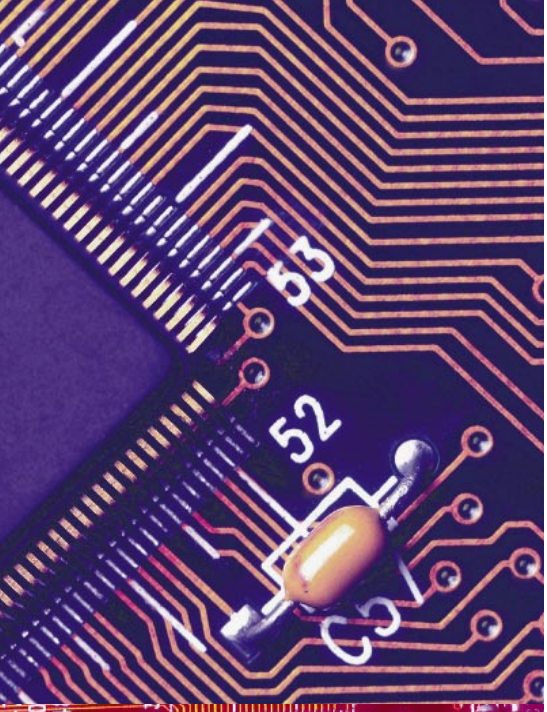
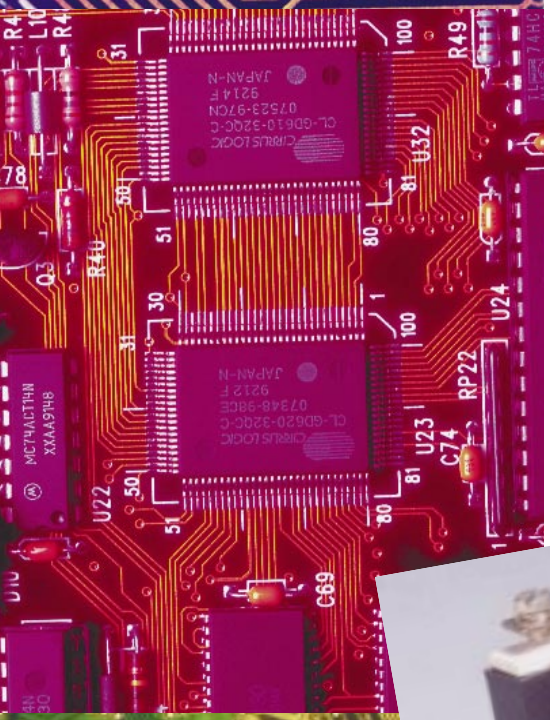




Metal Oxide Varistors

CKE

MOV Transient Voltage Suppressors

Description

CKE, Inc. features two radial leaded MOV product lines:

- Standard Series
- High Energy Series

CKE, Inc. also features three High Energy Special Package MOV products:

- PA Series
- Z33M & Z40M Series
- EH Series

Our Standard Series will continue to offer the optimum value in quality and economy. These parts are presented in Tables 1 and 2 of the catalog.

The High Energy Series offers a premium quality in a higher density package, allowing a reduction to the next lower mm size from standard MOV ratings. This can be allowed because the current and energy ratings have increases of up to 50% over the standard series MOVs. For specifications please contact CKE, Inc.

CKE, Inc. identifies its Z-MOV product line by using various characters and actual electrical specifications that are incorporated into the part number. CKE uses a "Z" prefix as its identity for all Z-MOV products and an "H" suffix to identify the High Energy Series parts. All parts 7 mm and larger with a voltage rating of 130 V and up have the RMS voltage ratings in their part number. All 5 mm parts and those with voltages lower than 130 RMS are identified by the mm size and the peak nominal clamping volts at the 1 milliamp level.

CKE, Inc. uses the latest in manufacturing technology in the production of our varistors. Both the Standard Series and High Energy Series MOV parts with a (Underwriters Laboratories Recognized Component Mark) conform to UL1414, UL1449 and CSA class 2221 01. All of CKE's line voltage parts are UL recognized and listed on File E90510 (M).

Parameter Definitions

Maximum Applied Voltage — Maximum AC RMS value of a sine wave or maximum DC value "filtered."

Varistor Voltage — Voltage between terminals when 1 mA of DC current is applied (0.1 mA for 5 mm parts).

Energy — Maximum energy of two 2 ms pulses at 1 minute interval which cause > 10% change in varistor voltage.

Maximum Clamping (VI) — Peak voltage value for peak current applied with 8 μs rise time, 20 μs decay to 50% value of the current.

Maximum Power Dissipation Ratings

5 mm	0.1 Watt	Z33M	1.5 Watt
7 mm	0.25 Watt	Z40M	2.0 Watt
10 mm	0.4 Watt	EH4	1.5 Watt
14 mm	0.6 Watt	EH5	1.75 Watt
20 mm	1 Watt	EH6	2.0 Watt

Major Ratings and Characteristics

F	Maximum pull on leads, for 1 minute	N	20
S_{V1}	Temperature coefficient of V_1	%/deg C	+ 0.02 to -0.07
T	Operating and storage temperature range	°C	-40 to 125
t	Response time in typical application	ns	< 15
R_{ins}	Insulation resistance, element to case	Ω	10^8
V_{ins}	Isolation test voltage, element to case	V	1500 AC

Selection Procedure

MOVs are transient voltage clipping devices and cannot regulate the line voltage. Therefore, there are important steps to follow in selecting the correct MOV:

1. The open circuit or surge voltage must not exceed the maximum applied continuous voltage.
2. The energy rating of the varistor, in joules, must not be exceeded. The transient energy rating may be calculated by $W = \frac{1}{2} LI^2$, where "L" is the inductance of the component or the system inductance responsible for the transient. "I" would be the current flowing in the inductance during the interruption.
3. The peak current interrupted will determine the clamping voltage. Review the VI characteristics to determine if the MOV selected will clamp at the maximum peak voltage required. A larger MOV will provide a lower clamping voltage.

Note:

Higher voltage MOV selection is acceptable as long as the maximum clamping voltage meets your requirements. Higher energy ratings are also acceptable provided the physical space is available. Under no circumstances is a lower voltage rating MOV to be used.

Products/Services Available From CKE

1. Complete line of Radial Lead Metal Oxide Varistors (Z-MOVs) and high energy packages
2. Zener Surge Suppressors (Trans Zaps)
3. Selenium Surge Suppressors (Klip-Sels, Voltraps)
4. Selenium Rectifier Assemblies
5. Custom Silicon Rectifier Assemblies
6. Custom Surge Suppressors
7. Engineering and technical assistance

Dimensions

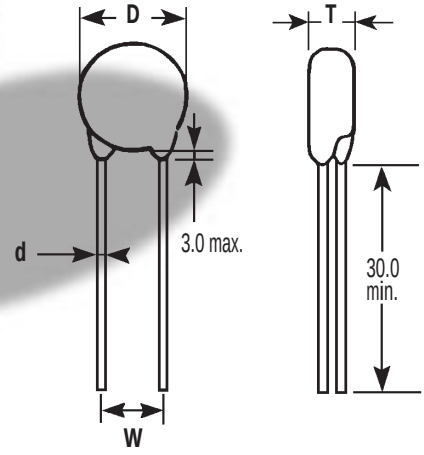


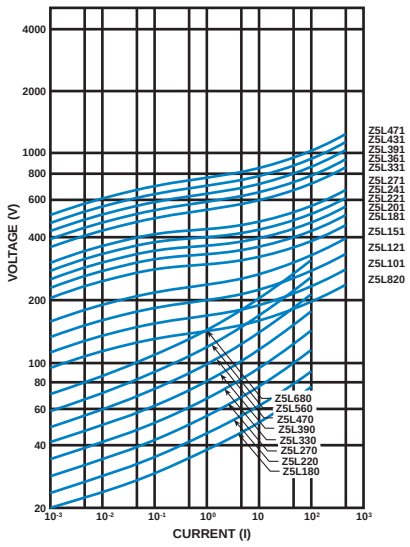
TABLE 1 STANDARD ENERGY SERIES LOW VOLTAGE MOVS

CKE Part Number	Marking On Part	Max Applied Contin. Volt		Varistor Voltage @ 1 ma DC	Energy 2ms	Max. Clamping Voltage 8/20 µs		Peak Current	Typical Capacitance	Dimensions ± 1 mm			
		AC	DC	DC Volts	Joules	Volts	Amps	Amps	pF	D-Max	T	W	d
Z5L180	180	11	14	18(16-20)	0.3	40	1	100	1600	7.5	3.5	5.0	0.6
Z5L220	220	14	18	22(20-24)	0.4	48	1	100	1300	7.5	3.5	5.0	0.6
Z5L270	270	17	22	27(24-30)	0.5	60	1	100	1050	7.5	3.5	5.0	0.6
Z5L330	330	20	26	33(30-36)	0.6	73	1	100	900	7.5	3.5	5.0	0.6
Z5L390	390	25	31	39(35-43)	0.8	86	1	100	500	7.5	3.5	5.0	0.6
Z5L470	470	30	38	47(42-52)	1.0	104	1	100	450	7.5	3.5	5.0	0.6
Z5L560	560	35	45	56(50-62)	1.0	123	1	100	400	7.5	3.5	5.0	0.6
Z5L680	680	40	56	68(61-75)	1.2	150	1	100	350	7.5	3.5	5.0	0.6
Z5L820	820	50	65	82(74-90)	1.7	145	5	400	250	7.5	3.5	5.0	0.6
Z5L101	101	60	85	100(90-110)	2.0	175	5	400	200	7.0	3.7	5.0	0.6
Z5L121	121	75	100	120(108-132)	2.5	210	5	400	170	7.0	3.8	5.0	0.6
Z5L151	151	95	125	150(135-165)	3.0	260	5	400	140	7.0	4.0	5.0	0.6
UL Z5L181	181	115	153	180(162-198)	3.5	300	5	400	100	7.0	4.1	5.0	0.6
UL Z5L201	201	130	170	200(185-225)	4.0	355	5	400	80	7.0	4.2	5.0	0.6
UL Z5L221	221	140	180	220(198-242)	4.5	380	5	400	70	7.0	4.3	5.0	0.6
UL Z5L241	241	150	200	240(216-264)	5.0	415	5	400	70	7.0	4.4	5.0	0.6
UL Z5L271	271	175	225	270(243-297)	6.0	475	5	400	60	7.0	4.6	5.0	0.6
Z5L331	331	210	275	330(297-363)	6.5	580	5	400	55	7.0	4.9	5.0	0.6
UL Z5L361	361	230	300	360(324-396)	7.5	620	5	400	50	7.0	5.1	5.0	0.6
UL Z5L391	391	250	320	390(351-429)	8.0	675	5	400	50	7.0	5.4	5.0	0.6
UL Z5L431	431	275	350	430(387-473)	9.0	745	5	400	45	7.0	5.7	5.0	0.6
UL Z5L471	471	300	385	470(423-517)	10.0	810	5	400	40	7.0	6.0	5.0	0.6
Z7L180	7L180	11	14	18(16-20)	0.8	36	2.5	250	3500	9.0	3.5	5.0	0.6
Z7L220	7L220	14	18	22(20-24)	0.9	43	2.5	250	2800	9.0	3.6	5.0	0.6
Z7L270	7L270	17	22	27(24-30)	1.0	53	2.5	250	2000	9.0	3.7	5.0	0.6
Z7L330	7L330	20	26	33(30-36)	1.2	65	2.5	250	1500	9.0	3.9	5.0	0.6
Z7L390	7L390	25	31	39(35-43)	1.5	77	2.5	250	1350	9.0	3.8	5.0	0.6
Z7L470	7L470	30	38	47(42-52)	1.8	90	2.5	250	1150	9.0	3.9	5.0	0.6
Z7L560	7L560	35	45	56(50-62)	2.3	105	2.5	250	950	9.0	4.0	5.0	0.6
Z7L680	7L680	40	56	68(61-75)	3.0	125	2.5	250	700	9.0	4.2	5.0	0.6
Z7L820	7L820	50	65	82(74-90)	4.0	135	10.0	1200	550	9.0	3.6	5.0	0.6
UL Z7L101	7L101	60	85	100(90-110)	5.0	165	10.0	1200	500	9.0	3.7	5.0	0.6
UL Z7L121	7L121	75	100	120(108-132)	6.0	200	10.0	1200	450	9.0	3.8	5.0	0.6
Z7L151	7L151	95	125	150(135-165)	8.0	250	10.0	1200	350	9.0	4.0	5.0	0.6
UL Z7L181	7L181	115	153	180(162-198)	10.0	300	10.0	1200	220	9.0	4.1	5.0	0.6
Z10L180	10L180	11	14	18(16-20)	1.5	36	5	500	7500	13.5	3.6	7.5	0.8
Z10L220	10L220	14	18	22(20-24)	2.0	43	5	500	6000	13.5	3.7	7.5	0.8
Z10L270	10L270	17	22	27(24-30)	2.5	53	5	500	4000	13.5	3.8	7.5	0.8
Z10L330	10L330	20	26	33(30-36)	3.0	65	5	500	3000	13.5	4.0	7.5	0.8
Z10L390	10L390	25	31	39(35-43)	3.5	77	5	500	2600	13.5	4.1	7.5	0.8
Z10L470	10L470	30	38	47(42-52)	4.5	90	5	500	2200	13.5	4.0	7.5	0.8
Z10L560	10L560	35	45	56(50-62)	5.5	105	5	500	1800	13.5	4.1	7.5	0.8
Z10L680	10L680	40	56	68(61-75)	6.5	125	5	500	1300	13.5	4.3	7.5	0.8
Z10L820	10L820	50	65	82(74-90)	8.0	135	25	2500	1800	13.5	4.0	7.5	0.8
Z10L101	10L101	60	85	100(90-110)	10.0	165	25	2500	1400	13.5	4.1	7.5	0.8
Z10L121	10L121	75	100	120(108-132)	12.0	200	25	2500	1100	13.5	4.2	7.5	0.8
UL Z10L151	10L151	95	125	150(135-165)	16.0	250	25	2500	900	13.5	4.5	7.5	0.8
Z10L181	10L181	115	153	180(162-198)	18.0	300	25	2500	550	13.5	4.5	7.5	0.8
Z15L180	Z15L180	11	14	18(16-20)	3.5	36	10	1000	18000	17.0	3.6	7.5	0.8
Z15L220	Z15L220	14	18	22(20-24)	4.0	43	10	1000	15000	17.0	3.7	7.5	0.8
Z15L270	Z15L270	17	22	27(24-30)	5.0	53	10	1000	10000	17.0	3.8	7.5	0.8
Z15L330	Z15L330	20	26	33(30-36)	6.0	65	10	1000	7500	17.0	4.0	7.5	0.8
Z15L390	Z15L390	25	31	39(35-43)	7.2	77	10	1000	6500	17.0	4.1	7.5	0.8
Z15L470	Z15L470	30	38	47(42-52)	8.8	90	10	1000	5500	17.0	4.0	7.5	0.8
Z15L560	Z15L560	35	45	56(50-62)	10.0	105	10	1000	4500	17.0	4.1	7.5	0.8
Z15L680	Z15L680	40	56	68(61-75)	13.0	125	10	1000	3300	17.0	4.3	7.5	0.8
Z15L820	Z15L820	50	65	82(74-90)	14.5	135	50	4500	2900	17.0	4.0	7.5	0.8
Z15L101	Z15L101	60	85	100(90-110)	20.0	165	50	4500	2400	17.0	4.1	7.5	0.8
Z15L121	Z15L121	75	100	120(108-132)	22.0	200	50	4500	1900	17.0	4.2	7.5	0.8
Z15L151	Z15L151	95	125	150(135-165)	30.0	250	50	4500	1500	17.0	4.5	7.5	0.8
UL Z15L181	Z15L181	115	153	180(162-198)	35.0	300	50	4500	1200	17.0	4.5	7.5	0.8
Z21L180	Z21L180	11	14	18(16-20)	10.0	36	20	2000	18000	23.0	4.1	10.0	1.0
Z21L220	Z21L220	14	18	22(20-24)	13.0	43	20	2000	15000	23.0	4.2	10.0	1.0
Z21L270	Z21L270	17	22	27(24-30)	15.0	53	20	2000	10000	23.0	4.3	10.0	1.0
Z21L330	Z21L330	20	26	33(30-36)	20.0	65	20	2000	7500	23.0	4.5	10.0	1.0
Z21L390	Z21L390	25	31	39(35-43)	24.0	77	20	2000	6500	23.0	4.5	10.0	1.0
Z21L470	Z21L470	30	38	47(42-52)	30.0	90	20	2000	5500	23.0	4.6	10.0	1.0
Z21L560	Z21L560	35	45	56(50-62)	35.0	105	20	2000	4500	23.0	4.7	10.0	1.0
Z21L680	Z21L680	40	56	68(61-75)	40.0	125	20	2000	3300	23.0	4.8	10.0	1.0
Z21L820	Z21L820	50	65	82(74-90)	27.0	135	100	6500	2900	23.0	4.5	10.0	1.0
Z21L101	Z21L101	60	85	100(90-110)	30.0	165	100	6500	2400	23.0	4.6	10.0	1.0
Z21L121	Z21L121	75	100	120(108-132)	40.0	200	100	6500	1190	23.0	4.7	10.0	1.0
Z21L151	Z21L151	95	125	150(135-165)	50.0	250	100	6500	1500	23.0	4.9	10.0	1.0
UL Z21L181	Z21L181	115	153	180(162-198)	60.0	300	100	6500	1200	23.0	4.9	10.0	1.0

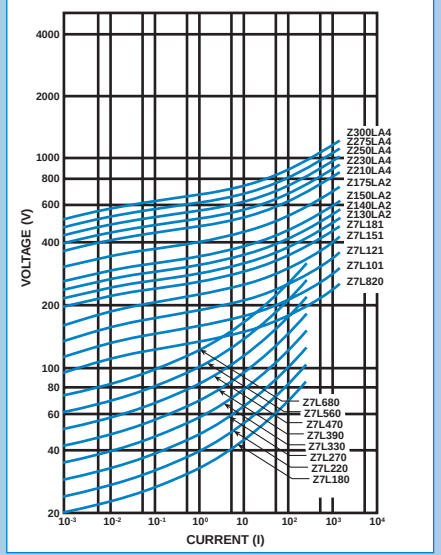
TABLE 2 STANDARD ENERGY SERIES LINE VOLTAGE MOVs

CKE Part Number	Marking On Part	Max Applied Contin. Volt		Varistor Voltage @ 1 ma DC	Energy 2ms	Max. Clamping Voltage 8/20 µs		Peak Current	Typical Capacitance	Dimensions ±1 mm			
		AC	DC	DC Volts	Joules	Volts	Amps	Amps	pF	D-Max	T	W	d
Z130LA2	1302	130	170	200(185-225)	11	340	10	1200	250	9.0	4.2	5.0	0.6
Z130LA5	1305	130	170	200(185-225)	20	340	25	2500	500	13.5	4.6	7.5	0.8
Z130LA10A	Z130LA10A	130	170	200(185-225)	38	340	50	4500	1000	17.0	4.6	7.5	0.8
Z130LA20A	Z130LA20A	130	170	200(185-225)	70	340	100	6500	2000	23.0	5.0	10.0	1.0
Z140LA2	1402	140	180	220(198-242)	12	360	10	1200	250	9.0	4.3	5.0	0.6
Z140LA5	1405	140	180	220(198-242)	23	360	25	2500	450	13.5	4.7	7.5	0.8
Z140LA10A	Z140LA10A	140	180	220(198-242)	42	360	50	4500	1000	17.0	4.7	7.5	0.8
Z140LA20A	Z140LA20A	140	180	220(198-242)	75	360	100	6500	2000	23.0	5.2	10.0	1.0
Z150LA2	1502	150	200	240(216-264)	13	395	10	1200	200	9.0	4.4	5.0	0.6
Z150LA5	1505	150	200	240(216-264)	25	395	25	2500	400	13.5	4.8	7.5	0.8
Z150LA10A	Z150LA10A	150	200	240(216-264)	45	395	50	4500	900	17.0	4.8	7.5	0.8
Z150LA20A	Z150LA20A	150	200	240(216-264)	80	395	100	6500	1800	23.0	5.3	10.0	1.0
Z175LA2	1752	175	225	270(247-303)	15	455	10	1200	170	9.0	4.6	5.0	0.6
Z175LA5	1755	175	225	270(247-303)	30	455	25	2500	350	13.5	5.0	7.5	0.8
Z175LA10A	Z175LA10A	175	225	270(247-303)	55	455	50	4500	750	17.0	5.1	7.5	0.8
Z175LA20A	Z175LA20A	175	225	270(247-303)	90	455	100	6500	1600	23.0	5.4	10.0	1.0
Z210LA4	2104	210	275	330(297-363)	15	550	10	1200	140	9.0	4.8	5.0	0.6
Z210LA10	210L	210	275	330(297-363)	32	550	25	2500	300	13.5	5.2	7.5	0.8
Z210LA20A	Z210LA20A	210	275	330(297-363)	60	550	50	4500	650	17.0	5.3	7.5	0.8
Z210LA40A	Z210LA20A	210	275	330(297-363)	105	550	100	6500	1400	23.0	5.5	10.0	1.0
Z230LA4	2304	230	300	360(324-396)	15	595	10	1200	130	9.0	5.2	5.0	0.6
Z230LA10	230L	230	300	360(324-396)	35	595	25	2500	300	14.0	5.7	7.5	0.8
Z230LA20A	Z230LA20A	230	300	360(324-396)	65	595	50	4500	550	17.5	5.7	7.5	0.8
Z230LA40A	Z230LA40A	230	300	360(324-396)	120	595	100	6500	1200	24.0	6.1	10.0	1.0
Z250LA4	2504	250	330	390(351-429)	21	650	10	1200	130	9.0	5.4	5.0	0.6
Z250LA10	250L	250	330	390(351-429)	40	650	25	2500	270	14.0	5.8	7.5	0.8
Z250LA20A	Z250LA20A	250	330	390(351-429)	72	650	50	4500	500	17.5	5.8	7.5	0.8
Z250LA40A	Z250LA40A	250	330	390(351-429)	130	650	100	6500	1000	24.0	6.4	10.0	1.0
Z275LA4	2754	275	350	430(387-473)	23	710	10	1200	110	9.0	5.7	5.0	0.6
Z275LA10	275L	275	350	430(387-473)	45	710	25	2500	250	14.0	6.2	7.5	0.8
Z275LA20A	Z275LA20A	275	350	430(387-473)	75	710	50	4500	450	17.5	6.2	7.5	0.8
Z275LA40A	Z275LA40A	275	350	430(387-473)	140	710	100	6500	900	24.0	6.7	10.0	1.0
Z300LA4	3004	300	385	470(423-517)	25	775	10	1200	100	9.0	6.0	5.0	0.6
Z300LA10	300L	300	385	470(423-517)	45	775	25	2500	230	14.0	6.2	7.5	0.8
Z300LA20A	Z300LA20A	300	385	470(423-517)	80	775	50	4500	440	17.5	6.2	7.5	0.8
Z300LA40A	Z300LA40A	300	385	470(423-517)	150	775	100	6500	900	24.0	6.7	10.0	1.0
Z350LA10	350L	350	455	560(504-616)	45	925	25	2500	180	14.0	6.1	7.5	0.8
Z350LA20A	Z350LA20A	350	455	560(504-616)	80	925	50	4500	350	17.5	6.3	7.5	0.8
Z350LA40A	Z350LA40A	350	455	560(504-616)	150	925	100	6500	700	24.0	6.8	10.0	1.0
Z385LA10	385L	385	505	620(558-682)	45	1025	25	2500	130	14.0	6.2	7.5	0.8
Z385LA20A	Z385LA20A	385	505	620(558-682)	85	1025	50	4500	250	17.5	6.5	7.5	0.8
Z385LA40A	Z385LA40A	385	505	620(558-682)	150	1025	100	6500	500	24.0	6.9	10.0	1.0
Z420LA10	420L	420	560	680(612-748)	45	1120	25	2500	130	14.0	6.5	7.5	0.8
Z420LA20A	Z420LA20A	420	560	680(612-748)	90	1120	50	4500	250	17.5	6.5	7.5	0.8
Z420LA40A	Z420LA40A	420	560	680(612-748)	160	1120	100	6500	460	24.0	6.9	10.0	1.0
Z460LA10	460L	460	615	750(675-825)	50	1240	25	2500	120	14.0	6.8	7.5	0.8
Z460LA20A	Z460LA20A	460	615	750(675-825)	100	1240	50	4500	230	17.5	6.8	7.5	0.8
Z460LA40A	Z460LA40A	460	615	750(675-825)	175	1240	100	6500	420	24.0	7.3	10.0	1.0
Z480LA20	480L	480	640	780(702-858)	50	1290	25	2500	120	14.0	6.9	7.5	0.8
Z480LA40A	Z480LA40A	480	640	780(702-858)	105	1290	50	4500	230	17.5	6.9	7.5	0.8
Z480LA80A	Z480LA80A	480	640	780(702-858)	180	1290	100	6500	420	24.0	7.4	10.0	1.0
Z510LA20	510L	510	670	820(738-902)	55	1355	25	2500	105	14.0	7.1	7.5	0.8
Z510LA40A	Z510LA40A	510	670	820(738-902)	110	1355	50	4500	200	17.5	7.1	7.5	0.8
Z510LA80A	Z510LA80A	510	670	820(738-902)	190	1355	100	6500	400	24.0	7.6	10.0	1.0
Z550LA20	550L	550	700	910(819-1000)	60	1500	25	2500	95	14.0	7.6	7.5	0.8
Z550LA40A	Z550LA40A	550	700	910(819-1000)	120	1500	50	4500	180	17.5	7.6	7.5	0.8
Z550LA80A	Z550LA80A	550	700	910(819-1000)	220	1500	100	6500	350	24.0	8.1	10.0	1.0
Z575LA20	575L	575	745	920(819-1000)	60	1500	25	2500	95	14.0	7.6	7.5	0.8
Z575LA40A	Z575LA40A	575	745	920(819-1000)	120	1500	50	4500	180	17.5	7.6	7.5	0.8
Z575LA80A	Z575LA80A	575	745	920(819-1000)	220	1500	100	6500	350	24.0	8.1	10.0	1.0
Z600LA20	625L	625	825	1000(900-1100)	65	1650	25	2500	80	14.0	8.0	7.5	0.8
Z600LA50A	Z600LA50A	625	825	1000(900-1100)	130	1650	50	4500	150	17.5	8.0	7.5	0.8
Z600LA100A	Z600LA100A	625	825	1000(900-1100)	230	1650	100	6500	320	24.0	8.5	10.0	1.0
Z660LA20A	660L	680	895	1100(990-1210)	70	1815	25	2500	80	14.0	8.5	7.5	0.8
Z660LA50A	Z660LA50A	680	895	1100(990-1210)	140	1815	50	4500	150	17.5	8.5	7.5	0.8
Z660LA100A	Z660LA100A	680	895	1100(990-1210)	250	1815	100	6500	300	24.0	9.0	10.0	1.0
Z1000LA80A	Z1000LA80A	1000	1465	1800(1620-1980)	240	2970	50	4500	100	17.5	12.0	15.0	0.8
Z1000LA160A	Z1000LA160A	1000	1465	1800(1620-1980)	400	2970	100	6500	200	25.0	12.0	15.0	1.0

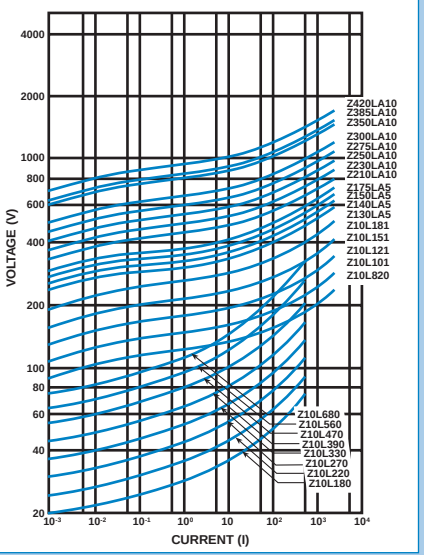
5mm VI Characteristics



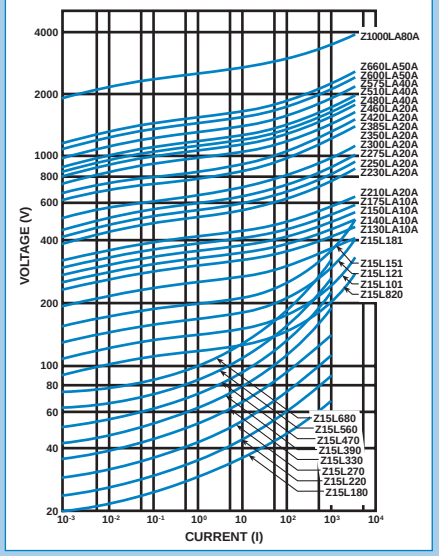
7mm VI Characteristics



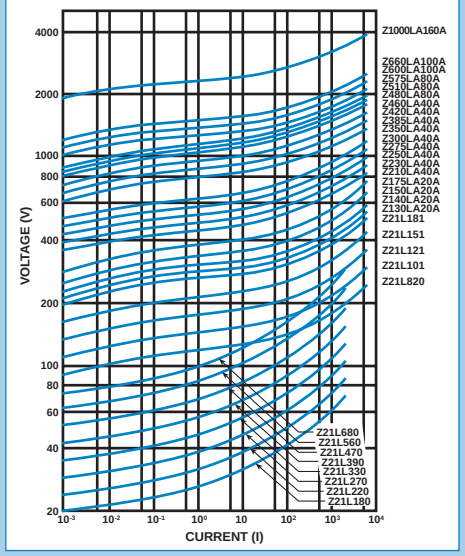
10mm VI Characteristics



14mm VI Characteristics



20mm VI Characteristics



Energy Rating VS Pulse Duration

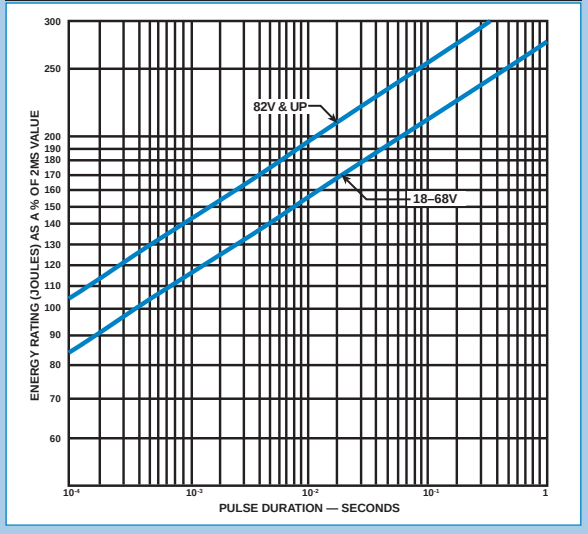


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TABLE 3 HIGH ENERGY SERIES TRANSIENT VOLTAGE SUPPRESSORS Z33M & Z40M SERIES

Type	Voltage Ratings				Energy	Maximum Operating Conditions			Typical Capacitance
	VAC Volts RMS	VDC Volts	Varistor Peak Voltage Min.	Varistor Peak Voltage Max.		Max. Clamping Voltage		Peak Current (8x20µs) Amps	
			Volts	Volts	Joules	Volts	Amp.		pf
Z33M201	130	170	180	220	210	340	200	25000	6600
Z33M241	150	200	216	264	240	395	200	25000	6000
Z33M271	175	225	243	297	255	455	200	25000	5010
Z33M361	230	300	324	396	325	595	200	25000	4200
Z33M391	250	320	351	429	350	650	200	25000	3600
Z33M431	275	350	387	473	400	710	200	25000	3300
Z33M471	300	385	423	517	405	775	200	25000	3100
Z33M511	320	415	459	561	415	845	200	25000	3000
Z33M621	385	505	558	682	425	1025	200	25000	2640
Z33M681	420	560	612	748	450	1120	200	25000	2520
Z33M751	460	615	675	825	500	1240	200	25000	2300
Z33M781	485	640	702	858	520	1290	200	25000	2300
Z33M821	510	670	738	902	545	1355	200	25000	2160
Z33M911	550	745	819	1001	600	1500	200	25000	2100
Z33M102	625	825	900	1100	655	1650	200	25000	2040
Z33M112	680	895	990	1210	725	1815	200	25000	1850
Z40M201	130	170	180	220	310	340	300	40000	13200
Z40M241	150	200	216	264	360	395	300	40000	12000
Z40M271	175	225	243	297	380	455	300	40000	10020
Z40M361	230	300	324	396	460	595	300	40000	8400
Z40M391	250	320	351	429	490	650	300	40000	7200
Z40M431	275	350	387	473	550	710	300	40000	6600
Z40M471	300	385	423	517	590	775	300	40000	6200
Z40M511	320	420	459	561	640	845	300	40000	6000
Z40M621	385	505	558	682	775	1025	300	40000	5280

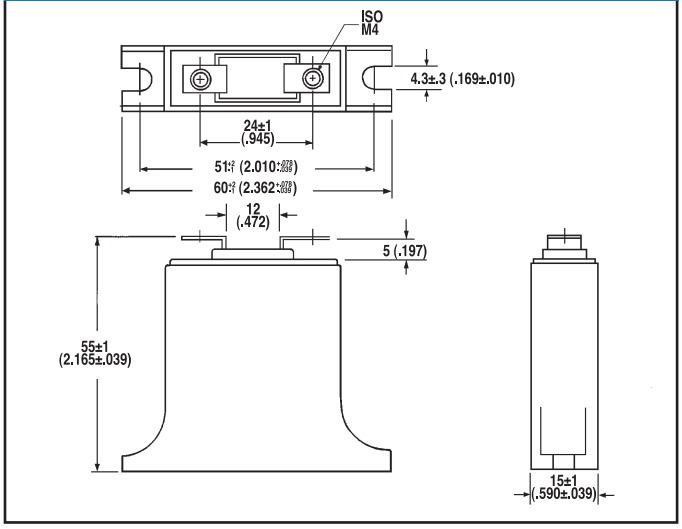
TABLE 4 HIGH ENERGY SERIES TRANSIENT VOLTAGE SUPPRESSORS PA SERIES

Type	Voltage Ratings				Energy	Maximum Operating Conditions			Typical Capacitance
	VAC Volts RMS	VDC Volts	Varistor Peak Voltage Min.	Varistor Peak Voltage Max.		Max. Clamping Voltage		Peak Current (8x20µs) Amps	
			Volts	Volts	Joules	Volts	Amp.		pf
Z130PA20A Z130PA20C	130	175	184 184	243 220	100	360 325	100 100	6500	2400
Z150PA20A Z150PA20C	150	200	212 212	284 243	100	420 360	100 100	6500	2000
Z200PA20A	200	260	297	363	110	550	100	6500	1800
Z250PA40A Z250PA40C	250	330	354 354	453 413	130	675 620	100 100	6500	1400
Z275PA40A Z275PA40C	275	369	389 389	494 453	140	740 680	100 100	6500	1200
Z320PA40A Z320PA40C	320	420	462 462	565 539	160	850 800	100 100	6500	1100
Z420PA40A Z420PA40C	420	560	610 610	790 690	160	1160 1050	100 100	6500	1000
Z480PA80A Z480PA80C	480	640	670 670	860 790	180	1280 1160	100 100	6500	1000
Z510PA80A Z510PA80C	510	675	735 735	963 860	190	1410 1280	100 100	6500	1000
Z550PA80A Z550PA80C	550	700	775 775	1000 960	200	1500 1400	100 100	6500	900
Z575PA80A Z575PA80C	575	730	805 805	1050 960	220	1560 1410	100 100	6500	900
Z625PA80A	625	825	900	1100	230	1650	100	6500	800
Z660PA100A Z660PA100C	660	850	940 940	1210 1100	250	1820 1650	100 100	6500	800
Z1000PA100A Z1000PA100C	1000	1350	1460 1460	1880 1720	380	2800 2580	100 100	6500	600

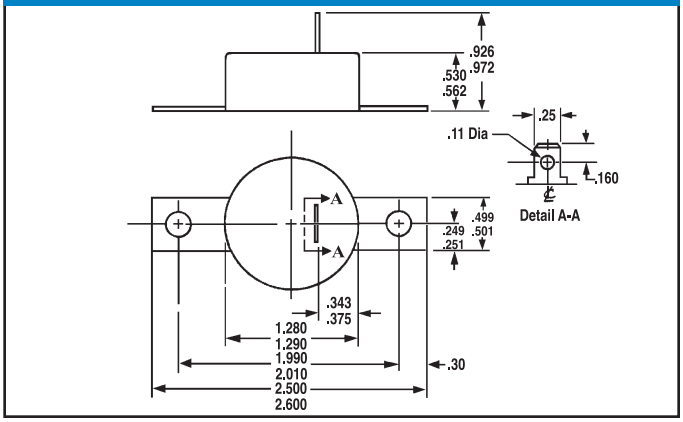
TABLE 5 HIGH ENERGY SERIES TRANSIENT VOLTAGE SUPPRESSORS EH SERIES

Part Number	Continuous		Transient Characteristics							Typical Capacitance
	RMS Voltage	DC Voltage	(10/1000µs)	Peak Current (8/20µs)	Varistors @ 1 mA DC Test Current			Clamping Voltage (8/20µs)		
	VAC	VDC	W-Sec.	Ipk	Min.	Nom.	Max.	V_C	Ip	
	Volts	Volts	Joules	Amperes	Volts	Volts	Volts	Volts	Amps	Picofarads
Z130EH4	130	175	200	25000	184	200	228	330	200	6800
Z130EH5	130	175	270	32000	184	200	228	325	200	8500
Z130EH6	130	175	370	40000	184	200	228	320	200	10200
Z150EH4	150	200	220	25000	212	240	268	385	200	6800
Z150EH5	150	200	300	32000	212	240	268	380	200	8500
Z150EH6	150	200	400	40000	212	240	268	375	200	10200
Z250EH4	250	330	330	25000	354	390	429	635	200	4000
Z250EH5	250	330	370	32000	354	390	429	630	200	5000
Z250EH6	250	330	650	40000	354	390	429	620	200	6000
Z275EH4	275	369	360	25000	389	430	473	690	200	3800
Z275EH5	275	369	400	32000	389	430	473	685	200	4750
Z275EH6	275	369	700	40000	389	430	473	685	200	5700
Z320EH4	320	420	390	25000	462	510	539	830	200	3600
Z320EH5	320	420	460	32000	462	510	539	820	200	4500
Z320EH6	320	420	750	40000	462	510	539	810	200	5400
Z420EH4	420	560	400	25000	610	680	748	1050	200	2040
Z420EH5	420	560	600	32000	610	680	748	1025	200	2720
Z420EH6	420	560	850	40000	610	680	748	1000	200	3780
Z480EH4	480	640	450	25000	670	750	824	1160	200	2320
Z480EH5	480	640	650	32000	670	750	824	1140	200	2900
Z480EH6	480	640	900	40000	670	750	824	1120	200	3480
Z510EH4	510	675	500	25000	735	820	910	1280	200	2320
Z510EH5	510	675	700	32000	735	820	910	1270	200	2900
Z510EH6	510	675	950	40000	735	820	910	1250	200	3480
Z575EH4	575	730	550	25000	805	910	1005	1500	200	2320
Z575EH5	575	730	770	32000	805	910	1005	1490	200	2900
Z575EH6	575	730	1050	40000	805	910	1005	1480	200	3480
Z600EH4	600	810	575	25000	900	1000	1100	1650	200	1320
Z600EH5	600	810	810	32000	900	1000	1100	1640	200	1640
Z600EH6	600	810	1100	40000	900	1000	1100	1620	200	1980
Z660EH4	660	850	600	25000	940	1050	1160	1780	200	1320
Z660EH5	660	850	900	32000	940	1050	1160	1760	200	1640
Z660EH6	660	850	1250	40000	940	1050	1160	1740	200	1980

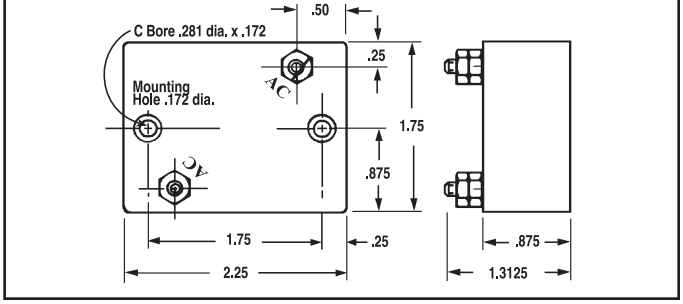
Z33M & Z40M SERIES



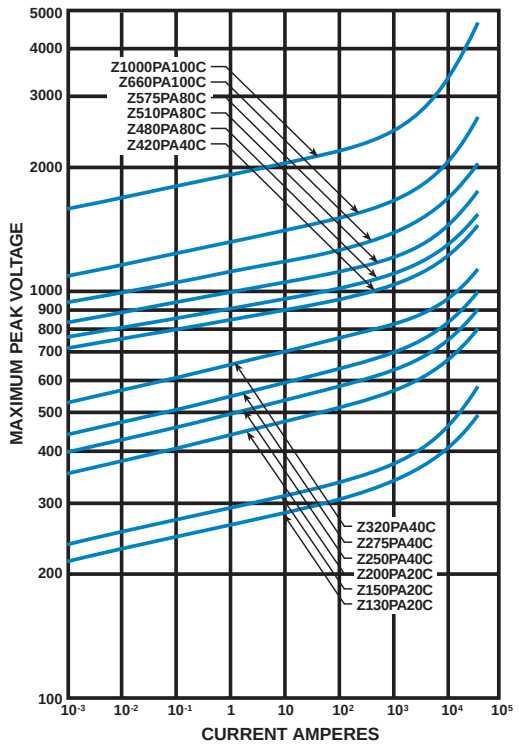
PA SERIES



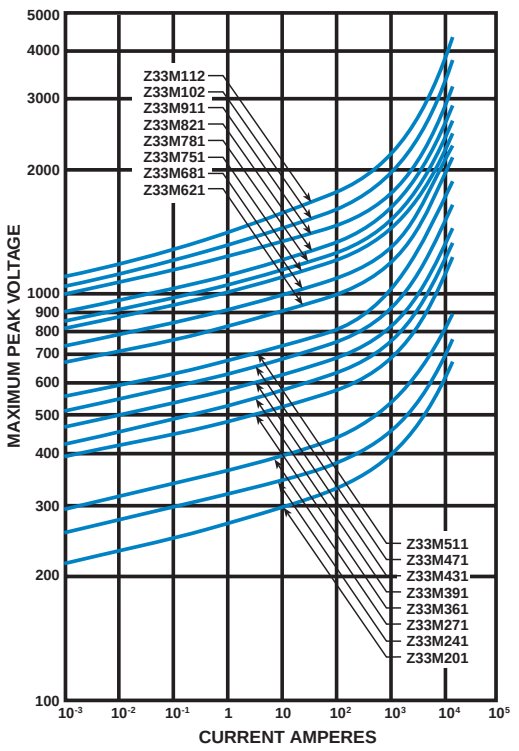
EH SERIES



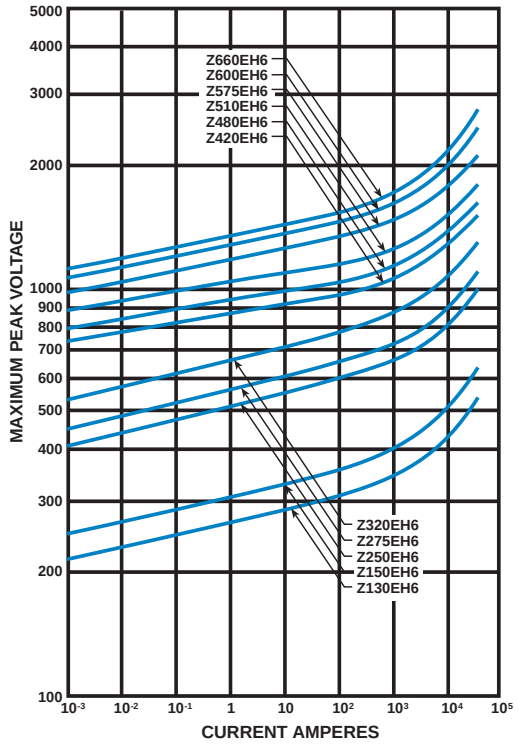
PA Series Voltage VS Current Characteristics



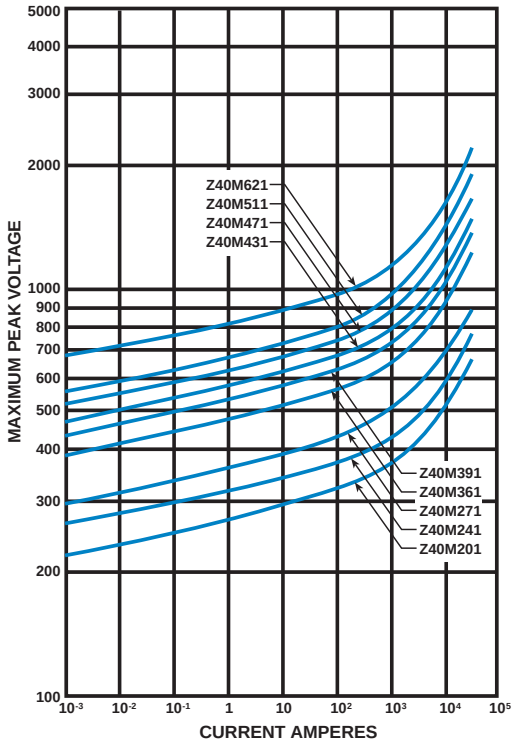
Z33M Series Voltage VS Current Characteristics



EH Series Voltage VS Current Characteristics



Z40M Series Voltage VS Current Characteristics



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