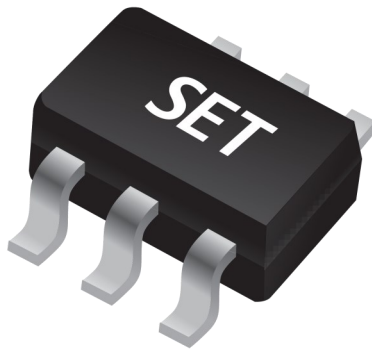


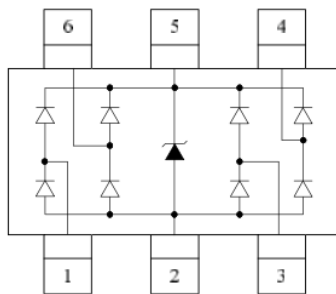
# ESD Protection Diodes

Ultra-Low Capacitance ESD and Transient Voltage Protection

SD0508T26U1 SOT26



## Pinout and Functional Block Diagram



## Applications

- USB Power and Data Line Protection
- Serial ATA
- MDDI Ports
- Display Ports
- High Definition Multi-Media Interface (HDMI)
- Monitors and Flat Panel Displays
- Digital Video Interface (DVI)

## Description

SD0508T26U1 is an ultra-low capacitance Transient Voltage Suppressor (TVS) designed to protection for high-speed data interfaces. With typical capacitance of 0.20pF (I/O to I/O) only, SD0501T26U1 is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD), Level 4(± 15 kV air, ± 8 kV contact discharge), IEC61000-4-4 (electrical fast transient-EFT) (40 A, 5 / 50 ns), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

SD0508T26U1 uses small SOT-23-6L package. Each SD0501T26U1 device can protect four high-speed data lines one Vcc line. The combined features of ultra-low capacitance, small size and high ESD robustness make SD0508T26U1 ideal for high-speed data ports and high-frequency lines (e.g., HDMI & DVI) applications. The low clamping voltage of the SD0508T26U1 guarantees a minimum stress on the protected IC.

## Features

- IEC61000-4-2 (ESD) ± 25 kV (Air), ± 20 kV (Contact)
- IEC 61000-4-4(EFT) 40 A(5 / 50 ns)
- Package Optimized for High-speed Lines
- Protects Four Data Lines and One Vcc Line
- Low Capacitance: 0.20 pF (I/O to I/O)
- Low Clamping Voltage
- Low Leakage Current
- High Temperature to Reflow Soldering Guaranteed: 260 °C / 10 sec
- Flammability Rating: UL 94 V-0
- Halogen Free and RoHS Compliant

## Order Information

Type	Package	Marking Code	Delivery Form	Delivery Quantity
SD0508T26U1	SOT26	V05	7" T&R	3000 PCS

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## Limiting Values

(T<sub>A</sub> = 25 °C, unless otherwise specified)

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>ESD</sub>	Electrostatic Discharge Voltage	IEC 61000-4-2; Contact Discharge	-	20	kV
		IEC 61000-4-2; Air Discharge	-	25	kV
P <sub>PP</sub>	Peak Pulse Power (8 / 20 μs)	-	-	60	W
T <sub>A</sub>	Operating Temperature Range	-	-55	125	°C
T <sub>stg</sub>	Storage Temperature Range	-	-55	150	°C

## Electrical Characteristics

(T<sub>A</sub> = 25 °C, unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ.	Max	Unit
V <sub>RWM</sub>	Reverse Working Voltage	Any I/O pin to ground	-	-	5.0	V
V <sub>BR</sub>	Reverse Breakdown Voltage	I <sub>T</sub> = 1mA Any I/O pin to ground	6.0	-	9.0	V
I <sub>R</sub>	Reverse Leakage Current	V <sub>RWM</sub> = 5 V Any I/O pin to ground	-	-	1	μA
V <sub>C1</sub>	Clamping Voltage	I <sub>PP</sub> = 1 A, t <sub>p</sub> = 8 / 20 μs Any I/O pin to ground	-	-	10	V
V <sub>C2</sub>	Clamping Voltage	I <sub>PP</sub> = 4 A, t <sub>p</sub> = 8 / 20 μs Any I/O pin to ground	-	-	15	V
V <sub>C3</sub>	Clamping Voltage	I <sub>PP</sub> = 8 A, t <sub>p</sub> = 8 / 20 μs V <sub>CC</sub> pin to ground	-	-	15	V
C <sub>ESD1</sub>	Parasitic Capacitance	V <sub>R</sub> = 0 V, f = 1 MHz Between I/O pins	-	0.2	0.3	pF
C <sub>ESD2</sub>	Junction Capacitance	V <sub>R</sub> = 0 V, f = 1 MHz Any I/O pin to ground	-	0.45	0.50	pF
C <sub>ESD3</sub>	Parasitic Capacitance	V <sub>R</sub> = 0 V, f = 1 MHz Between V <sub>CC</sub> pin and ground	-	0.80	-	pF

Note: I/O Pins are pin 1,3,4,6. Pin 5 is V<sub>CC</sub>. Pin 2 is GND.

# ESD Protection Diodes

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SD0508T26U1 SOT26

## Performance Curve for Reference

( $T_A=25\text{ }^\circ\text{C}$  unless otherwise noted)

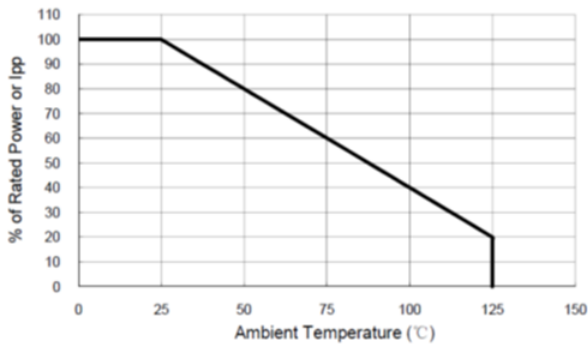


FIGURE 1  
Power Derating Curve

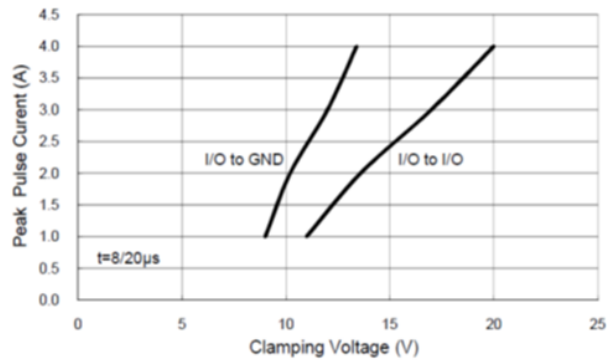


FIGURE 2  
Clamping Voltage VS. Peak Pulse Current

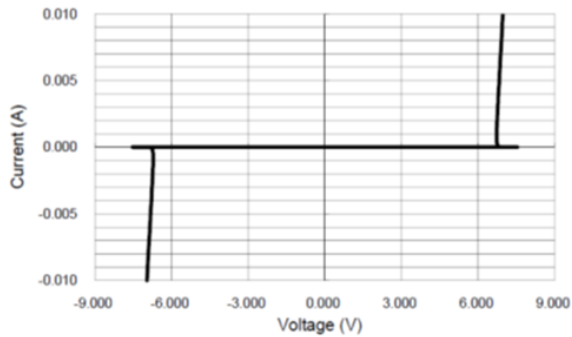


FIGURE 3  
Voltage Sweeping of I/O to I/O

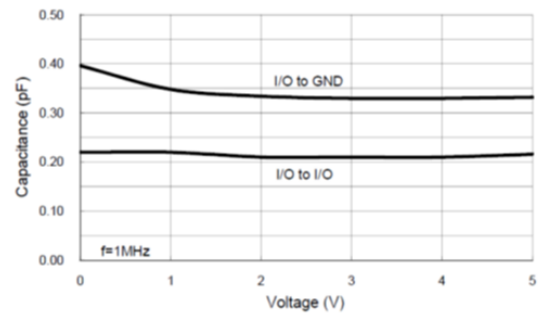


FIGURE 4  
Voltage VS. Capacitance

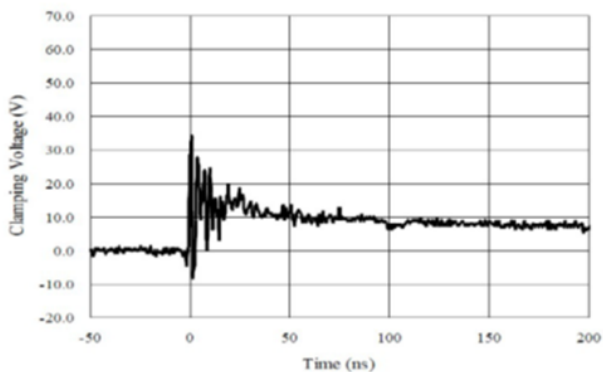


FIGURE 5  
ESD Clamping of I/O to GND  
(+8 kV Contact Per IEC 61000-4-2)

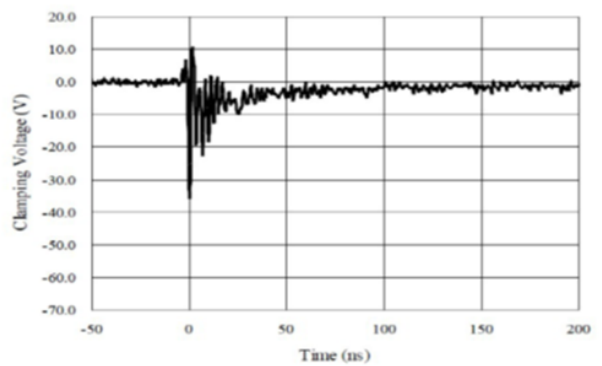


FIGURE 6  
ESD Clamping of I/O to GND  
(-8 kV Contact Per IEC 61000-4-2)

ESD TVS

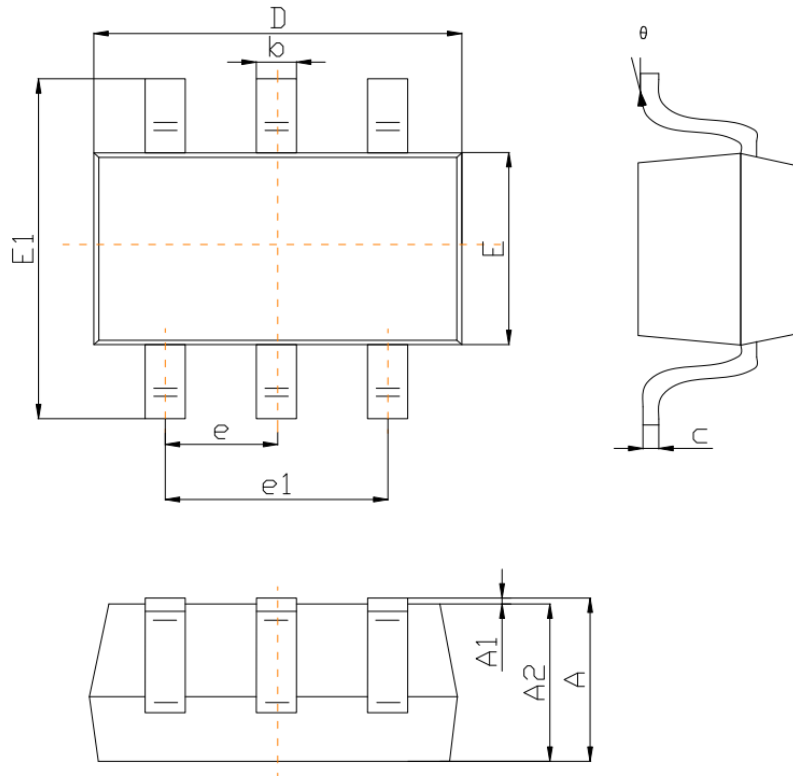
ESD TVS

# ESD Protection Diodes

Ultra-Low Capacitance ESD and Transient Voltage Protection

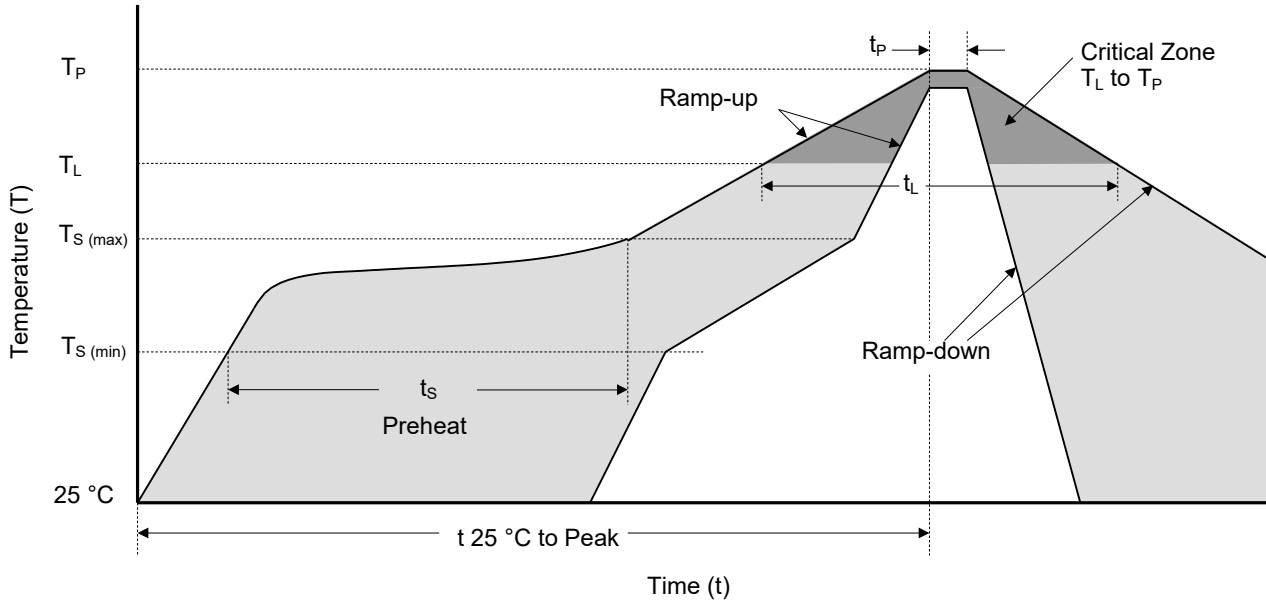
SD0508T26U1 SOT26

## Package Dimensions - SOT26



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.05	1.25	0.041	0.049
A1	0.00	0.10	0.000	0.004
A2	1.05	1.15	0.041	0.045
b	0.30	0.50	0.012	0.020
c	0.10	0.20	0.004	0.008
D	2.82	3.02	0.111	0.119
E	1.50	1.70	0.059	0.067
E1	2.65	2.95	0.104	0.116
e	0.95 BSC		0.037 BSC	
e1	1.80	2.00	0.071	0.079
L	0.30	0.60	0.012	0.024
	0°	8°	0°	8°

Soldering Parameters



Reflowing Condition

Reflow Soldering Parameters		Lead-Free Assembly
Pre-heat	Temperature Min ( $T_{S(min)}$ )	150 °C
	Temperature Max ( $T_{S(max)}$ )	200 °C
	Time (min to max) ( $t_s$ )	60 ~ 120 seconds
Average Ramp Up Rate (Liquidus Temp ( $T_L$ ) to Peak)		3 °C / second max.
$T_{S(max)}$ to $T_L$ Ramp-up Rate		3 °C / second max.
Reflow	Temperature ( $T_L$ ) (Liquidus)	217 °C
	Time (min to max) ( $t_L$ )	60 ~ 150 seconds
Peak Temperature ( $T_P$ )		260 <sup>+0/-5</sup> °C
Time of within 5 °C of Actual Peak Temperature ( $t_p$ )		20 ~ 40 seconds
Ramp-down Rate		6 °C / second max.
Time from 25 °C to Peak Temperature		8 Minutes max.
Do Not Exceed		260 °C

ESD TVS

ESD TVS



# ATTENTION

## Usage

1. TVS must be operated in the specified ambient temp.
2. Do not clean the TVS with strong polar solvent such as ketone, esters, benzene and halogenated hydrocarbon, to avoid damaging the encapsulating layer.
3. Please do not apply severe vibration, shock or pressure to TVS, to avoid element cracking.

## Replacement

1. If TVS is visually damaged, please replace it.
2. TVS is a non-repairable product. For safety sake, please use equivalent TVS for replacement.

## Storage

1. Storage Temp. Range: (-55 to 150) °C.
2. Do not store the TVS at the high temp., high humidity or corrosive gas environment, to avoid influencing the solder-ability of the lead wires. The product shall be used up within 1 year after receiving the goods.

## Environmental Conditions

1. TVS should not be exposed to the open air, nor direct sunshine.
2. TVS should avoid rain, water vapor or other condition of high temp. and high humidity.
3. TVS should avoid sand dust, salt mist, or other harmful gases.

## Max. Typical Capacitance of TVS

1. The typical capacitance of TVS is listed in the specifications. Designers may refer to it when designing TVS in High frequency circuit.

## Installation Mechanical Stress

1. Do not knock TVS when installing, to avoid mechanical damage.
2. Please do not apply severe vibration, shock or pressure to TVS, to avoid surface resin or element cracking.