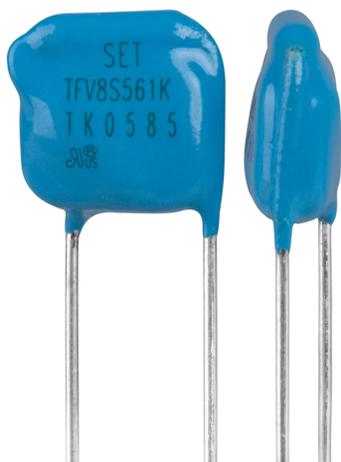


热保护型压敏电阻

Thermal Fuse Varistor (TFV)

TFV8S 系列 Series



简介 Description

TFV 系列由压敏电阻和热保护元件组成。内置的热保护元件可快速响应压敏电阻的温度变化提供即时的热保护，集成式结构较传统分离结构具有更低的电感和更好的抑制浪涌过电压能力。

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

特点 Features

- 专利产品 Patented Product
- 具有热保护功能的压敏电阻 Thermal Protection Varistor
- 热保护元件内置，更省空间 Thermal Protection Elements Are Built In To Save Space
- 三引线版本可用于指示用途 Three-lead Version Available For Indication Purpose
- 低漏电流 Low Leakage
- 工作温度 Operating Temp. Range:(-40 ~ 105) °C
- 满足RoHS & REACH要求 RoHS & REACH Compliant

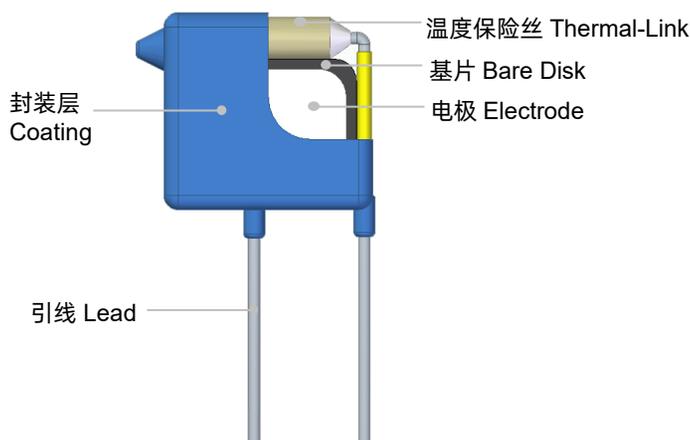
应用 Applications

- 电源 Power Supplies
- 家用电器 Home Electrical Appliances
- 工业设备 Industrial Devices
- 防雷插座 Surge Protectors
- 通讯设备 Telecom Devices
- 交流保护模块 AC Panel Protection Modules
- 交流功率表 AC Power Meters
- 接地故障电流互感器 GFCI (Ground Fault Current Interrupter)
- 不间断电源 UPS (Uninterruptable Power Supply)
- 逆变器 Inverters

安规信息 Agency Approvals

认证 Agency	标准 Standards	认证号 File No.
	UL 1449 4 th Edition	E322662
	CSA C22.2 NO.269.5-17	E322662
	EN IEC 61051-1:2018 IEC 61051-2:1991+A1 IEC 61051-2-2:1991 Annex G.8.1, G.8.2 of IEC 62368-1:2018	J 50554061
	GB/T 10193-1997 GB/T 10194-1997 GB 4943.1-2011 GB 8898-2011	On-going

产品结构 Product Structure



热保护型压敏电阻

Thermal Fuse Varistor (TFV)

TFV8S 系列 Series

产品标识 Marking



内部标识 Internal code

年份代码
Year Code
2000—A
.....
2022—W

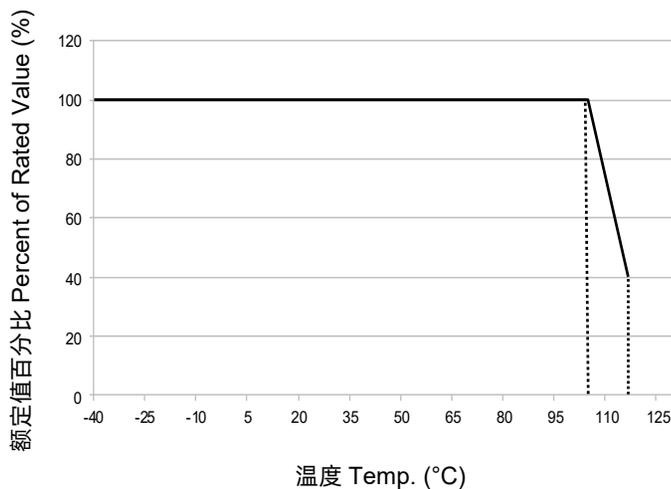
浪涌等级
Surge Rating
K:标准型 Standard Type

流水号
Serial Number
(E.G.: 0001)

TFV

TFV

温度降额曲线 Temp. Derating Curve



温度 Temp. (°C)
常温系列温度降额曲线
For Normal Temp. Series

备注：应用环境温度超过105 °C 时，峰值电流和能量额定值应按照上述曲线相应的降低。
Note: When ambient temp. exceeds 105 °C, the peak surge current and energy rating should be reduced as shown in left curve.

技术参数 General Technical Data

项目 Item	值 Value	单位 Unit
工作温度 Operating Temp.	-40 ~ +105	°C
存储温度 Storage Temp.	-40 ~ +125	°C
耐电压 Voltage Proof	≥2500	V _{ac}
绝缘电阻 Insulation Resistance	≥100	MΩ

型号说明 Part Numbering System

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

流水号 Other Options

包装 & 引脚长度 Packaging & Lead Length

散装: 散装+标准长度 (L28)
BUL: Bulk + Standard Lead Length (Normal L28)

引脚类型 Lead Types

A: 直线型引线 Straight Lead

浪涌等级 Surge Level

K: 标准型 Standard Type

工作温度 Operating Temp.

P: 环氧树脂包封 Epoxy Coating 105 °C

引线 Lead

2: 2 PIN

3: 3 PIN

电压公差 Voltage Tolerance

K: ±10%

J: ±5%

S: 特殊定制 Special Tolerance

标称压敏电压 Nominal Varistor Voltage

220: $22 \times 10^0 = 22V$

471: $47 \times 10^1 = 470 V$

122: $12 \times 10^2 = 1200 V$

形状 Disk Shape

S: 正方形 Square

基片尺寸 Bare Disk Dimension

8: 8×10 mm

产品类别 Product Category

压敏电阻

Selfuse Varistor

*更多细节请参照包装信息

*For More Details Refer To Packaging Information.

术语 Glossary

项目 Item	描述 Description
V_N	标准压敏电压 Nominal Varistor Voltage 在规定持续时间的脉冲电流下测得MOV两端的电压。 Voltage, at specified D.C. current used as a reference point in the component characteristics.
I_L	漏电流 Leakage Current 在25°C或规定的其它温度下, 施加最大直流电压时, 通过压敏电阻器中的电流。 Current passing through the varistor at the max. d.c. voltage, and at a temp. of 25 °C, or any other specified temp.
UCT	上限类别温度 Upper Category Temp. 压敏电阻器设计所确定的能够连续工作的最高环境温度。 Max. ambient temp. for which a varistor has been designed to operate continuously.
LCT	下限类别温度 Lower Category Temp. 压敏电阻器设计所确定的能够连续工作的最低环境温度。 Minimum ambient temp. at which a varistor has been designed to operate continuously.
Max. Peak Current	最大峰值电流 Max. Peak Current 在环境温度25°C时, 对于规定的脉冲次数而言, 压敏电阻器中允许通过的每个脉冲的最大电流值。 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	箝制电压 Clamping Voltage 规定脉冲峰值电流及规定波形下测得MOV两端的电压峰值。 Peak voltage developed across the varistor terminations under standard atmospheric conditions, when passing an 8/20 μ s class current pulse.
Voltage Proof	耐电压 Voltage Proof 连续可施加在压敏电阻器引出端和导电性安装之间的最大峰值电压。 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	电容量 Capacitance MOV两端之间的电容量, 其测量应在规定的正弦频率和电压以及规定的温度下进行。除非另有规定, 推荐采用25°C下, 1 V r.m.s, 1 kHz的信号。 Capacitance across the MOV measured at a specified frequency and voltage.
V_{ac}	最大连续交流电压 Max. Continuous a.c. Voltage 在环境温度25°C时, 可以施加在元件上连续工作的、波形基本是正弦波(总谐波畸变小于5%)的最大交流电压有效值。当温度高于25°C时, 详细规范应给出降额曲线。 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}	最大连续直流电压 Max. Continuous d.c. Voltage 在环境温度25°C时, 可以施加在元件上连续工作的最大直流电压(波纹小于5%)。当温度高于25°C时, 详细规范应给出降额曲线。 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	标称放电电流 Nominal Discharge Current 流过SPD具有8/20 μ s波形的电流峰值, 用于II级试验的SPD分级以及I级、II级试验的SPD的预处理试验。 Crest value of the current through the SPD having a current waveshape of 8/20 μ s.
I_{max}	最大放电电流 Max. Discharge Current 流过SPD, 具有8/20 μ s波形电流的峰值, 其值按II级动作负载的程序确定。 I_{max} 大于 I_n 。 Crest value of a current through the SPD having an 8/20 μ s waveshape and magnitude according to the manufacturers specification. I_{max} is equal to or greater than I_n .

热保护型压敏电阻

Thermal Fuse Varistor (TFV)

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T_f	<p>额定动作温度 Rated function Temp.</p> <p>通不超过10 mA的探测电流时，测得的使温度保险丝导电状态改变的温度。 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.</p>
T_h	<p>保持温度 Holding Temp.</p> <p>持续负载额定电流168小时不断开，产品本体表面温度最高。 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.</p>
U_r	<p>额定电压 Rated Voltage</p> <p>温度保险丝分类用，允许用于电路并安全断开的最高电压。 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.</p>

TFV

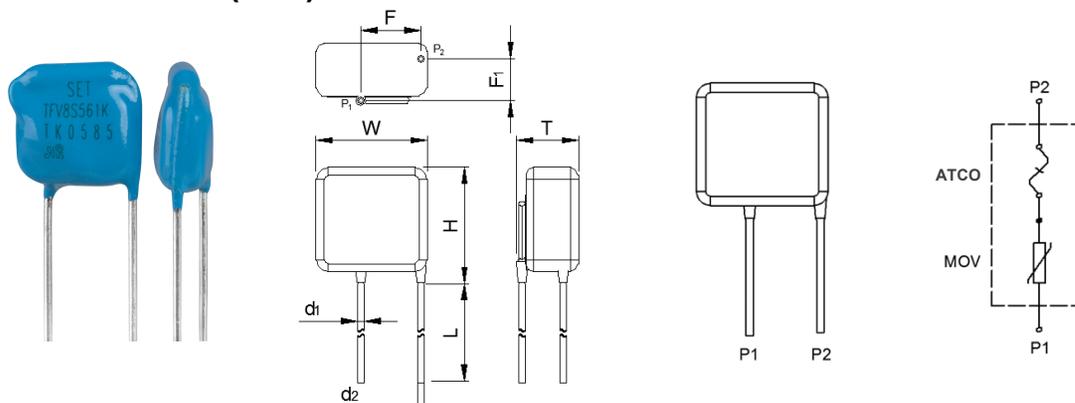
TFV

热保护型压敏电阻

Thermal Fuse Varistor (TFV)

TFV8S 系列 Series

尺寸 Dimensions (mm)



型号 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

备注：以上数据仅供参考
The above data is for reference only.

热保护型压敏电阻

Thermal Fuse Varistor (TFV)

TFV8S 系列 Series

技术参数 Specification

型号 Model	最大连续工作电压 Max. Continuous Operating Voltage		压敏电压 Varistor Voltage @1 mA DC		箝制电压 Clamping Voltage (Max.)		最大峰值电流 Max. Discharge Current (8/20 μs)		最大能量 Max. Energy (10/1000 μs)	静态电容 Typical Capacitance (For reference only) @1 kHz	安规认证 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	●	●	●	○

备注 Note: ● 已认证 Approved ○ 无认证 Unauthorized

TFV

TFV

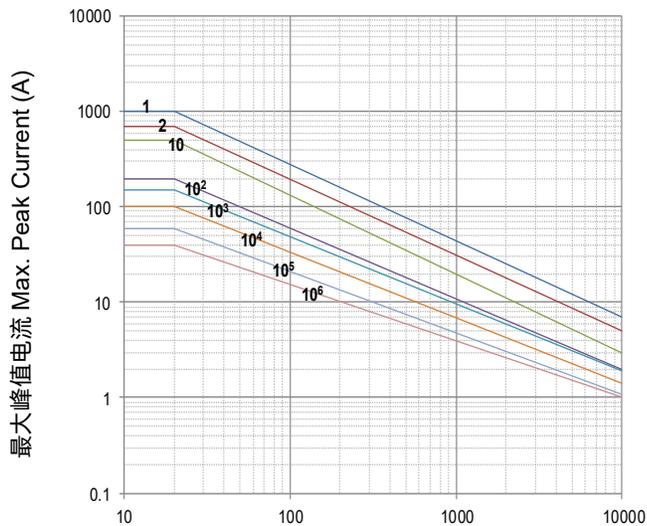
技术参数 Specification

型号 Model	受限电流 Limited Current	额定动作温度 Rated Function Temp.	熔断温度 Fuse Temp.	保持温度 Holding Temp.	额定电压 Rated Voltage	
		T_f		T_h	AC	DC
	(A)	(°C)	(°C)	(°C)	(V)	(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

备注：以上数据仅供参考
The above data is for reference only.

性能曲线 (仅供参考) Performance Curve (For reference only)

- 最大峰值电流降额曲线 Max. Peak Current Derating Curves

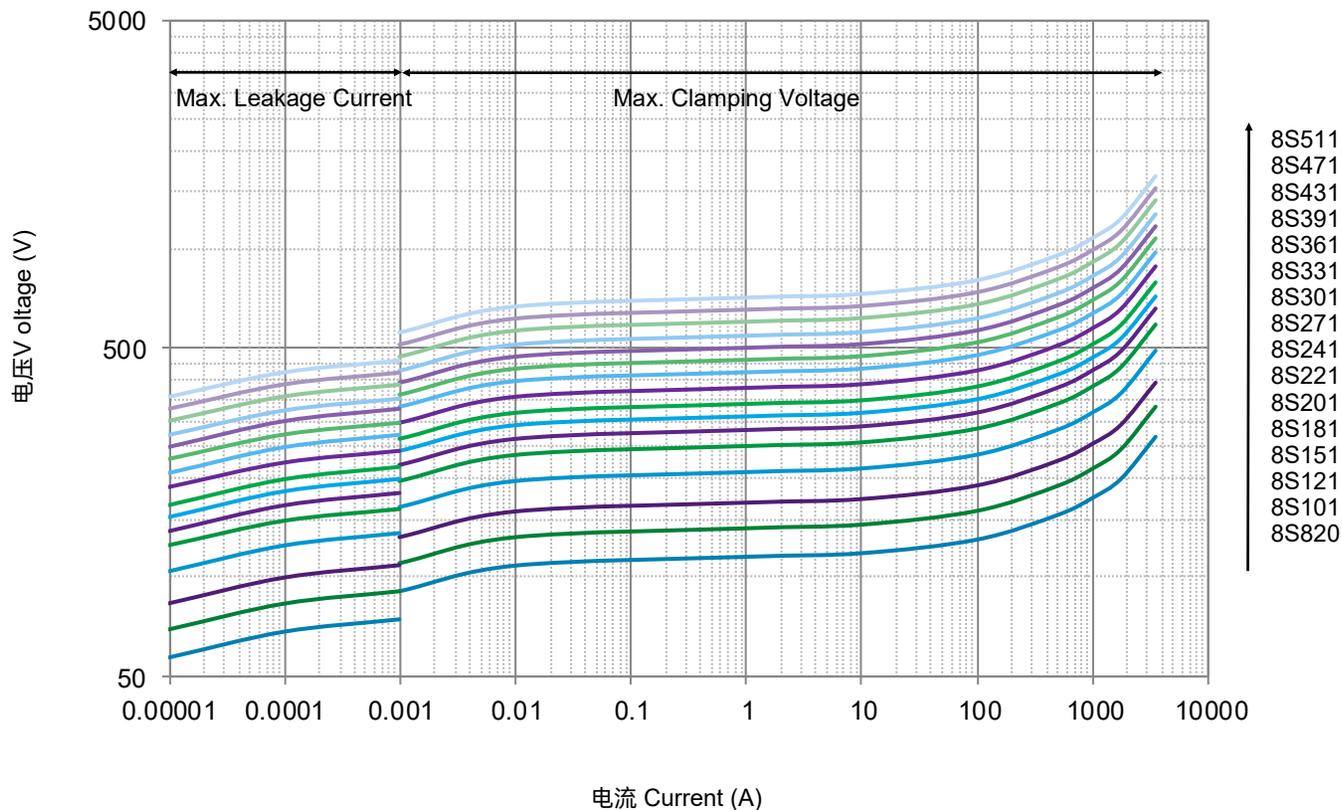


脉冲持续时间 Impulse Duration (μs)

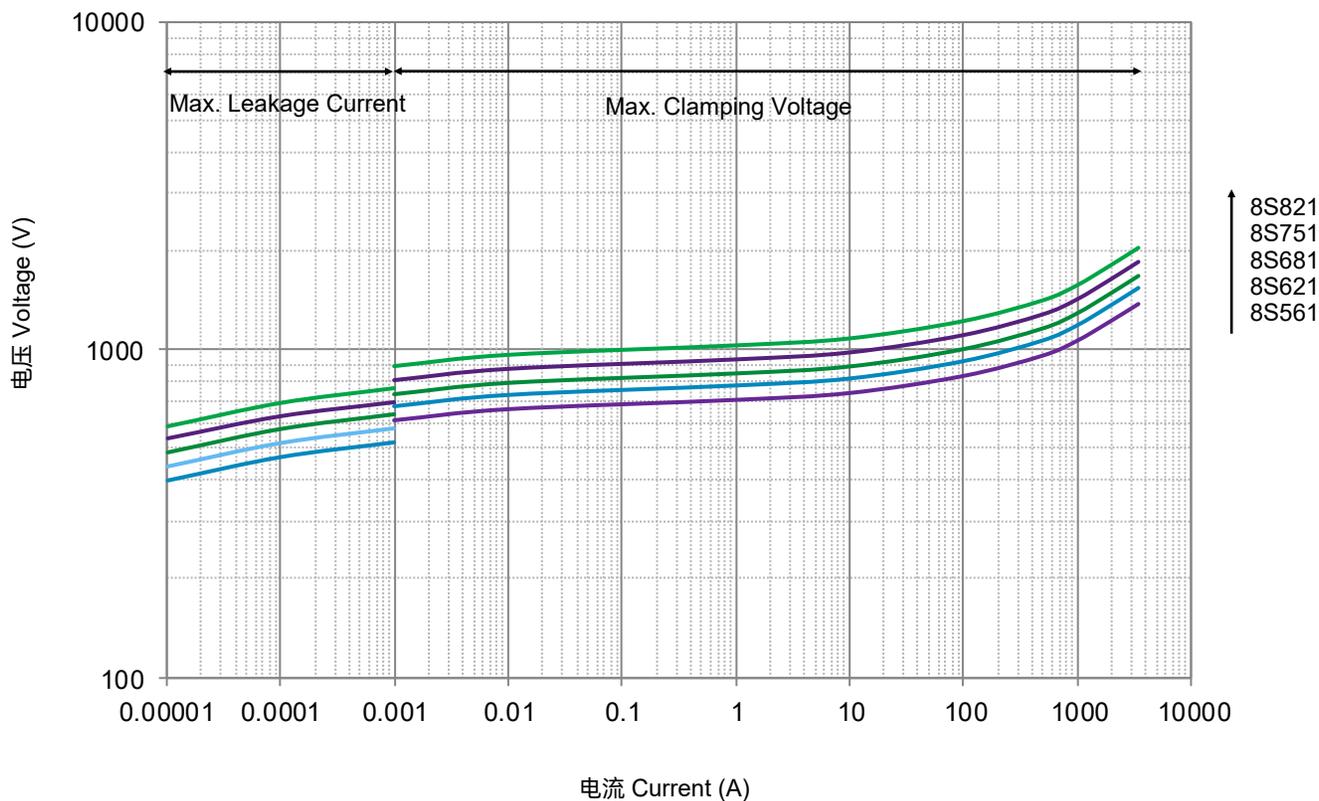
TFV8S820K to TFV8S821K

备注: 1,2,10,10²,10³,10⁴,10⁵,10⁶ 表示重复冲击的次数. Note: 1,2,10,10²,10³,10⁴,10⁵,10⁶ Stand for Repetitions.

- 伏安特性曲线 Voltage-Current Characteristic Curves



● 伏安特性曲线 Voltage-Current Characteristic Curves

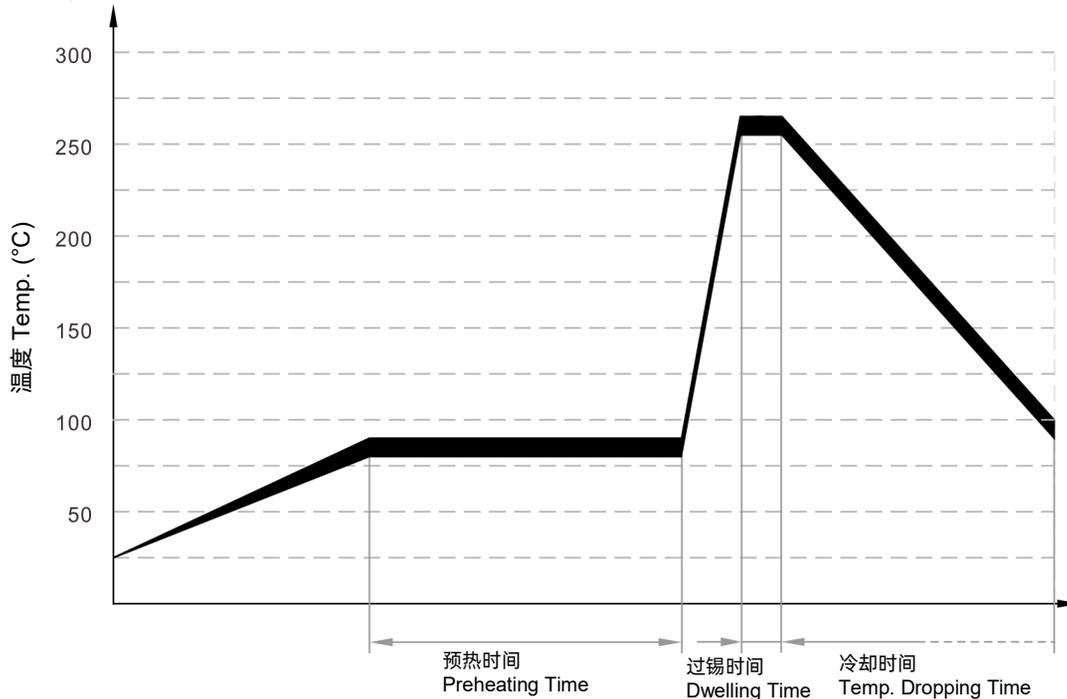


焊接参数 Soldering Parameters

波峰焊参数 Wave Soldering Parameters

本波峰焊参数仅供参考，实际使用时应做相关的试验进行验证。

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



波峰焊曲线 Wave Soldering Curve

项目 Item	温度 Temp. (°C)	时间 Time (s)
预热 Preheating	80 ~ 90	60 ~ 150
过锡 Dwelling	260 ± 5	2 ~ 4
冷却时间 Cooling Time	≤ 80	10

手工焊参数 Recommended Hand-Soldering Parameters

项目 Item	条件 Condition
烙铁头部温度 Temp. of Solder Head	350 °C (max.)
焊接时间 Soldering Time	2 seconds (max.)
引脚外露脚长度 Distance between Soldering Point and Coating	2 mm (min.)

热保护型压敏电阻

Thermal Fuse Varistor (TFV)

TFV8S 系列 Series

包装 Packaging Information

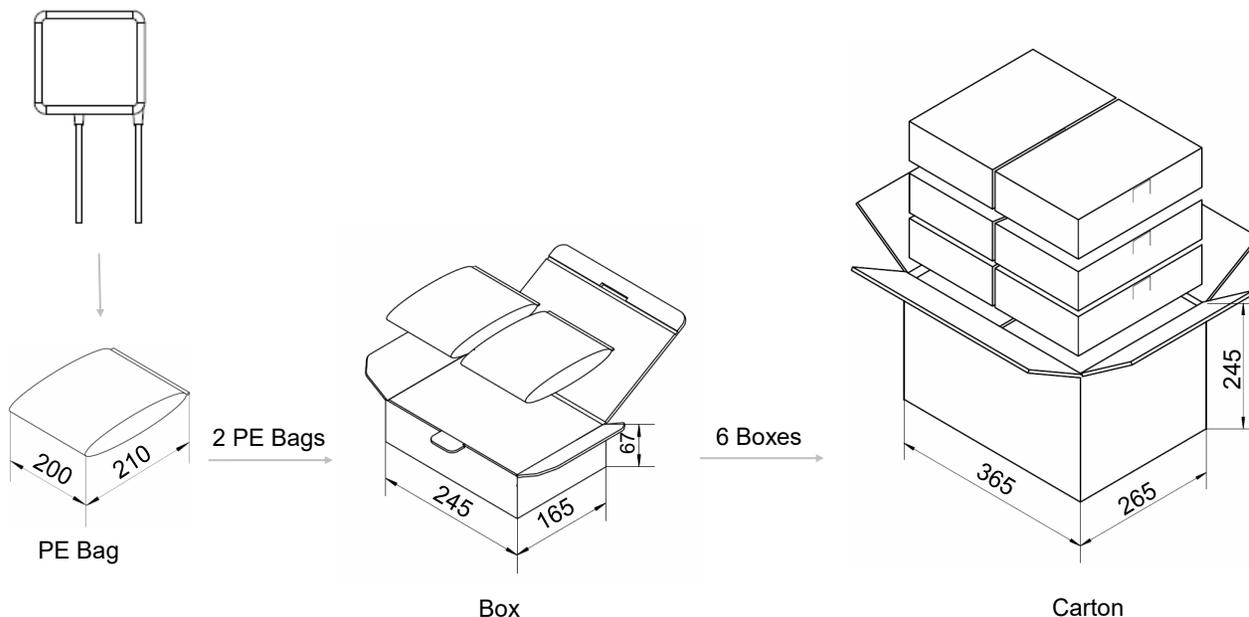
- 散装包装 Bulk Packaging (Code: BUL)
- 散装包装数量和重量 Bulk Packaging Quantity & Weight.

系列 Series	标称压敏电压 Nominal Varistor Voltage	PE袋 PE Bag	数量/盒 Box	数量/箱 Carton	毛重/箱 (365*265*245) G. W. / Carton
	(V)	(PCS)	(PCS)	(PCS)	(kg)±10%
8S	820 ~ 561	400	800	4800	8 ~ 14
	621 ~ 821	250	500	3000	11~ 14

备注：其他引脚长度的包装请咨询赛尔特。

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

单位 Dimensions (mm)





注意

ATTENTION

TFV

TFV

使用 Usage

1. 请不要强烈的振动、冲击或施加压力，以免压敏电阻表面树脂或元件产生裂痕。
Please do not apply severe vibration, shock or pressure to MOV, to avoid surface resin or element cracking.
2. 对引线进行弯曲加工或切断加工时，请固定元件端引线。卤折弯距离引线绝缘覆盖部分至少2 mm。
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.
3. 为了降低产品的表面温升，建议波峰焊前在产品上增加隔热罩。
In order to reduce the surface temperature rise, adding heat insulated shroud is recommended before wave .
4. 以上曲线仅供参考，使用前请确认，以免损伤温度保险丝。
This curve is for reference only. Please confirm before production to avoid damaging the integrated Thermal Fuse .

更换 Replacement

如发现压敏电阻外观有损伤，请更换。
If varistor is visually damaged, please replace it.

贮存 Storage

1. 存储温度： Storage Temp. Range: (-40 to ~ 125) °C
2. 相对湿度： Relative Humidity: ≤75% RH

- 热保护型压敏电阻的贮存应避免高温、高湿、日光直射和腐蚀性气体的场合，避免影响引脚可焊性，产品购入后请于1年内使用完。
Please store TFMOV without high temp, high humidity or corrosive gas. to avoid reducing the solderability of the pins, please use them up within 1year after receiving the goods.

不适宜环境条件 Environmental Conditions

- 压敏电阻不应直接暴露在露天工作。
Varistor should not be exposed to the open air.
- 压敏电阻应避免在雨水，水蒸汽等高温高湿的条件下工作。
Varistor should avoid rain, water vapor or other condition of high temp. and high humidity.
- 压敏电阻应避免在沙尘、盐雾、有害气体的条件下工作。
Varistor should avoid sand dust, salt spray, or other harmful gases.

压敏电阻的固有电容 Max. Typical Capacitance of Varistor

压敏电阻的固有电容最大参考值已在规格表中列出，供设计师在高频电路中选用时参考。
The typical capacitance of varistor is listed in the specifications. Designers may refer to it when designing MOV in high frequency circuit.

安装 Installation

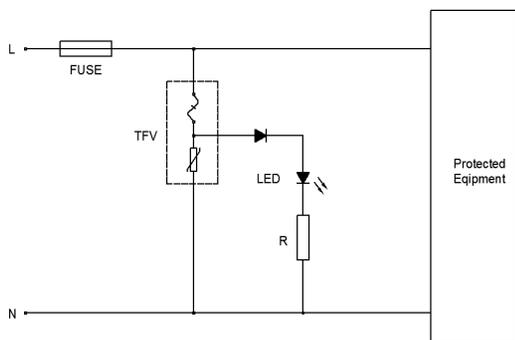
机械应力 Mechanical Stress

应用案例 Application Examples

以下应用案件展示了TFV 指示引线如何显示热保护元件已断开。这意味着电路不再受MOV保护。
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.

应用案例1 Application Example 1

在这种情况下，LED通常开启，并且在热元件打开时关闭。
In this case, the LED is normally on, and is off when the thermal element opens.



应用案例2 Application Example 2

该电路利用光耦合器在TFV热保护压敏电阻和指示或报警电路之间提供电流隔离。
This circuit utilizes an optocoupler to provide galvanic isolations between the TFV varistor and the indicating or alarm circuitry.

