

说明

TVSXX00DRVR 故障电流进行可靠分流，以保护系统免受高功率瞬态冲击或雷击。该器件为满足常见的工业信号线路 EMC 要求提供了解决方案。

TVSXX00DRVR 使用独特的反馈机制确保在故障期间发挥精确的平缓钳位能力。精确的电压调节允许设计人员放心地选择具有较低电压容差的系统组件，从而能够在不影响可靠性的情况下降低系统成本和复杂度。

此外，TVSXX00DRVR 采用小型 DFN2*2-6 封装，专为空间受限的应用而设计。极低的器件漏电流和电容可尽可能降低对受保护线路的影响。

特性

- ◆8/20μs 浪涌电流下实现低钳位电压
 - ◆DFN2*2-6
 - ◆低漏电流
 - ◆低电容
- 集成 4 级 IEC 61000-4-2 ESD 保护

应用

- 工业传感器 I/O
- 医疗设备
- USB Type-C™ Vbus
- PLC I/O 模块
- 电器

基本信息

订购信息

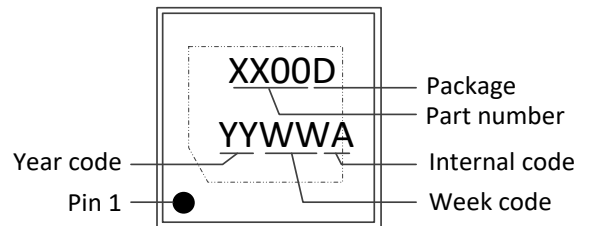
Part Number	Description
TVSXX00DRVR	DFN2*2-6
MPQ	3000pcs

绝对最大额定值

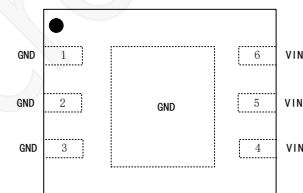
Parameter	Value
Junction temperature	150°C
Storage temperature, Tstg	-55 to 150°C
Leading temperature (soldering, 10secs)	260°C

超过绝对最大额定值中列出的应力可能会对设备造成永久性损坏。长时间暴露在绝对最大额定值条件下可能会影响可靠性。不暗示设备在超出推荐作条件部分所示的任何条件下的功能运行。

印章信息



引脚定义



PIN NO.	PIN name	Description
1~3	GND	GND
4~6	VIN	ESD and surge protected channel
Exposed thermal pad	GND	GND

推荐使用条件

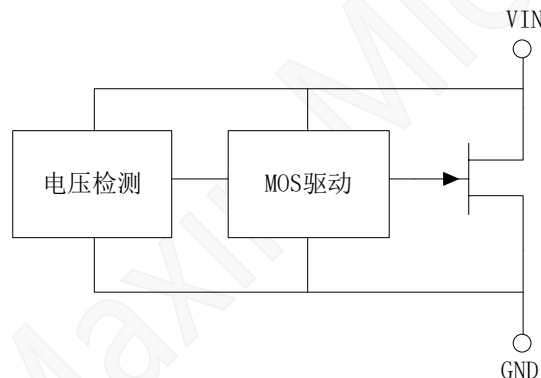
Symbol	Range
Ambient temperature	-40~85°C
Operating temperature	-40~125°C
ESD (contact discharge)	±8KV
ESD (air-gap discharge)	±15KV

同系列器件对比表

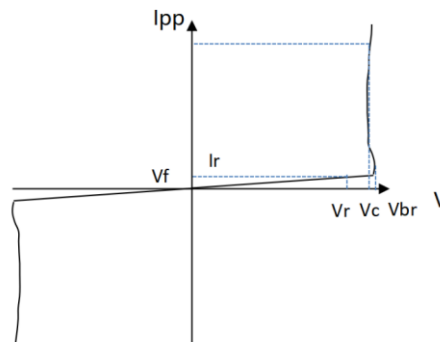
(T =25°C unless otherwise noted)

型号	Vr(V)	Vc (V)	Test Current IT (mA)	Maximum Peak Pulse Current Ipp (A)8/20uS	Maximum Peak Pulse Power (W) (8/20 μs)	Reverse Leakage Current (nA)
TVS0500DRVR	5	7.8	1	60	400	0.07
TVS1400DRVR	14	18.4	1	60	820	2.2
TVS1800DRVR	18	22.8	1	60	960	1.2
TVS2200DRVR	22	26.1	1	60	1120	10
TVS2700DRVR	27	32.5	1	60	1250	1.8
TVS3300DRVR	33	38	1	55	1330	19
型号	Maximum Forward Peak Pulse Current Ipp (A)8/20uS	Maximum Forward Peak Pulse Power (W) (8/20 μs)	IBR (DC Breakdown current) (mA)	EFT(A)	IF (DC Forward Current) (mA)	Cin(pF)
TVS0500DRVR	50	80	50	80	500	155
TVS1400DRVR	50	80	23	80	500	68
TVS1800DRVR	50	80	18	80	500	116
TVS2200DRVR	50	80	18	80	500	105
TVS2700DRVR	50	80	12	80	500	100
TVS3300DRVR	50	80	10	80	500	130

功能框图



I-V 特性曲线



VR Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation

VBR Breakdown Voltage -- Maximum voltage that flows though the TVS at a specified test current (IT)

VC Clamping Voltage -- Peak voltage measured across the TVS at a specified IPPM (peak impulse current)

IR Reverse Leakage Current -- Current measured at VR

Operation description

Overview

The TVSXX00DRVR is a precision clamp with a low, flat clamping voltage during transient overvoltage events like surge and protecting the system with zero voltage overshoot.

Feature Description

The TVSXX00DRVR's flat clamping feature helps keep the clamping voltage very low to keep the downstream circuits from being stressed. The flat clamping feature can also help end-equipment designers save cost by opening the possibility to use lower cost lower voltage tolerant downstream ICs. The TVSXX00DRVR has minimal leakage under the standoff voltage at V_r , making it a good candidate for applications where low leakage and power dissipation is a necessity.

Wide ambient temperature range of -40°C to $+125^{\circ}\text{C}$ makes it a good candidate for most applications. Compact packages enable it to be used in small devices and save board area.

Protection Specifications

- The TVSXX00DRVR also integrates IEC 61000-4-2 Level 4 ESD Protection.
- These combine so that the device can be protected against all transient conditions regardless of length or type.

Minimal Derating

Unlike traditional diodes the TVSXX00DRVR has very little derating of maximum power dissipation and allows for robust performance up to 125°C . Traditional TVS diodes lose up to 50% of their current carrying capability when at high temperatures, so a surge pulse above 85°C ambient can cause failures that are not seen at room temperature. The TVSXX00DRVR prevents this and allows for the same level of protection regardless of temperature.

During large transient swings, the TVSXX00DRVR will begin clamping the input signal to protect downstream conditions. While this prevents damage during fault conditions, it can cause leakage when the intended input signal has a fast slew rate. To keep power dissipation low and remove the chance of signal distortion, it is recommended to keep the slew rate of any input signal on the TVSXX00DRVR below $2.5\text{ V}/\mu\text{s}$ at room temperature and below $0.7\text{ V}/\mu\text{s}$ at 125°C . Faster slew rates will cause the device to clamp the input signal and draw current through the device for a few microseconds, increasing

the rise time of the signal. This will not cause any harm to the system or to the device, however if the fast input voltage swings occur regularly it can cause device overheating.

Application and Implementation

Application Information

A typical operation for the TVSXX00DRVR would be protecting Vbus input. Without any input protection, if a surge event is caused by lightning, coupling, hot-swap ringing, or any other fault condition this input voltage will rise to hundreds of volts for multiple microseconds, violating the absolute maximum input voltage and harming the device.

Configuration Options

The TVSXX00DRVR can be used in either unidirectional or bidirectional configuration. The TVSXX00DRVR shows unidirectional usage to protect an input. By placing two MXX00TVS's in series with reverse orientation, bidirectional operation can be used which will allow a working voltage of $\pm V_r$. TVSXX00DRVR operation in bidirectional will be like unidirectional operation, with a minor increase in breakdown voltage and clamping voltage.

Power Supply Recommendations

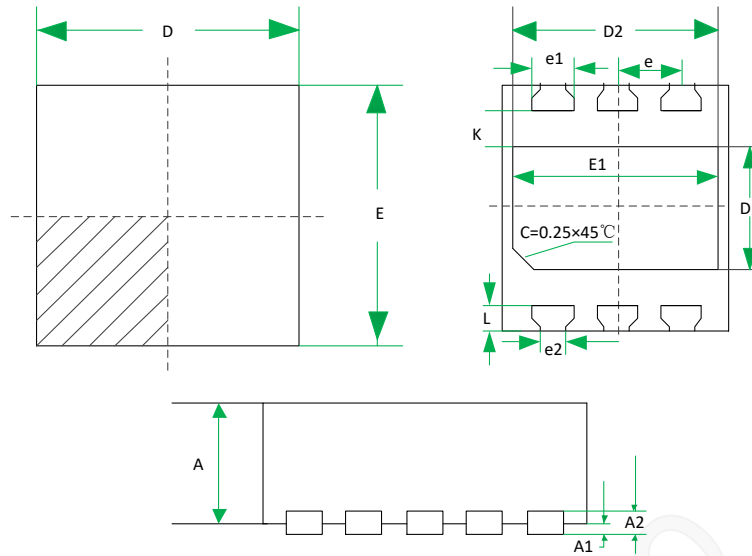
The TVSXX00DRVR is a clamping device so there is no need to power it. Take care not to violate the recommended VIN voltage range (0V to V_r) so that the device functions properly.

Layout Guidelines

The optimum placement is as close to the connector as possible. EMI during an ESD event can couple from the trace being struck to other nearby unprotected traces, resulting in early system failures. The PCB designer must minimize the possibility of EMI coupling by keeping any unprotected traces away from the protected traces which are between the TVS and the connector.

Route the protected traces as straight as possible. Eliminate any sharp corners on the protected traces between the TVSXX00DRVR and the connector by using rounded corners with the largest raid possible. Electric fields tend to build up on corners, increasing EMI coupling.

Package information DFN2*2-6L



SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.025	0.05
A2	0.203REF		
D	1.95	2.00	2.05
D1	0.85	0.9	0.95
E	1.95	2.00	2.05
E1	1.65	1.70	1.75
e	0.65BSC		
e1	0.45BSC		
e2	0.33BSC		
L	0.20	0.25	0.30
K	0.3BSC		

Restrictions on Product Use

- ◆ MAXIN micro is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing MAXIN products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such MAXIN products could cause loss of human life, bodily injury or damage to property.
- ◆ In developing your designs, please ensure that MAXIN products are used within specified operating ranges as set forth in the most recent MAXIN products specifications.
- ◆ The information contained herein is subject to change without notice.

Version update record:

V10 The original version

V11 Added a series of product models.

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