Maida Development Company

Product Catalog

- Components and Assemblies -

---

www.maida.com

sales@maida.com

(757) 723-0785

v2021_0217

TABLE OF CONTENTS

THE MAIDA DEVELOPMENT COMPANY

Since 1947 the Maida Development Company has been a leading manufacturer and supplier of high-quality components and assemblies for the electronic industry. Maida currently has numerous product lines, consisting of through-hole and surface mount metal oxide varistors (MOV's), Surge Protective Devices, ceramic disk capacitors, NTC thermistors, and X2Y™ EMI devices. From its founding in 1947, by Francis X. Maida, the corporate offices for Maida have been located in Hampton, Virginia.

Maida products are shipped and distributed worldwide to OEMs and end-users that require exceptional service and delivery. Distribution is achieved with an international team of trained, experienced sales representatives and distributors strategically located worldwide. Maida also manages customer accounts and ships products directly to customers through its Corporate and China offices.

Component products supplied by Maida cover a wide range of uses and industries. Maida's metal oxide varistors are used in many applications that require protection against transients induced by lightning struck power lines. They also provide protection for suppression of transients caused by switching inductive loads from transformers, relays and coils. Common applications include surge protective devices (SPD's), ground fault circuit interrupters, arc-fault circuit interrupters, power supplies, telecommunication equipment, computer and computer-related products, motor control systems, cable TV systems, portable electronics devices and AC smoke detectors, plus many special applications.

The Maida supplied products include a complete line of radial and tab leaded metal oxide varistors along with a line of surface mount varistors. Surge protection is also provided with modular one-port and two-port designs for quick installation into applications such as LED lighting. Maida also offers a complete line of high voltage ceramic disc capacitors, complemented by a selection of safety capacitors. NTC ceramic thermistors used for in-rush current limiting and temperature sensing applications are also part of the product line-up at Maida. Custom design and fabrication of components for specific customer requirements are also available from Maida. Specialty products meeting the requirements of ITAR and MIL-STD testing are also offered.

Maida products are recognized worldwide by organizations such as UL©, CSA©, and VDE©. Compliance to many other standards such as ANSI©, and IEEE© are also available.

Maida products have a long heritage of proven, high quality performance and reliability. They even worked their way to the moon and back during the Apollo Space Program. The Maida success story in part has resulted from a continuous dynamic program of research and development for improving both products and manufacturing processes to meet customer needs. Dedicated employees, management with a customer service attitude, sound competitive marketing, and state-of–the art products sum up the Maida story.

Maida Development Company
201 S. Mallory Street
Hampton, Virginia 23663
Phone (757) 723-0785
Fax (757) 722-1194

Please e-mail us at sales@maida.com or visit us at *www.maida.com*

INTRODUCTION to MOV's

Maida Development Company, domestically owned and operated for since 1947, has served the electronics industry with a wide variety of ceramic components. Our line of Zinc Oxide Varistors (ZOV) is designed for transient voltage suppression and surge energy absorption. Most are recognized by UL, CSA, and VDE.

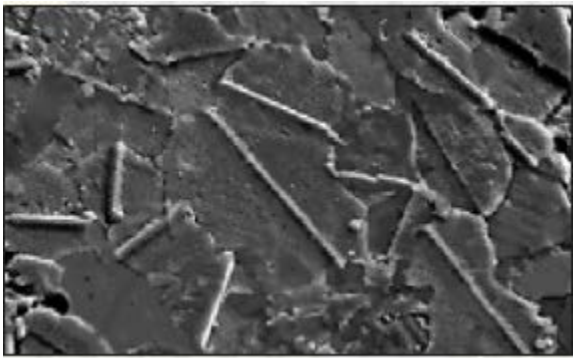


Figure 1

The terms zinc oxide varistor (ZOV) and metal oxide varistor (MOV) are synonymous. Other metal oxides are added to zinc oxide to produce a multi-grain ceramic semiconductor made up of randomly oriented, highly conductive zinc oxide crystals separated by insulating barrier layers (refer to figure 1). The resistivity of the grains is in the range of 1 - 10 ohm-cm. That of the barrier junction is near 10^{12} ohm-cm. Two adjacent grains in direct contact constitute an n-p-n junction which is non-polar (like back-to-back diodes). The barrier energy that must be exceeded to produce conduction through the grain boundary is approximately 3 V per grain boundary. Voltage, current, and energy ratings are determined by the oxide composition and by the physical dimensions of the part. For a given ceramic composition, voltage ratings increase with ceramic thickness, current increases with area (diameter), and energy increases with the mass of the unit.

Transient over-voltages are a major cause for malfunction or total failure of electronic circuitry and equipment. These transients occur whenever there are sudden changes in a power distribution system whether resulting from lightning disturbances on incoming power lines or from energy demand changes of equipment from within the circuit. With such changes, voltage spikes are created by the energy stored in reactive components of inductance and capacitance. These voltage impulses can (1) destroy semiconductor devices through high avalanche currents and thermal runaway, (2) diminish dielectric strength of insulations, (3) impair electromechanical contacts, and (4) cause malfunctions of logic circuitry by stray signals. Transient voltage rise times can be extremely fast and any effective transient suppression device must be capable of "clamping" the voltage during the early portion of this rise, i.e., in the nano-second range.

The most distinguishing feature of zinc oxide varistors is their highly exponential variation of current over a narrow range of applied voltage. Within the useful varistor voltage range, the voltage-current relationship is empirically approximated by the expression:

$$I = AV^{\alpha} \qquad (1)$$

where I = current in amperes
V = voltage
A = a material constant
α = an exponent defining the degree of non-linearity

The value of alpha (α) is an index or figure of merit indicating the effectiveness of a varistor (refer to figure 2). For an ideal resistor α would be unity; for silicon carbide varistors α is 2-6; and for zener diodes, 5-100. Maida's varistors have alpha values ranging from 15 to 50 but are typically 25-40.

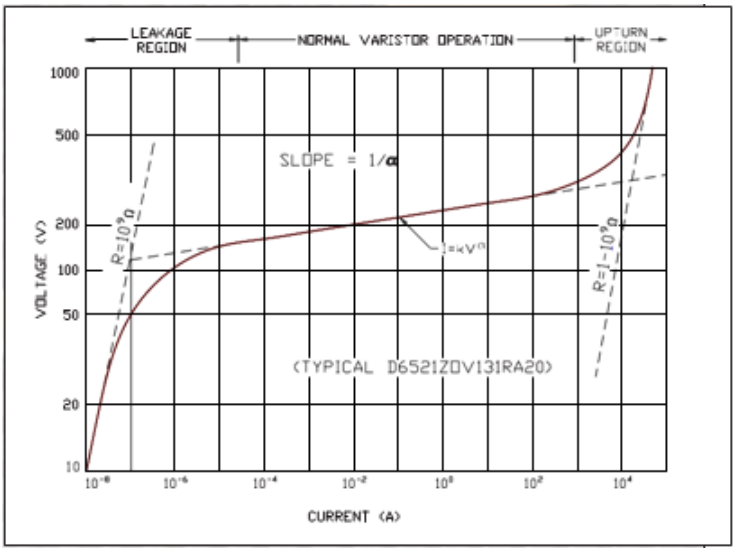


Figure 2

A ZOV exposed to voltage transients above the active varistor voltage range changes from an insulating state with very low leakage current to a highly conductive state having a current level several orders of magnitude above the "stand- by" level. The conduction mechanism is a semiconductor process so rapid (<1ns) that effective measurement of response time is difficult. For a ZOV with radial leads, the time required for voltage "clamping" to occur is determined more by lead inductance effects than by varistor action itself. Current pulses associated with transient voltage spikes have inherently slower rise times than the voltage wave, often in the microsecond range and quite long compared to ZOV response time. The result is that transient voltages are clamped at a safe level and the associated pulse energy is absorbed by the ceramic varistor.

Maida's ZOVs perform very reliably and experience low failure rates. However, catastrophic failure may occur if a ZOV is subjected to transient surges beyond its rated values of energy and peak current. Voltage breakdown, or "puncture", of the ceramic discs results in a short-circuit. Also, open-circuit failures are possible if a ZOV is operated at steady state conditions above its voltage rating so that the exponential increase in current causes overheating and eventual separation of the wire lead and disc at the solder junction. Proper fusing and shielding from other circuit components are recommended.

It is convenient to use a log-log plot of equation [1] where α is the slope of the voltage versus current curve.

$$\alpha = \frac{\log (I_2/I_1)}{\log (V_2/V_1)} \qquad (2)$$

If voltage measurements are taken at current levels one decade apart ($I_2/I_1 = 10$), then for that decade:

$$\alpha = \frac{1}{\log (V_2/V_1)} \qquad (3)$$

The varistor voltage range is that portion of the V-I curve which falls between two regions of transition in resistivity: (1) at lower voltage, a linear/non-linear transition from a high resistance ohmic mode (10^8-10^9 ohms), and (2) at higher voltage, a non-linear/linear transition back to an ohmic mode with resistance of only a few ohms. Typically, within the varistor range, only a 6% change in applied voltage produces greater than a tenfold change in current (α>40).

Some specific areas of application of Maida's ZOVs are:

- Protection against transients induced by lightning on incoming power lines
- Suppression of transients caused by switching inductive loads: transformers, relays, coils
- Ground fault interrupters
- Power supplies
- Communication equipment
- Microprocessor protection
- Motor control systems
- Cable TV systems
- AC operated smoke detectors
- Computers
- Medical equipment
- Street lighting
- Automotive
- Traffic facilities
- Railway distribution/vehicles
- Microwave devices

VARISTOR RATINGS AND CONCEPTS

- **AC voltage rating.** This is the maximum continuous sinusoidal RMS voltage which may be applied. In selecting a Maida ZOV, this value should include the nominal AC line voltage
- to be applied plus an allowance (~10%) for routine high-line fluctuations. As examples, select a 130 VAC ZOV for a 117 VAC, a 140 or 150 VAC for 125 VAC, and a 250 VAC ZOV for 220 VAC use.

- **DC voltage rating.** This is the maximum continuous DC voltage which may be applied across the ZOV and is determined by the DC idle power. This value is typically about 95% of the peak recurrent AC voltage. The peak recurrent AC voltage is $\sqrt{2}$ times the RMS value and coincides with the minimum varistor voltage at 1mADC.

- **Nominal varistor voltage.** The nominal varistor voltage is defined as that point at which the linear/non-linear transition is complete and is arbitrarily specified as V@1mADC. The usual tolerance on nominal varistor voltage is $\pm$ 10%. The varistor voltage rating is a function of: (1) the height of the energy barrier at the individual grain boundaries, (2) the average size of the ZnO grains within the ceramic, and (3) the thickness of the ceramic element.

- **DC leakage current.** With rated DC voltage applied the maximum leakage current value is 200μA. Typical values are less than 100μA.

- **Single impulse peak current rating.** This parameter characterizes the maximum current handling capability of a varistor for a non-recur- ring surge event. The 8/20 μs exponential current waveform defined in ANSI/IEEE C62.41 (1991), which simulates lightning induced surges, is the industry-accepted standard used to establish this parameter.

- **Single impulse energy rating.** This parameter characterizes the maximum energy handling capability of a varistor, expressed in joules, for a non-recurring surge event.

- **Significance of energy specifications.** The single pulse energy rating of a varistor is often misunderstood and misused as a figure of merit for ZOV performance and effectiveness.

ANSI/IEEE C62.33 (1982) Standard for Surge Protective Devices states:

"Energy ratings can be misleading as an indicator of the comparative merit of different varistor designs. The energy deposited in a varistor by a transient current source depends on the varistor clamping voltage. Therefore, a lower energy rating does not necessarily mean a lower capability of survival in the transient environment."

"Instead, single and lifetime pulse current ratings are appropriate tests of varistor surge withstand capability. In the absence of special requirements, energy ratings are recommended for use only as supplements to the predominant current ratings, and for application problems which are more conveniently treated in terms of energy."

The energy absorbed by a device as a result of a surge, is defined by:

$$J = k \bullet E_{CLAMP} \bullet I_{PEAK} \bullet \tau \qquad [4]$$

where: J = energy absorbed in joules
k = form factor dependent upon shape of current impulse
k = 1 for a square wave pulse k = 0.5 for a triangular pulse
k = 1.4 for an exponential waveform
E_{CLAMP} = measured clamping voltage in volts (assumed constant during current decay)
I_{PEAK} = maximum let-through current in amps (crest value of current impulse wave)
τ = effective impulse duration in seconds

For current waveforms commonly used in energy qualification testing, the waveshapes may be separated into a rise portion and a decay portion. The energy content of each portion, represented by the area under the curve, may be calculated separately and the two energies combined to yield the total energy.

For the 10/1000 μs waveform, the rise portion may be considered triangular, and the decay portion exponential.

$$J_{TOTAL} = J_{RISE} + J_{DECAY}$$
$$= 0.5(E)(I)(10x10^{-6}) + 1.4(E)(I)(1000-10)(10^{-6})$$
$$= (E)(I)(10^{-6})(5 + 1386)$$
$$= 1391(10^{-6})(E)(I) \quad [5]$$

In the same way, for the 8/20 μs impulse:

$$J_{TOTAL} = J_{RISE} + J_{DECAY}$$
$$= 0.5(E)(I)(8)(10^{-6}) + 1.4(E)(I)(20-8)(10^{-6})$$
$$= (E)(I)(10^{-6})(4 + 16.8)$$
$$= 20.8(10^{-6})(E)(I) \quad [6]$$

In either case, the calculated energy is proportional to the product of the measured values of clamping voltage and let-through current. At any specified surge current level, lower clamping voltages are preferred for better surge protection, yet higher clamping voltages produce higher calculated energy values. This is misleading. Clearly the lower clamping voltage is more desirable because the varistor is required to absorb and dissipate less energy at the same current level. Only by increasing the peak current capability can real and unarguable increases in energy ratings be demonstrated.

- For both transient energy and transient peak current ratings, the values specified are the maximums that a ZOV can withstand without a disruptive failure or a change of varistor voltage (VDC@1 mA) that exceeds ± 10 percent of the pre-pulse value. Derating is required for multiple pulses of the same waveform as well as for pulses of longer duration.

- **Transient power dissipation.** This is the maximum power from a pulse or group of pulses that may be dissipated by the ZOV. The average pulse energy in joules, or watt- seconds, times the number of pulses per second indicates the total transient power in watts delivered to the ZOV. The transient power rating should not be exceeded.

- V - I curves, plotted between 1 μA and 10 kA or higher, reveal three distinct regions:
  - A leakage region below about 100 μA. Current is limited by the high resistivity of the boundary layers. Low leakage current is essential and depends upon the type, number, distribution, and mobility of charge carriers within the barrier layers. How these charge carriers respond to continuous application of voltage, and to variations of ambient temperature may greatly affect the life of a varistor.
  - The varistor range from 100 uA to about 1000 amps. In this range, barrier voltages are being exceeded. Slight voltage increases bring about multi-fold increases in let through current. Current flows nearly unrestricted through the barrier layers, and is limited only by the resistivity of the bulk ZnO grains.
  - A high current, or upturn, region.
  - Survivability in this region depends upon the ability of the bulk ZnO grains to absorb energy and dissipate it as heat back to the environment.

- A ZOV, to operate without failure or degradation, must quickly dissipate absorbed energy and return to its pre-pulse standby operating temperature. It also must have thermally stable leakage characteristics. The leakage current is important because it determines the watts loss (I^2R heat) that will be generated at steady-state operating voltage.

- The life of a ZOV is usually defined as the time required to reach a thermal runaway condition. Empirically, the relationship between ambient temperature and the life of varistors subjected to continuous electrical stress can be expressed by the Arrhenius rate equation, which simply states that the rate of degradation varies exponentially with the reciprocal of temperature:

$$t = t_o \exp[E_a - f(V)]/RT \qquad [7]$$

where t = time to thermal runaway
t_o = constant
R = constant
E_a = activation energy
T = temperature in ^oK
f(V) = applied voltage

When voltage is applied for a very long time, micro currents flow within the ceramic. Physical and chemical changes occur within the boundary layers and the activation energy changes accordingly. After some certain period of time the joule heating increases rapidly and exceeds the ZOV's ability to dissipate the heat back to the environment. The thermal runaway condition has been reached and the varistor life ends.

- Leakage current also empirically obeys the Arrhenius relationship as follows:

$$I_L = I_{Lo} \exp[- \{E_a - f(V)\}/kT \qquad [8]$$

where
I_L = resistive leakage current causing joule heating
I_{Lo} = initial resistive current much smaller than 1 mA/cm2
E_a = activation energy
f(V) = applied voltage
k = Boltzman's constant
T = absolute temperature

OTHER OVERVOLTAGE PROTECTION COMPONENTS

- The break down voltage of air is ~ 30,000 volts/inch, providing built-in overvoltage protection at about 6000 volts in most conventional and industrial wiring environments. This protection occurs by the uncontrolled breakdown that occurs in air between insulation terminals, i.e., at wall outlets.
- Gap-type carbon block arrestors have been widely used for years in the telecommunications industry. They function in air at atmospheric pressure. Arc-over voltages are established by very close air-gap dimensions. Replacement and maintenance costs are high.
- Gas tubes are a refinement of air-gap arrestors. Carefully shaped and separated electrodes are sealed in a hermetic envelope filled with a gas mixture. These "crowbar" devices are designed to fire in an arc dis- charge mode within a few microseconds, short-circuiting the high voltage surge to ground. They are rated to breakdown between 100 volts and several kilovolts and can sustain very large currents, up to 20,000 amps. During the discharge, the voltage across the gap drops to only a few volts. Once turned on, the gas tube may continue to conduct current after the transient has subsided, depending upon the power delivering capability of the circuit. This "follow" current can be catastrophic unless some specific means is provided to extinguish the arc. The actual breakdown voltage is a function of the rate of rise of
- the voltage spike and is statistical in nature. Discharge ranges as wide as 50 to 300 V may occur within a single manufactured lot. Because of sensitivity to rate of applied voltage, a gas tube which fires at 90 to 120 V with a voltage ramp of 100 V/sec, may not fire until 800 to 1000 V when a steep ramp of 10,000 V/sec is applied. Gas-tubes offer adequate protection against slow-rise surges, but may be inadequate for impulses with steeper fronts.
- Silicon avalanche diodes are available with clamping voltage ranges from 5 V to several hundred volts. These are large junction zener diodes specifically designed for surge suppression. They respond in a few nanoseconds and have precise clamping action. The major limitations are their inability to dissipate large amounts of energy and their cost.

MOV Terminology & General Specifications

TECHNICAL TERM	DESCRIPTION	SPECIFICATION
Operating Temperature	Operating Temperature Range without Derating.	-40°C to +85°C
Storage Temperature	Storage Temperature Range without Voltage Applied.	-50°C to +125°C
Curent / Energy Derating	Derating of maximum Values when Operated above +85°C	-2.5% / °C
Varistor Voltage Temperature Coefficient	$\frac{\text{Vv at 85°C - Vv at 25°C}}{\text{Vv at 25°C}} \times \frac{1}{60°C} \times 100$ Where Vv is varistor voltage at 1mADC	-0.05% / °C
Insulation Resistance	Minimum resistance between shorted terminals and varistor surface.	10,000M Ω minimum
HiPot Encapsulation	Minimum voltage applied for one minute between shorted terminals and varistor surface.	1000VAC + 2x MCOV
Impulse Response Time	Time lag between application of surge and varistor's "turn-on" conduction state.	< 50 nanoseconds
DC Leakage Current	Maximum current with rated DC voltage applied.	200uA maximum
Safety Agency Recognitions	UL1449 cUL CSA VDE	See Specification Sheet
Applied Voltage - AC	Maximum continuous sinusoidal RMS voltage which may be applied (MCOV).	See Specification Sheet
Applied Voltage - DC	Maximum continuous DC voltage which may be applied.	See Specification Sheet
Transient Energy (Joules)	The maximum energy absorbed with a varistor voltage change of less than ± 10% when one impulse of an 8x20us current waveform is applied.	See Specification Sheet
Transient Peak Current	The maximum current with a varistor voltage change of less than ± 10% when one impulse of an 8x20us current waveform is applied.	See Specification Sheet
Varistor Voltage	Voltage across the varistor measured at 1mADC	See Specification Sheet
Maximum Clamping Voltage	Peak voltage across the varistor with a specific peak impulse current applied (8x20us).	See Specification Sheet
Capacitance	Typical value measured at 1Vrms and a test frequency of 1KHz.	See Specification Sheet

LEAD CODES

The Maida Development Company prides itself on its ability to manufacture wire leaded devices to meet almost every request of its customers. The following table depicts common varieties of leads that are presently supplied. It should be noted that the dimensions (such as the X, Y, Z, height, lead length, epoxy “pant leg”, wire diameter, etc.) can be modified on any the items shown to meet almost any request. Maida is also capable of supplying the various lead forms in either right-hand or left-hand configurations.

For any inquiries regarding specific lead forms please contact us.

NOTE: The images shown depict a round varistor only. However, any lead configuration can be obtained on either round or square varistors.

TAPE & REEL

The Maida Development Company MOV’s are available in Bulk, Tape & Reel, or Ammo Pack packaging formats. All Tape & Reel and Ammo Pack part numbers are designated by suffixing the Maida style number with a T followed by a 1-2 digit alphanumeric code. The codes are generally given to indicate whether the packaging is either Ammo Pack or Tape & Reel, the typical lead spacing of the varistor, the lead style, the wire gauge (or wire diameter), and the taping pitch.

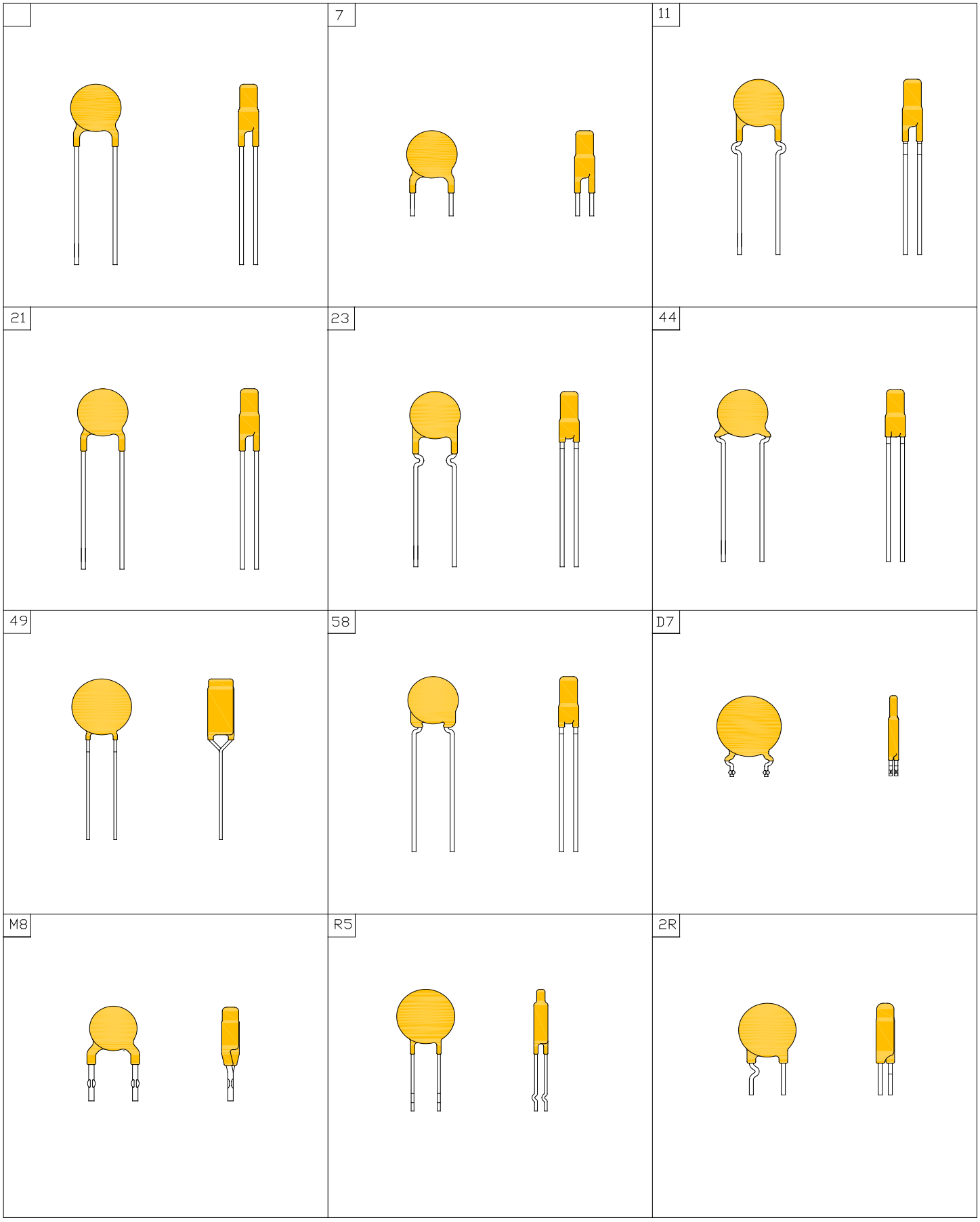
Generally, through-hole varistors with a lead spacing of 0.394”, or less, and a nominal disc diameter of 20mm, or less, can be taped. Larger diameters and/or lead spacing’s may be offered taped; however customers should contact us for confirmation.

All SMD Series, SMV Series, Encapsulated MOV Series, and MLV Series are provided Tape & Reel. For bulk packaging please contact us.

Maida’s taping specifications comply with the requirements of the EIA taping standard. Configurations are available to meet almost any request.

Detailed drawings for all taping codes are available upon request.

COMMON LEAD CODES



TAPING CODES

Code	Description	Lead Spacing (in)	Lead Spacing (mm)	Lead Form Type	Wire AWG
T1	PANASERT TAPE & REEL	0.200	5.08	STRAIGHT LEADS	22
T11	AMMO PACK TAPE & BOX	0.200	5.08	STRAIGHT LEADS	22
T12	AMMO PACK TAPE & BOX	0.300	7.62	STRAIGHT LEADS	22
T13	AMMO PACK TAPE & BOX	0.300	7.62	INSIDE KINK	22
T14	PANASERT TAPE & REEL	0.200	5.08	INSIDE KINK	22
T16	PANASERT TAPE & REEL	0.200	5.08	OFFSET KINK	22
T17	PANASERT TAPE & REEL	0.200	5.08	OUTSIDE KINK	22
T18	PANASERT TAPE & REEL	0.250	6.35	OUTSIDE KINK	22
T19	PANASERT TAPE & REEL	0.300	7.62	STRAIGHT LEADS	20
T1A	PANASERT TAPE & REEL	0.300	7.62	OUTSIDE KINK	20
T1B	PANASERT TAPE & REEL	0.250	6.35	STRAIGHT LEADS	22
T1C	PANASERT TAPE & REEL	0.200	5.08	OUTSIDE KINK	22
T1D	AMMO PACK TAPE & BOX	0.200	5.08	INSIDE KINK	22
T1E	PANASERT TAPE & REEL	0.200	5.08	INSIDE KINK	22
T1F	PANASERT TAPE & REEL	0.300	7.62	INSIDE KINK	22
T1G	PANASERT TAPE & REEL	0.300	7.62	STRAIGHT LEADS	20
T1H	PANASERT TAPE & REEL	0.394	10.01	STRAIGHT LEADS	20
T1I	PANASERT TAPE & REEL	0.375	9.53	STRAIGHT LEADS	20
T1J	AMMO PACK TAPE & BOX	0.300	7.62	OUTSIDE KINK	22
T1K	PANASERT TAPE & REEL	0.250	6.35	INSIDE KINK	22
T1L	PANASERT TAPE & REEL	0.200	5.08	STRAIGHT LEADS	22
T1M	PANASERT TAPE & REEL	0.300	7.62	OUTSIDE KINK	22
T1N	PANASERT TAPE & REEL	0.300	7.62	OUTSIDE KINK	20
T1P	PANASERT TAPE & REEL	0.335	8.51	OUTSIDE KINK	20
T1Q	PANASERT TAPE & REEL	0.375	9.53	INSIDE KINK	20
T1R	PANASERT TAPE & REEL	0.300	7.62	DOUBLE KINK	22
T1T	PANASERT TAPE & REEL	0.375	9.53	OUTSIDE KINK	20
T1U	AMMO PACK TAPE & BOX	0.300	7.62	OUTSIDE KINK	20
T1V	AMMO PACK TAPE & BOX	0.394	10.01	OUTSIDE KINK	22
T1W	AMMO PACK TAPE & BOX	0.200	5.08	IN-LINE LEADS	22
T1X	PANASERT TAPE & REEL	0.394	10.01	OUTSIDE KINK	20
T1Y	PANASERT TAPE & REEL	0.300	7.62	INSIDE KINK	20
T1Z	PANASERT TAPE & REEL	0.250	6.35	IN-LINE LEADS	22
T2	PANASERT TAPE & REEL	n/a	n/a	AXIAL	
T21	AMMO PACK TAPE & BOX	n/a	n/a	AXIAL	
T3	AMMO PACK TAPE & BOX	0.200	5.08	OUTSIDE KINK	22
T31	PANASERT TAPE & REEL	0.394	10.01	OUTSIDE KINK	18
T32	PANASERT TAPE & REEL	0.200	5.08	IN-LINE LEADS	22
T33	PANASERT TAPE & REEL	0.250	6.35	STRAIGHT LEADS	20
T34	PANASERT TAPE & REEL	0.100	2.54	STRAIGHT LEADS	22
T35	PANASERT TAPE & REEL	0.200	5.08	INSIDE KINK	20
T36	AMMO PACK TAPE & BOX	0.300	7.62	STRAIGHT LEADS	20
T37	PANASERT TAPE & REEL	0.375	9.53	STRAIGHT LEADS	22
T38	PANASERT TAPE & REEL	0.300	7.62	STRAIGHT LEADS	22
T39	PANASERT TAPE & REEL	0.300	7.62	IN-LINE LEADS	22

TAPING CODES (cont.)

Code	Description	Lead Spacing (in)	Lead Spacing (mm)	Lead Form Type	Wire AWG
T4	PANASERT TAPE & REEL	0.300	7.62	IN-LINE LEADS	20
T41	PANASERT TAPE & REEL	0.200	5.08	OUTSIDE KINK	20
T42	PANASERT TAPE & REEL	0.200	5.08	STRAIGHT LEADS	20
T43	AMMO PACK TAPE & BOX	0.300	7.62	IN-LINE LEADS	20
T44	AMMO PACK TAPE & BOX	0.394	10.01	STRAIGHT LEADS	20
T45	AMMO PACK TAPE & BOX	0.394	10.01	OUTSIDE KINK	20
T46	PANASERT TAPE & REEL	0.375	9.53	STRAIGHT LEADS	20
T47	AMMO PACK TAPE & BOX	0.375	9.53	INSIDE KINK	20
T48	PANASERT TAPE & REEL	0.200	5.08	OUTSIDE KINK	20
T49	PANASERT TAPE & REEL	0.200	5.08	INSIDE KINK	22
T5	AMMO PACK TAPE & BOX	0.250	6.35	OUTSIDE KINK	22
T51	PANASERT TAPE & REEL	0.200	5.08	IN-LINE LEADS	20
T52	AMMO PACK TAPE & BOX	0.250	6.35	INSIDE KINK	22
T53	PANASERT TAPE & REEL	0.300	7.62	OUTSIDE KINK	20
T54	PANASERT TAPE & REEL	0.250	6.35	OUTSIDE KINK	20
T55	PANASERT TAPE & REEL	0.200	5.08	DOUBLE KINK	22
T56	PANASERT TAPE & REEL	0.300	7.62	STRAIGHT LEADS	22
T57	AMMO PACK TAPE & BOX	0.300	7.62	INSIDE KINK	20
T58	PANASERT TAPE & REEL	0.300	7.62	INSIDE KINK	22
T59	AMMO PACK TAPE & BOX	0.200	5.08	INSIDE KINK	20
T6	3220 SMV TAPE & REEL	n/a	n/a	n/a	n/a
T61	AMMO PACK TAPE & BOX	0.200	5.08	OUTSIDE KINK	20
T62	AMMO PACK TAPE & BOX	0.200	5.08	INSIDE KINK	22
T63	PANASERT TAPE & REEL	0.200	5.08	STRAIGHT LEADS	20
T64	AMMO PACK TAPE & BOX	0.200	5.08	INSIDE KINK	21
T65	PANASERT TAPE & REEL	0.394	10.01	STRAIGHT LEADS	18
T66	PANASERT TAPE & REEL	0.375	9.53	INSIDE KINK	20
T67	PANASERT TAPE & REEL	0.200	5.08	INSIDE KINK	24
T68	AMMO PACK TAPE & BOX	0.300	7.62	STRAIGHT LEADS	22
T69	PANASERT TAPE & REEL	0.200	5.08	BUMP LEAD	22
T7	1206 MLV TAPE & REEL	n/a	n/a	n/a	n/a
T70	PANASERT TAPE & REEL	0.200	5.08	IN-LINE LEADS	22
T71	AMMO PACK TAPE & BOX	0.200	5.08	OUTSIDE KINK	22
T72	PANASERT TAPE & REEL	0.394	10.01	INSIDE KINK	20
T73	PANASERT TAPE & REEL	0.300	7.62	OUTSIDE KINK	22
T74	PANASERT TAPE & REEL	0.250	6.35	STRAIGHT LEADS	20
T75	PANASERT TAPE & REEL	0.300	7.62	IN-LINE LEADS W/ OUTSIDE KINK	20
T76	PANASERT TAPE & REEL	0.300	7.62	IN-LINE LEADS	22
T77	PANASERT TAPE & REEL	0.375	9.53	STRAIGHT LEADS	22
T78	PANASERT TAPE & REEL	0.200	5.08	STRAIGHT LEADS	22
T79	PANASERT TAPE & REEL	0.160	4.06	STRAIGHT LEADS	22

TAPING CODES (cont.)

Code	Description	Lead Spacing (in)	Lead Spacing (mm)	Lead Form Type	Wire AWG
T8	PANASERT TAPE & REEL	0.300	7.62	STRAIGHT LEADS	24
T81	PANASERT TAPE & REEL	0.375	9.53	OUTSIDE KINK	22
T82	PANASERT TAPE & REEL	0.400	10.16	OUTSIDE KINK	22
T83	PANASERT TAPE & REEL	0.160	4.06	STRAIGHT LEADS	24
T84	PANASERT TAPE & REEL	0.300	7.62	IN-LINE LEADS	20
T85	PANASERT TAPE & REEL	0.100	2.54	INSIDE KINK	22
T86	PANASERT TAPE & REEL	0.225	5.72	STRAIGHT LEADS	22
T87	PANASERT TAPE & REEL	0.200	5.08	OUTSIDE KINK	22
T88	PANASERT TAPE & REEL	0.160	4.06	IN-LINE LEADS	22
T89	PANASERT TAPE & REEL	0.300	7.62	IN-LINE LEADS	20
T90	AMMO PACK TAPE & BOX	0.300	7.62	OUTSIDE KINK	20
T91	PANASERT TAPE & REEL	0.354	8.99	INSIDE KINK	22
T92	AMMO PACK TAPE & BOX	0.200	5.08	OUTSIDE KINK	22
T93	AMMO PACK TAPE & BOX	0.394	10.01	STRAIGHT LEADS	18
T94	PANASERT TAPE & REEL	0.300	7.62	STRAIGHT LEADS	18
T95	PANASERT TAPE & REEL	0.394	10.01	ITRON IN-LINE	20
T96	PANASERT TAPE & REEL	0.200	5.08	OUTSIDE KINK	24
T97	AMMO PACK TAPE & BOX	0.300	7.62	IN-LINE LEADS	20
T98	AMMO PACK TAPE & BOX	0.200	5.08	OUTSIDE KINK	24
T99	AMMO PACK TAPE & BOX	0.300	7.62	IN-LINE LEADS	22

STANDARD SERIES

INTRODUCTION

The Standard Series is our broadest and most comprehensive line of radial-leaded varistors. These components consist of wire leads and have nominal disk diameters from 5mm to 25mm. They are available with maximum continuous operating voltages (MCOV) ranging from 11VAC to 1000VAC (up to 1500VAC upon request).
The Standard Series is designed to handle most low and medium power applications requiring through-hole components. Most sizes are available in Tape and Reel and ammo pack.

STYLE DESIGNATION

The Maida Style Number is the typical means to identify our components when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number. The Item Number is a unique designation for each MOV design, whereas numerous MOV designs may be made with the same Maida Style Number.
The following example is the standard part numbering system when ordering our Standard Series components by the Maida Style Number:

D 65 21 ZOV 131 RA 20 T1N

1. **Coating Designation**
   D – Epoxy Coating
   P – Phenolic Coating
   Neither – Denotes no conformal coating.

2. **Nominal Disk Diameter**
   58 – 5mm 69 – 14mm
   73 – 7mm 64 – 16mm
   68 – 8mm 63 – 18mm
   61 – 10mm 65 – 20mm
   71 – 11mm 66 – 25mm
   62 – 12mm

3. **Lead Configuration**
   (Refer to lead codes)

4. **Material Identifier**
   Zinc Oxide Varistor

5. **AC Voltage Rating**
   Two significant figures plus number of zeroes that follow, i.e. 131 is 130 VAC

6. **Special Instructions,** RA is standard

7. **Rating Code,** up to four numbers

8. **Optional Taping Code**
   T – Tape & Reel, Tape & Ammo
   Followed by up to two digit alphanumeric

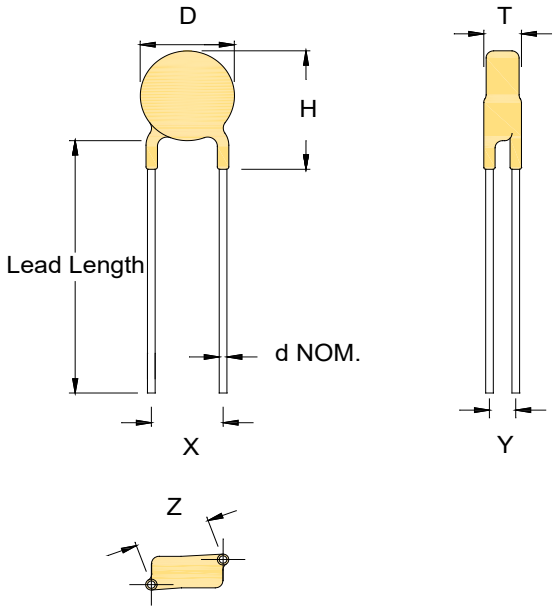
STANDARD MARKING

Minimum marking shall consist of an abbreviated style designation and, when space is available, the manufacturer's initials or company logo.

For example:
MDC
Z131
20UL

Where:
MDC - Company Initials
Z - Zinc Oxide Varistor
131 - AC Voltage rating (130VAC)
20 - Rating code
UL - UL recognition, if applicable

A manufacturing date code and/or special markings are available upon request.
Other safety agency designations are included where applicable.



Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec	1	2			(8 x 20μsec)		1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	(A)	(A)	Vmin (V)	Vmax (V)	(V)	(A)	(pF)
D58ZOV110RA00	X						5	Z110 - 00UL	11	14	0.6	0.6	250	125	16	20	40	1	2200
D73ZOV110RA01	X						7	Z110 - 01UL	11	14	1.1	1.1	500	250	16	20	36	2.5	3500
D6121ZOV110RA02	X						10	Z110 - 02UL	11	14	2.6	2.6	1000	500	16	20	36	5	7500
D6921ZOV110RA04	X						14	Z110 - 04UL	11	14	5.2	5.2	2000	1000	16	20	36	10	18000
D6521ZOV110RA10	X						20	Z110 - 10UL	11	14	13	13	3000	2000	16	20	36	20	37000
D58ZOV140RA00	X						5	Z140 - 00UL	14	18	0.7	0.7	250	125	20	24	48	1	2000
D73ZOV140RA01	X						7	Z140 - 01UL	14	18	1.3	1.3	500	250	20	24	43	2.5	2800
D6121ZOV140RA02	X						10	Z140 - 02UL	14	18	3.2	3.2	1000	500	20	24	43	5	6000
D6921ZOV140RA04	X						14	Z140 - 04UL	14	18	6.3	6.3	2000	1000	20	24	43	10	15000
D6521ZOV140RA13	X						20	Z140 - 13UL	14	18	16	16	3000	2000	20	24	43	20	30000
D58ZOV170RA00	X						5	Z170 - 00UL	17	22	0.9	0.9	250	125	24	30	60	1	1600
D73ZOV170RA01	X						7	Z170 - 01UL	17	22	1.6	1.6	500	250	24	30	53	2.5	2000
D6121ZOV170RA03	X						10	Z170 - 03UL	17	22	3.9	3.9	1000	500	24	30	53	5	4000
D6921ZOV170RA05	X						14	Z170 - 05UL	17	22	7.8	7.8	2000	1000	24	30	53	10	10000
D6521ZOV170RA15	X						20	Z170 - 15UL	17	22	19	19	3000	2000	24	30	53	20	22000
D58ZOV200RA00	X						5	Z200 - 00UL	20	26	1.1	1.1	250	125	30	36	73	1	1675
D73ZOV200RA01	X						7	Z200 - 01UL	20	26	2	2	500	250	30	36	65	2.5	3614
D6121ZOV200RA03	X						10	Z200 - 03UL	20	26	4.8	4.8	1000	500	30	36	65	5	6655
D6921ZOV200RA06	X						14	Z200 - 06UL	20	26	9.5	9.5	2000	1000	30	36	65	10	14447
D6521ZOV200RA20	X						20	Z200 - 20UL	20	26	24	24	3000	2000	30	36	65	20	33064
D58ZOV250RA01	X						5	Z250 - 01UL	25	31	1.2	1.2	250	125	35	43	86	1	1417
D73ZOV250RA02	X						7	Z250 - 02UL	25	31	2.4	2.4	500	250	35	43	77	2.5	3058
D6121ZOV250RA04	X						10	Z250 - 04UL	25	31	5.6	5.6	1000	500	35	43	77	5	5632
D6921ZOV250RA07	X						14	Z250 - 07UL	25	31	11	11	2000	1000	35	43	77	10	12225
D6521ZOV250RA24	X						20	Z250 - 24UL	25	31	28	28	3000	2000	35	43	77	20	27977
D58ZOV300RA01	X						5	Z300 - 01UL	30	38	1.5	1.5	250	125	42	52	99	1	1176
D73ZOV300RA02	X						7	Z300 - 02UL	30	38	2.8	2.8	500	250	42	52	93	2.5	2537
D6121ZOV300RA05	X						10	Z300 - 05UL	30	38	6.8	6.8	1000	500	42	52	93	5	4673
D6921ZOV300RA09	X						14	Z300 - 09UL	30	38	14	14	2000	1000	42	52	93	10	10144
D6321ZOV300RA26	X						18	Z300 - 26UL	30	38	26	26	2500	1500	42	52	93	20	18230
D6521ZOV300RA30	X						20	Z300 - 30UL	30	38	34	34	3000	2000	42	52	93	20	23215
D58ZOV350RA01	X						5	Z350 - 01UL	35	45	1.8	1.8	250	125	50	62	117	1	987
D73ZOV350RA02	X						7	Z350 - 02UL	35	45	3.4	3.4	500	250	50	62	110	2.5	2130
D6121ZOV350RA06	X						10	Z350 - 06UL	35	45	8.1	8.1	1000	500	50	62	110	5	3922
D6921ZOV350RA10	X						14	Z350 - 10UL	35	45	16	16	2000	1000	50	62	110	10	8514
D6521ZOV350RA35	X						20	Z350 - 35UL	35	45	41	41	3000	2000	50	62	110	20	19484
D58ZOV400RA01	X						5	Z400 - 01UL	40	56	2.2	2.2	250	125	61	75	138	1	438
D73ZOV400RA03	X						7	Z400 - 03UL	40	56	5.2	5.2	500	250	61	75	135	2.5	945
D6121ZOV400RA07	X						10	Z400 - 07UL	40	56	13	13	1000	500	61	75	135	5	1627
D6921ZOV400RA12	X						14	Z400 - 12UL	40	56	20	20	2000	1000	61	75	135	10	3285
D6521ZOV400RA40	X						20	Z400 - 40UL	40	56	49	49	3000	2000	61	75	135	20	7517
D58ZOV500RA01	X						5	Z500 - 01UL	50	66	3.5	3.5	800	600	74	90	163	5	364
D73ZOV500RA02	X						7	Z500 - 02UL	50	66	7	7	1750	1250	74	90	157	10	767
D6121ZOV500RA03	X						10	Z500 - 03UL	50	66	14	14	3500	2500	74	90	147	25	1375
D7121ZOV500RA04	X						11	Z500 - 04UL	50	66	19	19	4000	2800	74	90	147	30	1533
D6221ZOV500RA05	X						12	Z500 - 05UL	50	66	22	22	4500	3200	74	90	147	40	2602
D6921ZOV500RA06	X						14	Z500 - 06UL	50	66	28	28	6000	5000	74	90	147	50	2829
D6521ZOV500RA42	X						20	Z500 - 42UL	50	66	56	56	10000	7000	74	90	147	100	5041
D58ZOV600RA01	X						5	Z600 - 01UL	60	81	4.5	4.5	800	600	90	110	190	5	299
D73ZOV600RA02	X						7	Z600 - 02UL	60	81	9	9	1750	1250	90	110	180	10	629
D6121ZOV600RA03	X						10	Z600 - 03UL	60	81	18	18	3500	2500	90	110	175	25	1128
D7121ZOV600RA04	X						11	Z600 - 04UL	60	81	20	20	4000	2800	90	110	175	30	1257
D6221ZOV600RA05	X						12	Z600 - 05UL	60	81	22	22	4500	3200	90	110	175	40	2133
D6921ZOV600RA06	X						14	Z600 - 06UL	60	81	36	36	6000	5000	90	110	175	50	2319
D6521ZOV600RA45	X						20	Z600 - 45UL	60	81	72	72	10000	7000	90	110	175	100	5264
D58ZOV750RA01	X						5	Z750 - 01UL	75	102	5.5	5.5	800	600	108	132	220	5	249
D73ZOV750RA02	X						7	Z750 - 02UL	75	102	11	11	1750	1250	108	132	220	10	524
D6121ZOV750RA03	X						10	Z750 - 03UL	75	102	22	22	3500	2500	108	132	210	25	940
D7121ZOV750RA04	X						11	Z750 - 04UL	75	102	22	22	4000	2800	108	132	210	30	1048
D6221ZOV750RA05	X						12	Z750 - 05UL	75	102	27	27	4500	3200	108	132	210	40	1778
D6921ZOV750RA06	X						14	Z750 - 06UL	75	102	44	44	6000	5000	108	132	210	50	1933
D6521ZOV750RA55	X						20	Z750 - 55UL	75	102	88	88	10000	7000	108	132	210	100	4387
D58ZOV950RA01	X						5	Z950 - 01UL	95	127	6.6	6.6	800	600	135	165	240	5	118
D73ZOV950RA02	X						7	Z950 - 02UL	95	127	13	13	1750	1250	135	165	255	10	255
D6121ZOV950RA03	X						10	Z950 - 03UL	95	127	25	25	3500	2500	135	165	255	25	469
D7121ZOV950RA04	X						11	Z950 - 04UL	95	127	28	28	4000	2800	135	165	255	30	537
D6221ZOV950RA05	X						12	Z950 - 05UL	95	127	33	33	4500	3200	135	165	255	40	924
D6921ZOV950RA06	X						14	Z950 - 06UL	95	127	53	53	6000	5000	135	165	255	50	1019
D6521ZOV950RA65	X						20	Z950 - 65UL	95	127	106	106	10000	7000	135	165	255	100	2331

STANDARD SERIES

ELECTRICAL SPECIFICATIONS

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	1	2	Vmin	Vmax	(8 x 20μsec)		@1kHz
																	(V)	(A)	(pF)
D58ZOV121RA02	X						5	Z121 - 02UL	120	160	8	8	800	600	170	207	310	5	118
D73ZOV121RA03	X						7	Z121 - 03UL	120	160	16	16	1750	1250	170	207	320	10	255
D68ZOV121RA03	X						8	Z121 - 03UL8	120	160	19	19	2500	1700	170	207	320	15	327
D6121ZOV121RA04	X						10	Z121 - 04UL	120	160	33	33	3500	2500	170	207	320	25	469
D7121ZOV121RA05	X						11	Z121 - 05UL	120	160	36	36	4000	2800	170	207	320	30	537
D6221ZOV121RA07	X						12	Z121 - 07UL	120	160	41	41	4500	3200	170	207	320	40	924
D6921ZOV121RA09	X						14	Z121 - 09UL	120	160	52	52	6000	5000	170	207	320	50	1019
D6421ZOV121RA10							16	Z121 - 10	120	160	58	58	6300	5300	170	207	320	70	1506
D6321ZOV121RA65	X						18	Z121 - 65UL	120	160	65	65	7500	6500	170	207	320	100	1830
D6521ZOV121RA20	X						20	Z121 - 20UL	120	160	130	130	10000	7000	170	207	320	100	2331
D58ZOV131RA02	X			X			5	Z131 - 02UL	130	175	8.5	8.5	800	600	184	224	350	5	116
D73ZOV131RA03	X	X		X			7	Z131 - 03UL	130	175	17.5	17.5	1750	1250	184	224	340	10	250
D68ZOV131RA03	X	X					8	Z131 - 03UL8	130	175	27	27	2300	1500	184	224	340	15	316
D6121ZOV131RA04	X	X		X			10	Z131 - 04UL	130	175	45	45	3500	2500	184	224	340	25	438
D7121ZOV131RA05	X	X					11	Z131 - 05UL	130	175	48	48	4000	2800	184	224	340	30	494
D6221ZOV131RA07	X	X					12	Z131 - 07UL	130	175	53	53	4500	3200	184	224	340	40	835
D6921ZOV131RA09	X	X		X			14	Z131 - 09UL	130	175	70	70	6500	5000	184	224	340	50	890
D6421ZOV131RA10		X					16	Z131 - 10	130	175	100	100	7700	6000	184	224	340	70	1304
D6321ZOV131RA70	X	X					18	Z131 - 70UL	130	175	130	130	9000	7000	184	224	340	100	1571
D6521ZOV131RA20	X	X		X			20	Z131 - 20UL	130	175	150	150	12000	9000	184	224	340	100	2001
D6694ZOV131RA140	X	X					25	Z131 - 140UL	130	175	170	170	18000	13000	184	224	340	100	3634
D58ZOV141RA02	X			X			5	Z141 - 02UL	140	180	9	9	800	600	198	242	380	5	111
D73ZOV141RA03	X	X		X			7	Z141 - 03UL	140	180	20	20	1750	1250	198	242	360	10	232
D68ZOV141RA03	X	X					8	Z141 - 03UL8	140	180	30	30	2400	1700	198	242	360	15	293
D6121ZOV141RA04	X	X		X			10	Z141 - 04UL	140	180	50	50	3500	2500	198	242	360	25	407
D7121ZOV141RA05	X	X					11	Z141 - 05UL	140	180	54	54	4000	2800	198	242	360	30	458
D6221ZOV141RA07	X	X					12	Z141 - 07UL	140	180	59	59	4500	3200	198	242	360	40	775
D6921ZOV141RA09	X	X		X			14	Z141 - 09UL	140	180	78	78	6500	5000	198	242	360	50	825
D6421ZOV141RA10		X					16	Z141 - 10UL	140	180	106	106	7700	6000	198	242	360	70	1209
D6321ZOV141RA75	X	X					18	Z141 - 75UL	140	180	135	135	9000	7000	198	242	360	100	1457
D6521ZOV141RA20	X	X		X			20	Z141 - 20UL	140	180	160	160	12000	9000	198	242	360	100	1855
D6694ZOV141RA150	X	X					25	Z141 - 150UL	140	180	180	180	18000	13000	198	242	360	100	3370
D58ZOV151RA02	X			X			5	Z151 - 02UL	150	200	10.5	10.5	800	600	212	259	430	5	101
D73ZOV151RA03	X	X		X			7	Z151 - 03UL	150	200	21	21	1750	1250	212	259	395	10	212
D68ZOV151RA03	X	X					8	Z151 - 03UL8	150	200	30	30	2300	1700	212	259	395	15	268
D6121ZOV151RA04	X	X		X			10	Z151 - 04UL	150	200	55	55	3500	2500	212	259	395	25	373
D7121ZOV151RA05	X	X					11	Z151 - 05UL	150	200	58	58	4000	2800	212	259	395	30	420
D6221ZOV151RA07	X	X					12	Z151 - 07UL	150	200	64	64	4500	3200	212	259	395	40	710
D6921ZOV151RA09	X	X		X			14	Z151 - 09UL	150	200	84	84	6500	5000	212	259	395	50	756
D6421ZOV151RA10		X					16	Z151 - 10	150	200	112	112	7700	6000	212	259	395	70	1108
D6321ZOV151RA80	X	X					18	Z151 - 80UL	150	200	140	140	9000	7000	212	259	395	100	1336
D6521ZOV151RA20	X	X		X			20	Z151 - 20UL	150	200	170	170	12000	9000	212	259	395	100	1701
D6694ZOV151RA160	X	X					25	Z151 - 160UL	150	200	190	190	18000	13000	212	259	395	100	3089
D58ZOV181RA02	X			X			5	Z181 - 02UL	180	230	11	11	800	600	255	311	510	5	87
D73ZOV181RA03	X	X		X			7	Z181 - 03UL	180	230	24	24	1750	1250	255	311	445	10	182
D68ZOV181RA03	X	X					8	Z181 - 03UL8	180	230	32	32	2400	1700	255	311	445	15	230
D6121ZOV181RA04	X	X		X			10	Z181 - 04UL	180	230	60	60	3500	2500	255	311	465	25	319
D6221ZOV181RA07	X	X					12	Z181 - 07UL	180	230	62	62	4500	3200	255	311	465	40	609
D6921ZOV181RA09	X	X		X			14	Z181 - 09UL	180	230	100	100	6000	5000	255	311	465	50	648
D6321ZOV181RA100	X						18	Z181 - 100UL	180	230	150	150	7500	6000	255	311	465	100	1145
D6521ZOV181RA20	X	X		X			20	Z181 - 20UL	180	230	190	190	10000	7000	255	311	465	100	1458
D6694ZOV181RA200	X	X					25	Z181 - 200UL	180	230	200	200	13000	9000	255	311	465	100	2648
D58ZOV211RA07	X						5	Z211 - 07UL	210	270	13	13	800	600	297	363	545	5	74
D73ZOV211RA18	X	X		X			7	Z211 - 18UL	210	270	28	28	1750	1250	297	363	545	10	154
D61ZOV211RA30	X	X		X			10	Z211 - 30UL	210	270	58	58	3500	2500	297	363	545	25	271
D62ZOV211RA45	X	X					12	Z211 - 45UL	210	270	66	66	4500	3200	297	363	545	40	516
D69ZOV211RA65	X	X		X			14	Z211 - 65UL	210	270	120	120	6000	4500	297	363	545	50	550
D63ZOV211RA100	X	X					18	Z211 - 100UL	210	270	185	185	7500	6000	297	363	545	75	971
D65ZOV211RA110	X	X		X			20	Z211 - 110UL	210	270	230	230	10000	6500	297	363	545	100	1237
D6694ZOV211RA220	X	X					25	Z211 - 220UL	210	270	250	250	13000	9000	297	363	545	100	2247
D58ZOV231RA08	X						5	Z231 - 08UL	230	300	16	16	800	600	326	397	595	5	68
D73ZOV231RA20	X	X		X			7	Z231 - 20UL	230	300	32	32	1750	1250	326	397	595	10	141
D68ZOV231RA20		X					8	Z231 - 20	230	300	42	42	2400	1700	326	397	595	15	179
D61ZOV231RA35	X	X		X			10	Z231 - 35UL	230	300	65	65	3500	2500	326	397	595	25	248
D62ZOV231RA50	X	X					12	Z231 - 50UL	230	300	70	70	4500	3200	326	397	595	40	473
D69ZOV231RA70	X	X		X			14	Z231 - 70UL	230	300	135	135	6000	4500	326	397	595	50	504
D63ZOV231RA80	X	X					18	Z231 - 80UL	230	300	215	215	7500	6000	326	397	595	100	890
D65ZOV231RA115	X	X		X			20	Z231 - 115UL	230	300	270	270	10000	6500	326	397	595	100	1134
D6694ZOV231RA230	X	X					25	Z231 - 230UL	230	300	280	280	13000	9000	326	397	595	100	2059

STANDARD SERIES

ELECTRICAL SPECIFICATIONS

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec	1	2			(8 x 20μsec)		1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	(A)	(A)	Vmin (V)	Vmax (V)	(V)	(A)	(pF)
D58ZOV251RA08	X						5	Z251 - 08UL	250	330	17	17	800	600	354	432	675	5	62
D73ZOV251RA21	X	X		X			7	Z251 - 21UL	250	330	35	35	1750	1250	354	432	650	10	131
D68ZOV251RA21		X					8	Z251 - 21	250	330	45	45	2400	1700	354	432	650	15	165
D61ZOV251RA40	X	X		X			10	Z251 - 40UL	250	330	70	70	3500	2500	354	432	650	25	229
D62ZOV251RA55	X	X					12	Z251 - 55UL	250	330	80	80	4500	3200	354	432	650	40	437
D69ZOV251RA72	X	X		X			14	Z251 - 72UL	250	330	145	145	6000	4500	354	432	650	50	465
D63ZOV251RA90	X	X					18	Z251 - 90UL	250	330	240	240	7500	6000	354	432	650	75	822
D65ZOV251RA130	X	X		X			20	Z251 - 130UL	250	330	300	300	10000	6500	354	432	650	100	1047
D6694ZOV251RA260	X	X					25	Z251 - 260UL	250	330	315	315	13000	9000	354	432	650	100	1901
D58ZOV271RA09	X						5	Z271 -09UL	270	360	20	20	800	600	382	466	740	5	58
D73ZOV271RA23	X	X		X			7	Z271 - 23UL	270	360	40	40	1750	1250	382	466	710	10	121
D68ZOV271RA23		X					8	Z271 - 23	270	360	52	52	2400	1700	382	466	710	15	153
D61ZOV271RA43	X	X		X			10	Z271 - 43UL	270	360	80	80	3500	2500	382	466	710	25	213
D62ZOV271RA60	X	X					12	Z271 - 60UL	270	360	91	91	4500	3200	382	466	710	40	406
D69ZOV271RA75	X	X		X			14	Z271 - 75UL	270	360	160	160	6000	4500	382	466	710	50	432
D63ZOV271RA100	X	X					18	Z271 - 100UL	270	360	260	260	7500	6000	382	466	710	75	763
D65ZOV271RA140	X	X		X			20	Z271 - 140UL	270	360	325	325	10000	6500	382	466	710	100	972
D6694ZOV271RA280	X	X					25	Z271 - 280UL	270	360	340	340	13000	9000	382	466	710	100	1765
D58ZOV301RA10	X						5	Z301 -10UL	300	390	21	21	800	600	425	518	810	5	52
D73ZOV301RA25	X	X		X			7	Z301 - 25UL	300	390	42	42	1750	1250	425	518	790	10	108
D68ZOV301RA25		X					8	Z301 - 25	300	390	55	55	2400	1700	425	518	790	15	137
D61ZOV301RA45	X	X		X			10	Z301 - 45UL	300	390	85	85	3500	2500	425	518	790	25	190
D62ZOV301RA65	X	X					12	Z301 - 65UL	300	390	105	105	4500	3200	425	518	790	40	363
D69ZOV301RA80	X	X		X			14	Z301 - 80UL	300	390	175	175	6000	4500	425	518	790	50	386
D63ZOV301RA105	X	X					18	Z301 - 105UL	300	390	280	280	7500	6000	425	518	790	75	682
D65ZOV301RA150	X	X		X			20	Z301 - 150UL	300	390	350	350	10000	6500	425	518	790	100	869
D6694ZOV301RA300	X	X					25	Z301 - 300UL	300	390	360	360	13000	9000	425	518	790	100	1577
D58ZOV321RA11	X						5	Z321 - 11UL	320	420	21	21	800	600	453	553	850	5	49
D73ZOV321RA27	X	X					7	Z321 - 27UL	320	420	46	46	1750	1250	453	553	850	10	102
D61ZOV321RA45	X	X		X			10	Z321 - 45UL	320	420	92	92	3500	2500	453	553	850	25	179
D62ZOV321RA70	X	X					12	Z321 - 70UL	320	420	140	140	4500	3200	453	553	850	40	341
D69ZOV321RA90	X	X		X			14	Z321 - 90UL	320	420	190	190	6000	4500	453	553	850	50	363
D63ZOV321RA110	X	X					18	Z321 - 110UL	320	420	310	310	7500	6000	453	553	850	75	641
D65ZOV321RA160	X	X		X			20	Z321 - 160UL	320	420	385	385	10000	6500	453	553	850	100	816
D6694ZOV321RA320	X	X					25	Z321 - 320UL	320	420	430	430	13000	9000	453	553	850	100	1483
D58ZOV361RA12	X						5	Z361 - 12UL	360	470	22	22	800	600	522	638	960	5	42
D73ZOV361RA28	X	X					7	Z361 - 28UL	360	470	47	47	1750	1250	522	638	960	10	88
D61ZOV361RA45	X	X		X			10	Z361 - 45UL	360	470	97	97	3500	2500	522	638	960	25	154
D62ZOV361RA70	X	X					12	Z361 - 70UL	360	470	145	145	4500	3200	522	638	960	40	294
D69ZOV361RA85	X	X		X			14	Z361 - 85UL	360	470	205	205	6000	4500	522	638	960	50	313
D63ZOV361RA110	X	X					18	Z361 - 110UL	360	470	320	320	7500	6000	522	638	960	75	553
D65ZOV361RA160	X	X		X			20	Z361 - 160UL	360	470	410	410	10000	6500	522	638	960	100	704
D6694ZOV361RA320	X	X					25	Z361 - 320UL	360	470	440	440	13000	9000	522	638	960	100	1278
D58ZOV391RA13	X						5	Z391 - 13UL	390	500	25	25	800	600	552	674	1040	5	40
D73ZOV391RA29	X	X					7	Z391 - 29UL	390	500	51	51	1750	1250	552	674	1040	10	83
D61ZOV391RA45	X	X		X			10	Z391 - 45UL	390	500	107	107	3500	2500	552	674	1025	25	146
D62ZOV391RA70	X	X					12	Z391 - 70UL	390	500	150	150	4500	3200	552	674	1025	40	278
D69ZOV391RA85	X	X		X			14	Z391 - 85UL	390	500	215	215	6000	4500	552	674	1025	50	297
D63ZOV391RA110	X	X					18	Z391 - 110UL	390	500	330	330	7500	6000	552	674	1025	75	524
D65ZOV391RA150	X	X		X			20	Z391 - 150UL	390	500	420	420	10000	6500	552	674	1025	100	667
D6694ZOV391RA320	X	X					25	Z391 - 320UL	390	500	460	460	13000	9000	552	674	1025	100	1211
D58ZOV421RA14	X						5	Z421 - 14UL	420	560	26	26	800	600	594	725	1130	5	37
D73ZOV421RA30	X	X					7	Z421 - 30UL	420	560	57	57	1750	1250	594	725	1120	10	77
D61ZOV421RA45	X	X		X			10	Z421 - 45UL	420	560	110	110	3500	2500	594	725	1120	25	136
D62ZOV421RA70	X	X					12	Z421 - 70UL	420	560	156	156	4500	3200	594	725	1120	40	258
D69ZOV421RA90	X	X		X			14	Z421 - 90UL	420	560	225	225	6000	4500	594	725	1120	50	275
D63ZOV421RA110	X	X					18	Z421 - 110UL	420	560	340	340	7500	6000	594	725	1120	75	486
D65ZOV421RA160	X	X		X			20	Z421 - 160UL	420	560	430	430	10000	6500	594	725	1120	100	618
D6694ZOV421RA320	X	X					25	Z421 - 320UL	420	560	480	480	13000	9000	594	725	1120	100	1123
D58ZOV461RA17							5	Z461 - 17	460	615	25	25	800	600	651	795	1240	5	34
D61ZOV461RA50	X	X		X			10	Z461 - 50UL	460	615	115	115	3500	2500	651	795	1240	25	124
D62ZOV461RA75	X	X					12	Z461 - 75UL	460	615	162	162	4500	3200	651	795	1240	40	236
D69ZOV461RA100	X	X		X			14	Z461 - 100UL	460	615	230	230	6000	4500	651	795	1240	50	251
D63ZOV461RA120	X	X					18	Z461 - 120UL	460	615	360	360	7500	6000	651	795	1240	75	443
D65ZOV461RA175	X	X		X			20	Z461 - 175UL	460	615	450	450	10000	6500	651	795	1240	100	565
D6694ZOV461RA340	X	X					25	Z461 - 340UL	460	615	500	500	13000	9000	651	795	1240	100	1025

STANDARD SERIES

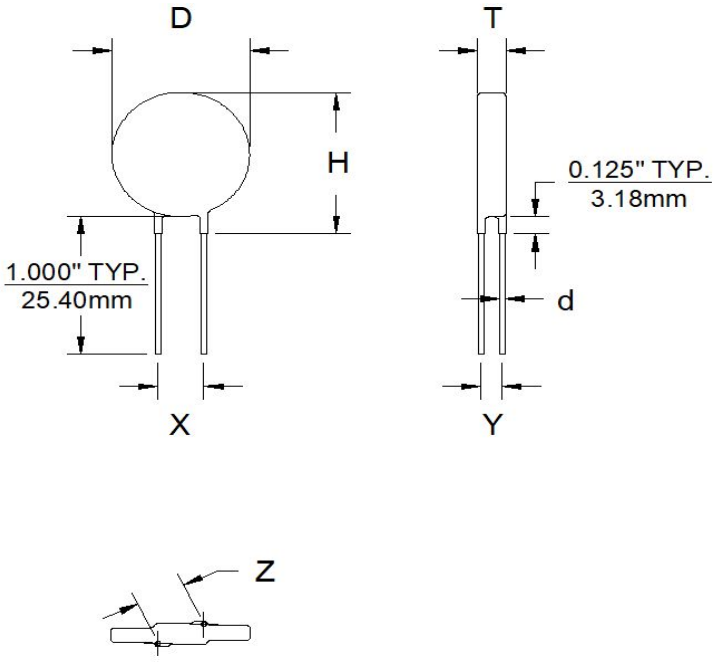
ELECTRICAL SPECIFICATIONS

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	1 (A)	2 (A)	Vmin (V)	Vmax (V)	(8 x 20μsec) (V)	(A)	@1kHz (pF)
D61ZOV481RA50	X	X		X			10	Z481 - 50UL	480	640	120	120	3500	2500	679	829	1300	25	119
D62ZOV481RA80	X	X					12	Z481 - 80UL	480	640	167	167	4500	3200	679	829	1300	40	227
D69ZOV481RA105	X	X		X			14	Z481 - 105UL	480	640	235	235	6000	4500	679	829	1300	50	242
D63ZOV481RA130	X	X					18	Z481 - 130UL	480	640	365	365	7500	6000	679	829	1300	75	427
D65ZOV481RA180	X	X		X			20	Z481 - 180UL	480	640	460	460	10000	6500	679	829	1300	100	544
D6694ZOV481RA360	X	X					25	Z481 - 360UL	480	640	510	510	13000	9000	679	829	1300	100	989
D61ZOV511RA55	X	X		X			10	Z511 - 55UL	510	675	125	125	3500	2500	722	881	1350	25	112
D62ZOV511RA85	X	X					12	Z511 - 85UL	510	675	172	172	4500	3200	722	881	1350	40	213
D69ZOV511RA110	X	X		X			14	Z511 - 110UL	510	675	240	240	6000	4500	722	881	1350	50	227
D63ZOV511RA140	X	X					18	Z511 - 140UL	510	675	375	375	7500	6000	722	881	1350	75	401
D65ZOV511RA190	X	X		X			20	Z511 - 190UL	510	675	470	470	10000	6500	722	881	1350	100	510
D6694ZOV511RA380	X	X					25	Z511 - 380UL	510	675	525	525	13000	9000	722	881	1350	100	927
D61ZOV551RA60	X	X		X			10	Z551 - 60UL	550	700	130	130	3500	2500	778	950	1400	25	104
D62ZOV551RA90	X	X					12	Z551 - 90UL	550	700	192	192	4500	3200	778	950	1400	40	198
D69ZOV551RA115	X	X		X			14	Z551 - 115UL	550	700	255	255	6000	4500	778	950	1400	50	211
D63ZOV551RA145	X	X					18	Z551 - 145UL	550	700	405	405	7500	6000	778	950	1400	75	373
D65ZOV551RA200	X	X		X			20	Z551 - 200UL	550	700	510	510	10000	6500	778	950	1400	100	475
D6694ZOV551RA400	X	X					25	Z551 - 400UL	550	700	540	540	13000	9000	778	950	1400	100	862
D61ZOV581RA65	X	X		X			10	Z581 - 65UL	580	735	140	140	3500	2500	821	1002	1500	25	98
D62ZOV581RA95	X	X					12	Z581 - 95UL	580	735	202	202	4500	3200	821	1002	1500	40	187
D69ZOV581RA120	X	X		X			14	Z581 - 120UL	580	735	265	265	6000	4500	821	1002	1500	50	199
D63ZOV581RA160	X	X					18	Z581 - 160UL	580	735	425	425	7500	6000	821	1002	1500	75	352
D65ZOV581RA220	X	X		X			20	Z581 - 220UL	580	735	530	530	10000	6500	821	1002	1500	100	449
D6694ZOV581RA440	X	X					25	Z581 - 440UL	580	735	560	560	13000	9000	821	1002	1500	100	815
D61ZOV621RA65	X	X		X			10	Z621 - 65UL	620	800	145	145	3500	2500	877	1071	1650	25	92
D62ZOV621RA100	X	X					12	Z621 - 100UL	620	800	215	215	4500	3200	877	1071	1650	40	175
D69ZOV621RA130	X	X		X			14	Z621 - 130UL	620	800	290	290	6000	4500	877	1071	1650	50	186
D63ZOV621RA170	X	X					18	Z621 - 170UL	620	800	450	450	7500	6000	877	1071	1650	75	329
D65ZOV621RA230	X	X		X			20	Z621 - 230UL	620	800	565	565	10000	6500	877	1071	1650	100	419
D6694ZOV621RA460	X	X					25	Z621 - 460UL	620	800	600	600	13000	9000	877	1071	1650	100	761
D61ZOV681RA70	X	X		X			10	Z681 - 70UL	680	860	155	155	3500	2500	962	1175	1800	25	84
D62ZOV681RA105	X	X					12	Z681 - 105UL	680	860	232	232	4500	3200	962	1175	1800	40	160
D69ZOV681RA150	X	X		X			14	Z681 - 150UL	680	860	310	310	6000	4500	962	1175	1800	50	170
D63ZOV681RA200	X	X					18	Z681 - 200UL	680	860	500	500	7500	6000	962	1175	1800	75	300
D65ZOV681RA260	X	X		X			20	Z681 - 260UL	680	860	620	620	10000	6500	962	1175	1800	100	382
D6694ZOV681RA520	X	X					25	Z681 - 520UL	680	860	655	655	13000	9000	962	1175	1800	100	694
D69ZOV751RA165	X	X		X			14	Z751 - 165UL	750	900	350	350	6000	4500	1062	1300	2100	50	151
D63ZOV751RA220	X	X					18	Z751 - 220UL	750	900	540	540	7500	6000	1062	1300	2100	75	267
D65ZOV751RA290	X	X		X			20	Z751 - 290UL	750	900	670	670	10000	6500	1062	1300	2100	100	340
D6694ZOV751RA560	X	X					25	Z751 - 560UL	750	900	700	700	13000	9000	1062	1300	2100	100	618
D69ZOV102RA220	X	X		X			14	Z102 - 220UL	1000	1200	510	510	6000	4500	1414	1728	2700	50	115
D63ZOV102RA280	X	X					18	Z102 - 280UL	1000	1200	690	690	7500	6000	1414	1728	2700	75	204
D65ZOV102RA360	X	X		X			20	Z102 - 360UL	1000	1200	860	860	10000	6500	1414	1728	2700	100	259
D6694ZOV102RA720	X	X					25	Z102 - 720UL	1000	1200	875	875	13000	9000	1414	1728	2700	100	471

A = UL1449
B = cUL
C = CSA
D = VDE
E = DEMKO
F =

STANDARD SERIES

MECHANICAL SPECIFICATIONS



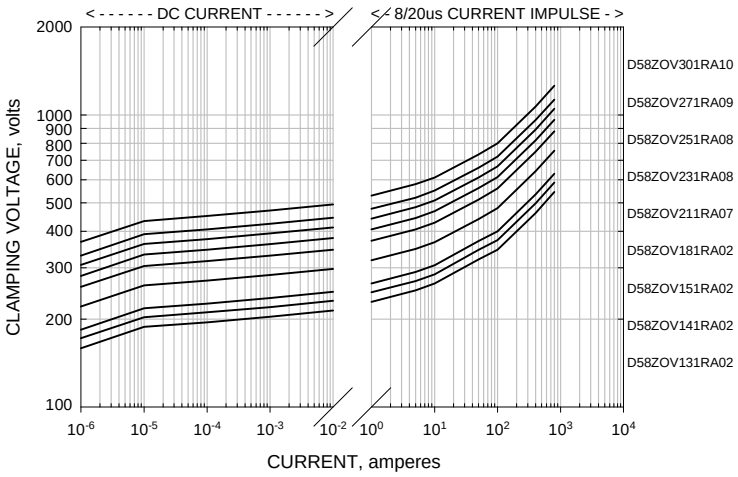
Dimension	5mm	7mm	8mm	10mm	11mm	12mm	14mm	16mm	18mm	20mm	25mm
MAX. D	0.298"	0.354"	0.394"	0.472"	0.531"	0.590"	0.650"	0.710"	0.812"	0.905"	1.100"
MAX. T	0.161" - 0.313"	0.161" - 0.313"	0.204" - 0.268"	0.161" - 0.405"	0.161" - 0.212"	0.161" - 0.385"	0.161" - 0.531"	0.161" - 0.212"	0.161" - 0.531"	0.161" - 0.531"	0.161" - 0.531"
MAX. H	0.423"	0.479"	0.519"	0.597"	0.656	0.715"	0.775"	0.835"	0.912"	1.030"	1.250"
TYP. X	0.200"	0.200"	0.200"	0.300"	0.300"	0.300"	0.300"	0.300"	0.300"	0.300"	0.500"
TYP. d	0.025"	0.025"	0.025"	0.032"	0.032"	0.032"	0.032"	0.032"	0.032"	0.032"	0.040"

NOTES:

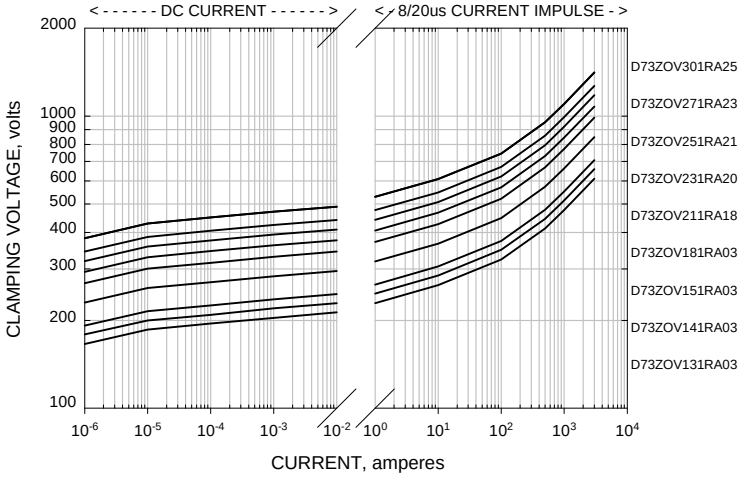
1. Alternate dimensional specifications, including lead styles, for any part listed may be available upon request.
2. Specifications are subject to change. Contact Maida for specific datasheet for exact dimensions.

STANDARD SERIES - TYPICAL VOLTAGE-CURRENT CURVES

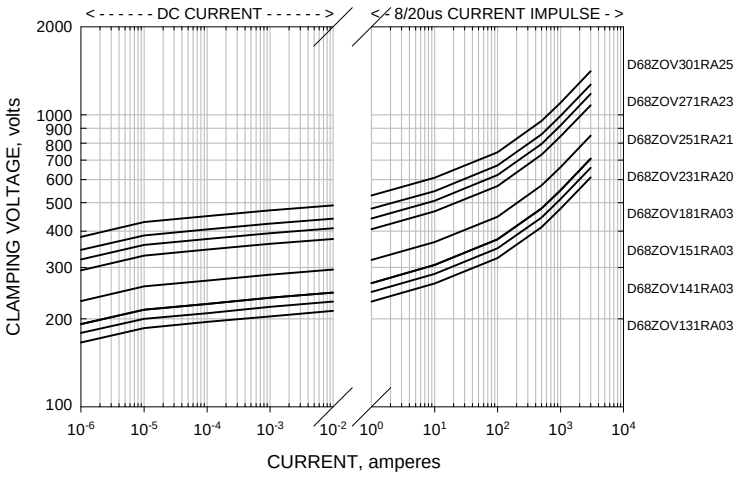
D58 (5mm) SERIES



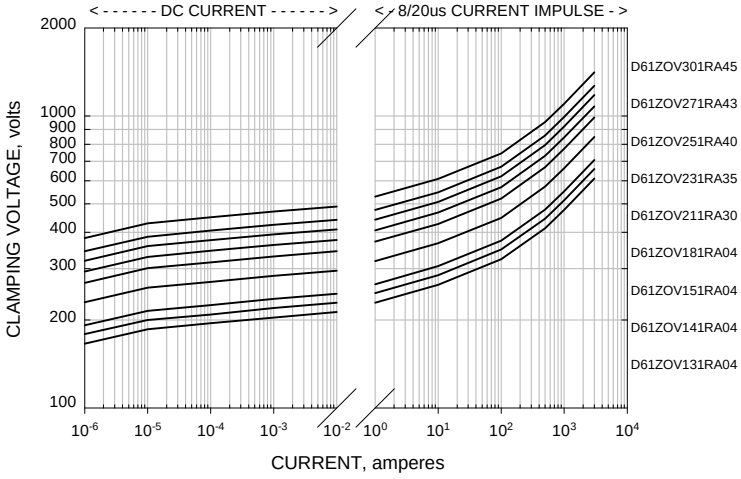
D73 (7mm) SERIES



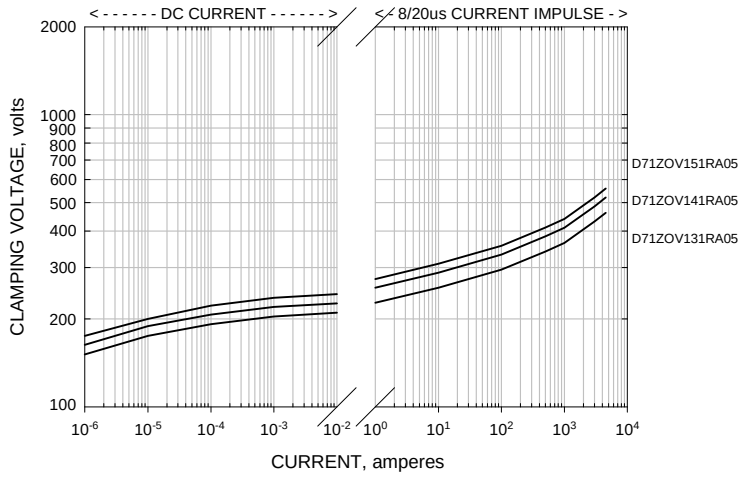
D68 (8mm) SERIES



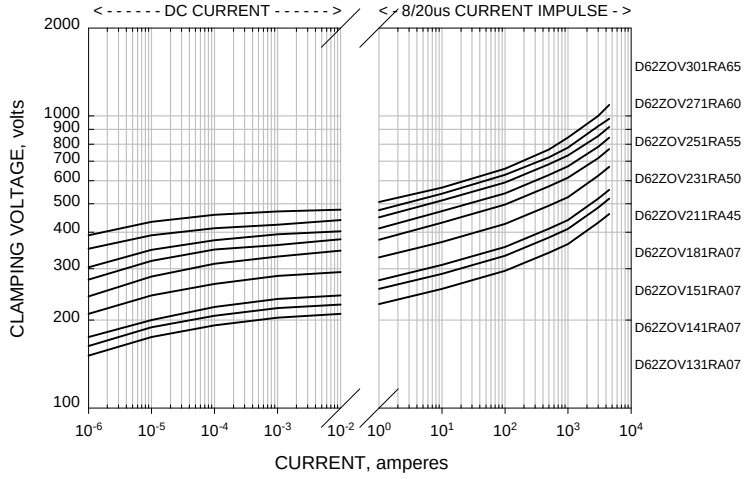
D61 (10mm) SERIES



D71 (11mm) SERIES



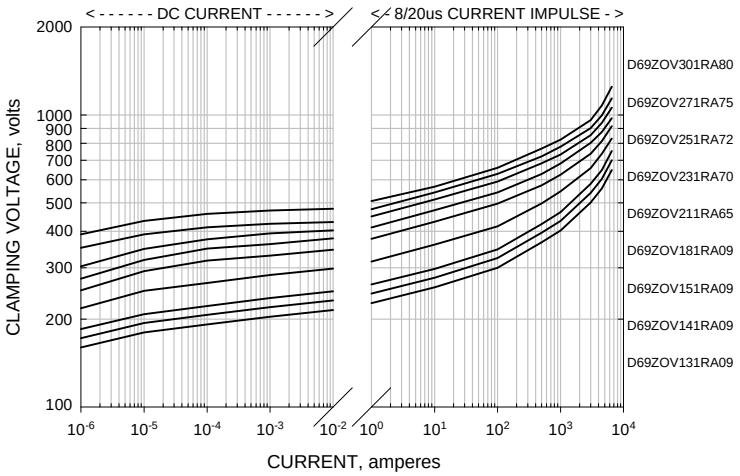
D62 (12mm) SERIES



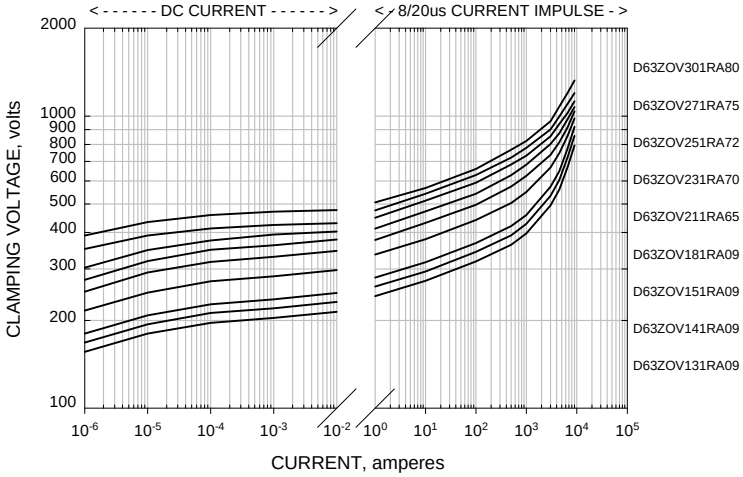
NOTE: For a more detailed V-I curve or for a voltage not listed on the graphs provided, please contact us.

STANDARD SERIES - TYPICAL VOLTAGE-CURRENT CURVES

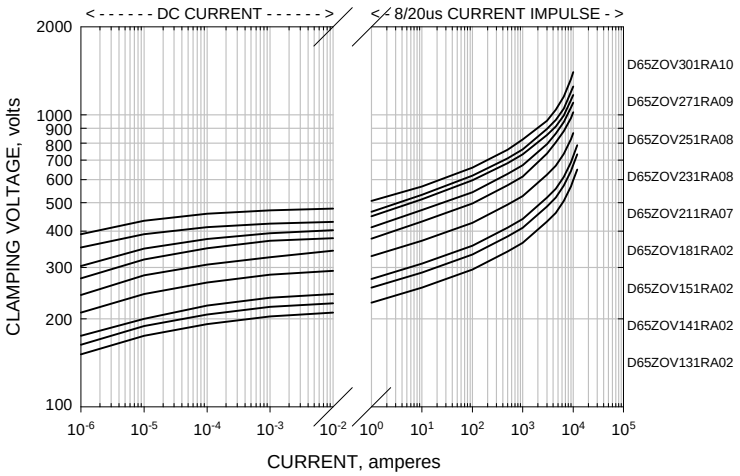
D69 (14mm) SERIES



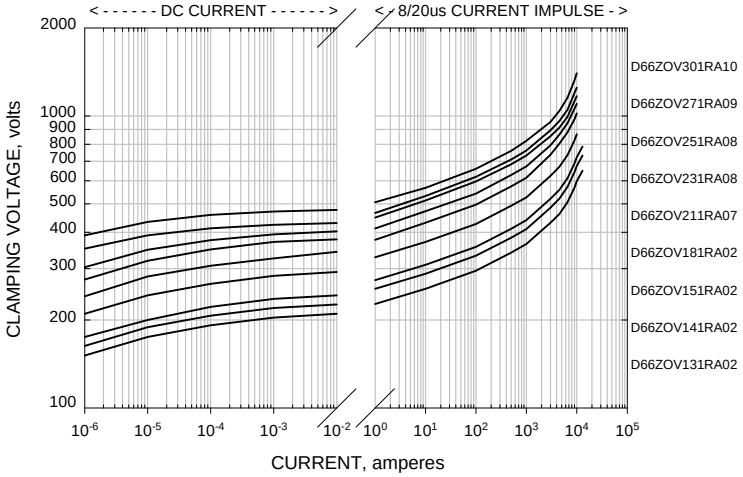
D63 (18mm) SERIES



D65 (20mm) SERIES

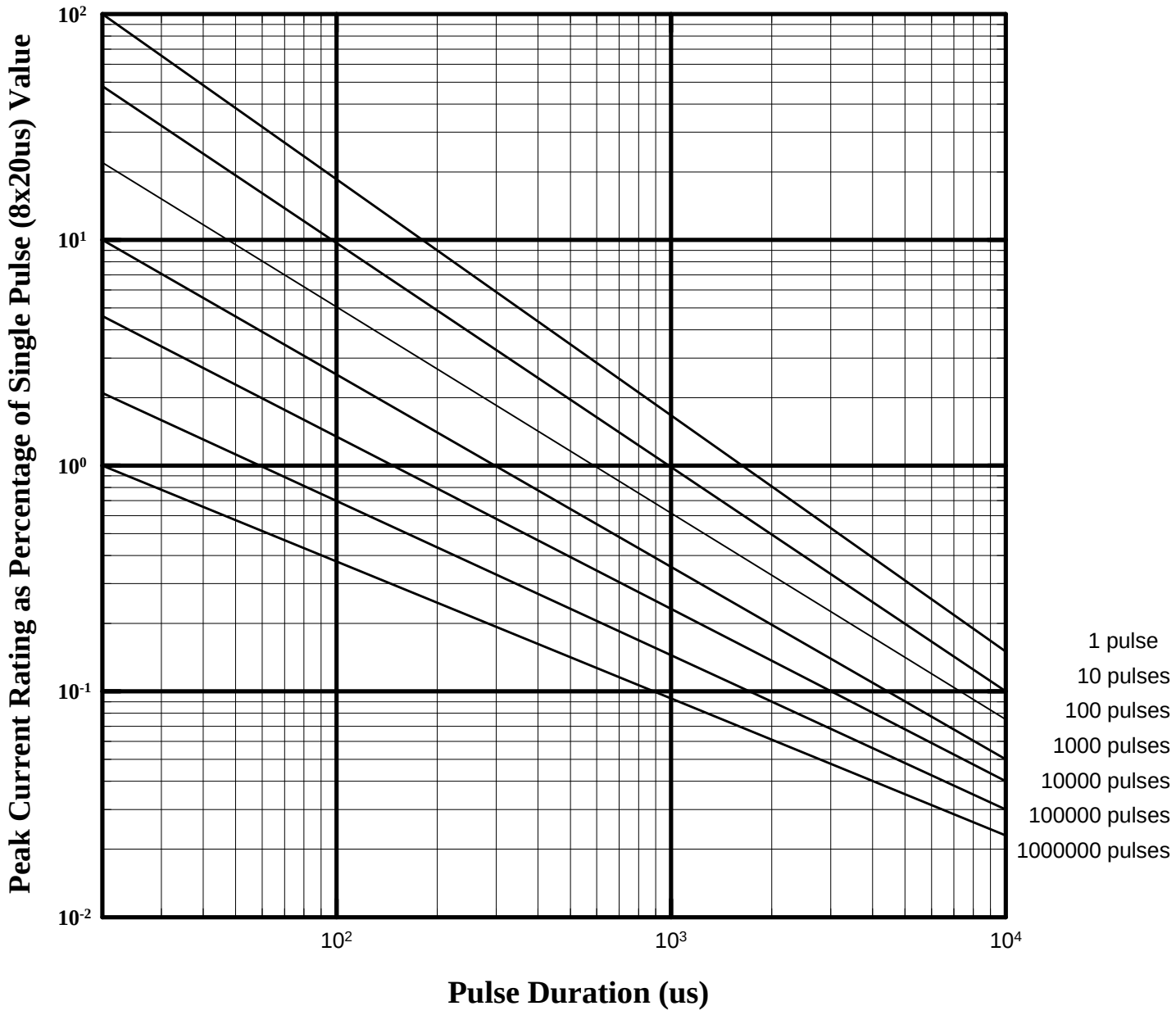


D66 (25mm) SERIES



NOTE: For a more detailed V-I curve or for a voltage not listed on the graphs provided, please contact us.

PEAK CURRENT PER PULSE vs. PULSE DURATION



INTRODUCTION

The HC Series, or High Current Series, is our specialized line of round and square, radial-leaded varistors. These components consist of wire leads and have nominal sizes from 8mm to 25mm. They are available with maximum continuous operating voltages (MCOV) ranging from 130VAC to 550VAC.
The HC Series is designed for pulse repetition and/or higher surge current environments including requirements by many safety agency standards, such as UL943. Most sizes are available in Tape and Reel and ammo pack.

STYLE DESIGNATION

The Maida Style Number is the typical means to identify our components when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number.
The following example is the standard part numbering system when ordering our HC Series components by the Maida Style Number:

D 65 21 ZOV 131 HC T1N

1. Coating Designation
D – Epoxy Coating
P – Phenolic Coating
R/S – Square Epoxy Coating
PR/PS – Square Phenolic Coating
Neither – Denote no conformal coating.

2. Nominal Sizes

68 – 8mm	R61 – 9mm Square
61 – 10mm	R71 – 10mm Square
71 – 11mm	R62 – 11mm Square
62 – 12mm	R69 – 12mm Square
69 – 14mm	R64 – 14mm Square
79 – 15mm	R65 – 17mm Square
64 – 16mm	R80 – 20mm Square
63 – 18mm	S66 – 25mm Square
65 – 20mm	
66 – 25mm	

3. Lead Configuration
(Refer to lead codes)
4. Material Identifier
Zinc Oxide Varistor
5. AC Voltage Rating
Two significant figures plus number of zeroes that follow, i.e. 131 is 130 VAC
6. Special Instructions
HC is standard
7. Optional Taping Code
T – Tape & Reel, Tape & Ammo
Followed by up to two digit alphanumeric

STANDARD MARKING

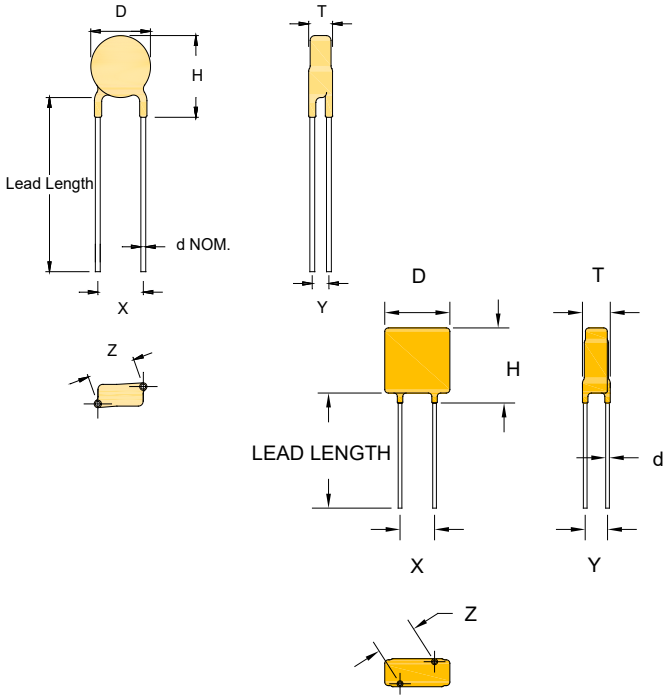
Minimum marking shall consist of an abbreviated style designation and, when space is available, the manufacturer's initials or company logo.

Example 1:	**Example 2:**
MDC	**MDC**
20HC	**R65**
130V	**HZ131**

Where:
MDC - Company Initials
20 - Round size
HC - High Current
130V - AC Voltage rating (130VAC)

MDC - Company Initials
R65 – Square size
HZ – High Current
131 – AC Voltage rating (130VAC)

A manufacturing date code and/or special markings are available upon request.
Other safety agency designations are included where applicable.



Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient				Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses						1 V rms @1kHz
											10 x 1000 μsec	8 x 20 μsec	1	2	Vmin	Vmax	(8 x 20μsec)		
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	(A)	(A)	(V)	(V)	(V)	(A)	(pF)
R61ZOV131HC	X	X					9	R61-HZ131	130	175	45	45	4500	3500	184	224	340	20	550
R71ZOV131HC	X	X					10	R71-HZ131	130	175	48	48	5200	3500	184	224	340	25	640
D71ZOV131HC	X	X					11	11HC130V	130	175	71	71	6000	3500	184	224	340	30	570
R62ZOV131HC	X	X					11	R62-HZ131	130	175	53	53	6500	5000	184	224	340	30	770
D62ZOV131HC	X	X					12	12HC130V	130	175	85	85	6500	5000	184	224	340	40	960
R69ZOV131HC	X	X					12	R69-HZ131	130	175	70	70	10000	7000	184	224	340	50	790
D69ZOV131HC	X	X					14	14HC130V	130	175	110	110	10000	7000	184	224	340	50	1040
R64ZOV131HC	X	X					14	R64-HZ131	130	175	100	100	10000	9000	184	224	340	50	1100
D64ZOV131HC	X	X					16	16HC130V	130	175	145	145	10000	9000	184	224	340	60	1510
R65ZOV131HC	X	X					17	R65-HZ131	130	175	150	150	15000	12000	184	224	340	100	1800
D63ZOV131HC	X	X					18	18HC130V	130	175	200	200	12000	9000	184	224	340	80	1800
D65ZOV131HC	X	X					20	20HC130V	130	175	225	225	15000	12000	184	224	340	100	2310
R80ZOV131HC	X	X					20	R80-HZ131	130	175	160	160	17000	13000	184	224	340	100	2450
R66ZOV131HC	X	X					22	R66-HZ131	130	175	170	170	18000	14000	184	224	325	150	3200
D66ZOV131HC	X	X					25	HZ131-140UL	130	175	250	250	17000	13000	184	224	340	100	4000
S66ZOV131HC	X	X					25	S66-HZ131	130	175	235	235	22000	18000	184	224	325	200	4150
D71ZOV141HC	X	X					11	11HC140V	140	180	78	78	6000	3500	198	242	360	30	530
D62ZOV141HC	X	X					12	12HC140V	140	180	97	97	6500	5000	198	242	360	40	890
D69ZOV141HC	X	X					14	14HC140V	140	180	120	120	10000	7000	198	242	360	50	960
D64ZOV141HC	X	X					16	16HC140V	140	180	155	155	10000	9000	198	242	360	60	1400
D63ZOV141HC	X	X					18	18HC140V	140	180	200	200	12000	9000	198	242	360	80	1680
D65ZOV141HC	X	X					20	20HC140V	140	180	255	255	15000	12000	198	242	360	100	2150
D66ZOV141HC	X	X					25	HZ141-150UL	140	180	270	270	17000	13000	198	242	360	100	3700
R61ZOV151HC	X	X					9	R61-HZ151	150	200	50	50	4500	3500	212	259	395	20	480
R71ZOV151HC	X	X					10	R71-HZ151	150	200	54	54	5200	3500	212	259	395	30	550
D71ZOV151HC	X	X					11	11HC150V	150	200	86	86	6000	3500	212	259	395	30	490
R62ZOV151HC	X	X					11	R62-HZ151	150	200	59	59	6500	5000	212	259	395	30	670
D62ZOV151HC	X	X					12	12HC150V	150	200	105	105	6500	5000	212	259	395	40	820
R69ZOV151HC	X	X					12	R69-HZ151	150	200	78	78	10000	7000	212	259	395	50	680
D69ZOV151HC	X	X					14	14HC150V	150	200	130	130	10000	7000	212	259	395	50	880
R64ZOV151HC	X	X					14	R64-HZ151	150	200	106	106	10000	9000	212	259	395	50	960
D64ZOV151HC	X	X					16	16HC150V	150	200	175	175	10000	9000	212	259	395	60	1290
R65ZOV151HC	X	X					17	R65-HZ151	150	200	160	160	15000	12000	212	259	395	100	1600
D63ZOV151HC	X	X					18	18HC150V	150	200	200	200	12000	9000	212	259	395	80	1540
D65ZOV151HC	X	X					20	20HC150V	150	200	275	275	15000	12000	212	259	395	100	1970
R80ZOV151HC	X	X					20	R80-HZ151	150	200	170	170	17000	13000	212	259	395	100	2100
R66ZOV151HC	X	X					22	R66-HZ151	150	200	180	180	18000	14000	212	259	360	150	2800
D66ZOV151HC	X	X					25	HZ151-160UL	150	200	290	290	17000	13000	212	259	395	100	3500
S66ZOV151HC	X	X					25	S66-HZ151	150	200	240	240	22000	18000	212	259	360	200	3600
D68ZOV181HC	X	X					8	HZ181-03	180	230	55	55	3500	2500	255	311	465	15	250
R61ZOV181HC	X	X					9	R61-HZ181	180	230	60	60	4500	3500	255	311	465	20	400
D61ZOV181HC	X	X					10	HZ181-04	180	230	84	84	4500	3500	255	311	465	25	510
R71ZOV181HC	X	X					10	R71-HZ181	180	230	61	61	5200	3500	255	311	465	25	460
D71ZOV181HC	X	X					11	HZ181-05	180	230	92	92	6000	3500	255	311	465	30	700
R62ZOV181HC	X	X					11	R62-HZ181	180	230	62	62	6500	5000	255	311	465	30	560
D62ZOV181HC	X	X					12	HZ181-07UL	180	230	112	112	6500	5000	255	311	465	40	920
R69ZOV181HC	X	X					12	R69-HZ181	180	230	100	100	10000	7000	255	311	465	50	570
D69ZOV181HC	X	X					14	HZ181-09UL	180	230	140	140	10000	7000	255	311	465	50	880
R64ZOV181HC	X	X					14	R64-HZ181	180	230	145	145	10000	9000	255	311	465	50	800
D64ZOV181HC	X	X					16	HZ181-12UL	180	230	187	187	10000	9000	255	311	465	60	1180
R65ZOV181HC	X	X					17	R65-HZ181	180	230	190	190	15000	12000	255	311	465	100	1300
D63ZOV181HC	X	X					18	HZ181-100UL	180	230	252	252	12000	9000	255	311	465	80	1540
D65ZOV181HC	X	X					20	HZ181-20UL	180	230	293	293	15000	12000	255	311	465	100	1960
R80ZOV181HC	X	X					20	R80-HZ181	180	230	195	195	17000	13000	255	311	455	100	1800
R66ZOV181HC	X	X					22	R66-HZ181	180	230	200	200	18000	14000	255	311	455	150	2300
D66ZOV181HC	X	X					25	HZ181-200UL	180	230	300	300	17000	13000	255	311	465	100	2900
S66ZOV181HC	X	X					25	S66-HZ181	180	230	310	310	22000	18000	255	311	455	200	3000

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient				Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses						1 V rms @1kHz
											10 x 1000 μsec	8 x 20 μsec	1	2	Vmin	Vmax	(8 x 20μsec)		
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	(A)	(A)	(V)	(V)	(V)	(A)	(pF)
D68ZOV211HC	X	X					8	HZ211-19	210	270	61	61	3500	2500	297	363	545	15	210
R61ZOV211HC	X	X					9	R61-HZ211	210	270	62	62	4500	3500	297	363	545	20	340
D61ZOV211HC	X	X					10	HZ211-30	210	270	88	88	4500	3500	297	363	545	25	440
R71ZOV211HC	X	X					10	R71-HZ211	210	270	65	65	5200	3500	297	363	545	25	400
D71ZOV211HC	X	X					11	HZ211-36	210	270	97	97	6000	3500	297	363	545	30	600
R62ZOV211HC	X	X					11	R62-HZ211	210	270	69	69	6500	5000	297	363	545	30	480
D62ZOV211HC	X	X					12	HZ211-45UL	210	270	118	118	6500	5000	297	363	545	40	780
R69ZOV211HC	X	X					12	R69-HZ211	210	270	120	120	10000	7000	297	363	545	50	490
D69ZOV211HC	X	X					14	HZ211-65UL	210	270	150	150	10000	7000	297	363	545	50	750
R64ZOV211HC	X	X					14	R64-HZ211	210	270	175	175	10000	9000	297	363	545	50	690
D64ZOV211HC	X	X					16	HZ211-85UL	210	270	199	199	10000	9000	297	363	545	60	1000
R65ZOV211HC	X	X					17	R65-HZ211	210	270	230	230	15000	12000	297	363	545	100	1100
D63ZOV211HC	X	X					18	HZ211-75UL	210	270	265	265	12000	9000	297	363	545	80	1300
D65ZOV211HC	X	X					20	HZ211-110UL	210	270	310	310	15000	12000	297	363	545	100	1660
R80ZOV211HC	X	X					20	R80-HZ211	210	270	240	240	17000	13000	297	363	545	100	1500
R66ZOV211HC	X	X					22	R66-HZ211	210	270	250	250	18000	14000	297	363	540	150	2000
D66ZOV211HC	X	X					25	HZ211-220UL	210	270	319	319	17000	13000	297	363	545	100	2470
S66ZOV211HC	X	X					25	S66-HZ211	210	270	420	420	22000	18000	297	363	540	200	2600
D68ZOV231HC	X	X					8	HZ231-20	230	300	66	66	3500	2500	326	397	595	15	190
R61ZOV231HC	X	X					9	R61-HZ231	230	300	65	65	4500	3500	326	397	595	20	310
D61ZOV231HC	X	X					10	HZ231-35	230	300	91	91	4500	3500	326	397	595	25	400
R71ZOV231HC	X	X					10	R71-HZ231	230	300	67	67	5200	3500	326	397	595	25	360
D71ZOV231HC	X	X					11	HZ231-42	230	300	101	101	6000	3500	326	397	595	30	550
R62ZOV231HC	X	X					11	R62-HZ231	230	300	70	70	6500	5000	326	397	595	30	440
D62ZOV231HC	X	X					12	HZ231-50UL	230	300	122	122	6500	5000	326	397	595	40	720
R69ZOV231HC	X	X					12	R69-HZ231	230	300	135	135	10000	7000	326	397	595	50	450
D69ZOV231HC	X	X					14	HZ231-70UL	230	300	155	155	10000	7000	326	397	595	50	680
R64ZOV231HC	X	X					14	R64-HZ231	230	300	205	205	10000	9000	326	397	595	50	630
D64ZOV231HC	X	X					16	HZ231-90UL	230	300	207	207	10000	9000	326	397	595	60	910
R65ZOV231HC	X	X					17	R65-HZ231	230	300	270	270	15000	12000	326	397	595	100	1000
D63ZOV231HC	X	X					18	HZ231-80UL	230	300	273	273	12000	9000	326	397	595	80	1200
D65ZOV231HC	X	X					20	HZ231-115UL	230	300	322	322	15000	12000	326	397	595	100	1520
R80ZOV231HC	X	X					20	R80-HZ231	230	300	275	275	17000	13000	326	397	595	100	1400
R66ZOV231HC	X	X					22	R66-HZ231	230	300	280	280	18000	14000	326	397	590	150	1800
D66ZOV231HC	X	X					25	HZ231-230UL	230	300	332	332	17000	13000	326	397	595	100	2260
S66ZOV231HC	X	X					25	S66-HZ231	230	300	490	490	22000	18000	326	397	590	200	2400
D68ZOV251HC	X	X					8	HZ251-21	250	330	70	70	3500	2500	354	432	650	15	180
R61ZOV251HC	X	X					9	R61-HZ251	250	330	70	70	4500	3500	354	432	650	20	290
D61ZOV251HC	X	X					10	HZ251-40	250	330	93	93	4500	3500	354	432	650	25	370
R71ZOV251HC	X	X					10	R71-HZ251	250	330	75	75	5200	3500	354	432	650	25	330
D71ZOV251HC	X	X					11	HZ251-48UL	250	330	105	105	6000	3500	354	432	650	30	510
R62ZOV251HC	X	X					11	R62-HZ251	250	330	80	80	6500	5000	354	432	650	30	400
D62ZOV251HC	X	X					12	HZ251-55UL	250	330	127	127	6500	5000	354	432	650	40	660
R69ZOV251HC	X	X					12	R69-HZ251	250	330	145	145	10000	7000	354	432	650	50	410
D69ZOV251HC	X	X					14	HZ251-72UL	250	330	160	160	10000	7000	354	432	650	50	630
R64ZOV251HC	X	X					14	R64-HZ251	250	330	225	225	10000	9000	354	432	650	50	580
D64ZOV251HC	X	X					16	HZ251-94UL	250	330	215	215	10000	9000	354	432	650	60	840
R65ZOV251HC	X	X					17	R65-HZ251	250	330	300	300	15000	12000	354	432	650	100	940
D63ZOV251HC	X	X					18	HZ251-90UL	250	330	281	281	12000	9000	354	432	650	80	1100
D65ZOV251HC	X	X					20	HZ251-130UL	250	330	334	334	15000	12000	354	432	650	100	1400
R80ZOV251HC	X	X					20	R80-HZ251	250	330	310	310	17000	13000	354	432	650	100	1270
R66ZOV251HC	X	X					22	R66-HZ251	250	330	315	315	18000	14000	354	432	620	150	1670
D66ZOV251HC	X	X					25	HZ251-260UL	250	300	345	345	17000	13000	354	432	650	100	2090
S66ZOV251HC	X	X					25	S66-HZ251	250	330	550	550	22000	18000	354	432	620	200	2150

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	(A)	(A)	Vmin (V)	Vmax (V)	(8 x 20μsec) (V)	(8 x 20μsec) (A)	(pF)
D68ZOV271HC	X	X					8	HZ271-23UL	270	360	75	75	3500	2500	382	466	710	15	170
R61ZOV271HC	X	X					9	R61-HZ271	270	360	80	80	4500	3500	382	466	710	20	270
D61ZOV271HC	X	X					10	HZ271-43UL	270	360	96	96	4500	3500	382	466	710	25	340
R71ZOV271HC	X	X					10	R71-HZ271	270	360	85	85	5200	3500	382	466	710	25	310
D71ZOV271HC	X	X					11	HZ271-52UL	270	360	108	108	6000	3500	382	466	710	30	470
R62ZOV271HC	X	X					11	R62-HZ271	270	360	91	91	6500	5000	382	466	710	30	370
D62ZOV271HC	X	X					12	HZ271-60UL	270	360	131	131	6500	5000	382	466	710	40	620
R69ZOV271HC	X	X					12	R69-HZ271	270	360	160	160	10000	7000	382	466	710	50	380
D69ZOV271HC	X	X					14	HZ271-75UL	270	360	168	168	10000	7000	382	466	710	50	590
R64ZOV271HC	X	X					14	R64-HZ271	270	360	245	245	10000	9000	382	466	710	50	530
D64ZOV271HC	X	X					16	HZ271-97UL	270	360	222	222	10000	9000	382	466	710	60	780
R65ZOV271HC	X	X					17	R65-HZ271	270	360	325	325	15000	12000	382	466	710	100	880
D63ZOV271HC	X	X					18	HZ271-100UL	270	360	290	290	12000	9000	382	466	710	80	1030
D65ZOV271HC	X	X					20	HZ271-140UL	270	360	346	346	15000	12000	382	466	710	100	1310
R80ZOV271HC	X	X					20	R80-HZ271	270	360	335	335	17000	13000	382	466	680	100	1200
R66ZOV271HC	X	X					22	R66-HZ271	270	360	340	340	18000	14000	382	466	680	150	1550
D66ZOV271HC	X	X					25	HZ271-280UL	270	360	358	358	17000	13000	382	466	710	100	1940
S66ZOV271HC	X	X					25	S66-HZ271	270	360	595	595	22000	18000	382	466	680	200	2000
D68ZOV301HC	X	X					8	HZ301-25UL	300	390	82	82	3500	2500	425	518	790	15	150
R61ZOV301HC	X	X					9	R61-HZ301	300	390	85	85	4500	3500	425	518	790	20	240
D61ZOV301HC	X	X					10	HZ301-45UL	300	390	99	99	4500	3500	425	518	790	25	310
R71ZOV301HC	X	X					10	R71-HZ301	300	390	95	95	5200	3500	425	518	790	25	280
D71ZOV301HC	X	X					11	HZ301-53UL	300	390	114	114	6000	3500	425	518	790	30	420
R62ZOV301HC	X	X					11	R62-HZ301	300	390	105	105	6500	5000	425	518	790	30	330
D62ZOV301HC	X	X					12	HZ301-65UL	300	390	138	138	6500	5000	425	518	790	40	550
R69ZOV301HC	X	X					12	R69-HZ301	300	390	175	175	10000	7000	425	518	790	50	340
D69ZOV301HC	X	X					14	HZ301-76UL	300	390	177	177	10000	7000	425	518	790	50	520
R64ZOV301HC	X	X					14	R64-HZ301	300	390	265	265	10000	9000	425	518	790	50	480
D64ZOV301HC	X	X					16	HZ301-100UL	300	390	234	234	10000	9000	425	518	790	60	700
R65ZOV301HC	X	X					17	R65-HZ301	300	390	350	350	15000	12000	425	518	790	100	790
D63ZOV301HC	X	X					18	HZ301-105UL	300	390	302	302	12000	9000	425	518	790	80	920
D65ZOV301HC	X	X					20	HZ301-150UL	300	390	363	363	15000	12000	425	518	790	100	1170
R80ZOV301HC	X	X					20	R80-HZ301	300	390	355	355	17000	13000	425	518	790	100	1060
R66ZOV301HC	X	X					22	R66-HZ301	300	390	360	360	18000	14000	425	518	760	150	1400
D66ZOV301HC	X	X					25	HZ301-300UL	300	390	378	378	17000	13000	425	518	790	100	1730
S66ZOV301HC	X	X					25	S66-HZ301	300	390	640	640	22000	18000	425	518	760	200	1800
D68ZOV321HC	X	X					8	HZ321-26UL	320	420	86	86	3500	2500	453	553	850	15	140
R61ZOV321HC	X	X					9	R61-HZ321	320	420	92	92	4500	3500	453	553	850	20	220
D61ZOV321HC	X	X					10	HZ321-45UL	320	420	102	102	4500	3500	453	553	850	25	290
R71ZOV321HC	X	X					10	R71-HZ321	320	420	115	115	5200	3500	453	553	850	25	260
D71ZOV321HC	X	X					11	HZ321-54UL	320	420	117	117	6000	3500	453	553	850	30	400
R62ZOV321HC	X	X					11	R62-HZ321	320	420	140	140	6500	5000	453	553	850	30	310
D62ZOV321HC	X	X					12	HZ321-70UL	320	420	142	142	6500	5000	453	553	850	40	520
R69ZOV321HC	X	X					12	R69-HZ321	320	420	190	190	10000	7000	453	553	850	50	320
D69ZOV321HC	X	X					14	HZ321-80UL	320	420	183	183	10000	7000	453	553	850	50	490
R64ZOV321HC	X	X					14	R64-HZ321	320	420	285	285	10000	9000	453	553	850	50	450
D64ZOV321HC	X	X					16	HZ321-104UL	320	420	242	242	10000	9000	453	553	850	60	660
R65ZOV321HC	X	X					17	R65-HZ321	320	420	385	385	15000	12000	453	553	810	100	740
D63ZOV321HC	X	X					18	HZ321-110UL	320	420	310	310	12000	9000	453	553	850	80	860
D65ZOV321HC	X	X					20	HZ321-160UL	320	420	375	375	15000	12000	453	553	850	100	1100
R80ZOV321HC	X	X					20	R80-HZ321	320	420	410	410	17000	13000	453	553	810	100	1000
R66ZOV321HC	X	X					22	R66-HZ321	320	420	430	430	18000	14000	453	553	810	150	1300
D66ZOV321HC	X	X					25	HZ321-320UL	320	420	391	391	17000	13000	453	553	850	100	1630
S66ZOV321HC	X	X					25	S66-HZ321	320	420	700	700	22000	18000	453	553	810	200	1700

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	1 (A)	2 (A)	Vmin (V)	Vmax (V)	(8 x 20μsec) (V)	(A)	(pF)
D68ZOV361HC	X	X					8	HZ361-27UL	360	470	91	91	3500	2500	522	638	960	15	120
R61ZOV361HC	X	X					9	R61-HZ361	360	470	97	97	4500	3500	522	638	960	20	190
D61ZOV361HC	X	X					10	HZ361-45UL	360	470	107	107	4500	3500	522	638	960	25	250
R71ZOV361HC	X	X					10	R71-HZ361	360	470	120	120	5200	3500	522	638	960	25	220
D71ZOV361HC	X	X					11	HZ361-56UL	360	470	125	125	6000	3500	522	638	960	30	340
R62ZOV361HC	X	X					11	R62-HZ361	360	470	145	145	6500	5000	522	638	960	30	270
D62ZOV361HC	X	X					12	HZ361-70UL	360	470	150	150	6500	5000	522	638	960	40	450
R69ZOV361HC	X	X					12	R69-HZ361	360	470	205	205	10000	7000	522	638	960	50	280
D69ZOV361HC	X	X					14	HZ361-85UL	360	470	197	197	10000	7000	522	638	960	50	430
R64ZOV361HC	X	X					14	R64-HZ361	360	470	310	310	10000	9000	522	638	960	50	390
D64ZOV361HC	X	X					16	HZ361-110UL	360	470	258	258	10000	9000	522	638	960	60	570
R65ZOV361HC	X	X					17	R65-HZ361	360	470	410	410	15000	12000	522	638	932	100	640
D63ZOV361HC	X	X					18	HZ361-110UL	360	470	327	327	12000	9000	522	638	960	80	740
D65ZOV361HC	X	X					20	HZ361-160UL	360	470	398	398	15000	12000	522	638	960	100	950
R80ZOV361HC	X	X					20	R80-HZ361	360	470	425	425	17000	13000	522	638	932	100	860
R66ZOV361HC	X	X					22	R66-HZ361	360	470	440	440	18000	14000	522	638	932	150	1100
D66ZOV361HC	X	X					25	HZ361-320UL	360	470	417	417	17000	13000	522	638	960	100	1400
S66ZOV361HC	X	X					25	S66-HZ361	360	470	750	750	22000	18000	522	638	932	200	1460
D68ZOV391HC	X	X					8	HZ391-29UL	390	505	99	99	3500	2500	552	674	1025	15	110
R61ZOV391HC	X	X					9	R61-HZ391	390	500	107	107	4500	3500	552	674	1025	20	180
D61ZOV391HC	X	X					10	HZ391-45UL	390	505	110	110	4500	3500	552	674	1025	25	230
R71ZOV391HC	X	X					10	R71-HZ391	390	500	125	125	5200	3500	552	674	1025	25	210
D71ZOV391HC	X	X					11	HZ391-57UL	390	505	132	132	6000	3500	552	674	1025	30	320
R62ZOV391HC	X	X					11	R62-HZ391	390	500	150	150	6500	5000	552	674	1025	30	250
D62ZOV391HC	X	X					12	HZ391-70UL	390	505	157	157	6500	5000	552	674	1025	40	420
R69ZOV391HC	X	X					12	R69-HZ391	390	500	215	215	10000	7000	552	674	1025	50	260
D69ZOV391HC	X	X					14	HZ391-90UL	390	505	205	205	10000	7000	552	674	1025	50	400
R64ZOV391HC	X	X					14	R64-HZ391	390	500	320	320	10000	9000	552	674	1025	50	370
D64ZOV391HC	X	X					16	HZ391-117UL	390	505	274	274	10000	9000	552	674	1025	60	530
R65ZOV391HC	X	X					17	R65-HZ391	390	500	420	420	15000	12000	552	674	1025	100	600
D63ZOV391HC	X	X					18	HZ391-110UL	390	505	339	339	12000	9000	552	674	1025	80	700
D65ZOV391HC	X	X					20	HZ391-150UL	390	505	416	416	15000	12000	552	674	1025	100	880
R80ZOV391HC	X	X					20	R80-HZ391	390	500	440	440	17000	13000	552	674	1025	100	820
R66ZOV391HC	X	X					22	R66-HZ391	390	500	460	460	18000	14000	552	674	1025	150	1070
D66ZOV391HC	X	X					25	HZ391-320UL	390	505	436	436	17000	13000	552	674	1025	100	1310
S66ZOV391HC	X	X					25	S66-HZ391	390	500	770	770	22000	18000	552	674	1025	200	1400
D68ZOV421HC	X	X					8	HZ421-32UL	420	560	105	105	3500	2500	594	725	1120	15	100
R61ZOV421HC	X	X					9	R61-HZ421	420	560	110	110	4500	3500	594	725	1120	20	170
D61ZOV421HC	X	X					10	HZ421-45UL	420	560	114	114	4500	3500	594	725	1120	25	220
R71ZOV421HC	X	X					10	R71-HZ421	420	560	135	135	5200	3500	594	725	1120	25	200
D71ZOV421HC	X	X					11	HZ421-58UL	420	560	136	136	6000	3500	594	725	1120	30	300
R62ZOV421HC	X	X					11	R62-HZ421	420	560	156	156	6500	5000	594	725	1120	30	240
D62ZOV421HC	X	X					12	HZ421-70UL	420	560	164	164	6500	5000	594	725	1120	40	390
R69ZOV421HC	X	X					12	R69-HZ421	420	560	225	225	10000	7000	594	725	1120	50	240
D69ZOV421HC	X	X					14	HZ421-95UL	420	560	215	215	10000	7000	594	725	1120	50	370
R64ZOV421HC	X	X					14	R64-HZ421	420	560	330	330	10000	9000	594	725	1120	50	340
D64ZOV421HC	X	X					16	HZ421-124UL	420	560	282	282	10000	9000	594	725	1120	60	500
R65ZOV421HC	X	X					17	R65-HZ421	420	560	430	430	15000	12000	594	725	1060	100	560
D63ZOV421HC	X	X					18	HZ421-110UL	420	560	351	351	12000	9000	594	725	1120	80	650
D65ZOV421HC	X	X					20	HZ421-160UL	420	560	434	434	15000	12000	594	725	1120	100	830
R80ZOV421HC	X	X					20	R80-HZ421	420	560	455	455	17000	13000	594	725	1060	100	760
R66ZOV421HC	X	X					22	R66-HZ421	420	560	480	480	18000	14000	594	725	1060	150	1000
D66ZOV421HC	X	X					25	HZ421-320UL	420	560	456	456	17000	13000	594	725	1120	100	1230
S66ZOV421HC	X	X					25	S66-HZ421	420	560	780	780	22000	18000	594	725	1060	200	1300

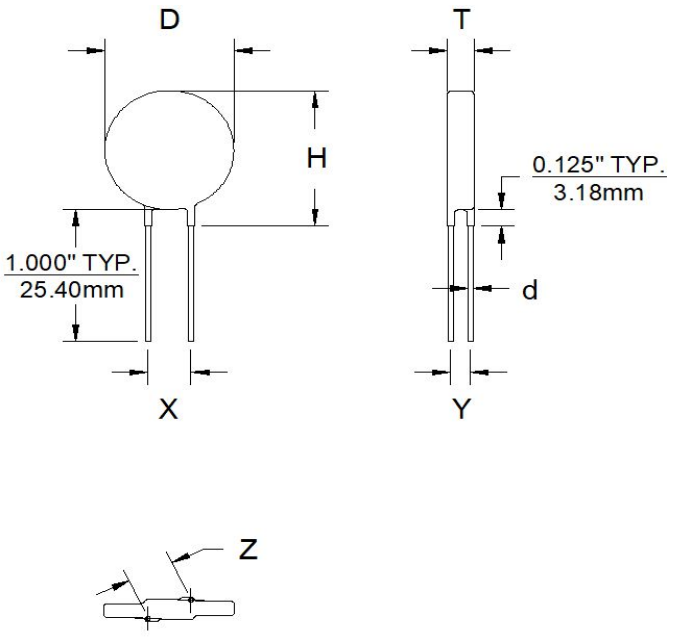
Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	1 (A)	2 (A)	Vmin (V)	Vmax (V)	(8 x 20μsec) (V)	(A)	(pF)
R61ZOV461HC	X	X					9	R61-HZ461	460	615	115	115	4500	3500	651	795	1240	20	160
D61ZOV461HC	X	X					10	HZ461-50UL	460	615	119	119	4500	3500	651	795	1240	25	200
R71ZOV461HC	X	X					10	R71-HZ461	460	615	140	140	5200	3500	651	795	1240	25	180
D71ZOV461HC	X	X					11	HZ461-62UL	460	615	143	143	6000	3500	651	795	1240	30	270
R62ZOV461HC	X	X					11	R62-HZ461	460	615	162	162	6500	5000	651	795	1240	30	220
D62ZOV461HC	X	X					12	HZ461-75UL	460	615	172	172	6500	5000	651	795	1240	40	360
R69ZOV461HC	X	X					12	R69-HZ461	460	615	230	230	10000	7000	651	795	1240	50	220
D69ZOV461HC	X	X					14	HZ461-100UL	460	615	227	227	10000	7000	651	795	1240	50	340
R64ZOV461HC	X	X					14	R64-HZ461	460	615	340	340	10000	9000	651	795	1240	50	310
D64ZOV461HC	X	X					16	HZ461-130UL	460	615	297	297	10000	9000	651	795	1240	60	460
R65ZOV461HC	X	X					17	R65-HZ461	460	615	450	450	15000	12000	651	795	1240	100	510
D63ZOV461HC	X	X					18	HZ461-120UL	460	615	368	368	12000	9000	651	795	1240	80	600
D65ZOV461HC	X	X					20	HZ461-175UL	460	615	457	457	15000	12000	651	795	1240	100	760
R80ZOV461HC	X	X					20	R80-HZ461	460	615	475	475	17000	13000	651	795	1240	100	690
R66ZOV461HC	X	X					22	R66-HZ461	460	615	500	500	18000	14000	651	795	1120	150	900
D66ZOV461HC	X	X					25	HZ461-340UL	460	615	482	482	17000	13000	651	795	1240	100	1130
S66ZOV461HC	X	X					25	S66-HZ461	460	615	825	825	22000	18000	651	795	1120	200	1170
R61ZOV481HC	X	X					9	R61-HZ481	480	640	120	120	4500	3500	679	829	1300	20	150
D61ZOV481HC	X	X					10	HZ481-50UL	480	640	121	121	4500	3500	679	829	1300	25	190
R71ZOV481HC	X	X					10	R71-HZ481	480	640	145	145	5200	3500	679	829	1300	25	170
D71ZOV481HC	X	X					11	HZ481-63UL	480	640	147	147	6000	3500	679	829	1300	30	260
R62ZOV481HC	X	X					11	R62-HZ481	480	640	167	167	6500	5000	679	829	1300	30	210
D62ZOV481HC	X	X					12	HZ481-80UL	480	640	176	176	6500	5000	679	829	1300	40	350
R69ZOV481HC	X	X					12	R69-HZ481	480	640	235	235	10000	7000	679	829	1300	50	210
D69ZOV481HC	X	X					14	HZ481-105UL	480	640	233	233	10000	7000	679	829	1300	50	330
R64ZOV481HC	X	X					14	R64-HZ481	480	640	350	350	10000	9000	679	829	1300	50	300
D64ZOV481HC	X	X					16	HZ481-136UL	480	640	305	305	10000	9000	679	829	1300	60	440
R65ZOV481HC	X	X					17	R65-HZ481	480	640	460	460	15000	12000	679	829	1300	100	490
D63ZOV481HC	X	X					18	HZ481-130UL	480	640	376	376	12000	9000	679	829	1300	80	570
D65ZOV481HC	X	X					20	HZ481-180UL	480	640	469	469	15000	12000	679	829	1300	100	730
R80ZOV481HC	X	X					20	R80-HZ481	480	640	480	480	17000	13000	679	829	1300	100	660
R66ZOV481HC	X	X					22	R66-HZ481	480	640	510	510	18000	14000	679	829	1160	150	870
D66ZOV481HC	X	X					25	HZ481-360UL	480	640	495	495	17000	13000	679	829	1300	100	1090
S66ZOV481HC	X	X					25	S66-HZ481	480	640	840	840	22000	18000	679	829	1160	200	1120
R61ZOV511HC	X	X					9	R61-HZ511	510	675	125	125	4500	3500	722	881	1350	20	140
D61ZOV511HC	X	X					10	HZ511-55UL	510	675	125	125	4500	3500	722	881	1350	25	180
R71ZOV511HC	X	X					10	R71-HZ511	510	675	150	150	5200	3500	722	881	1350	25	160
D71ZOV511HC	X	X					11	HZ511-66UL	510	675	153	153	6000	3500	722	881	1350	30	240
R62ZOV511HC	X	X					11	R62-HZ511	510	675	172	172	6500	5000	722	881	1350	30	200
D62ZOV511HC	X	X					12	HZ511-85UL	510	675	183	183	6500	5000	722	881	1350	40	320
R69ZOV511HC	X	X					12	R69-HZ511	510	675	240	240	10000	7000	722	881	1350	50	200
D69ZOV511HC	X	X					14	HZ511-110UL	510	675	242	242	10000	7000	722	881	1350	50	310
R64ZOV511HC	X	X					14	R64-HZ511	510	675	355	355	10000	9000	722	881	1350	50	280
D64ZOV511HC	X	X					16	HZ511-143UL	510	675	317	317	10000	9000	722	881	1350	60	410
R65ZOV511HC	X	X					17	R65-HZ511	510	675	470	470	15000	12000	722	881	1350	100	460
D63ZOV511HC	X	X					18	HZ511-140UL	510	675	389	389	12000	9000	722	881	1350	80	540
D65ZOV511HC	X	X					20	HZ511-190UL	510	675	487	487	15000	12000	722	881	1350	100	690
R80ZOV511HC	X	X					20	R80-HZ511	510	675	500	500	17000	13000	722	881	1350	100	620
R66ZOV511HC	X	X					22	R66-HZ511	510	675	525	525	18000	14000	722	881	1280	150	820
D66ZOV511HC	X	X					25	HZ511-380UL	510	675	514	514	17000	13000	722	881	1350	100	1020
S66ZOV511HC	X	X					25	S66-HZ511	510	675	860	860	22000	18000	722	881	1280	200	1060
R61ZOV551HC	X	X					9	R61-HZ551	550	700	130	130	4500	3500	778	950	1400	20	130
D61ZOV551HC	X	X					10	HZ551-60UL	550	700	130	130	4500	3500	778	950	1400	25	170
R71ZOV551HC	X	X					10	R71-HZ551	550	700	160	160	5200	3500	778	950	1400	25	150
D71ZOV551HC	X	X					11	HZ551-72UL	550	700	160	160	6000	3500	778	950	1400	30	230
R62ZOV551HC	X	X					11	R62-HZ551	550	700	192	192	6500	5000	778	950	1400	30	180
D62ZOV551HC	X	X					12	HZ551-90UL	550	700	192	192	6500	5000	778	950	1400	40	300
R69ZOV551HC	X	X					12	R69-HZ551	550	700	255	255	10000	7000	778	950	1400	50	190
D69ZOV551HC	X	X					14	HZ551-115UL	550	700	255	255	10000	7000	778	950	1400	50	290
R64ZOV551HC	X	X					14	R64-HZ551	550	700	385	385	10000	9000	778	950	1400	50	260
D64ZOV551HC	X	X					16	HZ551-150UL	550	700	333	333	10000	9000	778	950	1400	60	380
R65ZOV551HC	X	X					17	R65-HZ551	550	700	510	510	15000	12000	778	950	1400	100	430
D63ZOV551HC	X	X					18	HZ551-145UL	550	700	405	405	12000	9000	778	950	1400	80	500
D65ZOV551HC	X	X					20	HZ551-200UL	550	700	510	510	15000	12000	778	950	1400	100	640
R80ZOV551HC	X	X					20	R80-HZ551	550	700	525	525	17000	13000	778	950	1400	100	580
R66ZOV551HC	X	X					22	R66-HZ551	550	700	540	540	18000	14000	778	950	1360	150	760
D66ZOV551HC	X	X					25	HZ551-400UL	550	700	540	540	17000	13000	778	950	1400	100	950
S66ZOV551HC	X	X					25	S66-HZ551	550	700	930	930	22000	18000	778	950	1360	200	990

A = UL1449
B = cUL
C = CSA
D = VDE
E = DEMKO
F =

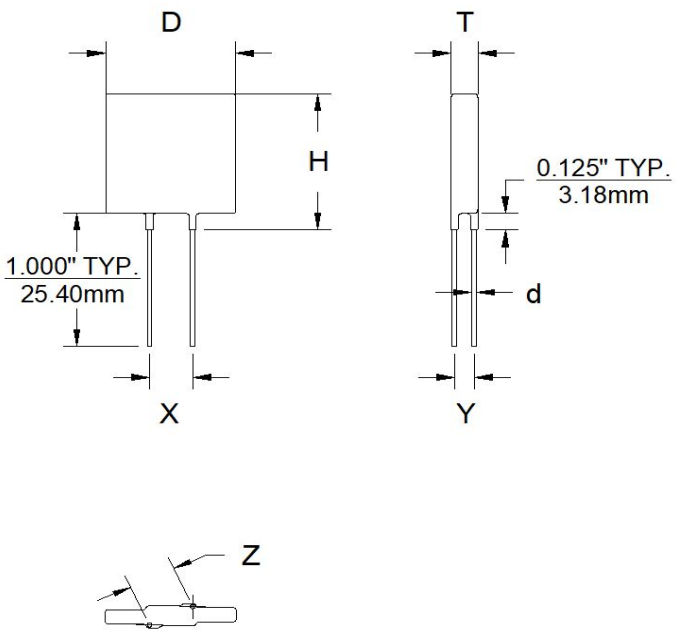
HC SERIES

MECHANICAL SPECIFICATIONS

Round



Square



Round

Dimension	8mm	10mm	11mm	12mm	14mm	16mm	18mm	20mm	25mm
MAX. D	0.394"	0.472"	0.531"	0.590"	0.650"	0.710"	0.787"	0.905"	1.100"
MAX. T	0.204" - 0.336"	0.204" - 0.402"	0.204" - 0.402"	0.204" - 0.410"	0.204" - 0.417"	0.204" - 0.417"	0.204" - 0.420"	0.204" - 0.420"	0.204" - 0.420"
MAX. H	0.519"	0.597"	0.656	0.715"	0.775"	0.835"	0.912"	1.030"	1.250"
TYP. X	0.200"	0.300"	0.300"	0.300"	0.300"	0.300"	0.300"	0.300"	0.500"
TYP. d	0.032"	0.032"	0.032"	0.032"	0.032"	0.032"	0.032"	0.032"	0.040"

Square

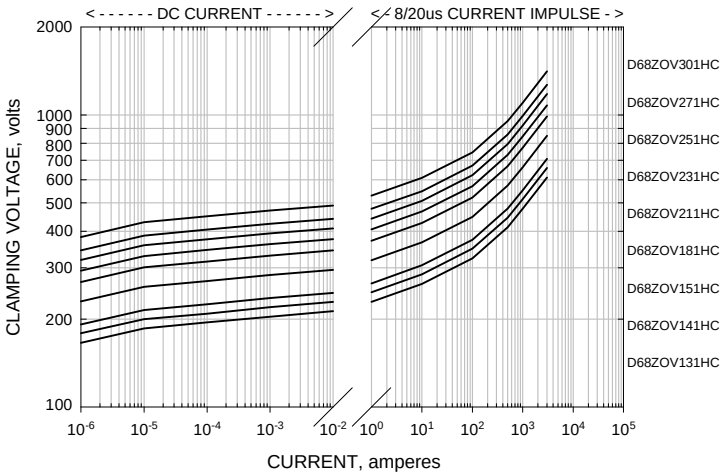
Dimension	9mm	10mm	11mm	12mm	14mm	17mm	20mm	22mm	25mm
MAX. D	0.454"	0.494"	0.533"	0.566"	0.651"	0.763"	0.877"	0.925"	1.142"
MAX. T	0.271" - 0.465"	0.271" - 0.465"	0.271" - 0.465"	0.271" - 0.465"	0.271" - 0.465"	0.271" - 0.465"	0.271" - 0.465"	0.271" - 0.465"	0.271" - 0.465"
MAX. H	0.579"	0.619"	0.658"	0.691"	0.776"	0.888"	1.002"	1.050"	1.267"
TYP. X	0.300"	0.300"	0.300"	0.300"	0.300"	0.300"	0.300"	0.300"	0.300"
TYP. d	0.032"	0.032"	0.032"	0.032"	0.032"	0.032"	0.032"	0.032"	0.032"

NOTES:

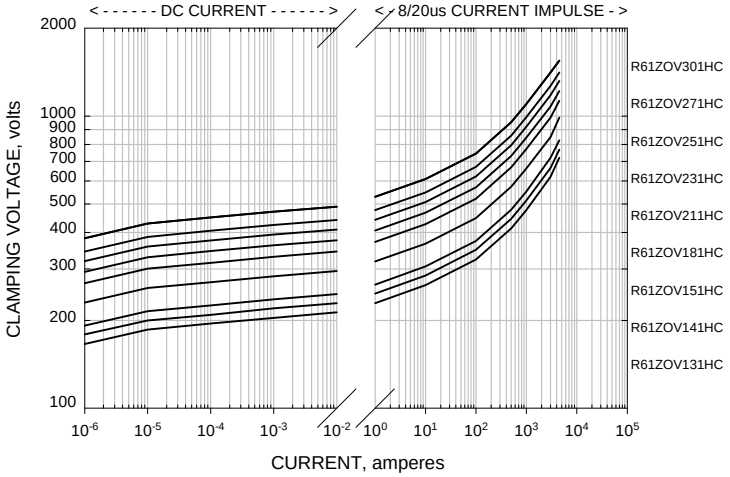
1. Alternate dimensional specifications, including lead styles, for any part listed may be available upon request.
2. Specifications are subject to change. Contact Maida for specific datasheet for exact dimensions.

HC SERIES - TYPICAL VOLTAGE-CURRENT CURVES

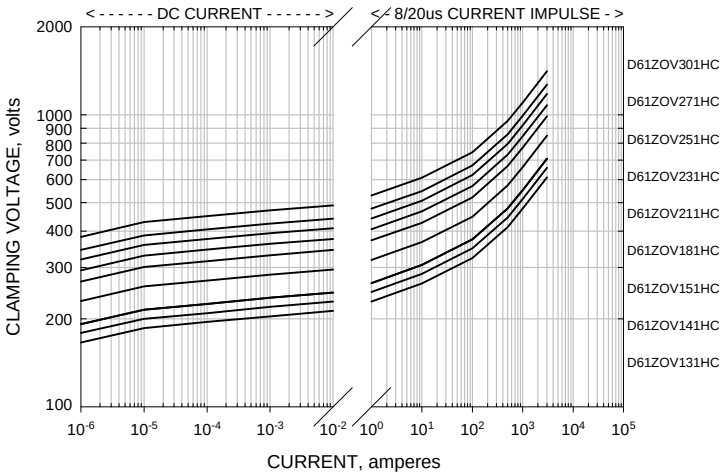
D68 (8mm) SERIES



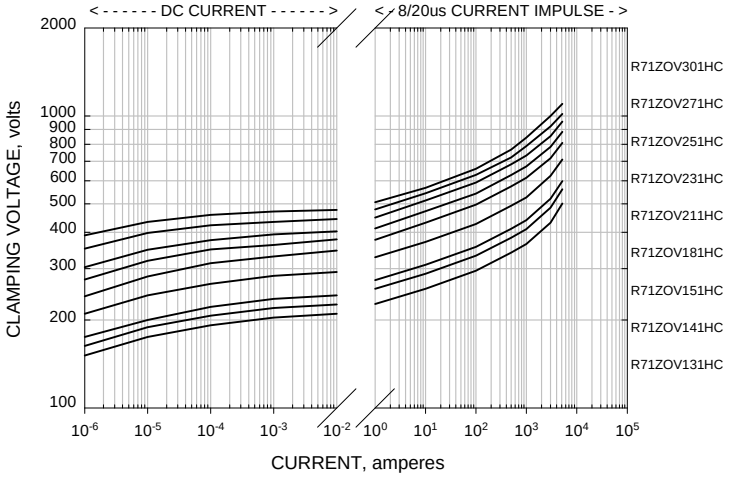
R61 (9mm SQUARE) SERIES



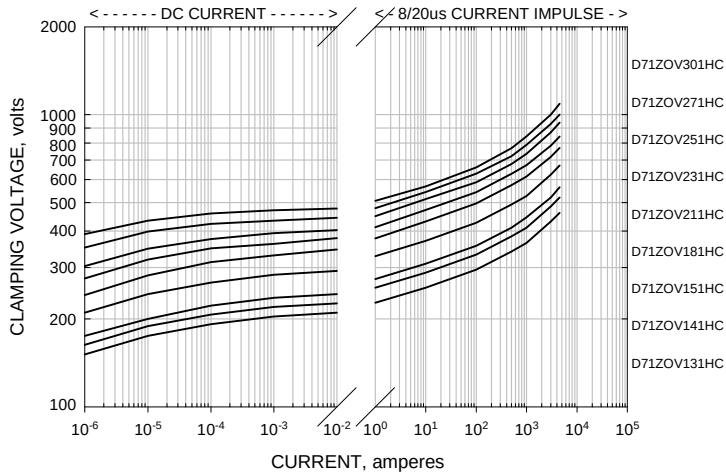
D61 (10mm) SERIES



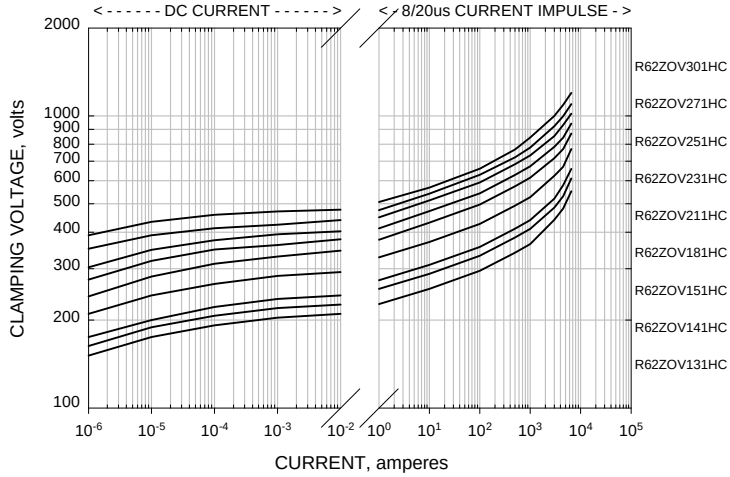
R71 (10mm SQUARE) SERIES



D71 (11mm) SERIES



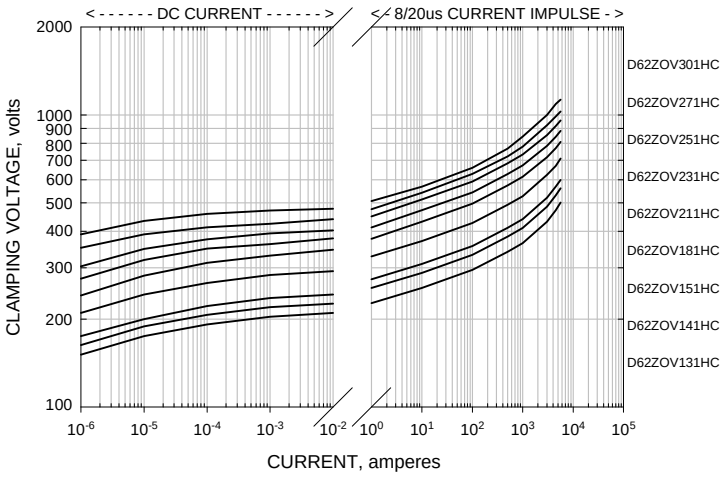
R62 (11mm SQUARE) SERIES



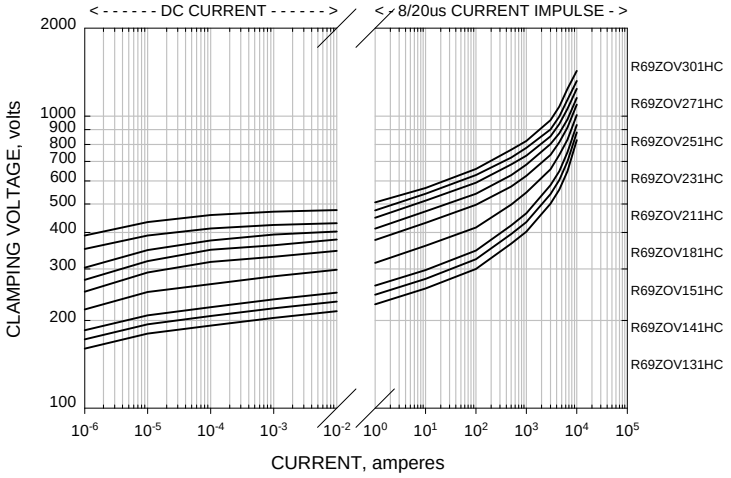
NOTE: For a more detailed V-I curve or for a voltage not listed on the graphs provided, please contact us.

HC SERIES - TYPICAL VOLTAGE-CURRENT CURVES

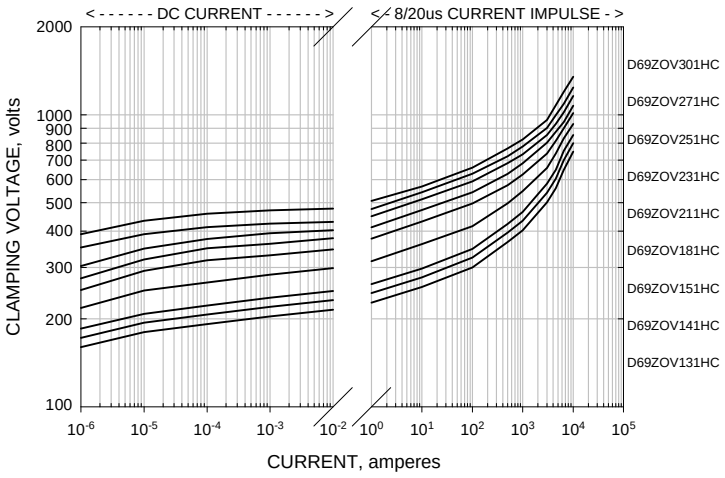
D62 (12mm) SERIES



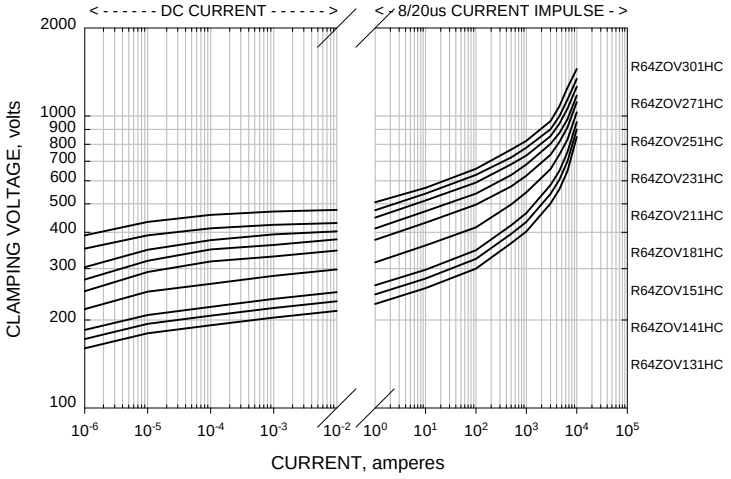
R69 (12mm SQUARE) SERIES



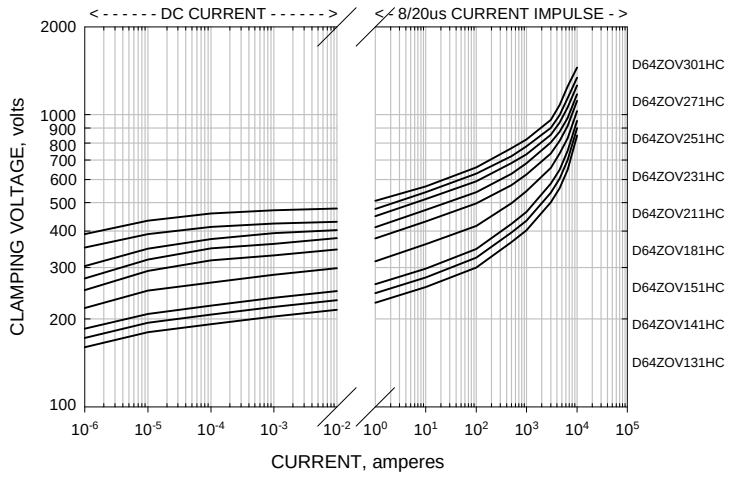
D69 (14mm) SERIES



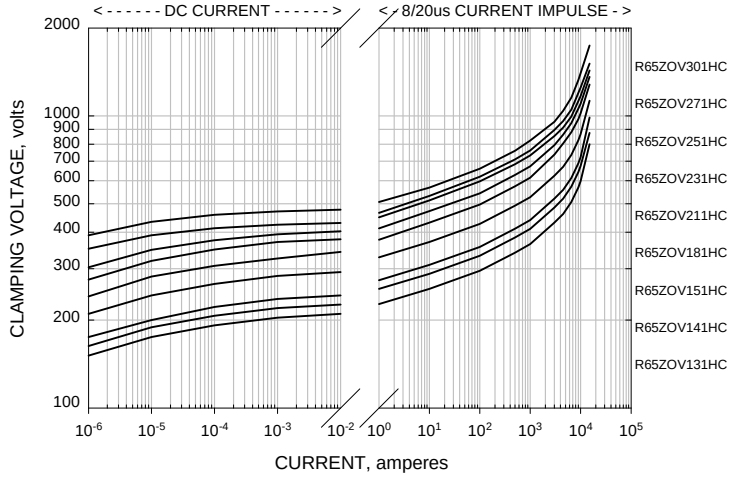
R64 (14mm SQUARE) SERIES



D64 (16mm) SERIES



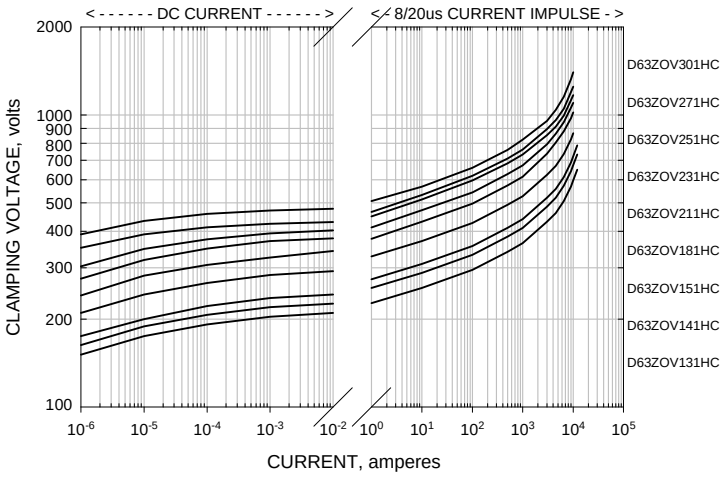
R65 (17mm SQUARE) SERIES



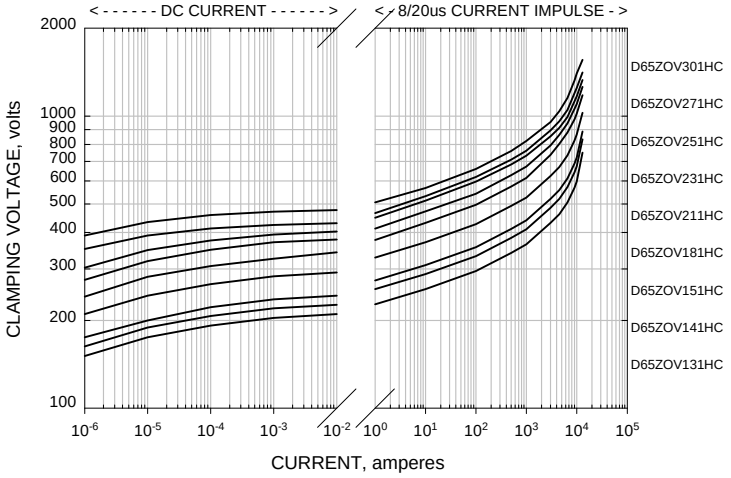
NOTE: For a more detailed V-I curve or for a voltage not listed on the graphs provided, please contact us.

HC SERIES - TYPICAL VOLTAGE-CURRENT CURVES

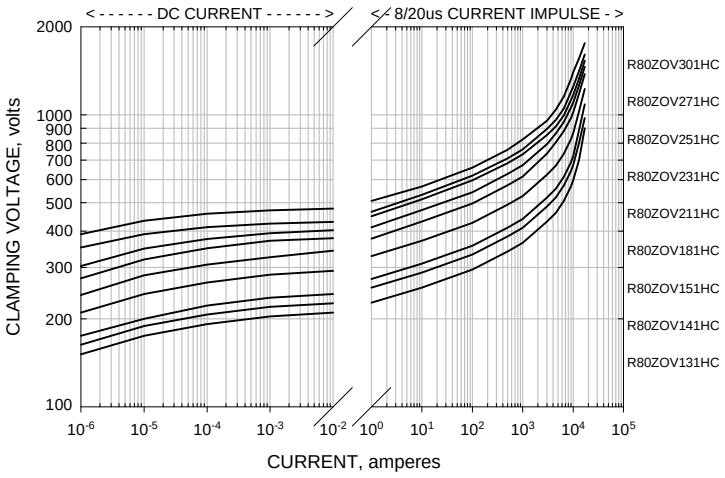
D63 (18mm) SERIES



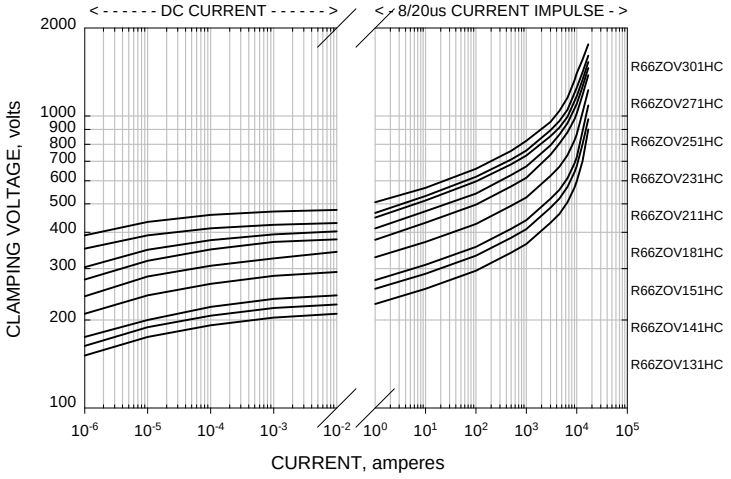
D65 (20mm) SERIES



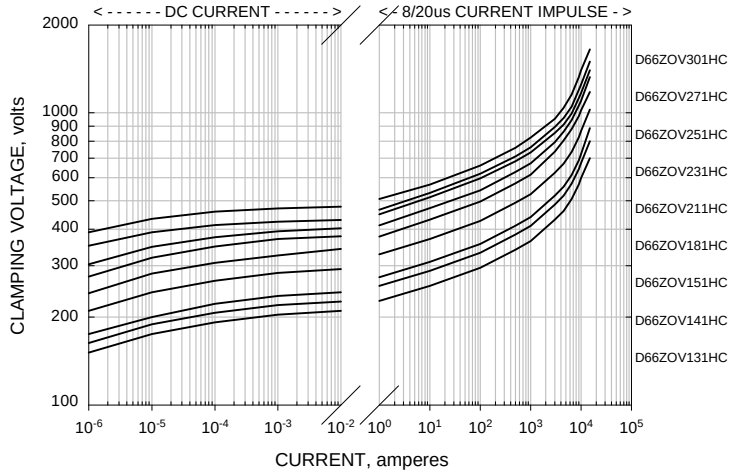
R80 (20mm SQUARE) SERIES



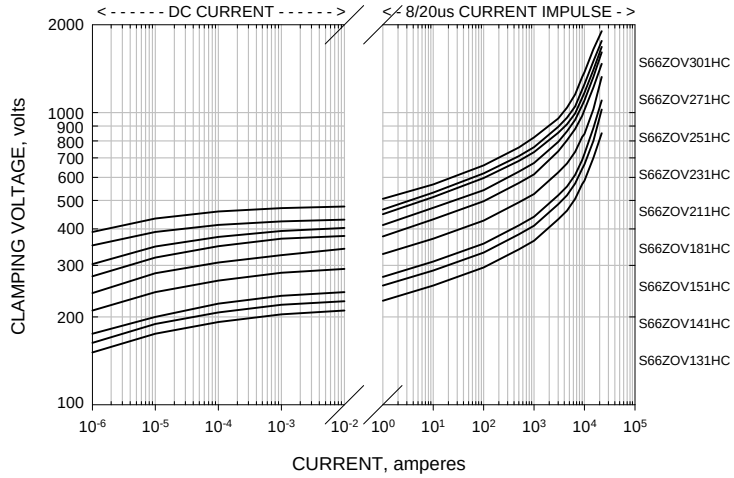
R66 (22mm SQUARE) SERIES



D66 (25mm) SERIES



S66 (25mm SQUARE) SERIES



NOTE: For a more detailed V-I curve or for a voltage not listed on the graphs provided, please contact us.

LOW PROFILE SERIES

INTRODUCTION

The Low Profile Series compliments our Standard Series as our square, radial-leaded varistors. These components consist of wire leads and have nominal sizes from 12mm to 25mm. They are available with maximum continuous operating voltages (MCOV) ranging from 130VAC to 1000VAC.
The Low Profile Series are designed to fit into spaces that Standard Series electrically equivalent are unable to fit. Most sizes are available in Tape and Reel and ammo pack.

STYLE DESIGNATION

The Maida Style Number is the typical means to identify our components when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number.
The following example is the standard part numbering system when ordering our Low-Profile Series components by the Maida Style Number:

R 65 21 ZOV 131 RA 150 T1N

1. **Coating Designation**
   R – Epoxy Coating
   S – Epoxy Coating, 25mm
   PR/PS – Square Phenolic Coating
   Neither – Denote no conformal coating.
2. **Nominal Size**
   R69 – 12mm Square
   R65 – 17mm Square
   R66 – 22mm Square
   S66 – 25mm Square
3. **Lead Configuration**
   (Refer to lead codes)
4. **Material Identifier**
   Zinc Oxide Varistor
5. **AC Voltage Rating**
   Two significant figures plus number of zeroes that follow, i.e. 131 is 130 VAC
6. **Special Instructions,** RA is standard
7. **Rating Code,** up to four numbers
8. **Optional Taping Code**
   T – Tape & Reel, Tape & Ammo
   Followed by up to two digit alphanumeric

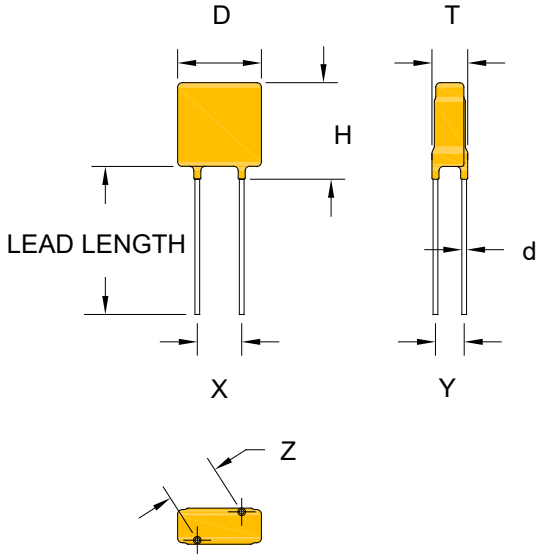
STANDARD MARKING

Minimum marking shall consist of an abbreviated style designation and, when space is available, the manufacturer's initials or company logo.

Example:
MDC
R65
131UL

Where:
MDC - Company Initials
R65 – Square Size
131 – AC Voltage rating (130VAC)
UL - UL recognition, if applicable

A manufacturing date code and/or special markings are available upon request.
Other safety agency designations are included where applicable.



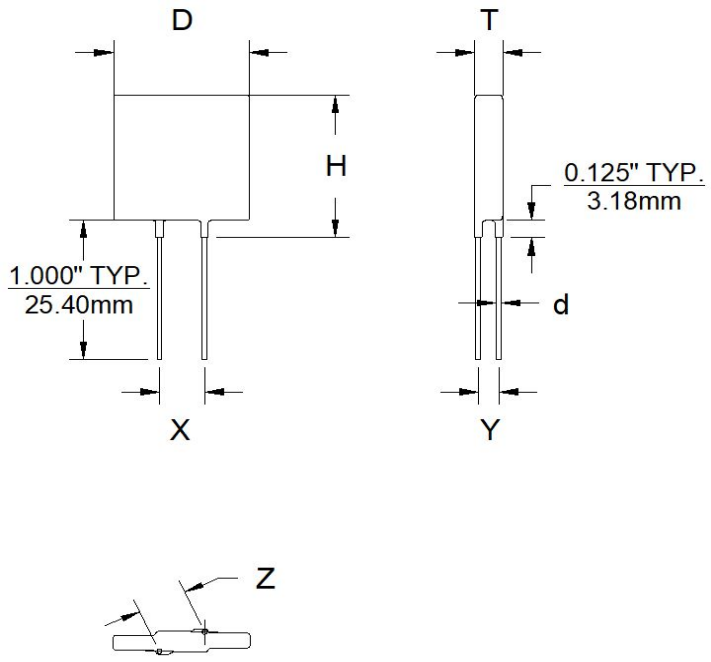
Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient				Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses						1 V rms
											10 x 1000 μsec	8 x 20 μsec	1	2	Vmin	Vmax	(8 x 20μsec)		@1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	(A)	(A)	(V)	(V)	(V)	(A)	(pF)
R6921ZOV131RA70	X	X					12	R69-131	130	175	70	70	6500	5000	184	224	340	50	780
R6521ZOV131RA150	X	X					17	R65-131UL	130	175	150	150	12000	9000	184	224	340	100	1770
R6678ZOV131RA170	X	X					22	R66-131UL	130	175	170	170	18000	15000	184	224	325	150	3280
S6678ZOV131RA235	X	X					25	S66-131UL	130	175	235	235	22000	18000	184	224	325	200	5000
R6921ZOV141RA78	X	X					12	R69-141	140	180	78	78	6500	5000	198	242	360	50	700
R6521ZOV141RA160	X	X					17	R65-141UL	140	180	160	160	12000	9000	198	242	360	100	1600
R6678ZOV141RA180	X	X					22	R66-141UL	140	180	180	180	18000	15000	198	242	345	150	2990
S6678ZOV141RA240	X	X					25	S66-141UL	140	180	240	240	22000	18000	198	242	345	200	4700
R6921ZOV151RA84	X	X					12	R69-151	150	200	84	84	6500	5000	212	259	395	50	650
R6521ZOV151RA170	X	X					17	R65-151UL	150	200	170	170	12000	9000	212	259	395	100	1480
R6678ZOV151RA190	X	X					22	R66-151UL	150	200	190	190	18000	15000	212	259	360	150	2740
S6678ZOV151RA250	X	X					25	S66-151UL	150	200	250	250	22000	18000	212	259	360	200	4300
R6921ZOV181RA100	X	X					12	R69-181	180	230	100	100	6000	4500	255	311	465	50	560
R6521ZOV181RA190	X	X					17	R65-181UL	180	230	190	190	10000	7000	255	311	465	100	1270
R6678ZOV181RA200	X	X					22	R66-181UL	180	230	200	200	15000	12000	255	311	455	150	2350
S6678ZOV181RA310	X	X					25	S66-181UL	180	230	310	310	18000	15000	255	311	455	200	3210
R69ZOV211RA120	X	X					12	R69-211	210	270	120	120	6000	4500	297	363	540	50	480
R65ZOV211RA230	X	X					17	R65-211UL	210	270	230	230	10000	7000	297	363	540	100	1080
R6678ZOV211RA250	X	X					22	R66-211UL	210	270	250	250	15000	12000	297	363	540	150	1990
S6678ZOV211RA340	X	X					25	S66-211UL	210	270	420	420	18000	15000	297	363	540	200	2720
R69ZOV231RA135	X	X					12	R69-231	230	300	135	135	6000	4500	326	397	595	50	440
R65ZOV231RA270	X	X					17	R65-231UL	230	300	270	270	10000	7000	326	397	595	100	1000
R6678ZOV231RA280	X	X					22	R66-231UL	230	300	280	280	15000	12000	326	397	590	150	1820
S6678ZOV231RA360	X	X					25	S66-231UL	230	300	490	490	18000	15000	326	397	590	200	2500
R69ZOV251RA145	X	X					12	R69-251	250	330	145	145	6000	4500	354	432	650	50	400
R65ZOV251RA300	X	X					17	R65-251UL	250	330	300	300	10000	7000	354	432	650	100	910
R6678ZOV251RA315	X	X					22	R66-251UL	250	330	315	315	15000	12000	354	432	620	150	1680
S6678ZOV251RA400	X	X					25	S66-251UL	250	330	550	550	18000	15000	354	432	620	200	2300
R69ZOV271RA160	X	X					12	R69-271	270	360	160	160	6000	4500	382	466	710	50	370
R65ZOV271RA325	X	X					17	R65-271UL	270	360	325	325	10000	7000	382	466	710	100	850
R6678ZOV271RA340	X	X					22	R66-271UL	270	360	340	340	15000	12000	382	466	680	150	1560
S6678ZOV271RA430	X	X					25	S66-271UL	270	360	595	595	18000	15000	382	466	680	200	2140
R69ZOV301RA175	X	X					12	R69-301	300	390	175	175	6000	4500	425	518	790	50	330
R65ZOV301RA350	X	X					17	R65-301UL	300	390	350	350	10000	7000	425	518	760	100	760
R6678ZOV301RA360	X	X					22	R66-301UL	300	390	360	360	13000	10000	425	518	760	150	1400
S6678ZOV301RA460	X	X					25	S66-301UL	300	390	640	640	15000	12000	425	518	760	200	1910
R69ZOV321RA190	X	X					12	R69-321	320	420	190	190	6000	4500	453	553	850	50	310
R65ZOV321RA385	X	X					17	R65-321UL	320	420	385	385	10000	7000	453	553	810	100	710
R6678ZOV321RA430	X	X					22	R66-321UL	320	420	430	430	13000	10000	453	553	810	150	1310
S6678ZOV321RA510	X	X					25	S66-321UL	320	420	700	700	15000	12000	453	553	810	200	1800
R69ZOV361RA205	X	X					12	R69-361	360	470	205	205	6000	4500	522	638	960	50	270
R65ZOV361RA410	X	X					17	R65-361UL	360	470	410	410	10000	7000	522	638	930	100	610
R6678ZOV361RA440	X	X					22	R66-361UL	360	470	440	440	13000	10000	522	638	930	150	1130
S6678ZOV361RA560	X	X					25	S66-361UL	360	470	750	750	15000	12000	522	638	930	200	1550
R69ZOV391RA215	X	X					12	R69-391UL	390	505	215	215	6000	4500	552	674	1025	50	260
R65ZOV391RA420	X	X					17	R65-391UL	390	505	420	420	10000	7000	552	674	1025	100	580
R6678ZOV391RA460	X	X					22	R66-391UL	390	505	460	460	13000	10000	552	674	1025	150	1070
S6678ZOV391RA590	X	X					25	S66-391UL	390	505	770	770	15000	12000	552	674	1025	200	1470
R69ZOV421RA225	X	X					12	R69-421UL	420	560	225	225	6000	4500	594	725	1120	50	240
R65ZOV421RA430	X	X					17	R65-421UL	420	560	430	430	10000	7000	594	725	1060	100	540
R6678ZOV421RA480	X	X					22	R66-421UL	420	560	480	480	13000	10000	594	725	1060	150	1000
S6678ZOV421RA610	X	X					25	S66-421UL	420	560	780	780	15000	12000	594	725	1060	200	1360
R69ZOV461RA230	X	X					12	R69-461UL	460	615	230	230	6000	4500	651	795	1240	50	220
R65ZOV461RA450	X	X					17	R65-461UL	460	615	450	450	10000	7000	651	795	1120	100	500
R6678ZOV461RA500	X	X					22	R66-461UL	460	615	500	500	13000	10000	651	795	1120	150	910
S6678ZOV461RA640	X	X					25	S66-461UL	460	615	825	825	15000	12000	651	795	1120	200	1240
R69ZOV481RA235	X	X					12	R69-481UL	480	640	235	235	6000	4500	679	829	1300	50	210
R65ZOV481RA460	X	X					17	R65-481UL	480	640	460	460	10000	7000	679	829	1160	100	470
R6678ZOV481RA510	X	X					22	R66-481UL	480	640	510	510	13000	10000	679	829	1160	150	880
S6678ZOV481RA650	X	X					25	S66-481UL	480	640	840	840	15000	12000	679	829	1160	200	1200
R69ZOV511RA240	X	X					12	R69-511UL	510	675	240	240	6000	4500	722	881	1350	50	200
R65ZOV511RA470	X	X					17	R65-511UL	510	675	470	470	10000	7000	722	881	1280	100	440
R6678ZOV511RA525	X	X					22	R66-511UL	510	675	525	525	13000	10000	722	881	1280	150	820
S6678ZOV511RA675	X	X					25	S66-511UL	510	675	860	860	15000	12000	722	881	1280	200	1120
R69ZOV551RA255	X	X					12	R69-551UL	550	700	255	255	6000	4500	778	950	1400	50	180
R65ZOV551RA510	X	X					17	R65-551UL	550	700	510	510	10000	7000	778	950	1360	100	410
R6678ZOV551RA540	X	X					22	R66-551UL	550	700	540	540	13000	10000	778	950	1360	150	760
S6678ZOV551RA690	X	X					25	S66-551UL	550	700	930	930	15000	12000	778	950	1360	200	1050

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient				Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses						
											10 x 1000 μsec	8 x 20 μsec	1	2	Vmin	Vmax	(8 x 20μsec)		1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	(A)	(A)	(V)	(V)	(V)	(A)	(pF)
R69ZOV581RA265	X	X					12	R69-581UL	580	735	265	265	6000	4500	821	1002	1500	50	170
R65ZOV581RA530	X	X					17	R65-581UL	580	735	530	530	10000	7000	821	1002	1430	100	390
R6678ZOV581RA560	X	X					22	R66-581UL	580	735	560	560	13000	10000	821	1002	1430	150	720
S6678ZOV581RA720	X	X					25	S66-581UL	580	735	970	970	15000	12000	821	1002	1430	200	990
R69ZOV621RA290	X	X					12	R69-621UL	620	800	290	290	6000	4500	877	1071	1650	50	160
R65ZOV621RA565	X	X					17	R65-621UL	620	800	565	565	10000	7000	877	1071	1540	100	360
R6678ZOV621RA600	X	X					22	R66-621UL	620	800	600	600	13000	10000	877	1071	1540	150	670
S6678ZOV621RA770	X	X					25	S66-621UL	620	800	1030	1030	15000	12000	877	1071	1540	200	920
R69ZOV681RA310	X	X					12	R69-681UL	680	860	310	310	6000	4500	962	1175	1800	50	150
R65ZOV681RA620	X	X					17	R65-681UL	680	860	620	620	10000	7000	962	1175	1700	100	330
R6678ZOV681RA655	X	X					22	R66-681UL	680	860	655	655	13000	10000	962	1175	1700	150	620
S6678ZOV681RA840	X	X					25	S66-681UL	680	860	1100	1100	15000	12000	962	1175	1700	200	840
R69ZOV751RA350	X	X					12	R69-751UL	750	900	350	350	6000	4500	1062	1300	2100	50	130
R65ZOV751RA670	X	X					17	R65-751UL	750	900	670	670	10000	7000	1062	1300	1880	100	300
R6678ZOV751RA700	X	X					22	R66-751UL	750	900	700	700	13000	10000	1062	1300	1880	150	550
S6678ZOV751RA900	X	X					25	S66-751UL	750	900	1250	1250	15000	12000	1062	1300	1880	200	750
R69ZOV102RA510	X	X					12	R69-102UL	1000	1200	510	510	6000	4500	1414	1728	2700	50	100
R65ZOV102RA860	X	X					17	R65-102UL	1000	1200	860	860	10000	7000	1414	1728	2500	100	230
R6678ZOV102RA875	X	X					22	R66-102UL	1000	1200	875	875	13000	10000	1414	1728	2500	150	420
S6678ZOV102RA1100	X	X					25	S66-102UL	1000	1200	1500	1500	15000	12000	1414	1728	2500	200	570

A = UL1449
B = cUL
C = CSA
D = VDE
E = DEMKO
F =

LOW PROFILE SERIES

MECHANICAL SPECIFICATIONS



Square

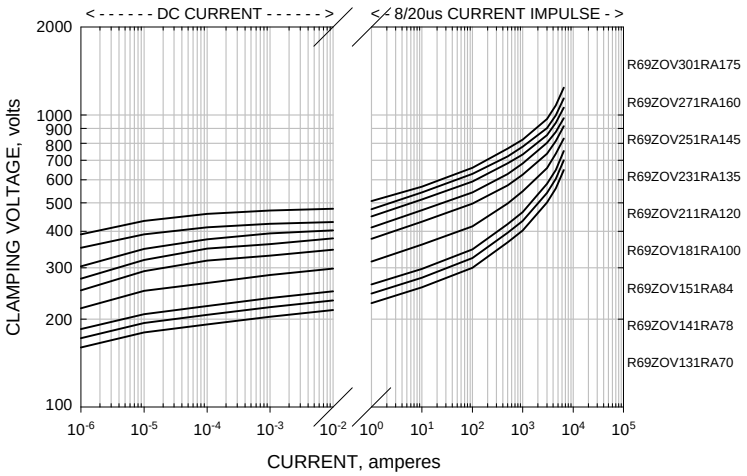
Dimension	12mm	17mm	22mm	25mm
MAX. D	0.566"	0.763"	0.925"	1.142"
MAX. T	0.248" - 0.514"	0.248" - 0.514"	0.248" - 0.514"	0.248" - 0.514"
MAX. H	0.691"	0.888"	1.050"	1.267"
TYP. X	0.300"	0.300"	0.394"	0.394"
TYP. d	0.032"	0.032"	0.032"	0.032"

NOTES:

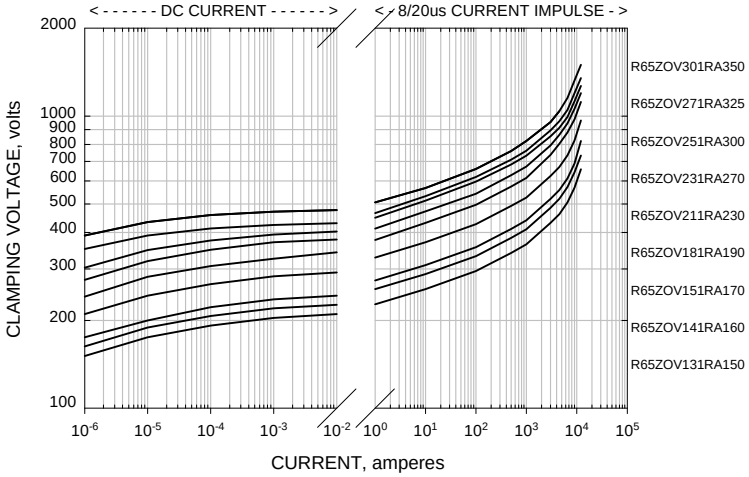
1. Alternate dimensional specifications, including lead styles, for any part listed may be available upon request.
2. Specifications are subject to change. Contact Maida for specific datasheet for exact dimensions.

LOW PROFILE SERIES - TYPICAL VOLTAGE-CURRENT CURVES

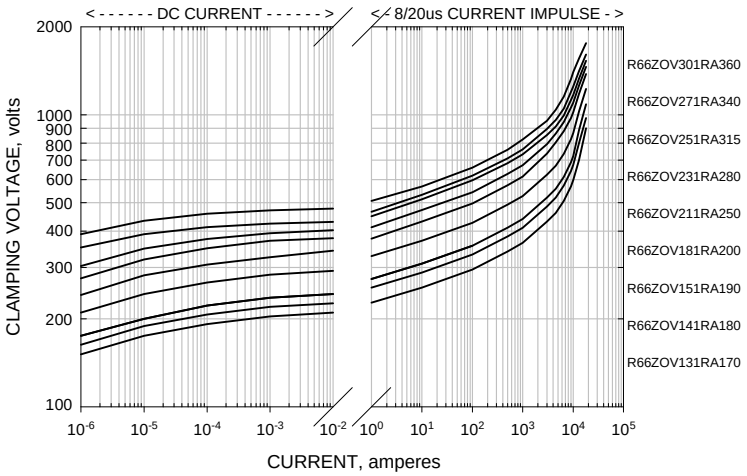
R69 (12mm SQUARE) SERIES



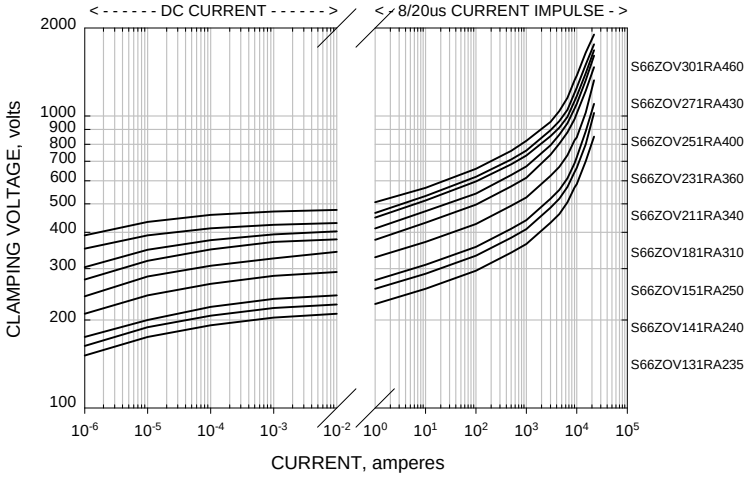
R65 (17mm SQUARE) SERIES



R66 (22mm SQUARE) SERIES



S66 (25mm SQUARE) SERIES



NOTE: For a more detailed V-I curve or for a voltage not listed on the graphs provided, please contact us.

HIGH ENERGY SERIES

INTRODUCTION

The High Energy Series is our large tab-leaded and wire-leaded varistors. They are available in round and square shapes. These varistors are available in 25mm, 32mm, 34mm, 40mm, and 53mm configurations including single and dual discs. They are available with maximum continuous operating voltages (MCOV) ranging from 130VAC to 1000VAC (up to 1500VAC upon request).
The High Energy Series is designed for pulse repetition and/or very large surge current environments. Numerous tab forms are available for all sizes, with limited wire leaded options.

STYLE DESIGNATION

The Maida Style Number is the typical means to identify our components when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number.
The following example is the standard part numbering system when ordering our High Energy Series components by the Maida Style Number:

D 78 80 ZOV 131 RA 210

1. **Coating Designation**
   D – Standard Epoxy Coating
   P – Phenolic Coating
   S – Square Disc Epoxy Coating
   PS – Square Disc Phenolic Coating
   Neither – Denote no conformal coating.
2. **Nominal Disk Diameter**
   S66 – 25mm Square
   78 – 32mm
   S75 – 34mm Square
   75 – 40mm
   77 – 53mm
3. **Lead Configuration**
   (Refer to lead codes)
4. **Material Identifier**
   Zinc Oxide Varistor
5. **AC Voltage Rating**
   Two significant figures plus number of zeroes that follow, i.e. 131 is 130 VAC
6. **Special Instructions,** RA is standard
7. **Rating Code,** up to four numbers

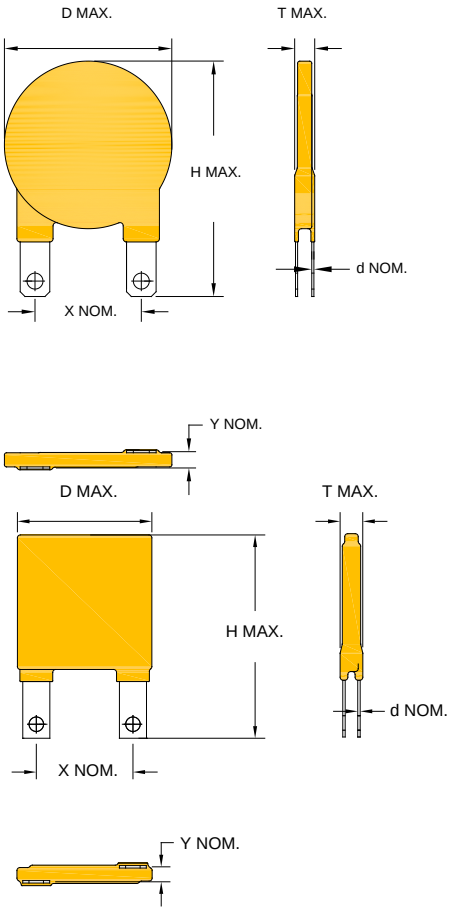
STANDARD MARKING

Minimum marking shall consist of an abbreviated style designation and, when space is available, the manufacturer's initials or company logo.

Example
MDC
Z131
210UL

Where:
MDC - Company Initials
Z - Zinc Oxide Varistor
131 - AC Voltage rating (130VAC)
210 - Rating code
UL - UL recognition, if applicable

A manufacturing date code and/or special markings are available upon request.
Other safety agency designations are included where applicable.



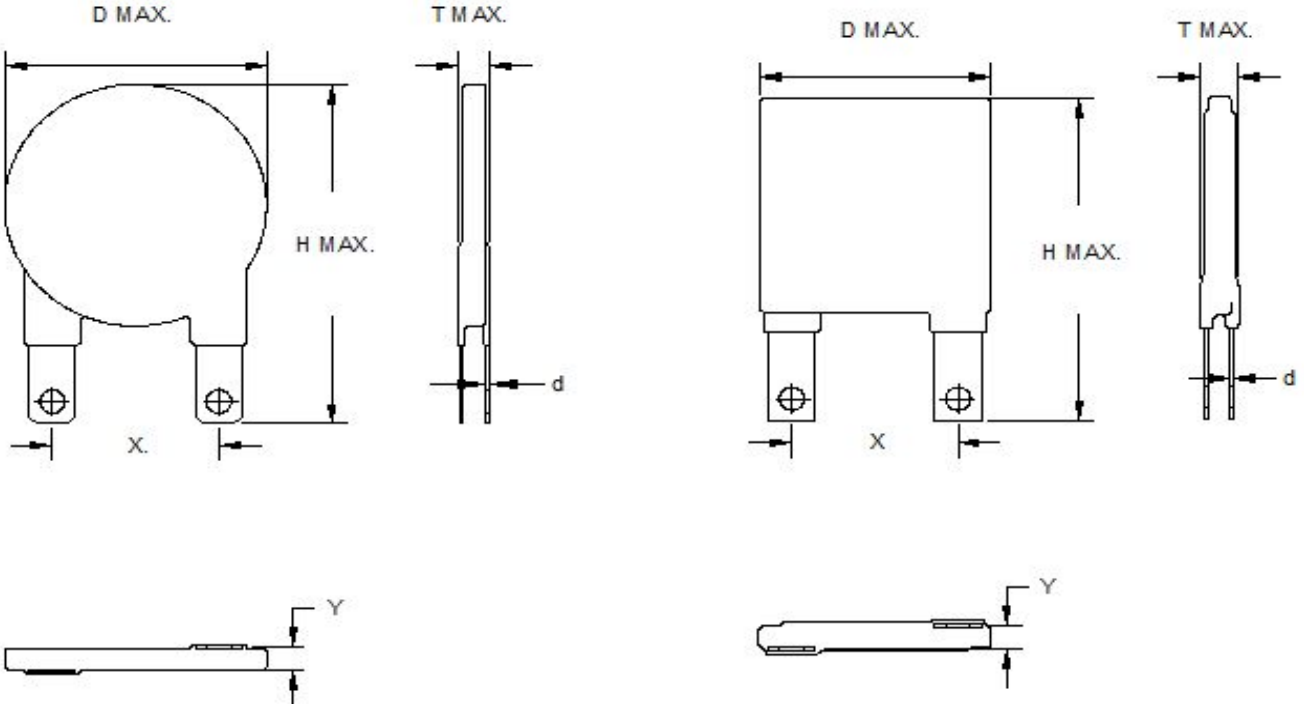
Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec	1	2			(8 x 20μsec)		1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	(A)	(A)	Vmin (V)	Vmax (V)	(V)	(A)	(pF)
S6680ZOV131RA180	X	X					25	C5S-131UL	130	175	180	180	20000	14000	184	224	340	100	5000
D7880ZOV131RA210	X	X					32	Z131-210UL	130	175	210	210	25000	20000	184	224	340	200	5400
S7580ZOV131RA310	X	X					34	D4S-131UL	130	175	310	310	40000	32000	184	224	340	300	8100
D7580ZOV131RA310	X	X					40	Z131-310UL	130	175	310	310	40000	32000	184	224	340	300	7600
D7780ZOV131RA490	X	X					53	Z131-490UL	130	175	490	490	70000	56000	184	224	340	500	15000
S6680ZOV141RA190	X	X					25	C5S-141UL	140	180	190	190	20000	14000	198	242	360	100	4700
D7880ZOV141RA225	X	X					32	Z141-225UL	140	180	225	225	25000	20000	198	242	360	200	5000
S7580ZOV141RA330	X	X					34	D4S-141UL	140	180	330	330	40000	32000	198	242	360	300	7500
D7580ZOV141RA330	X	X					40	Z141-330UL	140	180	330	330	40000	32000	198	242	360	300	7100
D7780ZOV141RA530	X	X					53	Z141-530UL	140	180	530	530	70000	56000	198	242	360	500	14000
S6680ZOV151RA200	X	X					25	C5S-151UL	150	200	200	200	20000	14000	212	259	395	100	4300
D7880ZOV151RA240	X	X					32	Z151-240UL	150	200	240	240	25000	20000	212	259	395	200	4600
S7580ZOV151RA360	X	X					34	D4S-151UL	150	200	360	360	40000	32000	212	259	395	300	6900
D7580ZOV151RA360	X	X					40	Z151-360UL	150	200	360	360	40000	32000	212	259	395	300	6500
D7780ZOV151RA570	X	X					53	Z151-570UL	150	200	570	570	70000	56000	212	259	395	500	13000
S6680ZOV181RA250	X	X					25	C5S-181UL	180	230	250	250	20000	14000	255	311	465	100	3200
D7880ZOV181RA250	X	X					32	Z181-250UL	180	230	250	250	25000	20000	255	311	465	200	2900
S7580ZOV181RA390	X	X					34	D4S-181UL	180	230	390	390	40000	32000	255	311	465	300	5600
D7580ZOV181RA390	X	X					40	Z181-390UL	180	230	390	390	40000	32000	255	311	465	300	4000
D7780ZOV181RA630	X	X					53	Z181-630UL	180	230	630	630	70000	56000	255	311	465	500	6300
S6680ZOV211RA270	X	X					25	C5S-211UL	210	270	270	270	20000	14000	297	363	640	100	2700
D7880ZOV211RA360	X						32	Z211-360UL	210	270	360	360	25000	20000	297	363	640	200	2500
S7580ZOV211RA430	X	X					34	D4S-211UL	210	270	430	430	40000	32000	297	363	640	300	4800
D7580ZOV211RA430	X						40	Z211-430UL	210	270	430	430	40000	32000	297	363	640	300	3400
D7780ZOV211RA700	X	X					53	Z211-700UL	210	270	700	700	70000	56000	297	363	640	500	5400
S6680ZOV231RA290	X	X					25	C5S-231UL	230	300	290	290	20000	14000	326	397	595	100	2500
D7880ZOV231RA300	X	X					32	Z231-300UL	230	300	300	300	25000	20000	326	397	595	200	2300
S7580ZOV231RA460	X	X					34	D4S-231UL	230	300	460	460	40000	32000	326	397	595	300	4400
D7580ZOV231RA460	X	X					40	Z231-460UL	230	300	460	460	40000	32000	326	397	595	300	3100
D7780ZOV231RA730	X	X					53	Z231-730UL	230	300	730	730	70000	56000	326	397	595	500	4900
S6680ZOV251RA310	X	X	X				25	C5S-251UL	250	330	330	330	20000	14000	354	432	650	100	2300
D7880ZOV251RA330	X	X	X				32	Z251-330UL	250	330	360	330	25000	20000	354	432	650	200	2500
S7580ZOV251RA490	X	X	X				34	D4S-251UL	250	330	490	490	40000	32000	354	432	650	300	4100
D7580ZOV251RA490	X	X	X				40	Z251-490UL	250	330	490	490	40000	32000	354	432	650	300	2900
D7780ZOV251RA800	X	X	X				53	Z251-800UL	250	330	880	880	70000	56000	354	432	650	500	4600
S6680ZOV271RA330	X	X					25	C5S-271UL	270	360	340	340	20000	14000	382	466	710	100	2100
D7880ZOV271RA360	X	X					32	Z271-360UL	270	360	360	360	25000	20000	382	466	710	200	2000
S7580ZOV271RA550	X	X					34	D4S-271UL	270	360	550	550	40000	32000	382	466	710	300	3800
D7580ZOV271RA550	X	X					40	Z271-550UL	270	360	550	550	40000	32000	382	466	710	300	2700
D7780ZOV271RA860	X	X					53	Z271-860UL	270	360	950	950	70000	56000	382	466	710	500	4200
S6680ZOV301RA350	X	X					25	C5S-301UL	300	390	350	350	20000	14000	425	518	790	100	1900
D7880ZOV301RA380	X	X					32	Z301-380UL	300	390	380	380	25000	20000	425	518	790	200	1700
S7580ZOV301RA600	X	X					34	D4S-301UL	300	390	600	600	40000	32000	425	518	790	300	3400
D7580ZOV301RA600	X	X					40	Z301-600UL	300	390	600	600	40000	32000	425	518	790	300	2400
D7780ZOV301RA940	X	X					53	Z301-940UL	300	390	1000	1000	70000	56000	425	518	790	500	3800
S6680ZOV321RA360	X	X					25	C5S-321UL	320	420	360	360	20000	14000	453	553	850	100	1800
D7880ZOV321RA430	X	X					32	Z321-430UL	320	420	430	430	25000	20000	453	553	850	200	1600
S7580ZOV321RA640	X	X					34	D4S-321UL	320	420	640	640	40000	32000	453	553	850	300	3200
D7580ZOV321RA640	X	X					40	Z321-640UL	320	420	640	640	40000	32000	453	553	850	300	2200
D7780ZOV321RA1000	X	X					53	Z321-1000UL	320	420	1100	1100	70000	52000	453	553	850	500	3600
S6680ZOV341RA365	X	X					25	C5S-340UL	340	440	365	365	20000	14000	480	587	910	100	1700
D7880ZOV341RA500	X	X					32	Z341-500UL	340	440	500	500	25000	20000	480	587	910	200	1550
S7580ZOV341RA685	X	X					34	D4S-341UL	340	440	685	685	40000	32000	480	587	910	300	2200
D7580ZOV341RA685	X	X					40	Z341-685UL	340	440	685	685	40000	32000	480	587	910	300	2100
D7780ZOV341RA1140	X	X					53	Z341-1140UL	340	440	1140	1140	70000	56000	480	587	910	500	3400
S6680ZOV361RA370	X	X					25	C5S-361UL	360	470	370	370	20000	14000	522	638	960	100	1500
D7880ZOV361RA530	X	X					32	Z361-530UL	360	470	530	530	25000	20000	522	638	960	200	1400
S7580ZOV361RA710	X	X					34	D4S-361UL	360	470	710	710	40000	32000	522	638	960	300	2800
D7580ZOV361RA710	X	X					40	Z361-710UL	360	470	710	710	40000	32000	522	638	960	300	1900
D7780ZOV361RA1180	X	X					53	Z361-1180UL	360	470	1180	1180	70000	56000	522	638	960	500	3200
S6680ZOV391RA380	X	X					25	C5S-391UL	390	505	380	380	20000	14000	552	674	1025	100	1500
D7880ZOV391RA550	X	X					32	Z391-550UL	390	505	550	550	25000	20000	552	674	1025	200	1300
S7580ZOV391RA800	X	X					34	D4S-391UL	390	505	800	800	40000	32000	552	674	1025	300	2600
D7580ZOV391RA800	X	X					40	Z391-800UL	390	505	800	800	40000	32000	552	674	1025	300	1800
D7780ZOV391RA1200	X	X					53	Z391-1200UL	390	505	1200	1200	70000	52000	552	674	1025	500	3000
S6680ZOV421RA390	X	X					25	C5S-421UL	420	560	390	390	20000	14000	594	725	1120	100	1400
D7880ZOV421RA600	X	X					32	Z421-600UL	420	560	600	600	25000	20000	594	725	1120	200	1300
S7580ZOV421RA910	X	X					34	D4S-421UL	420	560	910	910	40000	32000	594	725	1120	300	2400
D7580ZOV421RA910	X	X					40	Z421-910UL	420	560	910	910	40000	32000	594	725	1120	300	1700
D7780ZOV421RA1500	X	X					53	Z421-1500UL	420	560	1500	1500	70000	52000	594	725	1120	500	2800

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	1 (A)	2 (A)	Vmin (V)	Vmax (V)	(8 x 20μsec) (V)	(A)	(pF)
S6680ZOV461RA430	X	X					25	C5S-461UL	460	615	430	430	20000	14000	651	795	1240	100	1200
D7880ZOV461RA520	X	X					32	Z461-520UL	460	615	520	520	25000	20000	651	795	1240	200	1100
S7580ZOV461RA780	X	X					34	D4S-461UL	460	615	920	920	40000	32000	651	795	1240	300	2200
D7580ZOV461RA780	X	X					40	Z461-780UL	460	615	780	780	40000	32000	651	795	1240	300	1500
D7780ZOV461RA1200	X	X					53	Z461-1200UL	460	615	1600	1600	70000	52000	651	795	1240	500	2500
S6680ZOV481RA440	X	X					25	C5S-481UL	480	640	440	440	20000	14000	679	829	1300	100	1200
D7880ZOV481RA550	X	X					32	Z481-550UL	480	640	550	550	25000	20000	679	829	1300	200	1100
S7580ZOV481RA820	X	X					34	D4S-481UL	480	640	930	930	40000	32000	679	829	1300	300	2100
D7580ZOV481RA820	X	X					40	Z481-820UL	480	640	820	820	40000	32000	679	829	1300	300	1500
D7780ZOV481RA1250	X	X					53	Z481-1250UL	480	640	1600	1600	70000	52000	679	829	1300	500	2400
S6680ZOV511RA450	X	X					25	C5S-511UL	510	675	450	450	20000	14000	722	881	1350	100	1100
D7880ZOV511RA580	X	X					32	Z511-580UL	510	675	580	580	25000	20000	722	881	1350	200	1000
S7580ZOV511RA900	X	X					34	D4S-511UL	510	675	940	940	40000	32000	722	881	1350	300	2000
D7580ZOV511RA900	X	X					40	Z511-900UL	510	675	900	900	40000	32000	722	881	1350	300	1400
D7780ZOV511RA1400	X	X					53	Z511-1400UL	510	675	1800	1800	70000	52000	722	881	1350	500	2300
S6680ZOV551RA480	X	X					25	C5S-551UL	550	700	480	480	20000	14000	778	950	1400	100	1000
D7880ZOV551RA620	X	X					32	Z551-620UL	550	700	620	620	25000	20000	778	950	1400	200	950
S7580ZOV551RA960	X	X					34	D4S-551UL	550	700	960	960	40000	32000	778	950	1400	300	1800
D7580ZOV551RA960	X	X					40	Z551-960UL	550	700	960	960	40000	32000	778	950	1400	300	1300
D7780ZOV551RA1500	X	X					53	Z551-1500UL	550	700	2000	2000	70000	52000	778	950	1400	500	2100
S6680ZOV581RA520	X	X					25	C5S-581UL	580	735	520	520	20000	14000	821	1002	1500	100	990
D7880ZOV581RA650	X	X					32	Z581-650UL	580	735	650	650	25000	20000	821	1002	1500	200	900
S7580ZOV581RA1000	X	X					34	D4S-581UL	580	735	1000	1000	40000	32000	821	1002	1500	300	1700
D7580ZOV581RA1000	X	X					40	Z581-1000UL	580	735	1000	1000	40000	32000	821	1002	1500	300	1200
D7780ZOV581RA1580	X	X					53	Z581-1580UL	580	735	2100	2100	70000	52000	821	1002	1500	500	2000
S6680ZOV621RA550	X	X					25	C5S-621UL	620	800	550	550	20000	14000	877	1071	1650	100	920
D7880ZOV621RA680	X	X					32	Z621-680UL	620	800	680	680	25000	20000	877	1071	1650	200	840
S7580ZOV621RA1040	X	X					34	D4S-621UL	620	800	1040	1040	40000	32000	877	1071	1650	300	1600
D7580ZOV621RA1040	X	X					40	Z621-1040UL	620	800	1040	1040	40000	32000	877	1071	1650	300	1100
D7780ZOV621RA1750	X	X					53	Z621-1750UL	620	800	2200	2200	70000	52000	877	1071	1650	500	1900
S6680ZOV681RA620	X	X					25	C5S-681UL	680	860	620	620	20000	14000	962	1175	1800	100	840
D7880ZOV681RA760	X	X					32	Z681-760UL	680	860	760	760	25000	20000	962	1175	1800	200	770
S7580ZOV681RA1100	X	X					34	D4S-681UL	680	860	1100	1100	40000	32000	962	1175	1800	300	1500
D7580ZOV681RA1100	X	X					40	Z681-1100UL	680	860	1100	1100	40000	32000	962	1175	1800	300	1000
D7780ZOV681RA1800	X	X					53	Z681-1800UL	680	860	2500	2500	70000	52000	962	1175	1800	500	1700
S6680ZOV751RA670	X	X					25	C5S-751UL	750	970	670	670	20000	14000	1062	1300	2100	100	750
D7880ZOV751RA800	X	X					32	Z751-800UL	750	970	800	800	25000	20000	1062	1300	2100	200	680
S7580ZOV751RA1200	X	X					34	D4S-751UL	750	970	1200	1200	40000	32000	1062	1300	2100	300	1300
D7580ZOV751RA1200	X	X					40	Z751-1200UL	750	970	1200	1200	40000	32000	1062	1300	2100	300	940
D7780ZOV751RA2000	X	X					53	Z751-2000UL	750	970	2600	2600	70000	52000	1062	1300	2100	500	1500
S6680ZOV881RA780	X	X					25	C5S-881UL	880	1150	780	780	20000	14000	1245	1520	2290	100	650
D7880ZOV881RA850	X	X					32	Z881-850UL	880	1150	850	850	25000	20000	1245	1520	2290	200	590
S7580ZOV881RA1300	X	X					34	D4S-881UL	880	1150	1300	1300	40000	32000	1245	1520	2290	300	1100
D7580ZOV881RA1300	X	X					40	Z881-1300UL	880	1150	1300	1300	40000	32000	1245	1520	2290	300	810
D7780ZOV881RA2500	X	X					53	Z881-2500UL	880	1150	3200	3200	70000	52000	1245	1520	2290	500	1300
S6680ZOV102RA860	X	X					25	C5S-102UL	1000	1200	860	860	20000	14000	1414	1728	2700	100	570
D7880ZOV102RA900	X	X					32	Z102-900UL	1000	1200	900	900	25000	20000	1414	1728	2700	200	520
S7580ZOV102RA1400	X	X					34	D4S-102UL	1000	1200	1400	1400	40000	32000	1414	1728	2700	300	1000
D7580ZOV102RA1400	X	X					40	Z102-1400UL	1000	1200	1400	1400	40000	32000	1414	1728	2700	300	710
D7780ZOV102RA3000	X	X					53	Z102-3000UL	1000	1200	3200	3200	70000	52000	1414	1728	2700	500	1200

A = UL1449
B = cUL
C = CSA
D = VDE
E = DEMKO
F =

HE SERIES

MECHANICAL SPECIFICATIONS



	Round				Square	
Dimension	**25mm**	**32mm**	**40mm**	**53mm**	**25mm**	**34mm**
MAX. D	1.142"	0.354"	0.394"	0.472"	1.142"	1.476"
MAX. T	0.248" - 0.514"	0.248" - 0.514"	0.248" - 0.514"	0.248" - 0.514"	0.248" - 0.514"	0.248" - 0.514"
MAX. H	1.970"	2.213"	2.370"	3.075"	1.970"	2.225"
TYP. X	1.000"	1.000"	1.000"	1.000"	1.000"	1.000"
TYP. d	0.020"	0.020"	0.020"	0.020"	0.020"	0.020"

NOTES:

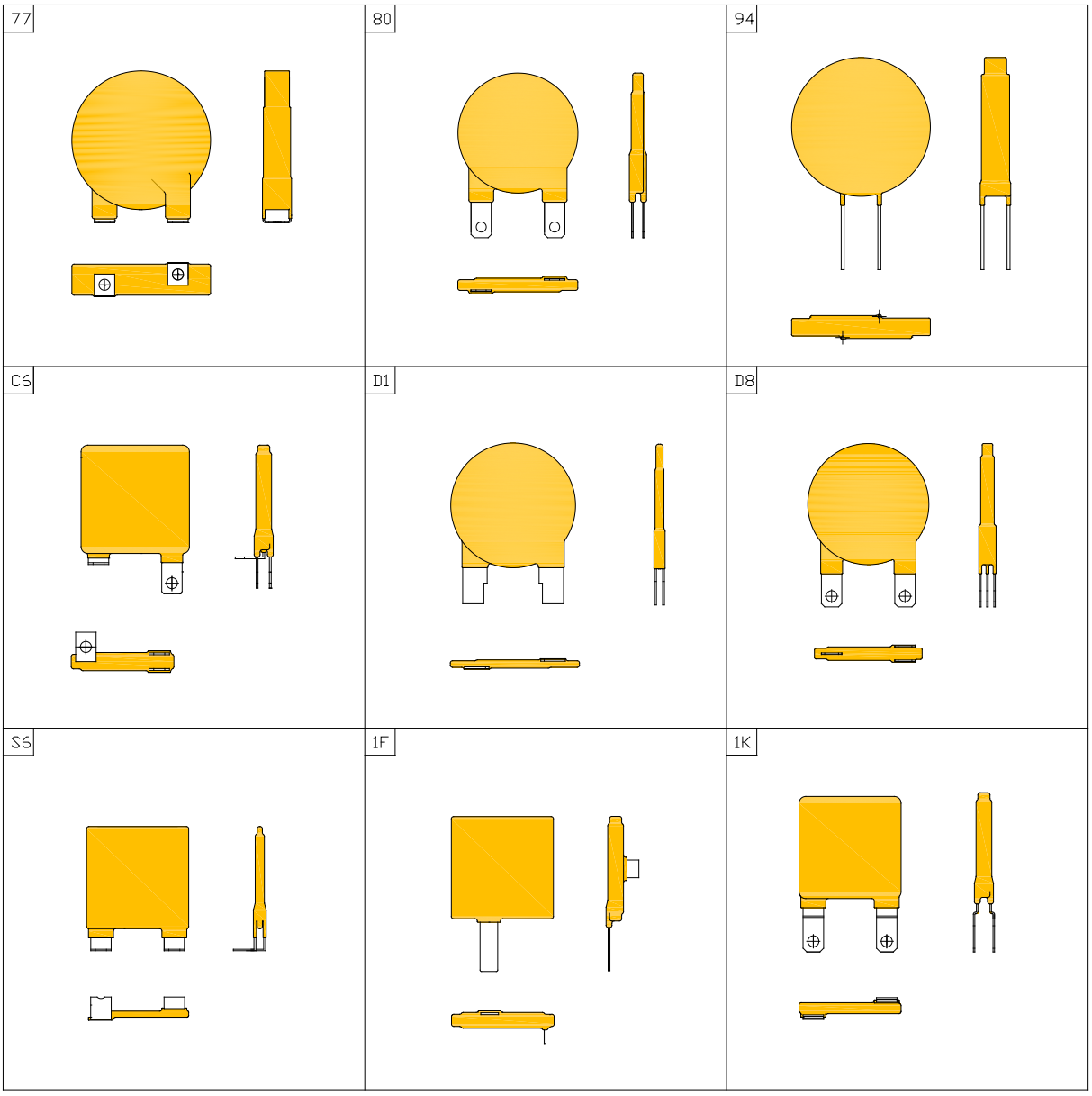
1. Alternate dimensional specifications, including lead styles, for any part listed may be available upon request.
2. Specifications are subject to change. Contact Maida for specific datasheet for exact dimensions.

TAB LEAD CODES

The Maida Development Company prides itself on its ability to manufacture tab leaded devices to meet almost every request of its customers. The following table depicts common varieties of leads that are presently supplied. It should be noted that the dimensions (such as the X, height, tab lead length, epoxy “pant leg”, tab configurations, etc.) can be modified on any the items shown to meet almost any request. Maida is also capable of supplying the various tab lead forms in either right-hand or left-hand configurations.

For any inquiries regarding specific lead forms please contact us.

NOTE: Any tab lead configuration can be obtained on either round or square varistors.



THERMALLY PROTECTED HIGH ENERGY (TPHE) SERIES

INTRODUCTION

The Thermally Protected High Energy, TPHE, Series is designed for safe disconnection of the Varistor from the circuit due to abnormal operating conditions. The TPHE Series is designed to withstand the rigors of UL1449 4th Edition Type 1 and Type 2 applications while still meeting the requirements of typical High Energy Varistor applications.
The FSS design is for new and existing applications requiring high current surge capabilities, with integrated thermal protection accommodating form, and fit allowing for a drop in replacement for existing product offerings.
The FSD design is also for new and existing applications. It is packaged in a DIN-RAIL mounting configuration. The FSD design is available with 1, 2, 3, and 4 pole configurations for Delta and Wye connections.
The FSP design is similar to the FSS. It utilizes a smaller package to accommodate lower profile applications.

Current ranges: I_N – (10kA, and 20kA)
I_{MAX} – (25kA - 75kA)

STYLE DESIGNATION

The Maida Style Number is the typical means to identify our components when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number.
The following example is the standard part numbering system when ordering our Thermally Protected Series components by the Maida Style Number:

FSS ZOV 151 R

1. **Nominal Disk Diameter**
   FSD – 34mm Square DIN-RAIL
   FSS – 34mm Square
   FSP – 25mm Square
2. **Material**
   ZOV – Zinc Oxide Varistor
3. **AC Voltage Rating**
   Two significant figures plus number of zeroes that follow, i.e. 151 is 150 VAC
4. **Special Instructions**
   R is standard

STANDARD MARKING

Minimum marking shall consist of an abbreviated style designation and, when space is available, the manufacturer's initials or company logo.

Example:
MDC
FSS
151

Where:
MDC – Company initials/Logo
FS - Fail Safe
S - 34 mm
151 - AC Voltage Rating (150VAC)

A manufacturing date code and/or special markings are available upon request. Other safety agency designations are included where applicable.

The FSP, FSS and FSD TPHE Designs

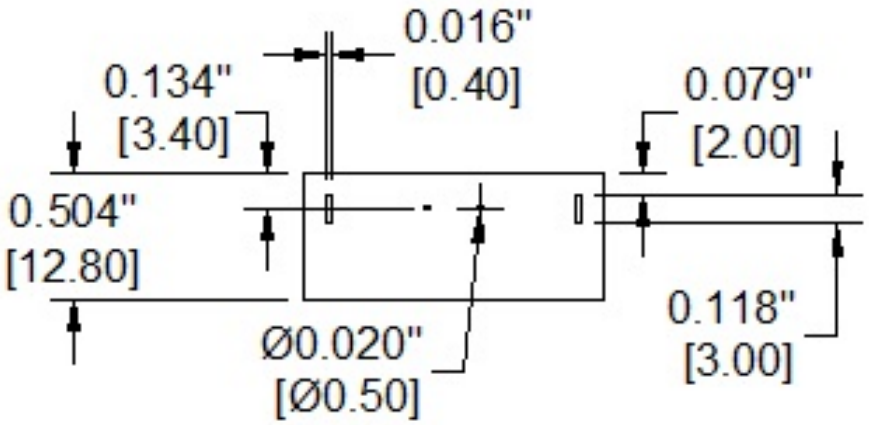
THERMALLY PROTECTED HE (TPHE) SERIES

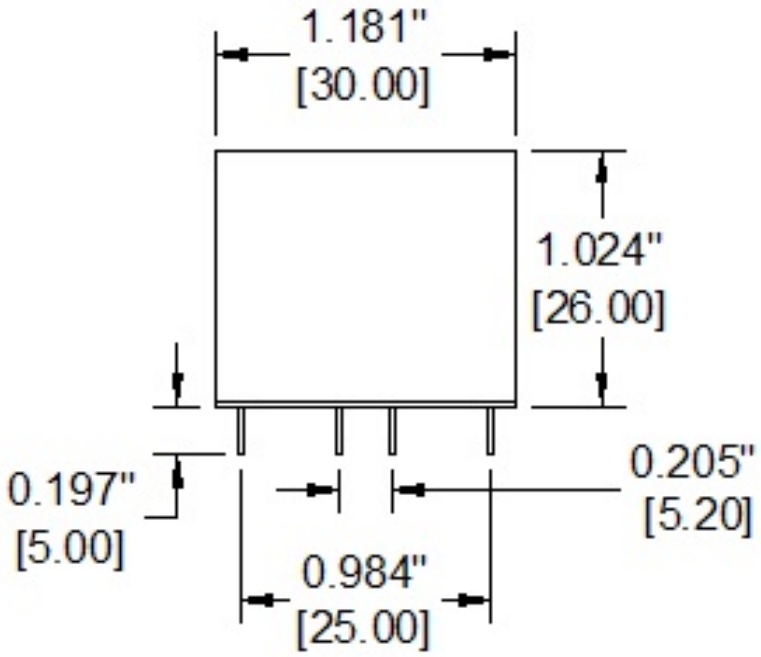
ELECTRICAL SPECIFICATIONS

Maida Style Number	Recognitions To Safety Agency Standards						# of Poles	Minimum Marking	Nominal Voltage	MCOV				Peak Current (8x20us)		MLV				SCCR	Operating Temp.	UL SPD Type
										(VAC)				# of pulses		(V)						
	A	B	C	D	E	F			(VAC)	L-L	L-N	L-G	N-G	1	15 (I_N)	L-L	L-N	L-G	N-G	(kA)	(°C)	
FSPZOV151R	X	X					1	MDC-FSP-151	120	150	-	-	-	25	10	600	-	-	-	200	-40 to 80	2CA
FSSZOV151CR	X	X					1	MDC-FSS-151C	120	150	-	-	-	50	20	600	-	-	-	200	-40 to 80	2CA
FSSZOV151R	X						1	MDC-FSS-151	120	150	-	-	-	50	20	600	-	-	-	200	-40 to 80	1CA
FSDZOV151-R	X	X					1	MDC-FSD-151	120	150	-	-	-	50	20	1560	-	-	-	-	-40 to 85	4CA
FSDZOV151-2R	X	X					2	MDC-FSD-151-2R	120	-	150	150	150	50	20	-	3120	1560	1560	-	-40 to 85	4CA
FSDZOV151-3R	X	X					3	MDC-FSD-151-3R	208/120	300	-	150	-	50	20	3120	-	1560	-	-	-40 to 85	4CA
FSDZOV151-3NR	X	X					3	MDC-FSD-151-3N	208/120	300	150	150	48	50	20	3120	1560	2730	1170	-	-40 to 85	4CA
FSDZOV151-4R	X	X					4	MDC-FSD-151-4R	208/120	300	150	150	150	50	20	3120	3120	1560	1560	-	-40 to 85	4CA
FSDZOV151-NR	X	X					2	MDC-FSD-151-N	120	-	150	150	48	50	20	-	1560	2730	1170	-	-40 to 85	4CA
FSPZOV181R	X	X					1	MDC-FSP-181	120	180	-	-	-	25	10	800	-	-	-	200	-40 to 80	2CA
FSSZOV181CR	X	X					1	MDC-FSS-181	120	180	-	-	-	50	20	600	-	-	-	200	-40 to 85	2CA
FSSZOV181R	X						1	MDC-FSS-181	120	180	-	-	-	50	20	600	-	-	-	200	-40 to 85	1CA
FSDZOV181-R	X	X					1	MDC-FSD-181	120	180	-	-	-	50	20	1570	-	-	-	-	-40 to 85	4CA
FSDZOV181-2R	X	X					2	MDC-FSD-181-2R	120	-	180	180	180	50	20	-	3140	1570	1570	-	-40 to 85	4CA
FSDZOV181-3R	X	X					3	MDC-FSD-181-3R	208/120	360	-	180	-	50	20	3140	-	1570	-	-	-40 to 85	4CA
FSDZOV181-3NR	X	X					3	MDC-FSD-181-3N	208/120	360	180	180	48	50	20	3140	1570	2740	1170	-	-40 to 85	4CA
FSDZOV181-4R	X	X					4	MDC-FSD-181-4R	208/120	360	180	180	180	50	20	3140	3140	1570	1570	-	-40 to 85	4CA
FSDZOV181-NR	X	X					2	MDC-FSD-181-N	120	-	180	180	48	50	20	-	1570	2740	1170	-	-40 to 85	4CA
FSSZOV271CAR	X	X					1	MDC-FSS-271CA	240	275	-	-	-	50	20	800	-	-	-	200	-40 to 85	2CA
FSSZOV271AR	X						1	MDC-FSS-275A	240	275	-	-	-	50	20	800	-	-	-	200	-40 to 85	1CA
FSDZOV271-R	X	X					1	MDC-FSD-271	240	275	-	-	-	50	20	1830	-	-	-	-	-40 to 85	4CA
FSDZOV271-2R	X	X					2	MDC-FSD-271-2R	240	-	275	275	275	50	20	-	3660	1830	1830	-	-40 to 85	4CA
FSDZOV271-3R	X	X					3	MDC-FSD-271-3R	415/240	550	-	275	-	50	20	3660	-	1830	-	-	-40 to 85	4CA
FSDZOV271-3NR	X	X					3	MDC-FSD-271-3N	415/240	550	275	275	48	50	20	3660	1830	3460	1630	-	-40 to 85	4CA
FSDZOV271-4R	X	X					4	MDC-FSD-271-4R	415/240	550	275	275	275	50	20	3660	3660	1830	1830	-	-40 to 85	4CA
FSDZOV271-NR	X	X					2	MDC-FSD-271-N	240	-	275	275	48	50	20	-	1830	3460	1630	-	-40 to 85	4CA
FSPZOV321R	X	X					1	MDC-FSP-321	277	320	-	-	-	25	10	1000	-	-	-	200	-40 to 80	2CA
FSSZOV321CR	X	X					1	MDC-FSS-321CR	277	320	-	-	-	50	20	1000	-	-	-	200	-40 to 85	2CA
FSSZOV321	X						1	MDC-FSS-321	277	320	-	-	-			1000	-	-	-	200	-40 to 85	1CA
FSDZOV321-R	X	X					1	MDC-FSD-321	277	320	-	-	-	50	20	1890	-	-	-	-	-40 to 85	4CA
FSDZOV321-2R	X	X					2	MDC-FSD-321-2R	277	-	320	320	320	50	20	-	3780	1890	1890	-	-40 to 85	4CA
FSDZOV321-3R	X	X					3	MDC-FSD-321-3R	480/277	640	-	320	-	50	20	3780	-	1890	-	-	-40 to 85	4CA
FSDZOV321-4R	X	X					4	MDC-FSD-321-4R	480/277	640	320	320	320	50	20	3780	3780	1890	1890	-	-40 to 85	4CA
FSDZOV321-NR	X	X					2	MDC-FSD-321-N	277	-	320	320	48	50	20	-	1890	3520	1630	-	-40 to 85	4CA
FSPZOV421R	X	X					1	MDC-FSP-421	347	420	-	-	-	25	10	1200	-	-	-	200	-40 to 80	2CA
FSSZOV421CR	X	X					1	MDC-FSS-421CR	347	420	-	-	-	50	20	1500	-	-	-	200	-40 to 85	2CA
FSSZOV421R	X						1	MDC-FSS-421	347	420	-	-	-	50	20	1500	-	-	-	200	-40 to 85	1CA
FSDZOV421-R	X	X					1	MDC-FSD-421	347	420	-	-	-	50	20	2180	-	-	-	-	-40 to 85	4CA
FSDZOV421-2R	X	X					2	MDC-FSD-421-2R	347	-	420	420	420	50	20	-	4360	2180	2180	-	-40 to 85	4CA
FSDZOV421-3R	X	X					3	MDC-FSD-421-3R	600/347	840	-	420	-	50	20	4360	-	2180	-	-	-40 to 85	4CA
FSDZOV421-3NR	X	X					3	MDC-FSD-421-3N	600/347	840	420	420	48	50	20	4360	2180	3810	1630	-	-40 to 85	4CA
FSDZOV421-4R	X	X					4	MDC-FSD-421-4R	600/347	840	420	420	420	50	20	4360	4360	2180	2180	-	-40 to 85	4CA
FSDZOV421-NR	X	X					2	MDC-FSD-421-N	347	-	420	420	48	50	20	-	2180	3900	1630	-	-40 to 85	4CA
FSPZOV551R	X	X					1	MDC-FSP-551	480	550	-	-	-	25	10	1800	-	-	-	200	-40 to 80	2CA
FSSZOV551CR	X	X					1	MDC-FSS-551CR	480	550	-	-	-	50	20	1500	-	-	-	200	-40 to 85	2CA
FSSZOV551R	X						1	MDC-FSS-551	480	550	-	-	-	50	20	1500	-	-	-	200	-40 to 85	1CA
FSDZOV551-R	X	X					1	MDC-FSD-551	480	550	-	-	-	50	20	2550	-	-	-	-	-40 to 85	4CA
FSDZOV551-2R	X	X					2	MDC-FSD-551-2R	480	-	1000	550	550	50	20	-	5100	2550	2550	-	-40 to 85	4CA
FSDZOV551-3R	X	X					3	MDC-FSD-551-3R	600/347	1000	-	550	-	50	20	5240	-	2550	-	-	-40 to 85	4CA
FSDZOV551-4R	X	X					4	MDC-FSD-551-4R	600/347	1000	550	550	550	50	20	5240	5240	2550	2550	-	-40 to 85	4CA
FSPZOV681R	X	X					1	MDC-FSP-681	600	690	-	-	-	25	10	2000	-	-	-	200	-40 to 80	2CA
FSSZOV681CR	X	X					1	MDC-FSS-681CR	600	690	-	-	-	50	20	2000	-	-	-	200	-40 to 85	2CA
FSSZOV681R	X						1	MDC-FSS-681	600	690	-	-	-	50	20	2000	-	-	-	200	-40 to 85	1CA
FSDZOV681-R	X	X					1	MDC-FSD-681	600	690	-	-	-	50	20	2990	-	-	-	-	-40 to 85	4CA
FSDZOV681-2R	X	X					2	MDC-FSD-681-2R	600	-	690	690	690	50	20	-	5980	2990	2990	-	-40 to 85	4CA
FSDZOV681-3R	X	X					3	MDC-FSD-681-3R	600/347	1000	-	690	-	50	20	5980	-	2990	-	-	-40 to 85	4CA
FSDZOV681-4R	X	X					4	MDC-FSD-681-4R	600/347	1000	690	690	690	50	20	5980	5980	2990	2990	-	-40 to 85	4CA

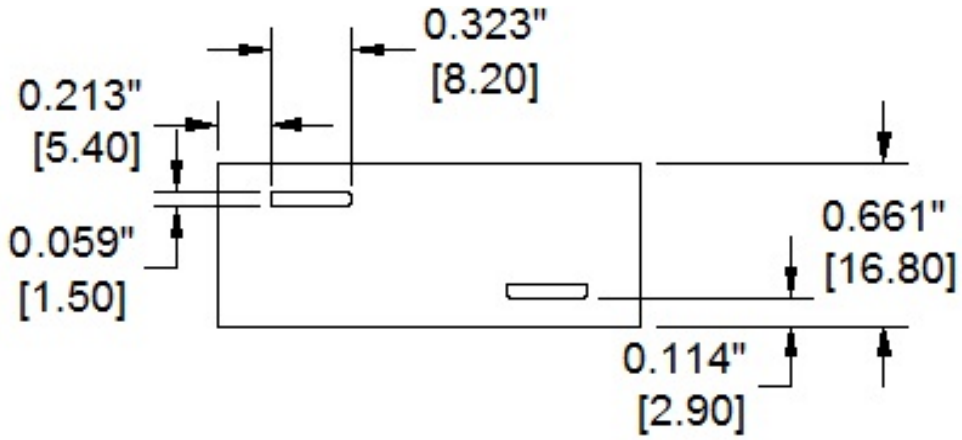
A = UL1449
B = cUL
C = CSA
D = VDE
E = DEMKO
F =

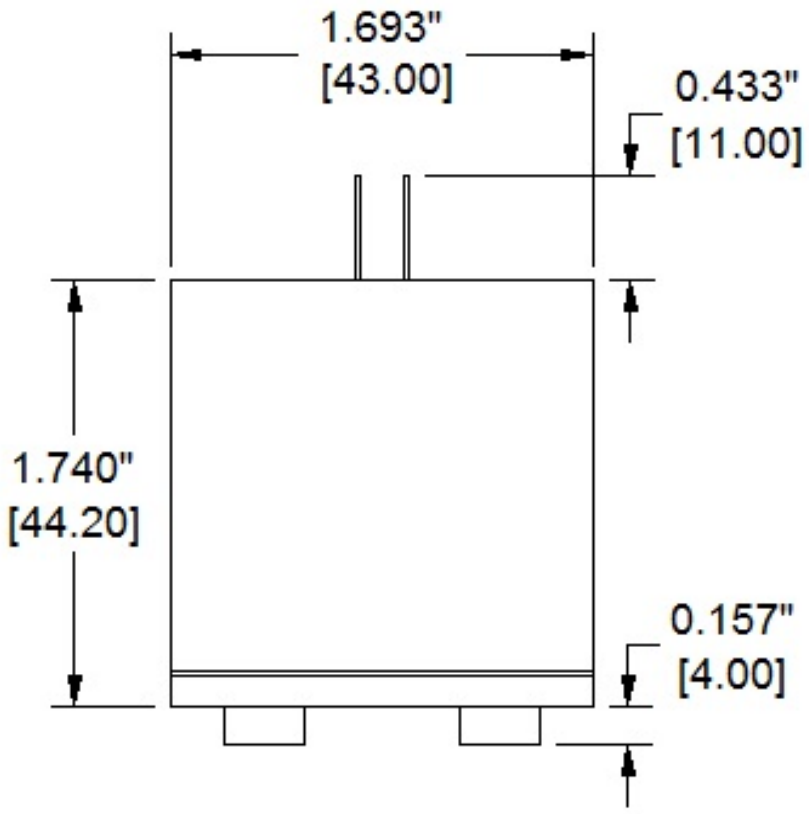
FSP Dimensions



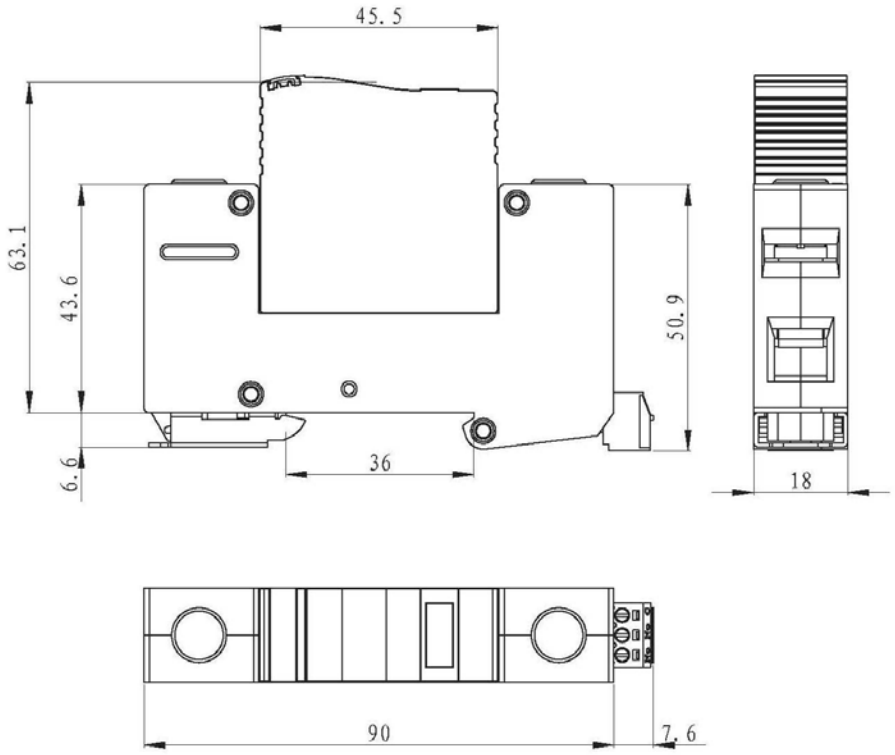


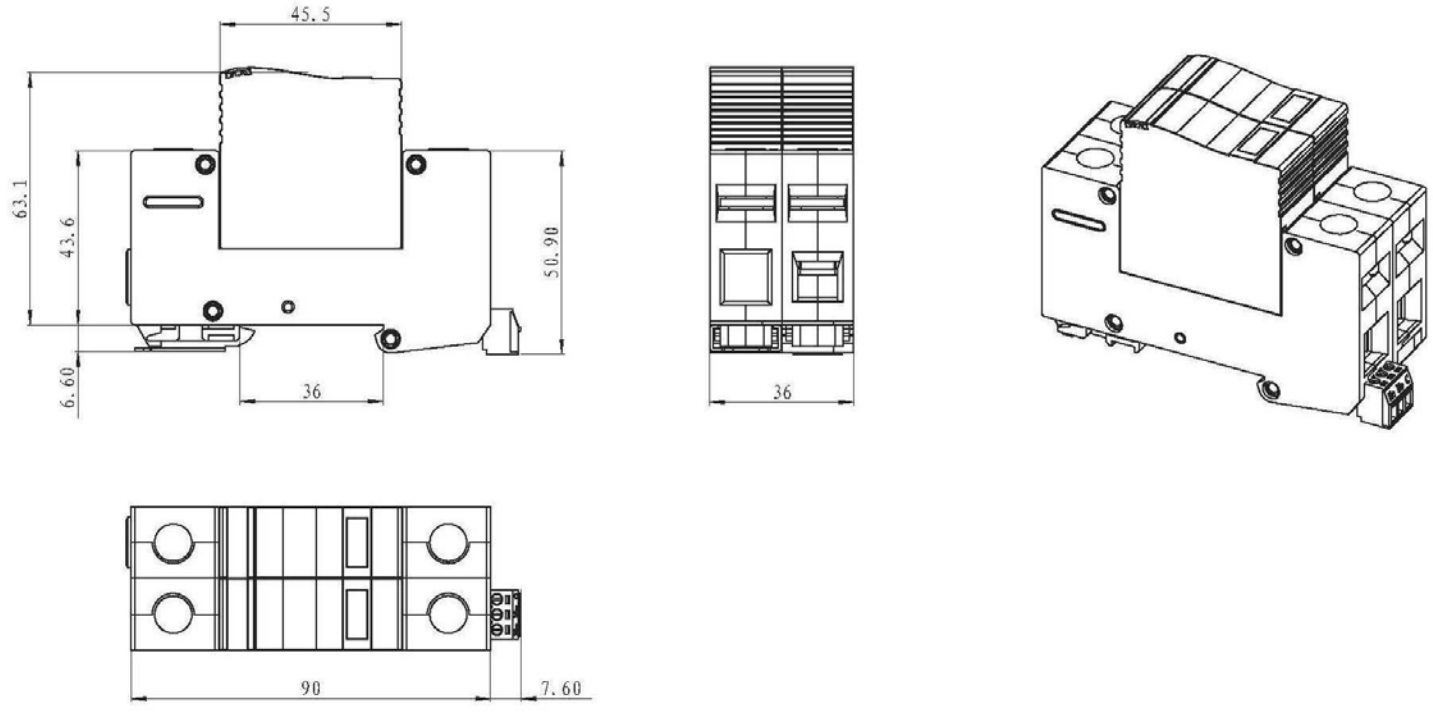
FSS Dimensions



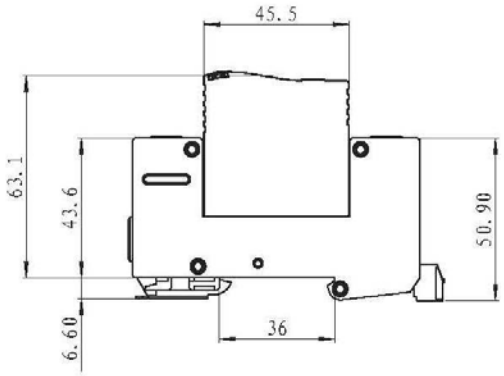


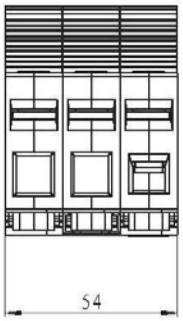
FSD Dimensions

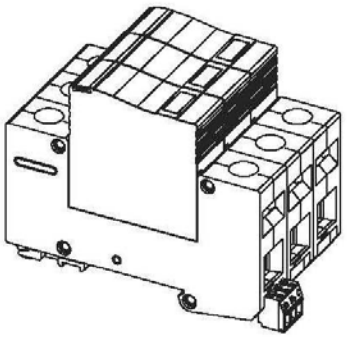


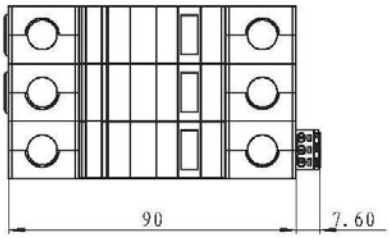


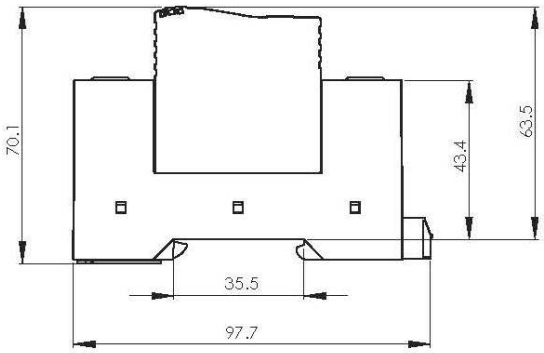
FSD Dimensions (cont.)

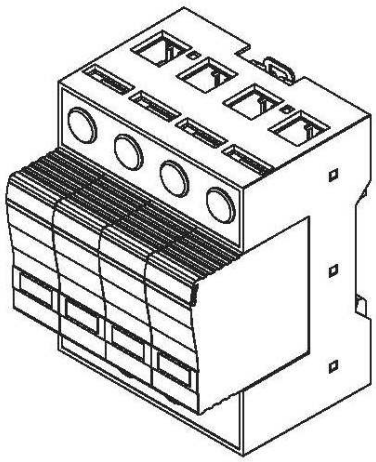


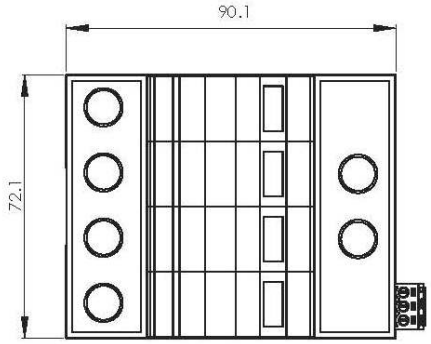


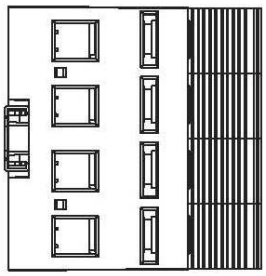












THERMALLY PROTECTED SERIES

INTRODUCTION

The Thermally Protected Series is designed for safe disconnection of the varistor from the circuit due to abnormal operating conditions. These components consist of 2 or 3 leaded wire leads, a thermal disconnect (FN, FM, FN), and have nominal diameters of 14mm, 20mm, and 25mm. Fusible link designs (FF, FT) are also available.

STYLE DESIGNATION
The Maida Style Number is the typical means to identify our components when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number.
The following example is the standard part numbering system when ordering our Thermally Protected Series components by the Maida Style Number:

14 FN 201 K

1. **Nominal Disk Diameter**
   14 – 14mm
   20 – 20mm
   25 – 25mm

2. **Lead Configuration**
   FN – 2 leaded, thermal fuse
   FM – 3 leaded, thermal fuse on center lead
   FF – 3 leaded, fusible link on center lead
   FE – 3 leaded, thermal fuse on outer lead
   FT – 3 leaded, fusible link on outer lead

3. **AC Voltage Rating**
   Two significant figures plus number of zeroes that follow, i.e. 201 is 200 VDC

4. **Varistor Voltage Range Tolerance**

STANDARD MARKING
Minimum marking shall consist of an abbreviated style designation and, when space is available, the manufacturer's initials or company logo.

Example:
MDC
FV
14N201

Where:
MDC - Company Initials
FV - Fail safe Varistor
14 - Diameter
N - Series (FN, FM, FE, FF, FT)
201 - Nominal DC Voltage Rating (200VDC)

A manufacturing date code and/or special markings are available upon request.
Other safety agency designations are included where applicable.

THERMALLY PROTECTED SERIES

ELECTRICAL SPECIFICATIONS

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient						Max Clamping Voltage (@Test Current)		Typical Cap.
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC				
											10 x 1000 μsec	8 x 20 μsec					(8 x 20μsec)		1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	(A)	(A)	(V)	(V)	(V)	(A)	(pF)
14FE820K	X						14	MDC-FV-14E820K	50	65	27	27	4500	2500	74	90	135	50	2400
14FM820K	X						14	MDC-FV-14M820K	50	65	27	27	4500	2500	74	90	135	50	2400
14FN820K	X						14	MDC-FV-14N820K	50	65	27	27	4500	2500	74	90	135	50	2400
20FE820K	X						20	MDC-FV-20E820K	50	65	56	56	10000	6500	74	90	135	100	4900
20FM820K	X						20	MDC-FV-20M820K	50	65	56	56	10000	6500	74	90	135	100	4900
20FN820K	X						20	MDC-FV-20N820K	50	65	56	56	10000	6500	74	90	135	100	4900
14FE101K	X						14	MDC-FV-14E101K	60	85	33	33	4500	2500	90	110	165	50	2000
14FM101K	X						14	MDC-FV-14M101K	60	85	33	33	4500	2500	90	110	165	50	2000
14FN101K	X						14	MDC-FV-14N101K	60	85	33	33	4500	2500	90	110	165	50	2000
20FE101K	X						20	MDC-FV-20E101K	60	85	70	70	10000	6500	90	110	165	100	4000
20FM101K	X						20	MDC-FV-20M101K	60	85	70	70	10000	6500	90	110	165	100	4000
20FN101K	X						20	MDC-FV-20N101K	60	85	70	70	10000	6500	90	110	165	100	4000
14FE121K	X						14	MDC-FV-14E121K	75	100	40	40	4500	2500	108	132	200	50	1700
14FM121K	X						14	MDC-FV-14M121K	75	100	40	40	4500	2500	108	132	200	50	1700
14FN121K	X						14	MDC-FV-14N121K	75	100	40	40	4500	2500	108	132	200	50	1700
20FE121K	X						20	MDC-FV-20E121K	75	100	85	85	10000	6500	108	132	200	100	3300
20FM121K	X						20	MDC-FV-20M121K	75	100	85	85	10000	6500	108	132	200	100	3300
20FN121K	X						20	MDC-FV-20N121K	75	100	85	85	10000	6500	108	132	200	100	3300
14FE151K	X						14	MDC-FV-14E151K	95	125	50	50	6000	4500	135	165	250	50	1300
14FM151K	X						14	MDC-FV-14M151K	95	125	50	50	6000	4500	135	165	250	50	1300
14FN151K	X						14	MDC-FV-14N151K	95	125	50	50	6000	4500	135	165	250	50	1300
20FE151K	X						20	MDC-FV-20E151K	95	125	100	100	10000	6000	135	165	250	100	2700
20FM151K	X						20	MDC-FV-20M151K	95	125	100	100	10000	6000	135	165	250	100	2700
20FN151K	X						20	MDC-FV-20N151K	95	125	100	100	10000	6000	135	165	250	100	2700
25FE151K	X						25	MDC-FV-25E151K	95	125	160	160	15000	12000	135	165	250	150	4300
25FM151K	X						25	MDC-FV-25M151K	95	125	160	160	15000	12000	135	165	250	150	4300
25FN151K	X						25	MDC-FV-25N151K	95	125	160	160	15000	12000	135	165	250	150	4300
14FE181K	X						14	MDC-FV-14E181K	115	150	58	58	6000	4500	162	198	300	50	1100
14FM181K	X						14	MDC-FV-14M181K	115	150	58	58	6000	4500	162	198	300	50	1100
14FN181K	X						14	MDC-FV-14N181K	115	150	58	58	6000	4500	162	198	300	50	1100
20FE181K	X						20	MDC-FV-20E181K	115	150	110	110	10000	6000	162	198	300	100	2200
20FM181K	X						20	MDC-FV-20M181K	115	150	110	110	10000	6000	162	198	300	100	2200
20FN181K	X						20	MDC-FV-20N181K	115	150	110	110	10000	6000	162	198	300	100	2200
25FE181K	X						25	MDC-FV-25E181K	115	150	175	175	15000	12000	162	198	300	150	3500
25FM181K	X						25	MDC-FV-25M181K	115	150	175	175	15000	12000	162	198	300	150	3500
25FN181K	X						25	MDC-FV-25N181K	115	150	175	175	15000	12000	162	198	300	150	3500
14FE201K	X						14	MDC-FV-14E201K	130	170	70	70	6000	4500	185	225	340	50	1000
14FM201K	X						14	MDC-FV-14M201K	130	170	70	70	6000	4500	185	225	340	50	1000
14FN201K	X						14	MDC-FV-14N201K	130	170	70	70	6000	4500	185	225	340	50	1000
20FE201K	X						20	MDC-FV-20E201K	130	170	140	140	10000	6000	185	225	340	100	2000
20FM201K	X						20	MDC-FV-20M201K	130	170	140	140	10000	6000	185	225	340	100	2000
20FN201K	X						20	MDC-FV-20N201K	130	170	140	140	10000	6000	185	225	340	100	2000
25FE201K	X						25	MDC-FV-25E201K	130	170	210	210	15000	12000	185	225	340	150	3200
25FM201K	X						25	MDC-FV-25M201K	130	170	210	210	15000	12000	185	225	340	150	3200
25FN201K	X						25	MDC-FV-25N201K	130	170	210	210	15000	12000	185	225	340	150	3200
14FE221K	X						14	MDC-FV-14E221K	140	180	78	78	6000	4500	198	242	360	50	900
14FM221K	X						14	MDC-FV-14M221K	140	180	78	78	6000	4500	198	242	360	50	900
14FN221K	X						14	MDC-FV-14N221K	140	180	78	78	6000	4500	198	242	360	50	900
20FE221K	X						20	MDC-FV-20E221K	140	180	155	155	10000	6000	198	242	360	100	1800
20FM221K	X						20	MDC-FV-20M221K	140	180	155	155	10000	6000	198	242	360	100	1800
20FN221K	X						20	MDC-FV-20N221K	140	180	155	155	10000	6000	198	242	360	100	1800
25FE221K	X						25	MDC-FV-25E221K	140	180	230	230	15000	12000	198	242	360	150	2900
25FM221K	X						25	MDC-FV-25M221K	140	180	230	230	15000	12000	198	242	360	150	2900
25FN221K	X						25	MDC-FV-25N221K	140	180	230	230	15000	12000	198	242	360	150	2900
14FE241K	X						14	MDC-FV-14E241K	150	200	85	85	6000	4500	216	264	395	50	830
14FM241K	X						14	MDC-FV-14M241K	150	200	85	85	6000	4500	216	264	395	50	830
14FN241K	X						14	MDC-FV-14N241K	150	200	85	85	6000	4500	216	264	395	50	830
20FE241K	X						20	MDC-FV-20E241K	150	200	170	170	10000	6000	216	264	395	100	1650
20FM241K	X						20	MDC-FV-20M241K	150	200	170	170	10000	6000	216	264	395	100	1650
20FN241K	X						20	MDC-FV-20N241K	150	200	170	170	10000	6000	216	264	395	100	1650
25FE241K	X						25	MDC-FV-25E241K	150	200	255	255	15000	12000	216	264	395	150	2650
25FM241K	X						25	MDC-FV-25M241K	150	200	255	255	15000	12000	216	264	395	150	2650
25FN241K	X						25	MDC-FV-25N241K	150	200	255	255	15000	12000	216	264	395	150	2650
14FE271K	X						14	MDC-FV-14E271K	175	225	100	100	6000	4500	243	297	455	50	740
14FM271K	X						14	MDC-FV-14M271K	175	225	100	100	6000	4500	243	297	455	50	740
14FN271K	X						14	MDC-FV-14N271K	175	225	100	100	6000	4500	243	297	455	50	740
20FE271K	X						20	MDC-FV-20E271K	175	225	190	190	10000	6000	243	297	455	100	1500
20FM271K	X						20	MDC-FV-20M271K	175	225	190	190	10000	6000	243	297	455	100	1500
20FN271K	X						20	MDC-FV-20N271K	175	225	190	190	10000	6000	243	297	455	100	1500
25FE271K	X						25	MDC-FV-25E271K	175	225	285	285	15000	12000	243	297	455	150	2400
25FM271K	X						25	MDC-FV-25M271K	175	225	285	285	15000	12000	243	297	455	150	2400
25FN271K	X						25	MDC-FV-25N271K	175	225	285	285	15000	12000	243	297	455	150	2400

THERMALLY PROTECTED SERIES

ELECTRICAL SPECIFICATIONS

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	1 (A)	2 (A)	Vmin (V)	Vmax (V)	(8 x 20μsec) (V)	(A)	(pF)
14FE301K	X						14	MDC-FV-14E301K	190	250	107	107	6000	4500	270	330	500	50	670
14FM301K	X						14	MDC-FV-14M301K	190	250	107	107	6000	4500	270	330	500	50	670
14FN301K	X						14	MDC-FV-14N301K	190	250	107	107	6000	4500	270	330	500	50	670
20FE301K	X						20	MDC-FV-20E301K	190	250	205	205	10000	6000	270	330	500	100	1300
20FM301K	X						20	MDC-FV-20M301K	190	250	205	205	10000	6000	270	330	500	100	1300
20FN301K	X						20	MDC-FV-20N301K	190	250	205	205	10000	6000	270	330	500	100	1300
25FE301K	X						25	MDC-FV-25E301K	190	250	310	310	15000	12000	270	330	500	150	2100
25FM301K	X						25	MDC-FV-25M301K	190	250	310	310	15000	12000	270	330	500	150	2100
25FN301K	X						25	MDC-FV-25N301K	190	250	310	310	15000	12000	270	330	500	150	2100
14FE331K	X						14	MDC-FV-14E331K	210	275	115	115	6000	4500	297	363	550	50	610
14FM331K	X						14	MDC-FV-14M331K	210	275	115	115	6000	4500	297	363	550	50	610
14FN331K	X						14	MDC-FV-14N331K	210	275	115	115	6000	4500	297	363	550	50	610
20FE331K	X						20	MDC-FV-20E331K	210	275	215	215	10000	6000	297	363	550	100	1200
20FM331K	X						20	MDC-FV-20M331K	210	275	215	215	10000	6000	297	363	550	100	1200
20FN331K	X						20	MDC-FV-20N331K	210	275	215	215	10000	6000	297	363	550	100	1200
25FE331K	X						25	MDC-FV-25E331K	210	275	325	325	15000	12000	297	363	550	150	1900
25FM331K	X						25	MDC-FV-25M331K	210	275	325	325	15000	12000	297	363	550	150	1900
25FN331K	X						25	MDC-FV-25N331K	210	275	325	325	15000	12000	297	363	550	150	1900
14FE361K	X						14	MDC-FV-14E361K	230	300	125	125	6000	4500	324	396	595	50	560
14FM361K	X						14	MDC-FV-14M361K	230	300	125	125	6000	4500	324	396	595	50	560
14FN361K	X						14	MDC-FV-14N361K	230	300	125	125	6000	4500	324	396	595	50	560
20FE361K	X						20	MDC-FV-20E361K	230	300	225	225	10000	6000	324	396	595	100	1100
20FM361K	X						20	MDC-FV-20M361K	230	300	225	225	10000	6000	324	396	595	100	1100
20FN361K	X						20	MDC-FV-20N361K	230	300	225	225	10000	6000	324	396	595	100	1100
25FE361K	X						25	MDC-FV-25E361K	230	300	340	340	15000	12000	324	396	595	150	1750
25FM361K	X						25	MDC-FV-25M361K	230	300	340	340	15000	12000	324	396	595	150	1750
25FN361K	X						25	MDC-FV-25N361K	230	300	340	340	15000	12000	324	396	595	150	1750
14FE391K	X						14	MDC-FV-14E391K	250	320	140	140	6000	4500	351	429	650	50	510
14FM391K	X						14	MDC-FV-14M391K	250	320	140	140	6000	4500	351	429	650	50	510
14FN391K	X						14	MDC-FV-14N391K	250	320	140	140	6000	4500	351	429	650	50	510
20FE391K	X						20	MDC-FV-20E391K	250	320	240	240	10000	6000	351	429	650	100	1000
20FM391K	X						20	MDC-FV-20M391K	250	320	240	240	10000	6000	351	429	650	100	1000
20FN391K	X						20	MDC-FV-20N391K	250	320	240	240	10000	6000	351	429	650	100	1000
25FE391K	X						25	MDC-FV-25E391K	250	320	360	360	15000	12000	351	429	650	150	1600
25FM391K	X						25	MDC-FV-25M391K	250	320	360	360	15000	12000	351	429	650	150	1600
25FN391K	X						25	MDC-FV-25N391K	250	320	360	360	15000	12000	351	429	650	150	1600
14FE431K	X						14	MDC-FV-14E431K	275	350	155	155	6000	4500	387	473	710	50	460
14FM431K	X						14	MDC-FV-14M431K	275	350	155	155	6000	4500	387	473	710	50	460
14FN431K	X						14	MDC-FV-14N431K	275	350	155	155	6000	4500	387	473	710	50	460
20FE431K	X						20	MDC-FV-20E431K	275	350	270	270	10000	6000	387	473	710	100	930
20FM431K	X						20	MDC-FV-20M431K	275	350	270	270	10000	6000	387	473	710	100	930
20FN431K	X						20	MDC-FV-20N431K	275	350	270	270	10000	6000	387	473	710	100	930
25FE431K	X						25	MDC-FV-25E431K	275	350	440	440	15000	12000	387	473	710	150	1500
25FM431K	X						25	MDC-FV-25M431K	275	350	440	440	15000	12000	387	473	710	150	1500
25FN431K	X						25	MDC-FV-25N431K	275	350	440	440	15000	12000	387	473	710	150	1500
14FE471K	X						14	MDC-FV-14E471K	300	385	175	175	6000	4500	423	517	775	50	430
14FM471K	X						14	MDC-FV-14M471K	300	385	175	175	6000	4500	423	517	775	50	430
14FN471K	X						14	MDC-FV-14N471K	300	385	175	175	6000	4500	423	517	775	50	430
20FE471K	X						20	MDC-FV-20E471K	300	385	350	350	10000	6000	423	517	775	100	850
20FM471K	X						20	MDC-FV-20M471K	300	385	350	350	10000	6000	423	517	775	100	850
20FN471K	X						20	MDC-FV-20N471K	300	385	350	350	10000	6000	423	517	775	100	850
25FE471K	X						25	MDC-FV-25E471K	300	385	490	490	15000	12000	423	517	775	150	1400
25FM471K	X						25	MDC-FV-25M471K	300	385	490	490	15000	12000	423	517	775	150	1400
25FN471K	X						25	MDC-FV-25N471K	300	385	490	490	15000	12000	423	517	775	150	1400
14FE511K	X						14	MDC-FV-14E511K	320	415	190	190	6000	4500	459	561	845	50	390
14FM511K	X						14	MDC-FV-14M511K	320	415	190	190	6000	4500	459	561	845	50	390
14FN511K	X						14	MDC-FV-14N511K	320	415	190	190	6000	4500	459	561	845	50	390
20FE511K	X						20	MDC-FV-20E511K	320	415	380	380	10000	6000	459	561	845	100	780
20FM511K	X						20	MDC-FV-20M511K	320	415	380	380	10000	6000	459	561	845	100	780
20FN511K	X						20	MDC-FV-20N511K	320	415	380	380	10000	6000	459	561	845	100	780
25FE511K	X						25	MDC-FV-25E511K	320	415	530	530	15000	12000	459	561	845	150	1250
25FM511K	X						25	MDC-FV-25M511K	320	415	530	530	15000	12000	459	561	845	150	1250
25FN511K	X						25	MDC-FV-25N511K	320	415	530	530	15000	12000	459	561	845	150	1250
14FE561K	X						14	MDC-FV-14E561K	350	460	200	200	6000	4500	504	616	925	50	360
14FM561K	X						14	MDC-FV-14M561K	350	460	200	200	6000	4500	504	616	925	50	360
14FN561K	X						14	MDC-FV-14N561K	350	460	200	200	6000	4500	504	616	925	50	360
20FE561K	X						20	MDC-FV-20E561K	350	460	400	400	10000	6000	504	616	925	100	710
20FM561K	X						20	MDC-FV-20M561K	350	460	400	400	10000	6000	504	616	925	100	710
20FN561K	X						20	MDC-FV-20N561K	350	460	400	400	10000	6000	504	616	925	100	710
25FE561K	X						25	MDC-FV-25E561K	350	460	560	560	15000	12000	504	616	925	150	1150
25FM561K	X						25	MDC-FV-25M561K	350	460	560	560	15000	12000	504	616	925	150	1150
25FN561K	X						25	MDC-FV-25N561K	350	460	560	560	15000	12000	504	616	925	150	1150

THERMALLY PROTECTED SERIES

ELECTRICAL SPECIFICATIONS

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	1 (A)	2 (A)	Vmin (V)	Vmax (V)	(8 x 20μsec) (V)	(A)	(pF)
14FE621K	X						14	MDC-FV-14E621K	385	505	210	210	6000	4500	558	682	1025	50	320
14FM621K	X						14	MDC-FV-14M621K	385	505	210	210	6000	4500	558	682	1025	50	320
14FN621K	X						14	MDC-FV-14N621K	385	505	210	210	6000	4500	558	682	1025	50	320
20FE621K	X						20	MDC-FV-20E621K	385	505	425	425	10000	6000	558	682	1025	100	650
20FM621K	X						20	MDC-FV-20M621K	385	505	425	425	10000	6000	558	682	1025	100	650
20FN621K	X						20	MDC-FV-20N621K	385	505	425	425	10000	6000	558	682	1025	100	650
25FE621K	X						25	MDC-FV-25E621K	385	505	590	590	15000	12000	558	682	1025	150	1050
25FM621K	X						25	MDC-FV-25M621K	385	505	590	590	15000	12000	558	682	1025	150	1050
25FN621K	X						25	MDC-FV-25N621K	385	505	590	590	15000	12000	558	682	1025	150	1050
14FE681K	X						14	MDC-FV-14E681K	420	560	220	220	6000	4500	612	748	1120	50	290
14FM681K	X						14	MDC-FV-14M681K	420	560	220	220	6000	4500	612	748	1120	50	290
14FN681K	X						14	MDC-FV-14N681K	420	560	220	220	6000	4500	612	748	1120	50	290
20FE681K	X						20	MDC-FV-20E681K	420	560	455	455	10000	6000	612	748	1120	100	600
20FM681K	X						20	MDC-FV-20M681K	420	560	455	455	10000	6000	612	748	1120	100	600
20FN681K	X						20	MDC-FV-20N681K	420	560	455	455	10000	6000	612	748	1120	100	600
25FE681K	X						25	MDC-FV-25E681K	420	560	620	620	15000	12000	612	748	1120	150	950
25FM681K	X						25	MDC-FV-25M681K	420	560	620	620	15000	12000	612	748	1120	150	950
25FN681K	X						25	MDC-FV-25N681K	420	560	620	620	15000	12000	612	748	1120	150	950
14FE751K							14	MDC-FV-14E751K	460	615	225	225	6000	4500	675	825	1240	50	270
14FM751K							14	MDC-FV-14M751K	460	615	225	225	6000	4500	675	825	1240	50	270
14FN751K							14	MDC-FV-14N751K	460	615	225	225	6000	4500	675	825	1240	50	270
20FE751K							20	MDC-FV-20E751K	460	615	455	455	10000	6000	675	825	1240	100	530
20FM751K							20	MDC-FV-20M751K	460	615	455	455	10000	6000	675	825	1240	100	530
20FN751K							20	MDC-FV-20N751K	460	615	455	455	10000	6000	675	825	1240	100	530
25FE751K							25	MDC-FV-25E751K	460	615	630	630	15000	12000	675	825	1240	150	850
25FM751K							25	MDC-FV-25M751K	460	615	630	630	15000	12000	675	825	1240	150	850
25FN751K							25	MDC-FV-25N751K	460	615	630	630	15000	12000	675	825	1240	150	850
14FE781K							14	MDC-FV-14E781K	485	640	240	240	6000	4500	702	858	1290	50	260
14FM781K							14	MDC-FV-14M781K	485	640	240	240	6000	4500	702	858	1290	50	260
14FN781K							14	MDC-FV-14N781K	485	640	240	240	6000	4500	702	858	1290	50	260
20FE781K							20	MDC-FV-20E781K	485	640	455	455	10000	6000	702	858	1290	100	510
20FM781K							20	MDC-FV-20M781K	485	640	455	455	10000	6000	702	858	1290	100	510
20FN781K							20	MDC-FV-20N781K	485	640	455	455	10000	6000	702	858	1290	100	510
25FE781K							25	MDC-FV-25E781K	485	640	675	675	15000	12000	702	858	1290	150	800
25FM781K							25	MDC-FV-25M781K	485	640	675	675	15000	12000	702	858	1290	150	800
25FN781K							25	MDC-FV-25N781K	485	640	675	675	15000	12000	702	858	1290	150	800
14FE821K							14	MDC-FV-14E821K	510	670	245	245	6000	4500	738	902	1355	50	240
14FM821K							14	MDC-FV-14M821K	510	670	245	245	6000	4500	738	902	1355	50	240
14FN821K							14	MDC-FV-14N821K	510	670	245	245	6000	4500	738	902	1355	50	240
20FE821K							20	MDC-FV-20E821K	510	670	475	475	10000	6000	738	902	1355	100	500
20FM821K							20	MDC-FV-20M821K	510	670	475	475	10000	6000	738	902	1355	100	500
20FN821K							20	MDC-FV-20N821K	510	670	475	475	10000	6000	738	902	1355	100	500
25FE821K							25	MDC-FV-25E821K	510	670	690	690	15000	12000	738	902	1355	150	750
25FM821K							25	MDC-FV-25M821K	510	670	690	690	15000	12000	738	902	1355	150	750
25FN821K							25	MDC-FV-25N821K	510	670	690	690	15000	12000	738	902	1355	150	750
14FE911K							14	MDC-FV-14E911K	550	745	255	255	6000	4500	819	1001	1500	50	220
14FM911K							14	MDC-FV-14M911K	550	745	255	255	6000	4500	819	1001	1500	50	220
14FN911K							14	MDC-FV-14N911K	550	745	255	255	6000	4500	819	1001	1500	50	220
20FE911K							20	MDC-FV-20E911K	550	745	500	500	10000	6000	819	1001	1500	100	440
20FM911K							20	MDC-FV-20M911K	550	745	500	500	10000	6000	819	1001	1500	100	440
20FN911K							20	MDC-FV-20N911K	550	745	500	500	10000	6000	819	1001	1500	100	440
25FE911K							25	MDC-FV-25E911K	550	745	715	715	15000	12000	819	1001	1500	150	700
25FM911K							25	MDC-FV-25M911K	550	745	715	715	15000	12000	819	1001	1500	150	700
25FN911K							25	MDC-FV-25N911K	550	745	715	715	15000	12000	819	1001	1500	150	700
14FE102K							14	MDC-FV-14E102K	625	825	280	280	6000	4500	900	1100	1650	50	200
14FM102K							14	MDC-FV-14M102K	625	825	280	280	6000	4500	900	1100	1650	50	200
14FN102K							14	MDC-FV-14N102K	625	825	280	280	6000	4500	900	1100	1650	50	200
20FE102K							20	MDC-FV-20E102K	625	825	560	560	10000	6000	900	1100	1650	100	400
20FM102K							20	MDC-FV-20M102K	625	825	560	560	10000	6000	900	1100	1650	100	400
20FN102K							20	MDC-FV-20N102K	625	825	560	560	10000	6000	900	1100	1650	100	400
25FE102K							25	MDC-FV-25E102K	625	825	750	750	15000	12000	900	1100	1650	150	650
25FM102K							25	MDC-FV-25M102K	625	825	750	750	15000	12000	900	1100	1650	150	650
25FN102K							25	MDC-FV-25N102K	625	825	750	750	15000	12000	900	1100	1650	150	650
14FE112K							14	MDC-FV-14E112K	680	895	310	310	6000	4500	990	1210	1815	50	180
14FM112K							14	MDC-FV-14M112K	680	895	310	310	6000	4500	990	1210	1815	50	180
14FN112K							14	MDC-FV-14N112K	680	895	310	310	6000	4500	990	1210	1815	50	180
20FE112K							20	MDC-FV-20E112K	680	895	610	610	10000	6000	990	1210	1815	100	360
20FM112K							20	MDC-FV-20M112K	680	895	610	610	10000	6000	990	1210	1815	100	360
20FN112K							20	MDC-FV-20N112K	680	895	610	610	10000	6000	990	1210	1815	100	360
25FE112K							25	MDC-FV-25E112K	680	895	780	780	15000	12000	990	1210	1815	150	600
25FM112K							25	MDC-FV-25M112K	680	895	780	780	15000	12000	990	1210	1815	150	600
25FN112K							25	MDC-FV-25N112K	680	895	780	780	15000	12000	990	1210	1815	150	600

THERMALLY PROTECTED SERIES

ELECTRICAL SPECIFICATIONS

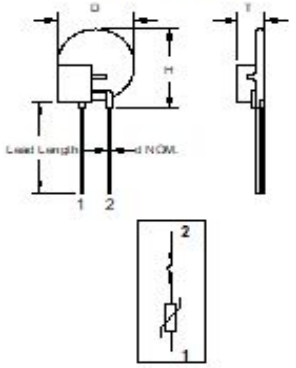
Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	1 (A)	2 (A)	Vmin (V)	Vmax (V)	(8 x 20μsec) (V)	(A)	@1kHz (pF)
14FE122K							14	MDC-FV-14E122K	750	990	310	310	6000	4500	1080	1320	1980	50	150
14FM122K							14	MDC-FV-14M122K	750	990	310	310	6000	4500	1080	1320	1980	50	150
14FN122K							14	MDC-FV-14N122K	750	990	310	310	6000	4500	1080	1320	1980	50	150
20FE122K							20	MDC-FV-20E122K	750	990	650	650	10000	6000	1080	1320	1980	100	320
20FM122K							20	MDC-FV-20M122K	750	990	650	650	10000	6000	1080	1320	1980	100	320
20FN122K							20	MDC-FV-20N122K	750	990	650	650	10000	6000	1080	1320	1980	100	320
25FE122K							25	MDC-FV-25E122K	750	990	840	840	15000	12000	1080	1320	1980	150	550
25FM122K							25	MDC-FV-25M122K	750	990	840	840	15000	12000	1080	1320	1980	150	550
25FN122K							25	MDC-FV-25N122K	750	990	840	840	15000	12000	1080	1320	1980	150	550

A = UL1449
B = cUL
C = CSA
D = VDE
E = DEMKO
F =

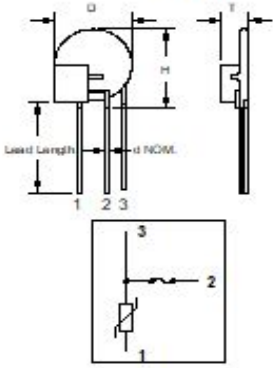
THERMALLY PROTECTED SERIES

MECHANICAL SPECIFICATIONS

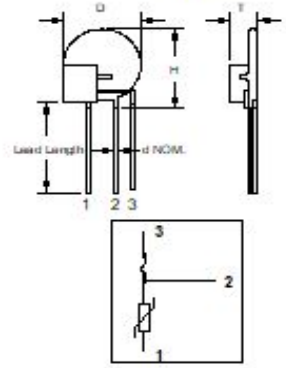
FN Type



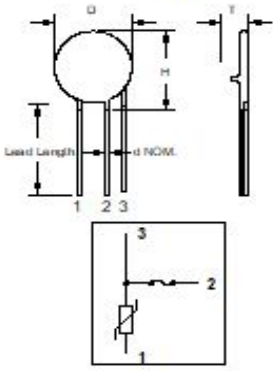
FM Type



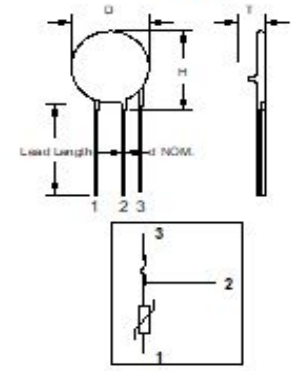
FE Type



FF Type



FT Type



Dimension	14mm	20mm	25mm
MAX. D	0.763"	0.945"	1.142"
MAX. T	0.386" - 0.709"	0.386" - 0.709"	0.386" - 0.709"
MAX. H	0.888"	1.050"	1.267"
TYP. X	0.295"/0.492"	0.295"/0.492"	0.295"/0.492"
TYP. d	0.032"	0.032"	0.040"

NOTES:

1. Alternate dimensional specifications, including lead styles, for any part listed may be available upon request.
2. Specifications are subject to change. Contact Maida for specific datasheet for exact dimensions.

INTRODUCTION

The SMD Series is ideal for SMT processing and Pick and Place assembly. Its low profile package offers space savings compared to leaded devices. The SMD Series utilizes the same ceramic elements used in the leaded Standard Series, only in a surface mount package. These are a direct replacement to their comparable Standard Series counterparts with all the same electrical characteristics. Available in 5mm, 7mm, 10mm, 14mm, and 20mm disc sizes. The construction is RoHS compliant and the coating is UL94-V0 rated. They are available with maximum continuous operating voltages (MCOV) ranging from 11VAC to 550VAC.

STYLE DESIGNATION

The Maida Style Number is the typical means to identify our components when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number.
The following example is the standard part numbering system when ordering our SMD Series components by the Maida Style Number:

SM 20 ZOV 131 RA 20

1. **Package Description**
   SM – Surface Mount
2. **Ceramic Disc Size**
   05 – 5mm
   07 – 7mm
   10 – 10mm
   14 – 14mm
   20 – 20mm
3. **Material Identifier**
   Zinc Oxide Varistor
4. **AC Voltage Rating**
   Two significant figures plus number of zeroes that follow, i.e. 131 is 130 VAC
5. **Special Instructions,** RA is standard
6. **Rating Code,** up to 3 numbers

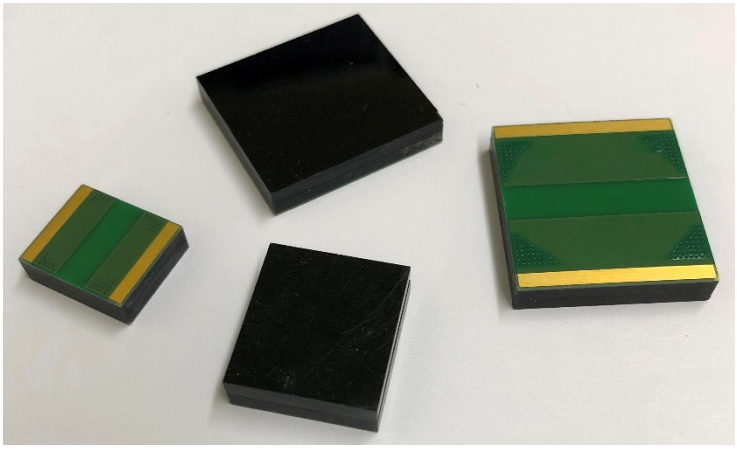
STANDARD MARKING

Minimum marking shall consist of an abbreviated style designation and, when space is available, the manufacturer's initials or company logo.

Example
MDC
SM20131

Where:
MDC - Company Initials
SM - SM Series
20 - Ceramic Disc Size
131 - AC Voltage rating (130VAC)

A manufacturing date code and/or special markings may be available upon request.
Other safety agency designations are included where applicable.



Maida Style Number	Recognitions To Safety Agency Standards						Nominal Ceramic Disc Size	Minimum Marking	Maximum Ratings						Electrical Characteristics					
									Continuous		Transient									
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.	
											10 x 1000 μsec	8 x 20 μsec	1	2			(8 x 20μsec)		1 V rms @1kHz	
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	(A)	(A)	Vmin (V)	Vmax (V)	(V)	(A)	(pF)	
SM05ZOV110RA00	X	X					5	SM05110	11	14	0.6	0.6	250	125	16	20	40	1	2200	
SM07ZOV110RA01	X	X					7	SM07110	11	14	1.1	1.1	500	250	16	20	36	2.5	3500	
SM10ZOV110RA02	X	X					10	SM10110	11	14	2.6	2.6	1000	500	16	20	36	5	7500	
SM14ZOV110RA04	X	X					14	SM14110	11	14	5.2	5.2	2000	1000	16	20	36	10	18000	
SM20ZOV110RA10	X	X					20	SM20110	11	14	13	13	3000	2000	16	20	36	20	37000	
SM05ZOV140RA00	X	X					5	SM05140	14	18	0.7	0.7	250	125	20	24	48	1	2000	
SM07ZOV140RA01	X	X					7	SM07140	14	18	1.3	1.3	500	250	20	24	43	2.5	2800	
SM10ZOV140RA02	X	X					10	SM10140	14	18	3.2	3.2	1000	500	20	24	43	5	6000	
SM14ZOV140RA04	X	X					14	SM14140	14	18	6.3	6.3	2000	1000	20	24	43	10	15000	
SM20ZOV140RA13	X	X					20	SM20140	14	18	16	16	3000	2000	20	24	43	20	30000	
SM05ZOV170RA00	X	X					5	SM05170	17	22	0.9	0.9	250	125	24	30	60	1	1600	
SM07ZOV170RA01	X	X					7	SM07170	17	22	1.6	1.6	500	250	24	30	53	2.5	2000	
SM10ZOV170RA03	X	X					10	SM10170	17	22	3.9	3.9	1000	500	24	30	53	5	4000	
SM14ZOV170RA05	X	X					14	SM14170	17	22	7.8	7.8	2000	1000	24	30	53	10	10000	
SM20ZOV170RA15	X	X					20	SM20170	17	22	19	19	3000	2000	24	30	53	20	22000	
SM05ZOV200RA00	X	X					5	SM05200	20	26	1.1	1.1	250	125	30	36	73	1	1675	
SM07ZOV200RA01	X	X					7	SM07200	20	26	2	2	500	250	30	36	65	2.5	3614	
SM10ZOV200RA03	X	X					10	SM10200	20	26	4.8	4.8	1000	500	30	36	65	5	6655	
SM14ZOV200RA06	X	X					14	SM14200	20	26	9.5	9.5	2000	1000	30	36	65	10	14447	
SM20ZOV200RA20	X	X					20	SM20200	20	26	24	24	3000	2000	30	36	65	20	33064	
SM05ZOV250RA01	X	X					5	SM05250	25	31	1.2	1.2	250	125	35	43	86	1	1417	
SM07ZOV250RA02	X	X					7	SM07250	25	31	2.4	2.4	500	250	35	43	77	2.5	3058	
SM10ZOV250RA04	X	X					10	SM10250	25	31	5.6	5.6	1000	500	35	43	77	5	5632	
SM14ZOV250RA07	X	X					14	SM14250	25	31	11	11	2000	1000	35	43	77	10	12225	
SM20ZOV250RA24	X	X					20	SM20250	25	31	28	28	3000	2000	35	43	77	20	27977	
SM05ZOV300RA01	X	X					5	SM05300	30	38	1.5	1.5	250	125	42	52	99	1	1176	
SM07ZOV300RA02	X	X					7	SM07300	30	38	2.8	2.8	500	250	42	52	93	2.5	2537	
SM10ZOV300RA05	X	X					10	SM10300	30	38	6.8	6.8	1000	500	42	52	93	5	4673	
SM14ZOV300RA09	X	X					14	SM14300	30	38	14	14	2000	1000	42	52	93	10	10144	
SM20ZOV300RA30	X	X					20	SM20300	30	38	34	34	3000	2000	42	52	93	20	23215	
SM05ZOV350RA01	X	X					5	SM05350	35	45	1.8	1.8	250	125	50	62	117	1	987	
SM07ZOV350RA02	X	X					7	SM07350	35	45	3.4	3.4	500	250	50	62	110	2.5	2130	
SM10ZOV350RA06	X	X					10	SM10350	35	45	8.1	8.1	1000	500	50	62	110	5	3922	
SM14ZOV350RA10	X	X					14	SM14350	35	45	16	16	2000	1000	50	62	110	10	8514	
SM20ZOV350RA35	X	X					20	SM20350	35	45	41	41	3000	2000	50	62	110	20	19484	
SM05ZOV400RA01	X	X					5	SM05400	40	56	2.2	2.2	250	125	61	75	138	1	438	
SM07ZOV400RA03	X	X					7	SM07400	40	56	5.2	5.2	500	250	61	75	135	2.5	945	
SM10ZOV400RA07	X	X					10	SM10400	40	56	13	13	1000	500	61	75	135	5	1627	
SM14ZOV400RA12	X	X					14	SM14400	40	56	20	20	2000	1000	61	75	135	10	3285	
SM20ZOV400RA40	X	X					20	SM20400	40	56	49	49	3000	2000	61	75	135	20	7517	
SM05ZOV500RA01	X	X					5	SM05500	50	66	3.5	3.5	800	600	74	90	163	5	364	
SM07ZOV500RA02	X	X					7	SM07500	50	66	7	7	1750	1250	74	90	157	10	767	
SM10ZOV500RA03	X	X					10	SM10500	50	66	14	14	3500	2500	74	90	147	25	1375	
SM14ZOV500RA06	X	X					14	SM14500	50	66	28	28	6000	5000	74	90	147	50	2829	
SM20ZOV500RA42	X	X					20	SM20500	50	66	56	56	10000	7000	74	90	147	100	5041	
SM05ZOV600RA01	X	X					5	SM05600	60	81	4.5	4.5	800	600	90	110	190	5	299	
SM07ZOV600RA02	X	X					7	SM07600	60	81	9	9	1750	1250	90	110	180	10	629	
SM10ZOV600RA03	X	X					10	SM10600	60	81	18	18	3500	2500	90	110	175	25	1128	
SM14ZOV600RA06	X	X					14	SM14600	60	81	36	36	6000	5000	90	110	175	50	2319	
SM20ZOV600RA45	X	X					20	SM20600	60	81	72	72	10000	7000	90	110	175	100	5264	
SM05ZOV750RA01	X	X					5	SM05750	75	102	5.5	5.5	800	600	108	132	220	5	249	
SM07ZOV750RA02	X	X					7	SM07750	75	102	11	11	1750	1250	108	132	220	10	524	
SM10ZOV750RA03	X	X					10	SM10750	75	102	22	22	3500	2500	108	132	210	25	940	
SM14ZOV750RA06	X	X					14	SM14750	75	102	44	44	6000	5000	108	132	210	50	1933	
SM20ZOV750RA55	X	X					20	SM20750	75	102	88	88	10000	7000	108	132	210	100	4387	
SM05ZOV950RA01	X	X					5	SM05950	95	127	6.6	6.6	800	600	135	165	240	5	118	
SM07ZOV950RA02	X	X					7	SM07950	95	127	13	13	1750	1250	135	165	255	10	255	
SM10ZOV950RA03	X	X					10	SM10950	95	127	25	25	3500	2500	135	165	255	25	469	
SM14ZOV950RA06	X	X					14	SM14950	95	127	53	53	6000	5000	135	165	255	50	1019	
SM20ZOV950RA65	X	X					20	SM20950	95	127	106	106	10000	7000	135	165	255	100	2331	
SM05ZOV121RA02	X	X					5	SM05121	120	160	8	8	800	600	170	207	310	5	118	
SM07ZOV121RA03	X	X					7	SM07121	120	160	16	16	1750	1250	170	207	320	10	255	
SM10ZOV121RA04	X	X					10	SM10121	120	160	33	33	3500	2500	170	207	320	25	469	
SM14ZOV121RA09	X	X					14	SM14121	120	160	52	52	6000	5000	170	207	320	50	1019	
SM20ZOV121RA20	X	X					20	SM20121	120	160	130	130	10000	7000	170	207	320	100	2331	
SM05ZOV131RA02	X	X					5	SM05131	130	175	8.5	8.5	800	600	184	224	350	5	116	
SM07ZOV131RA03	X	X					7	SM07131	130	175	17.5	17.5	1750	1250	184	224	340	10	250	
SM10ZOV131RA04	X	X					10	SM10131	130	175	45	45	3500	2500	184	224	340	25	438	
SM14ZOV131RA09	X	X					14	SM14131	130	175	70	70	6500	5000	184	224	340	50	890	
SM20ZOV131RA20	X	X					20	SM20131	130	175	150	150	12000	9000	184	224	340	100	2001	

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Ceramic Disc Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	1 (A)	2 (A)	Vmin (V)	Vmax (V)	(8 x 20μsec) (V)	(A)	@1kHz (pF)
SM05ZOV141RA02	X	X					5	SM05141	140	180	9	9	800	600	198	242	380	5	111
SM07ZOV141RA03	X	X					7	SM07141	140	180	20	20	1750	1250	198	242	360	10	232
SM10ZOV141RA04	X	X					10	SM10141	140	180	50	50	3500	2500	198	242	360	25	407
SM14ZOV141RA09	X	X					14	SM14141	140	180	78	78	6500	5000	198	242	360	50	825
SM20ZOV141RA20	X	X					20	SM20141	140	180	160	160	12000	9000	198	242	360	100	1855
SM05ZOV151RA02	X	X					5	SM05151	150	200	10.5	10.5	800	600	212	259	430	5	101
SM07ZOV151RA03	X	X					7	SM07151	150	200	21	21	1750	1250	212	259	395	10	212
SM10ZOV151RA04	X	X					10	SM10151	150	200	55	55	3500	2500	212	259	395	25	373
SM14ZOV151RA09	X	X					14	SM14151	150	200	84	84	6500	5000	212	259	395	50	756
SM20ZOV151RA20	X	X					20	SM20151	150	200	170	170	12000	9000	212	259	395	100	1701
SM05ZOV181RA02	X	X					5	SM05181	180	230	11	11	800	600	255	311	510	5	87
SM07ZOV181RA03	X	X					7	SM07181	180	230	24	24	1750	1250	255	311	445	10	182
SM10ZOV181RA04	X	X					10	SM10181	180	230	60	60	3500	2500	255	311	465	25	319
SM14ZOV181RA09	X	X					14	SM14181	180	230	100	100	6000	5000	255	311	465	50	648
SM20ZOV181RA20	X	X					20	SM20181	180	230	190	190	10000	7000	255	311	465	100	1458
SM05ZOV211RA07	X	X					5	SM05211	210	270	13	13	800	600	297	363	545	5	74
SM07ZOV211RA18	X	X					7	SM07211	210	270	28	28	1750	1250	297	363	545	10	154
SM10ZOV211RA30	X	X					10	SM10211	210	270	58	58	3500	2500	297	363	545	25	271
SM14ZOV211RA65	X	X					14	SM14211	210	270	120	120	6000	4500	297	363	545	50	550
SM20ZOV211RA110	X	X					20	SM20211	210	270	230	230	10000	6500	297	363	545	100	1237
SM05ZOV231RA08	X	X					5	SM05231	230	300	16	16	800	600	326	397	595	5	68
SM07ZOV231RA20	X	X					7	SM07231	230	300	32	32	1750	1250	326	397	595	10	141
SM10ZOV231RA35	X	X					10	SM10231	230	300	65	65	3500	2500	326	397	595	25	248
SM14ZOV231RA70	X	X					14	SM14231	230	300	135	135	6000	4500	326	397	595	50	504
SM20ZOV231RA115	X	X					20	SM20231	230	300	270	270	10000	6500	326	397	595	100	1134
SM05ZOV251RA08	X	X					5	SM05251	250	330	17	17	800	600	354	432	675	5	62
SM07ZOV251RA21	X	X					7	SM07251	250	330	35	35	1750	1250	354	432	650	10	131
SM10ZOV251RA40	X	X					10	SM10251	250	330	70	70	3500	2500	354	432	650	25	229
SM14ZOV251RA72	X	X					14	SM14251	250	330	145	145	6000	4500	354	432	650	50	465
SM20ZOV251RA130	X	X					20	SM20251	250	330	300	300	10000	6500	354	432	650	100	1047
SM05ZOV271RA09	X	X					5	SM05271	270	360	20	20	800	600	382	466	740	5	58
SM07ZOV271RA23	X	X					7	SM07271	270	360	40	40	1750	1250	382	466	710	10	121
SM10ZOV271RA43	X	X					10	SM10271	270	360	80	80	3500	2500	382	466	710	25	213
SM14ZOV271RA75	X	X					14	SM14271	270	360	160	160	6000	4500	382	466	710	50	432
SM20ZOV271RA140	X	X					20	SM20271	270	360	325	325	10000	6500	382	466	710	100	972
SM05ZOV301RA10	X	X					5	SM05301	300	390	21	21	800	600	425	518	810	5	52
SM07ZOV301RA25	X	X					7	SM07301	300	390	42	42	1750	1250	425	518	790	10	108
SM10ZOV301RA45	X	X					10	SM10301	300	390	85	85	3500	2500	425	518	790	25	190
SM14ZOV301RA80	X	X					14	SM14301	300	390	175	175	6000	4500	425	518	790	50	386
SM20ZOV301RA150	X	X					20	SM20301	300	390	350	350	10000	6500	425	518	790	100	869
SM05ZOV321RA11	X	X					5	SM05321	320	420	21	21	800	600	453	553	850	5	49
SM07ZOV321RA27	X	X					7	SM07321	320	420	46	46	1750	1250	453	553	850	10	102
SM10ZOV321RA45	X	X					10	SM10321	320	420	92	92	3500	2500	453	553	850	25	179
SM14ZOV321RA90	X	X					14	SM14321	320	420	190	190	6000	4500	453	553	850	50	363
SM20ZOV321RA160	X	X					20	SM20231	320	420	385	385	10000	6500	453	553	850	100	816
SM05ZOV361RA12	X	X					5	SM05361	360	470	22	22	800	600	522	638	960	5	48
SM07ZOV361RA28	X	X					7	SM07361	360	470	47	47	1750	1250	522	638	960	10	90
SM10ZOV361RA45	X	X					10	SM10361	360	470	97	97	3500	2500	522	638	960	25	154
SM14ZOV361RA85	X	X					14	SM14361	360	470	205	205	6000	4500	522	638	960	50	313
SM20ZOV361RA160	X	X					20	SM20361	360	470	410	410	10000	6500	522	638	960	100	704
SM05ZOV391RA13	X	X					5	SM05391	390	500	25	25	800	600	552	674	1040	5	46
SM07ZOV391RA29	X	X					7	SM07391	390	500	51	51	1750	1250	552	674	1040	10	85
SM10ZOV391RA45	X	X					10	SM10391	390	500	107	107	3500	2500	552	674	1025	25	146
SM14ZOV391RA85	X	X					14	SM14391	390	500	215	215	6000	4500	552	674	1025	50	297
SM20ZOV391RA150	X	X					20	SM20391	390	500	420	420	10000	6500	552	674	1025	100	667
SM05ZOV421RA14	X	X					5	SM05421	420	560	26	26	800	600	594	725	1130	5	37
SM07ZOV421RA30	X	X					7	SM07421	420	560	57	57	1750	1250	594	725	1120	10	79
SM10ZOV421RA45	X	X					10	SM10421	420	560	110	110	3500	2500	594	725	1120	25	136
SM14ZOV421RA90	X	X					14	SM14421	420	560	225	225	6000	4500	594	725	1120	50	275
SM20ZOV421RA160	X	X					20	SM20421	420	560	430	430	10000	6500	594	725	1120	100	618
SM05ZOV461RA16	X	X					5	SM05461	460	615	28	28	800	600	651	795	1280	5	39
SM07ZOV461RA33	X	X					7	SM07461	460	615	63	63	1750	1250	651	795	1280	10	77
SM10ZOV461RA50	X	X					10	SM10461	460	615	115	115	3500	2500	651	795	1240	25	124
SM14ZOV461RA100	X	X					14	SM14461	460	615	230	230	6000	4500	651	795	1240	50	251
SM20ZOV461RA175	X	X					20	SM20461	460	615	450	450	10000	6500	651	795	1240	100	565
SM05ZOV481RA18	X	X					5	SM05481	480	640	30	30	800	600	679	829	1320	5	37
SM07ZOV481RA35	X	X					7	SM07481	480	640	66	66	1750	1250	679	829	1320	10	70
SM10ZOV481RA50	X	X					10	SM10481	480	640	120	120	3500	2500	679	829	1300	25	119
SM14ZOV481RA105	X	X					14	SM14481	480	640	235	235	6000	4500	679	829	1300	50	242
SM20ZOV481RA180	X	X					20	SM20481	480	640	460	460	10000	6500	679	829	1300	100	544

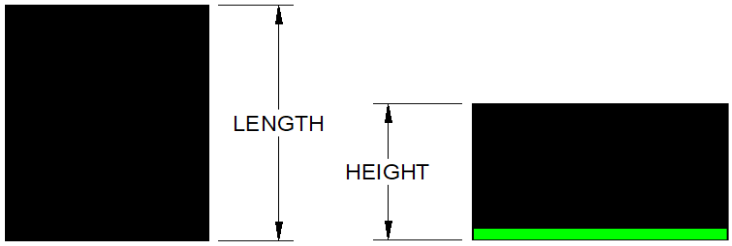
Maida Style Number	Recognitions To Safety Agency Standards						Nominal Ceramic Disc Size	Minimum Marking	**Maximum Ratings**						**Electrical Characteristics**				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	1 (A)	2 (A)	Vmin (V)	Vmax (V)	(8 x 20μsec) (V)	(A)	@1kHz (pF)
SM05ZOV511RA20	X	X					5	SM05511	510	675	32	32	800	600	722	881	1390	5	35
SM07ZOV511RA37	X	X					7	SM07511	510	675	65	65	1750	1250	722	881	1390	10	65
SM10ZOV511RA55	X	X					10	SM10511	510	675	125	125	3500	2500	722	881	1350	25	112
SM14ZOV511RA110	X	X					14	SM14511	510	675	240	240	6000	4500	722	881	1350	50	227
SM20ZOV511RA190	X	X					20	SM20511	510	675	470	470	10000	6500	722	881	1350	100	510
SM05ZOV551RA22	X	X					5	SM05551	550	700	35	35	800	600	778	950	1480	5	32
SM07ZOV551RA39	X	X					7	SM07551	550	700	68	68	1750	1250	778	950	1480	10	60
SM10ZOV551RA60	X	X					10	SM10551	550	700	130	130	3500	2500	778	950	1400	25	104
SM14ZOV551RA115	X	X					14	SM14551	550	700	255	255	6000	4500	778	950	1400	50	211
SM20ZOV551RA200	X	X					20	SM20551	550	700	510	510	10000	6500	778	950	1400	100	475

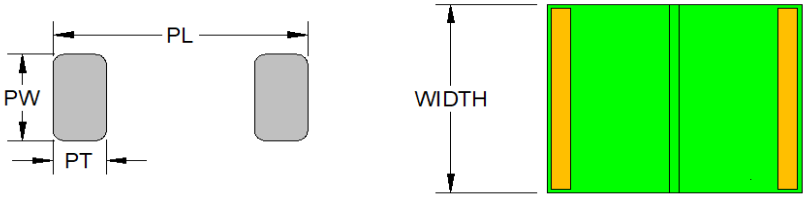
A = UL1449
B = cUL
C = CSA
D = VDE
E = DEMKO
F =

SMD SERIES

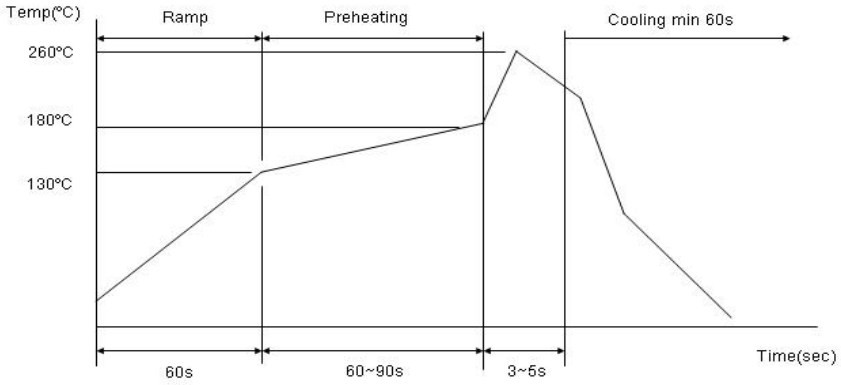
MECHANICAL SPECIFICATIONS

Maida Style Number	Length (L)	Width (W)	MAX. Height (H)	Recommended Land Pad Length (PL)	Recommended Land Pad Width (PW)	Recommended Land Pad Thickness (PT)
SM05	0.280"±0.012"	0.248"±0.012"	0.232"	0.330"	0.267"	0.080"
SM07	0.394"±0.012"	0.315"±0.012"	0.232"	0.452"	0.365"	0.100"
SM10	0.563"±0.012"	0.484"±0.012"	0.181"	0.613"	0.534"	0.120"
SM14	0.709"±0.012"	0.638"±0.012"	0.232"	0.759"	0.688"	0.140"
SM20	0.945"±0.012"	0.874"±0.012"	0.181"	0.995"	0.924"	0.140"





Recommended Reflow Profile



HV MLV SERIES

INTRODUCTION

The HV MLV Series is a surface mount, multilayer varistor (MLV) design for line voltage applications. While typical MLV's are designed for low voltage applications, these MLV's are available with maximum continuous operating voltages (MCOV) ranging from 150VAC to 300VAC. Available in EIA chip sizes of 0806 and 1206.

STYLE DESIGNATION

The Maida Style Number is the typical means to identify our components when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number.

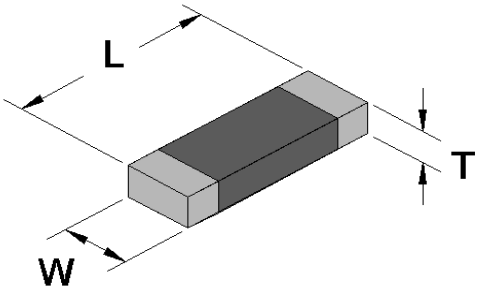
The following example is the standard part numbering system when ordering our SMD Series components by the Maida Style Number:

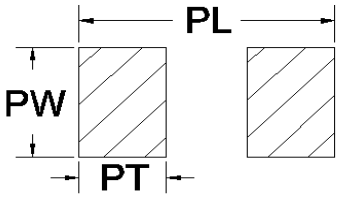
HV 151 N 0806 101

1. **Package Description**
   HV – HV Series MLV
2. **AC Voltage Rating**
   Two significant figures plus number of zeroes that follow, i.e. 151 is 150 VAC
3. **End Termination Type**
   N – Tin (Sn) plated Nickel (Ni)
4. **Chip Size**
   As defined by EIA standards
5. **Special Instructions,** 101 is standard

STANDARD MARKING

The HV MLV Series do not have individual markings on the components due to the chip sizes. The HV MLV Series components are supplied Tape & Reel. Each reel is marked with all required information and may include special annotation as required by our customers.





MLV SERIES

INTRODUCTION

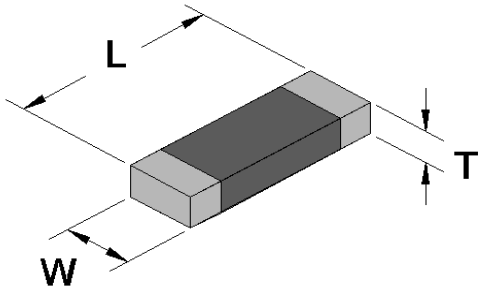
The MLV Series, designed for surface mount applications, are small multilayer varistors. They are available in standard EIA sizes of 0402, 0603, 0805, 1206, 1210, 1812 and 2220 packages.

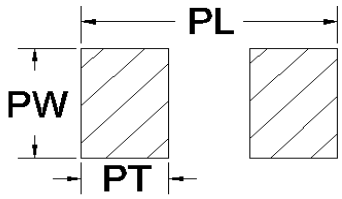
SV Series – This is our standard MLV series. They provide good high current pulse protection with moderate capacitance.

The MLV Series of varistors are designed to provide transient, surge, and ESD (Electrostatic Discharge) protection for a wide variety of applications.

STYLE DESIGNATION
The Maida Style Number is the typical means to identify our components when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number.
The following example is the standard part numbering system when ordering our MLV Series components by the Maida Style Number:

STANDARD MARKING
The MLV Series do not have markings.





SV 18 N 0603 120 R

1. **Series Designation**
2. **DC Voltage Rating (VDC)**
3. **End Termination Type**
   N – Tin (Sn) plated Nickel (Ni)
4. **Chip size**
   As defined by EIA standards
5. **Nominal Capacitance (pF)**
   Two significant figures plus number of zeroes that follow, i.e. 120 is 12 pF
8. **Packaging Code**
   B – Bulk
   R – Tape & Reel

HV SERIES (For line voltage and higher)

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy	Nominal Discharge I_{NOM}	Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											8 x 20 μsec	8x20µs (15)	1	2	Vmin	Vmax	(8 x 20μsec)		1 V rms @1kHz
	A	B	C	D	E	F	(EIA)		(AC)	(DC)	(J)	(A)	(A)	(A)	(V)	(V)	(V)	(A)	(pF)
HV151N0806101	X	X					0806	N/A	150	200	0.7	10.0	40	25	216	264	340	1	60
HV181N0806101	X	X					0806	N/A	180	230	0.8	10.0	40	25	243	297	400	1	40
HV251N0806101	X	X					0806	N/A	250	330	1.0	10.0	40	25	354	432	500	1	25
HV271N0806101	X	X					0806	N/A	270	360	1.2	10.0	40	25	387	473	560	1	15
HV151N1206101	X	X					1206	N/A	150	200	1.5	10.0	80	50	216	264	350	1	35
HV181N1206101	X	X					1206	N/A	180	230	1.6	10.0	80	50	243	297	380	1	30
HV251N1206101	X	X					1206	N/A	250	330	2.0	10.0	80	50	354	432	560	1	20
HV271N1206101	X	X					1206	N/A	270	360	2.5	10.0	80	50	387	473	600	1	20
HV301N1206101	X	X					1206	N/A	300	390	3.0	10.0	80	50	425	518	650	1	15

SV SERIES

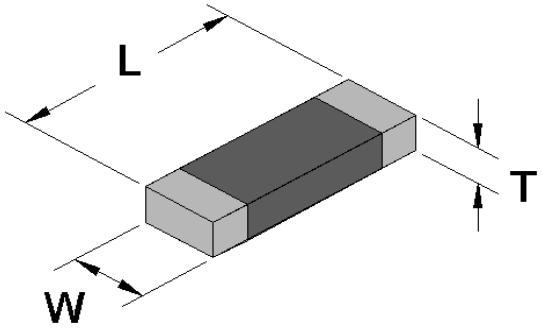
Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec	1	2	Vmin	Vmax	(8 x 20μsec)		1 V rms @1kHz
	A	B	C	D	E	F	(EIA)		(AC)	(DC)	(J)	(J)	(A)	(A)	(V)	(V)	(V)	(A)	(pF)
SV5R5N0402271							0402	N/A	4	5.5	0.1	0.1	20	20	6.9	9.3	19	1	270
SV9N0402131							0402	N/A	6.5	9	0.1	0.1	20	20	11.3	15.2	32	1	130
SV11N0402121							0402	N/A	8	11	0.1	0.1	20	20	12.7	17.3	33	1	120
SV11N0402400							0402	N/A	8	11	0.1	0.1	10	10	12.7	17.3	33	1	40
SV14N0603900							0402	N/A	11	14	0.1	0.1	20	20	16.2	19.8	38	1	90
SV14N0603330							0402	N/A	11	14	0.1	0.1	10	10	16.2	19.8	42	1	33
SV18N0603850							0402	N/A	14	18	0.1	0.1	20	20	19.8	24.2	45	1	85
SV3R5N0603181							0603	N/A	2.5	3.3	0.1	0.1	20	20	4.4	6.6	13	1	180
SV5R5N0603271							0603	N/A	4	5.5	0.1	0.1	30	30	6.9	9.3	16	1	270
SV8N0603141							0603	N/A	6	8	0.1	0.1	30	30	8.8	13.2	29	1	140
SV9N0603211							0603	N/A	7	9	0.1	0.1	30	30	10	15	27	1	210
SV11N0603201							0603	N/A	8	11	0.1	0.1	30	30	13	18	27	1	200
SV14N0603101							0603	N/A	11	14	0.1	0.1	30	30	16.2	19.8	35	1	100
SV14N0603151							0603	N/A	11	14	0.1	0.1	30	30	16.2	19.8	35	1	150
SV18N0603131							0603	N/A	14	18	0.1	0.1	30	30	19.8	24.2	40	1	130
SV26N0603101							0603	N/A	20	26	0.1	0.1	30	30	27.9	34.1	58	1	100
SV30N0603040							0603	N/A	25	30	0.1	0.1	30	30	38	46	65	1	40
SV39N0603030							0603	N/A	30	39	0.1	0.1	30	30	42	52	80	1	30
SV5R5N0805102							0805	N/A	4	5.5	0.3	0.3	120	120	6.9	9.3	15	2	1000
SV9N0805641							0805	N/A	6.5	9	0.3	0.3	120	120	11.3	15.2	24	2	640
SV11N0805581							0805	N/A	8	11	0.3	0.3	120	120	13	18	27	2	580
SV14N0805501							0805	N/A	10	14	0.3	0.3	120	120	17.5	23.7	30	2	500
SV18N0805401							0805	N/A	14	18	0.3	0.3	120	120	23	30	40	2	400
SV22N0805361							0805	N/A	17	22	0.3	0.3	120	120	28	34	50	2	360
SV26N0805281							0805	N/A	20	26	0.3	0.3	120	120	33	40	58	2	280
SV30N0805201							0805	N/A	25	30	0.3	0.3	120	120	38	46	65	2	200
SV39N0805151							0805	N/A	30	39	0.3	0.3	120	120	42	52	80	2	150
SV5R5N1206312							1206	N/A	4	5.5	0.4	0.4	100	100	7.5	10.5	20	10	3100
SV9N1206222							1206	N/A	6.5	9	0.4	0.4	150	150	11.3	15.2	25	10	2200
SV14N1206172							1206	N/A	10	14	0.4	0.4	150	150	17.5	23.7	30	10	1700
SV18N1206102							1206	N/A	14	18	0.4	0.4	150	150	23	30	40	10	1000
SV26N1206941							1206	N/A	20	26	0.4	0.4	150	150	33	40	58	10	940
SV30N1206891							1206	N/A	25	30	0.4	0.4	150	150	38	46	66	10	890
SV42N1206641							1206	N/A	30	42	0.4	0.4	150	150	46	60	180	10	640
SV48N1206601							1206	N/A	40	48	0.4	0.4	150	150	55	66	100	10	600
SV56N1206181							1206	N/A	40	56	0.4	0.4	150	150	63	77	120	10	180
SV18N1210172							1210	N/A	14	18	0.9	0.9	220	220	23	30	40	10	1700
SV26N1210122							1210	N/A	20	26	0.9	0.9	220	220	33	40	58	10	1200
SV30N1210901							1210	N/A	25	30	0.9	0.9	220	220	38	46	66	10	900
SV38N1210781							1210	N/A	30	38	0.9	0.9	250	250	42.3	51.7	77	10	780
SV48N1210451							1210	N/A	40	48	0.9	0.9	250	250	55	66	100	10	450
SV60N1210601							1210	N/A	50	60	0.9	0.9	250	250	69	83	120	10	600

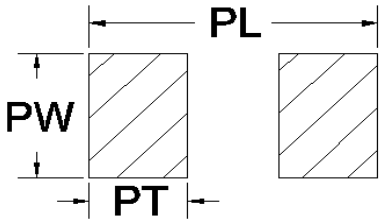
A = UL1449
B = cUL
C = CSA
D = VDE
E = DEMKO
F =

MLV SERIES

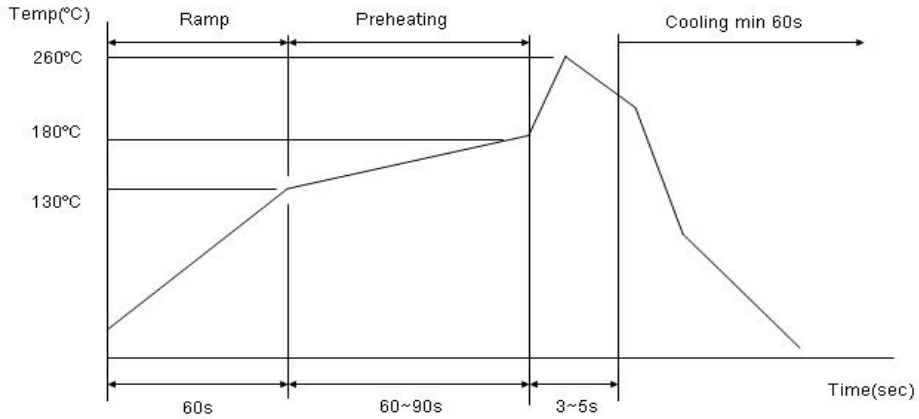
MECHANICAL SPECIFICATIONS

Size	Length (L)	Width (W)	MAX. Height (H)	Recommended Land Pad Length (PL)	Recommended Land Pad Width (PW)	Recommended Land Pad Thickness (PT)	End Termination Material
HV - 0806	0.086"±0.008"	0.067"±0.008"	0.079"	0.138"	0.079"	0.047"	Ag/Ni/Sn
HV - 1206	0.126"±0.012"	0.067"±0.008"	0.079"	0.159"	0.079"	0.047"	Ag/Ni/Sn
0402	0.039"±0.004"	0.020"±0.002"	0.020"	0.067"	0.024"	0.022"	Ag/Ni/Sn
0603	0.063"±0.006"	0.032"±0.006"	0.035"	0.100"	0.042"	0.037"	Ag/Ni/Sn
0805	0.079"±0.008"	0.049"±0.008"	0.035"	0.137"	0.061"	0.039"	Ag/Ni/Sn
1206	0.126"±0.012"	0.063"±0.012"	0.067"	0.159"	0.079"	0.047"	Ag/Ni/Sn
1210	0.126"±0.012"	0.098"±0.012"	0.071"	0.159"	0.114"	0.047"	Ag/Ni/Sn





Recommended Reflow Profile



ENCAPSULATED MOV SERIES

INTRODUCTION

The Encapsulated MOV (eMOV) Series is ideal for SMT processing and Pick and Place assembly. Its low-profile package offers space savings compared to leaded devices. These encapsulated components can withstand higher surge energies (up to 1200A) than MLVs. They are available in standard EIA sizes of 2825 and 4032 packages. The construction is RoHS compliant and the coating is UL94-V0 rated. They are available with maximum continuous operating voltages (MCOV) ranging from 11VAC to 680VAC.

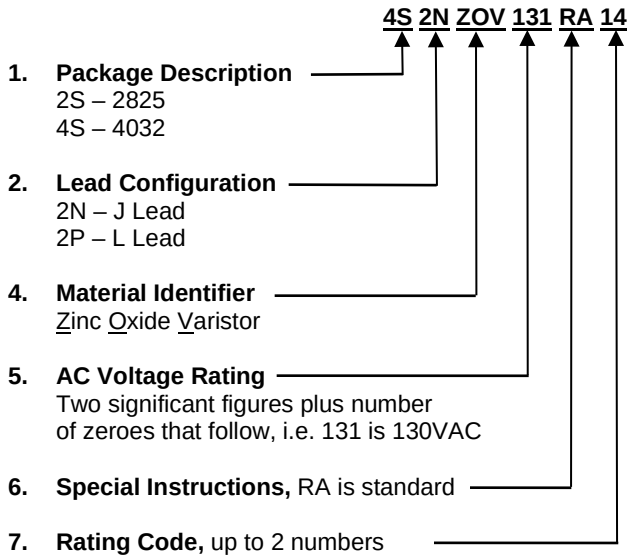
STYLE DESIGNATION
The Maida Style Number is the typical means to identify our components when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number.
The following example is the standard part numbering system when ordering our Encapsulated MOV Series components by the Maida Style Number:

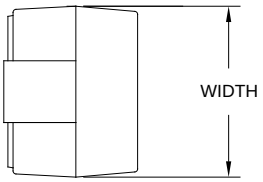
STANDARD MARKING
Minimum marking shall consist of an abbreviated style designation and, when space is available, the manufacturer's initials or company logo.

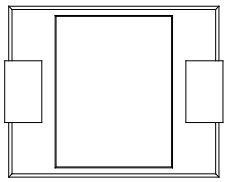
Example
MDC
4S131UL

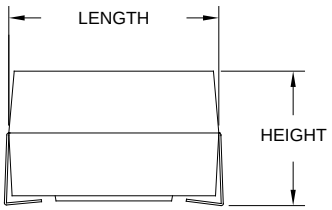
Where:
MDC - Company Initials
4S - Package Description
131 - AC Voltage rating (130VAC)
UL - UL recognition, if applicable

A manufacturing date code and/or special markings may be available upon request.
Other safety agency designations are included where applicable.

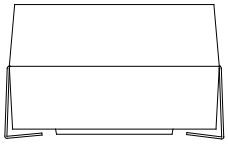




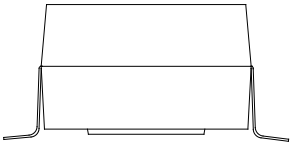




2N - J Lead Style



2P - L Lead Style



ENCAPSULATED MOV SERIES

ELECTRICAL SPECIFICATIONS

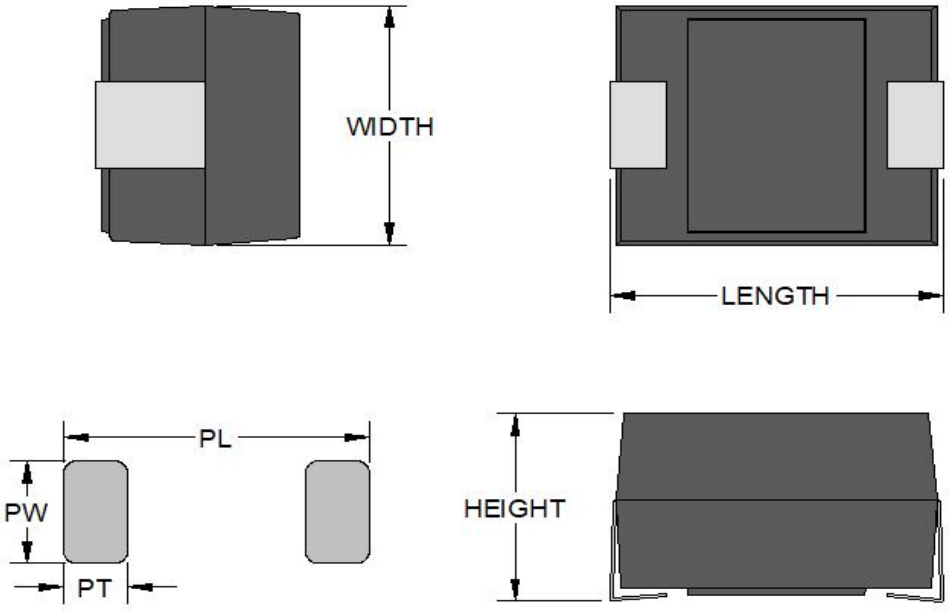
Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size	Minimum Marking	Maximum Ratings						Electrical Characteristics				
									Continuous		Transient								
									Applied Voltage		Energy		Peak Current 8 x 20 μsec # Pulses		Varistor Voltage @1 mA DC		Max Clamping Voltage (@Test Current)		Typical Cap.
											10 x 1000 μsec	8 x 20 μsec							1 V rms @1kHz
	A	B	C	D	E	F	(mm)		(AC)	(DC)	(J)	(J)	1 (A)	2 (A)	Vmin (V)	Vmax (V)	(8 x 20μsec) (V)	(A)	(pF)
2S2NZOV110RA00	X	X					5	2S110	11	14	0.6	0.6	250	125	16	20	40	1	2200
4S2NZOV110RA01	X	X					7	4S110	11	14	1.1	1.1	500	250	16	20	36	2	3500
2S2NZOV140RA00	X	X					5	2S140	14	18	0.7	0.7	250	125	20	24	48	1	2000
4S2NZOV140RA01	X	X					7	4S140	14	18	1.3	1.3	500	250	20	24	43	2	2800
2S2NZOV170RA00	X	X					5	2S170	17	22	0.9	0.9	250	125	24	30	60	1	1600
4S2NZOV170RA01	X	X					7	4S170	17	22	1.6	1.6	500	250	24	30	53	2	2000
2S2NZOV200RA00	X	X					5	2S200	20	26	1.1	1.1	250	125	30	36	73	1	1700
4S2NZOV200RA01	X	X					7	4S200	20	26	2	2	500	250	30	36	65	2	3600
2S2NZOV250RA01	X	X					5	2S250	25	31	1.2	1.2	250	125	35	43	86	1	1400
4S2NZOV250RA02	X	X					7	4S250	25	31	2.4	2.4	500	250	35	43	77	2	3060
2S2NZOV300RA01	X	X					5	2S300	30	38	1.5	1.5	250	125	42	52	99	1	1175
4S2NZOV300RA02	X	X					7	4S300	30	38	2.8	2.8	500	250	42	52	93	2	2540
2S2NZOV350RA01	X	X					5	2S350	35	45	1.8	1.8	250	125	50	62	117	1	990
4S2NZOV350RA02	X	X					7	4S350	35	45	3.4	3.4	500	250	50	62	110	2	2130
2S2NZOV400RA01	X	X					5	2S400	40	56	2.2	2.2	250	125	61	75	138	1	440
4S2NZOV400RA03	X	X					7	4S400	40	56	5.2	5.2	500	250	61	75	135	2	945
2S2NZOV500RA01	X	X					5	2S500	50	66	3.5	3.5	800	600	74	90	163	5	360
4S2NZOV500RA02	X	X					7	4S500	50	66	7	7	1750	1250	74	90	157	10	770
2S2NZOV600RA01	X	X					5	2S600	60	81	4.5	4.5	800	600	90	110	190	5	300
4S2NZOV600RA02	X	X					7	4S600	60	81	9	9	1750	1250	90	110	180	10	630
2S2NZOV750RA01	X	X					5	2S750	75	102	5.5	5.5	800	600	108	132	220	5	250
4S2NZOV750RA02	X	X					7	4S750	75	102	11	11	1750	1250	108	132	220	10	520
2S2NZOV950RA01	X	X					5	2S950	95	127	6.6	6.6	800	600	135	165	240	5	200
4S2NZOV950RA02	X	X					7	4S950	95	127	13	13	1750	1250	135	165	255	10	420
2S2NZOV121RA02	X	X					5	2S121	120	160	8	8	800	600	170	207	310	5	120
4S2NZOV121RA03	X	X					7	4S121	120	160	16	16	1750	1250	170	207	320	10	250
2S2NZOV131RA02	X	X					5	2S131	130	175	8.5	8.5	800	600	184	224	350	5	120
4S2NZOV131RA03	X	X					7	4S131	130	175	17.5	17.5	1750	1250	184	224	340	10	250
2S2NZOV141RA02	X	X					5	2S141	140	180	9	9	800	600	198	242	380	5	110
4S2NZOV141RA03	X	X					7	4S141	140	180	20	20	1750	1250	198	242	360	10	230
2S2NZOV151RA02	X	X					5	2S151	150	200	10.5	10.5	800	600	212	259	430	5	100
4S2NZOV151RA03	X	X					7	4S151	150	200	21	21	1750	1250	212	259	395	10	210
2S2NZOV181RA02	X	X					5	2S181	180	230	11	11	800	600	255	311	510	5	90
4S2NZOV181RA03	X	X					7	4S181	180	230	24	24	1750	1250	255	311	445	10	180
2S2NZOV211RA07	X	X					5	2S211	210	270	13	13	800	600	297	363	545	5	74
4S2NZOV211RA18	X	X					7	4S211	210	270	28	28	1750	1250	297	363	545	10	150
2S2NZOV231RA08	X	X					5	2S231	230	300	16	16	800	600	326	397	595	5	68
4S2NZOV231RA20	X	X					7	4S231	230	300	32	32	1750	1250	326	397	595	10	140
2S2NZOV251RA08	X	X					5	2S251	250	330	17	17	800	600	354	432	675	5	62
4S2NZOV251RA21	X	X					7	4S251	250	330	35	35	1750	1250	354	432	650	10	130
2S2NZOV271RA09	X	X					5	2S271	270	360	20	20	800	600	382	466	740	5	58
4S2NZOV271RA23	X	X					7	4S271	270	360	40	40	1750	1250	382	466	710	10	120
2S2NZOV301RA10	X	X					5	2S301	300	390	21	21	800	600	425	518	810	5	52
4S2NZOV301RA25	X	X					7	4S301	300	390	42	42	1750	1250	425	518	790	10	110
4S2NZOV321RA27	X	X					7	4S321	320	420	46	46	1750	1250	453	553	850	10	100
4S2NZOV361RA28	X	X					7	4S361	360	470	47	47	1750	1250	522	638	960	10	88
4S2NZOV391RA29	X	X					7	4S391	390	500	51	51	1750	1250	552	674	1040	10	83
4S2NZOV421RA30	X	X					7	4S421	420	560	57	57	1750	1250	594	725	1120	10	77
4S2NZOV461RA33	X	X					7	4S461	460	615	65	65	1750	1250	651	795	1240	10	72
4S2NZOV481RA35	X	X					7	4S481	480	640	66	66	1750	1250	679	829	1300	10	70
4S2NZOV511RA42	X	X					7	4S511	510	675	42	42	1750	1250	722	881	1350	10	62
4S2NZOV551RA43	X	X					7	4S551	550	700	43	43	1750	1250	778	950	1400	10	72
4S2NZOV581RA38	X	X					7	4S581	580	725	78	78	1750	1250	821	1002	1500	10	58
4S2NZOV621RA40	X	X					7	4S621	620	800	82	82	1750	1250	877	1071	1650	10	55
4S2NZOV681RA42	X	X					7	4S681	680	860	88	88	1750	1250	962	1175	1800	10	50

A = UL1449
B = cUL
C = CSA
D = VDE
E = DEMKO
F =

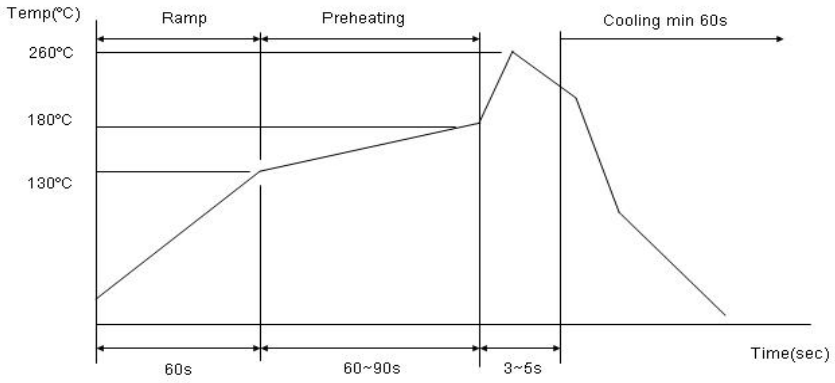
eMOV SERIES

MECHANICAL SPECIFICATIONS

Style	Length (L)	Width (W)	MAX. Height (H)	Recommended Land Pad Length (PL)	Recommended Land Pad Width (PW)	Recommended Land Pad Thickness (PT)
2S Series	0.280"±0.010"	0.250"±0.010"	0.158"	0.331"	0.138"	0.098"
4S Series	0.402"±0.010"	0.327"±0.010"	0.256"	0.476"	0.138"	0.118"



Recommended Reflow Profile



MPD SERIES

INTRODUCTION

The MPD Series is a modular surge protective device (SPD), featuring an IP65 enclosure rating, and is used for transient overvoltage protection. The MPD Series utilizes thermal protection in conjunction with metal oxide varistors to provide a protection package for use in many applications such as commercial and residential indoor/outdoor LED lighting fixtures. The MPD Series can be connected in series or parallel, is RoHS compliant, and has a LED operational indicator. The MPD Series is available with MCOV of: 120VAC, 277VAC, 347VAC, 480VAC.

KEY FEATURES

- **UL1449 - Type 4CA**
- **Thermally Protected**
- **Series/Parallel Connectivity**
- **Operational indicator**
- **In: 5kA/10kA Imax: 10kA/20kA (@ 8/20us)**
- **IP65 enclosure rating**
- **85°C Operating Temperature**

TYPICAL APPLICATIONS

- **LED Street Lighting**
- **Traffic Lighting**
- **Roadway Lighting**
- **Parking/Garage Lighting**
- **Indoor/Outdoor LED Lighting Fixture**
- **AC Power Systems requiring thermal protection**
- **Digital Signs**

SAFETY AGENCY APPROVALS

- **UL1449**
- **cUL**

STYLE DESIGNATION

The Maida Style Number is the typical means to identify our devices when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number.

The following example is the standard part numbering system when ordering our MPD Series components by the Maida Style Number:

MPD 10K 277 20K L FF x

Maida Protective Device

Nominal Discharge Current (I_N)
05K – 5kA
10K – 10kA

Operating Voltage
120 – 120VAC MCOV
277 – 277VAC MCOV
347 – 347VAC MCOV
480 – 480VAC MCOV

Peak Current Rating (I_{MAX})
10K – 10kA
20K – 20kA

Status Indicator
L – Light indicator

Protective Disconnect Method
FF – Fail Off

Enclosure Style
G – IP65 Single Grommet
x – Additional Options Possible

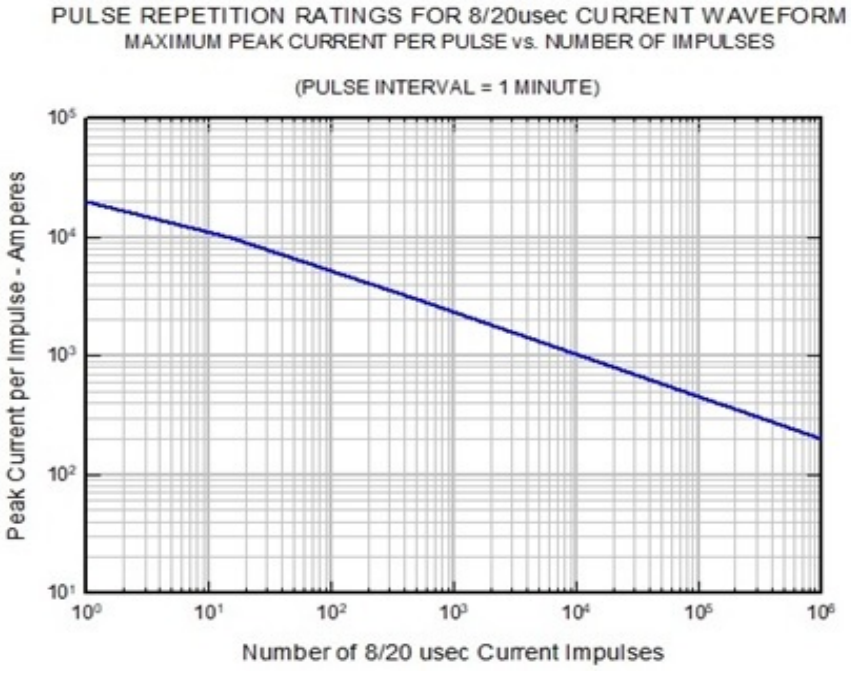
GENERAL SPECIFICATIONS

Operating Voltage Range	120VAC to 480VAC
Rated Continuous RMS Current	7A
Insulation Resistance	> 1,000MOhm
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-55°C to +125°C

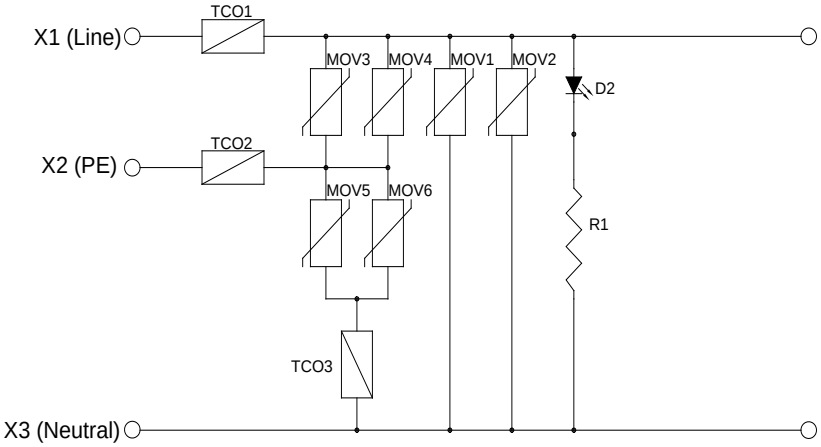
SAFETY AGENCY APPROVAL

Agency	**File Number**
UL	E321173
cUL	E321173

Maida Style Number	Maximum Continuous Operating Voltage (MCOV)	Peak Current (8 x 20 us)		Voltage Protection Rating (VPR)	Rated Current	Response Time	Degree of Enclosure Protection
		In	Imax	@ 6kV/3kA	Ir		
	(VAC)	(kA)	(kA)	(V)	(A)	(ns)	
MPD5K12010KLFFx	120	5	10	L-N: 1280 L-G: 1280 N-G: 1300	7	< 100	IP65
MPD5K27710KLFFx	277	5	10	L-N: 1830 L-G: 1830 N-G: 1840	7	< 100	IP65
MPD5K34710KLFFx	347	5	10	L-N: 2235 L-G: 2235 N-G: 2255	7	< 100	IP65
MPD5K48010KLFFx	480	5	10	L-N: 2810 L-G: 3100 N-G: 3000	7	< 100	IP65
MPD10K12020KLFFx	120	10	20	L-N: 1280 L-G: 1280 N-G: 1300	7	< 100	IP65
MPD10K27720KLFFx	277	10	20	L-N: 1830 L-G: 1830 N-G: 1840	7	< 100	IP65
MPD10K34720KLFFx	347	10	20	L-N: 2235 L-G: 2235 N-G: 2255	7	< 100	IP65
MPD10K48020KLFFx	480	10	20	L-N: 2810 L-G: 3100 N-G: 3000	7	< 100	IP65

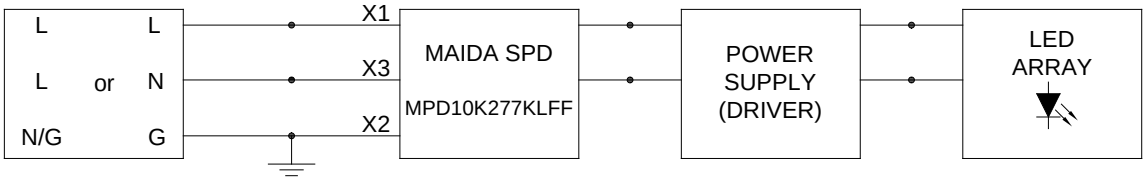


SCHEMATIC
(Patent Pending)

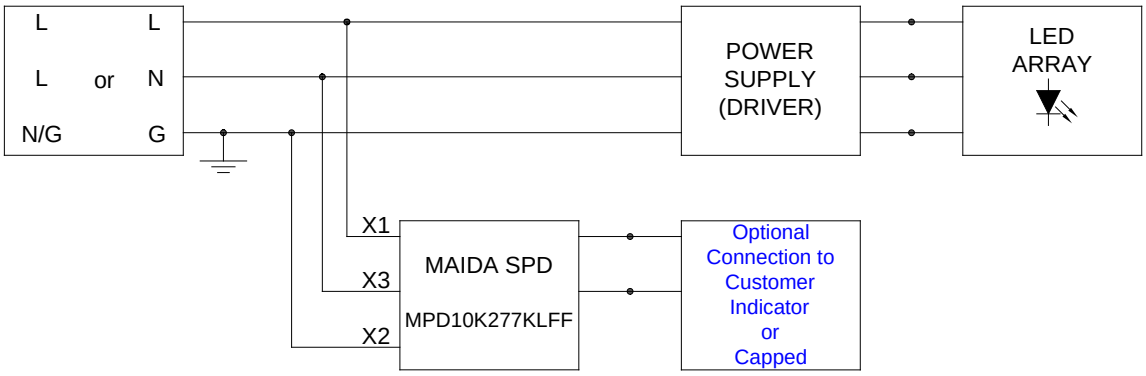


TYPICAL INSTALLATION

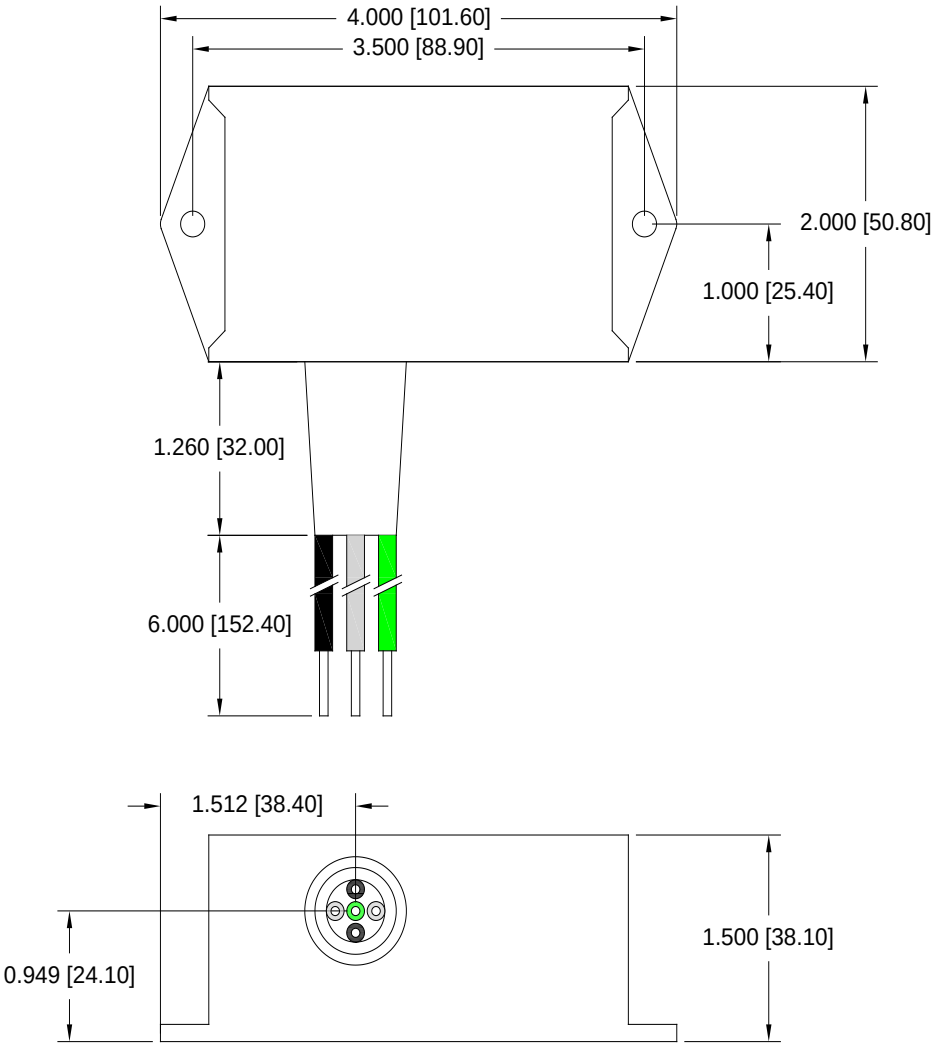
Series Connection

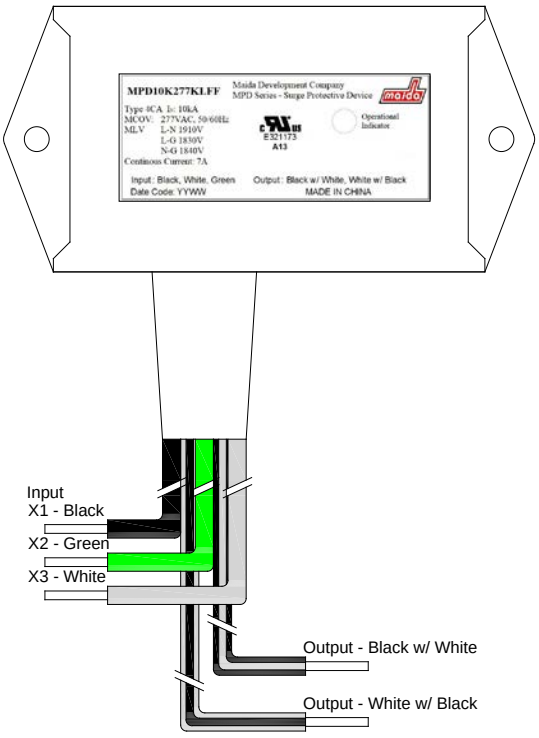


Parallel Connection



DIMENSIONS





Dimensions are in inches [mm]