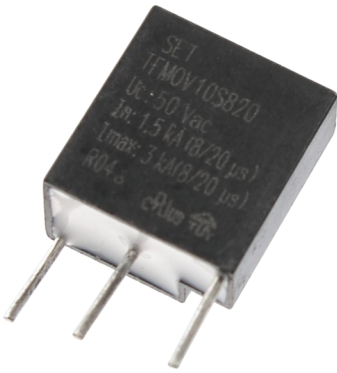


# TFMOV

Thermal Fuse & MOV (TFMOV)

TFMOV10S Series

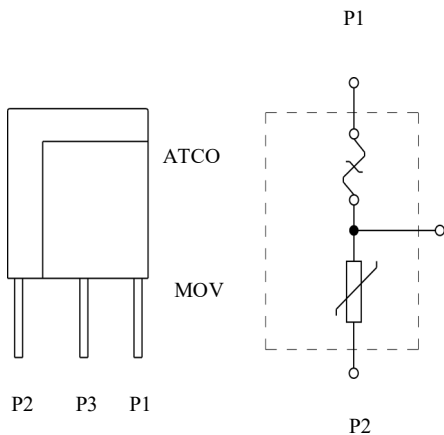
## Description



Thermal Fuse & MOV (TFMOV) is a thermally protected varistor that has all the characteristics of a thermally protected varistor (MOV). TFMOV has all the characteristics of a varistor (MOV) with thermal protection, and there are two types of deterioration: natural deterioration due to long-term operation and deterioration due to an abnormal surge. When a surge occurs, the leakage current of the degraded MOV continues to increase, causing the surface temperature of the MOV to continue to rise and the possibility of fire. At this time, the thermal cutoff (fusible alloy) in the TFMOV senses the abnormal temperature and operates (blows) to disconnect the MOV from the main circuit to protect the entire circuit, and the MOV itself will not continue to heat up and catch fire.

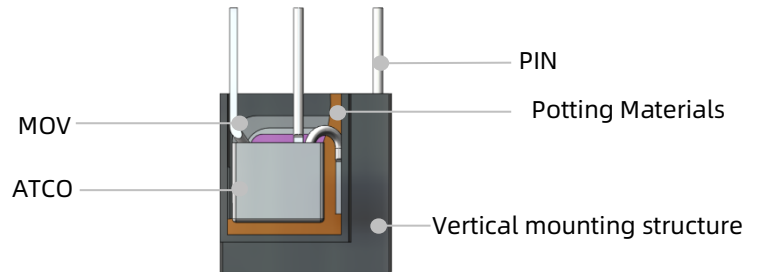
SETsafe | SETfuse Thermal Protection Varistors - Fusible Alloy TFMOV10S Series are mainly composed of Varistors (MOV), Thermal Fuses (Fusible Alloy) (ATCO), Flame Retardant Cases and Metal Components (Pins), Potting Materials. Vertical mounting structure; Nominal discharge current: (1.5 ~ 3) kA; Maximum continuous operating voltage: (50 ~ 510) VAC; Safety certificates: UL, cUL, TUV, CQC; RoHS, REACH compliant.

## Schematics



TFMOV(ATCO)

## Structure



TFMOV(ATCO)

## 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

## 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)

# TFMOV

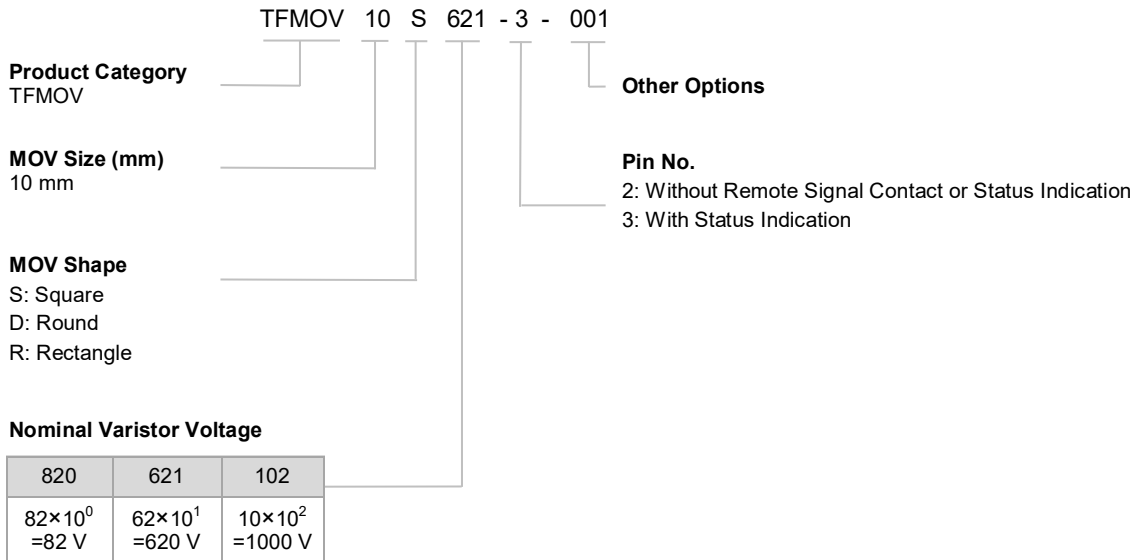
Thermal Fuse & MOV (TFMOV)

TFMOV10S Series

## Agency Approvals

Agency Symbol	Standards	The File No. and certification No. obtained by SETsafe   SETfuse	Category
	UL 1449	E322662	Type 4CA
	CSA C22.2 NO. 269, CSA ECN 516	E322662	Type 4CA
	IEC/EN 61643-11	J 50249886	Class II
	GB 4943.1-2011, GB 8898-2011; GB/T 10193-1997, GB/T 10194-1997	CQC15001125793	Class II
Environment	RoHS & REACH	Compliant	

## Part Numbering System



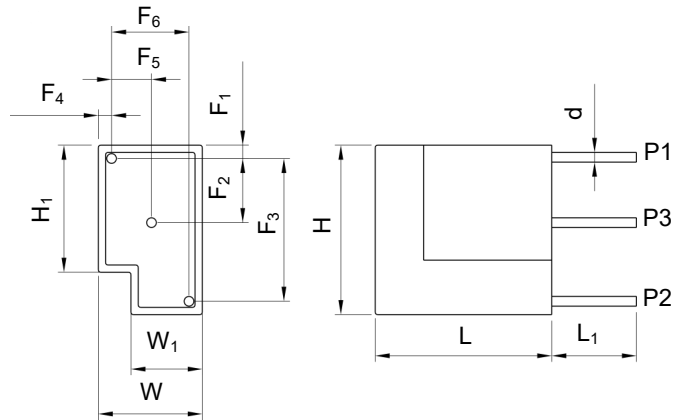
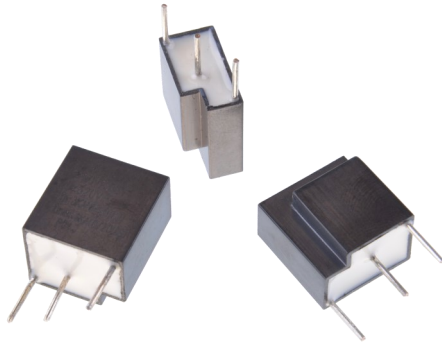
**Reminder:**

Part numbering system in the datasheet is only for selecting correct parameter and product features. Before placing order, please contact us for specifications and use the part number and product code in the specifications to place order to ensure the part is correct. Product code is the unique identification.

# TFMOV

Thermal Fuse & MOV (TFMOV)

## TFMOV10S Series



Note:  
Pin P3 is Optional  
Unit: mm

Nominal Varistor Voltage	L (±1.0)	L <sub>1</sub> (±1.0)	W (±1.0)	W <sub>1</sub> (±1.0)	H (±1.0)	H <sub>1</sub> (±0.5)	d (-0.05,+0.10)
10S270 ~ 560	15.0	7.0	7.6	4.9	14.0	10.5	0.80
10S680 ~ 151	15.0	7.0	8.6	5.9	14.0	10.5	0.80
10S181 ~ 271	15.0	7.0	9.6	6.9	14.0	10.5	0.80
10S301 ~ 471	15.0	7.0	10.6	7.9	14.0	10.5	0.80
10S511 ~ 621	15.0	7.0	11.6	8.9	14.0	10.5	0.80
10S681 ~ 821	15.0	7.0	12.6	9.9	14.0	10.5	0.80
Nominal Varistor Voltage	F <sub>1</sub> (±0.5)	F <sub>2</sub> (±0.5)	F <sub>3</sub> (±0.5)	F <sub>4</sub> (±0.5)	F <sub>5</sub> (±0.5)	F <sub>6</sub> (±0.5)	
10S270 ~ 560	1.1	5.3	11.8	1.1	3.3	5.4	
10S680 ~ 151	1.1	5.3	11.8	1.1	3.3	6.4	
10S181 ~ 271	1.1	5.3	11.8	1.1	3.3	7.4	
10S301 ~ 471	1.1	5.3	11.8	1.1	3.3	8.4	
10S511 ~ 621	1.1	5.3	11.8	1.1	3.3	9.4	
10S681 ~ 821	1.1	5.3	11.8	1.1	3.3	10.4	

# TFMOV

Thermal Fuse & MOV (TFMOV)

TFMOV10S Series

## Specifications

Model	Max. Continuous Operating Voltage		Varistor Voltage @1 mA DC		Clamping Voltage (Max.)		Nominal Dis-charge Current (8/20 μs)	Max. Dis-charge Current (8/20 μs)	Voltage Clamping Ratio <sup>a</sup>		Max. Energy (Joule)	Typical Capacitance (Reference)	Thermal Fuse
	U <sub>c</sub>		Min.	Max.	V <sub>C</sub>	I <sub>p</sub>	I <sub>n</sub>	I <sub>max</sub>	R <sub>cl</sub>	I <sub>n</sub>	10/1000 μs	@1 kHz	UL 60691 E214712
	(VAC)	(VDC)	(V)		(V)	(A)	(kA)			(kA)	(J)	(pF)	
TFMOV10S270	17	22	24	31	53	10	1	2	4.6	1	10	7400	VY-2 Series U <sub>r</sub> :690 VAC I <sub>t</sub> :5 A
TFMOV10S330	20	26	30	36	65	10	1	2	4.6	1	12	6100	
TFMOV10S390	25	31	35	43	77	10	1	2	4.6	1	13	5100	
TFMOV10S470	30	38	42	52	93	10	1	2	4.3	1	17	4300	
TFMOV10S560	35	45	50	62	110	10	1	2	3.8	1	20	3600	
TFMOV10S680	40	56	61	75	135	10	1	2	3.8	1	24	2900	
TFMOV10S820	50	65	74	90	135	50	1.5	3	3.2	1.5	27	2400	
TFMOV10S101	60	85	90	110	165	50	1.5	3	3.2	1.5	33	2000	
TFMOV10S121	75	100	108	132	200	50	1.5	3	3.2	1.5	40	1700	
TFMOV10S151	95	125	135	165	250	50	3	6	3.2	3	53	1300	
TFMOV10S181	115	150	162	198	300	50	3	6	2.3	3	60	1100	
TFMOV10S201	130	170	185	225	340	50	3	6	2.3	3	70	1000	
TFMOV10S221	140	180	198	242	360	50	3	6	2.3	3	78	900	
TFMOV10S241	150	200	216	264	395	50	3	6	2.3	3	84	830	
TFMOV10S271	175	225	243	297	455	50	3	6	2.3	3	99	740	
TFMOV10S301	190	250	270	330	500	50	3	6	2.3	3	108	670	
TFMOV10S331	210	275	297	363	550	50	3	6	2.3	3	115	610	
TFMOV10S361	230	300	324	396	595	50	3	6	2.3	3	130	560	
TFMOV10S391	250	320	351	429	650	50	3	6	2.3	3	140	510	
TFMOV10S431	275	350	387	473	710	50	3	6	2.3	3	155	460	
TFMOV10S471	300	385	423	517	775	50	3	6	2.3	3	175	430	
TFMOV10S511	320	415	459	561	845	50	3	6	2.3	3	180	390	
TFMOV10S561	350	460	504	616	925	50	3	6	2.3	3	185	360	
TFMOV10S621	385	505	558	682	1025	50	3	6	2.3	3	190	320	
TFMOV10S681	420	560	612	748	1120	50	3	6	2.3	3	200	290	
TFMOV10S751	460	615	675	825	1240	50	3	6	2.3	3	210	270	
TFMOV10S821	510	670	738	902	1355	50	3	6	2.3	3	220	260	

Note:

a:  $R_{cl} = \frac{V_C}{V_N}$ ,  $U_p \geq V_C$ ,  $V_C$ : Clamping Voltage (@  $I_n$ ),  $V_N$ : Varistor Voltage,  $U_p$ : Voltage Protection Level.

The Value of Voltage Protection Level ( $U_p$ ) 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.

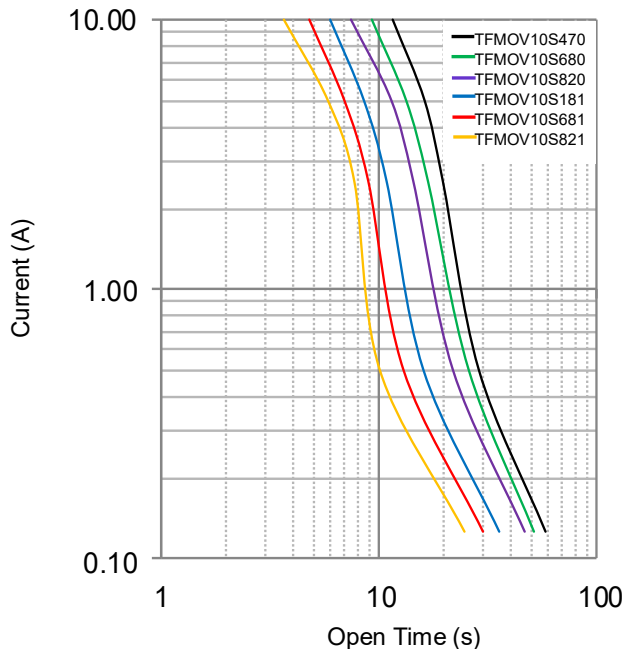
# TFMOV

Thermal Fuse & MOV (TFMOV)

TFMOV10S Series

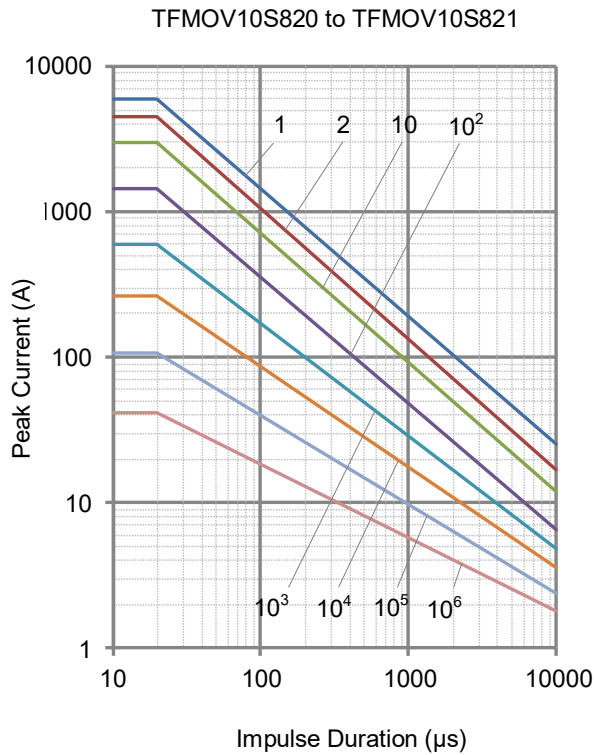
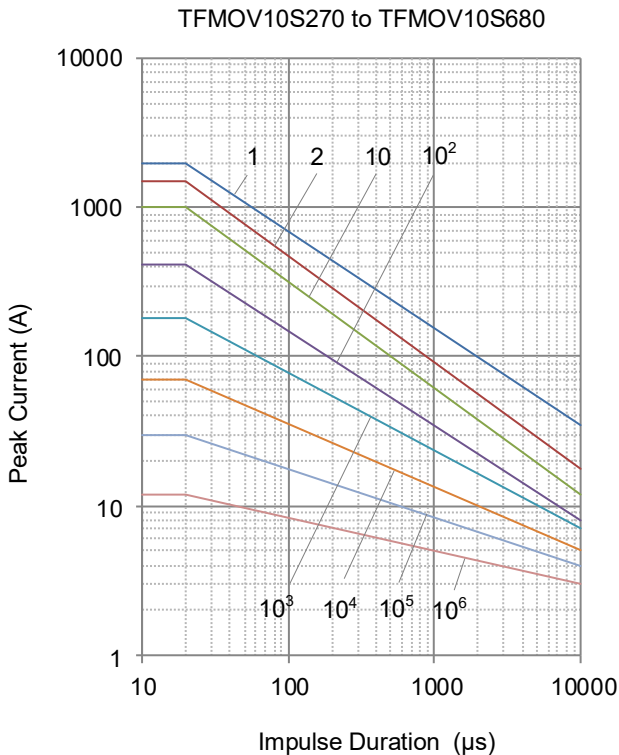
## Performance Curve for Reference

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



Note: The limited current test curve is for reference only.

### Max. Peak Current Derating Curve



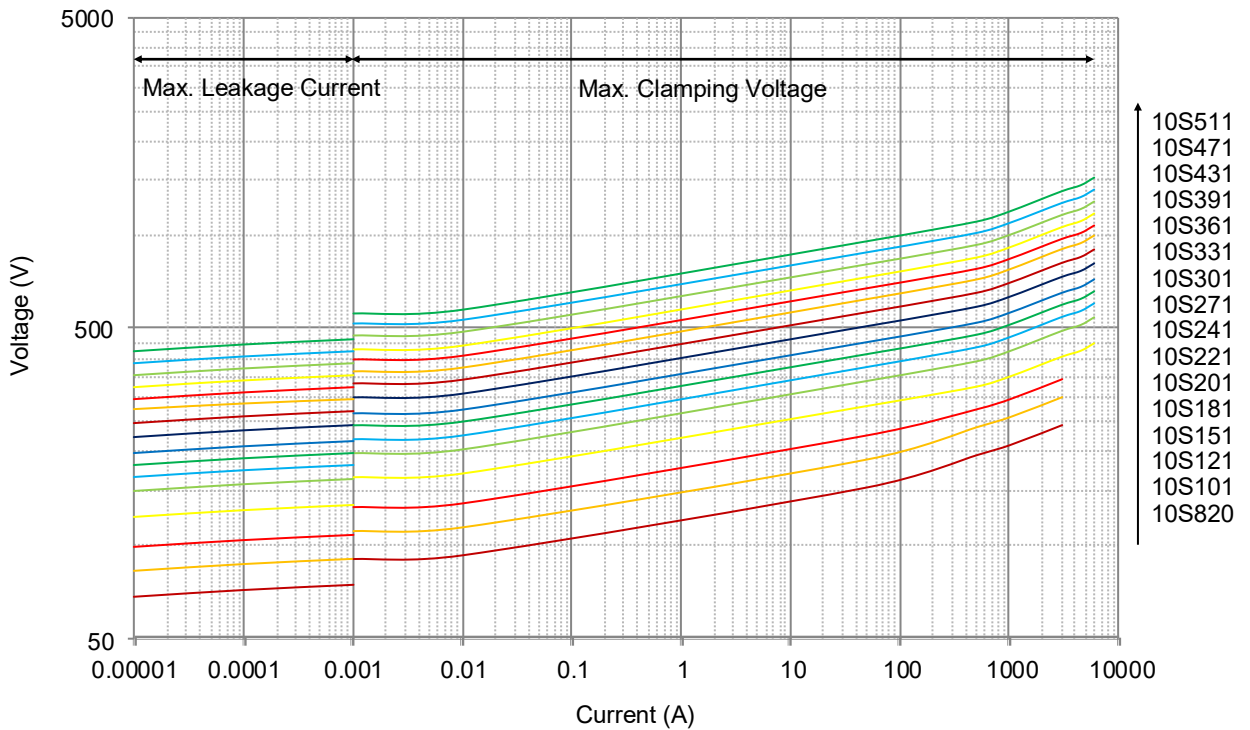
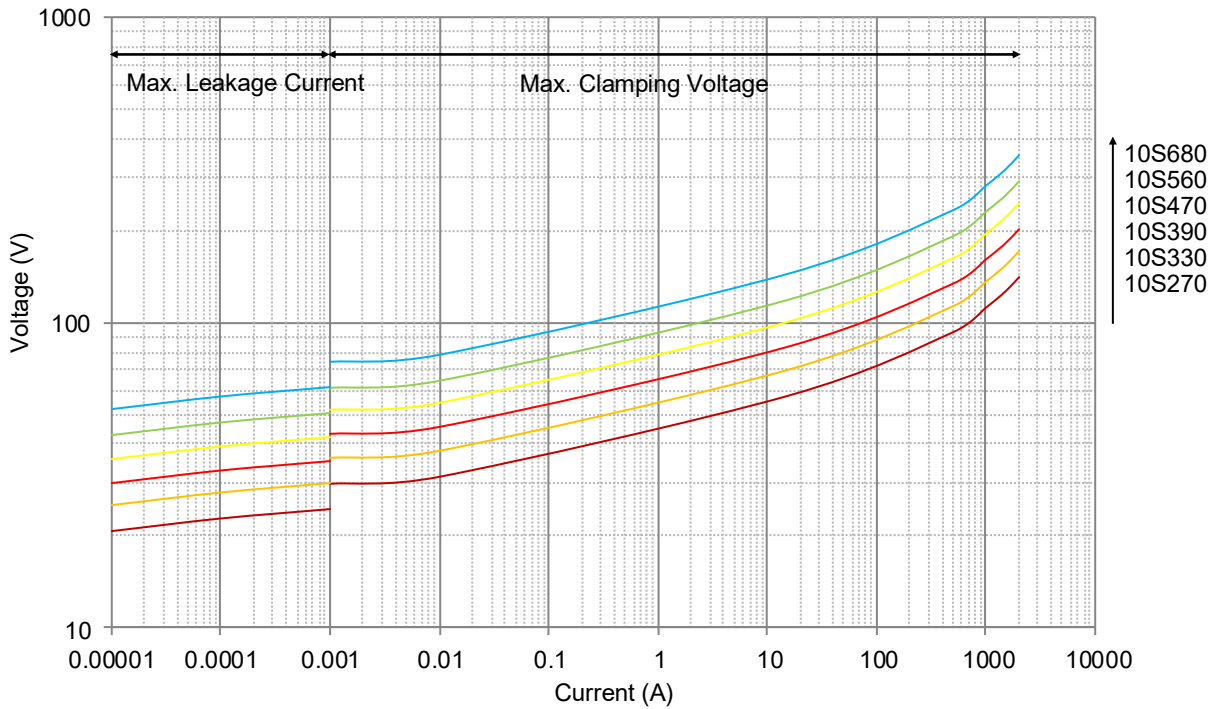
Note: 1, 2, 10, 10<sup>2</sup>, 10<sup>3</sup>, 10<sup>4</sup>, 10<sup>5</sup>, 10<sup>6</sup> Stand for number of repetitions.

# TFMOV

Thermal Fuse & MOV (TFMOV)

TFMOV10S Series

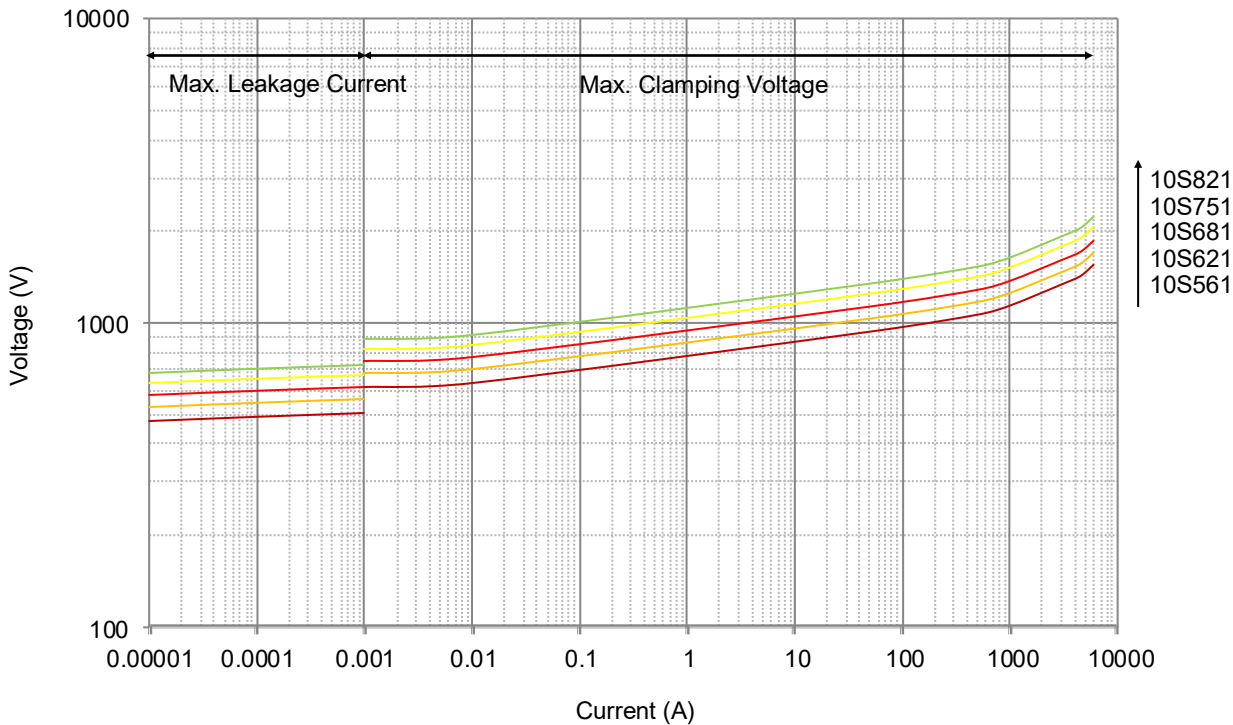
## Voltage-Current Characteristic Curves



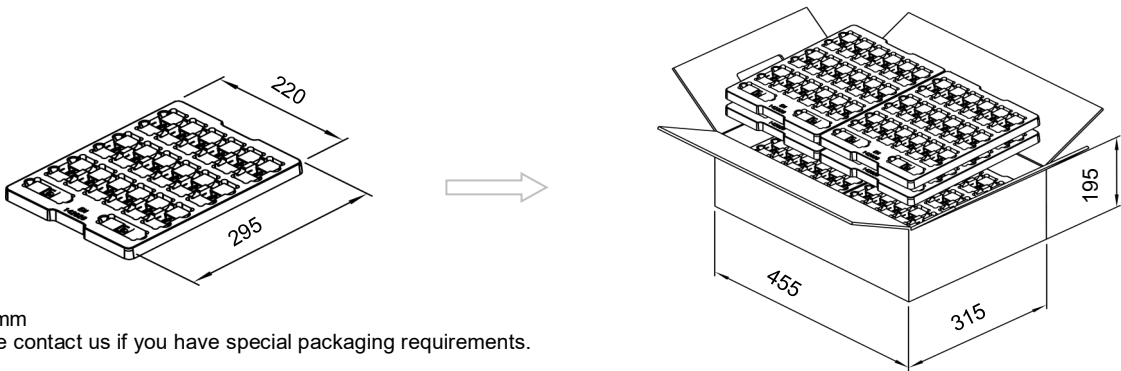
# TFMOV

Thermal Fuse & MOV (TFMOV)

TFMOV10S Series



## Packaging Information



Unit: mm  
Please contact us if you have special packaging requirements.

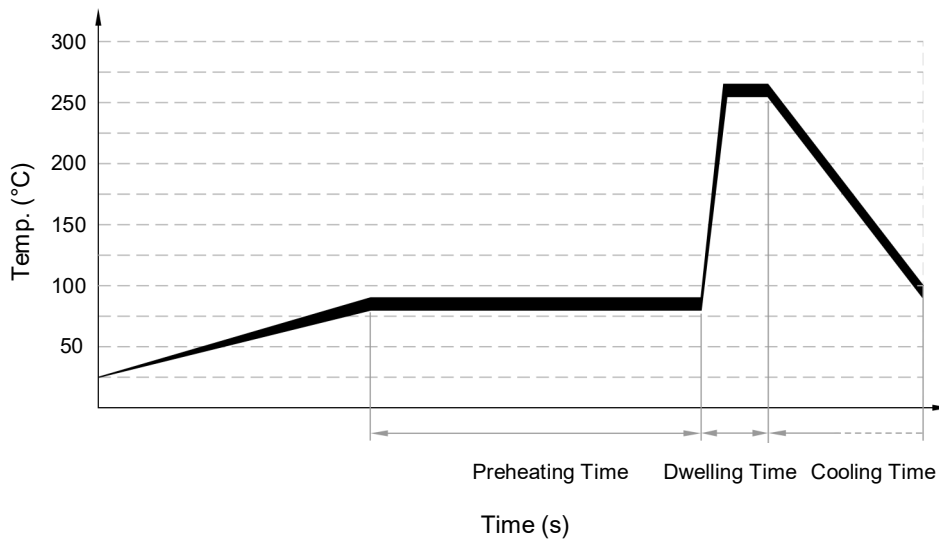
Item	Nominal Varistor Voltage	Tray	Carton
Dimensions (mm)	N/A	295 × 220	455 × 315 × 195
Quantity (PCS)	270 ~ 151	80	2400
	181 ~ 271	80	1920
	301 ~ 821	80	1600

# TFMOV

Thermal Fuse & MOV (TFMOV)

TFMOV10S Series

## Wave Soldering Parameters (Reference)



Item	Temp. (°C)	Time (s)
Preheating	80 to 90	60 to 150
Dwelling	250 to 260	2 to 4

## Recommended Hand-Soldering Parameters

Item	Condition
Iron Temperature	350 °C (Max.)
Soldering Time	4 seconds (Max.)
Distance between Soldering Point and the Bottom of Product	2 mm (Min.)

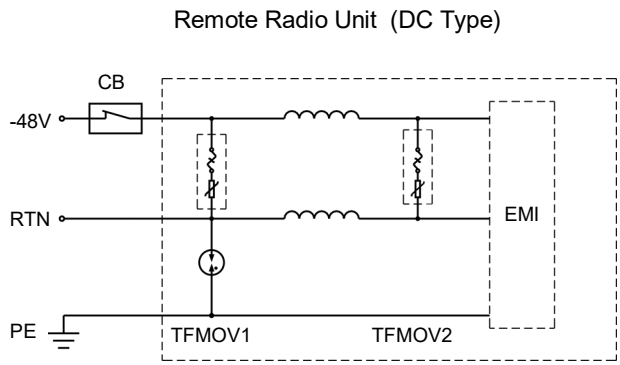
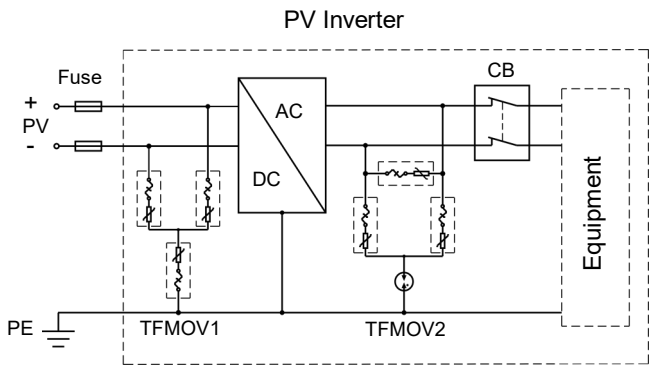
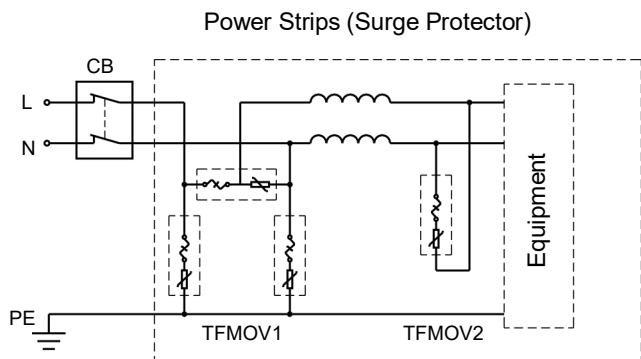
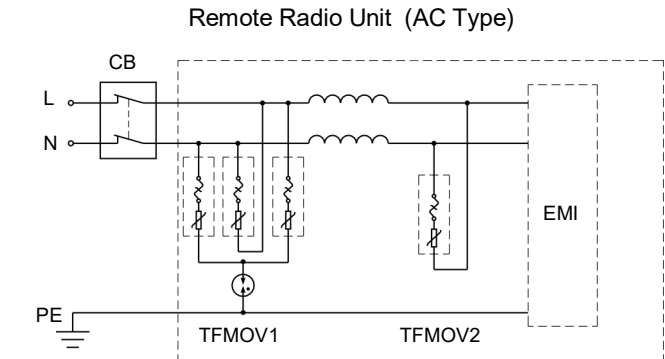


# TFMOV

Thermal Fuse & MOV (TFMOV)

TFMOV10S Series

## Application Options



## Design

When a single TFMOV surge capacity can't meet the requirement of customers, paralleling more TFMOVs is recommended. Due to its nonlinear current-voltage characteristics, please pay attention to below tips:

1. Use the TFMOV from the same manufacturer with same model to parallel.
2. Control the varistor voltage; Typically, the varistor voltage deviation should be less than 1% in the same group (between the Max and Min), and meet the next tip at the same time.
3. Calculate the average surge capacity for each TFMOV and keep a margin at least 10%.
4. Design the layout like Figure.2. to make sure the surge capacity is divided averagely.

The Design not Recommended

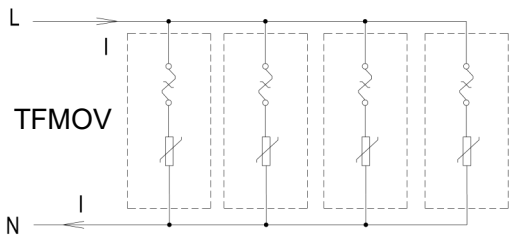


Figure .1

The Design Recommended

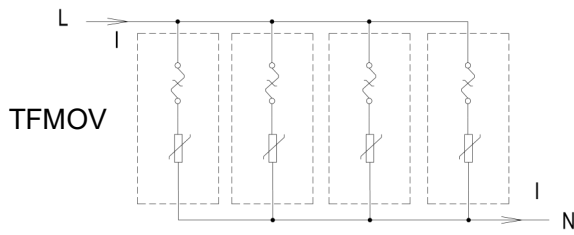


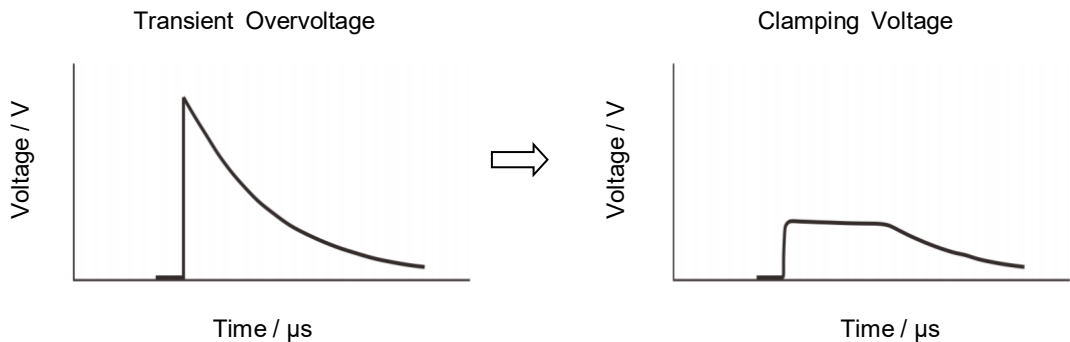
Figure .2

# TFMOV

Thermal Fuse & MOV (TFMOV)

TFMOV10S Series

## MOV Operation Principle



## MOV 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.

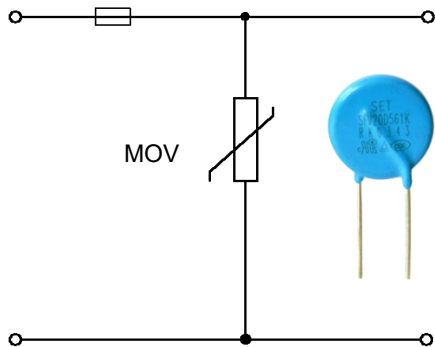


Figure a Typical surge protection circuit

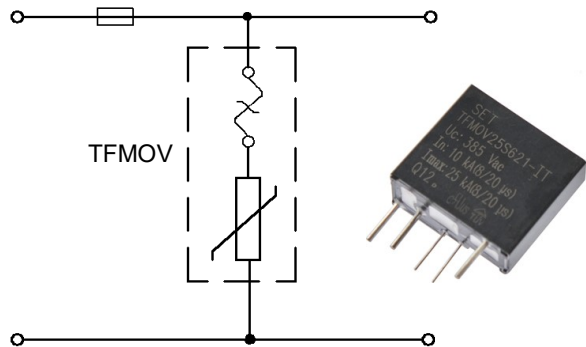


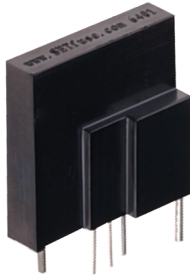
Figure b: High reliability surge protection circuit

# TFMOV

Thermal Fuse & MOV (TFMOV)

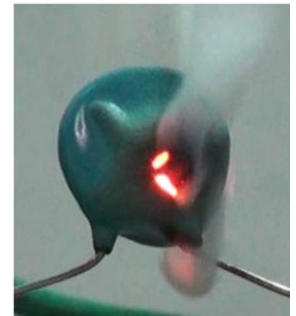
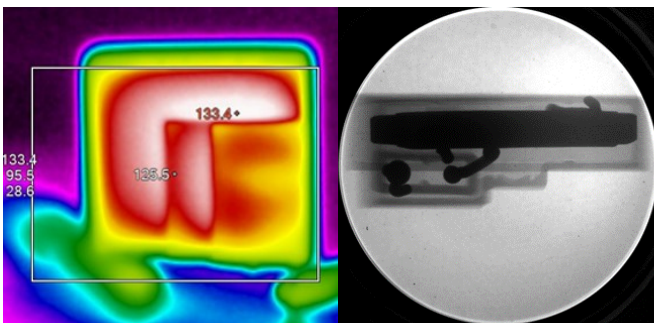
TFMOV10S Series

## Benefits



**Safety**

**Hidden Danger**



Hole in Varistor

### TFMOV Failure Simulation

During the electrical performance degrading of varistor, the inbuilt ATCO will open the circuit when the leakage current of varistor increases to tens of micro Amperes. As shown in the figure above, this is a safe open circuit failure.

### MOV Failure Simulation

The electrical performance of varistor degrades with operating, mostly the varistor voltage drops, and leakage current increases. The heat accumulation can cause the temperature increase sharply and varistor results in thermal breakdown to short circuit status. It's very dangerous.

## Glossary

Item	Description
$V_N$	<b>Nominal Varistor Voltage</b> Voltage, at specified d.c. current used as a reference point in the component characteristic.
8/20 $\mu$ s	<b>8/20 Current Impulse</b> Current impulse with a nominal virtual front time of 8 $\mu$ s and a nominal time to half-value of 20 $\mu$ s. — (IEC 61643-11)
1.2/50 $\mu$ s	<b>1.2/50 Voltage Impulse</b> Voltage impulse with a nominal virtual front time of 1.2 $\mu$ s and a nominal time to half-value of 50 $\mu$ s. — (IEC 61643-11)
$U_c$	<b>Maximum Continuous Operating Voltage</b> Maximum r.m.s. voltage, which may be continuously applied to the SPD's mode of protection. — (IEC 61643-11)
$I_n$	<b>Nominal Discharge Current</b> Crest value of the current through the SPD having a current waveshape of 8/20 $\mu$ s. — (IEC 61643-11)
$I_{imp}$	<b>Impulse Discharge Current for Class I Test</b> 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)
$I_{max}$	<b>Maximum Discharge Current</b> Crest value of a current through the SPD having an 8/20 $\mu$ s waveshape and magnitude according to the manufacturers specification. $I_{max}$ is equal to or greater than $I_n$ . — (IEC 61643-11)
$V_c$	<b>Clamping Voltage</b> Peak voltage developed across the varistor terminations under standard atmospheric conditions, when passing an 8/20 $\mu$ s class current pulse.
$C_v$	<b>Capacitance</b> Capacitance across the MOV measured at a specified frequency and voltage.
<b>Modes of protection</b>	<b>Modes of protection</b> 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)
$U_p$	<b>Voltage Protection Level</b> 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 wave shape. — (IEC 61643-11)
<b>TCO</b>	<b>Thermal-Link</b> A non-resettable device incorporating a THERMAL ELEMENT which will open a circuit once only when exposed for a sufficient length of time to a temperature in excess of that for which it has been designed.
<b>ATCO</b>	<b>Alloy Thermal-Link</b> Alloy Type Thermal-Link, Alloy is the thermal element.
<b>MOV</b>	<b>Varistors</b> A resistive device with nonlinear voltammetry characteristics

## TFMOV

Thermal Fuse &amp; MOV (TFMOV)

TFMOV10S Series

## Patents

Name	Region	Category	Patent NO.
Varistor with In-built Alloy-Type Thermal Fuse	China	Patent for Invention	ZL 200510044661.5
A Protection Pluggable Module with Over Current、Over Voltage、and Over Temperature Protection Function	China	Utility Model	ZL 201020244488.X
A Varistor with Double Protection Function	China	Utility Model	ZL 201020255481.8
Surge Protection Module Applicable for Power Strip	China	Utility Model	ZL 201120107173.5
A Surge Protection Module Applicable for Power Strip	China	Patent for Invention	ZL 201110092261.7
A New Type of Varistor and Surge Protective Device with Thermal Protection	China	Utility Mode	ZL 201420306127.1
A Surge Protective Device	China	Utility Modeel	ZL 201420415059.2
A Varistor and Thermal Protection Component Combination	China	Utility Mode	ZL 201520376567.9
合金型温度ヒューズ付のバリスタ	Japan	Utility Mode	3142835
Varistor with an Alloy-Type Temperature Fuse	Australia	Utility Mode	2007100456
Varistor with an Alloy-Type Temperature Fuse	Taiwan	Utility Model	M 300855
Varistor with an Alloy-type Temperature Fuse	Canada	Patent for Invention	2588819
Metal Oxide Varistor with Built-in Alloy-Type Temperature Fuse	USA	Patent for Invention	US 8780521
Varistor with In-built Alloy Type Thermal Fuse (with Housing)	USA	Patent for Invention	US 9355763



## ATTENTION

### Usage

1. Frequency range is from 47 Hz to 63 Hz.
2. The voltage applied continuously to the TFMOV can not exceed its maximum continuous operating voltage  $U_c$ .
3. When atmosphere press is from 80 kPa to 106 kPa, the related altitude shall be from 2000 meters to - 500 meters.
4. Do not touch the product body or pins directly when power is on, to avoid electric shock.
5. Do not clean the TFMOV with strong polar solvent such as ketone, esters, benzene, halogenated hydrocarbon, to avoid damaging the enclosure.
6. It should have a reliable grounding when using these products.

### Replacement

TFMOV is a non-repairable product. For safety sake, please use equivalent TFMOV for replacement.

### Storage

Do not store TFMOV at high temperature, high humidity or corrosive gas environment. To avoid reducing the solderability of the pins, please use them up within 1 year after receiving the goods.

### Installation Position

Do not install the TFMOV on a place that may often suffer severe continuous vibration.

### Mechanical Stress

Do not take violent action such as knocking when assembling to avoid mechanical damage.

## Thermal Fuse & MOV (TFMOV) Feature & Model List Overview

Rated Voltage $U_n$ (V)	AC	DC	Nominal Discharge Current $I_n$ (kA)										Maximum Continuous Operating Voltage $U_n$ (V)		Model			
			1	1.5	2.5	3	4	5	AC	DC								
690V																750	1000	TFMOV10S Series
600V																680	895	
480V																625	825	
400V																550	745	
347V																510	670	
254																460	615	
																	420	
220																385	505	
230V																350	460	
300V																320	415	
																300	385	
220V																275	350	
																250	320	
130V																230	300	
																210	275	
110V																190	250	
																175	225	
60V																150	200	
																140	180	
48V																130	170	
																115	150	
36V																95	125	
																75	100	
24V																60	85	
																50	65	
12V																40	56	
																35	45	
															30	38		
															25	31		
															20	26		
															17	22		

## Thermal Fuse & MOV (TFMOV) Feature & Model List Overview

Rated Voltage $U_n$ (V)	AC	DC	Model								Maximum Continuous Operating Voltage $U_n$ (V)		
			7.5	8	10	10	10	15	15	15	AC	DC	
690V	600V		TFMOV20S122x	○	○	○	TFMOV25D122x	TFMOV25S122x	○	○	○	750	1000
			TFMOV20S112x	○	○	○	TFMOV25D112x	TFMOV25S112x	○	○	○	680	895
480V	400V		TFMOV20S102x	○	○	○	TFMOV25D102x	TFMOV25S102x	○	○	○	625	825
			TFMOV20S911x	○	○	○	TFMOV25D911x	TFMOV25S911x	○	○	○	550	745
347V	300V		TFMOV20S821x	○	○	○	TFMOV25D821x	TFMOV25S821x	○	○	○	510	670
			TFMOV20S751x	○	○	○	TFMOV25D751x	TFMOV25S751x	○	○	○	460	615
220 - 230V	254 - 277V		TFMOV20S681x	TFMOV20S681Lx	○	○	TFMOV25D681x	TFMOV25S681x	TFMOV25S681Lx	○	○	420	560
			TFMOV20S621x	TFMOV20S621Lx	○	○	TFMOV25D621x	TFMOV25S621x	TFMOV25S621Lx	○	○	385	505
220 - 230V	300V		TFMOV20S561x	TFMOV20S561Lx	○	○	TFMOV25D561x	TFMOV25S561x	TFMOV25S561Lx	○	○	350	460
			TFMOV20S511x	TFMOV20S511Lx	○	○	TFMOV25D511x	TFMOV25S511x	TFMOV25S511Lx	○	○	320	415
110V	110V		TFMOV20S471x	TFMOV20S471Lx	○	○	TFMOV25D471x	TFMOV25S471x	TFMOV25S471Lx	○	○	300	385
			TFMOV20S431x	TFMOV20S431Lx	○	○	TFMOV25D431x	TFMOV25S431x	TFMOV25S431Lx	○	○	275	350
110V	220V		TFMOV20S391x	TFMOV20S391Lx	○	○	TFMOV25D391x	TFMOV25S391x	TFMOV25S391Lx	○	○	250	320
			TFMOV20S361x	TFMOV20S361Lx	○	○	TFMOV25D361x	TFMOV25S361x	TFMOV25S361Lx	○	○	230	300
110V	130V		TFMOV20S331x	TFMOV20S331Lx	○	○	TFMOV25D331x	TFMOV25S331x	TFMOV25S331Lx	○	○	210	275
			TFMOV20S301x	TFMOV20S301Lx	○	○	TFMOV25D301x	TFMOV25S301x	TFMOV25S301Lx	○	○	190	250
110V	110V		TFMOV20S271x	TFMOV20S271Lx	○	○	TFMOV25D271x	TFMOV25S271x	TFMOV25S271Lx	○	○	175	225
			TFMOV20S241x	TFMOV20S241Lx	○	○	TFMOV25D241x	TFMOV25S241x	TFMOV25S241Lx	○	○	150	200
48V	60V		TFMOV20S221x	TFMOV20S221Lx	○	○	TFMOV25D221x	TFMOV25S221x	TFMOV25S221Lx	○	○	140	180
			TFMOV20S201x	TFMOV20S201Lx	○	○	TFMOV25D201x	TFMOV25S201x	TFMOV25S201Lx	○	○	130	170
48V	60V		○	○	TFMOV25S181x	TFMOV25S181Lx	○	○	○	TFMOV20K181x	115	150	
			○	○	TFMOV25S151x	TFMOV25S151Lx	○	○	○	TFMOV20K151x	95	125	
36V	48V		○	○	TFMOV25S121x	TFMOV25S121Lx	○	○	○	TFMOV34S121x	75	100	
			○	○	TFMOV25S101x	TFMOV25S101Lx	○	○	○	TFMOV34S101x	60	85	
24V	24V		○	○	TFMOV25S820x	TFMOV25S820Lx	○	○	○	TFMOV34S560Lx	50	65	
			○	○	○	○	TFMOV34S680x	○	○	TFMOV34S470Lx	40	56	
12V	12V		○	○	○	○	TFMOV34S560x	○	○	○	35	45	
			○	○	○	○	TFMOV34S470x	○	○	○	30	38	
			○	○	○	○	○	○	○	25	31		
			○	○	○	○	○	○	○	20	26		
			○	○	○	○	○	○	○	17	22		



## Thermal Fuse & MOV (TFMOV) Feature & Model List Overview

Rated Voltage $U_n$ (V)	Model	Maximum Continuous Operating Voltage $U_n$ (V)	
		AC	DC
690V	600V	750	1000
		680	895
480V	400V	625	825
		550	745
347V	300V	510	670
		460	615
254	220V	420	560
		385	505
220	277V	350	460
		320	415
230V	300V	300	385
		275	350
120	220V	250	320
		230	300
130V	220V	210	275
		190	250
110V	110V	175	225
		150	200
110V	110V	140	180
		130	170
60V	60V	115	150
		95	125
48V	60V	75	100
		60	85
48V	48V	50	65
		40	56
24V	24V	35	45
		30	38
12V	12V	25	31
		20	26
AC	DC	17	22

$I_{max} = 2.5I_n$

Nominal Discharge Current  $I_n$  (kA)

## Thermal Fuse & MOV (TFMOV) Feature & Model List Overview

Rated Voltage $U_n$ (V)	AC	DC	Nominal Discharge Current $I_n$ (kA)						Maximum Continuous Operating Voltage $U_n$ (V)	
			2.5x2	5x2	7.5x2	2.5x3	5x3	7.5x3	AC	DC
690V		600V	○	○	○	○	○	○	750	1000
			○	○	○	○	○	○	680	895
480V			○	○	○	○	○	○	625	825
		400V	○	○	○	○	○	○	550	745
347V			○	○	○	○	○	○	510	670
			○	○	○	○	○	○	460	615
		254	○	○	○	○	○	○	420	560
220		277V	○	○	○	○	○	○	385	505
			○	○	○	○	○	○	350	460
230V		300V			TFMOV21R2P511	○	○	TFMOV21R3P511	320	415
			○	○	TFMOV21R2P471	○	○	TFMOV21R3P471	300	385
			○	○	TFMOV21R2P431	○	○	TFMOV21R3P431	275	350
			○	○	TFMOV21R2P391	○	○	TFMOV21R3P391	250	320
120		220V	○	○	TFMOV21R2P361	○	○	TFMOV21R3P361	230	300
			○	○	TFMOV21R2P331	○	○	TFMOV21R3P331	210	275
		130V	○	○	TFMOV21R2P301	○	○	TFMOV21R3P301	190	250
			○	○	TFMOV21R2P271	○	○	TFMOV21R3P271	175	225
			○	○	TFMOV21R2P241	○	○	TFMOV21R3P241	150	200
110V		110V	○	○	TFMOV21R2P221	○	○	TFMOV21R3P221	140	180
			○	○	TFMOV21R2P201	○	○	TFMOV21R3P201	130	170
			○	TFMOV21R2P181	○	○	TFMOV21R3P181	○	115	150
		60V	○	TFMOV21R2P151	○	○	TFMOV21R3P151	○	95	125
48V		60V	○	TFMOV21R2P121	○	○	TFMOV21R3P121	○	75	100
		48V	○	TFMOV21R2P101	○	○	TFMOV21R3P101	○	60	85
		36V	○	TFMOV21R2P820	○	○	TFMOV21R3P820	○	50	65
			TFMOV21R2P680	○	○	TFMOV21R3P680	○	○	40	56
24V		24V	TFMOV21R2P560	○	○	TFMOV21R3P560	○	○	35	45
			TFMOV21R2P470	○	○	TFMOV21R3P470	○	○	30	38
			○	○	○	○	○	○	25	31
12V		12V	○	○	○	○	○	○	20	26
			○	○	○	○	○	○	17	22