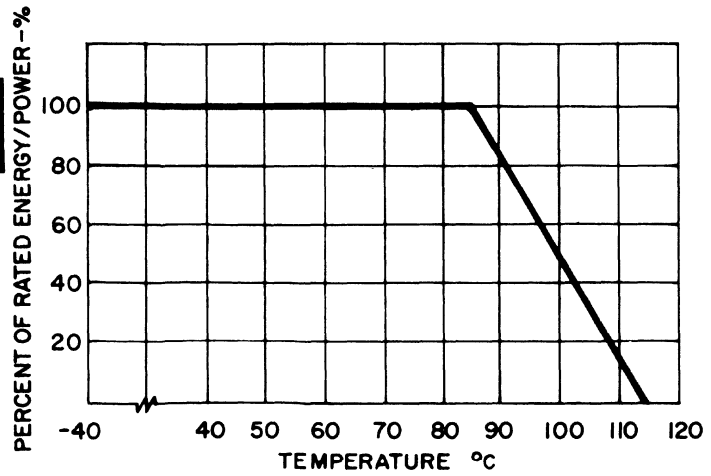


FIGURE 2. POWER AND ENERGY RATING VS TEMPERATURE

The average power input over the periodic time base resulting from successive voltage transients must be equal to, or less than, the GE-MOV varistor's rated average power dissipation at the specified ambient temperature! When this condition is met, the selected GE-MOV varistor has an energy rating high enough to suppress a voltage transient of the specified energy level at its operating surface temperature.

1. For higher average power dissipation, refer to General Electric's Power-MOV ™ Varistor Series. Publication #180.67 3/73.

MAXIMUM RATINGS: CHARACTERISTICS:

Model Number	RMS (1) Input Voltage	Recurrent (1) Peak Idle Voltage	DC Input Voltage	Energy (2)	Average (2) Power Dissipation	Peak Current For $t_p < 6$ us	Varistor (3) Peak Voltage @ 1 mA A.C. Peak		Maximum Thermal Resistance Body to Air	Typical Capacitance
							Min.	Max.		
	Volts	Volts	Volts	Joules	Watts	Amperes	Volts	Volts	°C/W	Picofarads
V95LA7A	95	134	130	7	0.45	1000	134	207	67	1050
V95LA7B				7	0.45	1000	134	170	67	1050
V130LA10A	130	184	175	10	0.5	1000	184	254	60	700
V130LA20A				20	0.85	2000	184	254	37	1500
V130LA20B				20	0.85	2000	184	238	37	1500
V150LA10A	150	212	200	10	0.5	1000	212	282	60	640
V150LA20A				20	0.85	2000	212	282	37	1400
V150LA20B				20	0.85	2000	212	255	37	1400
V250LA15A	250	354	330	15	0.6	1000	354	472	50	375
V250LA20A				20	0.6	1000	354	472	50	375
V250LA40A				40	0.9	2000	354	472	35	820
V250LA40B				40	0.9	2000	354	428	35	820
V275LA15A	275	389	369	15	0.6	1000	389	522	50	360
V275LA20A				20	0.6	1000	389	522	50	360
V275LA40A				40	0.9	2000	389	522	35	780
V275LA40B				40	0.9	2000	389	495	35	780
V420LB20A	420	595	—(4)	20	0.55	1000	595	800	55	225
V420LB40A			560	40	0.9	2000	595	800	35	490
V420LB40B			560	40	0.9	2000	595	752	35	490
V460LB20A	460	650	—(4)	20	0.55	1000	650	878	55	210
V460LB40A			615	40	0.9	2000	650	878	35	460
V460LB40B			615	40	0.9	2000	650	800	35	460
V480LB20A	480	679	—(4)	20	0.55	570	679	914	55	195
V480LB40A			—(4)	40	0.7	1000	679	914	45	195
V480LB80A			640	80	1.0	2000	679	914	30	430
V480LB80B			640	80	1.0	2000	679	878	30	430
V510LB20A	510	721	—(4)	20	0.55	570	721	970	55	185
V510LB40A			—(4)	40	0.7	1000	721	970	45	185
V510LB80A			675	80	1.0	2000	721	970	30	405
V510LB80B			675	80	1.0	2000	721	914	30	405
V550LB20A	550	778	—(4)	20	0.6	570	778	1060	50	175
V550LB40A				40	0.7	1000	778	1060	45	175
V550LB80A				80	1.0	2000	778	1060	30	390
V550LB80B				80	1.0	2000	778	963	30	390
V575LB20A	575	813	—(4)	20	0.65	570	813	1115	47	165
V575LB40A				40	0.8	1000	813	1115	36	165
V575LB80A				80	1.1	2000	813	1115	27	365
V575LB80B				80	1.1	2000	813	970	27	365
V1000LB80A	1000	1414	—(4)	80	0.9	1000	1414	1900	35	90
V1000LB160A				160	1.3	2000	1414	1900	24	210
V1000LB160B				160	1.3	2000	1414	1750	24	210

NOTES:

(1) Sinusoidal voltage assumed as normal input conditions. If nonsinusoidal wave input is present, peak voltage input values should be used to select model.
(2) See Figure 2.
(3) 1 mA standby current based upon 60 HZ sinusoidal input.
(4) Not recommended due to high power dissipation.

Maximum Volt–Ampere Characteristics:

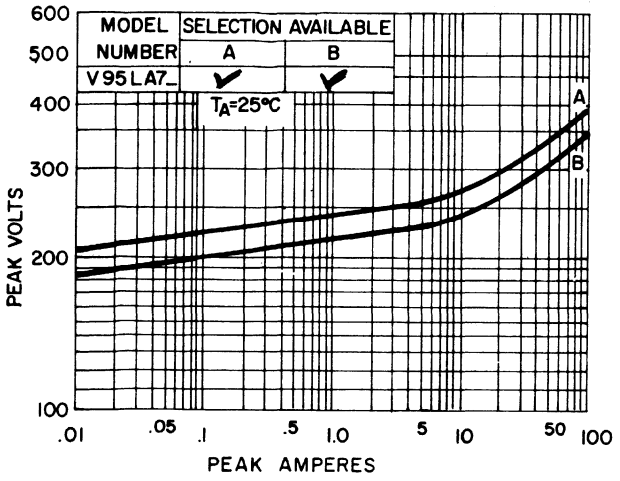


FIGURE 3. 95 VRMS PRODUCT

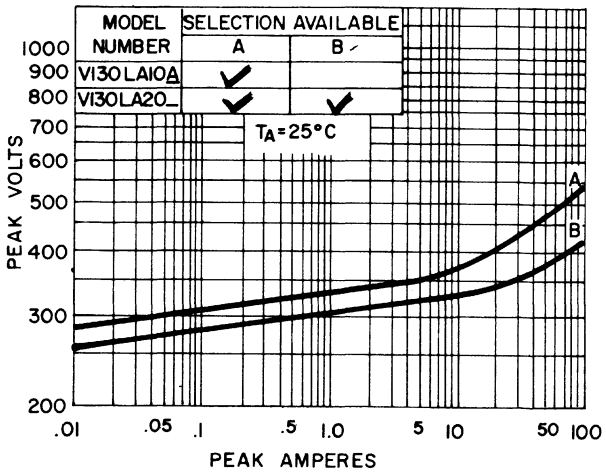


FIGURE 4. 130 VRMS PRODUCT

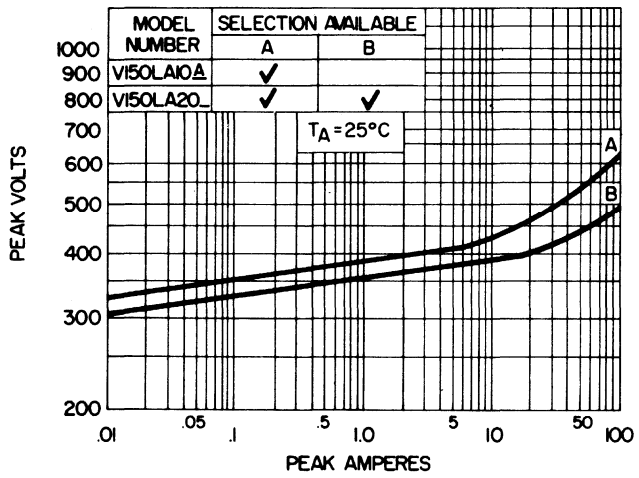


FIGURE 5. 150 VRMS PRODUCT

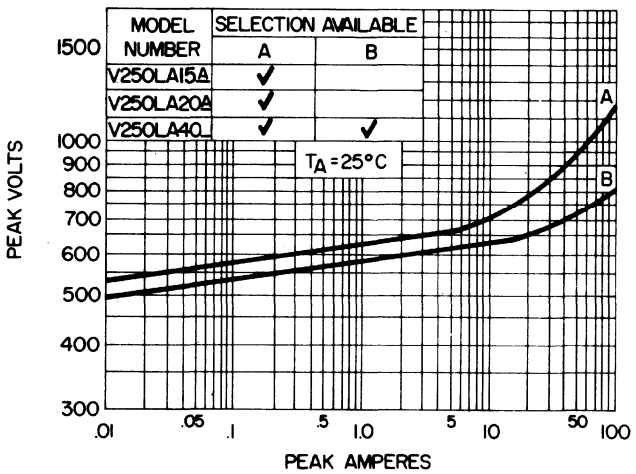


FIGURE 6. 250 VRMS PRODUCT

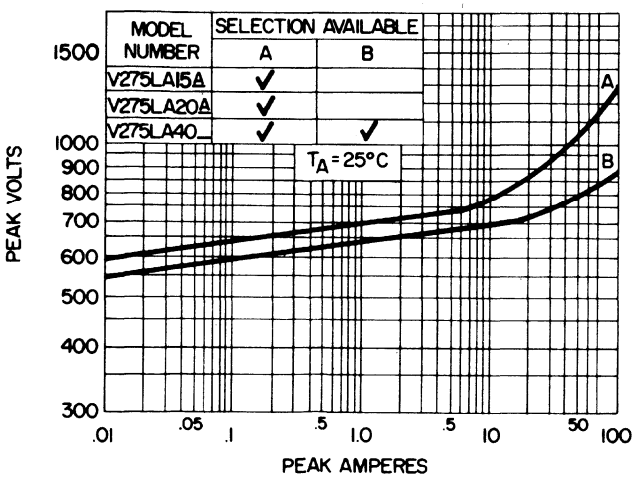


FIGURE 7. 275 VRMS PRODUCT

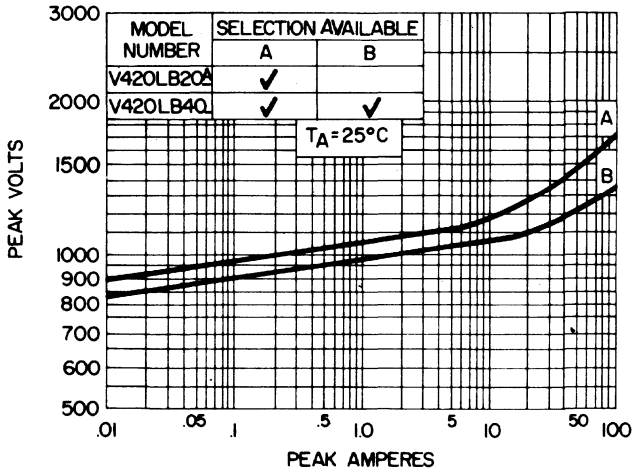


FIGURE 8. 420 VRMS PRODUCT

Maximum Volt–Ampere Characteristics:

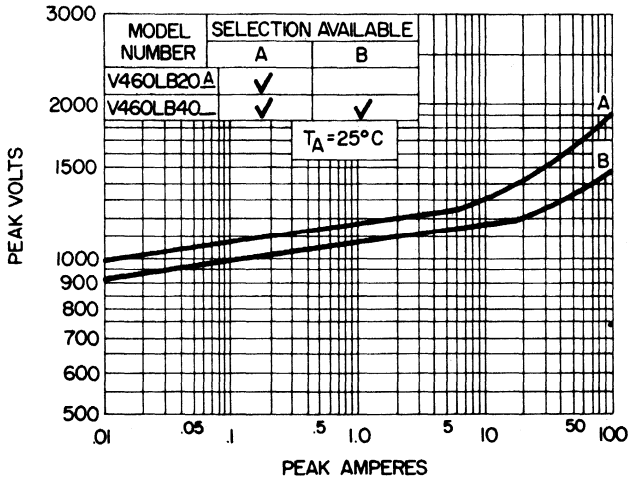


FIGURE 9. 460 VRMS PRODUCT

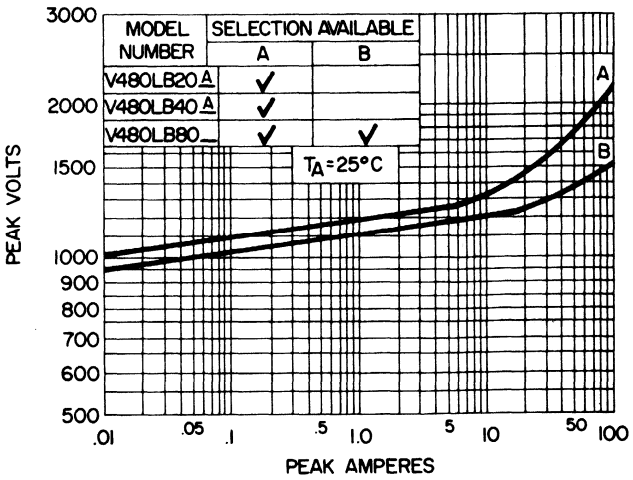


FIGURE 10. 480 VRMS PRODUCT

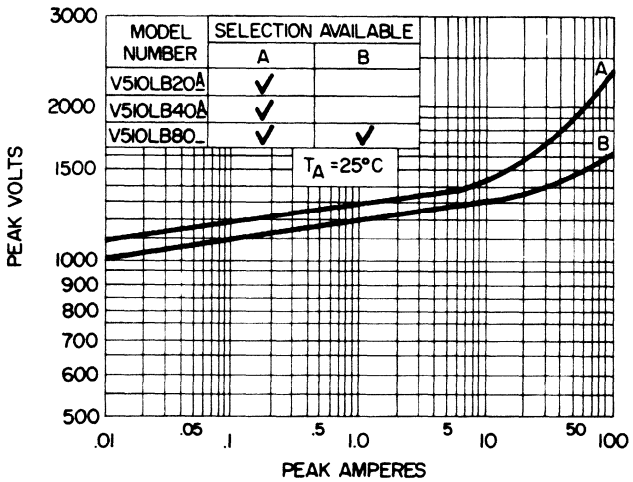


FIGURE 11. 510 VRMS PRODUCT

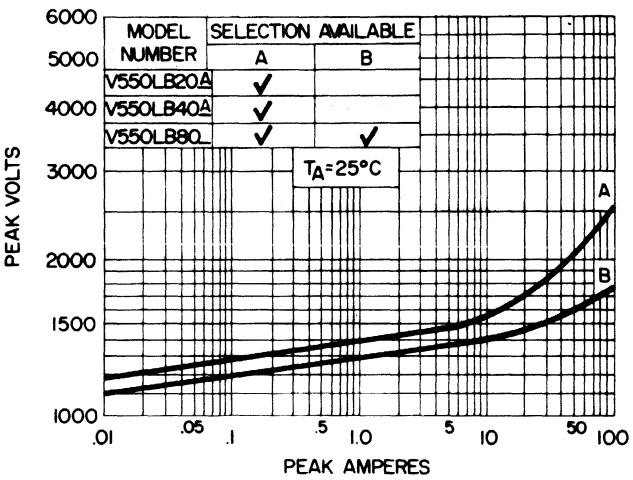


FIGURE 12. 550 VRMS PRODUCT

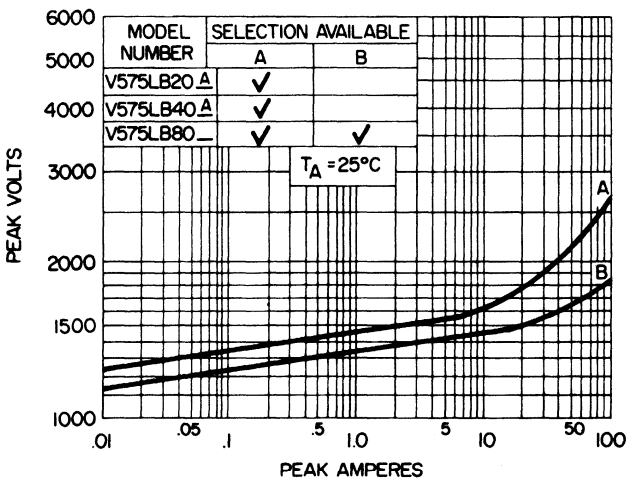


FIGURE 13. 575 VRMS PRODUCT

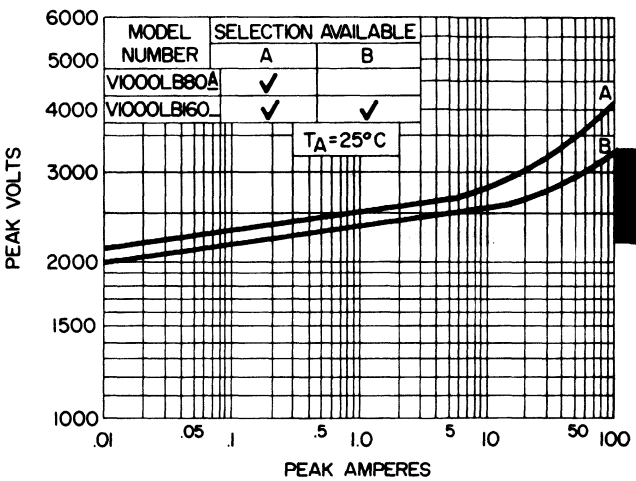


FIGURE 14. 1000 VRMS PRODUCT

Varistor Measurement Methods:

A charged coaxial line or other type of high energy pulse source such as the Velonex Pulse Generator – Model 350, is satisfactory for pulse testing. Care must be taken not to exceed the energy or power rating of the device under test. In addition, coaxial current shunts, such as those manufactured by T&M Research, and devices with leads as short as possible are recommended. The Tektronic 576 curve tracer can be used for 1–10 milliampere AC readings.

Velonex, Varian Division
560 Robert Avenue
Santa Clara, California 95050

T&M Research Products Inc.
129 Rhode Island, N.E.
Albuquerque, New Mexico 87108

Definition of Varistor Terms:

1. **Recurrent peak idle voltage.**

   The peak voltage that appears across the GE–MOV varistor terminals when no transient is present. This voltage should be the RMS line voltage $X\sqrt{2}$ (to obtain peak voltage) plus some factor to insure high line conditions (usually 10%).

   AC example: For a 220 VRMS system, the peak idle voltage would be
   220 X 1.414 X 1.10 = 342 VAC peak idle.

   DC example: For a 300 VDC system, the peak idle voltage would be
   300 X 1.10 = 330 VDC peak idle.

2. **Peak clamping voltage.**

   The peak voltage to which the transient voltage must be suppressed.

3. **Transient peak current.**

   Instantaneous peak current of the voltage transient.

4. **Transient pulse width.**

   The width of the transient spike in micro-seconds.

5. **Transient rep rate.**

   The number of transient pulses per second.

6. **Transient energy.**

   The available energy in Watt-seconds (joules).
   Energy = $1/2\ LI^2 = 1/2\ CV^2 = I^2RT = VIT$
   (where T = pulse width in seconds).

7. **Ambient temperature.**

   Temperature in which the GE-MOV varistor will be operating. (°C)

8. **Clamp ratio.**

$$CR = \frac{\text{Peak Clamping Voltage}}{\text{Recurrent Peak Idle Voltage}}$$

Application Notes:

Pub. No.	Title
200.60	GE-MOV ™ VARISTORS VOLTAGE TRANSIENT SUPPRESSORS
200.71	USING GE-MOV ™ VARISTORS FOR THE SUPPRESSION OF VOLTAGE SURGES DUE TO THE SWITCHING OF INDUCTIVE LOADS
200.72	USING GE-MOV ™ VARISTORS TO EXTEND CONTACT LIFE
95.44	GE-MOV ™ VARISTOR RELIABILITY REPORT

ELECTRONIC INNOVATIONS IN ACTION

GE-MOV™

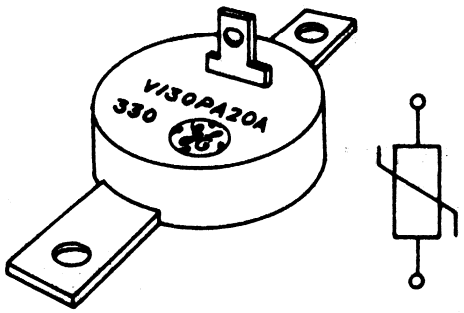
Metal Oxide Varistors

130-575 VOLTS RMS A.C. 170-780 VOLTS D.C.

POWER-MOV VARISTOR SERIES

Description:

General Electric metal oxide varistors are voltage dependent, symmetrical resistors which perform in a manner similar to back-to-back zener diodes in circuit protective functions and offer advantages in performance and economics. When exposed to high energy voltage transients, the varistor impedance changes from a very high standby value to a very low conducting value thus clamping the transient voltage to a safe level. The dangerous energy of the incoming high voltage pulse is absorbed by the GE-MOV™ varistor, thus protecting voltage sensitive circuit components.



Electrical Symbol

Features*:

- Up to 15 Watt Average Power Dissipation
- NEMA Creep and Strike Distances
- Excellent Clamping (As low as 1.7 @10 Amps)
- Discharge Current Capability as high as 2000 Amps
- Energy Dissipation Up To 80 Watt-seconds
- Fast Response (<50 nanoseconds)
- Low Standby Power Dissipation
- Quick Connect Terminal

*Refer to rating table for individual product capabilities

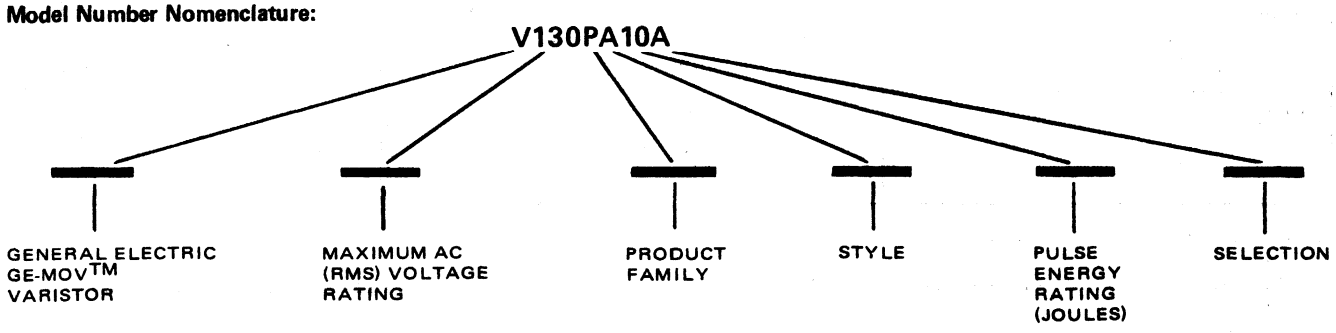
Benefits:

- Promotes System Cost Reduction
- Improves Circuit, Component & System Reliability
- Increases Product Safety
- Eliminates Follow-On Current
- Reduces System Size & Weight Requirements
- Extends Contact Life
- Protects Circuit Insulation

Applications:

- Component and System Voltage Transient
- Protection in:
  - –Inductive Switching Circuits
  - –Transformer Switching Circuits
  - –Regenerative Loads
  - – Switching Magnetic Amplifiers
  - – Semiconductor Reverse Recovery (Voltage)
- Contact Arc Suppression
- Reduction of Lightning Effects

Model Number Nomenclature:



RATINGS:

Maximum Energy, Power and Peak Current ..... See Rating Table
Storage Temperature, T_{STG} ..... -40°C to +125°C
Maximum Hot Spot Temperature, T_{HS} ..... 125°C
Operating Case Temperature (without derating) ..... 70°C
Maximum Thermal Impedance Case to Ambient for Maximum Recurrent Peak AC Voltage ..... ≤ 8°C/WATT
Maximum Thermal Impedance Case to Ambient for Maximum DC Input ..... ≤ 5°C/WATT
Maximum Voltage Temperature Coefficient ..... -0.05%/°C

MECHANICAL:

Insulation Resistance – Megohms ..... > 1000
Hipot Encapsulation – Volts DC for 1 Minute 2500
Maximum Weight ..... 45 Grams

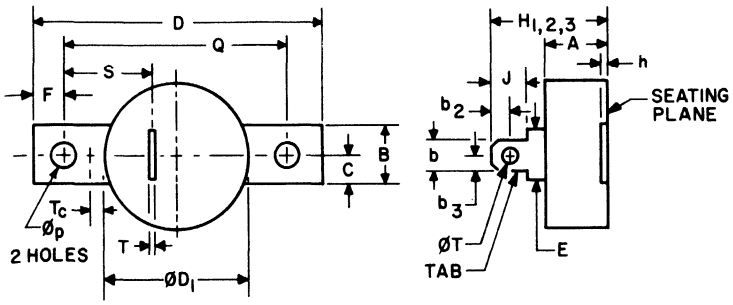
RATINGS / CHARACTERISTICS

Model Number	Maximum[1] RMS Input Voltage	Maximum[1] Recurrent Peak Voltage	DC Input Voltage (3)(5)	Maximum Energy	Average[2][3] Power Dissipation	Maximum Peak Current For tp < 6μs	Varistor[4] Peak Voltage @ 1mA AC		Thermal Resistance Hot Spot to Case
							MIN	MAX	
	VOLTS	VOLTS	VOLTS	JOULES	WATTS	AMPERES	VOLTS	VOLTS	°C/W
V130PA10(*)	130	184	170	10	8	1000	167	254	6.8
20(*)				20	15	2000			3.6
V150PA10(*)	150	212	215	10	8	1000	212	282	6.8
20(*)				20	15	2000			3.6
V250PA10(*)				10	4	570			13.7
20(*)	250	354	330	20	7	1000	330	428	7.8
40(*)				40	13	2000			4.2
V275PA10(*)				10	4	570			13.7
20(*)	275	389	360	20	7	1000	364	472	7.8
40(*)				40	13	2000			4.2
V420PA20(*)	420	595	550	20	5	1000	567	751	11.0
40(*)				40	10	2000			5.5
V460PA20(*)	460	650	625	20	5	1000	625	878	11.0
40(*)				40	10	2000			5.5
V480PA20(*)				20	3	570			18.3
40(*)	480	679	625	40	5	1000	650	914	11.0
80(*)				80	10	2000			5.5
V510PA20(*)				20	3	570			18.3
40(*)	510	721	655	40	5	1000	680	963	11.0
80(*)				80	10	2000			5.5
V550PA20(*)				20	3	570			18.3
40(*)	550	778	755	40	5	1000	795	1060	11.0
80(*)				80	9	2000			6.1
V575PA20(*)				20	3	570			18.3
40(*)	575	813	780	40	5	1000	825	1115	11.0
80(*)				80	9	2000			6.1

*Refer to V-I curves for desired selection.

NOTES:

(1) Steady State Defined as normal input conditions. If non-sinusoidal wave input is present, peak voltage input values should be used to select model.
(2) See Figure 2.
(3) Refer to Figures 13-17 for Idle power dissipation.
(4) 1 mA standby current based upon 60 Hz sinusoidal input.
(5) DC Input Voltage for 1.0 Watt Idle Power Dissipation.



SYMBOL	INCHES			MILLIMETERS			NOTES
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A			.580			14.74	
b			.251			6.38	1
b_2		.160			4.06		
b_3		.125			3.18		
B			.510			12.96	
C			.260			6.61	
D			2.615			66.43	
ϕD_1			1.320			33.53	
E		.440			11.18		
F		.300			7.62		
h			.035			.89	
H_1	.910		.985	23.11		25.02	3
H_2	.980		1.050	24.89		26.67	3
H_3	1.120		1.190	28.44		30.23	3
J			.315			8.01	
ϕp	.232		.236	5.89		6.00	
Q	1.990	2.000	2.010	50.54	50.80	51.06	
S		.775			19.68		
T			.036			.92	1
ϕT	.118			2.99			
T_c		.125			3.18		2

NOTES: 1. Tab is designed to fit 1/4 inch quick connect terminal.
2. Case temperature is measured at T_c on top surface of plate.
3. H_1 (130-150 VRMS Devices)
H_2 (250-275 VRMS Devices)
H_3 (420-575 VRMS Devices)
4. Electrical connection between top terminal & Base plate

FIGURE 1

DIMENSION TABLE

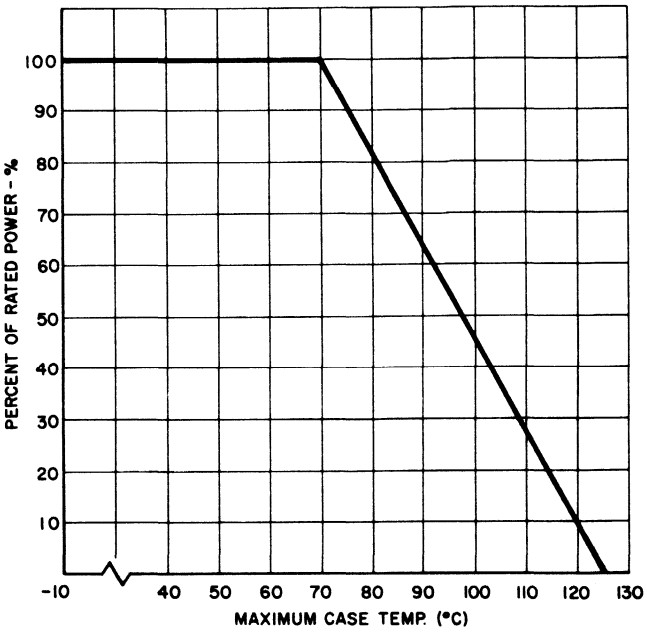


FIGURE 2

POWER RATING VS. CASE TEMPERATURE

MAXIMUM VOLT-AMPERE CHARACTERISTICS

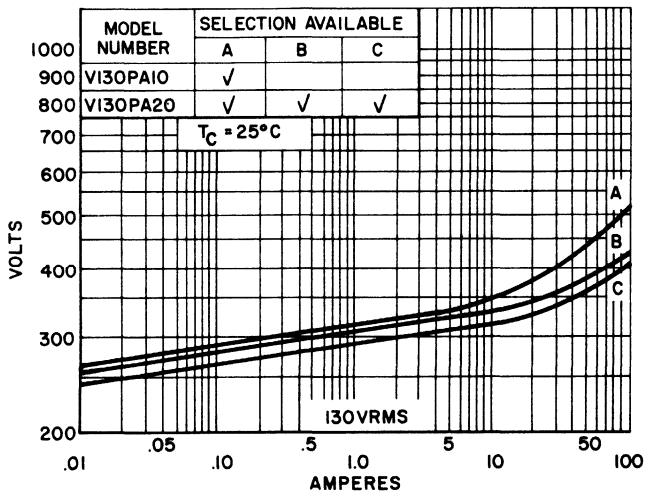


FIGURE 3

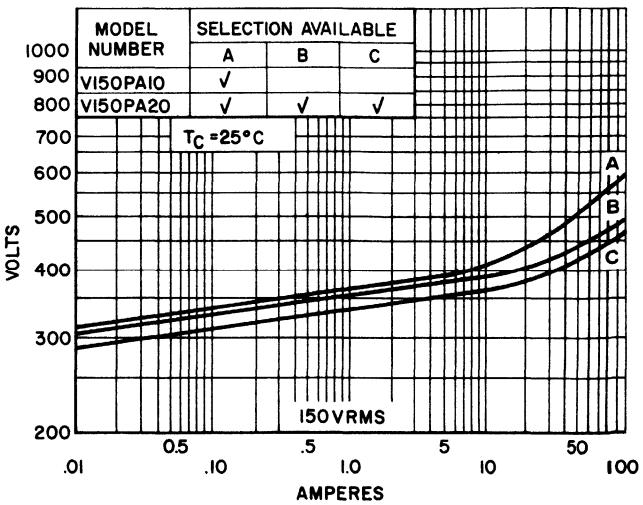


FIGURE 4

MAXIMUM VOLT-AMPERE CHARACTERISTICS

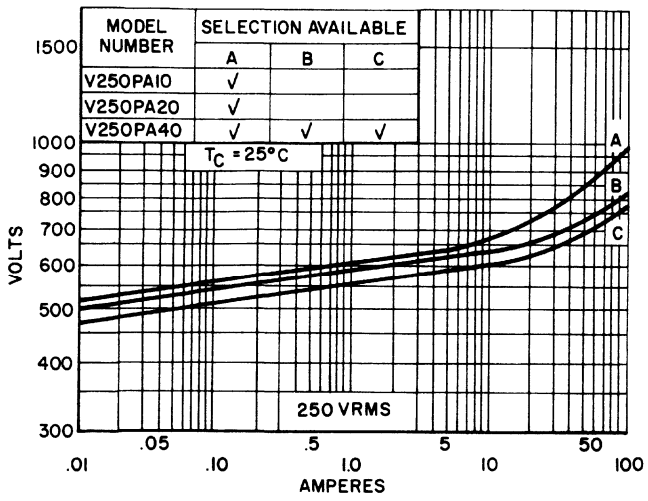


FIGURE 5

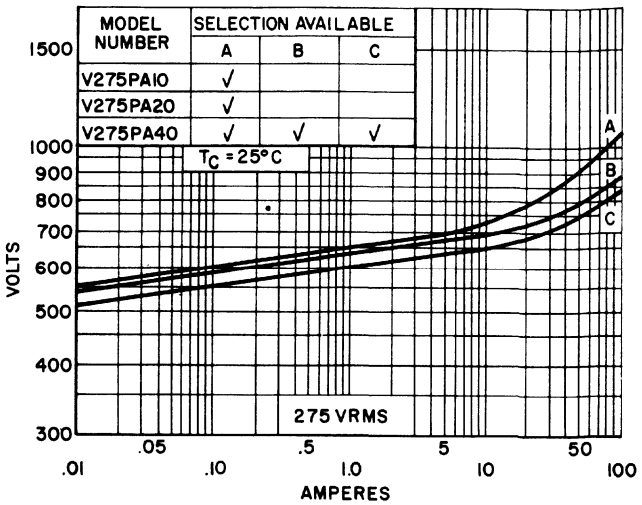


FIGURE 6

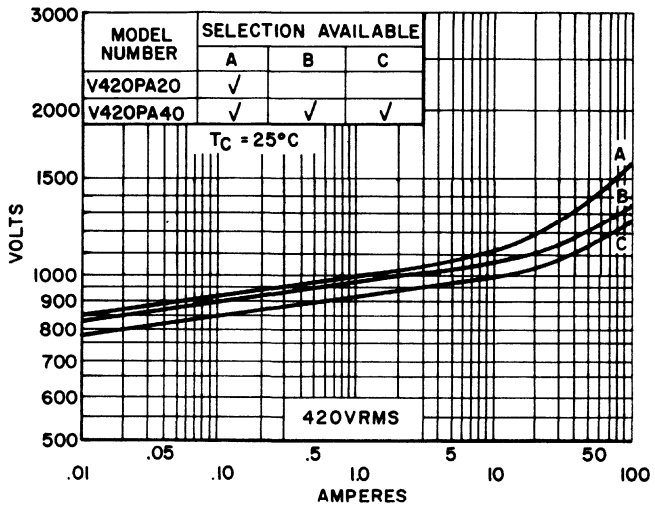


FIGURE 7

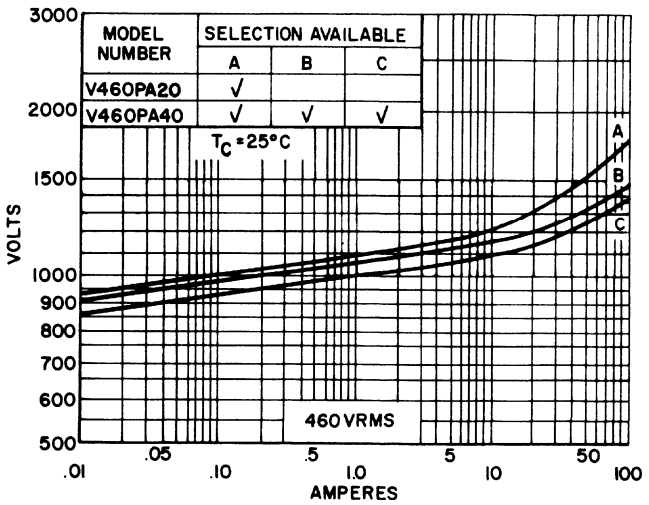


FIGURE 8

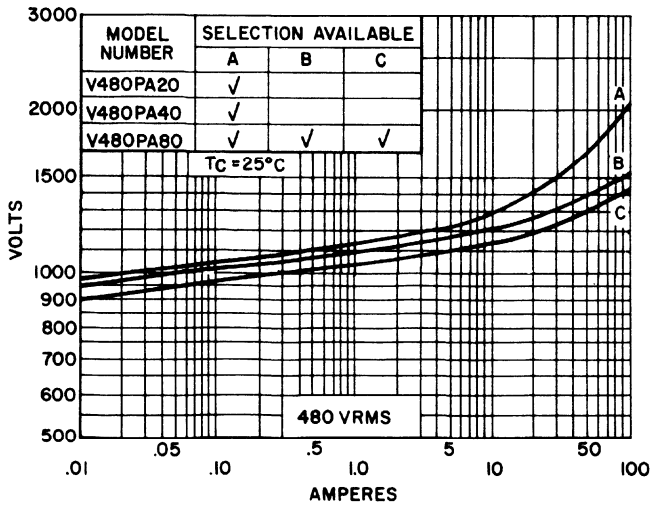


FIGURE 9

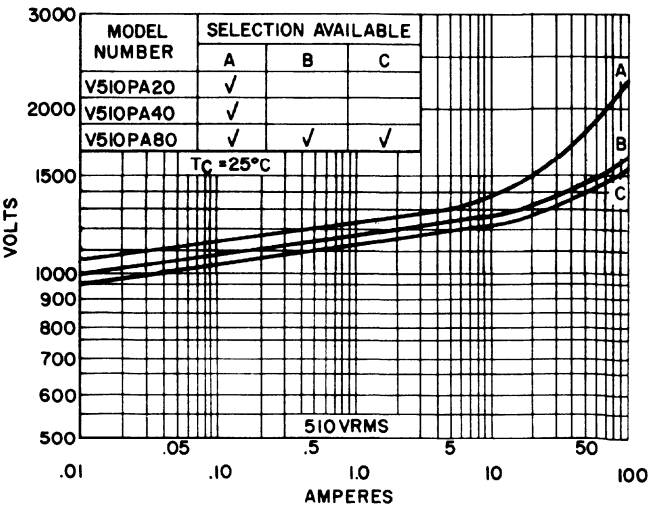


FIGURE 10

MAXIMUM VOLT-AMPERE CHARACTERISTICS

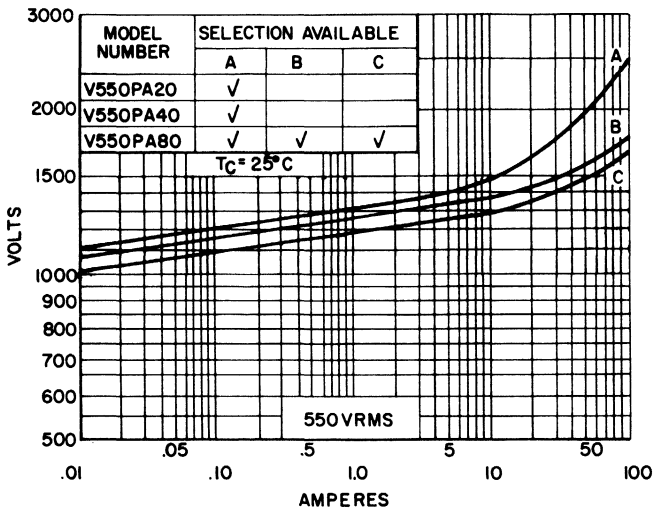


FIGURE 11

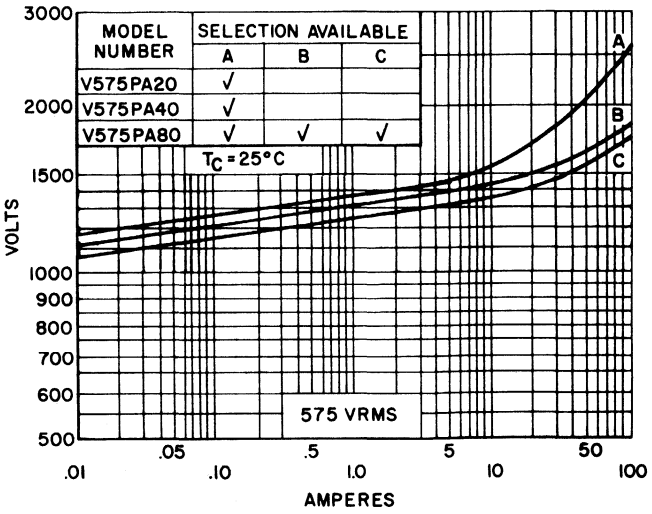


FIGURE 12

AC IDLE POWER DISSIPATION CURVES:*

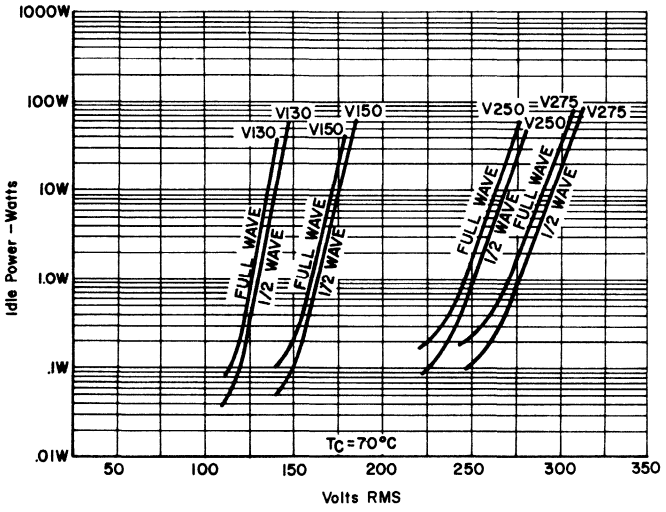


FIGURE 13

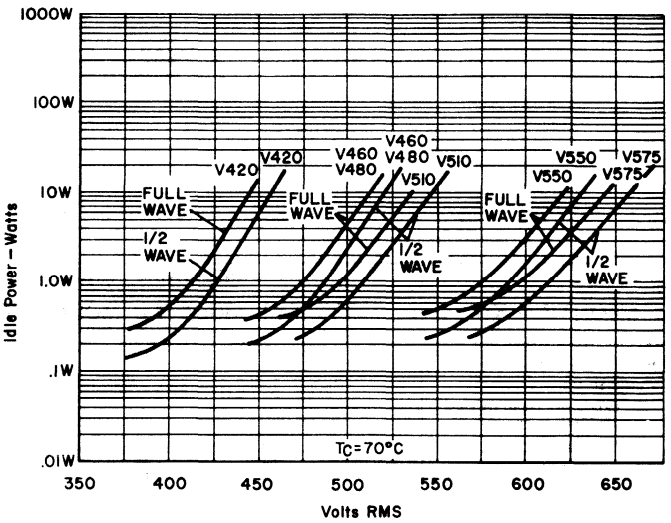


FIGURE 14

DC IDLE POWER DISSIPATION CURVES:*

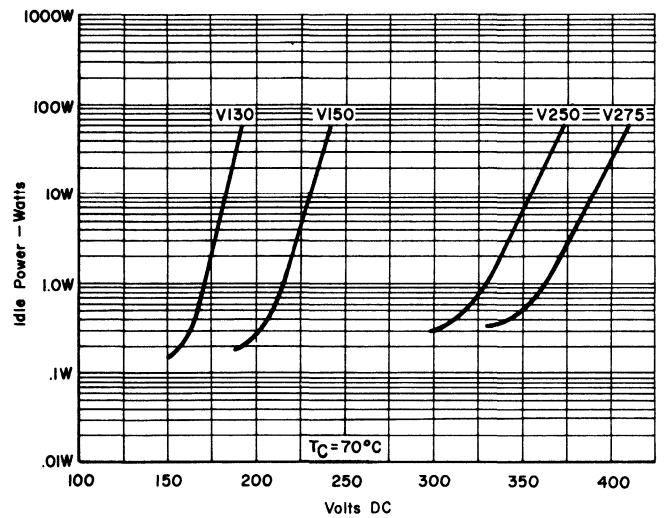


FIGURE 15

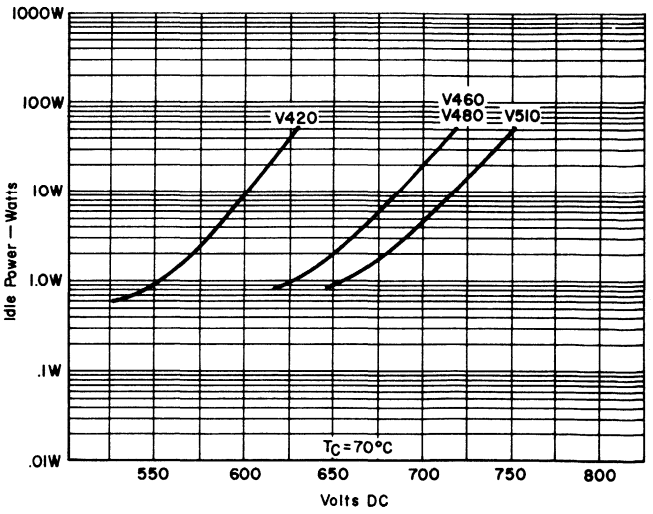


FIGURE 16

*90% confidence factor for max idle power dissipation after 10,000 hours operation.

DC IDLE POWER DISSIPATION CURVES:*

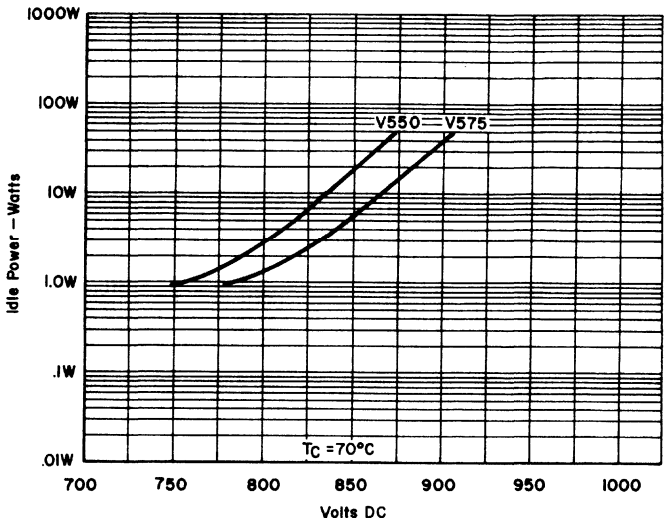
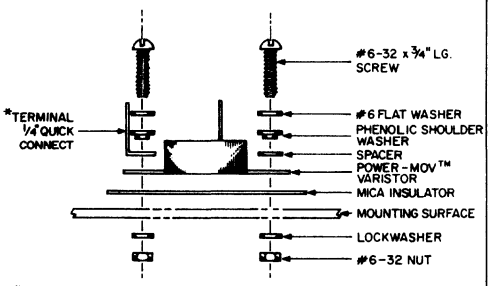
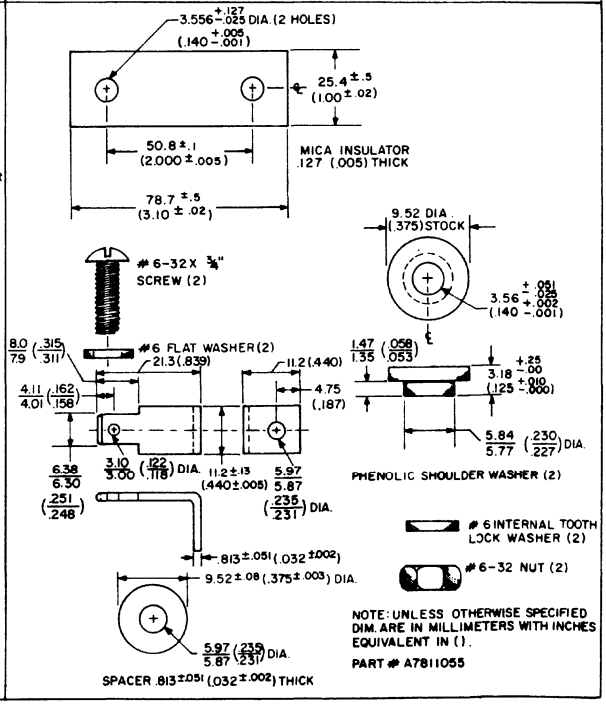


FIGURE 17

*90% confidence factor for max idle power dissipation after 10,000 hours operation.

HARDWARE

MOUNTING KIT	INSULATING KITS NOT SUPPLIED WITH UNITS UNLESS STATED ORDER BY PART #	
	TYPICAL ISOLATED MOUNTING:	ISOLATION KIT:
NO HARDWARE SUPPLIED WITH UNIT SUGGESTED MOUNTINGS: 1. #10-32 PAN HEAD SCREWS, LOCK WASHERS AND NUTS. 2. RIVET OF EQUIVALENT SIZE. NOTE: GE G623, DOW CORNING DC3,4, 340 OR 640 THERMAL GREASE IS RECOMMENDED FOR ALL MOUNTINGS.	 *RECOMMEND SOLDERING TERMINAL TO DEVICE.	

GE-MOV™

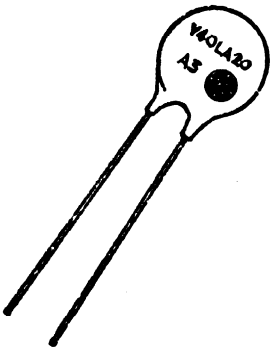
Metal Oxide Varistors

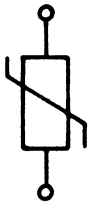
40-80 VOLTS RMS AC 53-110 VOLTS DC

LOW VOLTAGE GE-MOV™ SERIES

Description:

General Electric **Metal Oxide Varistors** are voltage dependent, symmetrical resistors which perform in a manner similar to back-to-back zener diodes in circuit protective functions and offer advantages in performance and economics. When exposed to high energy voltage transients, the varistor impedance changes from a very high standby value to a very low conducting value thus clamping the transient voltage to a safe level. The dangerous energy of the incoming high voltage pulse is absorbed by the GE-MOV™ varistor, thus protecting voltage sensitive circuit components.





Electrical Symbol

FEATURES: *

- Low Voltage Design
- Discharge Current Capability as High as 500 Amps
- Excellent Clamping
- Energy Dissipation up to 40 Watt-Seconds (Joules)
- Fast Response (< 50 Nanoseconds)
- Low Standby Drain
- Wide Operating Temperature Range
- Low Temperature Coefficient

*Refer to Rating Table for Individual Product Capabilities

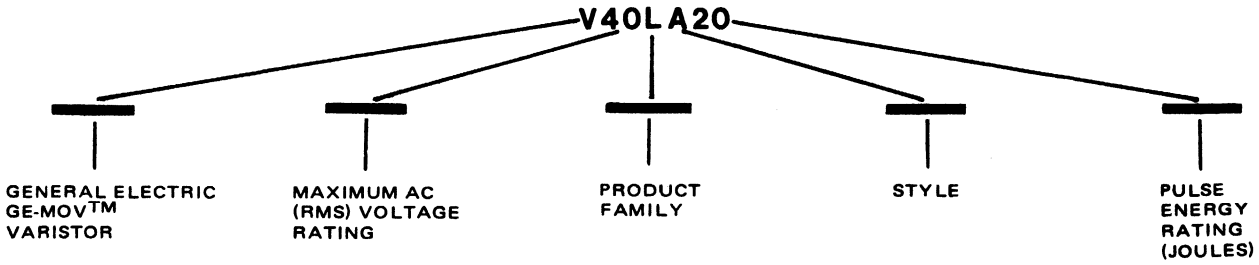
BENEFITS:

- Promotes System Cost Reduction
- Improves Circuit, Component and System Reliability
- Increases Product Safety
- Eliminates Follow-On Current
- Reduces System Size and Weight Requirements
- Extends Contact Life
- Protects Circuit Insulation

APPLICATIONS:

- Component and System Voltage Transient Protection in:
  - Inductive Switching Circuits
  - Transformer Switching Circuits
  - Regenerative Loads
  - Switching Magnetic Amplifiers
  - Semiconductor Reverse Recovery (Voltage)
- Contact Arc Suppression
- Reduction of Lightning Effects

Model Number Nomenclature:



Maximum Electrical Ratings:

Maximum Energy, Power and Peak Current . . . . . See Rating Table
Storage Temperature, T_{STG} . . . . . −40°C to +125°C
Operating Surface Temperature, T_S . . . . . 115°C
Operating Ambient Temperature (without derating) . . . . . 85°C

Mechanical Ratings:

Insulation Resistance – Megohms . . . . . > 1000
Hipot Encapsulation – Volts D.C. for 1 Minute 2500
Solderability . . . . . Per Mil Std 202D Method 208B

Rating Table:

Model Number	Max. RMS Input(2) Voltage	Max. DC Input(2) Voltage	Varistor Peak Voltage (3) @ 1 mA AC (Peak) Min.	Varistor Peak Voltage (3) @ 1 mA AC (Peak) Max.	Energy(1) Rating	Capacitance (Typical)	Peak Current For Pulses Less Than 6 Microseconds Wide
	Volts	Volts	Volts	Volts	Joules	Picofarads	Amperes
V40LA20	40	53	57	80	20	53000	500
V60LA30	60	80	85	115	30	35000	500
V80LA40	80	110	113	152	40	25000	500

Notes: (1) See Figure 2. (2) Steady State defined as normal input conditions. If nonsinusoidal wave input is present, peak voltage input values should be used to select model. (3) 1 mA standby current based upon 60 Hz sinusoidal input.

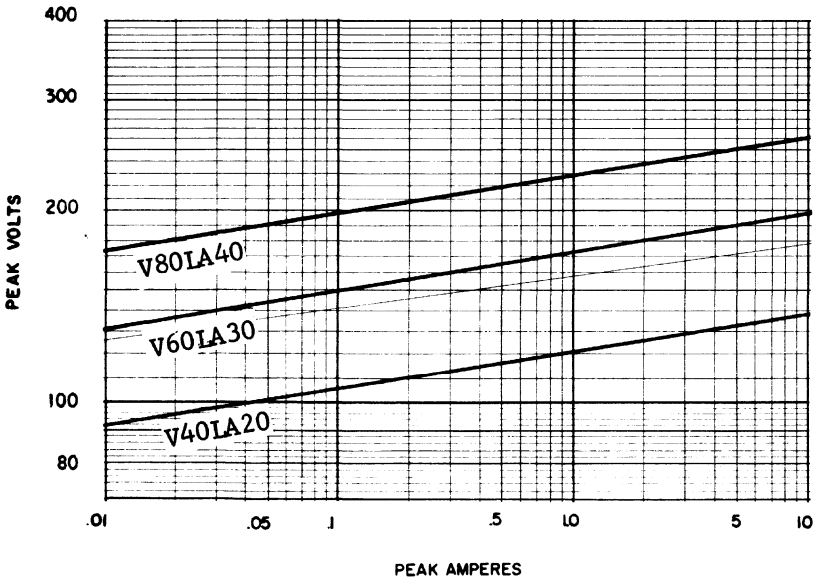
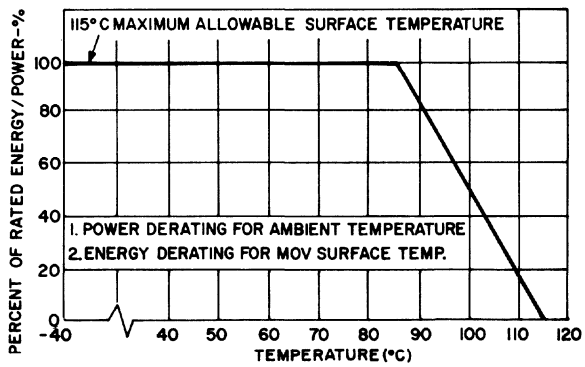


FIGURE 1 MAXIMUM VOLT-AMPERE CHARACTERISTICS



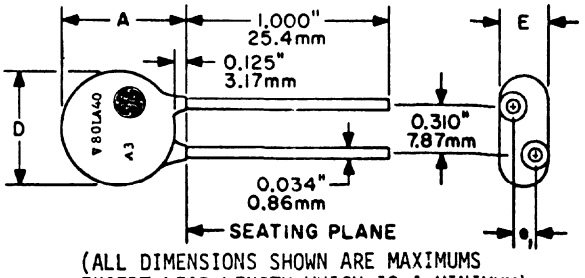
The average power input over the periodic time base resulting from successive voltage transients must be equal to, or less than, the GE -MOV's rated average power dissipation at the specified ambient temperature. When this condition is met, the selected GE-MOV varistor has an energy rating high enough to suppress a voltage transient of the specified energy level at its operating surface temperature.

FIGURE 2 POWER AND ENERGY RATINGS VS TEMPERATURE

Dimension Table:

Model	A MAX. In.	A MAX. MM	D MAX. In.	D MAX. MM	E MAX. In.	E MAX. MM	e_1 MAX. In.	e_1 MAX. MM
V40LA20	1.005	25.53	.880	22.36	.230	5.85	.170	4.32
V60LA30	1.005	25.53	.880	22.36	.260	6.61	.175	4.45
V80LA40	1.005	25.53	.880	22.36	.290	7.37	.180	4.58

NOTE:
1) Lead spacing dimensions as measured within 0.050 inches (1.27 mm) of seating plane.



(ALL DIMENSIONS SHOWN ARE MAXIMUMS EXCEPT LEAD LENGTH WHICH IS A MINIMUM)

GE-MOV™

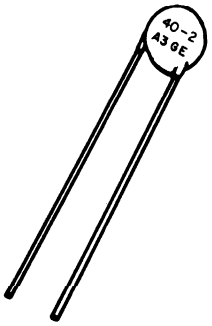
Metal Oxide Varistors

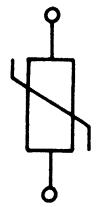
40-80 VOLTS RMS AC 53-110 VOLTS DC

LOW VOLTAGE MINI MOV™ SERIES

Description:

General Electric **Metal Oxide Varistors** are voltage dependent, symmetrical resistors which perform in a manner similar to back-to-back zener diodes in circuit protective functions and offer advantages in performance and economics. When exposed to high energy voltage transients, the varistor impedance changes from a very high standby value to a very low conducting value thus clamping the transient voltage to a safe level. The dangerous energy of the incoming high voltage pulse is absorbed by the GE-MOV™ varistor, thus protecting voltage sensitive circuit components.





Electrical Symbol

FEATURES: *

- Low Voltage Design
- Discharge Current Capability as High as 50 Amps
- Excellent Clamping
- Fast Response (< 50 Nanoseconds)
- Compact and Lightweight
- Wide Operating Temperature Range
- Low Standby Drain
- Easily Installed

*Refer to Rating Table for Individual Product Capabilities

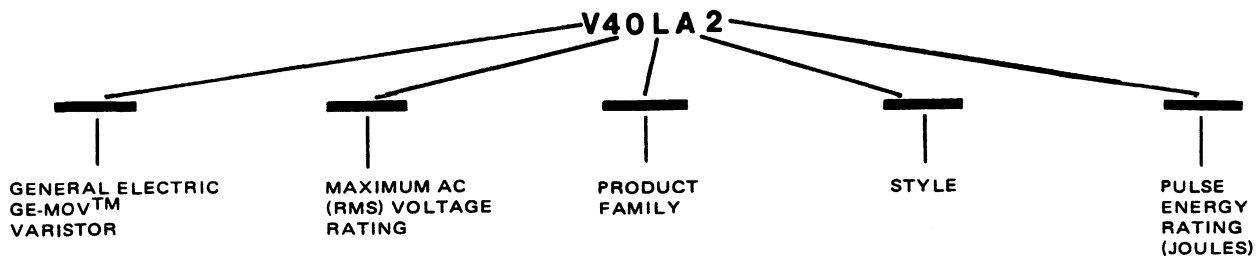
BENEFITS:

- Promotes System Cost Reduction
- Improves Circuit, Component and System Reliability
- Increases Product Safety
- Eliminates Follow-On Current
- Reduces System Size and Weight Requirements
- Extends Contact Life
- Protects Circuit Insulation

APPLICATIONS:

- Component and System Voltage Transient Protection in:
  - Inductive Switching Circuits
  - Transformer Switching Circuits
  - Semiconductor Reverse Recovery (Voltage)
- Contact Arc Suppression
- Reduction of Lightning Effects

Model Number Nomenclature:



Maximum Electrical Ratings:

Maximum Energy, Power and Peak Current ..... See Rating Table
Storage Temperature, T_{STG} ..... −40°C to +125°C
Operating Surface Temperature, T_S ..... 115°C
Operating Ambient Temperature (without derating) ..... 85°C

Mechanical Ratings:

Insulation Resistance – Megohms ..... > 1000
Hipot Encapsulation – Volts D.C. for 1 Minute 2500
Solderability ..... Per Mil Std 202D Method 208B

Rating Table:

Model Number	Max. RMS Input(2) Voltage	Max. DC Input(2) Voltage	Varistor Peak Voltage (3) @ 0.1 mA AC (Peak) Min.	Varistor Peak Voltage (3) @ 0.1 mA AC (Peak) Max.	Energy(1) Rating	Capacitance (Typical)	Peak Current For Pulses Less Than 6 Microseconds Wide
	Volts	Volts	Volts	Volts	Joules	Picofarads	Amperes
V40LA2	40	53	55	82	2	4100	50
V60LA3	60	80	81	119	3	2700	50
V80LA4	80	110	107	160	4	1900	50

Notes: (1) See Figure 2. (2) Steady State defined as normal input conditions. If nonsinusoidal wave input is present, peak voltage input values should be used to select model. (3) 0.1 mA standby current based upon 60 Hz sinusoidal input.

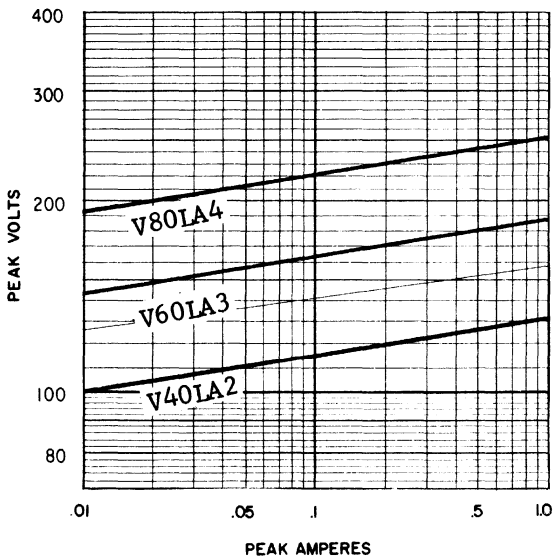
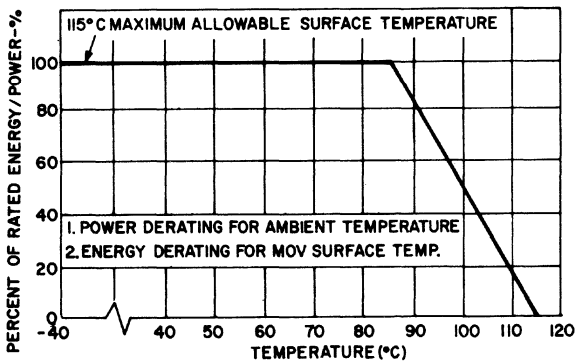


FIGURE 1 MAXIMUM VOLT-AMPERE CHARACTERISTICS



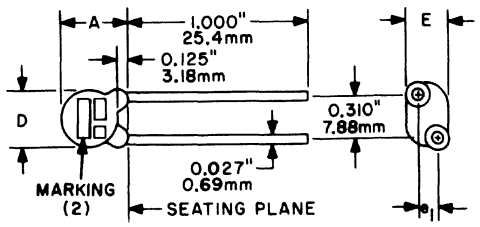
The average power input over the periodic time base resulting from successive voltage transients must be equal to, or less than, the Mini-MOV's rated average power dissipation at the specified ambient temperature. When this condition is met, the selected Mini-MOV varistor has an energy rating high enough to suppress a voltage transient of the specified energy level at its operating surface temperature.

FIGURE 2 POWER AND ENERGY RATINGS VS TEMPERATURE

Dimension Table:

Model	A MAX. In.	A MAX. MM	D MAX. In.	D MAX. MM	E MAX. In.	E MAX. MM	e_1 MAX. In.	e_1 MAX. MM
V40LA2	.460	11.69	.335	8.51	.190	4.83	.100	2.54
V60LA3	.460	11.69	.335	8.51	.230	5.84	.137	3.50
V80LA4	.460	11.69	.335	8.51	.270	6.86	.175	4.45

NOTE:
1) Lead spacing dimensions as measured within 0.050 inches (1.27 mm) of seating plane.
2) Marking will consist of an abbreviated catalog number, date code, and logo. Example: V40LA2 would be marked 40-2 A2GE.



(ALL DIMENSIONS SHOWN ARE MAXIMUMS EXCEPT LEAD LENGTH WHICH IS A MINIMUM)