

DESCRIPTION

The SM series of transient voltage suppressors are designed to protect components which are connected to data and transmission lines from over voltages caused by electrostatic discharge (**ESD**), electrical fast transients (**EFT**), and induced lightning.

TVS diodes are characterized by their high surge capability, low operating and clamping voltages, and fast response time. This makes them ideal for use as board level protection of sensitive semiconductor components. The dual junction common anode design allows the user to protect two separate lines with one package. The low cost SOT-23 package allows flexibility in the design of "crowded" PC boards. The SM series is suitable protection for sensitive TTL and CMOS ICs such as microprocessors, I/O transceivers, ASICs, transducers, and CMOS memory.

The SM series TVS diode will meet the surge requirements of IEC 1000-4-2 (Formerly IEC 801-2), Level 4, "Human Body Model" for air and contact discharge.

APPLICATIONS:

- RS-232, RS-423 data lines
- Cellular phone terminals
- Audio/Video inputs
- Portable electronics
- Networks

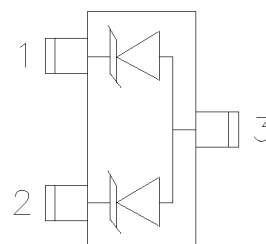
FEATURES:

- 300 watts Peak Pulse Power (tp = 8 x 20µs)
- Transient protection for data, signal, and Vcc bus to **IEC 1000-4-2 (ESD) & IEC 1000-4-4 (EFT)**
- Protects two unidirectional lines or one bidirectional line
- **ESD** protection >15kV
- Low Leakage Current
- Solid state silicon avalanche technology

MECHANICAL CHARACTERISTICS:

- JEDEC SOT-23 package
- Solder temperature : 265°C for 10 seconds
- Readily solderable terminals
- Marking : Marking Code
- Packaging : Tape & Reeled per EIA 481-1

SCHEMATIC



MAXIMUM RATINGS

RATING	SYMBOL	VALUE	UNIT
Peak Pulse Power (tp = 8 x 20µs)	Ppk	300	Watts
Operating Temperature	Tj	-55 to +150	°C
Storage Temperature	Tstg	-55 to +150	°C

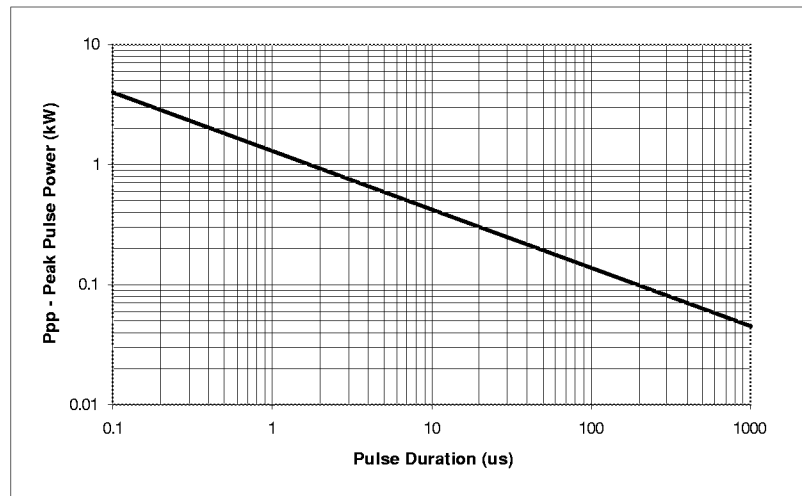
ELECTRICAL CHARACTERISTICS @ 25°C

Part Number	Device Marking Code	Reverse Stand-off Voltage	Min V _{BR} @ 1mA	Max. Clamping @ Ipp=1A ¹	Max. Peak Pulse Current ²	Leakage Current @ V _{RWM}	Capacitance @ 0v, 1MHz Pin 1- 2	Capacitance @ 0v, 1MHz Pin 1-3 & 2-3
		V _{RWM} Volts	BV(min) Volts	Vc Volts	Ipp Amps	I _R µA	Cj pf	Cj pf
SM05	M05	5	6	9.8	17	20	350	400
SM12	M12	12	13.3	19	12	1	120	150
SM15	M15	15	16.7	24	10	1	75	100
SM24	M24	24	26.7	43	5	1	50	60
SM36	M36	36	40	60	4	1	40	45

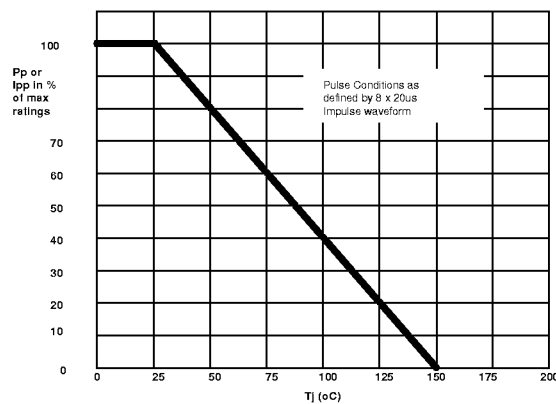
Notes :

1. Clamping voltage values are based upon an industry standard 8 x 20µs peak pulse current (Ipp) waveform.
2. tp = 8/20µs

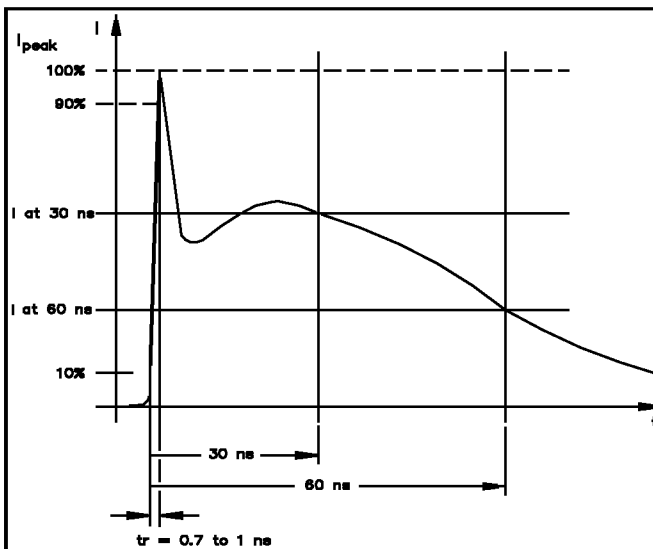
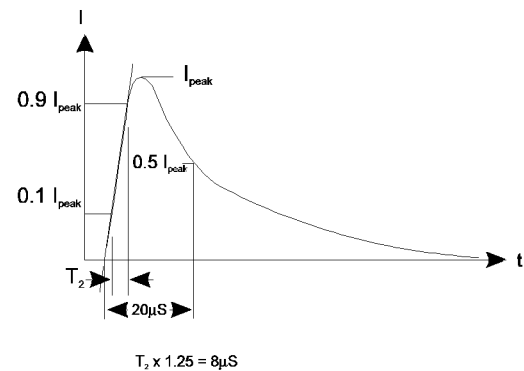
PEAK PULSE POWER vs. PULSE TIME



PULSE DERATING CURVE



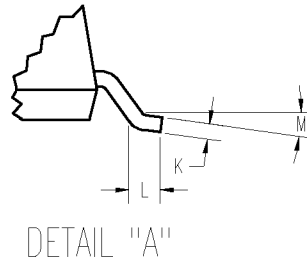
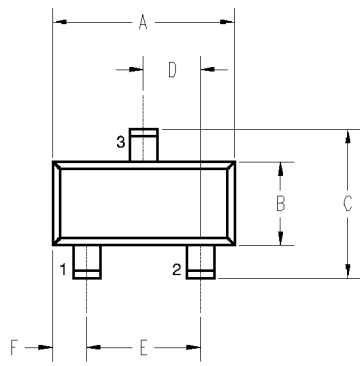
8x20μs IMPULSE WAVEFORM



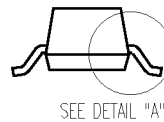
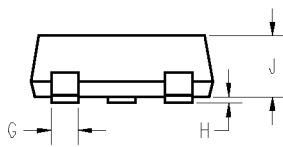
LEVEL	First Peak Current of Discharge (±10%) (A)	Peak Current (±30%) at 30ns (A)	Peak Current (±30%) at 60ns (A)	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)
1	7.5	4	2	2	2
2	15	8	4	4	4
3	22.5	12	6	6	8
4	30	16	8	8	15

IEC 1000-4-2 ESD WAVEFORM & DISCHARGE PARAMETERS

MECHANICAL OUTLINE - SOT-23



DIM #	DIMENSIONS				NOTE
	INCHES		MM		
A	.105	.120	2.67	3.05	
B	.047	.055	1.20	1.40	
C	.083	.098	2.10	2.50	
D	.035	.040	0.88	1.02	
E	.071	.079	1.80	2.00	
F	.017	.022	0.44	0.55	
G	.015	.020	0.37	0.51	
H	.001	.004	0.02	0.10	
J	.031	.040	0.79	1.02	
K	.003	.006	.089	.150	
L	.005	.010	0.13	0.25	
M	0	8	0	8	

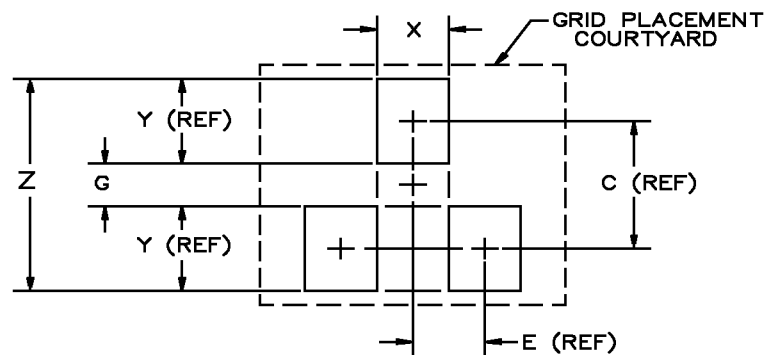


Note 1 : Controlling Dimension : Millimeters

LAND PATTERN - SOT-23

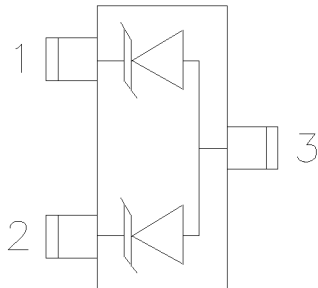
The layout of a surface mount board is a critical part of the design process. The footprint of the package must be the correct size to insure proper solder connection between the board and the device. Correct pad geometry will allow the devices to self align when subjected to the solder reflow process.

DIM #	DIMENSIONS				NOTE
	INCHES		MM		
C	—	.09	—	2.20	—
E	—	.04	—	.95	—
G	.03	.04	.80	1.00	—
X	.03	.04	.80	1.00	—
Y	—	.06	—	1.40	—
Z	.14	.15	3.40	3.60	—



Note 1 : Grid placement courtyard is 8 x 8 elements (4mm x 4mm) in accordance with the international grid detailed in IEC Publication 97.

CONNECTION DIAGRAM



Utilization as a bidirectional TVS

Bidirectional protection of one I/O line is achieved by configuring the device as follows: Inputs/Outputs are connected at pin 1. Pin 2 is connected to ground. Pin 3 is not connected.

Utilization as a unidirectional TVS

Unidirectional protection of two I/O lines is achieved by configuring the device as follows: Inputs/Outputs are connected at pins 1 & 2. Pin 3 is connected to ground.

TYPICAL APPLICATION

MICROPROCESSOR PROTECTION

