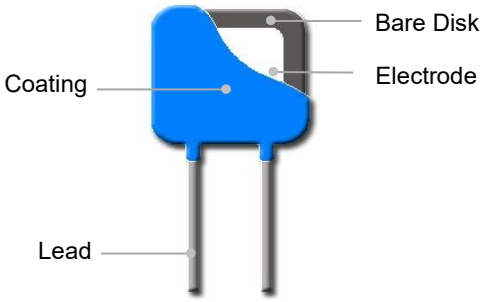
Description

Metl Oxide Varistor (MOV) is a nonlinear resistance component with zinc oxide (ZnO) as its main constituent. The resistance of an MOV is sensitive to changes in the lied voltage. Below the threshold voltage, the MOV exhibits high resistance, allowing only a negligibly small leakage current to flow. Once the threshold voltage is exceeded, the resistance of the MOV drops sharply, enabling the conduction of a large current. This characteristic makes the MOV suitable for detecting and suppressing surge voltage and overvoltage, thereby protect the circuit from damage caused by excessive voltage.

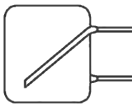
The Metal Oxide Varistor (MOV) finds wide application in various fields such as photovolt aics, communication, lightning protection, power supply, and power strips. It serves to suppress transient overvoltage and absorb surge energy within the circuit.

SETsafe | SETfuse offers Metal Oxide Varistors (MOV) with maximum peak current ratings ranging from 8 kA to 50 kA, and maximum continuous voltage ratings from 130VAC to 750 VAC. Safety certification Includes UL, cUL, TUV, and CQC, and comply with RoHS and REACH requirements.

Product Structure



Lead Types

Lead Types		Codes
All Lead Wire A		L

Agency Information

Agency	Standards	No.
	UL 1449 4th Edition	E322662
	CSA C22.2 NO.269.5-17	E322662
	EN IEC 61051-1:2018 EN IEC 61051-2:2021 IEC 61051-2-2:1991 Annex G.8.1 of IEC 62368-1:2023	J 50401611

Applications

- Power Supplies
- Home Electrical Appliances
- Industrial Devices
- Surge Protectors
- Telecom Devices

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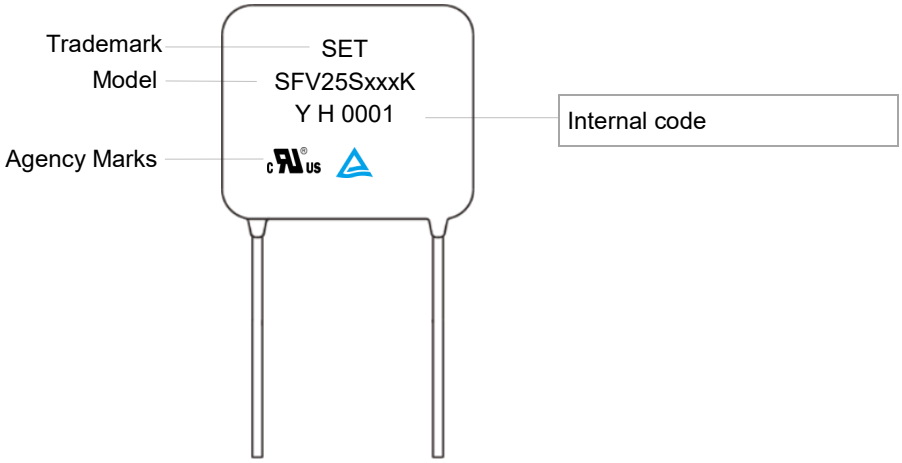
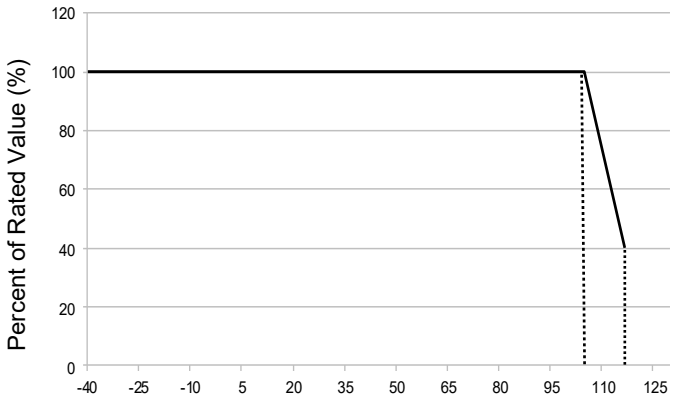
Marking



Temp. Derating Curve



For Normal Temp. Series

Note:
When ambient Temp. exceeds 105 °C, the peak surge current and energy rating should be reduced as shown in left curve.

General Technical Data

Item	Value	Unit
Operating Temperature	-40 to +105	°C
Storage Temperature	-40 to +125	°C
Voltage Proof	≥2500	V_{ac}
Insulation Resistance	≥100	MΩ

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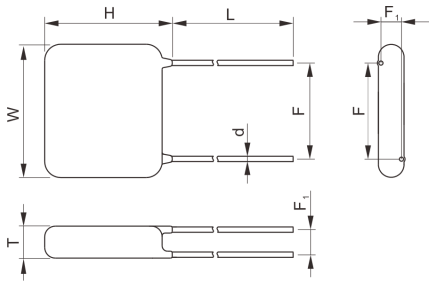
Dimensions (mm)



Straight Lead

Model	L	W (Max.)	H (Max.)	T (Max.)	d	F	F_1
SFV25S241K	16.0±3.0	28	30	7.0	1.20±0.05	18.0±1.0	2.6 ~ 4.6
SFV25S271K	16.0±3.0	28	30	7.2	1.20±0.05	18.0±1.0	2.8 ~ 4.8
SFV25S301K	16.0±3.0	28	30	7.4	1.20±0.05	18.0±1.0	3.0 ~ 5.0
SFV25S331K	16.0±3.0	28	30	7.6	1.20±0.05	18.0±1.0	3.1 ~ 5.1
SFV25S361K	16.0±3.0	28	30	7.8	1.20±0.05	18.0±1.0	3.3 ~ 5.3
SFV25S391K	16.0±3.0	28	30	8.0	1.20±0.05	18.0±1.0	3.5 ~ 5.5
SFV25S431K	16.0±3.0	28	30	8.2	1.20±0.05	18.0±1.0	3.7 ~ 5.7
SFV25S471K	16.0±3.0	28	30	8.5	1.20±0.05	18.0±1.0	4.0 ~ 6.0
SFV25S511K	16.0±3.0	28	30	8.7	1.20±0.05	18.0±1.0	4.2 ~ 6.2
SFV25S561K	16.0±3.0	28	30	9.0	1.20±0.05	18.0±1.0	4.5 ~ 6.5
SFV25S621K	16.0±3.0	28	30	9.4	1.20±0.05	18.0±1.0	4.8 ~ 6.8
SFV25S681K	16.0±3.0	28	30	9.8	1.20±0.05	18.0±1.0	5.2 ~ 7.2
SFV25S751K	16.0±3.0	28	30	10.2	1.20±0.05	18.0±1.0	5.6 ~ 7.6
SFV25S821K	16.0±3.0	28	30	10.7	1.20±0.05	18.0±1.0	6.0 ~ 8.0
SFV25S911K	16.0±3.0	28	30	11.2	1.20±0.05	18.0±1.0	6.6 ~ 8.6
SFV25S102K	16.0±3.0	28	30	11.8	1.20±0.05	18.0±1.0	7.1 ~ 9.1
SFV25S112K	16.0±3.0	28	30	12.4	1.20±0.05	18.0±1.0	7.7 ~ 9.7
SFV25S122K	16.0±3.0	28	30	13.0	1.20±0.05	18.0±1.0	8.3 ~ 10.3

Note:
The above data is for reference only.

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Part Numbering System

SFV 25 S 471 - K P H A BUL - 001

Other Options

***Packaging & Lead Length**
BUL: Bulk + Standard Lead Length (Normal L28)
C35: Bulk + Cut to 3.5 mm
(Range:2.5 mm to 6 mm)

Lead Types
A: Straight Lead
E: Straight Strap Lead
L: All Lead Wire A

Surge Level
H: High Energy Type

Operating Temp.
P: Epoxy Coating 105 °C

Voltage Tolerance
K: ±10%
J: ±5%
S: Special Tolerance

Nominal Varistor Voltage
220: 22×10^{0} = 22 V
471: 47×10^{1} = 470 V
122: 12×10^{2} = 1200 V

Disk Shape
S: Square

Bare Disk Dimension
25: 22×25 mm

Product Category
SETfuse Varistor

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 indentification.

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Specification

Model	Max. Continuous Operating Voltage		Varistor Voltage @1 mA DC		Clamping Voltage (Max.)		Max. Discharge Current (8/20 μs)		Max. Energy (10/1000 μs)	Typical Capacitance (For reference only) @1 kHz	Agency Information			
	VAC	VDC	Min.	Max.	V_C	I_P	I_n	I_{max}	(J)	(pF)	UL	cUL	TUV	CQC
	(V)	(V)	(V)	(V)	(V)	(A)	(kA)	(kA)						
SFV25S241K	150	200	216	264	395	175	10	25	302	2800	●	●	●	○
SFV25S271K	175	225	243	297	455	175	10	25	340	2450	●	●	●	○
SFV25S301K	190	250	270	330	500	175	10	25	375	2200	●	●	●	○
SFV25S331K	210	275	297	363	550	175	10	25	410	2050	●	●	●	○
SFV25S361K	230	300	324	396	595	175	10	25	465	1850	●	●	●	○
SFV25S391K	250	320	351	429	650	175	10	25	520	1700	●	●	●	○
SFV25S431K	275	350	387	473	710	175	10	25	575	1600	●	●	●	○
SFV25S471K	300	385	423	517	775	175	10	25	630	1450	●	●	●	○
SFV25S511K	320	415	459	561	845	175	10	25	665	1300	●	●	●	○
SFV25S561K	350	460	504	616	925	175	10	25	720	1200	●	●	●	○
SFV25S621K	385	505	558	682	1025	175	10	25	790	1100	●	●	●	○
SFV25S681K	420	560	612	748	1120	175	10	25	790	1000	●	●	●	○
SFV25S751K	460	615	675	825	1240	175	10	25	825	900	●	●	●	○
SFV25S821K	510	670	738	902	1355	175	10	25	840	800	●	●	●	○
SFV25S911K	550	745	819	1001	1500	175	10	25	900	700	●	●	●	○
SFV25S102K	625	825	900	1100	1650	175	10	25	950	660	●	●	●	○
SFV25S112K	680	895	990	1210	1815	175	10	25	1040	615	●	●	●	○
SFV25S122K	750	1000	1080	1320	1980	175	10	25	1170	555	●	●	●	○

●: Approved ○: Unauthorized ● RoHS & REACH Compliant

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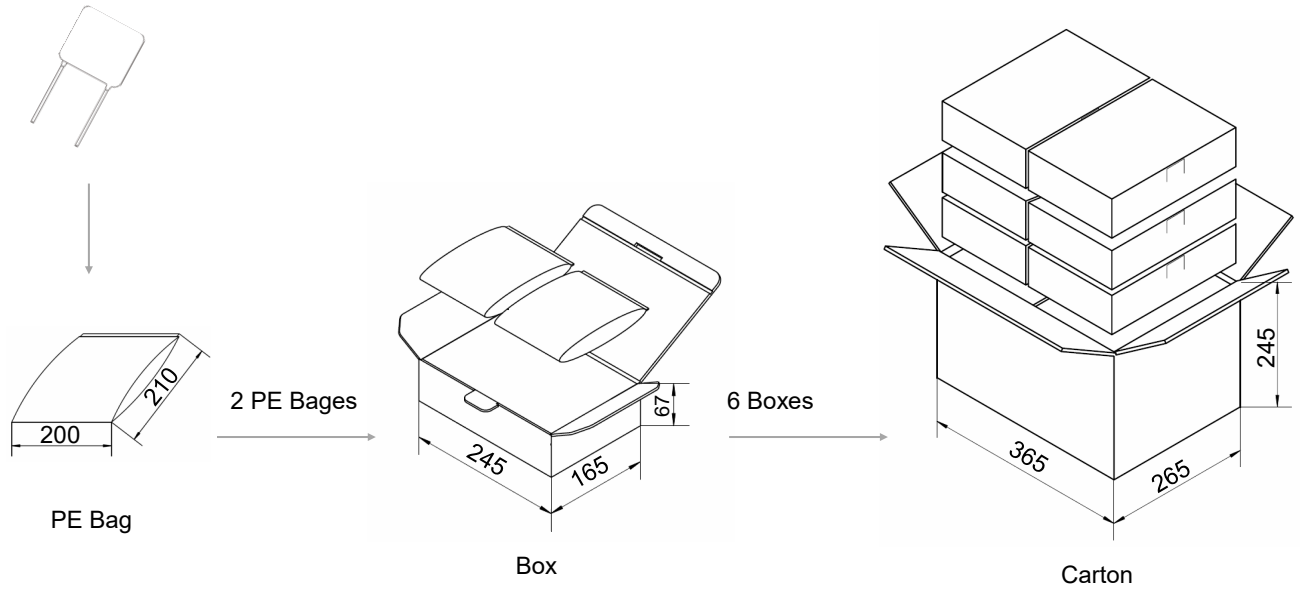
Packaging Information

- Bulk Packaging (Code: BUL)
- Bulk Packaging Quantity & Weight.

Series	Nominal Varistor Voltage	PE Bag	Box	Carton	G. W / Carton （365 × 265 × 245）
	(V)	(PCS)	(PCS)	(PCS)	(kg)±10%
SFV25S Series	241 ~ 821	100	200	1200	15 ~ 26
	911 ~ 122	80	160	960	23 ~ 28

Note:
Other lead length packaging information, please contact SETsafe | SETfuse.

All Dimensions in mm



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Installation

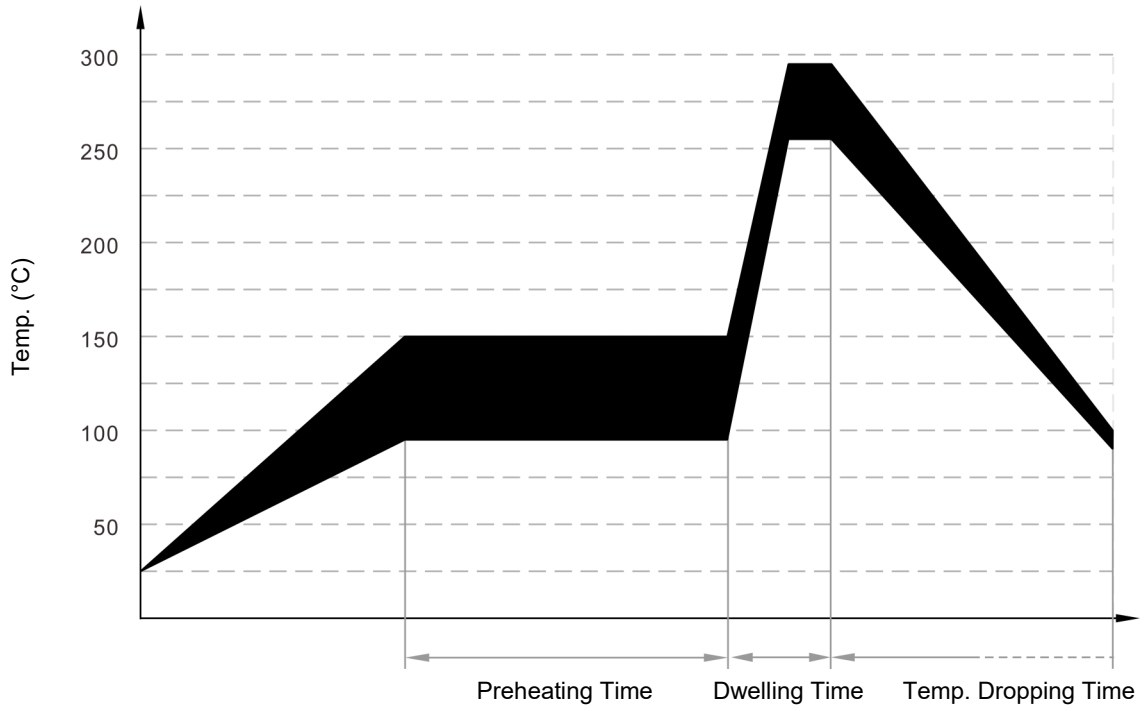
Mechanical Stress

Do not knock MOV when installing, to avoid mechanical damage.

Soldering Parameters

Wave Soldering Parameters

The wave soldering parameters are for reference only. When MOV is for practice use, some related validation is recommended.



Wave Soldering Curve

Item	Temp. (°C)	Time (s)
Preheating	90 to 150	<150
Dwelling	255 to 290	3 to 10

Recommended Hand-Soldering Parameters

Item	Condition
Temp. of Solder Head	350 °C (max.)
Soldering Time	4 seconds (max.)

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Glossary

Item	Description
V_N	**Nominal Varistor Voltage** Voltage, at specified D.C. current used as a reference point in the component characteristics. — (GB 18802.331) — (IEC 61051-1)
I_L	**Leakage Current** Measuring at 75% of varistor voltage. — (GB/T 10193) — (IEC 61051-1)
UCT	**Upper Category Temp.** Max. ambient temp. for which a varistor has been designed to operate continuously. — (GB/T 10193) — (IEC 61051-1)
LCT	**Lower Category Temp.** Minimum ambient temp. at which a varistor has been designed to operate continuously. — (GB/T 10193) — (IEC 61051-1)
Max. Peak Current	**Max. Peak Current** Max. current per pulse, which may be passed by a varistor at an ambient temp. of 25 °C, for a given number of pulses. — (GB/T 10193) — (IEC 61051-1)
V_C	**Clamping Voltage** Peak voltage developed across the varistor terminations under standard atmospheric conditions, when passing an 8/20 μs class current pulse. — (GB 18802.331) — (IEC 61051-1)
Voltage Proof	**Voltage Proof** Max. peak voltage, which may be applied under continuous operating conditions between the varistor terminations and any conducting mounting surface (Applicable only to insulated varistors). — (GB/T 10193) — (IEC 61051-1)
C_V	**Capacitance** Capacitance across the MOV measured at a specified frequency and voltage. — (GB 18802.331) — (IEC 61051-1)
V_{ac}	**Max. Continuous a.c. Voltage** Max. a.c. r.m.s. voltage of a substantially sinusoidal waveform (less than 5% total harmonic distortion) which can be applied to the component under continuous operating conditions at 25 °C. — (GB/T 10193) — (IEC 61051-1)
V_{dc}	**Max. Continuous d.c. Voltage** Max. d.c. voltage (with less than 5% ripple) which can be applied to the component under continuous operating conditions at an ambient temp. of 25 °C. — (GB/T 10193) — (IEC 61051-1)
I_{max}	**Max. Discharge Current** Crest value of a current through the SPD having an 8/20 μs waveshape and magnitude according to the manufacturers specification. I_{max} is equal to or greater than I_n. — (GB 18802.1) — (IEC 61643-11)

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ATTENTION

Usage

1. Varistor must operated in the specified ambient temp.
2. Do not clean the varistor with strong polar solvent such as ketone, esters, benzene and halogenated hydrocarbon.
3. Please do not apply severe vibration, shock or pressure to MOV.
4. Please fix lead wires when bending or cutting. The distance between the bending point and the sealing of MOV shall be greater than 2 mm.

Replacement

If varistor is visually damaged,please replace it.

Storage

1. Storage Temp. Range: (-40 to +125) °C.
2. Relative Humidity : ≤75% RH.
3. Altitude: <2000 m.
4. Do not store the MOV at the high temp., high humidity or corrosive gas environment, to avoid influencing the solder-ability of the lead wires, the product shall be used up within 1 year after receiving the goods.

Environmental Conditions

1. Varistor should neither be exposed to the open air, nor direct sunshine.
2. Varistor should avoid rain, water vapor or other condition of high temp. and high humidity.
3. Varistor should avoid sand dust, salt spray, or other harmful gases.

Max. Typical Capacitance of Varistor

The typical capacitance of varistor is listed in the specifications. Designers may refer to it when designing MOV in high frequency circuit.

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Metal Oxide Varistor-High Surge Type (MOV) Feature & Model List Overview

Nominal Operating Voltage U_n (V) AC	Nominal Operating Voltage U_n (V) DC	8	13	27.5	50	Maximum Continuous Operating Voltage U_n (V) AC	Maximum Continuous Operating Voltage U_n (V) DC	Page
480V	500V	○	○	SFV25S122K	SFV34S122K	750	990	
		○	○	SFV25S112K	SFV34S112K	680	895	
		○	○	SFV25S102K	SFV34S102K	625	825	
415V		○	○	SFV25S911K	SFV34S911K	550	745	
380V		○	○	SFV25S821K	SFV34S821K	510	670	
		○	○	SFV25S751K	SFV34S751K	460	615	
100V - 240V		SFV14D681K	SFV20D681K	SFV25S681K	SFV34S681K	420	560	
		SFV14D621K	SFV20D621K	SFV25S621K	SFV34S621K	385	505	
		SFV14D561K	SFV20D561K	SFV25S561K	SFV34S561K	350	460	
		SFV14D511K	SFV20D511K	SFV25S511K	SFV34S511K	320	415	
100V - 220V		SFV14D471K	SFV20D471K	SFV25S471K	SFV34S471K	300	385	
		SFV14D431K	SFV20D431K	SFV25S431K	SFV34S431K	275	350	
100V - 120V	250V	SFV14D391K	SFV20D391K	SFV25S391K	SFV34S391K	250	320	
		SFV14D361K	SFV20D361K	SFV25S361K	SFV34S361K	230	300	
		SFV14D331K	SFV20D331K	SFV25S331K	SFV34S331K	210	275	
		SFV14D301K	SFV20D301K	SFV25S301K	SFV34S301K	190	250	
100V	125V	SFV14D271K	SFV20D271K	SFV25S271K	SFV34S271K	175	225	
		SFV14D241K	SFV20D241K	SFV25S241K	SFV34S241K	150	200	
		SFV14D221K	SFV20D221K	○	○	140	180	
		SFV14D201K	SFV20D201K	○	○	130	170	
		○	○	○	○	115	150	
	48V	○	○	○	○	95	125	
		○	○	○	○	75	100	
		○	○	○	○	60	85	
		○	○	○	○	50	65	
	24V	○	○	○	○	40	56	
		○	○	○	○	35	45	
	12V	○	○	○	○	30	38	
		○	○	○	○	25	31	
		○	○	○	○	20	26	
		○	○	○	○	17	22	
		○	○	○	○	14	18	

Maximum Peak Current (8/20 μs) (kA)

Model

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