

Varistor Glossary of Terms and Definitions

Term	Symbol	Definition
Rated AC Voltage	V_{RMS}	Maximum continuous sinusoidal AC voltage (< 5% total harmonic distortion) which may be applied to the varistor at 25°C.
Rated DC Voltage	V_{DC}	Maximum continuous DC voltage (< 5% ripple) which may be applied to the varistor at 25°C.
Leakage Current	I_L	Current passing through the varistor at rated DC voltage at 25 °C or any other specified temperature.
Varistor Voltage	V_N	Voltage across the varistor measured at 1mA of DC current.
Clamping Voltage	V_C	Maximum peak voltage developed across the varistor when passing an 8/20 μ s class current pulse.
Class Current	I_C	A peak value of current which is 1/10 of the maximum peak current for 100 pulses at two per minute for an 8/20 pulse.
Voltage Clamping Ratio	V_C / V_{APP}	A figure of merit measure of the varistor clamping effectiveness as defined by the symbols V_C/V_{APP} , where $V_{APP} = V_{RMS}$ or V_{DC} .
Single Pulse Transient Energy	W_{MAX}	Energy which may be dissipated for a single 10/1000 μ s pulse of a maximum rated current, with rated AC/DC voltage applied, without causing device failure.
Load Dump Transient	W_{LD}	Load dump is a transient that occurs in an automotive environment. It is an exponentially decaying positive voltage that occurs in the event of a battery disconnect while the alternator is still generating charging current, with other loads remaining on the alternator circuit at the time of battery disconnect.
Single Pulse Peak Current	I_P	Maximum peak current that may be applied to the varistor for a single 8/20 μ s pulse, with line voltage applied, without causing device failure.
Average Power Dissipation	P_{MAX}	Maximum average dissipated power at 25 °C resulting from a group of pulses occurring within a specified isolated time period, without causing device failure.
Capacitance	$C_{(TYP)}$	Capacitance between two terminals of the varistor measured at 1kHz.
Inductance	L	Inductive component of the varistor when measured with a current edge rate (di/dt) of 100mA/ns. Values are typically measured in nanohenries (nH).
Jump Start Transient	V_{JUMP}	The jump start transient results from the temporary application of an over-voltage in excess of the rated battery voltage. The circuit power supply may be subject to a temporary over-voltage condition due to the voltage regulation failing or it may be deliberately generated when it becomes necessary to boost start the car.
Response Time		The time lag between application of a surge and the varistor's "turn-on" conduction action.
Varistor Voltage Temperature Coefficient		$(V_N \text{ at } 85^\circ\text{C} - V_N \text{ at } 25^\circ\text{C}) / ((V_N \text{ at } 25^\circ\text{C}) \times 60^\circ\text{C}) \times 100$
Insulation Resistance	IR	Minimum resistance between shorted terminals and varistor surface.
Isolation Voltage		The maximum peak voltage that may be applied under continuous operating conditions between the varistor terminations and any conducting mounting surface.
Operating Temperature		The range of ambient temperature for which the varistor is designed to operate continuously, as defined by the temperature limits of its climatic category.
Storage Temperature		Storage temperature range without voltage applied.
Current/Energy Derating		Derating of maximum values when operated above the varistor's rated continuous operating temperature.

Overview of Protective Devices

