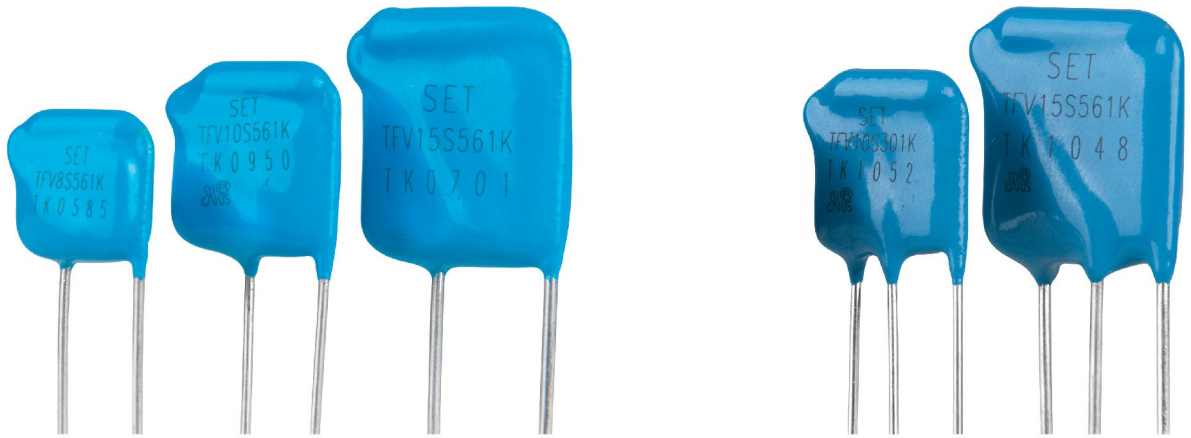
TFV

Thermal Fuse Varistor

- Over-temperature Protection, High Reliability
- Nominal Discharge Current (I_n): 1.5 / 2.5 / 5 kA
- Remote Signal Contact for Failure Indication (Optional)
- Epoxy Sealing Material, Flame-retardant to V0 (UL 94)
- Comply with UL/TUV/CQC

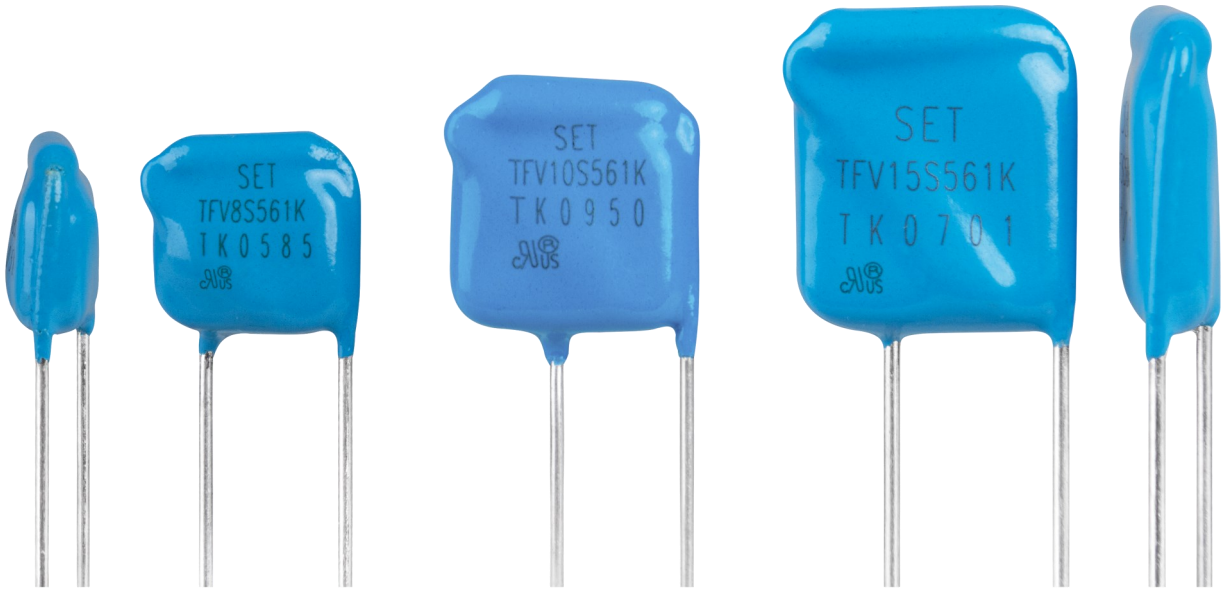


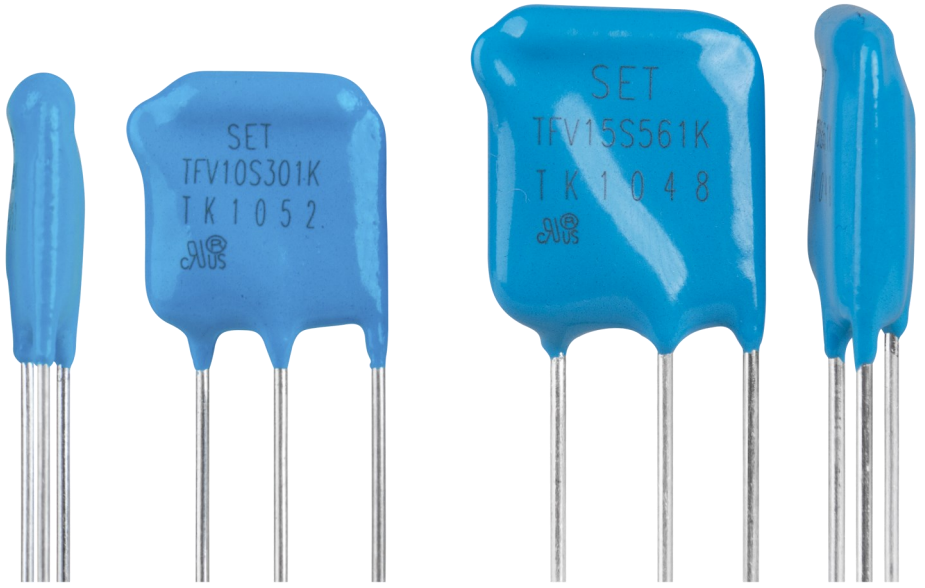
SET*safe* | SET*fuse*

Providing a Total Solution for High Standard Safety Circuit Protection

TFV

Thermal Fuse Varistor





TFV

Feature

- Patented Product
- Thermal Protection Varistor
- Thermal Protection Elements Are Built In To Save Space
- Three-lead Version Available For Indication Purpose
- Low Leakage
- Operating Temp. Range：(-40 °C to 105 °C)
- RoHS & REACH Compliant

Applications

- Power Supplies
- Home Electrical Appliances
- Industrial Devices
- Surge Protectors
- Telecom Devices
- AC Panel Protection Modules
- AC Power Meters
- GFCI (Ground Fault Current Interrupter)
- UPS (Uninterruptable Power Supply)
- Inverters

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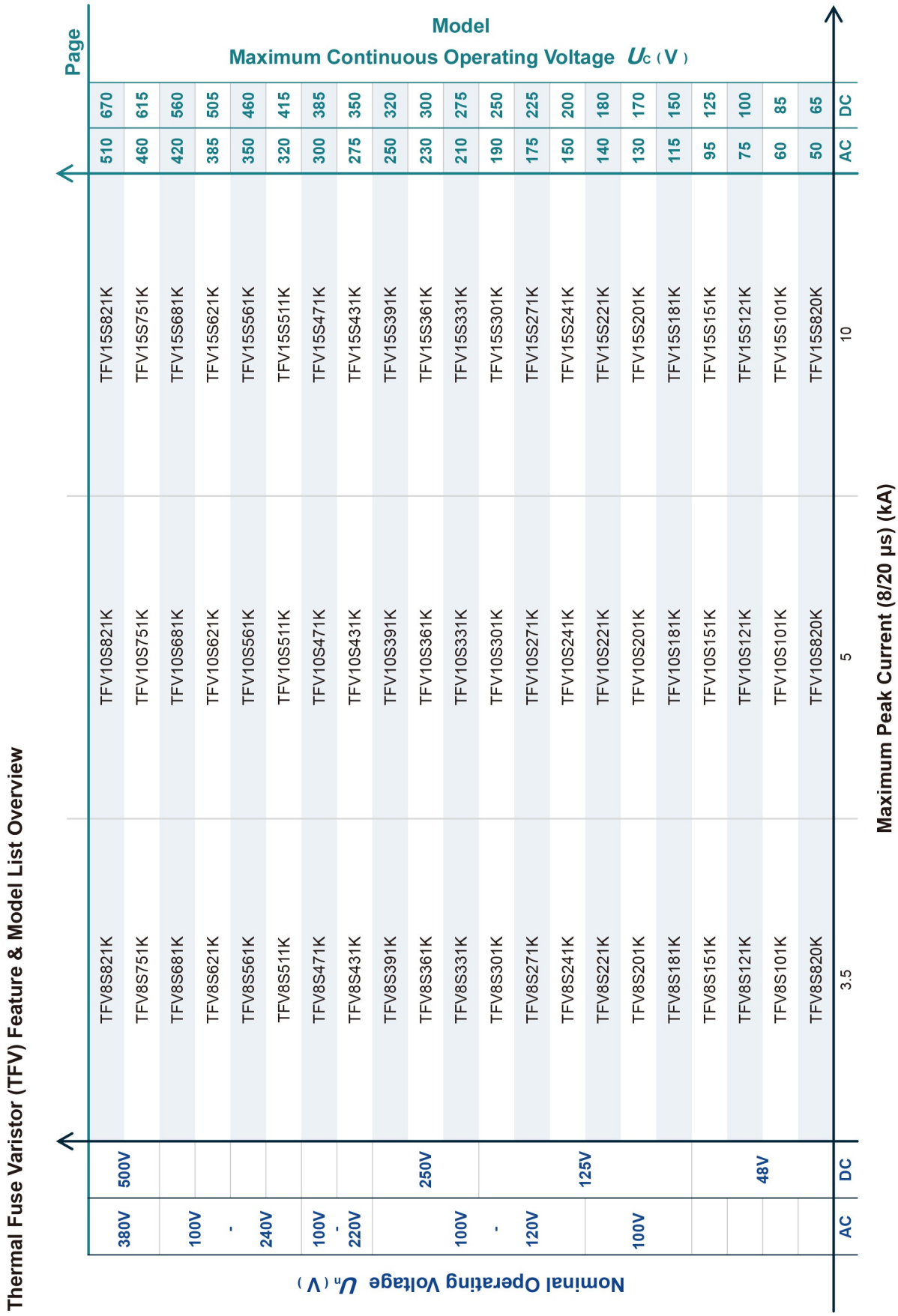
TFV
Thermal Fuse Varistor

Thermal Fuse Varistor (TFV) Feature & Model List Overview



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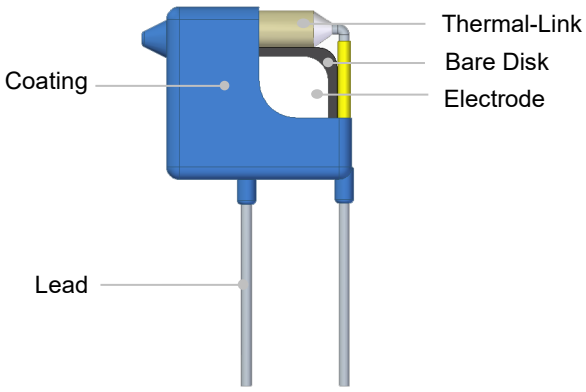
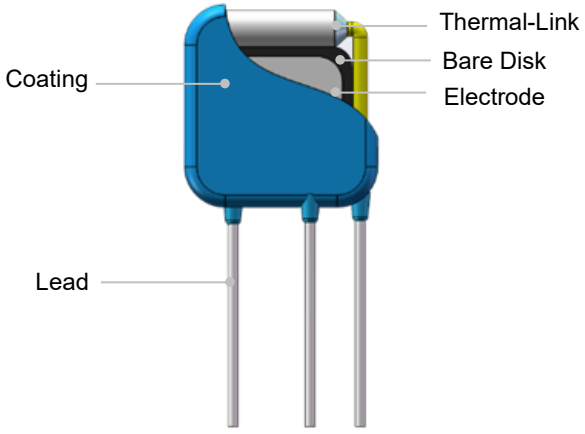
TFV
Thermal Fuse Varistor

Description

TFV series consists of Metal Oxide Varistor&Thermal Protection Element. The built-in thermal protection element can quickly respond to the Overtemperature of the varistor to provide instant protection.The integrated struduce of TFV has lower inductance and better ability to suppress surge and overvoltage .

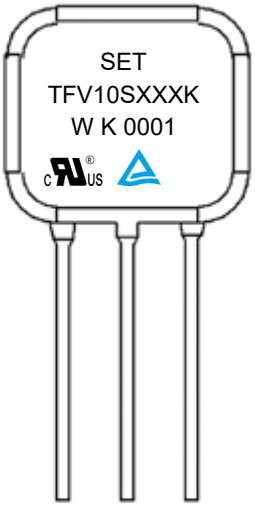
Product Structure

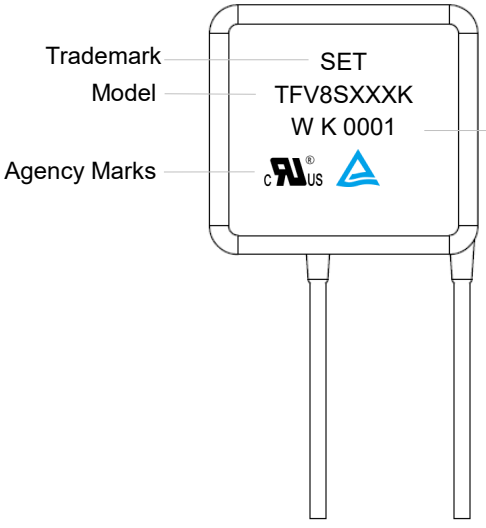




TFV

Marking





Year Code	2000—A …… 2022—W
Surge Level	K: Standard Type
Serial No.	(E.G.: 0001)

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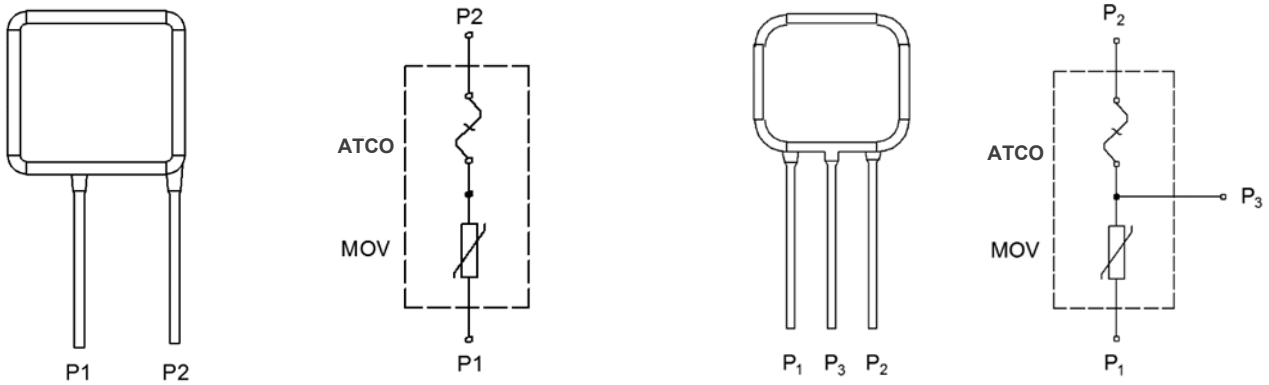
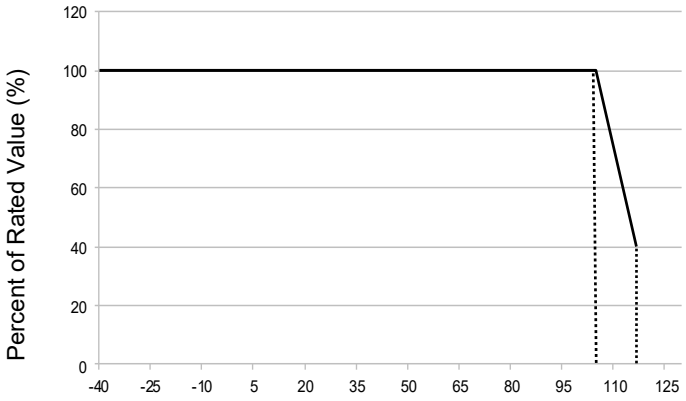
TFV
Thermal Fuse Varistor

Schematics



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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Agency Information	UL				CUL		TUV				CQC			
Category	VZCA2				VZCA8		/				/			
Series	Nominal Varistor Voltage	UCT	Standards	File NO.	Standards	File NO.	Nominal Varistor Voltage	UCT	Standards	File NO.	Nominal Varistor Voltage	UCT	Standards	File NO.
TFV8S	820 - 821	105 °C	UL 1449 4th Edition	E322662	CSA C22.2 No.269.5-17	E322662	820 - 821	105 °C	EN iEC 61051-1:2018 IEC 61051-2:1991+A1 IEC 61051-2-2:1991 Annex G.8.1 of IEC 62368-1:2018	J 50554061	820 - 821	105 °C	GB/T 10193-1997 GB/T 10194-1997 GB 4943.1-2011 GB 8898-2011	On-going
TFV10S	820 - 821	105 °C					820 - 821	105 °C	EN iEC 61051-1:2018 IEC 61051-2:1991+A1 IEC 61051-2-2:1991 Annex G.8.1 of IEC 62368-1:2018	J 50554091	820 - 821	105 °C	GB/T 10193-1997 GB/T 10194-1997 GB 4943.1-2011 GB 8898-2011	On-going
TFV15S	820 - 821	105 °C					820 - 821	105 °C	EN iEC 61051-1:2018 IEC 61051-2:1991+A1 IEC 61051-2-2:1991 Annex G.8.1 of IEC 62368-1:2018	J 50554143	820 - 821	105 °C	GB/T 10193-1997 GB/T 10194-1997 GB 4943.1-2011 GB 8898-2011	On-going

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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.
I_L	**Leakage Current** Current passing through the varistor at the max. d.c. voltage, and at a temp. of 25 °C, or any other specified temp.
UCT	**Upper Category Temp.** Max. ambient temp. for which a varistor has been designed to operate continuously.
LCT	**Lower Category Temp.** Minimum ambient temp. at which a varistor has been designed to operate continuously.
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.
V_C	**Clamping Voltage** Peak voltage developed across the varistor terminations under standard atmospheric conditions, when passing an 8/20 μs class current pulse.
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).
C_V	**Capacitance** Capacitance across the MOV measured at a specified frequency and voltage.
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.
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.
I_n	**Nominal Discharge Current** Crest value of the current through the SPD having a current waveshape of 8/20 μs.
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.
Limited Current	**Limited Current** UL 1449
T_f	**Rated function Temp.** The Temp. of the TCO which causes it to change its state of conductivity with a detection current up to 10 mA as the only load.
Fuse Temp.	**Fuse Temp.** IEC 60691
T_h	**Holding Temp.** The Max. temp. of product body surface at which a TCO will not change its state of conductivity when conducting rated current for 168 h.
U_r	**Rated Voltage** The voltage used to classify a TCO, which is the maximum voltage that TCO allows to carry and is able to cut off the circuit safely.

TFV

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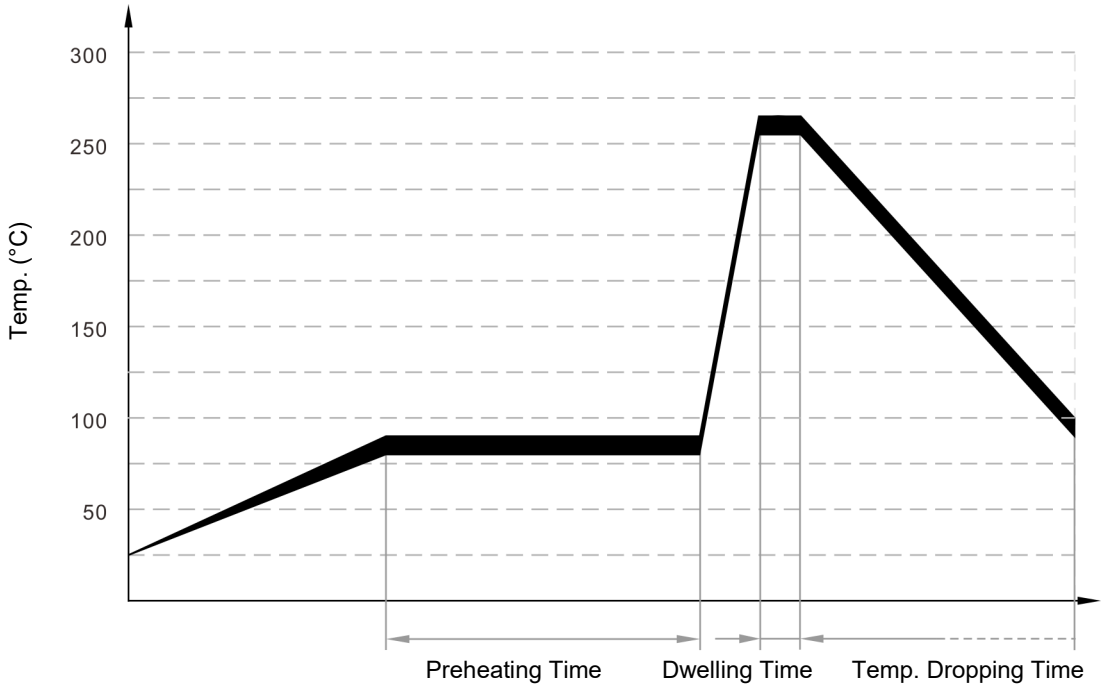
Soldering Parameters

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	80 to 90	60 to 150
Dwelling	260 ± 5	2 to 4
Cooling Time	≤ 80	10

Recommended Hand-Soldering Parameters

Item	Condition
Temp. of Solder Head	350 °C (max.)
Soldering Time	2 seconds (max.)
Distance between Soldering Point and Coating	2 mm (min.)

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Attention

Usage

1. Please do not apply severe vibration, shock or pressure to avoid surface resin or element cracking.
2. Please fix lead wires when bending or cutting. The distance between the bending point and the sealing of MOV shall be greater than 2mm.
3. In order to reduce the surface temperature rise, adding heat insulated shroud is recommended before wave soldering.
4. This curve is for reference only. Please confirm before production to avoid damaging the integrated Thermal Fuse.

Replacement

1. If varistor is visually damaged, please replace it.
2. Varistor is a non-repairable product. For safety sake, please use equivalent varistor for replacement.

Storage

1. Storage Temp. Range: (-40 to +125) °C
2. Relative Humidity : ≤75% RH
3. 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 not 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.

Installation

Mechanical Stress

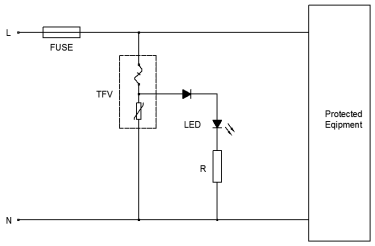
Do not knock MOV when installing, to avoid mechanical damage.

Please do not apply severe vibration, shock or pressure to MOV, to avoid surface resin or element cracking.

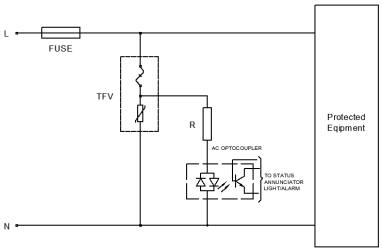
Application Examples

The application examples below show how the indicator lead on the TFV can be used to indicate that the thermal element has been opened. This signifies that the circuit is no longer protected from transients by the MOV.

1. In this case, the LED is normally on, and is off when the thermal element opens.



2. This circuit utilizes an optocoupler to provide galvanic isolations between the TFV varistor and the indicating or alarm circuitry.



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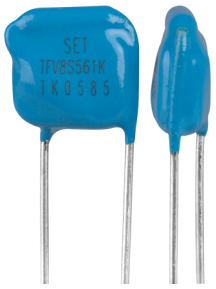
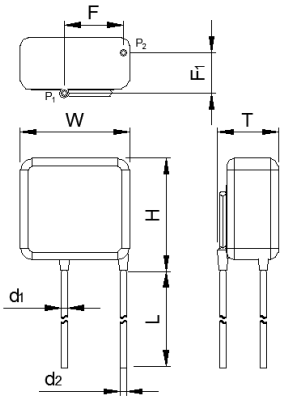
Dimensions (mm)





Model	L (Min.)	W (Max.)	H (Max.)	T (Max.)	d_1	d_2	F	F_1
TFV8S820K	15	15.5	16.5	4.4	0.80±0.05	0.80±0.05	7.5±1.0	0.2 - 2.2
TFV8S101K	15	15.5	16.5	4.6	0.80±0.05	0.80±0.05	7.5±1.0	0.3 - 2.3
TFV8S121K	15	15.5	16.5	4.8	0.80±0.05	0.80±0.05	7.5±1.0	0.4 - 2.4
TFV8S151K	15	15.5	16.5	5.1	0.80±0.05	0.80±0.05	7.5±1.0	0.6 - 2.6
TFV8S181K	15	15.5	16.5	4.5	0.80±0.05	0.80±0.05	7.5±1.0	0.3 - 2.3
TFV8S201K	15	15.5	16.5	4.6	0.80±0.05	0.80±0.05	7.5±1.0	0.4 - 2.4
TFV8S221K	15	15.5	16.5	4.7	0.80±0.05	0.80±0.05	7.5±1.0	0.4 - 2.4
TFV8S241K	15	15.5	16.5	4.8	0.80±0.05	0.80±0.05	7.5±1.0	0.5 - 2.5
TFV8S271K	15	15.5	16.5	5.0	0.80±0.05	0.80±0.05	7.5±1.0	0.6 - 2.6
TFV8S301K	15	15.5	16.5	5.2	0.80±0.05	0.80±0.05	7.5±1.0	0.6 - 2.6
TFV8S331K	15	15.5	16.5	5.4	0.80±0.05	0.80±0.05	7.5±1.0	0.7 - 2.7
TFV8S361K	15	15.5	16.5	5.6	0.80±0.05	0.80±0.05	7.5±1.0	0.8 - 2.8
TFV8S391K	15	15.5	16.5	5.7	0.80±0.05	0.80±0.05	7.5±1.0	0.9 - 2.9
TFV8S431K	15	15.5	16.5	6.0	0.80±0.05	0.80±0.05	7.5±1.0	1.0 - 3.0
TFV8S471K	15	15.5	16.5	6.2	0.80±0.05	0.80±0.05	7.5±1.0	1.1 - 3.1
TFV8S511K	15	15.5	16.5	6.4	0.80±0.05	0.80±0.05	7.5±1.0	1.2 - 3.2
TFV8S561K	15	15.5	16.5	6.7	0.80±0.05	0.80±0.05	7.5±1.0	1.4 - 3.4
TFV8S621K	15	15.5	16.5	7.1	0.80±0.05	0.80±0.05	7.5±1.0	1.5 - 3.5
TFV8S681K	15	15.5	16.5	7.4	0.80±0.05	0.80±0.05	7.5±1.0	1.7 - 3.7
TFV8S751K	15	15.5	16.5	7.9	0.80±0.05	0.80±0.05	7.5±1.0	1.6 - 3.9
TFV8S821K	15	15.5	16.5	8.3	0.80±0.05	0.80±0.05	7.5±1.0	2.1 - 4.1

Note:
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Part Numbering System

TFV 8 S 471 - K 3 P K A BUL - 001

Other Options

***Packaging & Lead Length**
BUL: Bulk + Standard Lead Length (Normal L28)

Lead Type
A: Straight Lead

Surge Level
K: Standard Type

Operating Temp.
P: Epoxy Coating 105 °C

Lead
2: 2 PIN
3: 3 PIN

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
8: 8×10 mm

Product Category
Metal Oxide Varistor

*For more details refer to Packaging Information.

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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 Approvals			
	Vac	Vdc	Min.	Max.	V_C	I_P	I_n	I_{max}	(J)	(pF)				
	(V)	(V)	(V)	(V)	(V)	(A)	(kA)	(kA)			UL	cUL	TUV	CQC
TFV8S820K	50	65	74	90	135	25	1.5	3.5	14	1200	●	●	●	○
TFV8S101K	60	85	90	110	165	25	1.5	3.5	17	1000	●	●	●	○
TFV8S121K	75	100	108	132	200	25	1.5	3.5	20	830	●	●	●	○
TFV8S151K	95	125	135	165	250	25	1.5	3.5	25	670	●	●	●	○
TFV8S181K	115	150	162	198	300	25	1.5	3.5	30	560	●	●	●	○
TFV8S201K	130	170	180	220	340	25	1.5	3.5	35	500	●	●	●	○
TFV8S221K	140	180	198	242	360	25	1.5	3.5	39	450	●	●	●	○
TFV8S241K	150	200	216	264	395	25	1.5	3.5	42	420	●	●	●	○
TFV8S271K	175	225	243	297	455	25	1.5	3.5	49	370	●	●	●	○
TFV8S301K	190	250	270	330	500	25	1.5	3.5	54	330	●	●	●	○
TFV8S331K	210	275	297	363	550	25	1.5	3.5	58	300	●	●	●	○
TFV8S361K	230	300	324	396	595	25	1.5	3.5	65	280	●	●	●	○
TFV8S391K	250	320	351	429	650	25	1.5	3.5	70	260	●	●	●	○
TFV8S431K	275	350	387	473	710	25	1.5	3.5	80	230	●	●	●	○
TFV8S471K	300	385	423	517	775	25	1.5	3.5	85	210	●	●	●	○
TFV8S511K	320	415	459	561	845	25	1.5	3.5	90	200	●	●	●	○
TFV8S561K	350	460	504	616	925	25	1.5	3.5	92	180	●	●	●	○
TFV8S621K	385	505	558	682	1025	25	1.5	3.5	95	160	●	●	●	○
TFV8S681K	420	560	612	748	1120	25	1.5	3.5	98	150	●	●	●	○
TFV8S751K	460	615	675	825	1240	25	1.5	3.5	100	130	●	●	●	○
TFV8S821K	510	670	738	902	1355	25	1.5	3.5	110	120	●	●	●	○

●: Approved ○: Unauthorized

TFV

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Specification

Model	Limited Current	Rated Function Temp.	Fuse Temp.	Holding Temp.	Rated Voltage	
	(A)	T_f (°C)	(°C)	T_h (°C)	AC (V)	DC (V)
TFV8S820K	5	145	140±2	121	250	50
TFV8S101K	5	145	140±2	121	250	50
TFV8S121K	5	145	140±2	121	250	50
TFV8S151K	5	145	140±2	121	250	50
TFV8S181K	5	145	140±2	121	250	50
TFV8S201K	5	145	140±2	121	250	50
TFV8S221K	5	145	140±2	121	250	50
TFV8S241K	5	145	140±2	121	250	50
TFV8S271K	5	145	140±2	121	250	50
TFV8S301K	5	145	140±2	121	250	50
TFV8S331K	5	145	140±2	121	250	50
TFV8S361K	5	145	140±2	121	250	50
TFV8S391K	5	145	140±2	121	250	50
TFV8S431K	5	145	140±2	121	250	50
TFV8S471K	5	145	140±2	121	250	50
TFV8S511K	5	145	140±2	121	250	50
TFV8S561K	5	145	140±2	121	250	50
TFV8S621K	5	145	140±2	121	250	50
TFV8S681K	5	145	140±2	121	250	50
TFV8S751K	5	145	140±2	121	250	50
TFV8S821K	5	145	140±2	121	250	50

Note:
The above data is for reference only.

TFV

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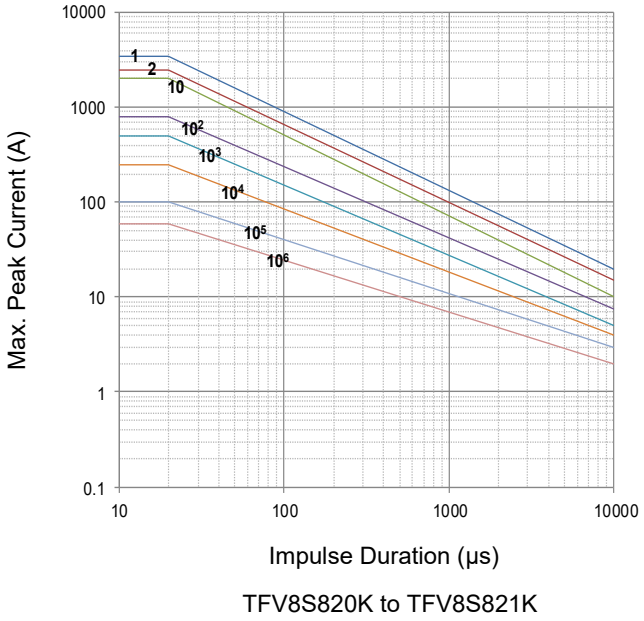
Performance Curve (For reference only)

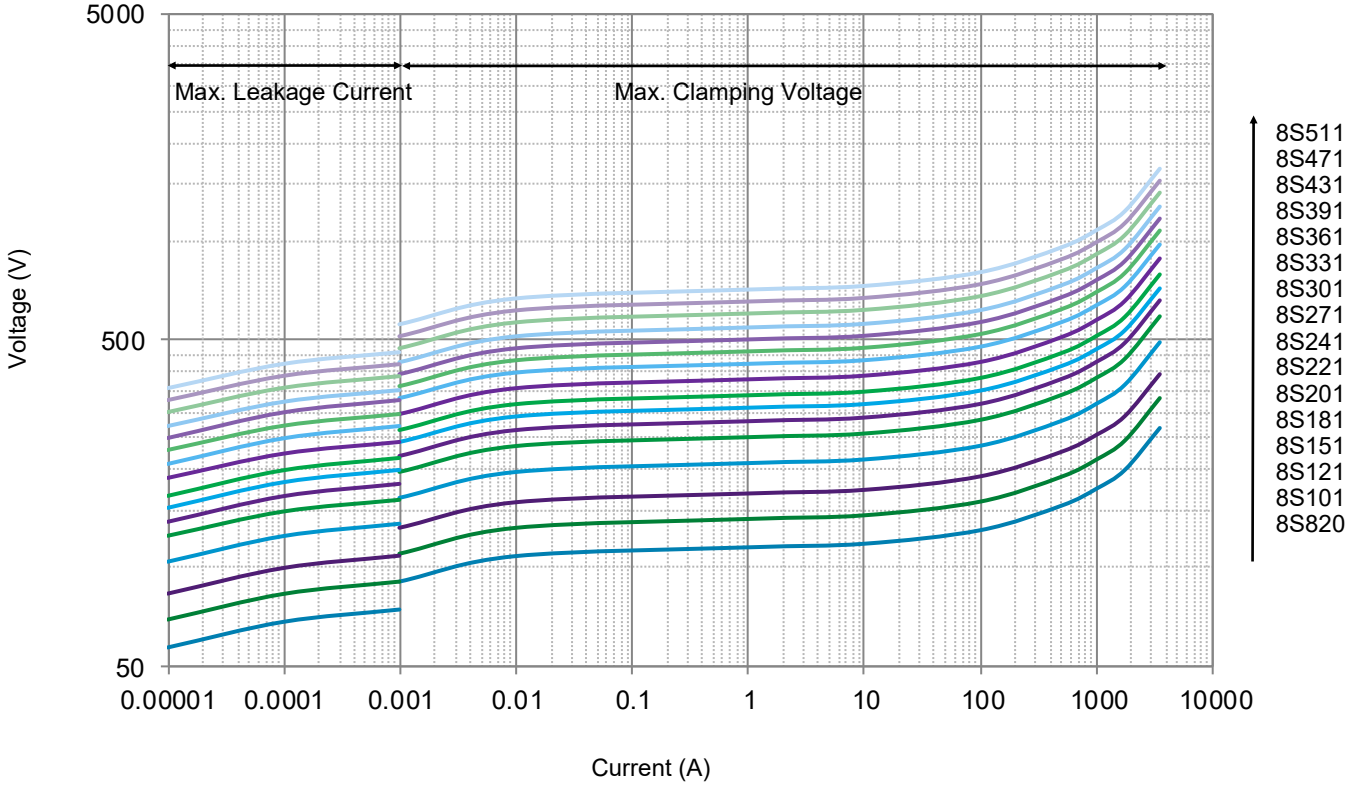
- Max. Peak Current Derating Curves



TFV8S820K to TFV8S821K

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

- Voltage-Current Characteristic Curves



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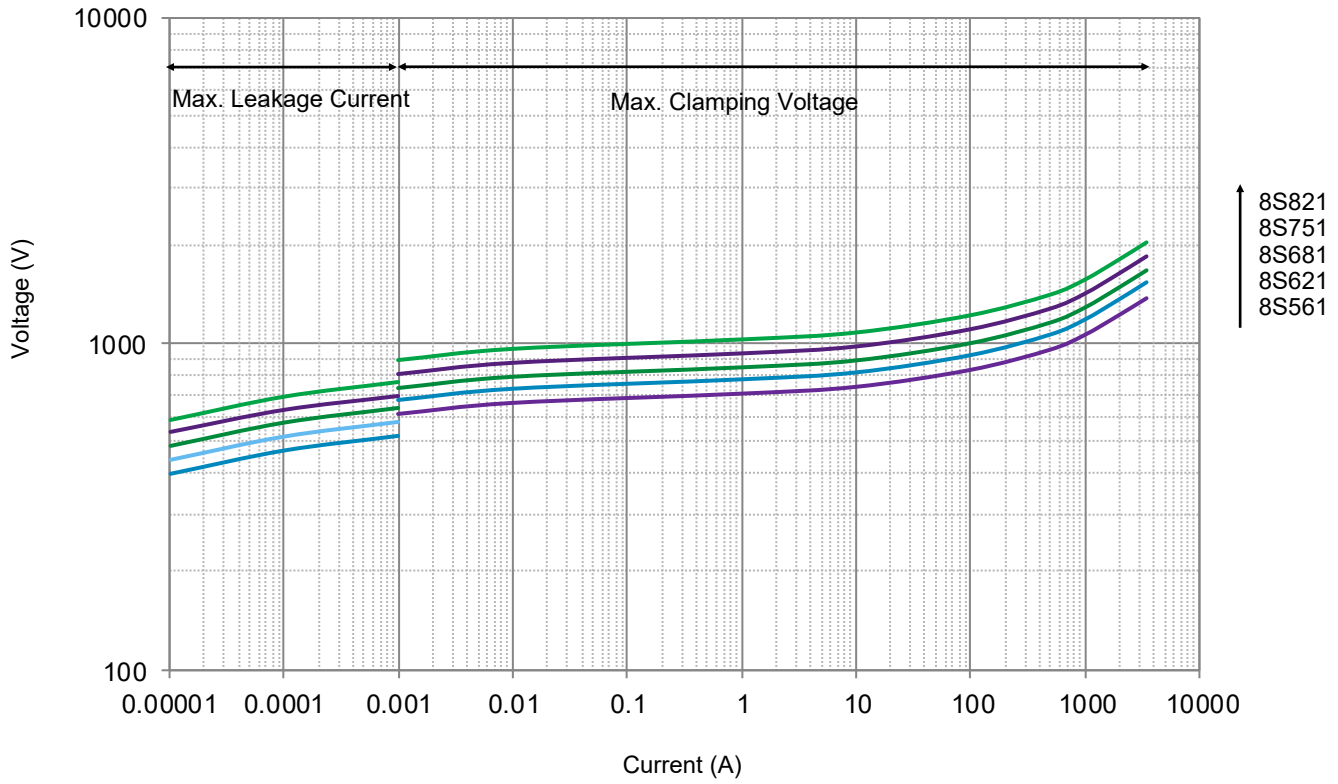
- Voltage-Current Characteristic Curves



TFV

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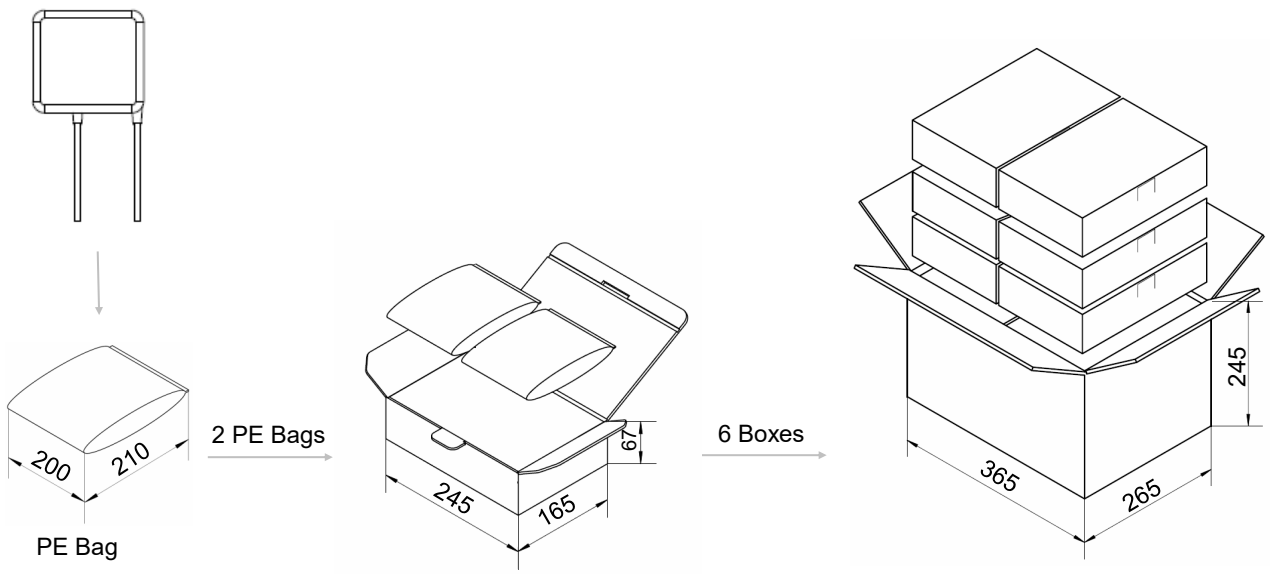
Packaging Information

- Bulk Packaging (Code: BUL)
- Bulk Packaging Dimensions & Quantity

Series	Nominal Varistor Voltage	PE Bag	Box	Carton	Gross Weight / Carton
	(V)	(PCS)	(PCS)	(PCS)	(kg)±10%
8S	820 - 561	400	800	4800	8 - 14
	621 - 821	250	500	3000	11 - 14

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

All Dimensions in mm



PE Bag

Box

Carton

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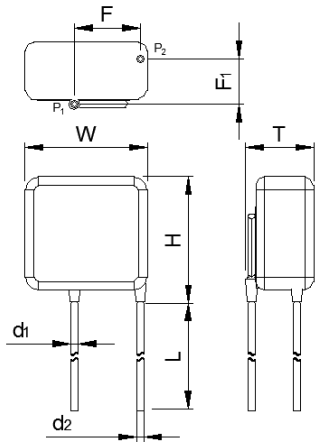
Dimensions (mm)



Model	L (Min.)	W (Max.)	H (Max.)	T (Max.)	d_1	d_2	F	F_1
TFV10S820K	15	16.5	18	4.4	0.80±0.05	0.80±0.05	7.5±1.0	0.2 - 2.2
TFV10S101K	15	16.5	18	4.6	0.80±0.05	0.80±0.05	7.5±1.0	0.3 - 2.3
TFV10S121K	15	16.5	18	4.8	0.80±0.05	0.80±0.05	7.5±1.0	0.4 - 2.4
TFV10S151K	15	16.5	18	5.1	0.80±0.05	0.80±0.05	7.5±1.0	0.6 - 2.6
TFV10S181K	15	16.5	18	4.5	0.80±0.05	0.80±0.05	7.5±1.0	0.3 - 2.3
TFV10S201K	15	16.5	18	4.6	0.80±0.05	0.80±0.05	7.5±1.0	0.4 - 2.4
TFV10S221K	15	16.5	18	4.7	0.80±0.05	0.80±0.05	7.5±1.0	0.4 - 2.4
TFV10S241K	15	16.5	18	4.8	0.80±0.05	0.80±0.05	7.5±1.0	0.5 - 2.5
TFV10S271K	15	16.5	18	5.0	0.80±0.05	0.80±0.05	7.5±1.0	0.6 - 2.6
TFV10S301K	15	16.5	18	5.2	0.80±0.05	0.80±0.05	7.5±1.0	0.6 - 2.6
TFV10S331K	15	16.5	18	5.4	0.80±0.05	0.80±0.05	7.5±1.0	0.7 - 2.7
TFV10S361K	15	16.5	18	5.6	0.80±0.05	0.80±0.05	7.5±1.0	0.8 - 2.8
TFV10S391K	15	16.5	18	5.7	0.80±0.05	0.80±0.05	7.5±1.0	0.9 - 2.9
TFV10S431K	15	16.5	18	6.0	0.80±0.05	0.80±0.05	7.5±1.0	1.0 - 3.0
TFV10S471K	15	16.5	18	6.2	0.80±0.05	0.80±0.05	7.5±1.0	1.1 - 3.1
TFV10S511K	15	16.5	18	6.4	0.80±0.05	0.80±0.05	7.5±1.0	1.2 - 3.2
TFV10S561K	15	16.5	18	6.7	0.80±0.05	0.80±0.05	7.5±1.0	1.4 - 3.4
TFV10S621K	15	16.5	18	7.1	0.80±0.05	0.80±0.05	7.5±1.0	1.5 - 3.5
TFV10S681K	15	16.5	18	7.4	0.80±0.05	0.80±0.05	7.5±1.0	1.7 - 3.7
TFV10S751K	15	16.5	18	7.9	0.80±0.05	0.80±0.05	7.5±1.0	1.6 - 3.9
TFV10S821K	15	16.5	18	8.3	0.80±0.05	0.80±0.05	7.5±1.0	2.1 - 4.1

Note:
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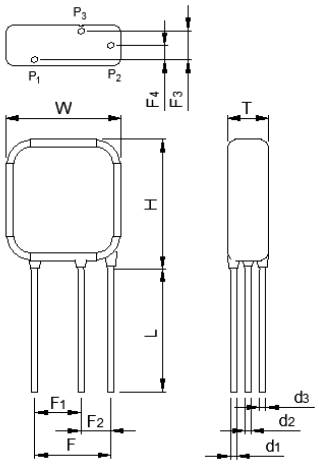
Dimensions (mm)



Model	L (Min.)	W (Max.)	H (Max.)	T (Max.)	d_1	d_2	d_3	F	F_1	F_2	F_3	F_4
TFV10S820	15	16.5	18	4.4	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	1.2 - 2.6	0.2 - 2.2
TFV10S101	15	16.5	18	4.6	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	1.3 - 2.8	0.3 - 2.3
TFV10S121	15	16.5	18	4.8	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	1.4 - 3.0	0.4 - 2.4
TFV10S151	15	16.5	18	5.1	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	1.5 - 3.3	0.6 - 2.6
TFV10S181	15	16.5	18	4.5	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	1.3 - 2.8	0.3 - 2.3
TFV10S201	15	16.5	18	4.6	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	1.4 - 2.9	0.4 - 2.4
TFV10S221	15	16.5	18	4.7	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	1.5 - 3.0	0.4 - 2.4
TFV10S241	15	16.5	18	4.8	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	1.6 - 3.1	0.5 - 2.5
TFV10S271	15	16.5	18	5.0	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	1.7 - 3.3	0.6 - 2.6
TFV10S301	15	16.5	18	5.2	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	1.8 - 3.5	0.6 - 2.6
TFV10S331	15	16.5	18	5.4	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	1.9 - 3.6	0.7 - 2.7
TFV10S361	15	16.5	18	5.6	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	2.0 - 3.8	0.8 - 2.8
TFV10S391	15	16.5	18	5.7	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	2.0 - 4.0	0.9 - 2.9
TFV10S431	15	16.5	18	6.0	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	2.2 - 4.2	1.0 - 3.0
TFV10S471	15	16.5	18	6.2	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	2.4 - 4.4	1.1 - 3.1
TFV10S511	15	16.5	18	6.4	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	2.6 - 4.6	1.2 - 3.2
TFV10S561	15	16.5	18	6.7	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	2.9 - 4.9	1.4 - 3.4
TFV10S621	15	16.5	18	7.1	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	3.2 - 5.2	1.5 - 3.5
TFV10S681	15	16.5	18	7.4	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	3.6 - 5.6	1.7 - 3.7
TFV10S751	15	16.5	18	7.9	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	4.0 - 6.0	1.6 - 3.9
TFV10S821	15	16.5	18	8.3	0.80±0.05	0.80±0.05	0.80±0.05	10.0±1.0	5.0±1.0	5.0±1.0	4.4 - 6.4	2.1 - 4.1

Note:
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Part Numbering System

TFV 10 S 471 - K 3 P K A BUL - 001

Other Options

***Packaging & Lead Length**
BUL: Bulk + Standard Lead Length (Normal L28)

Lead Type
A: Straight Lead

Surge Level
K: Standard Type

Operating Temp.
P: Epoxy Coating 105 °C

Lead
2: 2 PIN
3: 3 PIN

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
10: 10×12 mm

Product Category
Metal Oxide Varistor

*For more details refer to Packaging Information.

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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 Approvals			
	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)						
TFV10S820K	50	65	74	90	135	50	2.5	5	27	2400	●	●	●	○
TFV10S101K	60	85	90	110	165	50	2.5	5	33	2000	●	●	●	○
TFV10S121K	75	100	108	132	200	50	2.5	5	40	1700	●	●	●	○
TFV10S151K	95	125	135	165	250	50	2.5	5	53	1300	●	●	●	○
TFV10S181K	115	150	162	198	300	50	2.5	5	60	1100	●	●	●	○
TFV10S201K	130	170	180	220	340	50	2.5	5	70	1000	●	●	●	○
TFV10S221K	140	180	198	242	360	50	2.5	5	78	900	●	●	●	○
TFV10S241K	150	200	216	264	395	50	2.5	5	84	830	●	●	●	○
TFV10S271K	175	225	243	297	455	50	2.5	5	99	740	●	●	●	○
TFV10S301K	190	250	270	330	500	50	2.5	5	108	670	●	●	●	○
TFV10S331K	210	275	297	363	550	50	2.5	5	115	610	●	●	●	○
TFV10S361K	230	300	324	396	595	50	2.5	5	130	560	●	●	●	○
TFV10S391K	250	320	351	429	650	50	2.5	5	140	510	●	●	●	○
TFV10S431K	275	350	387	473	710	50	2.5	5	155	460	●	●	●	○
TFV10S471K	300	385	423	517	775	50	2.5	5	175	430	●	●	●	○
TFV10S511K	320	415	459	561	845	50	2.5	5	180	390	●	●	●	○
TFV10S561K	350	460	504	616	925	50	2.5	5	185	360	●	●	●	○
TFV10S621K	385	505	558	682	1025	50	2.5	5	190	320	●	●	●	○
TFV10S681K	420	560	612	748	1120	50	2.5	5	200	290	●	●	●	○
TFV10S751K	460	615	675	825	1240	50	2.5	5	210	270	●	●	●	○
TFV10S821K	510	670	738	902	1355	50	2.5	5	220	260	●	●	●	○

●: Approved ○: Unauthorized

TFV

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Specification

Model	Limited Current	Rated Function Temp.	Fuse Temp.	Holding Temp.	Rated Voltage	
	(A)	T_f (°C)	(°C)	T_h (°C)	AC (V)	DC (V)
TFV10S820K	5	145	140±2	121	250	50
TFV10S101K	5	145	140±2	121	250	50
TFV10S121K	5	145	140±2	121	250	50
TFV10S151K	5	145	140±2	121	250	50
TFV10S181K	5	145	140±2	121	250	50
TFV10S201K	5	145	140±2	121	250	50
TFV10S221K	5	145	140±2	121	250	50
TFV10S241K	5	145	140±2	121	250	50
TFV10S271K	5	145	140±2	121	250	50
TFV10S301K	5	145	140±2	121	250	50
TFV10S331K	5	145	140±2	121	250	50
TFV10S361K	5	145	140±2	121	250	50
TFV10S391K	5	145	140±2	121	250	50
TFV10S431K	5	145	140±2	121	250	50
TFV10S471K	5	145	140±2	121	250	50
TFV10S511K	5	145	140±2	121	250	50
TFV10S561K	5	145	140±2	121	250	50
TFV10S621K	5	145	140±2	121	250	50
TFV10S681K	5	145	140±2	121	250	50
TFV10S751K	5	145	140±2	121	250	50
TFV10S821K	5	145	140±2	121	250	50

TFV

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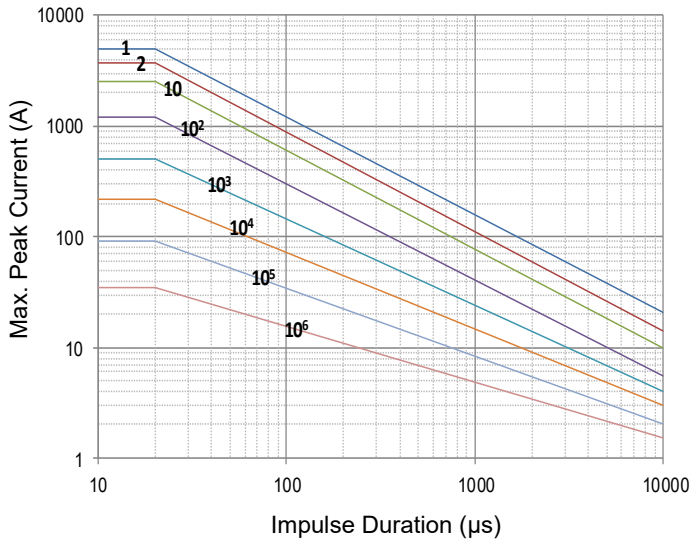
Performance Curve (For reference only)

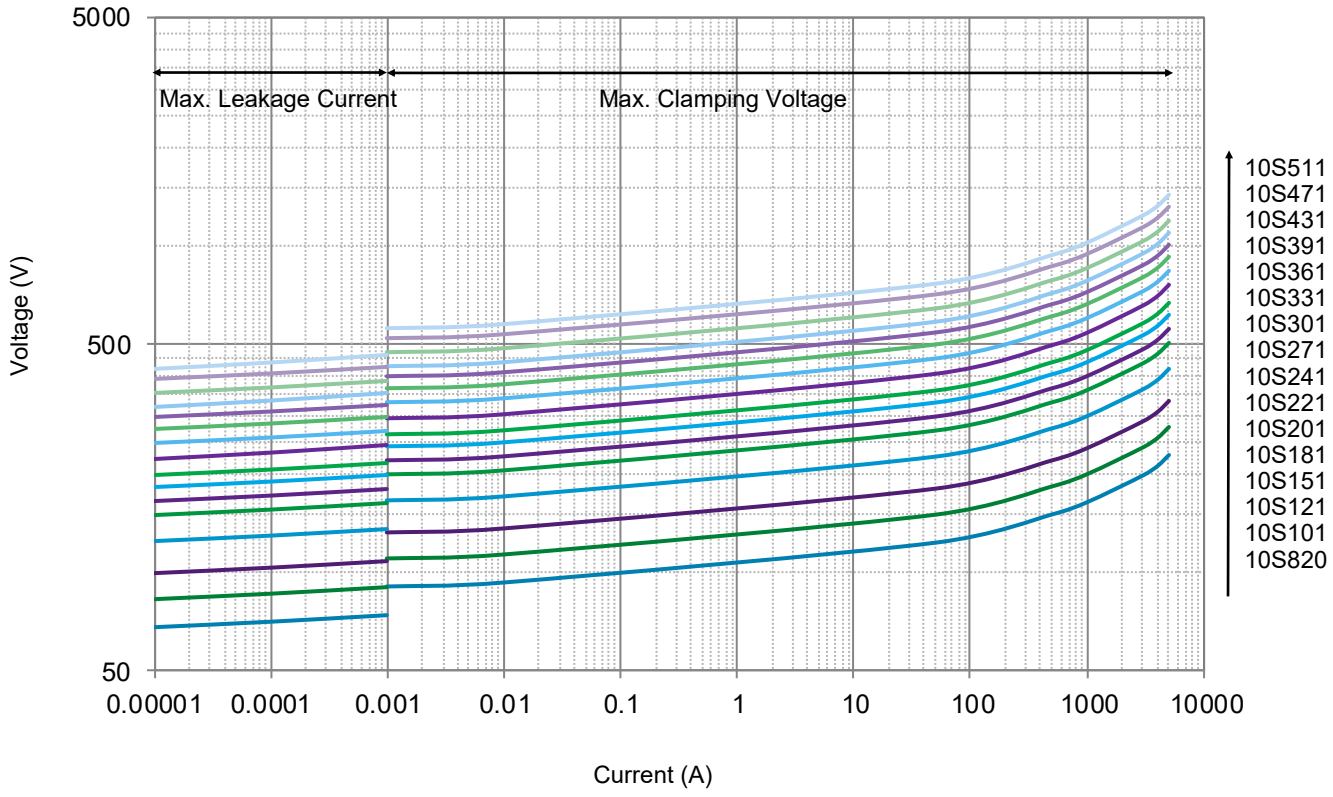
- Max. Peak Current Derating Curves



TFV10S820K to TFV10S821K

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

- Voltage-Current Characteristic Curves



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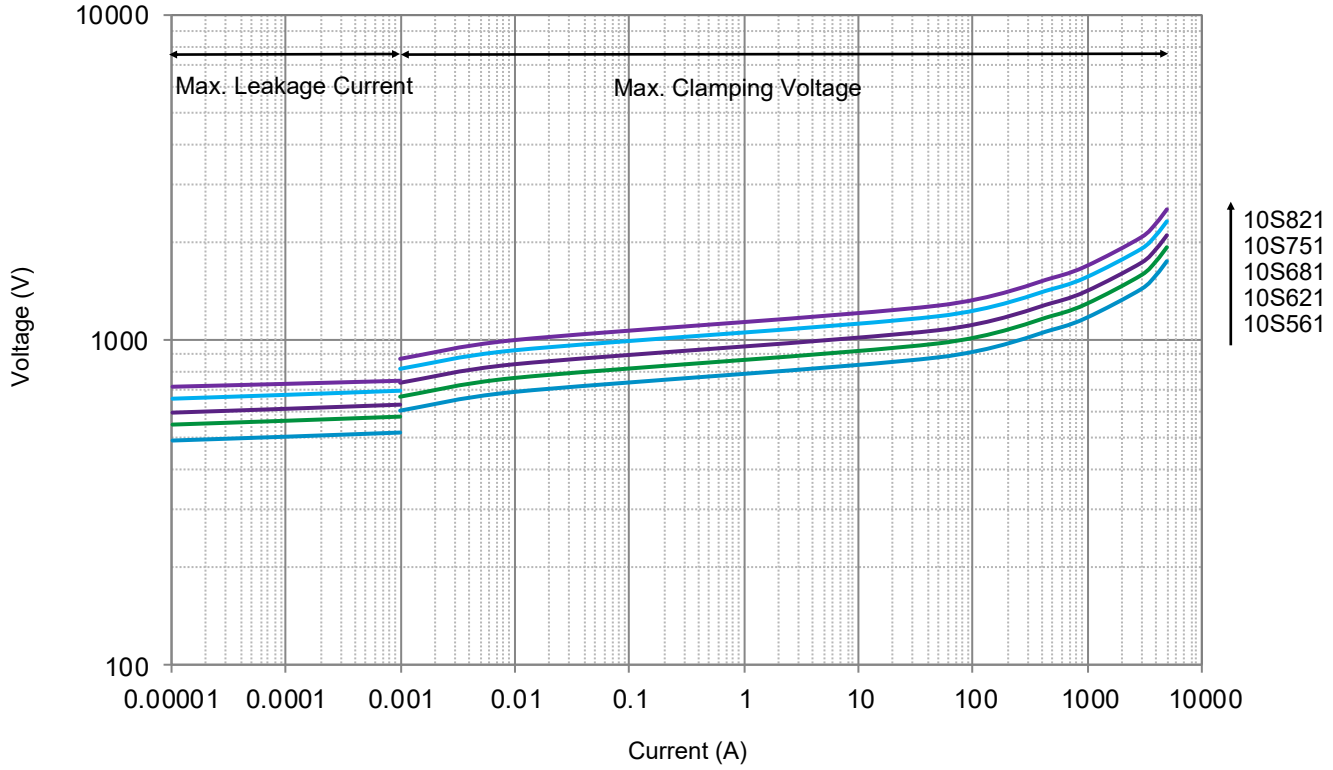
- Voltage-Current Characteristic Curves



TFV

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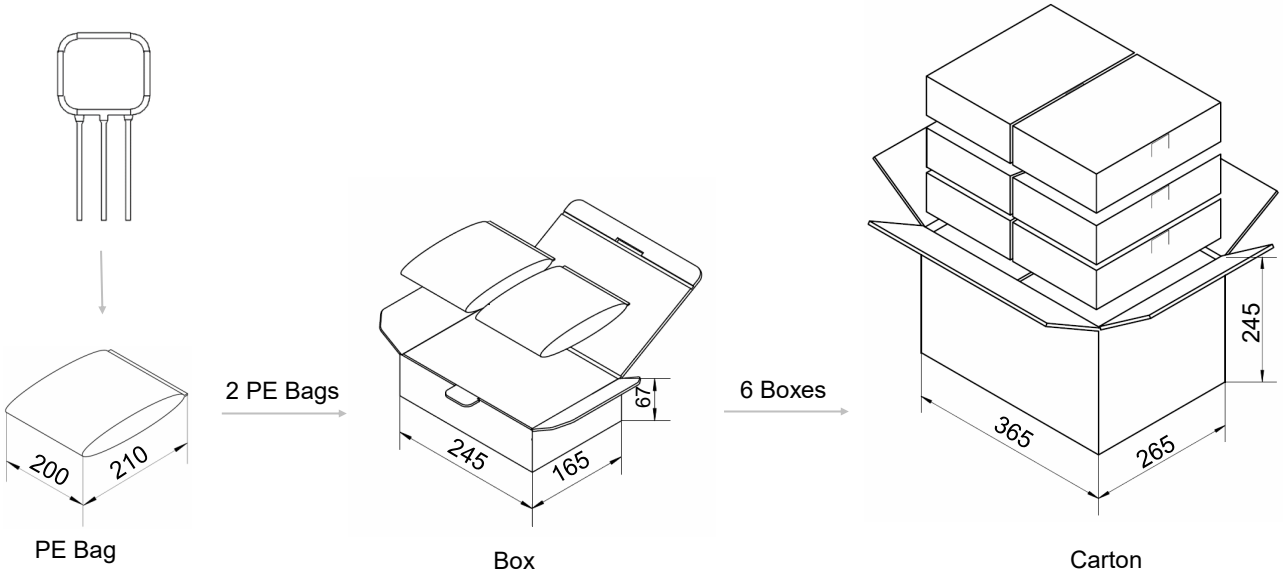
Packaging Information

- Bulk Packaging (Code: BUL)
- Bulk Packaging Dimensions & Quantity

Series	Nominal Varistor Voltage	PE Bag	Box	Carton	Gross Weight / Carton
	(V)	(PCS)	(PCS)	(PCS)	(kg)±10%
10S	820 - 561	400	800	4800	9 - 15
	621 - 821	250	500	3000	12 - 15

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

All Dimensions in mm



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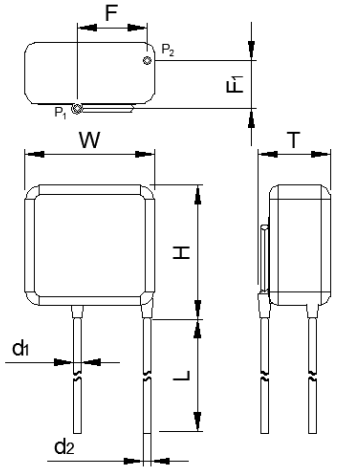
Dimensions (mm)



Model	L (Min.)	W (Max.)	H (Max.)	T (Max.)	d_1	d_2	F	F_1
TFV15S820K	15	21	26	4.8	1.00±0.05	1.00±0.05	10.0±1.0	0.4 - 2.4
TFV15S101K	15	21	26	5.0	1.00±0.05	1.00±0.05	10.0±1.0	0.5 - 2.5
TFV15S121K	15	21	26	5.2	1.00±0.05	1.00±0.05	10.0±1.0	0.6 - 2.6
TFV15S151K	15	21	26	5.5	1.00±0.05	1.00±0.05	10.0±1.0	0.8 - 2.8
TFV15S181K	15	21	26	4.9	1.00±0.05	1.00±0.05	10.0±1.0	0.5 - 2.5
TFV15S211K	15	21	26	5.0	1.00±0.05	1.00±0.05	10.0±1.0	0.6 - 2.6
TFV15S221K	15	21	26	5.1	1.00±0.05	1.00±0.05	10.0±1.0	0.6 - 2.6
TFV15S241K	15	21	26	5.2	1.00±0.05	1.00±0.05	10.0±1.0	0.7 - 2.7
TFV15S271K	15	21	26	5.4	1.00±0.05	1.00±0.05	10.0±1.0	0.8 - 2.8
TFV15S301K	15	21	26	5.6	1.00±0.05	1.00±0.05	10.0±1.0	0.9 - 2.9
TFV15S331K	15	21	26	5.8	1.00±0.05	1.00±0.05	10.0±1.0	0.9 - 2.9
TFV15S361K	15	21	26	6.0	1.00±0.05	1.00±0.05	10.0±1.0	1.0 - 3.0
TFV15S391K	15	21	26	6.1	1.00±0.05	1.00±0.05	10.0±1.0	1.1 - 3.1
TFV15S431K	15	21	26	6.4	1.00±0.05	1.00±0.05	10.0±1.0	1.2 - 3.2
TFV15S471K	15	21	26	6.6	1.00±0.05	1.00±0.05	10.0±1.0	1.3 - 3.3
TFV15S511K	15	21	26	6.8	1.00±0.05	1.00±0.05	10.0±1.0	1.5 - 3.5
TFV15S561K	15	21	26	7.1	1.00±0.05	1.00±0.05	10.0±1.0	1.6 - 3.6
TFV15S621K	15	21	26	7.5	1.00±0.05	1.00±0.05	10.0±1.0	1.8 - 3.8
TFV15S681K	15	21	26	7.8	1.00±0.05	1.00±0.05	10.0±1.0	1.9 - 3.9
TFV15S751K	15	21	26	8.3	1.00±0.05	1.00±0.05	10.0±1.0	2.1 - 4.1
TFV15S821K	15	21	26	8.7	1.00±0.05	1.00±0.05	10.0±1.0	2.3 - 4.3

Note:
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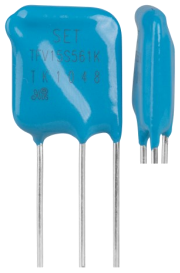
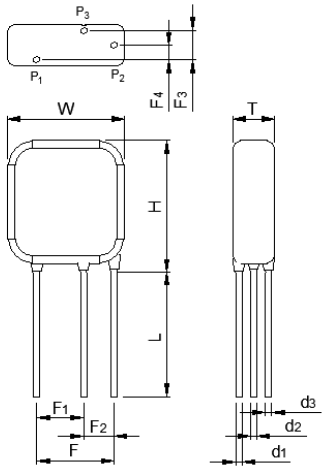
Dimensions (mm)





Model	L (Min.)	W (Max.)	H (Max.)	T (Max.)	d_1	d_2	d_3	F	F_1	F_2	F_3	F_4
TFV15S820K	15	21	26	4.8	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	1.2 - 2.6	0.4 - 2.4
TFV15S101K	15	21	26	5.0	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	1.3 - 2.8	0.5 - 2.5
TFV15S121K	15	21	26	5.2	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	1.4 - 3.0	0.6 - 2.6
TFV15S151K	15	21	26	5.5	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	1.5 - 3.3	0.8 - 2.8
TFV15S181K	15	21	26	4.9	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	1.3 - 2.8	0.5 - 2.5
TFV15S211K	15	21	26	5.0	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	1.4 - 2.9	0.6 - 2.6
TFV15S221K	15	21	26	5.1	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	1.5 - 3.0	0.6 - 2.6
TFV15S241K	15	21	26	5.2	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	1.6 - 3.1	0.7 - 2.7
TFV15S271K	15	21	26	5.4	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	1.7 - 3.3	0.8 - 2.8
TFV15S301K	15	21	26	5.6	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	1.8 - 3.5	0.9 - 2.9
TFV15S331K	15	21	26	5.8	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	1.9 - 3.6	0.9 - 2.9
TFV15S361K	15	21	26	6.0	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	2.0 - 3.8	1.0 - 3.0
TFV15S391K	15	21	26	6.1	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	2.0 - 4.0	1.1 - 3.1
TFV15S431K	15	21	26	6.4	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	2.2 - 4.2	1.2 - 3.2
TFV15S471K	15	21	26	6.6	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	2.4 - 4.4	1.3 - 3.3
TFV15S511K	15	21	26	6.8	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	2.6 - 4.6	1.5 - 3.5
TFV15S561K	15	21	26	7.1	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	2.9 - 4.9	1.6 - 3.6
TFV15S621K	15	21	26	7.5	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	3.2 - 5.2	1.8 - 3.8
TFV15S681K	15	21	26	7.8	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	3.6 - 5.6	1.9 - 3.9
TFV15S751K	15	21	26	8.3	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	4.0 - 6.0	2.1 - 4.1
TFV15S821K	15	21	26	8.7	1.00±0.05	1.00±0.05	1.00±0.05	12.5±1.0	7.5±1.0	5.0±1.0	4.4 - 6.4	2.3 - 4.3

Note:
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Part Numbering System

TFV 15 S 471 - K 3 P K A BUL - 001

Other Options

***Packaging & Lead Length**
BUL: Bulk + Standard Lead Length (Normal L28)

Lead Type
A: Straight Lead

Surge Level
K: Standard Type

Operating Temp.
P: Epoxy Coating 105 °C

Lead
2: 2 PIN
3: 3 PIN

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
Metal Oxide Varistor

*For more details refer to Packaging Information.

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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 Approvals			
	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)						
TFV15S820K	50	65	74	90	135	75	5	10	43	4000	●	●	●	○
TFV15S101K	60	85	90	110	165	75	5	10	53	3200	●	●	●	○
TFV15S121K	75	100	108	132	200	75	5	10	64	2700	●	●	●	○
TFV15S151K	95	125	135	165	250	75	5	10	85	2200	●	●	●	○
TFV15S181K	115	150	162	198	300	75	5	10	96	1800	●	●	●	○
TFV15S201K	130	170	180	220	340	75	5	10	102	1600	●	●	●	○
TFV15S221K	140	180	198	242	360	75	5	10	125	1450	●	●	●	○
TFV15S241K	150	200	216	264	395	75	5	10	134	1350	●	●	●	○
TFV15S271K	175	225	243	297	455	75	5	10	158	1200	●	●	●	○
TFV15S301K	190	250	270	330	500	75	5	10	173	1050	●	●	●	○
TFV15S331K	210	275	297	363	550	75	5	10	185	1000	●	●	●	○
TFV15S361K	230	300	324	396	595	75	5	10	208	900	●	●	●	○
TFV15S391K	250	320	351	429	650	75	5	10	224	800	●	●	●	○
TFV15S431K	275	350	387	473	710	75	5	10	248	750	●	●	●	○
TFV15S471K	300	385	423	517	775	75	5	10	280	680	●	●	●	○
TFV15S511K	320	415	459	561	845	75	5	10	300	630	●	●	●	○
TFV15S561K	350	460	504	616	925	75	5	10	310	580	●	●	●	○
TFV15S621K	385	505	558	682	1025	75	5	10	310	530	●	●	●	○
TFV15S681K	420	560	612	748	1120	75	5	10	320	500	●	●	●	○
TFV15S751K	460	615	675	825	1240	75	5	10	335	430	●	●	●	○
TFV15S821K	510	670	738	902	1355	75	5	10	350	400	●	●	●	○

●: Approved ○: Unauthorized

TFV

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Specification

Model	Limited Current	Rated Function Temp.	Fuse Temp.	Holding Temp.	Rated Voltage	
	(A)	T_f (°C)	(°C)	T_h (°C)	AC (V)	DC (V)
TFV15S820K	5	145	140±2	118	250	50
TFV15S101K	5	145	140±2	118	250	50
TFV15S118K	5	145	140±2	118	250	50
TFV15S151K	5	145	140±2	118	250	50
TFV15S181K	5	145	140±2	118	250	50
TFV15S201K	5	145	140±2	118	250	50
TFV15S221K	5	145	140±2	118	250	50
TFV15S241K	5	145	140±2	118	250	50
TFV15S271K	5	145	140±2	118	250	50
TFV15S301K	5	145	140±2	118	250	50
TFV15S331K	5	145	140±2	118	250	50
TFV15S361K	5	145	140±2	118	250	50
TFV15S391K	5	145	140±2	118	250	50
TFV15S431K	5	145	140±2	118	250	50
TFV15S471K	5	145	140±2	118	250	50
TFV15S511K	5	145	140±2	118	250	50
TFV15S561K	5	145	140±2	118	250	50
TFV15S621K	5	145	140±2	118	250	50
TFV15S681K	5	145	140±2	118	250	50
TFV15S751K	5	145	140±2	118	250	50
TFV15S821K	5	145	140±2	118	250	50

Note:
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TFV

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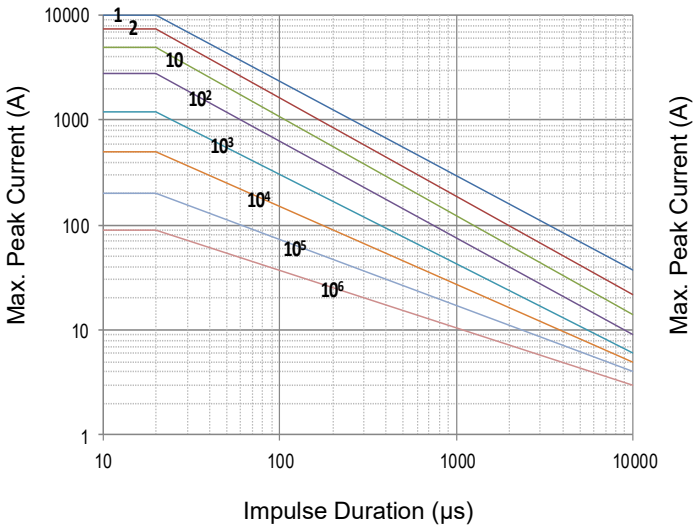
Performance Curve (For reference only)

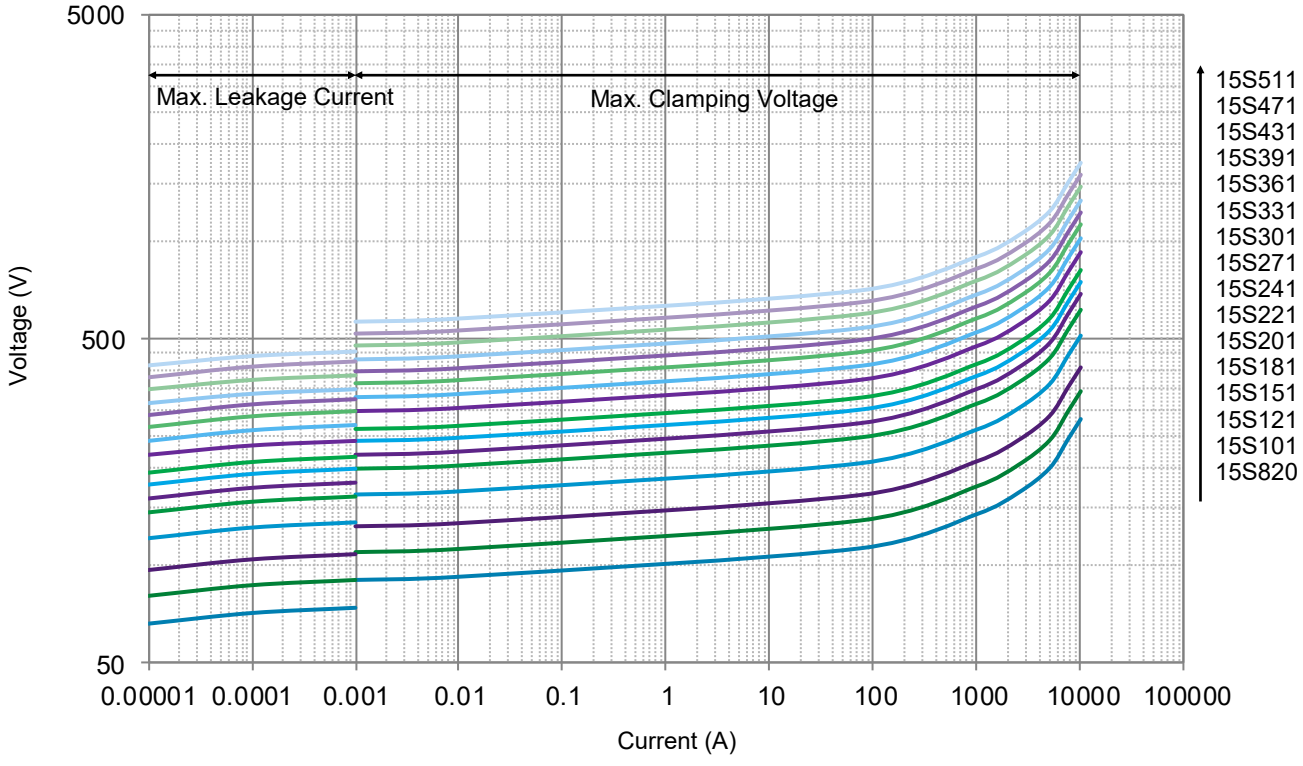
- Max. Peak Current Derating Curves



TFV15S820K to TFV15S821K

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

- Voltage-Current Characteristic Curves



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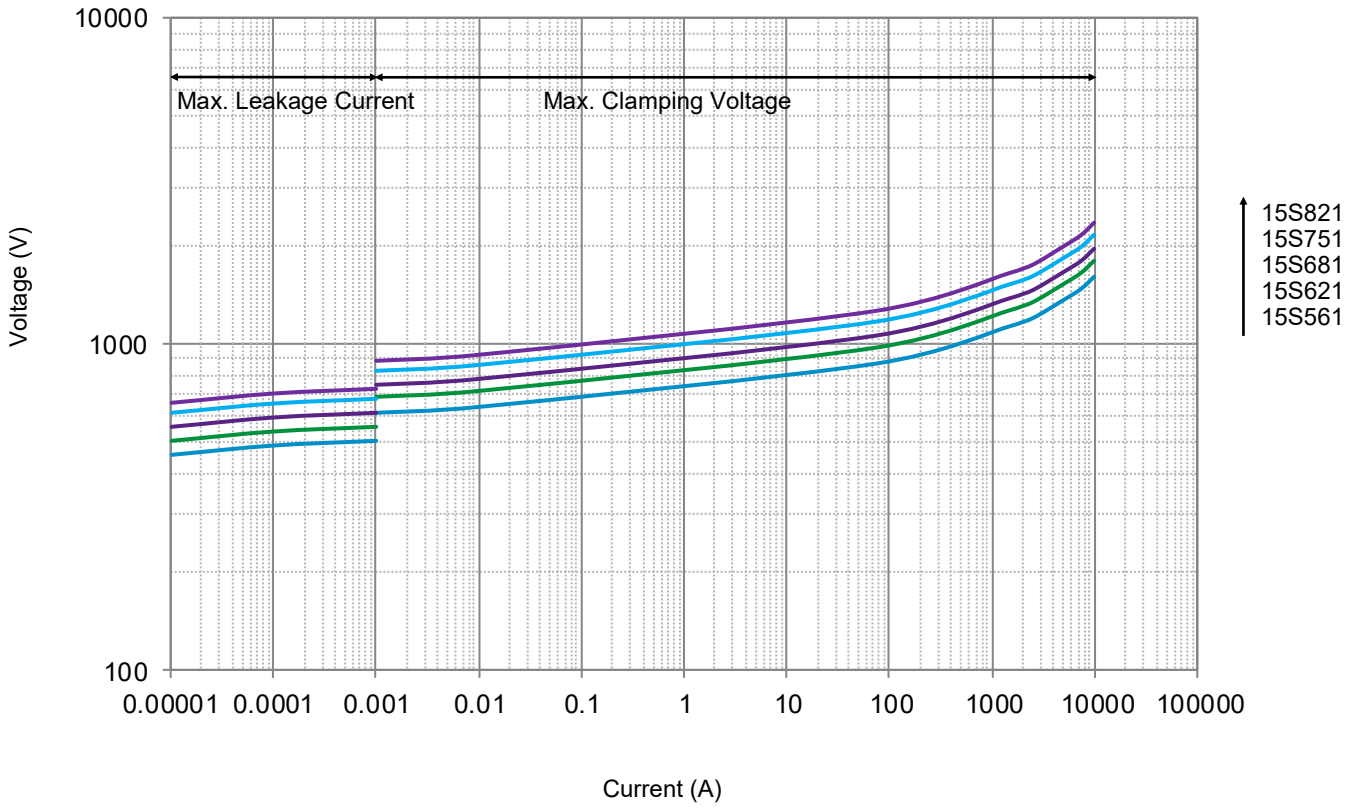
- Voltage-Current Characteristic Curves



TFV

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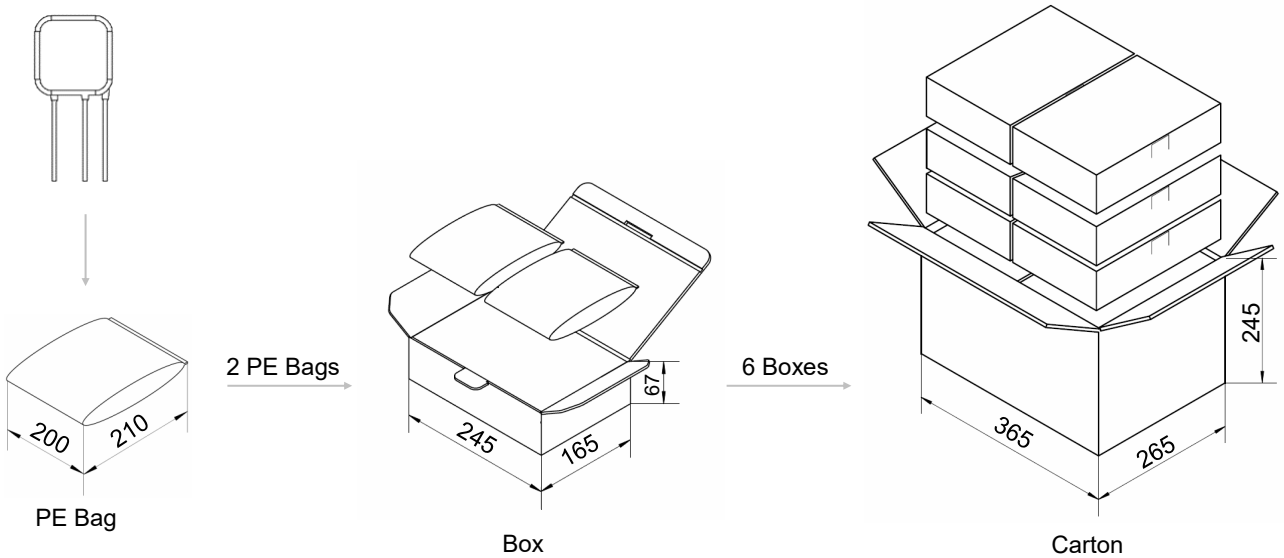
Packaging Information

- Bulk Packaging (Code: BUL)
- Bulk Packaging Dimensions & Quantity

Series	Nominal Varistor Voltage	PE Bag	Box	Carton	Gross Weight / Carton
15S	(V)	(PCS)	(PCS)	(PCS)	(kg)±10%
	820 - 361	200	400	2400	5 - 10
	391 - 561	150	300	1800	7 - 11
	621 - 821	100	200	1200	6 - 10

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

All Dimensions in mm



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21

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