Electrostatic Discharged Protection Devices (ESD) Data Sheet

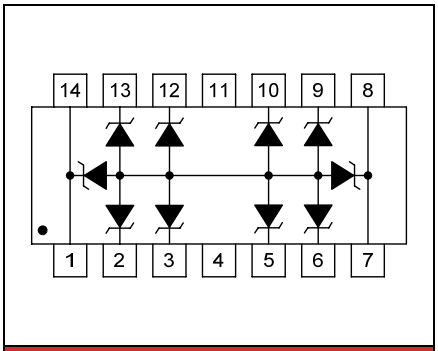
Description

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. This component is designed to provide transient suppression on multiple data lines and I/O ports. The low profile SOIC-14 design allows the user to protect up to eight data and I/O lines with one package.
The device will meet the surge requirements of IEC61000-4-2 (Formerly IEC801-2), Level 4. “Human Body Model” for air and Contact discharge.

Contact : ±8kV
Air : ±15kV

Features

- IEC61000-4-2 ESD 15KV Air, 8KV contact compliance
- SOIC-14 surface mount package
- Protects eight I/O lines
- Peak power dissipation of 350W under 8/20μs waveform
- Working voltage: 15V
- Low leakage current
- Low clamping voltage
- Solid-state silicon avalanche technology
- Lead Free/RoHS compliant
- Solder reflow temperature: Pure Tin-Sn, 260~270℃
- Flammability rating UL 94V-0
- Meets MSL level 1, per J-STD-020
- Marking: B SM15C-8



Pin Configuration

Applications

- RS-232 and RS-422 data line protection
- Microprocessor based equipment
- LAN/WAN equipment
- Set Top Box (STB)
- Series and parallel ports
- Instrumentation
- Notebooks, desktops, servers
- Peripherals
- I^2C serial port

Maximum Ratings

Rating	Symbol	Value	Unit
Peak pulse power (tp=8/20μs waveform)	P_{PP}	350	W
ESD voltage (Contact discharge)	V_{ESD}	±8	kV
ESD voltage (Air discharge)		±15	
Storage & operating temperature range	T_{STG} ,T_J	-55~+150	℃

Electrical Characteristics (T_J=25℃)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				15	V
Reverse breakdown voltage	V_{BR}	I_{BR}=1mA	16.7			V
Reverse leakage current	I_R	V_R=15V Each I/O pin			1	μA
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=1A			24	V
Clamping voltage (tp=8/20μs)	V_C	I_{PP}=5A			30	V
Off state junction capacitance	C_J	0Vdc,f=1MHz Between I/O pins and GND			75	pF

Applications Information

Pins 2, 3, 5, 6, 9, 10, 12 and 13 are connected to the Lines that are to be protected. Pins 1, 7, 8 and 14 are connected to ground. The ground connections should be made directly to the ground plane for best results. The path length is kept as short as possible to reduce The effects of parasitic inductance in the board traces. Pins 4 and 11 are not connected.

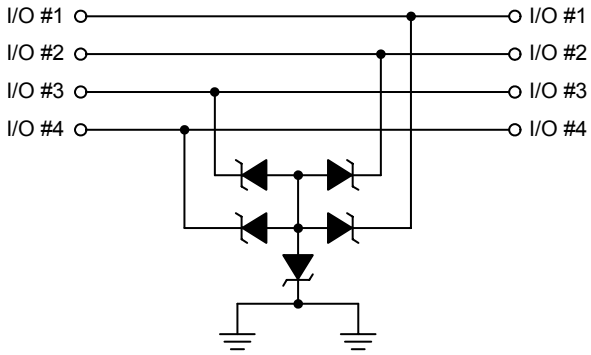


Figure 1. Bi-directional Protection

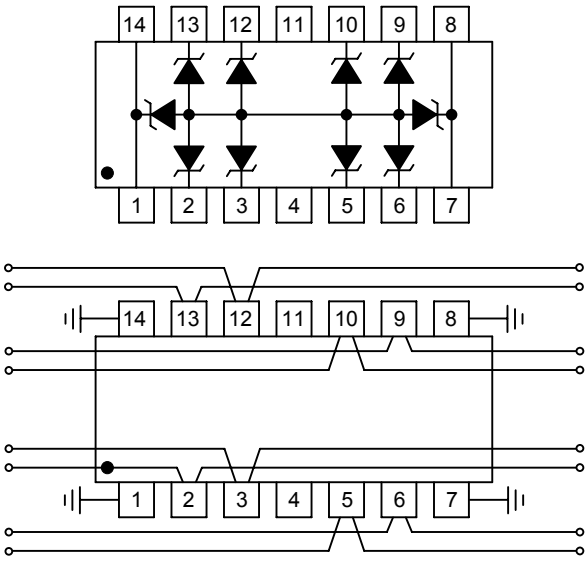


Figure 2. Short Path Length
(Reduce Parasitic Inductance)

Typical Characteristics Curves

Figure 1. Power Derating Curve

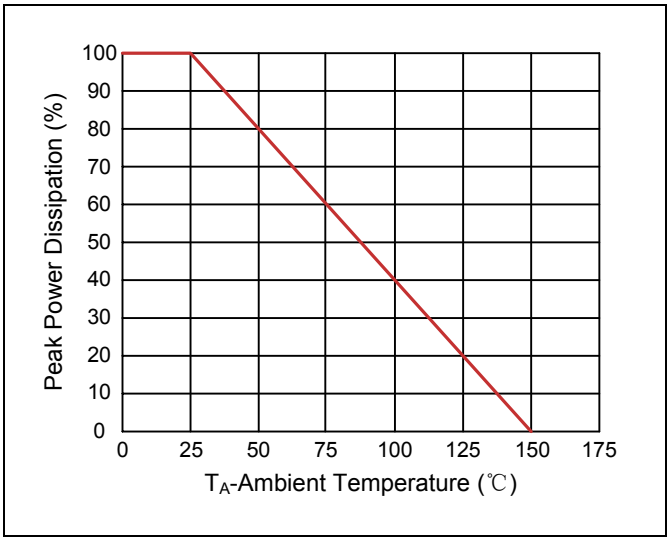


Figure 2. Pulse Waveforms

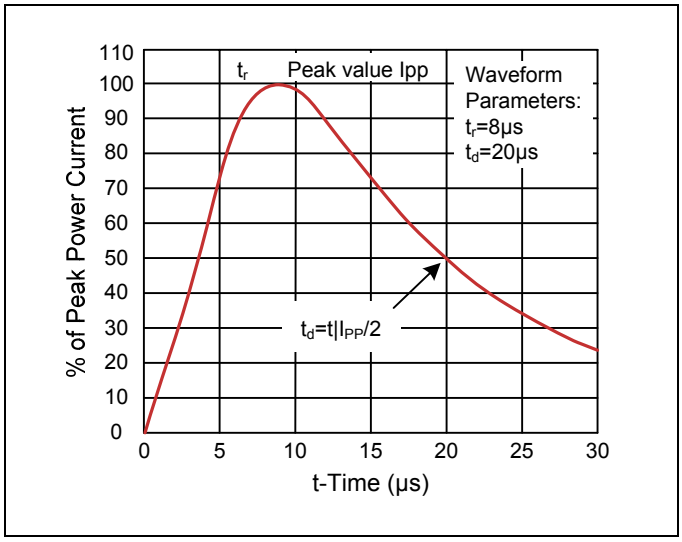
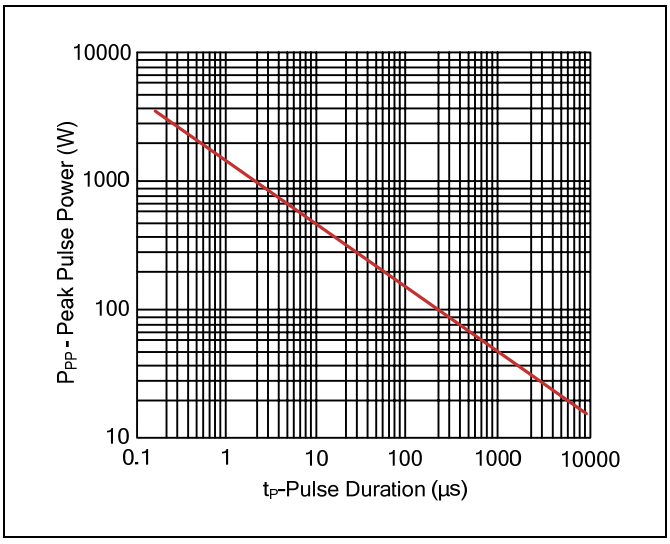
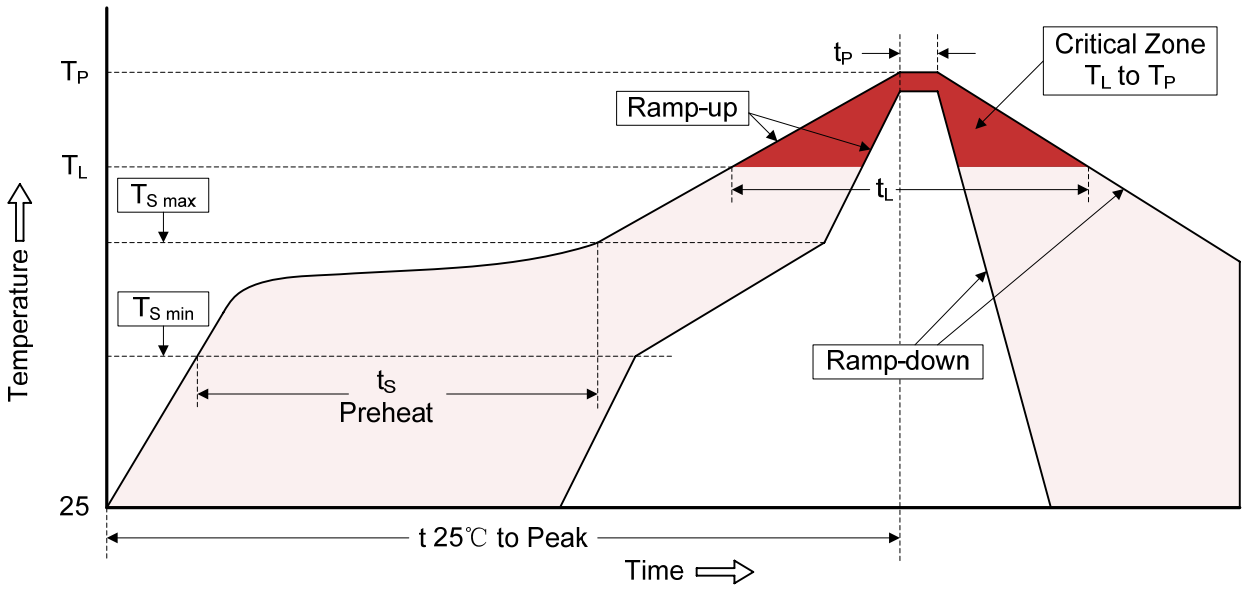


Figure 3. Non-Repetitive Peak Pulse vs. Pulse Time



Recommended Soldering Conditions

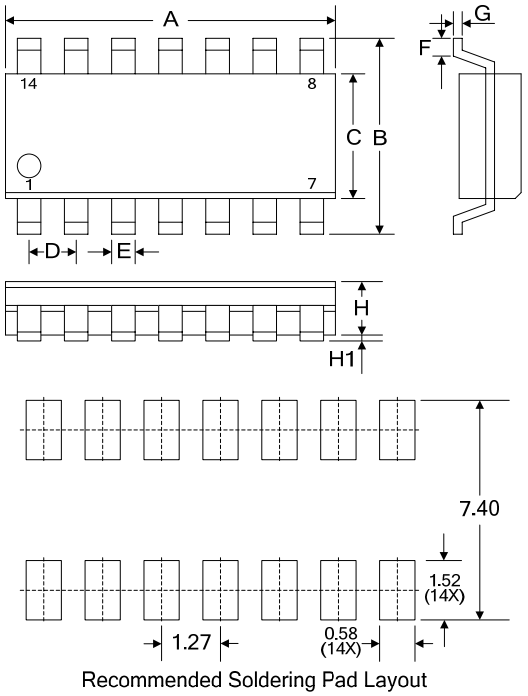
Reflow Soldering



Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3℃/second max.
Preheat -Temperature Min ($T_{S\ min}$) -Temperature Max ($T_{S\ max}$) -Time (min to max) (ts)	 150℃ 200℃ 60-180 seconds
$T_{S\ max}$ to T_L -Ramp-up Rate	 3℃/second max.
Time maintained above: -Temperature (T_L) -Time (t_L)	 217℃ 60-150 seconds
Peak Temperature (T_P)	260℃
Time within 5℃ of actual Peak Temperature (t_P)	20-40 seconds
Ramp-down Rate	6℃/second max.
Time 25℃ to Peak Temperature	8 minutes max.

Dimensions (SOIC-14)

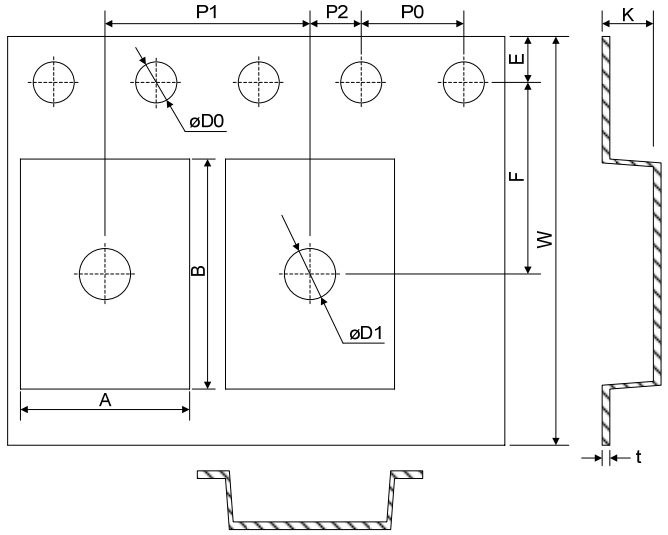


Recommended Soldering Pad Layout

Symbol	Dimension			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	8.55	8.75	0.337	0.344
B	5.80	6.20	0.228	0.244
C	3.80	4.00	0.150	0.157
D	1.27 BSC		0.050 BSC	
E	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	0.19	0.25	0.008	0.010
H	1.35	1.75	0.053	0.069
H1	0.10	0.25	0.004	0.010

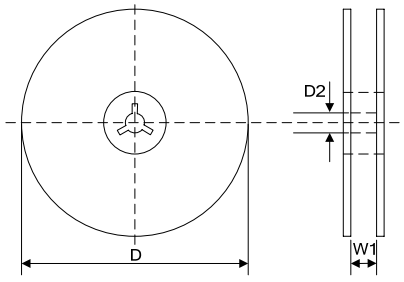
Packaging

Tape



Symbol	Dimension (mm)
W	16.00±0.30
P0	4.00±0.10
P1	8.00±0.10
P2	2.00±0.10
D0	Φ1.55±0.10
D1	Φ2.00±0.10
E	1.75±0.10
F	7.50±0.10
A	6.55±0.20
B	9.00±0.20
K	2.10±0.20
t	0.30±0.05

Reel



D	Φ330.0±3.0
D2	Φ13.0
W1	17.5
Quantity: 2500PCS	