低电容、双通道ESD保护二极管阵列

SM05 SOT23-3

描述

SM05 瞬态电压抑制器（TVS）设计用于保护连接到数据线和传输线的元件免受静电放电（ESD）引起的浪涌电压的影响。TVS 二极管具备高浪涌电流处理能力、低工作电压和箝位电压、快速响应时间。因此，它们非常适合用作敏感半导体元件的板级保护器件。双结共阳极设计允许用户保护一条双向数据线或两条单向数据线。扁平SOT23封装为空间受限电路板的设计提供了更高灵活性。SM05符合IEC 61000-4-2标准对空气间隙放电和接触放电的第4级要求。

应用

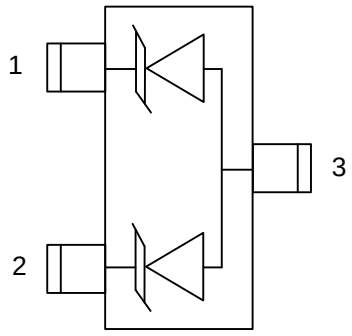
- 手机听筒和配件
- 便携式电子产品
- 工业控制
- 机顶盒
- 服务器、笔记本电脑和台式电脑

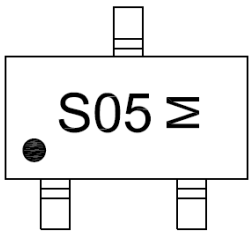
特性

- 数据线和电源线瞬态保护，符合IEC 61000-4-2标准：±15kV（空气间隙放电），±8kV（接触放电）
- 保护一条双向线路或两条单向线路
- 反向工作电压：5V
- 低钳位电压
- 固态硅雪崩技术

引脚配置

顶部视图





M: Month Code
SM05
SOT23-3

Ordering Information

Part Number	Working Voltage	Packaging Type	Channel	Marking Code	Shipping Qty
SM05	5.0V	SOT23-3	2	S05	3000pcs/7Inch Tape & Reel

Absolute Maximum Ratings

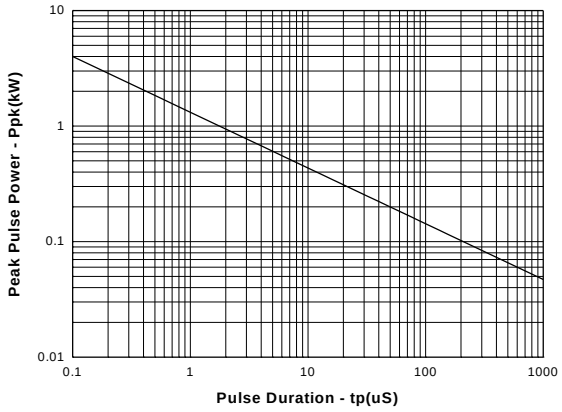
Rating	Symbol	Value	Unit
Peak Pulse Power (t_P=8/20μs)	P_{PK}	300	Watts
Thermal Resistance, Junction to Ambient	θ_{JA}	325	℃/W
Lead Soldering Temperature	T_L	260 (10 sec.)	℃
Operating Temperature	T_J	-55 to +125	℃
Storage Temperature	T_{STG}	-55 to +125	℃

Electrical Characteristics

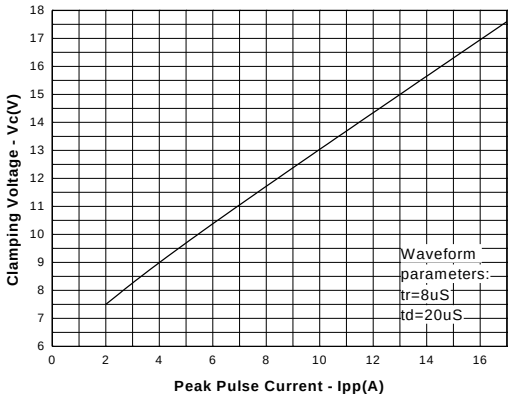
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Stand-Off Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	6	6.8	7.2	V
Reverse Leakage Current	I_R	V_{RWM}=5V, T=25℃			0.1	μA
Clamping Voltage	V_C	I_{PP}=5A, t_p=8/20μs			9.8	V
		I_{PP}=17A, t_p=8/20μs			17.6	
Peak Pulse Current	I_{PP}	t_p=8/20μs			17	A
Junction Capacitance	C_J	Pin 1 to 2 V_R=0V, f=1MHz		25		pF
Junction Capacitance	C_J	Pin 1 to 3 and Pin 2 to 3 V_R=0V, f=1MHz		50		pF
Reverse Dynamic Resistance	$R_{dyn,rev}$	I_{PP}>2A		0.55		Ω
Forward Dynamic Resistance	$R_{dyn,fwd}$			0.35		

Typical Operating Characteristics

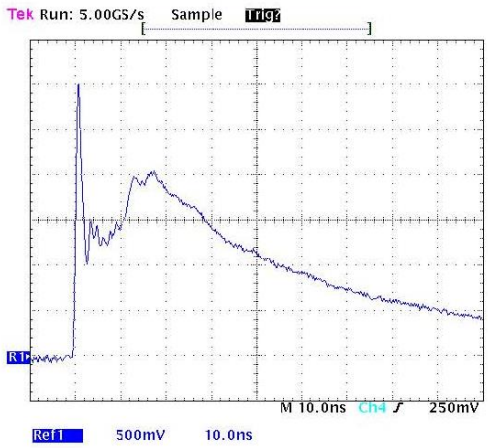
Non-Repetitive Peak Pulse Power vs. Pulse Time



Clamping Voltage vs. Peak Pulse Current



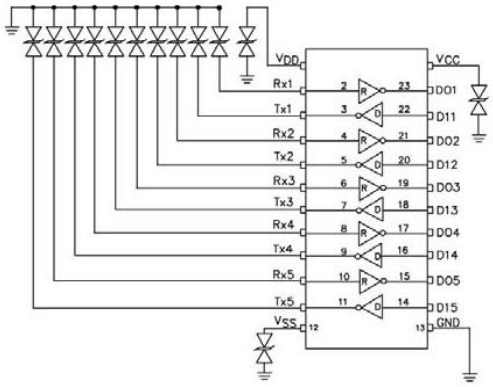
ESD Pulse Waveform (Per IEC 61000-4-2)



IEC 61000-4-2 Discharge Parameters

Level	First Peak Current (A)	Peak Current at 30 ns (A)	Peak Current at 60 ns (A)	Test Voltage (Contact Discharge) (kV)	Test Voltage (Air Discharge) (kV)
1	7.5	4	8	2	2
2	15	8	4	4	4
3	22.5	12	6	6	8
4	30	16	8	8	15

Typical Operating Circuits



Detailed Description

Device Connection Options

The SM05 is designed to protect one bidirectional or two unidirectional data or I/O lines operating at 5 volts. Connection options are as follows: Bidirectional: Pin 1 is connected to the data line and pin 2 is connected to ground (Since the device is symmetrical, these connections may be reversed). The ground connection should be made directly to a ground plane. The path length should be kept as short as possible to minimize parasitic inductance. Pin 3 is not connected. Unidirectional: Data lines are connected to pin 1 and pin 2. Pin 3 is connected to ground. For best results, this pin should be connected directly to a ground plane on the board. The path length should be kept as short as possible to minimize parasitic inductance.

Circuit Board Layout Recommendations for Suppression of ESD

Good circuit board layout is critical for the suppression of fast rise-time transients such as ESD. The following guidelines are recommended (Refer to application note SI99-01 for more detailed information): Place the TVS near the input terminals or connectors to restrict transient coupling. Minimize the path length between the TVS and the protected line. Minimize all conductive loops including power and ground loops. The ESD transient return path to ground should be kept as short as possible. Never run critical signals near board edges. Use ground planes whenever possible.

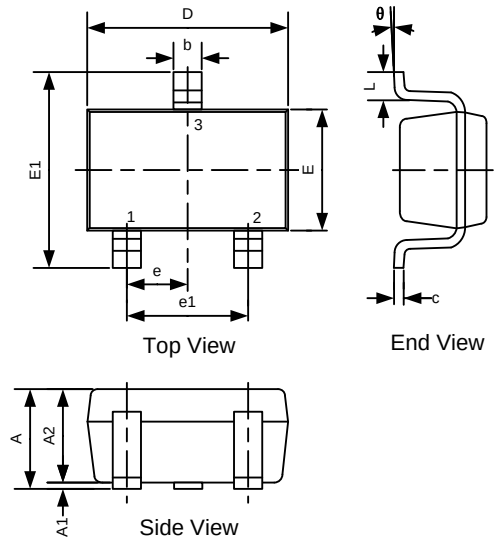
Matte Tin Lead Finish

Matte tin has become the industry standard lead-free replacement for SnPb lead finishes. A matte tin finish is composed of 100% tin solder with large grains. Since the solder volume on the leads is small compared to the solder paste volume that is placed on the land pattern of the PCB, the reflow profile will be determined by the requirements of the solder paste. Therefore, these devices are compatible with both lead-free and SnPb assembly techniques. In addition, unlike other lead-free compositions, matte tin does not have any added alloys that can cause degradation of the solder joint.

Package Information

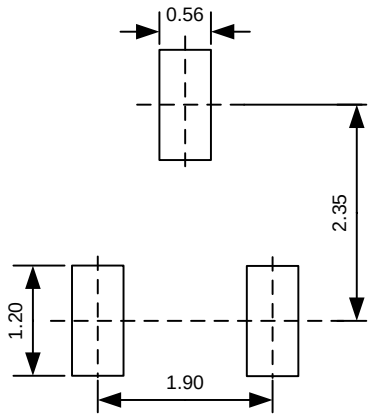
SM05: SOT23-3

Outline Drawing



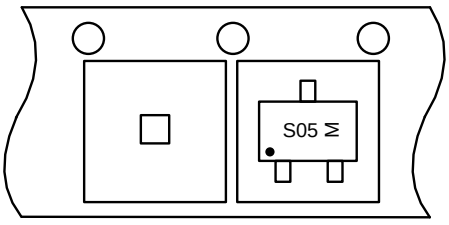
DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	1.013	1.15	1.40	0.040	0.045	0.055
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	1.00	1.10	1.30	0.039	0.043	0.051
b	0.30	-	0.50	0.012	-	0.020
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.82	-	3.10	0.111	-	0.122
E	1.50	1.60	1.70	0.059	0.063	0.067
E1	2.60	2.80	3.00	0.102	0.110	0.118
e	0.95REF			0.037REF		
e1	1.90REF			0.075REF		
L	0.30	-	0.60	0.012	-	0.024
θ	0 °	-	8 °	0 °	-	8 °

Land Pattern



NOTES:
1. Compound dimension: 2.92×1.60；
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

Tape and Reel Orientation



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