Varistors with Thermal Decoupler - VTD-MV Series

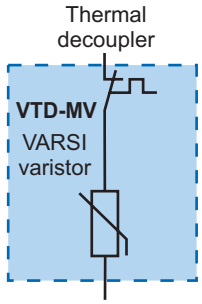
Description

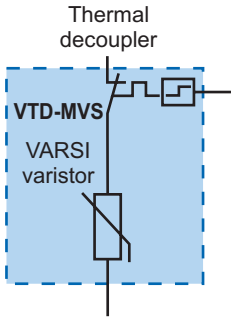
The VTD-MV(S) Varistors with Thermal Decoupler use specially shaped metal oxide varistors equipped with thermo decoupling devices. They are widely used in TVSS products, AC/DC power supplies, AC panel protection modules, AC line power supplies, surge protected strip connectors, AC power meters, UPSs (Uninterruptible Power Supplies), inverters, white goods, GFCIs (Ground Fault Current Interrupters). The advantages of the VTD-MV(S) Varistors with Thermal Decoupler are: terminals construction for PCB mounting; a thermal decoupling device which protects the VTD-MV(S) from varistor failure in the event of abnormal overvoltage and can withstand 16Amps (for one disconnector); the VTD-MV(S) also has the remote signalization capability. They can have different voltage values (see VTD-MV) or they can be matched and therefore rated for higher currents or a combination of these new features. The VTD-MV(S) products can be used in equipment with different power supplies as it is in personal computers (110V and 230V). You can choose from two, four, six or eight versions with different voltage (between 75Vac to 440Vac). It can be used if we have very sensitive and expensive equipment.

Main Features

Wide Operating Voltage Range V_{RMS}	75 V to 440 V
Very Good Protection Level UP (at U_{OC}/I_{SC})	400 V to 1800 V
High Max. Discharge Current Capability I_{max} (8/20 µs)	20000 A to 160000 A*
Terminals Construction for PCB mounting	
Option with Disconnecting Device and Signalization VTD-MVS	
Option with Matched Varistors for Higher Current Ratings (up to 160000 A)	
Options with Different Voltage Ratings in One Bulk (up to 8 different ratings)	
Options with Different Voltage and Current Ratings in One Bulk	

* for match version only





General Technical Data

Tested in accordance with	IEC 61643-1, IEC 61051-1 and UI1449
Category IEC / VDE	III / D
Operating Temperature	-40 ... +85°C
Response Time	< 25 ns
Mounting	on Printed Circuit Board

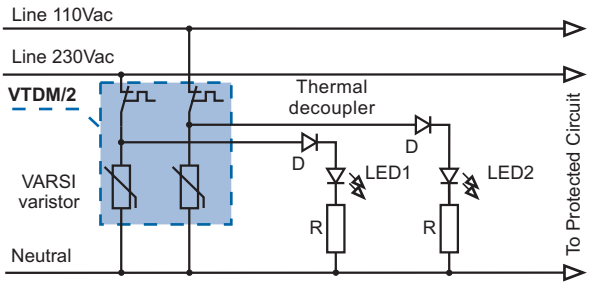
Type Designation

VTD-MV S 75/150/275 P 20 6 M

- **VTD-MV** — **VARSI** Metal Oxide **V**aristor with **T**hermo **D**ecoupler with **M**ultiple Varistors
- **S** — Option with Remote Signalization
- **75/150/275** — Max. AC Operating Voltage
- **P** — Varistor Design (Rectangular Disc)
- **20** — Rated Diameter of Varistor Disc
- **6** — No. of Varistors in One Bulk (2 - 8 pcs.)
- **M** — Matched for Parallel Operation

Applications

In this case we use VTD-MV to connect on two power supplies. First LED we connect between Line 230Vac (after thermal decoupler) and Neutral. The second LED we connect between Line 110Vac and neutral. Both LEDs are normally ON. If the thermal decoupler opens, the LED indication changes from ON to OFF.



In this application we have four different voltage levels with two VTDs connected in parallel for one protection level. We named this protection device as VTD-MV 75/150/275/440 P208M. Let suppose that we have one bulk (two VTDs with the same voltage) for power supply (275Vac) and the other three bulks for monitoring other devices. We manage to join two different versions of VTDs in one protection device, we join multi voltage (VTD-MV) and match version (VTDM).

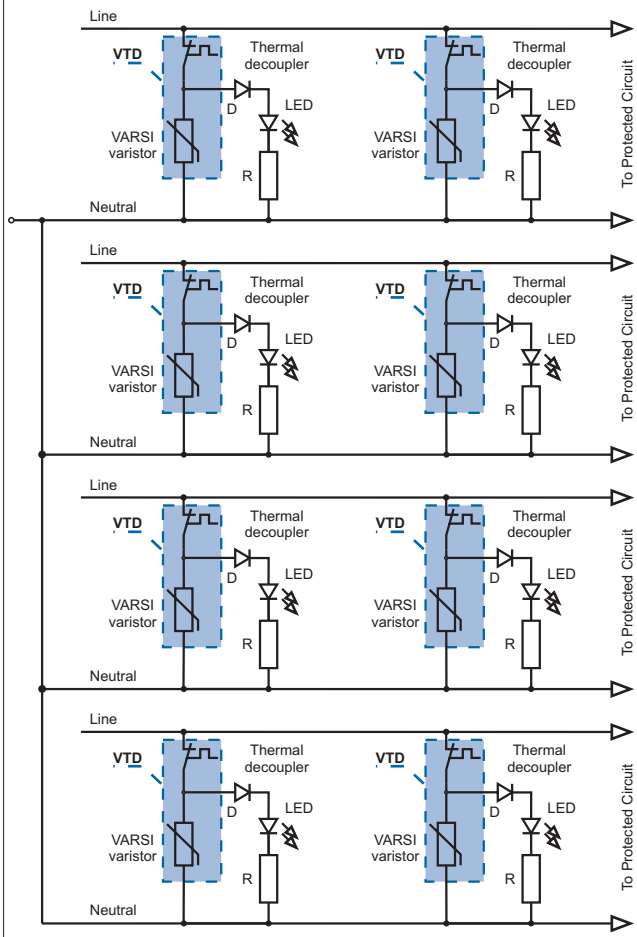


Table of Standard Values

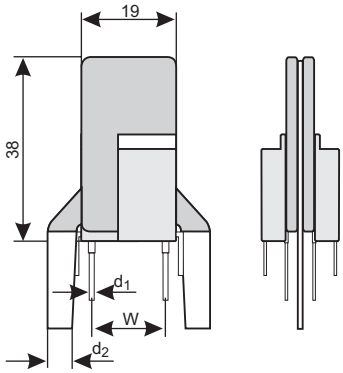
Part Number	Maximum Ratings T_A =+80°C			Characteristics T_A = +25°C							V - I Characte-ristic	Pulse Rating
	Operating Voltage		Max. Discharge Current (8/20 µs)	Protection Level at U_{oc}/I_{sc} Test Current (8/20 µs)		Varistor Voltage (1 mA)		Maximum Clamping Voltage at Test Curent (8/20 µs)		Typical Capacitance f=1kHz		
	RMS Voltage V_{RMS} (V)	DC Voltage V_{DC} (V)	I_{max} (kA)	U_p (V)	U_{oc}/I_{sc} (kV/kA)	V_N (V)	V_N (± %)	V_C (V)	I (A)	C (pF)	Page	Page
VTD-MV75P20*M	75	100	20	580	20/10	120	10	200	150	12000	7	7
VTD-MV95P20*M	95	125	20	650	20/10	150	10	250	150	7400	7	7
VTD-MV115P20*M	115	150	20	730	20/10	180	10	300	150	6000	7	7
VTD-MV130P20*M	130	170	20	760	20/10	205	10	340	150	5800	7	7
VTD-MV140P20*M	140	180	20	775	20/10	220	10	360	150	5400	7	7
VTD-MV150P20*M	150	200	20	790	20/10	240	10	395	150	5000	7	7
VTD-MV175P20*M	175	225	20	850	20/10	270	10	455	150	4200	7	7
VTD-MV230P20*M	230	300	20	1100	20/10	360	10	595	150	3400	7	7
VTD-MV250P20*M	250	320	20	1140	20/10	390	10	650	150	3200	7	7
VTD-MV275P20*M	275	350	20	1210	20/10	430	10	710	150	2900	7	7
VTD-MV300P20*M	300	385	20	1320	20/10	470	10	775	150	2700	7	7
VTD-MV320P20*M	320	420	20	1430	20/10	510	10	840	150	2400	7	7
VTD-MV350P20*M	350	460	20	1560	20/10	560	10	925	150	2200	7	7
VTD-MV385P20*M	385	505	20	1730	20/10	620	10	1025	150	2000	7	7
VTD-MV420P20*M	420	560	20	1880	20/10	680	10	1120	150	1900	7	7
VTD-MV440P20*M	440	585	20	1970	20/10	715	10	1180	150	1800	7	7

*number of varistors in one bulk

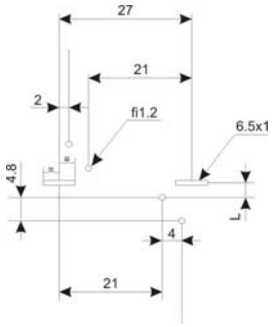
Dimensions

T_{max} (mm)	W (mm)	L (mm)	D1 (mm)	D1 (mm)	Part Number
9.8	13.7	2.0	1.2x0.5	5x0.5	VTD-MV75P202M
10.0	13.7	2.2	1.2x0.5	5x0.5	VTD-MV95P202M
10.1	13.7	2.3	1.2x0.5	5x0.5	VTD-MV115P202M
10.2	13.7	2.5	1.2x0.5	5x0.5	VTD-MV130P202M
10.3	13.7	2.6	1.2x0.5	5x0.5	VTD-MV140P202M
10.4	13.7	2.7	1.2x0.5	5x0.5	VTD-MV150P202M
10.5	13.7	2.9	1.2x0.5	5x0.5	VTD-MV175P202M
10.6	13.7	3.0	1.2x0.5	5x0.5	VTD-MV230P202M
10.7	13.7	3.1	1.2x0.5	5x0.5	VTD-MV250P202M
10.8	13.7	3.2	1.2x0.5	5x0.5	VTD-MV275P202M
10.9	13.7	3.3	1.2x0.5	5x0.5	VTD-MV300P202M
11.1	13.7	3.4	1.2x0.5	5x0.5	VTD-MV320P202M
11.3	13.7	3.6	1.2x0.5	5x0.5	VTD-MV350P202M
11.5	13.7	3.8	1.2x0.5	5x0.5	VTD-MV385P202M
11.7	13.7	4.0	1.2x0.5	5x0.5	VTD-MV420P202M
11.8	13.7	4.1	1.2x0.5	5x0.5	VTD-MV440P202M

VTD-MVSxxxP202M



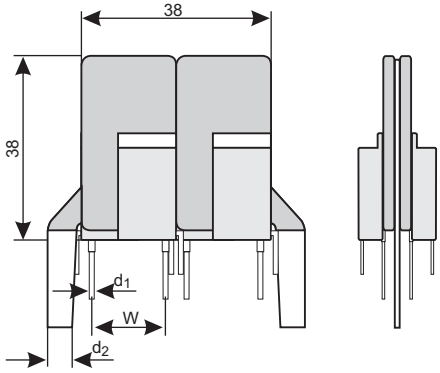
Footprint



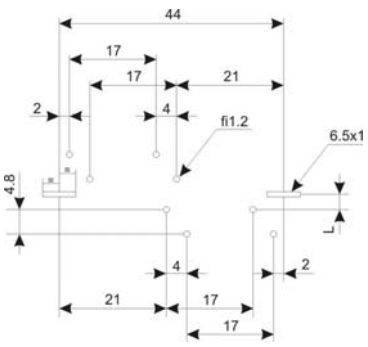
Dimensions

T_{max} (mm)	W (mm)	L (mm)	D1 (mm)	D1 (mm)	Part Number
9.8	13.7	2.0	1.2x0.5	5x0.5	VTD-MV75P204M
10.0	13.7	2.2	1.2x0.5	5x0.5	VTD-MV95P204M
10.1	13.7	2.3	1.2x0.5	5x0.5	VTD-MV115P204M
10.2	13.7	2.5	1.2x0.5	5x0.5	VTD-MV130P204M
10.3	13.7	2.6	1.2x0.5	5x0.5	VTD-MV140P204M
10.4	13.7	2.7	1.2x0.5	5x0.5	VTD-MV150P204M
10.5	13.7	2.9	1.2x0.5	5x0.5	VTD-MV175P204M
10.6	13.7	3.0	1.2x0.5	5x0.5	VTD-MV230P204M
10.7	13.7	3.1	1.2x0.5	5x0.5	VTD-MV250P204M
10.8	13.7	3.2	1.2x0.5	5x0.5	VTD-MV275P204M
10.9	13.7	3.3	1.2x0.5	5x0.5	VTD-MV300P204M
11.1	13.7	3.4	1.2x0.5	5x0.5	VTD-MV320P204M
11.3	13.7	3.6	1.2x0.5	5x0.5	VTD-MV350P204M
11.5	13.7	3.8	1.2x0.5	5x0.5	VTD-MV385P204M
11.7	13.7	4.0	1.2x0.5	5x0.5	VTD-MV420P204M
11.8	13.7	4.1	1.2x0.5	5x0.5	VTD-MV440P204M

VTD-MVSxxxP204M



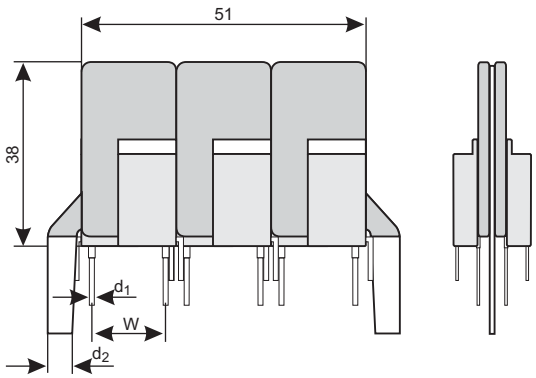
Footprint



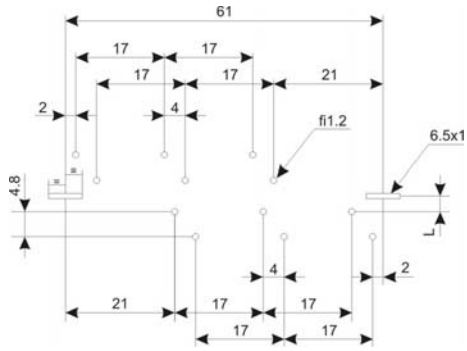
Dimensions

T_{max} (mm)	W (mm)	L (mm)	D1 (mm)	D1 (mm)	Part Number
9.8	13.7	2.0	1.2x0.5	5x0.5	VTD-MV75P206M
10.0	13.7	2.2	1.2x0.5	5x0.5	VTD-MV95P206M
10.1	13.7	2.3	1.2x0.5	5x0.5	VTD-MV115P206M
10.2	13.7	2.5	1.2x0.5	5x0.5	VTD-MV130P206M
10.3	13.7	2.6	1.2x0.5	5x0.5	VTD-MV140P206M
10.4	13.7	2.7	1.2x0.5	5x0.5	VTD-MV150P206M
10.5	13.7	2.9	1.2x0.5	5x0.5	VTD-MV175P206M
10.6	13.7	3.0	1.2x0.5	5x0.5	VTD-MV230P206M
10.7	13.7	3.1	1.2x0.5	5x0.5	VTD-MV250P206M
10.8	13.7	3.2	1.2x0.5	5x0.5	VTD-MV275P206M
10.9	13.7	3.3	1.2x0.5	5x0.5	VTD-MV300P206M
11.1	13.7	3.4	1.2x0.5	5x0.5	VTD-MV320P206M
11.3	13.7	3.6	1.2x0.5	5x0.5	VTD-MV350P206M
11.5	13.7	3.8	1.2x0.5	5x0.5	VTD-MV385P206M
11.7	13.7	4.0	1.2x0.5	5x0.5	VTD-MV420P206M
11.8	13.7	4.1	1.2x0.5	5x0.5	VTD-MV440P206M

VTD-MVSxxxP206M



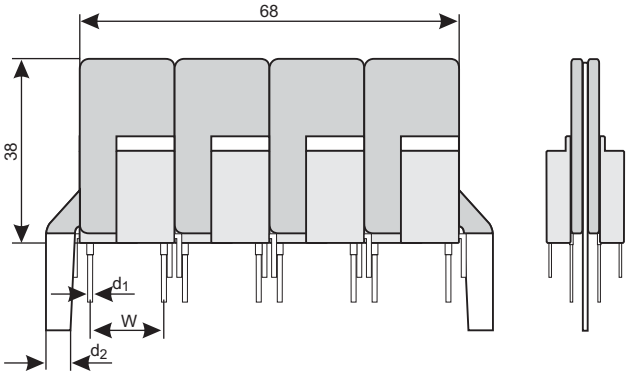
Footprint



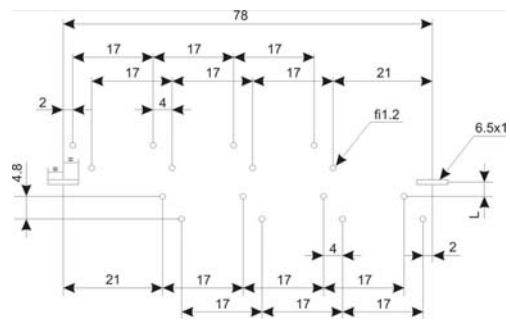
Dimensions

T_{max} (mm)	W (mm)	L (mm)	D1 (mm)	D1 (mm)	Part Number
9.8	13.7	2.0	1.2x0.5	5x0.5	VTD-MV75P208M
10.0	13.7	2.2	1.2x0.5	5x0.5	VTD-MV95P208M
10.1	13.7	2.3	1.2x0.5	5x0.5	VTD-MV115P208M
10.2	13.7	2.5	1.2x0.5	5x0.5	VTD-MV130P208M
10.3	13.7	2.6	1.2x0.5	5x0.5	VTD-MV140P208M
10.4	13.7	2.7	1.2x0.5	5x0.5	VTD-MV150P208M
10.5	13.7	2.9	1.2x0.5	5x0.5	VTD-MV175P208M
10.6	13.7	3.0	1.2x0.5	5x0.5	VTD-MV230P208M
10.7	13.7	3.1	1.2x0.5	5x0.5	VTD-MV250P208M
10.8	13.7	3.2	1.2x0.5	5x0.5	VTD-MV275P208M
10.9	13.7	3.3	1.2x0.5	5x0.5	VTD-MV300P208M
11.1	13.7	3.4	1.2x0.5	5x0.5	VTD-MV320P208M
11.3	13.7	3.6	1.2x0.5	5x0.5	VTD-MV350P208M
11.5	13.7	3.8	1.2x0.5	5x0.5	VTD-MV385P208M
11.7	13.7	4.0	1.2x0.5	5x0.5	VTD-MV420P208M
11.8	13.7	4.1	1.2x0.5	5x0.5	VTD-MV440P208M

VTD-MVSxxxP208M

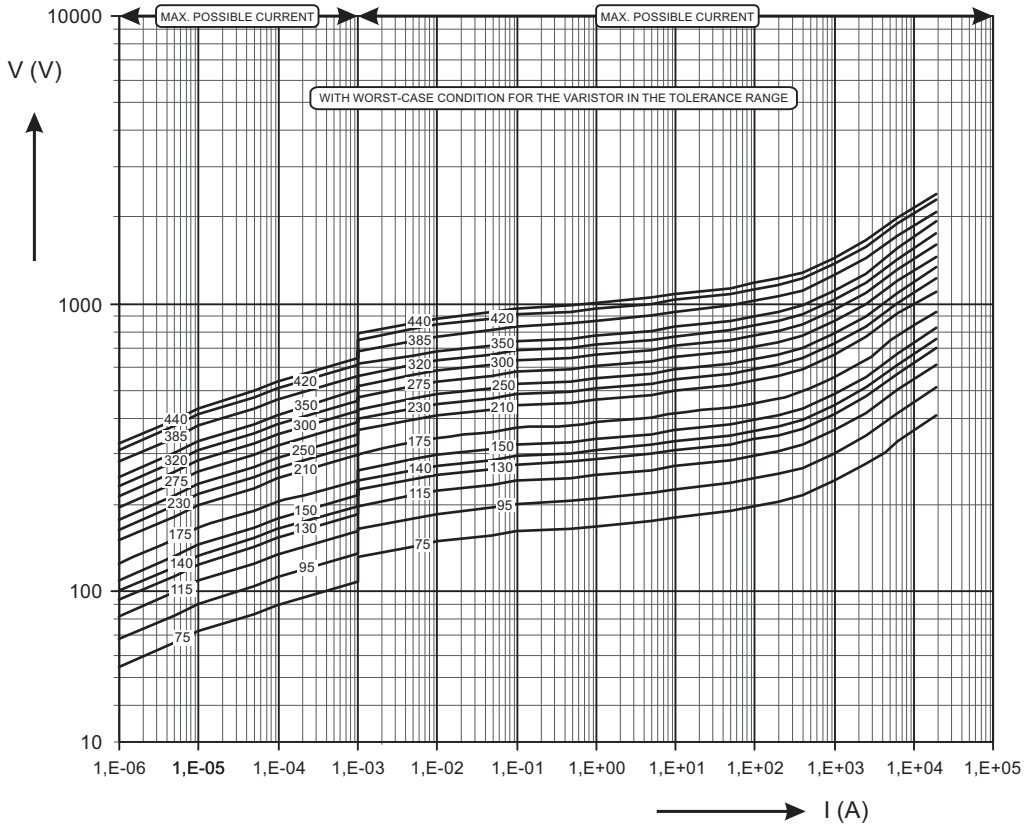


Footprint



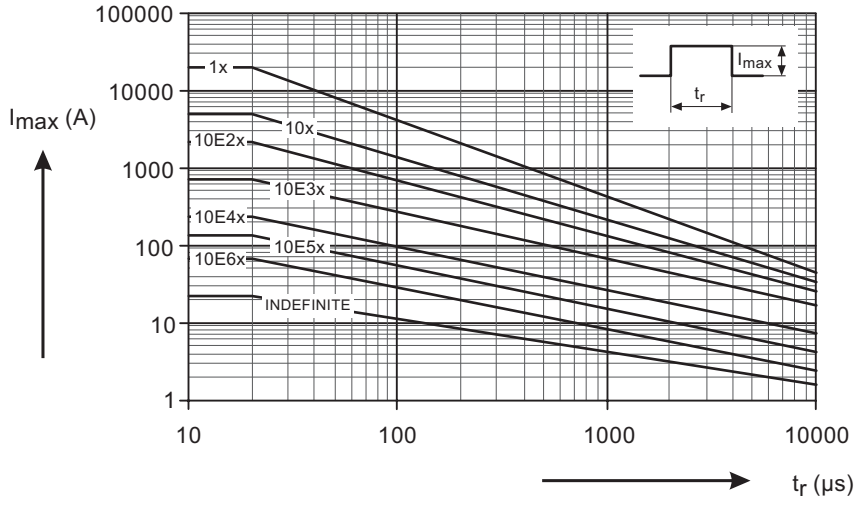
V-I Characteristics

VTD-MV75P202M-VTD-MV440P202M (Single disc)



Pulse Ratings

VTD-MV75P202M-VTD-MV440P202M (Single disc)



Why should we use VTDs instead of varistors?

Under normal operating conditions, the AC voltage applied to an MOV is not expected to exceed the MOV's Maximum ACRMS Voltage Rating. Occasionally, overvoltage transients may occur that exceed these limits. If, unlike a short-duration transient, an MOV is subjected to a sustained abnormal overvoltage, limited current condition (as required by IEC 61643 and UL1449), the MOV may go into thermal runaway resulting in overheating, smoke, and potential fire. If there are devices or fuses tied to the AC line that limit the current flow, the MOV can overheat and potentially cause the protected device to overheat, which results in smoke and eventually fire, so some level of protection must be supplied to the MOV to prevent this failure mode. A thermal fuse has traditionally provided such protection, but in our case it is a thermal disconnector, and the product's name is

VTD - VARISTOR with THERMAL DECOUPLER

VARSI

VARSI, d.o.o. Varistor and Couplings Manufacturing Company
Stegne 35, SI - 1521 Ljubljana, Slovenia
Tel.: + 386 1 500 31 80
Fax: + 386 1 500 32 37
E-mail: info@varsi.si
Web: www.varsi.si

Edition 01/2007