Thermally Protected Varistors

RoHS Compliant

Description

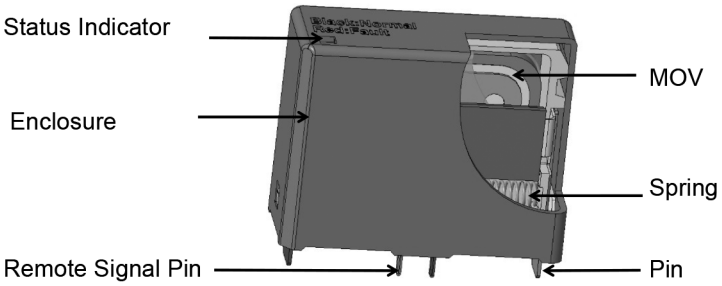
MPTFMOV is a combination of varistors (MOV) and thermal protection component. Since varistor has the characteristics of aging or degrading; MPTFMOV can separate the varistor from the main circuitry by opening the thermal protection component when the varistor (MOV) degrades or fails. It is often used in which requires high reliability and weather withstanding, such as photovoltaic inverters, communication equipment, and power supplies in data centers, etc.

Applications

- Telecom Equipment
- String Inverter in Photovoltaic System
- AC / DC Power Supply
- Uninterruptable Power Supply (UPS)
- Surge Protective Device (SPD)
- Electric Meter
- Power Distribution Unit (PDU)

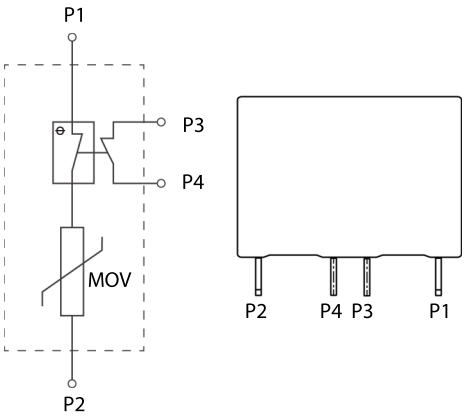
Features

- Thermal Protection, High Reliability
- Small Size
- Remote Signal Contact for Failure Indication (Optional)
- High Energy Capacity
- Epoxy Sealing Material, Flame-retardant to V0 (UL 94)
- Comply with UL 1449 / IEC 61643-11

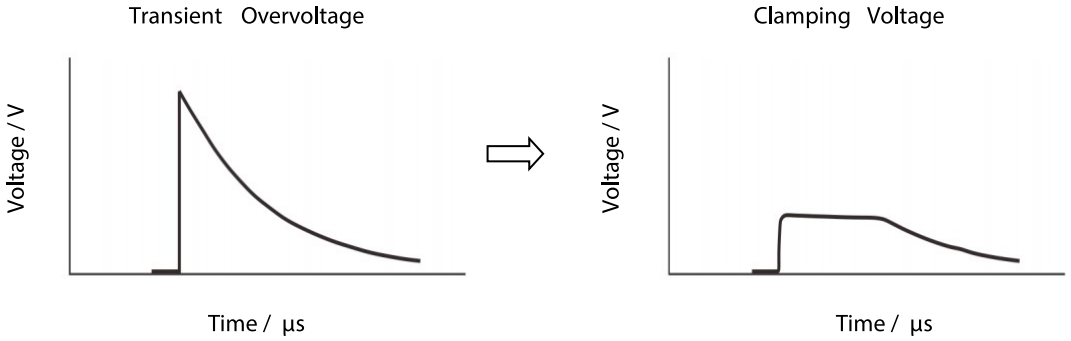


TFMOV(Remote Monitoring)
Mechanical trip

Schematics



Operation Principle



Thermal Protection

Figure a is a surge protection circuit commonly used in power supplies. MOV is used to suppress the surge voltage and protect the subsequent circuit. There is a risk of burning when the varistor degrades or fails. In the high-reliability surge protection circuit of Figure b, in order to improve the safety of the circuit, a thermal protection varistor TFMOV is used as the surge voltage protection element. TFMOV is a combination of varistors (MOV) and thermal protection component. When the temperature of the MOV is abnormally exceeded, the thermal fuse will be opened first, so that the failure mode of the MOV appears to be open-circuit failure.

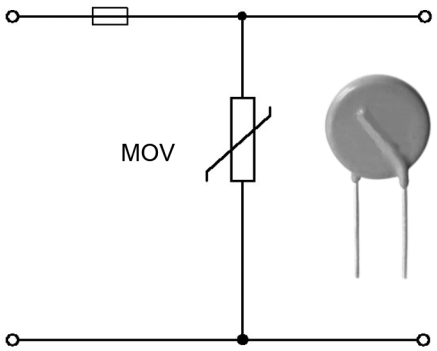


Figure a Typical surge protection circuit

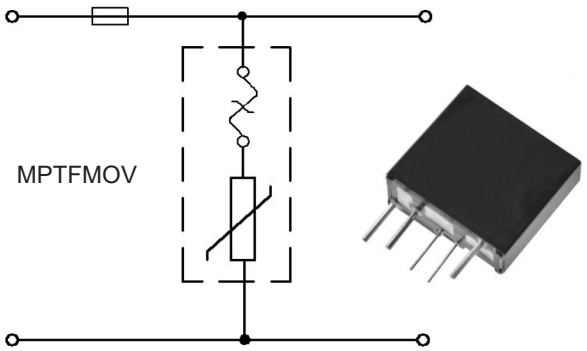
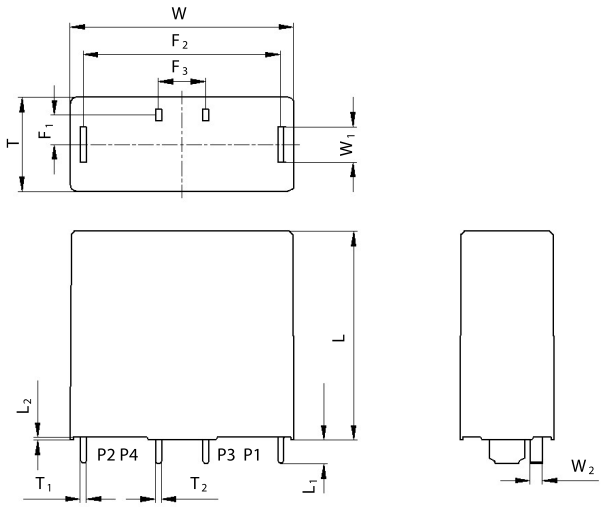


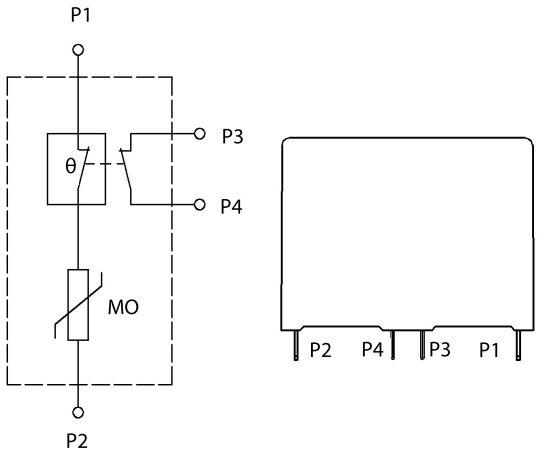
Figure b: High reliability surge protection circuit

Glossary

Item	Description
V_N	**Nominal Varistor Voltage** Voltage, at specified d.c. current used as a reference point in the component characteristic.
8/20 µs	**8/20 Current Impulse** Current impulse with a nominal virtual front time of 8 µs and a nominal time to half-value of 20 µs. — (IEC 61643-11)
1.2/50 µs	**1.2/50 Voltage Impulse** Voltage impulse with a nominal virtual front time of 1.2 µs and a nominal time to half-value of 50 µs. — (IEC 61643-11)
U_c	**Maximum Continuous Operating Voltage** Maximum r.m.s. voltage, which may be continuously applied to the SPD's mode of protection. — (IEC 61643-11)
I_n	**Nominal Discharge Current** Crest value of the current through the SPD having a current waveshape of 8/20. — (IEC 61643-11)
I_{imp}	**Impulse Discharge Current for Class I Test** Crest value of a discharge current through the SPD with specified charge transfer Q and specified energy W/R in the specified time. — (IEC 61643-11)
I_{max}	**Maximum Discharge Current** Crest value of a current through the SPD having an 8/20 waveshape and magnitude according to the manufacturers specification. Imax is equal to or greater than In. — (IEC 61643-11)
V_C	**Clamping Voltage** Peak voltage developed across the varistor terminations under standard atmospheric conditions, when passing an 8/20 µs class current pulse.
C_V	**Capacitance** Capacitance across the MOV measured at a specified frequency and voltage.
Modes of protection	**Mode of protection of an SPD** An intended current path, between terminals that contains protective components, e.g. line-to-line, line-to-earth, line-to-neutral, neutral-to-earth. — (IEC 61643-11)
U_p	**Voltage Protection Level** Maximum voltage to be expected at the SPD terminals due to an impulse stress with defined voltage steepness and an impulse stress with a discharge current with given amplitude and waveshape. — (IEC 61643-11)
I_P	**Degree of protection of enclosure** Classification preceded by the symbol IP indicating the extent of protection provided by an enclosure against access to hazardous parts, against ingress of solid foreign objects and possibly harmful ingress of water — (IEC 61643-11)



Schematics



Specification

Model	Nominal System Voltage	Nominal Varistor Voltage @1mA	Max. Continuous Operating Voltage		Nominal Discharge Current (8/20 µs)	Max. Discharge Current (8/20 µs)	Voltage Protection Level	SCCR
	U_n	V_N	MCOV		I_n	I_{max}	U_p	
	(VAC)	(V)	Uc (VAC)	Ucpv (VDC)	(kA)	(kA)	(V)	(kA)
MPTFMOV20M150	120	240	150	-	20	40	700	-
MPTFMOV20M175		270	175				700	200
MPTFMOV20M275	230	430	275				1100	-
MPTFMOV20M300		470	300				1200	200
MPTFMOV20M350	277	560	350				1500	
MPTFMOV20M385		620	385	500			1800	-
MPTFMOV20M510	347	820	510	670			2000	-
MPTFMOV20M550	480	910	550	720			2500	200
MPTFMOV20M680		1100	680	900			2800	-

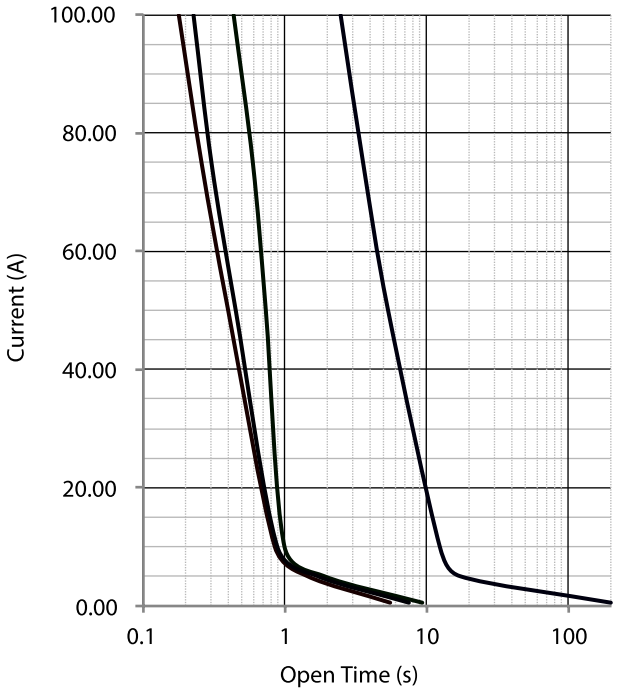
Note:

The Value of Voltage Protection Level (Up) is determined according to IEC 61643-11:2011 clause 6.4.

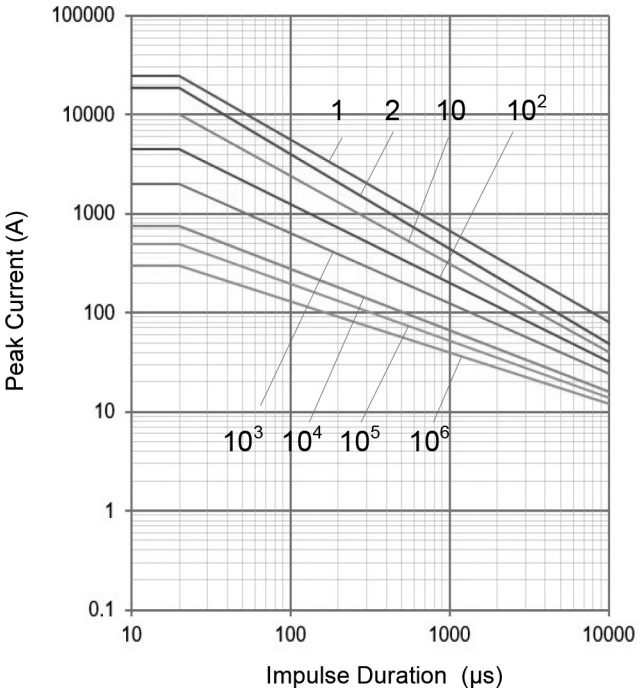
Preferred values of voltage protection level (kV): 0.08, 0.09, 0.10, 0.12, 0.15, 0.22, 0.33, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.2, 1.5, 1.8, 2.0, 2.5, 3.0, 4.0, 5.0, 6.0, 8.0, 10.

Performance Curve for Reference

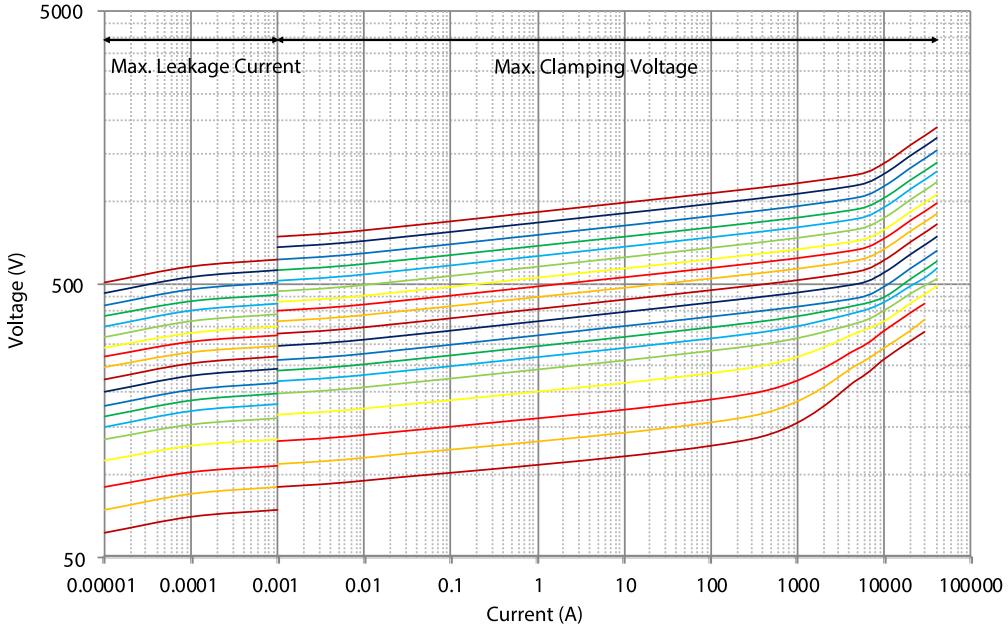
Limited Current Test Curve (UL 1449 4th clause 44.4) 4

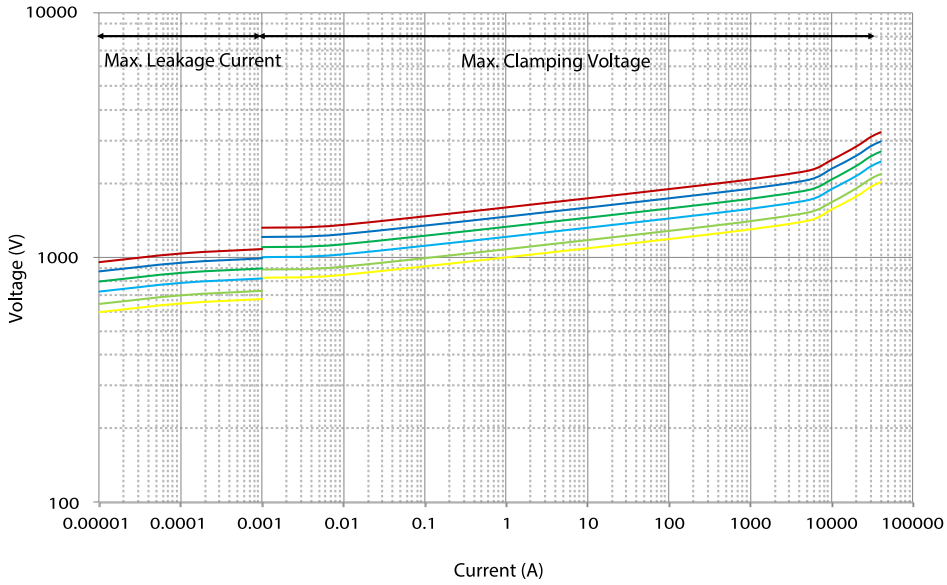


Max. Peak Current Derating Curve



Voltage-Current Characteristic Curves





Part Number Table

Description	Part Number
Varistor, 20kA, 150V AC	MPTFMOV20M150
Varistor, 20kA, 175V AC	MPTFMOV20M175
Varistor, 20kA, 275V AC	MPTFMOV20M275
Varistor, 20kA, 300V AC	MPTFMOV20M300
Varistor, 20kA, 350V AC	MPTFMOV20M350
Varistor, 20kA, 385V AC	MPTFMOV20M385
Varistor, 20kA, 510V AC	MPTFMOV20M510
Varistor, 20kA, 550V AC	MPTFMOV20M550
Varistor, 20kA, 680V AC	MPTFMOV20M680