

# 瞬态抑制二极管 TVS Diodes

Transient Voltage Suppression Diodes

3.0SMCJ Series



## 概述 Description

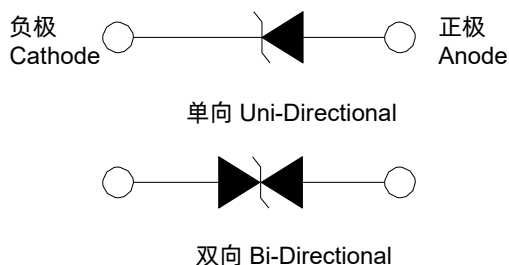
瞬态抑制二极管 (TVS) 是一种电路保护元件, 它可以削弱或过滤突增的瞬态电压(过压), 在浪涌到来瞬间几纳秒时间内发生雪崩击穿, 将浪涌电流引至接地端, 并将电压箝位在安全范围内, 从而实现了高效能的电压保护

Transient Voltage Suppressor (TVS) is a circuit protection component that either attenuates (reduces) or filters a transient voltage spike (overvoltage), TVS diodes provide critical protection by going into avalanche breakdown within no more than a few nanoseconds after a strike, clamping the transient voltage, and routing its current to the ground.

## 应用 Applications

- 通信设备      Communication Equipment
- 安防            Security & Protection
- 工控设备      Industrial Control Equipment
- 电源            Power Supply
- 汽车电子      Automotive Electronics
- 新能源设备    New Energy
- 防雷保护      Lightning Protection

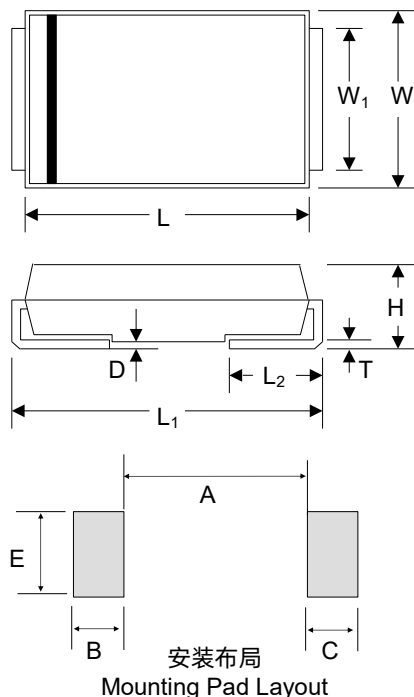
## 功能图 Functional Diagram



## 特性 Features

- 低浪涌电阻
- 优异的箝位性能
- 小型化紧凑封装, 内部结构去应力设计
- 重复率0.01% 的10/1000 μS 波形对应峰值脉冲功率3000 W
- 表贴应用, 节约空间
- 典型的故障模式为电压或电流超过额定而导致的短路
- IEC 61000-4-2 ESD 30 kV (空气), 30 kV (接触)
- 数据线EFT保护符合IEC 61000-4-4
- 快速响应时间
- 玻璃钝化保护
- 回流焊高温保证:260 °C/30 s
- 温度系数典型值0.1%
- 密封材料阻燃等级V-0
- 湿度敏感等级符合MSL 等级1
- 引脚镀雾锡
- 无卤素, 符合RoHS要求
- 无铅E3: 二级互连引线无铅, 端子镀锡(Sn) (IPC/JEDEC J-STD-609A.01)
- Low incremental surge resistance
- Excellent clamping capability
- Low profile package with built-in strain relief
- 3000 W peak pulse power capability with a 10/1000 μS Waveform, repetition rate (duty cycle): 0.01%
- For surface mounted applications to optimize board space
- Typical failure mode is short from over-specified voltage or current
- IEC 61000-4-2 ESD 30 kV (Air), 30 kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Very fast response time
- Glass passivated chip junction
- High temperature to reflow soldering guaranteed: 260 °C/30sec
- $V_{BR} @ T_J = V_{BR}@25\text{ °C} \times (1 + \alpha T \times (T_J - 25))$   
( $\alpha T$ : Temperature Coefficient, typical value is 0.1%)
- Plastic package is flammability rated V-0 per Underwriters Laboratories
- Meet MSL level1, per J-STD-020
- Matte tin lead-free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)

封装尺寸 Package Outline Dimensions (DO-214AB)



符号 Symbol	公制(毫米)Millimeters		英制(英寸) Inches	
	Min.	Max.	Min.	Max.
L	6.600	7.110	0.260	0.280
W	5.590	6.220	0.220	0.245
W <sub>1</sub>	2.900	3.200	0.114	0.126
H	2.060	2.620	0.079	0.103
T	0.1520	0.305	0.006	0.012
L <sub>1</sub>	7.750	8.130	0.305	0.320
L <sub>2</sub>	0.760	1.520	0.030	0.060
D	-	0.203	-	0.008
A	-	4.200	-	0.165
B	2.400	-	0.094	-
C	2.400	-	0.094	-
E	3.300	-	0.129	-

额定参数与特性 Maximum Ratings and Characteristics

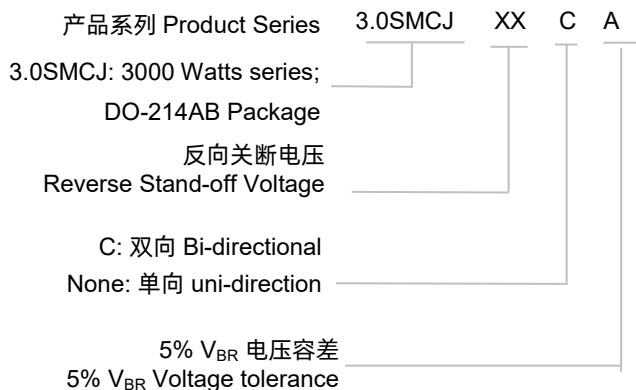
(除另有注释, 默认T<sub>A</sub>=25 °C Ratings at 25 °C ambient temperature unless otherwise specified.)

参数 Parameter	符号 Symbol	值 Value	单位 Unit
10/1000 μS 脉冲波形(图4)下, 峰值脉冲功耗(图2) Peak Power Dissipation(Fig.2)- with a 10/1000 μS waveform(Fig.4)	P <sub>PPM</sub>	3000	W
峰值功耗,无限散热, T <sub>L</sub> =50 °C Peak Power Dissipation on Infinite Heat Sink at T <sub>L</sub> =50 °C	P <sub>D</sub>	6.5	W
正向脉冲电流峰值 <sup>(1)</sup> ,额定负载叠加8.3 ms 单半正弦波测得(JEDEC方法) Peak Forward Surge Current,8.3ms single half sinewave superimposed on rated load (JEDEC Method) <sup>(1)</sup>	I <sub>FSM</sub>	200	A
正向瞬态峰值电压 @ I <sub>F</sub> =100 A, 仅适用于单向产品 Maximum Instantaneous Forward Voltage at 100 A for Unidirectional Only	V <sub>F</sub>	3.5	V
工作温度范围 Operating Temperature Range	T <sub>J</sub>	-65 to 150	°C
存储温度范围 Storage Temperature Range	T <sub>STG</sub>	-65 to 175	°C
热阻(结至引线) Typical Thermal Resistance Junction to Lead	R <sub>θJL</sub>	15	°C/W
热阻(结至环境) Typical Thermal Resistance Junction to Ambient	R <sub>θJA</sub>	75	°C/W

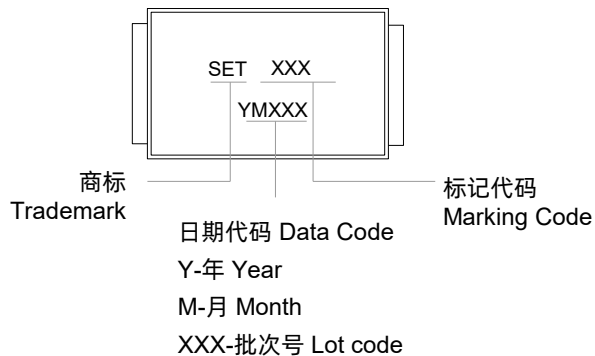
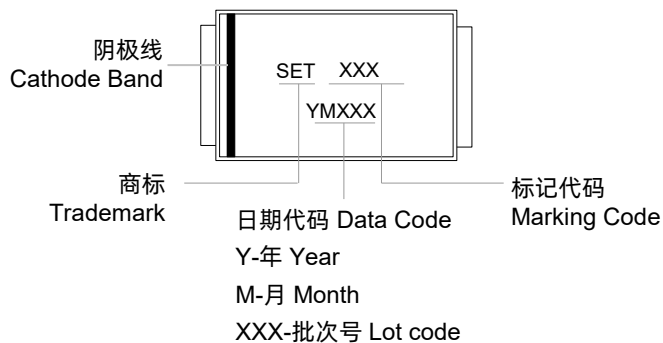
注释 Note

1. 叠加波形为8.3 ms单个半周期正弦波或等幅方波, 最长周期4次/min。  
Measured of 8.3 ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum.

## 型号规则 Part Numbering System



## 标记 Marking



## 术语 Glossary

项目 Item	描述 Description
$V_C$	<b>箝位电压 Clamping Voltage</b> TVS在低差阻区域内的电压，用于限制设备两端的电压。 Voltage across TVS in a region of low differential resistance that serves to limit the voltage across the device terminals.
$V_R$	<b>反向关断电压 Reverse Stand-off Voltage</b> TVS 在没有导通状态下最高电压。 Maximum voltage that can be applied to the TVS without operation. 注：也用 $V_{WM}$ （最高直流工作电压）表示，也称为截止电压( $V_{SO}$ )。 NOTE : It is also shown as $V_{WM}$ (maximum working voltage (maximum d.c. voltage)) and known as rated stand-off voltage ( $V_{SO}$ ).
$I_R$	<b>反向漏电流 Reverse Leakage Current</b> 量测 $V_R$ 的电流。 Current measured at $V_R$ . 注：也用 $I_D$ 待机电流表示。 NOTE : Also shown as $I_D$ for stand-by current.
$V_{BR}$	<b>击穿电压 Breakdown Voltage</b> 在击穿区以指定电流 $I_T$ (测试电流)通过TVS的电压。 Voltage across TVS at a specified current $I_T$ (test current) in the breakdown region.
$I_{PPM}$	<b>额定随机重复峰值脉冲电流 Rated Random Recurring Peak Impulse Current</b> 施加在设备上的随机重复峰值脉冲电流的最大额定值。 Maximum-rated value of random recurring peak impulse current that may be applied to a device.
$P_{M(AV)}$	<b>额定平均功率 Rated Average Power Dissipation</b> 所有电源(包括瞬态电流和待机电流)在短时间内平均产生的最大额定功耗。 Maximum-rated value of power dissipation resulting from all sources, including transients and standby current, averaged over a short period of time.
$P_{PPM}$	<b>额定随机重复峰值脉冲功率 Rated Random Recurring Peak Impulse Power Dissipation</b> 额定随机重复峰值脉冲电流( $I_{PPM}$ ) 和规定的最大箝位电压( $V_C$ )乘积的最大额定值。 Maximum-rated value of the product of rated random recurring peak impulse current ( $I_{PPM}$ ) multiplies by specified maximum clamping voltage ( $V_C$ ).
$C_J$	<b>电容 Capacitance</b> 在规定的频率和电压下所测量的TVS电容。 Capacitance across the TVS measured at a specified frequency and voltage.

—(GB-T 18802.321 / IEC 61643-321 / JESD210A)

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项目 Item	描述 Description
$V_{FS}$	<p><b>正向浪涌峰值电压 Peak Forward Surge Voltage</b></p> <p>在指定的正向浪涌电流(<math>I_{FS}</math>)和持续时间下, 通过TVS的峰值电压。 Peak voltage across TVS for a specified forward surge current (<math>I_{FS}</math>) and time duration.</p> <p>注: 也用<math>V_F</math>表示。 NOTE : Also shown as <math>V_F</math>.</p>
$I_{FS}$	<p><b>正向浪涌电流 Forward Surge Current</b></p> <p>在正向导通区域通过TVS的脉冲电流。 Pulsed current through TVS in the forward conducting region.</p> <p>注: 也用<math>I_F</math>表示。 NOTE : Also shown as <math>I_F</math>.</p>
$\alpha_{V(BR)}$	<p><b>击穿电压温度系数 Temperature Coefficient of Breakdown Voltage</b></p> <p>击穿电压的变化与温度变化的比值。 The change of breakdown voltage divided by the change of temperature.</p>
$I_{PP}$	<p><b>峰值脉冲电流 Peak pulse Current</b></p> <p>施加在TVS上的峰值脉冲电流, 以确定箝位电压<math>V_C</math>的特定波形。 Peak pulse current value applied across the TVS to determine the clamping voltage <math>V_C</math> for a specified wave shape.</p>
$I_T$	<p><b>脉冲直流测试电流 Pulsed D.C. Test Current</b></p> <p>测量击穿电压<math>V_{BR}</math>的测试电流。该电流值由制造商确定, 通常以脉冲持续时间小于40 ms的毫安级电流给出。 Test current for measurement of the breakdown voltage <math>V_{BR}</math>. This is defined by the manufacturer and usually given in milliamperes with a pulse duration of less than 40 ms.</p> <p>注: 也用<math>I_{BR}</math>表示。 NOTE : Also shown as <math>I_{BR}</math>.</p>

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# 瞬态抑制二极管 TVS Diodes

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电气特性 (除另有注释, 默认 $T_A=25\text{ }^\circ\text{C}$ )

Electrical Characteristics ( $T_A=25\text{ }^\circ\text{C}$  unless otherwise noted) Table 1

型号 Part Number		标记代码 Device Marking Code		击穿电压 Breakdown Voltage $V_{BR@I_T}$		测试 电流 Test Current $I_T$	反向关断 电压 Reverse Stand-off Voltage $V_R$	最大反向 漏电流 Max. Reverse Leakage Current $I_{R@V_R}$	最大峰值 脉冲电流 Max. Peak Pulse Current $I_{PP}$	最大箝位 电压 Max. Clamping Voltage $V_C@I_{PP}$
				Min	Max					
Uni	Bi	Uni	Bi	(V)		(mA)	(V)	( $\mu$ A)	(A)	(V)
3.0SMCJ5.0	3.0SMCJ5.0C	3CAD	3CWD	6.40	7.82	10	5.0	1000	312.5	9.6
3.0SMCJ5.0A	3.0SMCJ5.0CA	3CAE	3CWE	6.40	7.07	10	5.0	1000	326.1	9.2
3.0SMCJ6.0	3.0SMCJ6.0C	3CAF	3CWF	6.67	8.15	10	6.0	1000	263.2	11.4
3.0SMCJ6.0A	3.0SMCJ6.0CA	3CAG	3CWG	6.67	7.37	10	6.0	1000	291.3	10.3
3.0SMCJ6.5	3.0SMCJ6.5C	3CAH	3CWH	7.22	8.82	10	6.5	500	243.9	12.3
3.0SMCJ6.5A	3.0SMCJ6.5CA	3CAK	3CWK	7.22	7.98	10	6.5	500	267.9	11.2
3.0SMCJ6.8	3.0SMCJ6.8C	3CED	3CFD	7.56	9.22	10	6.8	500	247.9	12.1
3.0SMCJ6.8A	3.0SMCJ6.8CA	3CEE	3CFE	7.56	8.35	10	6.8	500	250.0	12.0
3.0SMCJ7.0	3.0SMCJ7.0C	3CAL	3CWL	7.78	9.51	10	7.0	200	225.6	13.3
3.0SMCJ7.0A	3.0SMCJ7.0CA	3CAM	3CWM	7.78	8.60	10	7.0	200	250.0	12.0
3.0SMCJ7.5	3.0SMCJ7.5C	3CAN	3CWN	8.33	10.2	1.0	7.5	100	209.8	14.3
3.0SMCJ7.5A	3.0SMCJ7.5CA	3CAP	3CWP	8.33	9.21	1.0	7.5	100	232.6	12.9
3.0SMCJ8.0	3.0SMCJ8.0C	3CAQ	3CWQ	8.89	10.9	1.0	8.0	50	200.0	15.0
3.0SMCJ8.0A	3.0SMCJ8.0CA	3CAR	3CWR	8.89	9.83	1.0	8.0	50	220.6	13.6
3.0SMCJ8.5	3.0SMCJ8.5C	3CAS	3CWS	9.44	11.5	1.0	8.5	20	188.7	15.9
3.0SMCJ8.5A	3.0SMCJ8.5CA	3CAT	3CWT	9.44	10.4	1.0	8.5	20	208.3	14.4
3.0SMCJ9.0	3.0SMCJ9.0C	3CAU	3CWU	10.0	12.2	1.0	9.0	10	177.5	16.9
3.0SMCJ9.0A	3.0SMCJ9.0CA	3CAV	3CWV	10.0	11.1	1.0	9.0	10	194.8	15.4
3.0SMCJ10	3.0SMCJ10C	3CAW	3CWW	11.1	13.6	1.0	10	3.0	159.6	18.8
3.0SMCJ10A	3.0SMCJ10CA	3CAX	3CWX	11.1	12.3	1.0	10	3.0	176.5	17.0
3.0SMCJ11	3.0SMCJ11C	3CAY	3CWY	12.2	14.9	1.0	11	3.0	149.3	20.1
3.0SMCJ11A	3.0SMCJ11CA	3CAZ	3CWZ	12.2	13.5	1.0	11	3.0	164.8	18.2
3.0SMCJ12	3.0SMCJ12C	3CBD	3CXD	13.3	16.3	1.0	12	3.0	136.4	22.0
3.0SMCJ12A	3.0SMCJ12CA	3CBE	3CXE	13.3	14.7	1.0	12	3.0	150.8	19.9
3.0SMCJ13	3.0SMCJ13C	3CBF	3CXF	14.4	17.6	1.0	13	3.0	126.1	23.8
3.0SMCJ13A	3.0SMCJ13CA	3CBG	3CXG	14.4	15.9	1.0	13	3.0	139.5	21.5
3.0SMCJ14	3.0SMCJ14C	3CBH	3CXH	15.6	19.1	1.0	14	3.0	116.3	25.8
3.0SMCJ14A	3.0SMCJ14CA	3CBK	3CXK	15.6	17.2	1.0	14	3.0	129.3	23.2
3.0SMCJ15	3.0SMCJ15C	3CBL	3CXL	16.7	20.4	1.0	15	3.0	111.5	26.9
3.0SMCJ15A	3.0SMCJ15CA	3CBM	3CXM	16.7	18.5	1.0	15	3.0	123.0	24.4
3.0SMCJ16	3.0SMCJ16C	3CBN	3CXN	17.8	21.8	1.0	16	3.0	104.2	28.8
3.0SMCJ16A	3.0SMCJ16CA	3CBP	3CXP	17.8	19.7	1.0	16	3.0	115.4	26.0

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				Min	Max					
Uni	Bi	Uni	Bi	(V)		(mA)	(V)	( $\mu$ A)	(A)	(V)
3.0SMCJ17	3.0SMCJ17C	3CBQ	3CXQ	18.9	23.1	1.0	17	3.0	98.4	30.5
3.0SMCJ17A	3.0SMCJ17CA	3CBR	3CXR	18.9	20.9	1.0	17	3.0	108.7	27.6
3.0SMCJ18	3.0SMCJ18C	3CBS	3CXS	20.0	24.4	1.0	18	3.0	93.2	32.2
3.0SMCJ18A	3.0SMCJ18CA	3CBT	3CXT	20.0	22.1	1.0	18	3.0	102.7	29.2
3.0SMCJ20	3.0SMCJ20C	3CBU	3CXU	22.2	27.1	1.0	20	3.0	83.8	35.8
3.0SMCJ20A	3.0SMCJ20CA	3CBV	3CXV	22.2	24.5	1.0	20	3.0	92.6	32.4
3.0SMCJ22	3.0SMCJ22C	3CBW	3CXW	24.4	29.8	1.0	22	3.0	76.1	39.4
3.0SMCJ22A	3.0SMCJ22CA	3CBX	3CXX	24.4	26.9	1.0	22	3.0	84.5	35.5
3.0SMCJ24	3.0SMCJ24C	3CBY	3CXY	26.7	32.6	1.0	24	3.0	69.8	43.0
3.0SMCJ24A	3.0SMCJ24CA	3CBZ	3CXZ	26.7	29.5	1.0	24	3.0	77.1	38.9
3.0SMCJ26	3.0SMCJ26C	3CCD	3CYD	28.9	35.3	1.0	26	3.0	64.4	46.6
3.0SMCJ26A	3.0SMCJ26CA	3CCE	3CYE	28.9	31.9	1.0	26	3.0	71.3	42.1
3.0SMCJ28	3.0SMCJ28C	3CCF	3CYF	31.1	38.0	1.0	28	3.0	60.0	50.0
3.0SMCJ28A	3.0SMCJ28CA	3CCG	3CYG	31.1	34.4	1.0	28	3.0	66.1	45.4
3.0SMCJ30	3.0SMCJ30C	3CCH	3CYH	33.3	40.7	1.0	30	3.0	56.1	53.5
3.0SMCJ30A	3.0SMCJ30CA	3CCK	3CYK	33.3	36.8	1.0	30	3.0	62.0	48.4
3.0SMCJ33	3.0SMCJ33C	3CCL	3CYL	36.7	44.9	1.0	33	3.0	50.8	59.0
3.0SMCJ33A	3.0SMCJ33CA	3CCM	3CYM	36.7	40.6	1.0	33	3.0	56.3	53.3
3.0SMCJ36	3.0SMCJ36C	3CCN	3CYN	40.0	48.9	1.0	36	3.0	46.7	64.3
3.0SMCJ36A	3.0SMCJ36CA	3CCP	3CYP	40.0	44.2	1.0	36	3.0	51.6	58.1
3.0SMCJ40	3.0SMCJ40C	3CCQ	3CYQ	44.4	54.3	1.0	40	3.0	42.0	71.4
3.0SMCJ40A	3.0SMCJ40CA	3CCR	3CYR	44.4	49.1	1.0	40	3.0	46.5	64.5
3.0SMCJ43	3.0SMCJ43C	3CCS	3CYS	47.8	58.4	1.0	43	3.0	39.1	76.7
3.0SMCJ43A	3.0SMCJ43CA	3CCT	3CYT	47.8	52.8	1.0	43	3.0	43.2	69.4
3.0SMCJ45	3.0SMCJ45C	3CCU	3CYU	50.0	61.1	1.0	45	3.0	37.4	80.3
3.0SMCJ45A	3.0SMCJ45CA	3CCV	3CYV	50.0	55.3	1.0	45	3.0	41.3	72.7
3.0SMCJ48	3.0SMCJ48C	3CCW	3CYW	53.3	65.1	1.0	48	3.0	35.1	85.5
3.0SMCJ48A	3.0SMCJ48CA	3CCX	3CYX	53.3	58.9	1.0	48	3.0	38.8	77.4
3.0SMCJ51	3.0SMCJ51C	3CCY	3CYY	56.7	69.3	1.0	51	3.0	32.9	91.1
3.0SMCJ51A	3.0SMCJ51CA	3CCZ	3CZY	56.7	62.7	1.0	51	3.0	36.4	82.4
3.0SMCJ54	3.0SMCJ54C	3CRD	3CZD	60.0	73.3	1.0	54	3.0	31.2	96.3
3.0SMCJ54A	3.0SMCJ54CA	3CRE	3CZE	60.0	66.3	1.0	54	3.0	34.4	87.1

TVS

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Transient Voltage Suppression Diodes

3.0SMCJ Series

型号 Part Number		标记代码 Device Marking Code		击穿电压 Breakdown Voltage $V_{BR@I_T}$		测试 电流 Test Current $I_T$	反向关断 电压 Reverse Stand-off Voltage $V_R$	最大反向 漏电流 Max. Reverse Leakage $I_R@V_R$	最大峰值 脉冲电流 Max. Peak Pulse Current $I_{PP}$	最大箝位 电压 Max. Clamping Voltage $V_C@I_{PP}$
				Min	Max					
Uni	Bi	Uni	Bi	(V)		(mA)	(V)	( $\mu$ A)	(A)	(V)
3.0SMCJ58	3.0SMCJ58C	3CRF	3CZF	64.4	78.7	1.0	58	3.0	29.1	103
3.0SMCJ58A	3.0SMCJ58CA	3CRG	3CZG	64.4	71.2	1.0	58	3.0	32.1	93.6
3.0SMCJ60	3.0SMCJ60C	3CRH	3CZH	66.7	81.5	1.0	60	3.0	28.0	107
3.0SMCJ60A	3.0SMCJ60CA	3CRK	3CZK	66.7	73.7	1.0	60	3.0	31.0	96.8
3.0SMCJ64	3.0SMCJ64C	3CRN	3CZN	71.1	86.9	1.0	64	3.0	26.3	114
3.0SMCJ64A	3.0SMCJ64CA	3CRP	3CZP	71.1	78.6	1.0	64	3.0	29.1	103
3.0SMCJ68	3.0SMCJ68C	3CRB	3CZB	75.5	92.3	1.0	68	3.0	24.8	121
3.0SMCJ68A	3.0SMCJ68CA	3CRC	3CZC	75.5	83.5	1.0	68	3.0	27.5	109
3.0SMCJ70	3.0SMCJ70C	3CEH	3CFH	77.8	95.1	1.0	70	3.0	24.0	125
3.0SMCJ70A	3.0SMCJ70CA	3CEK	3CFK	77.8	86.0	1.0	70	3.0	26.5	113
3.0SMCJ75	3.0SMCJ75C	3CRQ	3CZQ	83.3	102	1.0	75	3.0	22.4	134
3.0SMCJ75A	3.0SMCJ75CA	3CRR	3CZR	83.3	92.1	1.0	75	3.0	24.8	121
3.0SMCJ78	3.0SMCJ78C	3CRS	3CZS	86.7	106	1.0	78	3.0	21.6	139
3.0SMCJ78A	3.0SMCJ78CA	3CRT	3CZT	86.7	95.8	1.0	78	3.0	23.8	126
3.0SMCJ85	3.0SMCJ85C	3CRU	3CZU	94.4	115	1.0	85	3.0	19.9	151
3.0SMCJ85A	3.0SMCJ85CA	3CRV	3CZV	94.4	104	1.0	85	3.0	21.9	137
3.0SMCJ90	3.0SMCJ90C	3CRW	3CZW	100	122	1.0	90	3.0	18.8	160
3.0SMCJ90A	3.0SMCJ90CA	3CRX	3CZX	100	111	1.0	90	3.0	20.5	146
3.0SMCJ100	3.0SMCJ100C	3CRY	3CZY	111	136	1.0	100	3.0	16.8	179
3.0SMCJ100A	3.0SMCJ100CA	3CRZ	3CZZ	111	123	1.0	100	3.0	18.5	162
3.0SMCJ110	3.0SMCJ110C	3CSD	3CVD	122	149	1.0	110	3.0	15.3	196
3.0SMCJ110A	3.0SMCJ110CA	3CSE	3CVE	122	135	1.0	110	3.0	16.9	177
3.0SMCJ120	3.0SMCJ120C	3CSF	3CVF	133	163	1.0	120	3.0	14.0	214
3.0SMCJ120A	3.0SMCJ120CA	3CSG	3CVG	133	147	1.0	120	3.0	15.5	193
3.0SMCJ130	3.0SMCJ130C	3CSH	3CVH	144	176	1.0	130	3.0	13.0	231
3.0SMCJ130A	3.0SMCJ130CA	3CSK	3CVK	144	159	1.0	130	3.0	14.4	209
3.0SMCJ150	3.0SMCJ150C	3CSL	3CVL	167	204	1.0	150	3.0	11.2	268
3.0SMCJ150A	3.0SMCJ150CA	3CSM	3CVM	167	185	1.0	150	3.0	12.3	243
3.0SMCJ160	3.0SMCJ160C	3CSN	3CVN	178	218	1.0	160	3.0	10.5	287
3.0SMCJ160A	3.0SMCJ160CA	3CSP	3CVP	178	197	1.0	160	3.0	11.6	259
3.0SMCJ170	3.0SMCJ170C	3CSQ	3CVQ	189	231	1.0	170	3.0	9.9	304
3.0SMCJ170A	3.0SMCJ170CA	3CSR	3CVR	189	209	1.0	170	3.0	10.9	275



# 瞬态抑制二极管 TVS Diodes

Transient Voltage Suppression Diodes

3.0SMCJ Series

型号 Part Number		标记代码 Device Marking Code		击穿电压 Breakdown Voltage $V_{BR}@I_T$		测试 电流 Test Current $I_T$	反向关断 电压 Reverse Stand-off Voltage $V_R$	最大反向 漏电流 Max. Reverse Leakage $I_R@V_R$	最大峰值 脉冲电流 Max. Peak Pulse Current $I_{PP}$	最大箝位 电压 Max. Clamping Voltage $V_C@I_{PP}$
				Min	Max					
Uni	Bi	Uni	Bi	(V)		(mA)	(V)	( $\mu$ A)	(A)	(V)
3.0SMCJ188	3.0SMCJ188C	3CST	3CVT	209	255	1.0	188	3.0	8.7	344
3.0SMCJ188A	3.0SMCJ188CA	3CSS	3CVS	209	231	1.0	188	3.0	9.1	328
3.0SMCJ200	3.0SMCJ200C	3CSU	3CVU	222	272	1.0	200	3.0	8.4	356
3.0SMCJ200A	3.0SMCJ200CA	3CSV	3CVV	222	246	1.0	200	3.0	9.3	323
3.0SMCJ220	3.0SMCJ220C	3CSW	3CVW	245	299	1.0	220	3.0	7.7	392
3.0SMCJ220A	3.0SMCJ220CA	3CSX	3CVX	245	270	1.0	220	3.0	8.5	355
3.0SMCJ240	3.0SMCJ240C	3CSY	3CVY	267	326	1.0	240	3.0	7.0	428
3.0SMCJ240A	3.0SMCJ240CA	3CSZ	3CVZ	267	295	1.0	240	3.0	7.7	388
3.0SMCJ250	3.0SMCJ250C	3CTS	3CUS	278	340	1.0	250	3.0	6.7	446
3.0SMCJ250A	3.0SMCJ250CA	3CTT	3CUT	278	307	1.0	250	3.0	7.4	404
3.0SMCJ300	3.0SMCJ300C	3CTF	3CUF	333	408	1.0	300	3.0	5.6	535
3.0SMCJ300A	3.0SMCJ300CA	3CTG	3CUG	333	368	1.0	300	3.0	6.2	485
3.0SMCJ350	3.0SMCJ350C	3CTQ	3CUQ	389	476	1.0	350	3.0	4.8	624
3.0SMCJ350A	3.0SMCJ350CA	3CTR	3CUR	389	429	1.0	350	3.0	5.3	566
3.0SMCJ360	3.0SMCJ360C	3CTH	3CUH	400	489	1.0	360	3.0	4.6	652
3.0SMCJ360A	3.0SMCJ360CA	3CTK	3CUK	400	442	1.0	360	3.0	5.2	582
3.0SMCJ400	3.0SMCJ400C	3CTL	3CUL	445	544	1.0	400	3.0	4.2	713
3.0SMCJ400A	3.0SMCJ400CA	3CTM	3CUM	445	491	1.0	400	3.0	4.6	646
3.0SMCJ440	3.0SMCJ440C	3CTN	3CUN	489	598	1.0	440	3.0	3.8	784
3.0SMCJ440A	3.0SMCJ440CA	3CTP	3CUP	489	540	1.0	440	3.0	4.2	711

注释 Notes:

1. 对于 $V_R$ 为10 V及更低的双向产品， $I_R$ 值需乘以两倍。

For bidirectional type having  $V_R$  of 10 volts and less, the  $I_R$  should be doubled.

2. 对于没有A的产品， $V_{BR}$ 范围为 $\pm 10\%$ 且 $V_C$ 也比有A的产品高5%，当前不推荐没有A的产品用于新设计，带A的产品推荐优先选用。

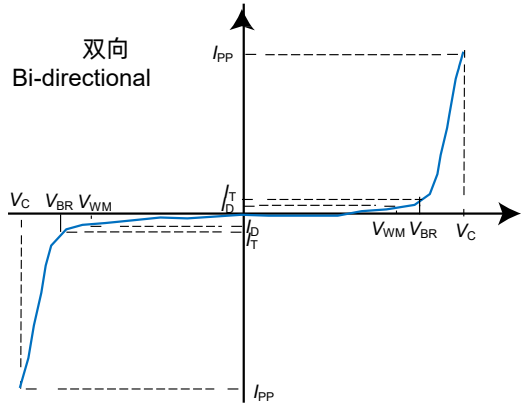
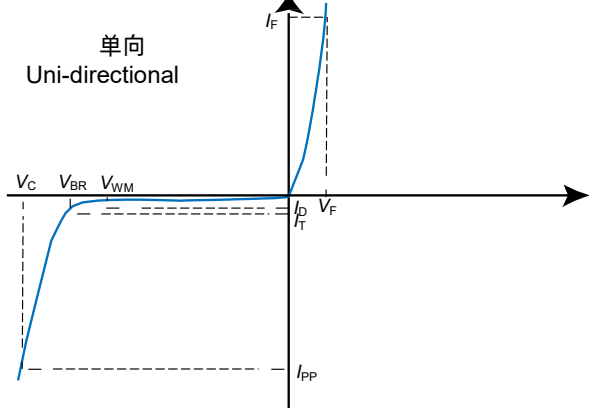
For parts without A in the PN, the  $V_{BR}$  tolerance is  $\pm 10\%$  and  $V_C$  is 5% higher than parts with A. The parts without A are currently available, but not recommended for new designs. The parts with A are preferred.

# 瞬态抑制二极管 TVS Diodes

Transient Voltage Suppression Diodes

3.0SMCJ Series

## 伏安特性曲线 I-V Curve Characteristics



## 参考性能曲线 (除有另外注释, 默认 $T_A=25^\circ\text{C}$ )

Performance Curve for Reference ( $T_A=25^\circ\text{C}$  unless otherwise noted)

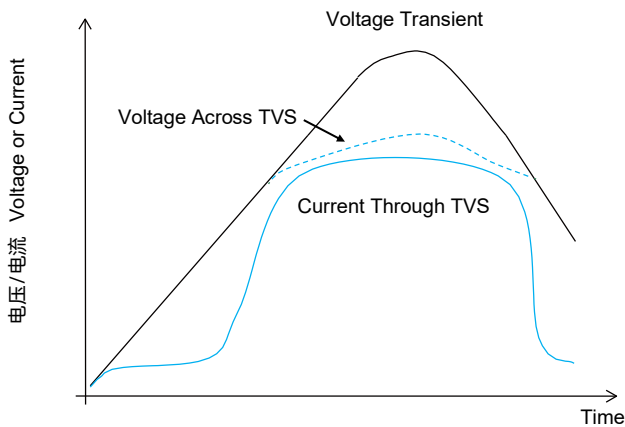


FIGURE 1 TVS瞬态箝位波形  
TVS Transients Clamping Waveform

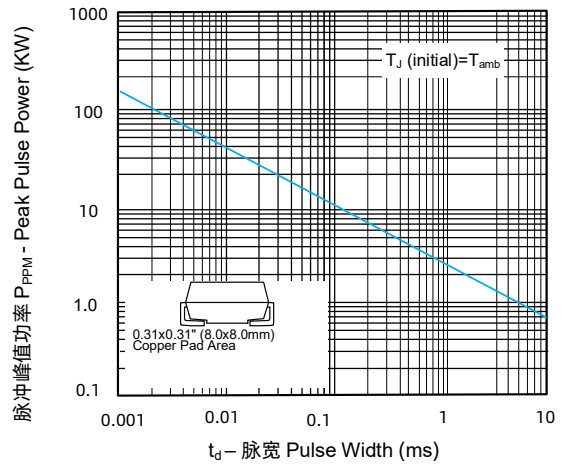


FIGURE 2 峰值脉冲功率额定曲线  
Peak Pulse Power Rating Curve

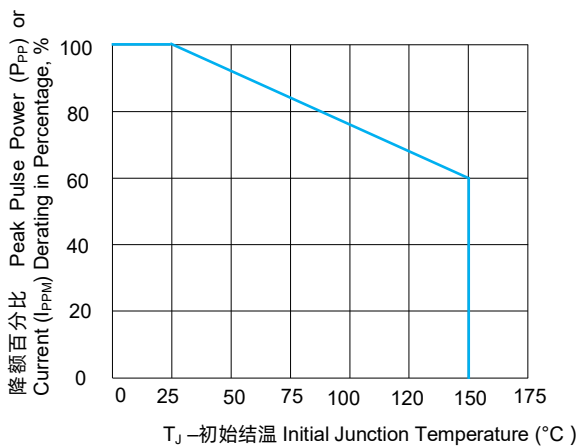


FIGURE 3 峰值脉冲功率降额曲线  
Peak Pulse Power Derating Curve

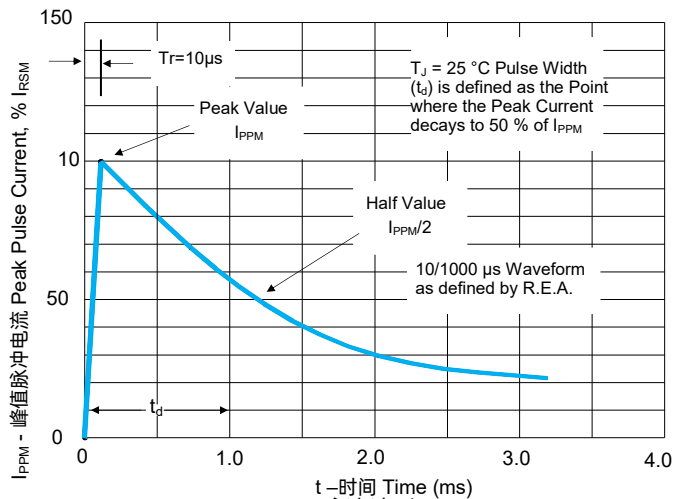
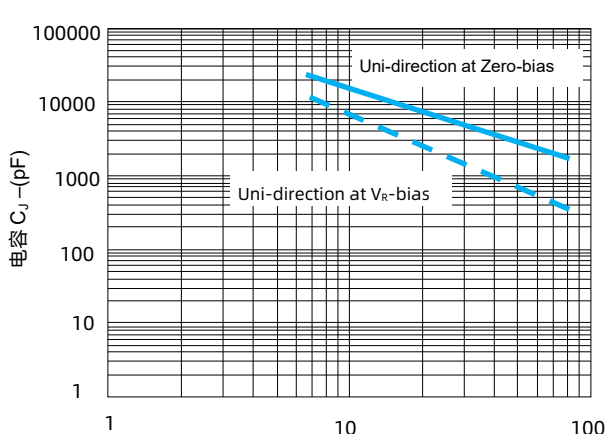


FIGURE 4 脉冲波形 Pulse Waveform

# 瞬态抑制二极管 TVS Diodes

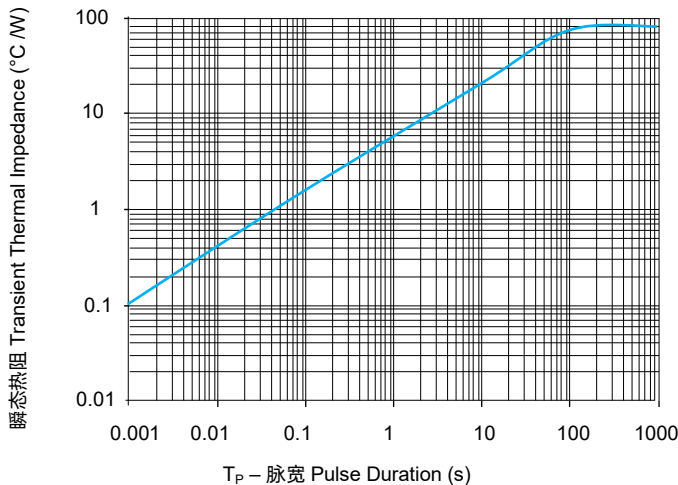
Transient Voltage Suppression Diodes

3.0SMCJ Series



$V_{BR}$  - 反向击穿电压 Reverse Breakdown Voltage (V)

FIGURE 5 典型结电容 Typical Junction Capacitance



$T_P$  - 脉宽 Pulse Duration (s)

FIGURE 6 典型瞬态热阻 Typical Transient Thermal Impedance

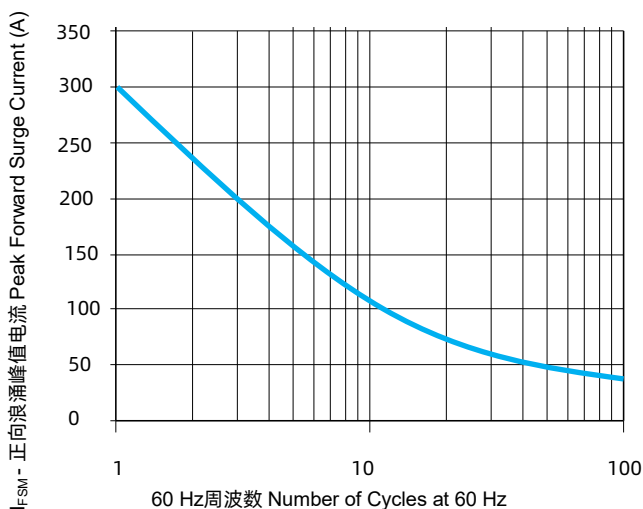


FIGURE 7 最大非重复正向浪涌电流(单向型)

Maximum Non-Repetitive Forward Surge Current  
Uni-Directional only

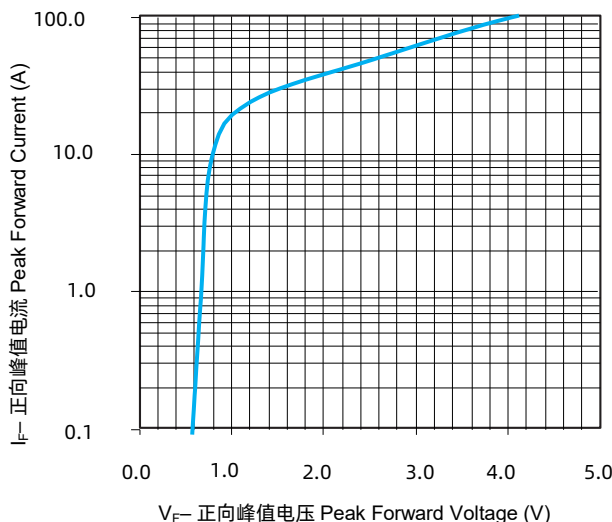


FIGURE 8 峰值正向电压及电流(典型值)

Peak Forward Drop vs Peak Forward Current (Typical Values)

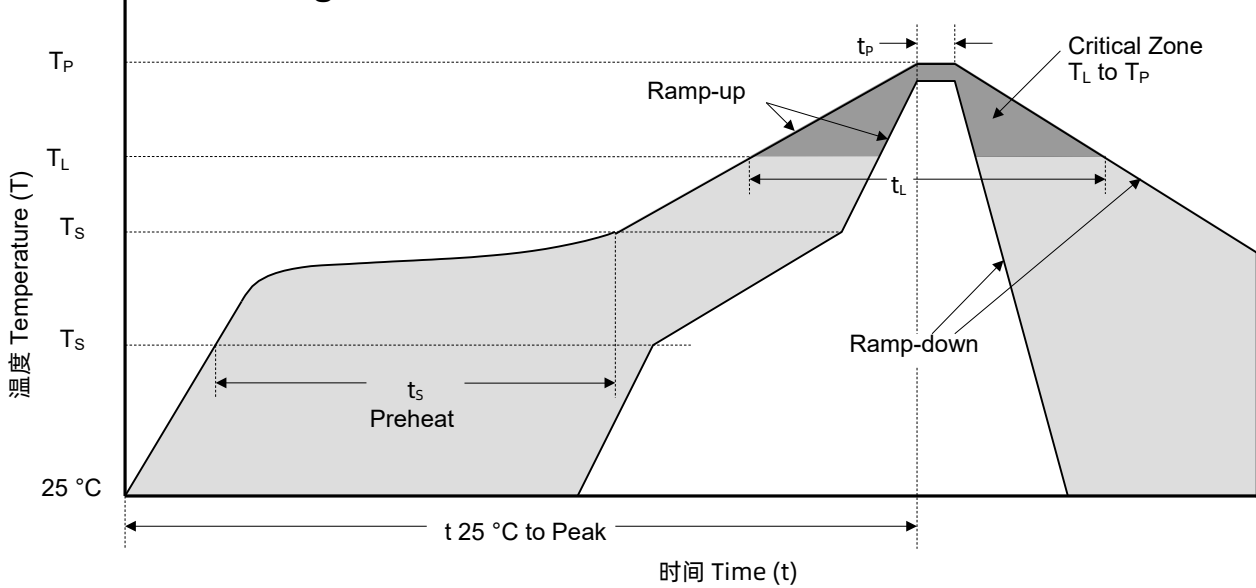
## 环境特性 Environmental Specifications

高温存储 High Temp. Storage	JESD22-A103
高温反偏 HTRB	JESD22-A108
温度循环 Temperature Cycling	JESD22-A104
湿度敏感性等级 MSL	JESDEC-J-STD-020, Level 1
高温高湿反偏 H3TRB	JESD22-A101
耐焊接热 RSH	JESD22-A111

## 物理特性 Physical Specifications

重量 Weight	0.007 ounce, 0.21 grams
封装 Case	JESD22DO214AB. Molded plastic body over glass passivated junction
极性 Polarity	Color band denotes positive end (cathode) except Bidirectional
端子 Terminal	Matte Tin-plated leads, Solderability per JESD22-B102

焊接参数 Soldering Parameters



回流焊条件 Reflowing Condition

回流焊接参数 Reflow Soldering Parameters		无铅组装 Lead-Free Assembly
预热 Pre-heat	最低温( $T_{S (min)}$ ) Temperature Min ( $T_{S (min)}$ )	150 °C
	最高温( $T_{S (max)}$ ) Temperature Max ( $T_{S (max)}$ )	200 °C
	升温时长( $t_s$ ) Time (min to max) ( $t_s$ )	60 ~ 120 seconds
平均升温速率(液相温度( $T_L$ )至峰值温度( $T_P$ )) Average Ramp-up Rate ( Liquidus Temp ( $T_L$ ) to Peak Temp ( $T_P$ ))		3 °C / second max.
$T_S (max)$ 到 $T_L$ 升温速率 $T_S (max)$ to $T_L$ Ramp-up Rate		3 °C / second max.
回流 Reflow	温度 Temperature ( $T_L$ ) (Liquidus)	217 °C
	时长 Time (min to max) ( $t_L$ )	60 ~ 150 seconds
峰值温度 Peak Temperature ( $T_P$ )		Table 1
实际峰值温度 ( $t_p$ ) 5 °C 以内的时间 Time of within 5 °C of Actual Peak Temperature ( $t_p$ )		20 ~ 40 seconds
降温速率 Ramp-down Rate		6 °C / second max.
25 °C 至峰值温度时长 Time from 25 °C to Peak Temperature		8 minutes max.
极限温度 Do Not Exceed		260 °C

# 瞬态抑制二极管 TVS Diodes

Transient Voltage Suppression Diodes

3.0SMCJ Series

## 包装信息 Packaging Information

编带 Tape	符号 Symbol	尺寸 Dimension (mm)
	W	16.00±0.3/-0.1
	P <sub>0</sub>	4.00±0.10
	P <sub>1</sub>	8.00±0.10
	P <sub>2</sub>	2.00±0.10
	D <sub>0</sub>	1.55±0.05
	D <sub>1</sub>	1.55±0.05
	E	1.75±0.10
	F	7.50±0.10
	A <sub>0</sub>	6.15±0.10
	B <sub>0</sub>	8.30±0.10
	K <sub>0</sub>	2.48±0.10
	T	0.30±0.05

卷盘尺寸 Reel Size	13寸卷盘 13" Reel	
	A	330 mm
	C	13.2 mm
	W <sub>1</sub>	16.4 mm

型号 Part Number	封装 Package	卷盘数量QTY (Reel)	包装选项 Packaging Option	包装规格 Packaging Specification
3.0SMCJxxx	DO-214AB	3000 PCS	Tape & Reel – 16mm tape/13" reel	EIA STD RS-481



# 注意

## ATTENTION

### 使用方法 Usage

1. 请在规定的温度范围内使用TVS。  
TVS must operate in the specified ambient temp.
2. 请勿使用强极性溶剂清洗TVS以免破坏封装层。  
Do not clean the TVS with strong polar solvent such as ketone, esters, benzene and halogenated hydrocarbon, to avoid damaging the encapsulating layer.
3. 请勿对TVS施加剧烈的振动，冲击或压力，以避免元件开裂。  
Please do not apply severe vibration, shock or pressure to TVS, to avoid element cracking.

### 更换 Replacement

1. 若TVS出现可视化损伤，请将其更换。  
If TVS is visually damaged, please replace it.
2. TVS为非修理型产品，安全起见，请更换同等规格的TVS。  
TVS is a non-repairable product. For safety sake, please use equivalent TVS for replacement.

### 存储 Storage

1. 存储温度范围。  
Storage Temp. Range: (-55 to 150) °C.
2. 请勿将TVS存放于高温高湿或腐蚀性气体环境中，已避免影响引脚的焊接性能，请于收货后一年内进行使用。  
Do not store the TVS 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.

## 环境条件 Environmental Conditions

1. 请勿暴露于室外阳光直射环境。  
TVS should not be exposed to the open air, nor direct sunshine.
2. 请避免雨水，水汽等高温高湿环境。  
TVS should avoid rain, water vapor or other condition of high temp. and high humidity.
3. 请避免沙尘，盐雾等有害环境。  
TVS should avoid sand dust, salt mist, or other harmful gases.

## TVS最大典型结电容 Max. Typical Capacitance of TVS

高频线路应用中请参照规格书中所给出的典型电容曲线。

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

## 安装机械应力 Installation Mechanical Stress

1. 安装TVS时请避免敲击，防止物理损伤。  
Do not knock TVS when installing, to avoid mechanical damage.
2. 请不要对 TVS 施加剧烈的振动、冲击或压力，以免表面树脂或元件破裂。  
Please do not apply severe vibration, shock or pressure to TVS, to avoid surface resin or element cracking.