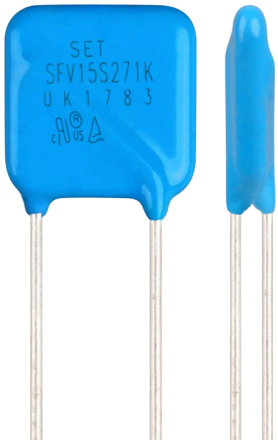
MOV
Metal Oxide Varistor

SFV15S Series



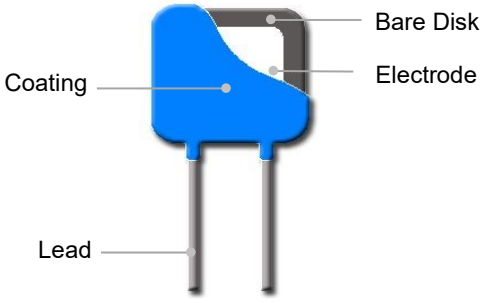
Description

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.

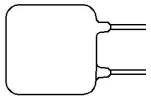
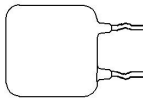
The Metal Oxide Varistor (MOV) finds wide application in various fields such as photovolt aics, communication, lightning protection, power supply, and power strips. It serves to suppress transient overvoltage and absorb surge energy within the circuit.

SETsafe | SETfuse offers Metal Oxide Varistors (MOV) with maximum peak current ratings ranging from 0.75 kA to 70 kA, and maximum continuous voltage ratings from 14VAC 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
Straight Lead		A
Outward Crimp Lead		C
Inline Crimp Lead		D

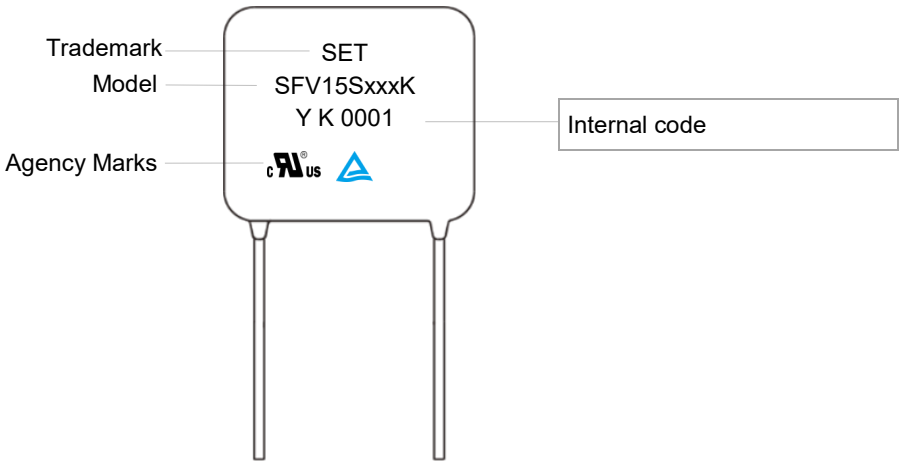
Agency Information

Agency	Standards	No.
	UL 1449 4th Edition	E322662
	CSA C22.2 NO.269.5-17	E322662
TÜVRheinland	EN IEC 61051-1:2018 EN IEC 61051-2:2021 IEC 61051-2-2:1991 Annex G.8.1 of IEC 62368-1:2018	J 50239738

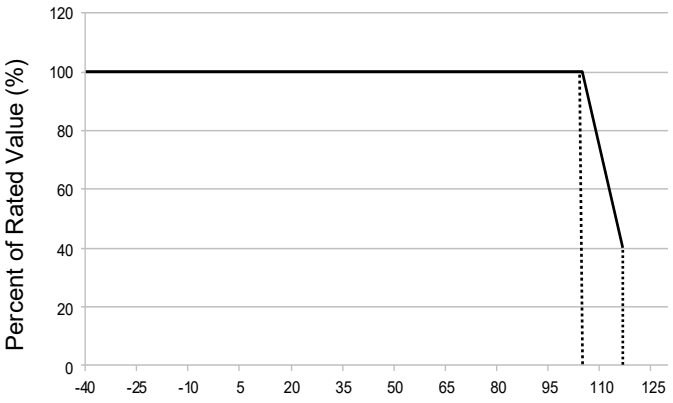
Applications

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

Marking



Temp. Derating Curve



For Normal Temp. Series

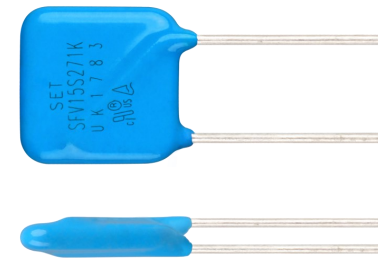
Note:
When ambient Temp. exceeds 105 °C, the peak surge current and energy rating should be reduced as shown in left curve.

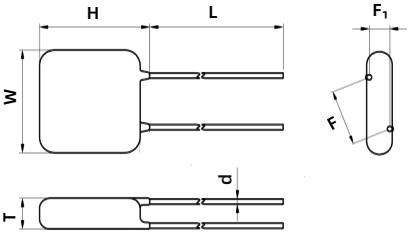
General Technical Data

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

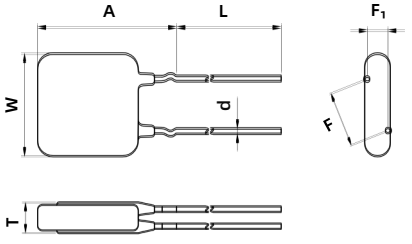
Dimensions (mm)

Model	L (Min.)	W (Max.)	H (Max.)	T (Max.)	d	F	F_1	A (Max.)
SFV15S220K	20	17	20	4.9	1.00±0.05	10.0±0.6	1.2 ~ 2.7	22.5
SFV15S270K	20	17	20	5.2	1.00±0.05	10.0±0.6	1.3 ~ 2.9	22.5
SFV15S330K	20	17	20	5.5	1.00±0.05	10.0±0.6	1.4 ~ 3.1	22.5
SFV15S390K	20	17	20	5.8	1.00±0.05	10.0±0.6	1.5 ~ 3.3	22.5
SFV15S470K	20	17	20	5.0	1.00±0.05	10.0±0.6	1.3 ~ 2.9	22.5
SFV15S560K	20	17	20	5.2	1.00±0.05	10.0±0.6	1.4 ~ 3.1	22.5
SFV15S680K	20	17	20	5.5	1.00±0.05	10.0±0.6	1.5 ~ 3.4	22.5
SFV15S820K	20	17	20	4.8	1.00±0.05	10.0±0.6	1.3 ~ 2.8	22.5
SFV15S101K	20	17	20	5.0	1.00±0.05	10.0±0.6	1.4 ~ 3.0	22.5
SFV15S121K	20	17	20	5.2	1.00±0.05	10.0±0.6	1.5 ~ 3.2	22.5
SFV15S151K	20	17	20	5.5	1.00±0.05	10.0±0.6	1.6 ~3.5	22.5
SFV15S181K	20	17	20	4.9	1.00±0.05	10.0±0.6	1.2 ~ 3.2	22.5
SFV15S201K	20	17	20	5.0	1.00±0.05	10.0±0.6	1.3 ~ 3.3	22.5
SFV15S221K	20	17	20	5.1	1.00±0.05	10.0±0.6	1.4 ~ 3.4	22.5
SFV15S241K	20	17	20	5.2	1.00±0.05	10.0±0.6	1.5 ~ 3.5	22.5
SFV15S271K	20	17	20	5.4	1.00±0.05	10.0±0.6	1.7 ~ 3.7	22.5
SFV15S301K	20	17	20	5.6	1.00±0.05	10.0±0.6	1.9 ~ 3.9	22.5
SFV15S331K	20	17	20	5.8	1.00±0.05	10.0±0.6	2.1 ~ 4.1	22.5
SFV15S361K	20	17	20	6.0	1.00±0.05	10.0±0.6	2.3 ~ 4.3	22.5
SFV15S391K	20	17	20	6.1	1.00±0.05	10.0±0.6	2.6 ~ 4.6	22.5
SFV15S431K	20	17	20	6.4	1.00±0.05	10.0±0.6	2.8 ~ 4.8	22.5
SFV15S471K	20	17	20	6.6	1.00±0.05	10.0±0.6	3.0 ~ 5.0	22.5
SFV15S511K	20	17	20	6.8	1.00±0.05	10.0±0.6	3.3 ~ 5.3	22.5
SFV15S561K	20	17	20	7.1	1.00±0.05	10.0±0.6	3.6 ~ 5.6	22.5
SFV15S621K	20	17	20	7.5	1.00±0.05	10.0±0.6	4.0 ~ 6.0	22.5
SFV15S681K	20	17	20	7.8	1.00±0.05	10.0±0.6	4.4 ~ 6.4	22.5
SFV15S751K	20	17	20	8.3	1.00±0.05	10.0±0.6	4.8 ~ 6.8	22.5
SFV15S821K	20	17	20	8.7	1.00±0.05	10.0±0.6	5.3 ~ 7.3	22.5

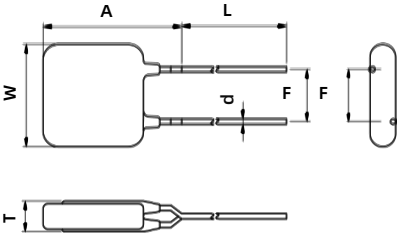




Straight Lead (A)



Outward Crimp (C)



Inline Crimp (D)

Note:
The above data is for reference only.

Part Numbering System

SFV 15 S 471 - K P K 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
C: Outward Crimp Lead
D: Inline Crimp Lead

Surge Level
K: Standard 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
15: 15×15 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.

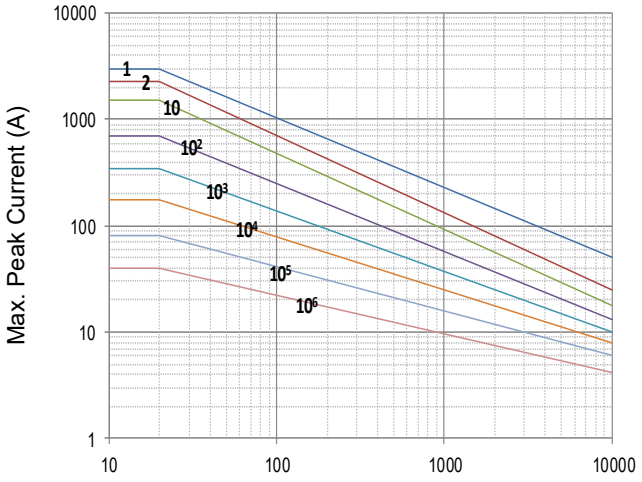
Specification

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)						
SFV15S220K	14	18	20	24	43	10	1.5	3	13	15000	●	●	●	○
SFV15S270K	17	22	24	31	53	15	1.5	3	16	10500	●	●	●	○
SFV15S330K	20	26	30	36	65	15	1.5	3	19	9300	●	●	●	○
SFV15S390K	25	31	35	43	77	15	1.5	3	21	7000	●	●	●	○
SFV15S470K	30	38	42	52	93	15	1.5	3	27	6000	●	●	●	○
SFV15S560K	35	45	50	62	110	15	1.5	3	32	5300	●	●	●	○
SFV15S680K	40	56	61	75	135	15	1.5	3	41	4700	●	●	●	○
SFV15S820K	50	65	74	90	135	75	5	10	43	4000	●	●	●	○
SFV15S101K	60	85	90	110	165	75	5	10	53	3200	●	●	●	○
SFV15S121K	75	100	108	132	200	75	5	10	64	2700	●	●	●	○
SFV15S151K	95	125	135	165	250	75	5	10	85	2200	●	●	●	○
SFV15S181K	115	150	162	198	300	75	5	10	96	1800	●	●	●	○
SFV15S201K	130	170	180	220	340	75	5	10	102	1600	●	●	●	○
SFV15S221K	140	180	198	242	360	75	5	10	125	1450	●	●	●	○
SFV15S241K	150	200	216	264	395	75	5	10	134	1350	●	●	●	○
SFV15S271K	175	225	243	297	455	75	5	10	158	1200	●	●	●	○
SFV15S301K	190	250	270	330	500	75	5	10	173	1050	●	●	●	○
SFV15S331K	210	275	297	363	550	75	5	10	185	1000	●	●	●	○
SFV15S361K	230	300	324	396	595	75	5	10	208	900	●	●	●	○
SFV15S391K	250	320	351	429	650	75	5	10	224	800	●	●	●	○
SFV15S431K	275	350	387	473	710	75	5	10	248	750	●	●	●	○
SFV15S471K	300	385	423	517	775	75	5	10	280	680	●	●	●	○
SFV15S511K	320	415	459	561	845	75	5	10	300	630	●	●	●	○
SFV15S561K	350	460	504	616	925	75	5	10	310	580	●	●	●	○
SFV15S621K	385	505	558	682	1025	75	5	10	310	530	●	●	●	○
SFV15S681K	420	560	612	748	1120	75	5	10	320	500	●	●	●	○
SFV15S751K	460	615	675	825	1240	75	5	10	335	430	●	●	●	○
SFV15S821K	510	670	738	902	1355	75	5	10	350	400	●	●	●	○

●: Approved ○: Unauthorized ● RoHS & REACH Compliant

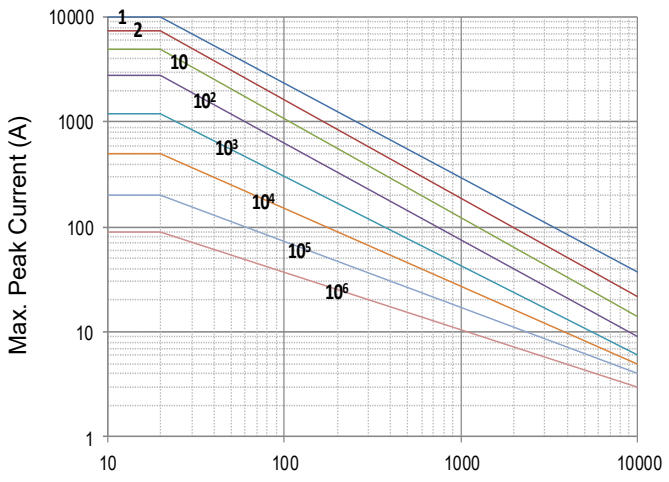
Performance Curve (For reference only)

- Max. Peak Current Derating Curves



Impulse Duration (μs)

SFV15S220K to SFV15S680K

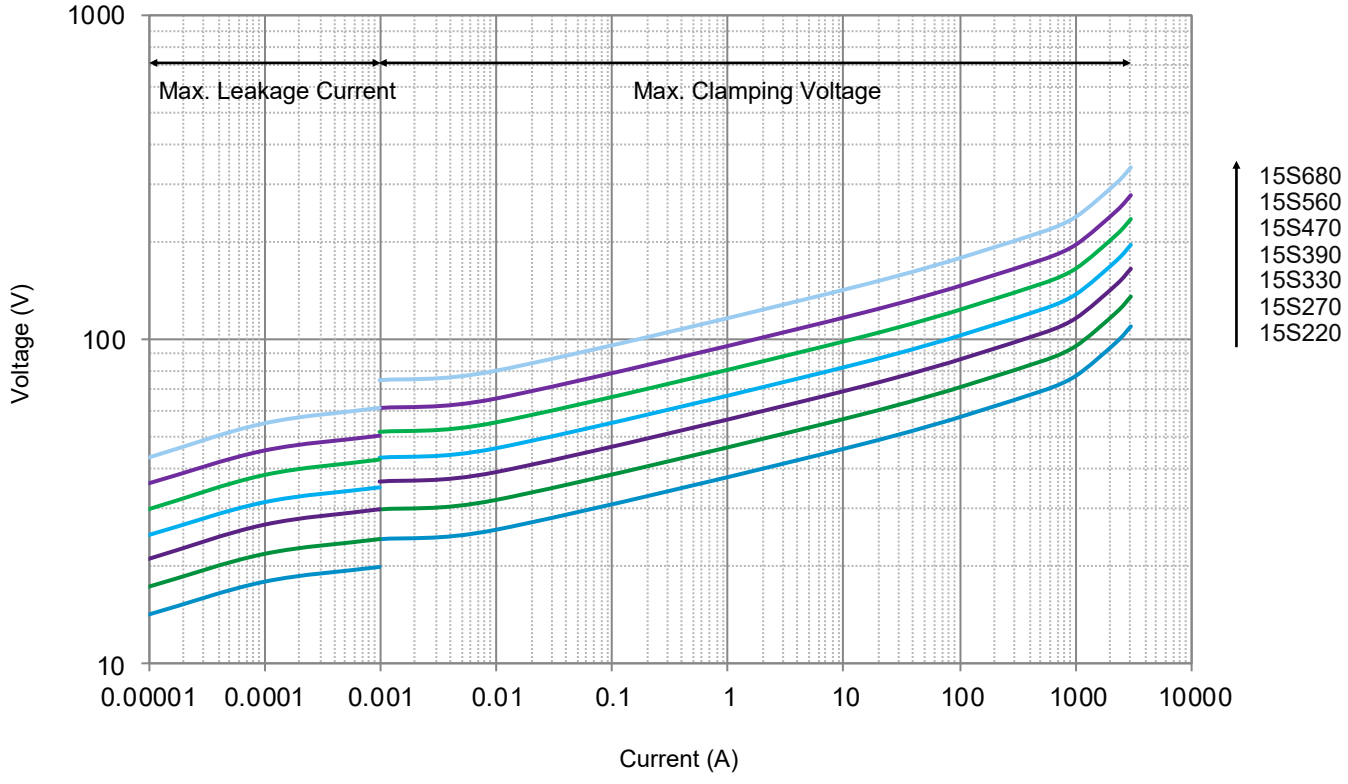


Impulse Duration (μs)

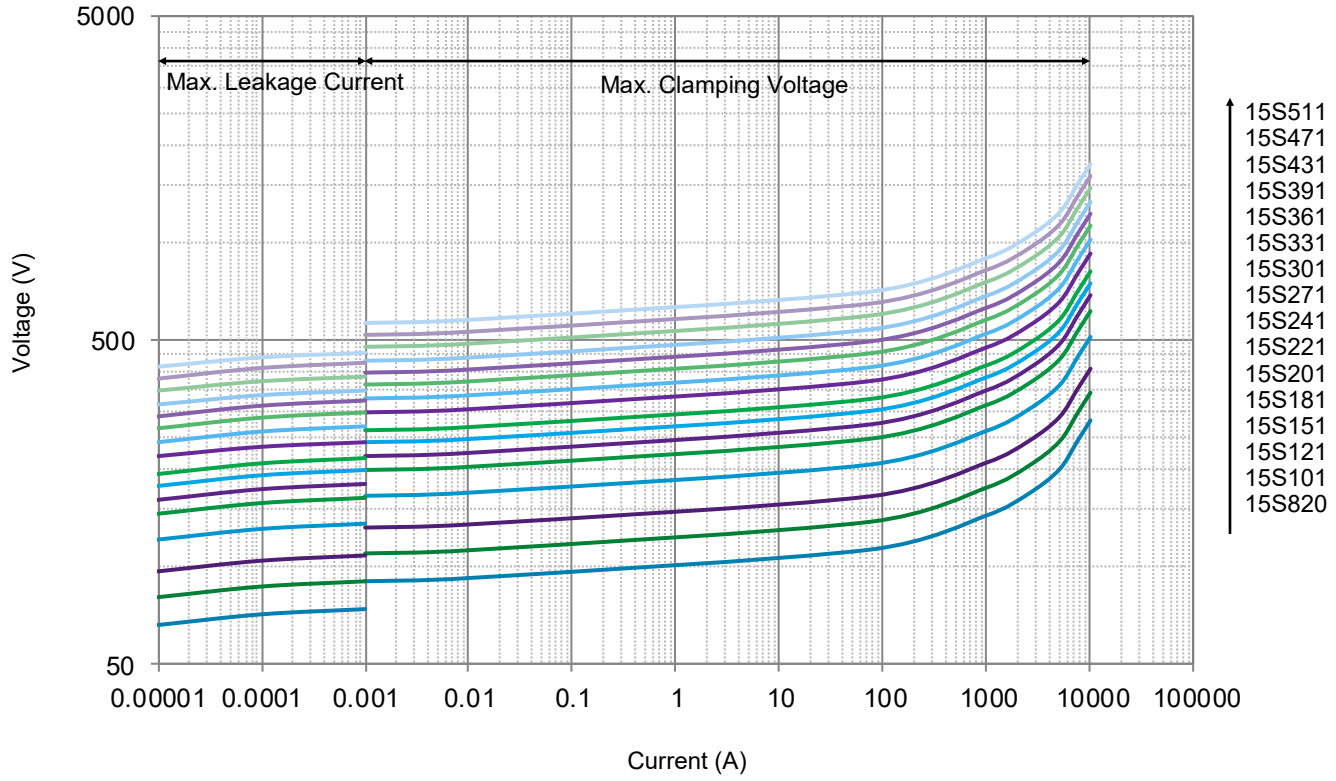
SFV15S820K to SFV15S821K

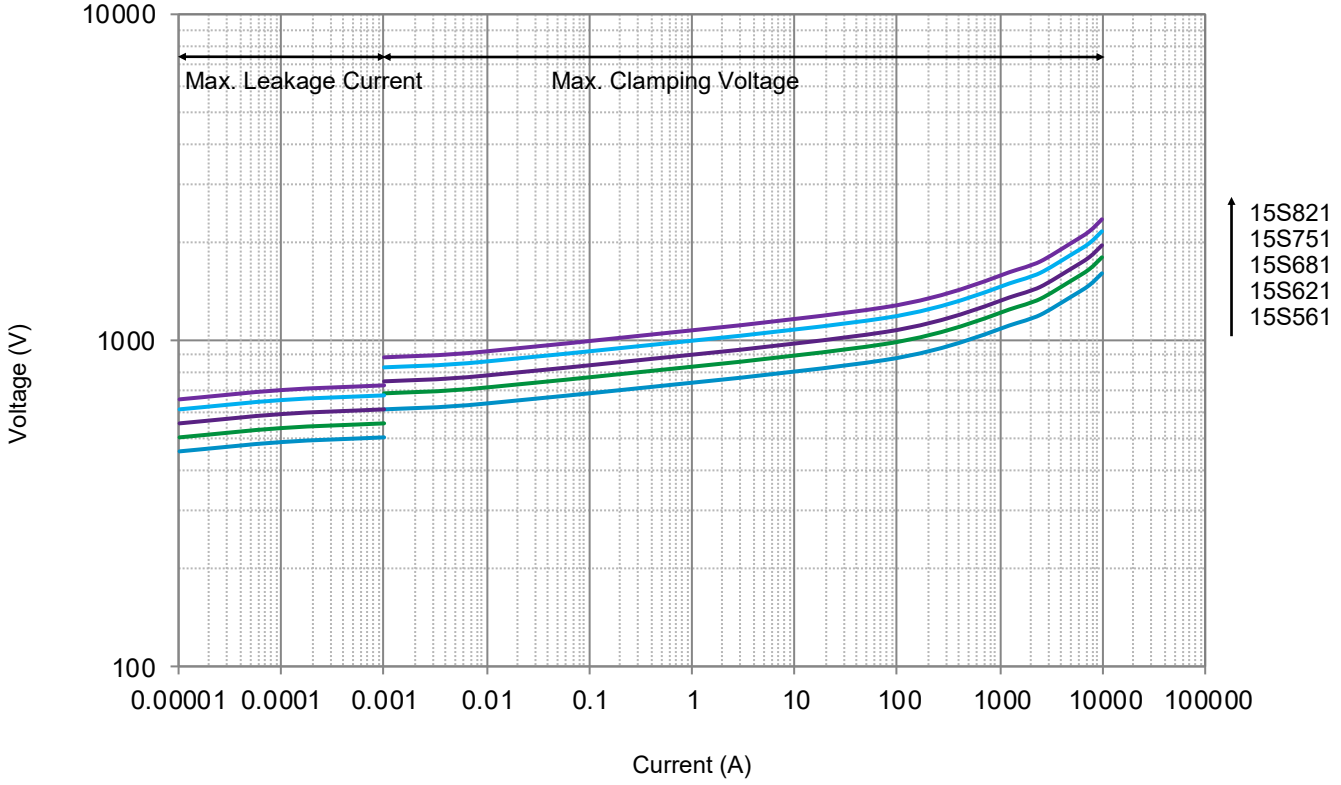
Note: 1, 2, 10, 10^2, 10^3, 10^4, 10^5, 10^6 Stand for Repetitions.

- Voltage-Current Characteristic Curves



- Voltage-Current Characteristic Curves





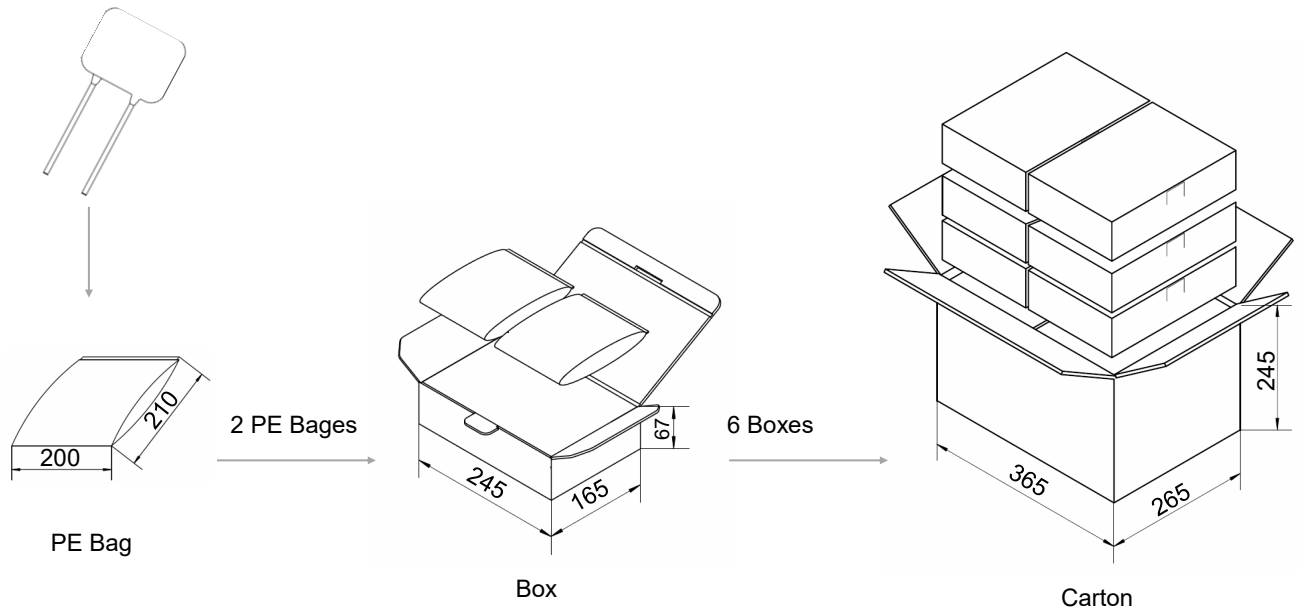
Packaging Information

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

Series	Nominal Varistor Voltage	PE Bag	Box	Carton	G. W / Carton (365 × 265 × 245)
SFV15S Series	(V)	(PCS)	(PCS)	(PCS)	(kg)±10%
	180 ~ 361	200	400	2400	4 ~ 7
	391 ~ 751	150	300	1800	5 ~ 8
	821	100	200	1200	9

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

All Dimensions in mm



Installation

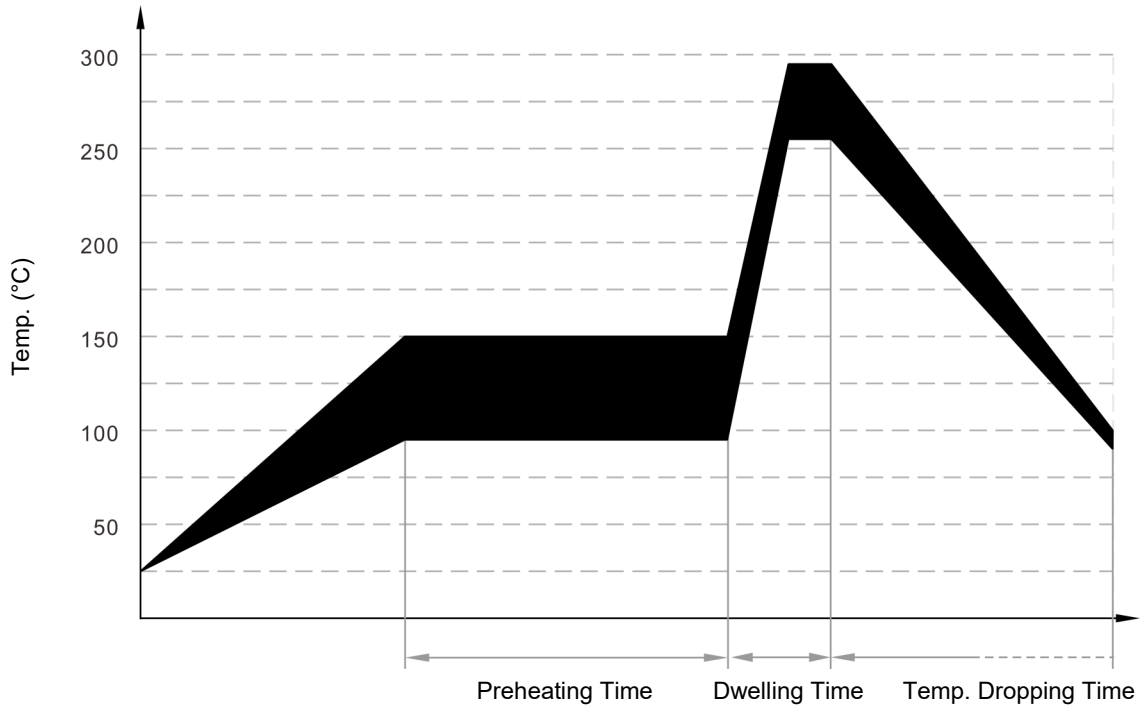
Mechanical Stress

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.)

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)

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.

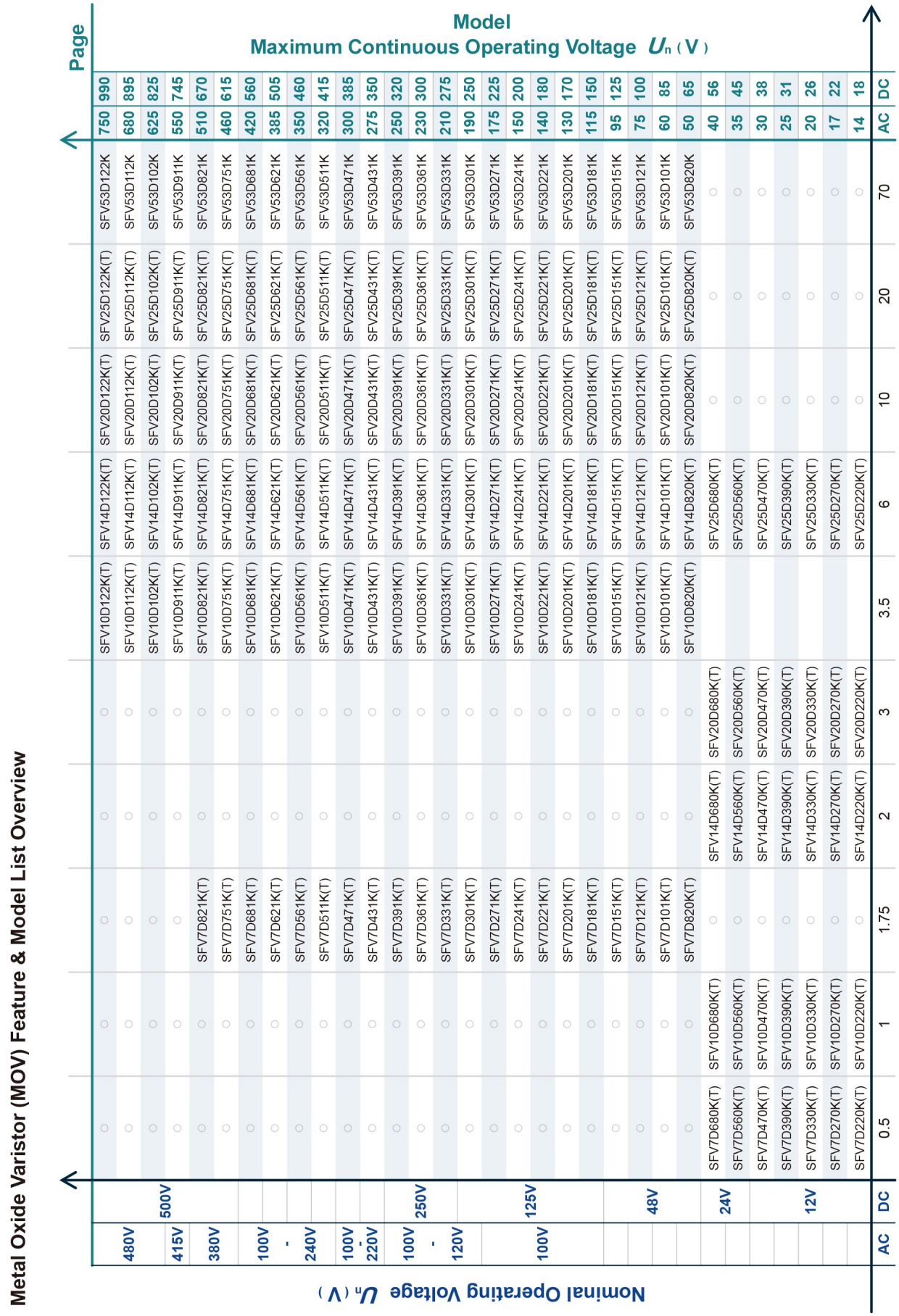
Environmental Conditions

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.

Metal Oxide Varistor (MOV) Feature & Model List Overview



Metal Oxide Varistor (MOV) Feature & Model List Overview

Nominal Operating Voltage U_n (V) AC	Nominal Operating Voltage U_n (V) DC	1.75	3.5	6	10	20	Maximum Continuous Operating Voltage U_n (V) AC	Maximum Continuous Operating Voltage U_n (V) DC
480V	500V	○	SFV10D122KM	SFV14D122KM	SFV20D122KM	SFV25D122KM	750	990
		○	SFV10D112KM	SFV14D112KM	SFV20D112KM	SFV25D112KM	680	895
		○	SFV10D102KM	SFV14D102KM	SFV20D102KM	SFV25D102KM	625	825
415V		○	SFV10D911KM	SFV14D911KM	SFV20D911KM	SFV25D911KM	550	745
380V		SFV7D821KM	SFV10D821KM	SFV14D821KM	SFV20D821KM	SFV25D821KM	510	670
		SFV7D751KM	SFV10D751KM	SFV14D751KM	SFV20D751KM	SFV25D751KM	460	615
100V - 240V		SFV7D681KM	SFV10D681KM	SFV14D681KM	SFV20D681KM	SFV25D681KM	420	560
		SFV7D621KM	SFV10D621KM	SFV14D621KM	SFV20D621KM	SFV25D621KM	385	505
		SFV7D561KM	SFV10D561KM	SFV14D561KM	SFV20D561KM	SFV25D561KM	350	460
		SFV7D511KM	SFV10D511KM	SFV14D511KM	SFV20D511KM	SFV25D511KM	320	415
100V - 220V		SFV7D471KM	SFV10D471KM	SFV14D471KM	SFV20D471KM	SFV25D471KM	300	385
		SFV7D431KM	SFV10D431KM	SFV14D431KM	SFV20D431KM	SFV25D431KM	275	350
100V - 120V	250V	SFV7D391KM	SFV10D391KM	SFV14D391KM	SFV20D391KM	SFV25D391KM	250	320
		SFV7D361KM	SFV10D361KM	SFV14D361KM	SFV20D361KM	SFV25D361KM	230	300
		SFV7D331KM	SFV10D331KM	SFV14D331KM	SFV20D331KM	SFV25D331KM	210	275
		SFV7D301KM	SFV10D301KM	SFV14D301KM	SFV20D301KM	SFV25D301KM	190	250
100V	125V	SFV7D271KM	SFV10D271KM	SFV14D271KM	SFV20D271KM	SFV25D271KM	175	225
		SFV7D241KM	SFV10D241KM	SFV14D241KM	SFV20D241KM	SFV25D241KM	150	200
		SFV7D221KM	SFV10D221KM	SFV14D221KM	SFV20D221KM	SFV25D221KM	140	180
		SFV7D201KM	SFV10D201KM	SFV14D201KM	SFV20D201KM	SFV25D201KM	130	170
		SFV7D181KM	SFV10D181KM	SFV14D181KM	SFV20D181KM	SFV25D181KM	115	150
	48V	SFV7D151KM	SFV10D151KM	SFV14D151KM	SFV20D151KM	SFV25D151KM	95	125
		SFV7D121KM	SFV10D121KM	SFV14D121KM	SFV20D121KM	SFV25D121KM	75	100
		SFV7D101KM	SFV10D101KM	SFV14D101KM	SFV20D101KM	SFV25D101KM	60	85
		SFV7D820KM	SFV10D820KM	SFV14D820KM	SFV20D820KM	SFV25D820KM	50	65
	24V	○	○	SFV25D680KM	○	○	40	56
		○	○	SFV25D560KM	○	○	35	45
	12V	○	○	SFV25D470KM	○	○	30	38
		○	○	○	○	○	25	31
		○	○	○	○	○	20	26
		○	○	○	○	○	17	22
		○	○	○	○	○	14	18

Model — Page

Maximum Peak Current (8/20 μs) (kA)

Metal Oxide Varistor (MOV) Feature & Model List Overview