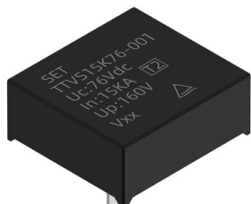


## Description

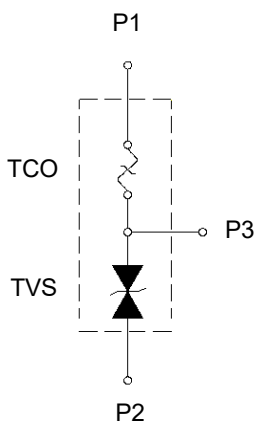


Thermally Protected Transient Voltage Suppression Diode (TTVS) is a transient suppression diode. Combined with TVS and thermal fuse (ATCO). When the transient energy far exceeds TVS its own endurance range, TVS burns out due to over-electrical stress, or the internal structure of the TVS changes due to long-term operation, and the electrical properties of the TVS degrades and the heat dissipation capacity is reduced to cause the junction temperature continues to increase and eventually the TVS is burned due to overheating. When an appeal situation occurs, the internal thermal protection of TTVS takes action and disconnects the TVS from the main circuit.

Thermally protected transient voltage suppression diodes (TTVS) are widely used in overvoltage protection of new energy equipment and communication equipment. It plays a big role in the absorption of surges and abnormal voltage.

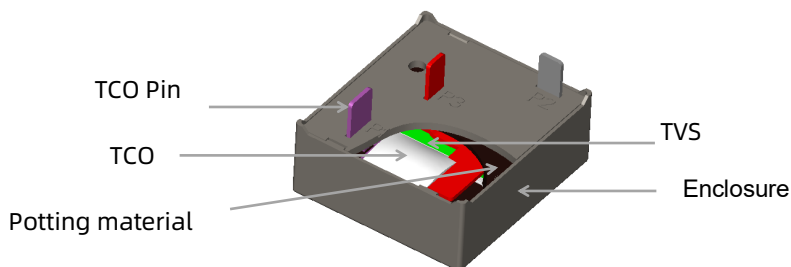
SETsafe | SETfuse's thermally protected transient voltage suppression diode TTVSxxK series are mainly composed of transient voltage suppression diodes(TVS), thermal fuse (ATCO), potting material, flame-retardant case and metal accessories (pins). Nominal Discharge Current: 15kA; Maximum continuous operating voltage: (58 ~ 76) VDC, Certification: TUV, Complied with RoHS and REACH.

## Schematics



Thermal Protected Transient Suppression Diode  
(Fuse alloy type)

## Structure




## Features

- High Reliability
- Small Size
- Failure Indication
- High Energy Capacity
- Sealing Material, Flame-retardant to V0 (UL 94)
- Comply with UL 1449 / IEC 61643-11

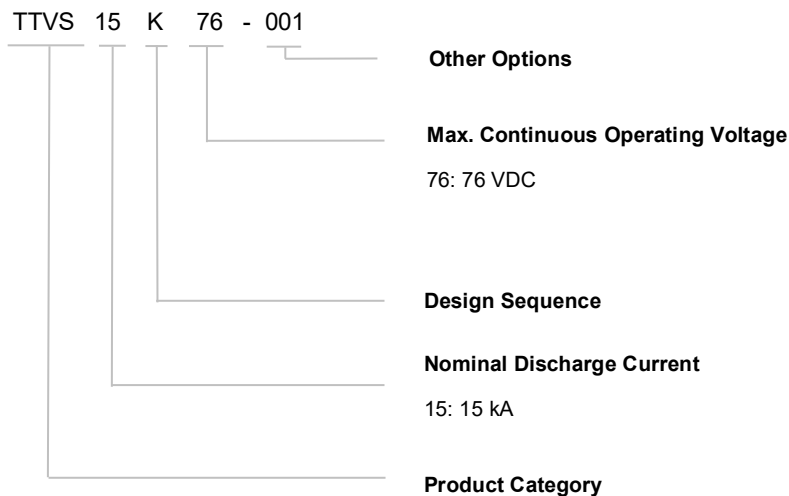
## Applications

- Communication Equipment
- Security and Protection
- Industrial Control Equipment
- Communication Power Supply
- New Energy Equipment

## Agency Information

Agency Symbol	Standards	The File No. and certification No. obtained by SETsafe   SETfuse	Category
	EN 61643-11	J50556562	T2
环境	RoHS & REACH	符合	

## Part Numbering System

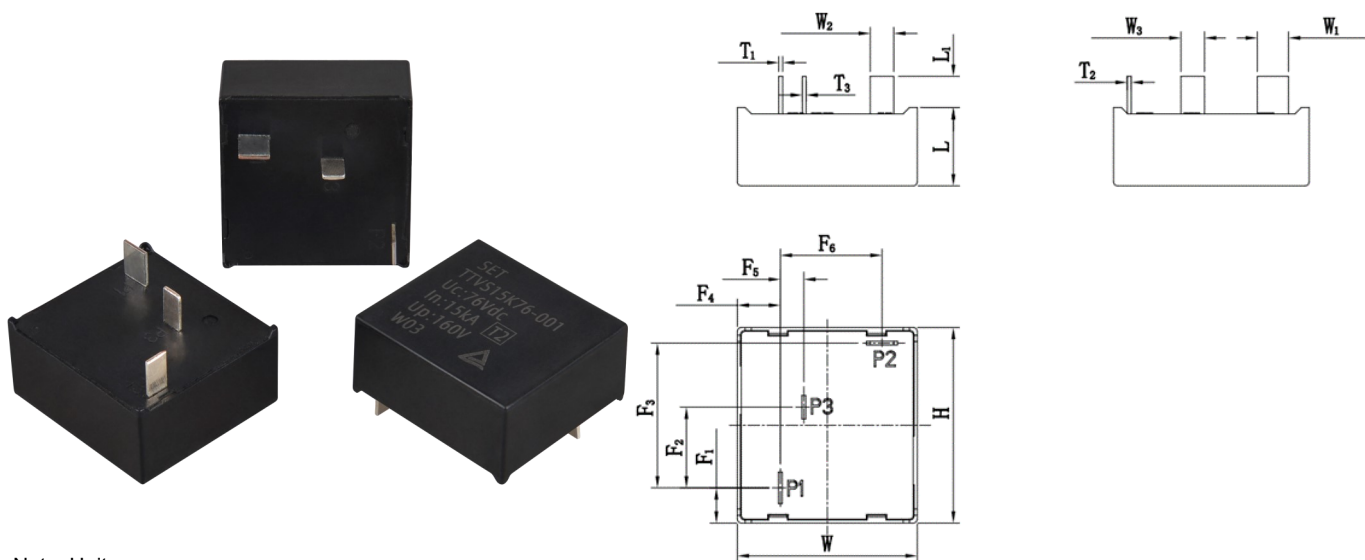


**Note:**

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.

Thermal Protected Transient Suppression Diode  
Fuse Alloy Type (TTVS)

TTVSxxK Series



Note: Unit : mm

TTVS15K76

L	L <sub>1</sub>	H	W	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	T <sub>1</sub>
10.0 ± 1.0	4.0 ± 1.0	25.0 ± 1.0	23.0 ± 1.0	4.0 ± 0.2	3.0 ± 0.2	3.0 ± 0.2	0.5 ± 0.2
T <sub>2</sub>	T <sub>3</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>
0.5 ± 0.2	0.5 ± 0.2	4.5 ± 0.5	10.3 ± 0.5	18.5 ± 0.5	5.5 ± 0.5	3.0 ± 0.5	13.0 ± 0.5

Specifications

Model	Dc Breakdown Voltage	Breakdown voltage Tests Current	Max. Continuous Operating Voltage	Nominal Discharge Current (8/20 μs)	Voltage Protection Level	Leakage Current	Static Capacitance	IEC/EN 61643-11
	V <sub>BR</sub>	I <sub>T</sub>	U <sub>c</sub>	I <sub>n</sub>	U <sub>P@I<sub>n</sub></sub>	IR@VR	C@10KHz	
	V	mA	V	kA	V	μA	nF	Class II
TTVS15K58	67 ± 3	10	58	15	120	20	18	•
TTVS15K66	76 ± 4	10	66	15	140	20	15	•
TTVS15K76	90 ± 5	10	76	15	160	20	12	•
TTVS20K58	67 ± 3	10	58	20	120	15	18	•
TTVS20K66	76 ± 4	10	66	20	140	15	15	•
TTVS20K76	90 ± 5	10	76	20	160	15	12	•

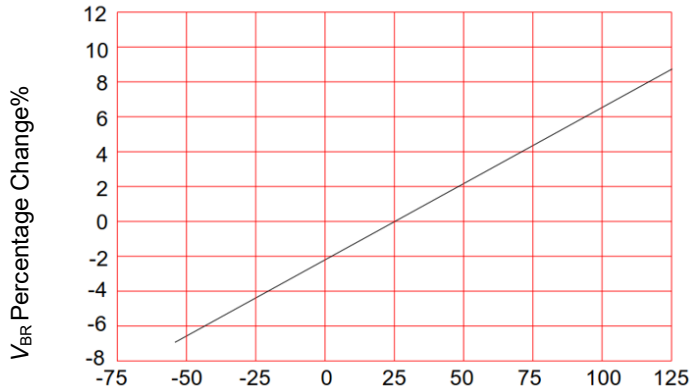
Note:

The voltage protection level (Up) is selected according to the preferred value of IEC 61643-11:2011 6.4 according to the calculation results;

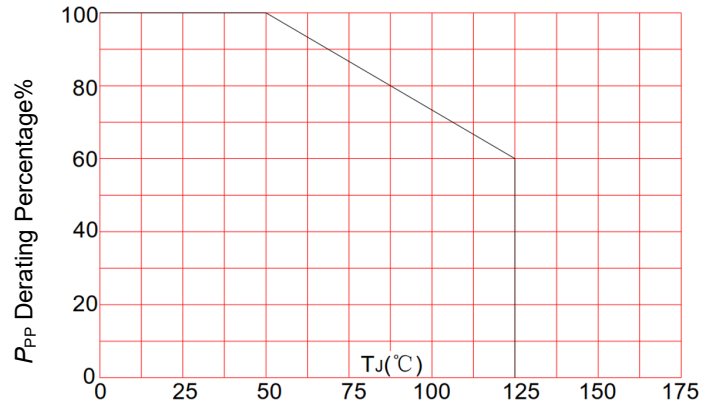
Voltage protection level preferred value (kV): 0.08, 0.09, 0.10, 0.12, 0.15, 0.22, 0.33, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.2, 1.5, 1.8, 2.0, 2.5, 3.0, 4.0, 5.0, 6.0, 8.0, 10;

### Performance Curve for Reference

Breakdown Voltage-Temperature Curve



Impulse Current-Temperature Curve

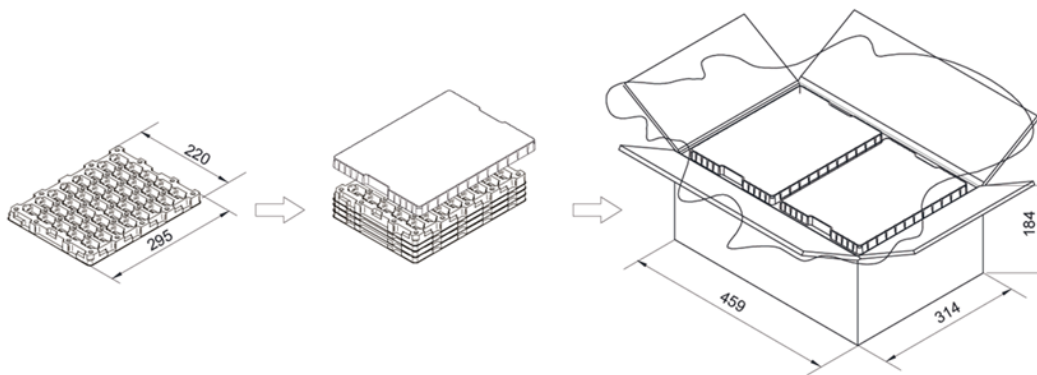


Junction Temperature(T<sub>J</sub>)°C

Junction Temperature(T<sub>J</sub>)°C

Note: The default parameter of the product is 25 °C. If the parameter requirements of other ambient temperatures are considered, the design should consider the influence of temperature on the parameters.

### Packaging Information



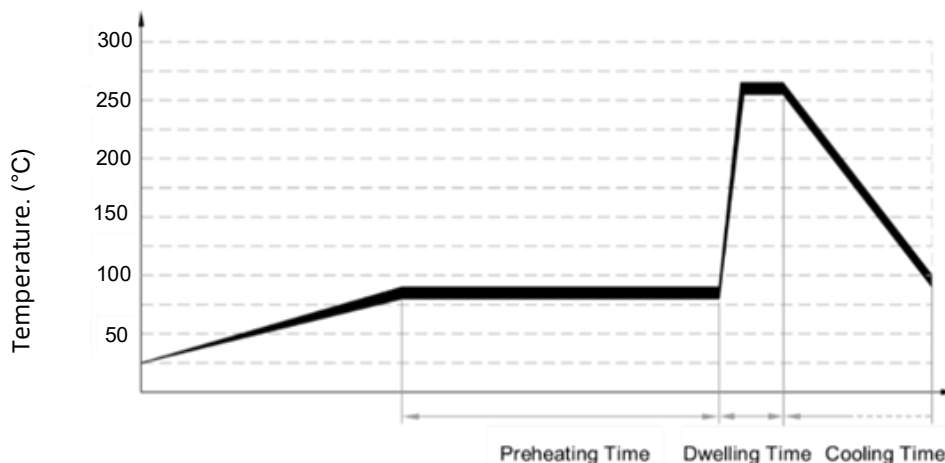
Unit: mm

Please contact us if you have special packaging requirements.

Item	Tray	Carton
Dimensions (mm)	295 × 220	455 × 314 × 195
Quantity (PCS)	40	640

### Wave Soldering Parameters (Reference)

This product can meet the wave soldering, pay attention to the length of the product pin beyond the PCB pad should not be more than 3 mm, the preheating temperature is controlled within 90 °C, the wave peak temperature is less than 260 °C, and the tinning time is less than 4 s. When welding, it is recommended to increase the protective cover to reduce the heat absorption of the product, and add cooling facilities to reduce the temperature to room temperature quickly after the product has passed the wave peak. Recommended Settings according to the following welding curve:



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.)

## Patents

Name	Region	Category	Patent NO.
A transient voltage suppressor of thermal protection type	China	Utility Model	ZL2021220841024
The utility model relates to a thermal protected transient suppression device	China	Utility Model	ZL2021231360206
Thermal protection varistor module and transient voltage suppressor	China	Appearance	ZL2021305707575
The utility model relates to a thermal protection transient voltage suppressor	China	Utility Model	ZL2021231355829
A novel transient voltage suppressor for overtemperature protection	China	Utility Model	ZL2022214731712

## Glossary

Item	Description
$V_{BR}$	<b>Breakdown Voltage</b> Voltage across TVS at a specified current $I_T$ in the breakdown region. — (IEC 61643-321)
$P_{PPM}$	<b>Rated Random Repeat Peak Pulse Power</b> Maximum-rated value of the product of rated random recurring peak impulse current (IPPM) multiplies by specified maximum clamping voltage ( $V_C$ ). — (IEC 61643-321)
$U_P$	<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 waveshape. — (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. — (IEC 61643-11)
$I_{PP}$	<b>Peak Pulse Current</b> Peak pulse current value applied across the TVS to determine the clamping voltage $V_C$ for a specified wave shape. — (IEC 61643-321)
$V_C$	<b>Clamping Voltage</b> Voltage across TVS in a region of low differential resistance that serves to limit the voltage across the device terminals.. — (IEC 61643-321)
$C_V$	<b>Capacitance</b> The capacitance measured at both ends of a transient suppression diode at a specific frequency and voltage. — (IEC 61643-321)
ATCO	<b>Alloy Hot Fuse</b> The temperature sensing element is a hot fuse made of alloy material.



# 注意

## Usage

1. This product is suitable for 48V DC systems.
2. The voltage continuously applied to the thermal protected transient suppression diode should not exceed its maximum continuous operating voltage  $U_c$ .
3. The air pressure is 54 kPa to 106 kPa, corresponding to the altitude of +5000 m to -500 m.
4. Do not directly touch the body or pin when powered on to prevent electric shock.
5. Please do not use ketones, esters, benzenes, halogenated hydrocarbons and other polar solvents to clean this product, so as to avoid damaging the packaging layer of the product.

## Replacement

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

## Storage

Do not store TTVS 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 TTVS 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.