SHANGHAI SEMITECH SEMICONDUCTOR CO., LTD

SOT04 ~ SOT36

Transient Voltage Suppressors for ESD Protection

General Description

The SOTxx is a transient voltage suppressor designed to protect components which are connected to data and transmission lines against ESD. It clamps the voltage just above the logic level supply for positive transients, and to a diode drop below ground for negative transients.

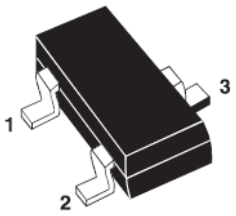
Applications

- Computers
- Printers
- Communication systems

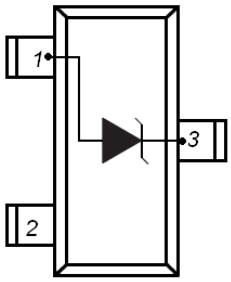
Features

- Unidirectional Transil functions
- Low leakage current: I_R max< 20 μ A at V_{RM}
- 300W peak pulse power(8/20μ s)
- Transient protection for data lines as per
  IEC61000-4-2(ESD) 15KV(air) 8KV(contact)
  IEC61000-4-5(Lightning) see I_{PPM} below

Functional diagram



SOT23

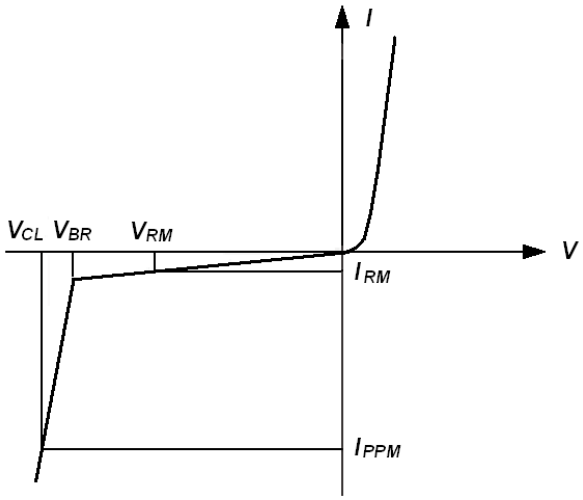


Absolute Ratings (T_{amb}=25°C)

Symbol	Parameter	Value	Units
P_{PP}	Peak Pulse Power (t_p = 8/20μs)	300	W
T_L	Maximum lead temperature for soldering during 10s	260	°C
T_{stg}	Storage Temperature Range	-55 to +15	°C
T_{op}	Operating Temperature Range	-40 to +125	°C
T_j	Maximum junction temperature	150	°C
V_{PP}	Electrostatic discharge IEC61000-4-2 air discharge IEC61000-4-2 contact discharge	 15 8	kv

Electrical Parameter

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{CL}	Clamping voltage
I_{RM}	Leakage current
I_{PPM}	Peak pulse current



Electrical Characteristics

Part Numbers	Marking	Rated Stand-off Voltage	Maximum Leakage Current	Minimum Breakdown Voltage	Maximum Clamping Voltage		Maximum Pulse Peak Current	Maximum Capacitance
			@ V_{RM}	1mA	1A [1]	5A [1]	tp=8/20us	0v, 1MHz
		V_{RM}	I_{RM}	V_{BR}	V_{CL}		I_{PPM}	C
		V	μA	V	V	V	A	pF
SOT04	04	4.0	20.0	5.0	8.5	10.5	17	300
SOT05	05	5.0	20.0	6.0	9.8	12.5	17	220
SOT08	08	8.0	5.0	8.5	13.4	15.0	15	190
SOT12	12	12.0	1.0	13.3	19.0	28.0	12	150
SOT15	15	15.0	1.0	16.7	24.0	35.0	10	140
SOT24	24	24.0	1.0	26.7	43.0	60.0	5	83
SOT36	36	36.0	1.0	40	60.0	75.0	2	80

1).8/20 waveform used. (see fig2.)

Typical Characteristics

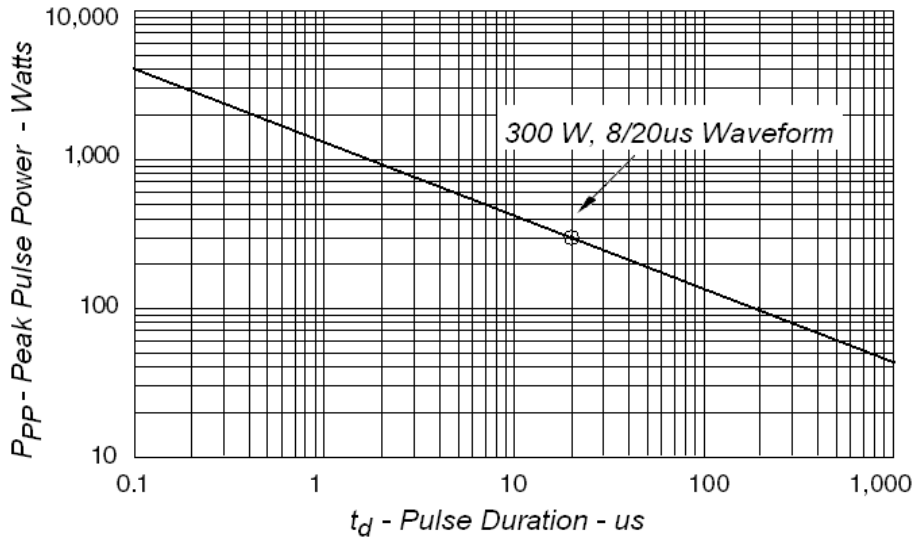


Fig1. Peak Pulse Power VS Pulse Time

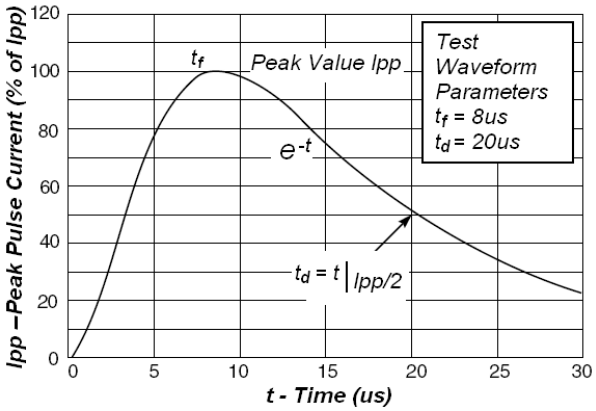


Fig2. Pulse Waveform

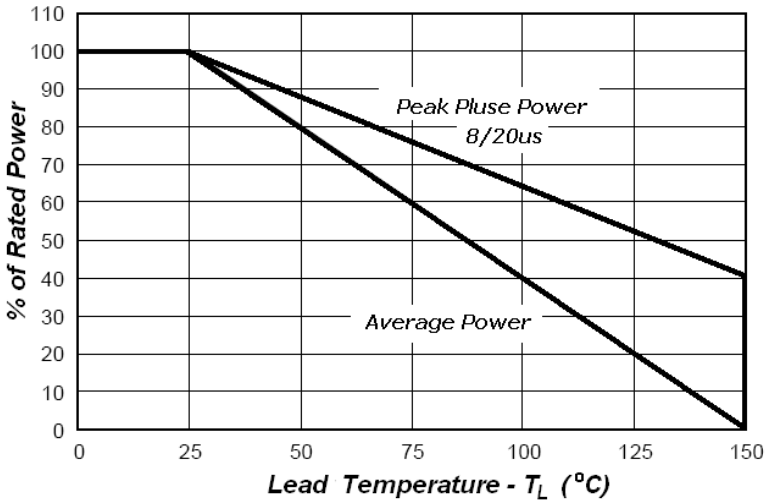


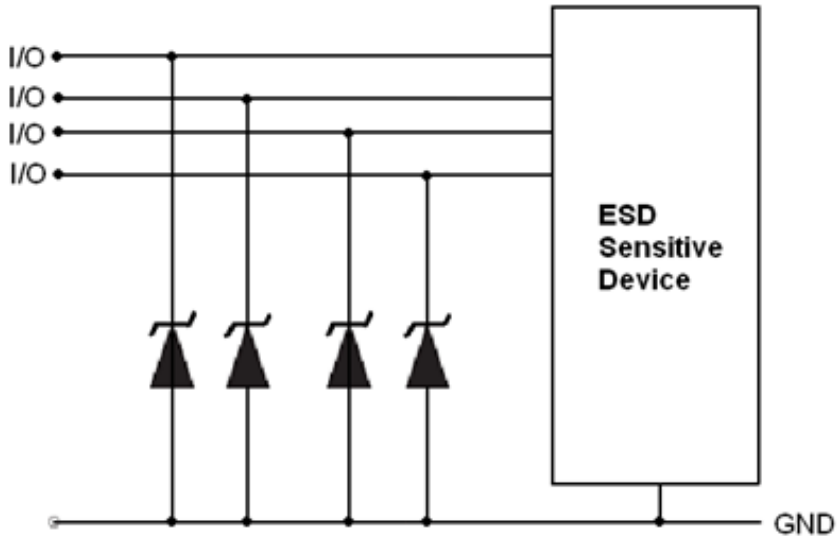
Fig3.Power Derating

Application Note

Electrostatic discharge (ESD) is a major cause of failure in electronic systems. Transient Voltage Suppressors (TVS) are an ideal choice for ESD protection. They are capable of clamping the incoming transient to a low enough level such that damage to the protected semiconductor is prevented.

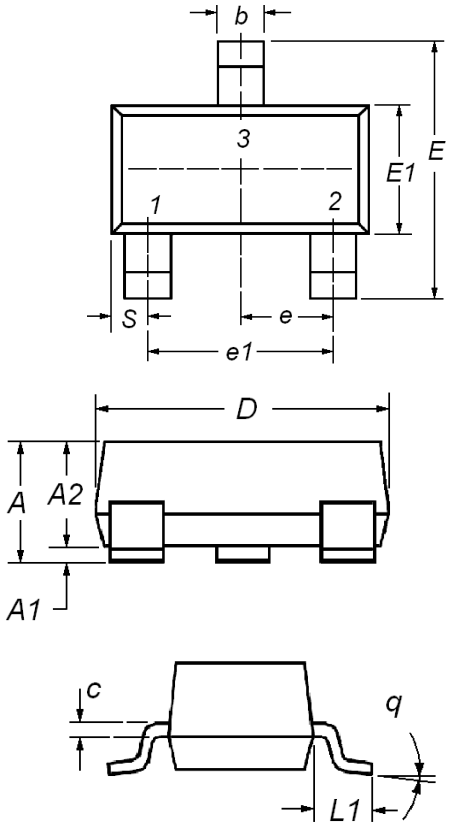
Surface mount TVS offer the best choice for minimal lead inductance. They serve as parallel protection elements, connected between the signal line to ground. As the transient rises above the operating voltage of the device, the TVS becomes a low impedance path diverting the transient current to ground. The SOTxx is the ideal board evel protection of ESD sensitive semiconductor components.

The tiny SOT23 package allows design flexibility in the design of high density boards where the space saving is at a premium. This enables to shorten the routing and contributes to hardening againt ESD.



4×SOTXX

Package mechanical data



Dim	Millimeters		
	Min	TYP	Max
A	1.00		1.40
A1	0		0.10
A2	1.00		1.30
b	0.35		0.50
c	0.10		0.20
D	2.70	2.90	3.10
E	2.40		2.80
E1	1.40		1.60
e	0.85		1.15
e1		1.90	
L1	0.40	.	
q	0°		10°
S	0.45		0.55