



Transient/Surge Absorbers Transient Voltage Surge Suppressors

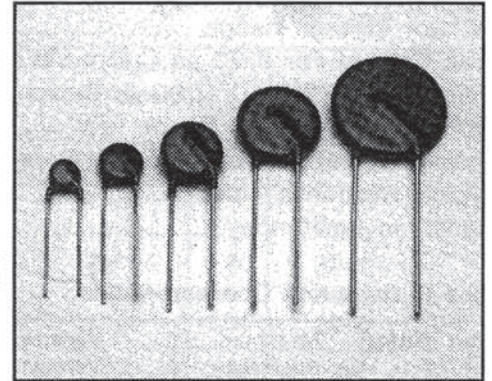


VAR SERIES

INTRODUCTION

Varen is a marketing manufacturing Brand name specializing in Metal Oxide Varistors (MOV). Our fully automated production lines ensure Varistors of high quality with the lowest tolerance level.

Varistors are voltage dependent, nonlinear devices which have an electrical behavior similar to back-to-back zener diodes. J-TYPE zinc oxide varistor are nonlinear resistors, consisting mainly of zinc oxide and several kinds of metal oxide additive. They are bilateral and symmetrical V-I characteristics curve and unparalleled large peak current capability are used for absorption of transient voltage, suppression of pulse noise and circuit voltage stabilization.

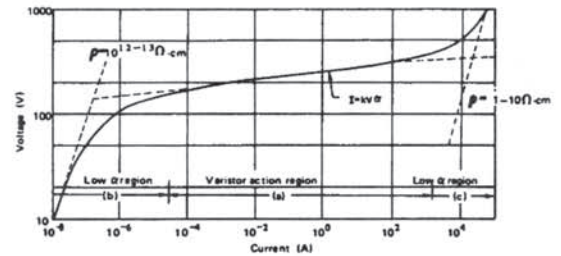


Features

- * Fast response
- * Excellent voltage ratio
- * High stabilization for circuit voltage
- * Unparalleled absorption for transient voltage characteristics
- * Bilateral and symmetrical V-I Characteristics curve

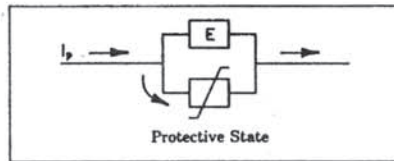
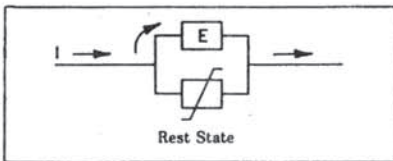
Applications

- * Surge Protection in consumer electronics
 - industrial electronics
 - telephone and telecommunication systems
 - automobile equipments
 - measuring and controller systems
 - electronic home appliances
 - gas and petroleum appliances
- * Absorption of switching surge from various kinds of relays and electro-magnetic valves.
- * Electrostatic discharge and spike noise suppression.
- * Protection of various kinds of transistors, diodes, ICs, thyristors, triac semiconductors, and etc.
- * Automobile control systems such as transistorized ignition system and electronic fuel injection systems and more.

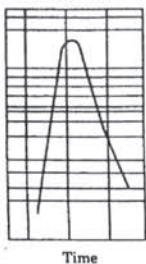


Typical Varistor V-I Curve

Related Standards
* **UL1414, UL1449**



Surge suppression of varistor



- Max. withstanding voltage of protected device
- Max. clamping voltage of varistor
- The real clamping voltage occurred
- Varistor voltage
- Operating voltage of protected device

The varistor's rest state has a high impedance (several megohms) in relation to the component to be protected and does not change the characteristics of the electric circuit. In the presence of transient voltage, the varistor then has a low impedance (a few ohms) and short circuits the assembly E to be protected.

PARAMETERS DEFINITION

*Varistor Voltage (breakdown voltage) :

The varistor voltage is the voltage across the varistor measured at a specified current I_c (0.1mA or 1mA) of specified duration.

*Maximum operating voltage :

The Maximum operating voltage corresponds to the rest state of the varistor, the rest state voltage offers a low leakage current in order to limit the power consumption of the protected device and not to disturb the circuit to be protected.

*Non linear exponent (α) :

The varistor voltage-current characteristic is defined by the equation : $I = KV^\alpha$ Where K is a constant dependent on geometry, and α is the non linear exponent. We usually take two points (V_1, I_1), (V_2, I_2), to estimate the value of α .

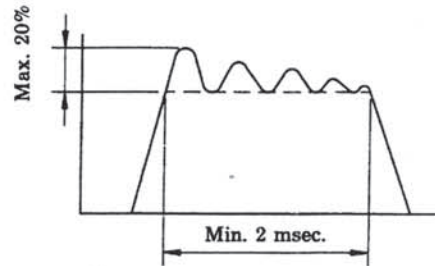
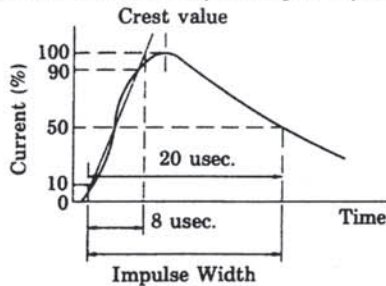
$$\alpha = \frac{\log I_1/I_2}{\log V_1/V_2} \quad \text{In which } I_1 \text{ and } I_2 \text{ are the current value corresponding to the voltage value } V_1 \text{ and } V_2$$

*Maximum clamping voltage :

Maximum clamping voltage is the maximum voltage V_p between two terminals with the specified standard impulse current I_p . (8X20usec.) The voltage value is an indication on the protective function of the varistor.

*Withstanding surge current :

Withstanding surge current is the maximum peak current for the varistor with the specified standard impulse current (8X20usec.) applied one time or two times and corresponding to a permissible variation of 10 % in the varistor voltage change.



*Energy

Maximum energy from one or a burst of pulses. It is the value within the varistor change of $\pm 10\%$ when one impulse of 2msec. is applied.

$$E = V_m \times I_m \times T$$

- E** : Energy
- V_m** : Max. clamping voltage at I_m .
- I_m** : Max. allowable single surge current of 2ms. (rectangular wave form)
- T** : Duration of surge current (2ms.)

*Rated power

The maximum power that can be applied within the specified ambient temperature.

*Capacitance

The capacitance of varistor is the typical value measured between the varistor terminals at specified frequency.

*Pulse lifetime rating

This is expressed as the maximum allowable number of impulse currents applied. 8/20 μ s impulse current (or 2ms square-wave) is applied at prescribed interval. This curve also provides for derating current as required with repetitive pulsing.

SOURCE OF SURGE VOLTAGE

- *Direct lightning surges.
- *Surge voltage by grounding fault.
- *From magnetic induction.
- *Induced lightning surges.
- *Surge voltage by switching operation.
- *From electrostatic induction.

HOW TO SELECT VAREN VARISTOR

- * To identify the source and route of surge.
- * To decide the connection method of varistor.
- * To decide varistor voltage and max. clamping voltage.
- * To decide surge current waveform by calculation from surge voltage and surge impedance..
- * To check whether the withstanding surge current and surge life of varistor is sufficient or not.
- * To check the variation of electric power of protective device.
- * To check whether the max. energy and energy life of varistor is enough or not.
- * To check the relation :

Max. withstanding voltage of protected device > Max. clamping voltage of varistor > The real clamping voltage occurred > Breakdown voltage of varistor > Operating voltage of protected device.

- *To check whether the loss of capacitance of varistor in operating condition.
- *To check whether the problem caused by loss current of leakage.
- *To check the connection method of varistor.
- *To check the condition of varistor overload.
- *To check any other problem by various operating condition.
- *To test and to verify by real practice.
- *To check the connection of the grounding wire.