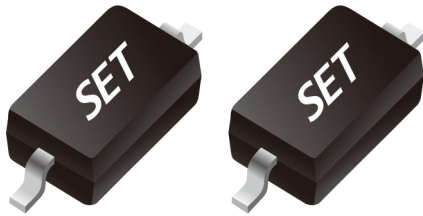


# ESD Protection Diodes

Ultra-Low Capacitance ESD and Transient Voltage Protection

SD0310D32U SOD323



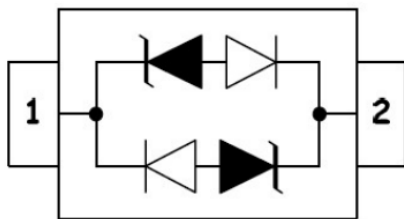
## Description

The SD0310D32U is ultra low capacitance transient voltage suppressor arrays, designed to protect applications such as portable electronics and SMART phones.

SD0310D32U 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 ( $\pm 15$  kV air,  $\pm 8$  kV contact discharge), IEC 61000-4-4 (EFT, 40 A 5 / 50 ns), IEC 61000-4-5 (Surge, 10 A 8 / 20  $\mu$ s), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc..

SD0310D32U is in an SOD-323 package. The combined features of ultra-low capacitance and high ESD robustness make SD0310D32U ideal for applications where arrays are not practical. The low clamping voltage of SD0310D32U guarantees a minimum stress on the protected IC.

## Pinout and Functional Block Diagram



## Applications

- Microprocessor based equipment
- Personal Digital Assistants (PDA's)
- Notebooks, Desktops, and Servers
- Cell Phone Handsets and Accessories
- Portable Instrumentation
- Peripherals
- USB Interface

## Features

- IEC61000-4-2 (ESD)  $\pm 15$  kV (Air),  $\pm 8$  kV (Contact)
- IEC61000-4-4 (EFT) 40 A (5 / 50 ns)
- IEC61000-4-5 (Lightning) 10 A(8 / 20  $\mu$ s)
- Protects One I/O Line (Bi-directional)
- Low Clamping Voltage
- Working Voltages : 3.3 V
- Low Leakage Current
- High Temperature to Reflow Soldering Guaranteed: 260 °C / 10 sec
- MSL1
- Flammability Rating: UL 94 V-0
- Halogen Free and RoHS Compliant

## Order Information

Type	Package	Marking Code	Delivery Form	Delivery Quantity
SD0310D32U	SOD323	CA1	7" T&R	3000 PCS

## 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	-	8	kV
		IEC 61000-4-2; Air Discharge	-	15	kV
P <sub>PP</sub>	Peak Pulse Power (8 / 20 μs)	-	-	150	W
T <sub>A</sub>	Operating Temperature Range	-	-45	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	-	-	-	3.3	V
V <sub>BR</sub>	Reverse Breakdown Voltage	I <sub>T</sub> = 1 mA	3.5	-	-	V
I <sub>R</sub>	Reverse Leakage Current	V <sub>RWM</sub> = 3.3 V	-	-	0.5	μA
V <sub>C1</sub>	Clamping Voltage1	I <sub>PP</sub> = 1 A, t <sub>p</sub> = 8 / 20 μs	-	-	6.5	V
V <sub>C2</sub>	Clamping Voltage2	I <sub>PP</sub> = 10 A, t <sub>p</sub> = 8 / 20 μs	-	-	15	V
I <sub>pp</sub>	Peak Pulse Current	t <sub>p</sub> = 8 / 20 μs	-	-	10	A
C <sub>J</sub>	Junction Capacitance	V <sub>R</sub> = 0 V, Measured at 1 MHz	-	-	1.0	pF

## Performance Curve for Reference

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

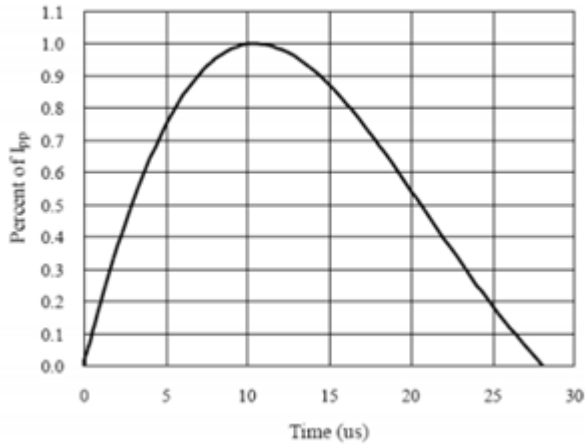


FIGURE 1

8 / 20  $\mu\text{s}$  Pulse Waveform

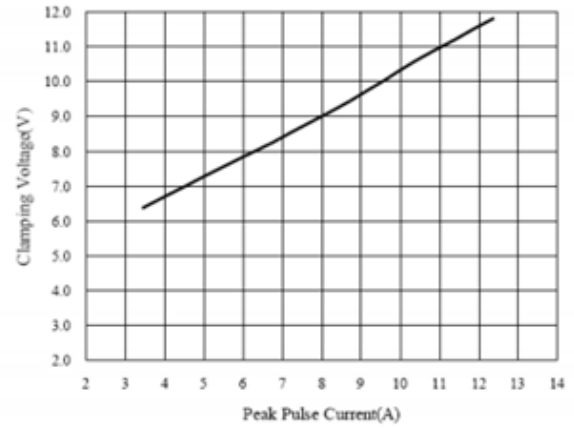


FIGURE 2

Clamping Voltage VS. Peak Pluse Current

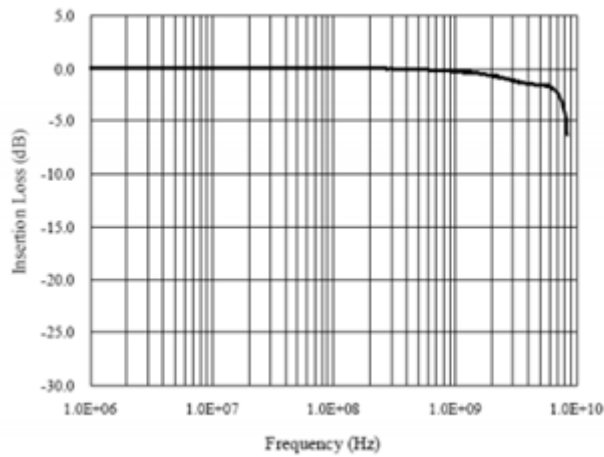


FIGURE 3

Insertion Loss S21

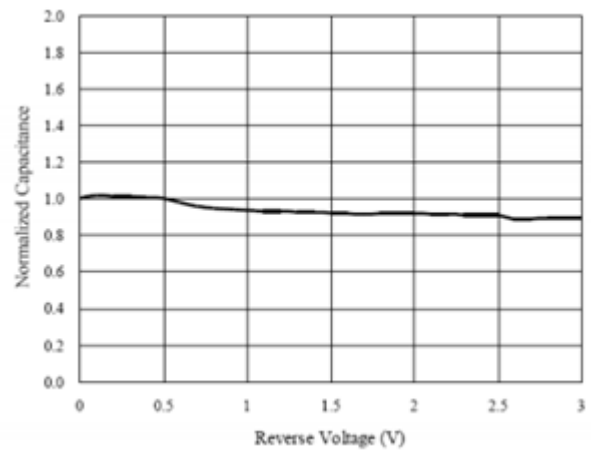


FIGURE 4

Normalized Capacitance VS. Voltage

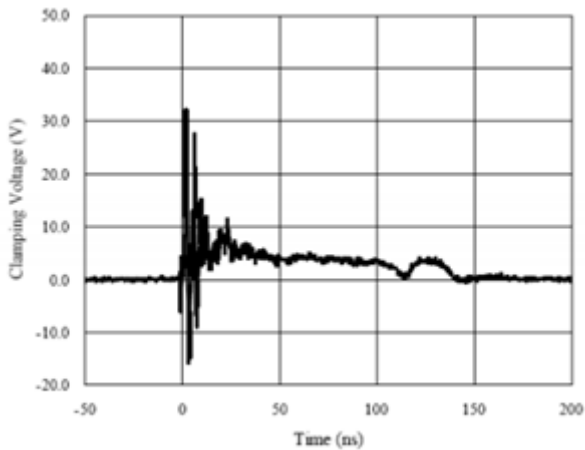


FIGURE 5

ESD Clamping of I/O to GND

(+8 kV Contact Per IEC 61000-4-2)

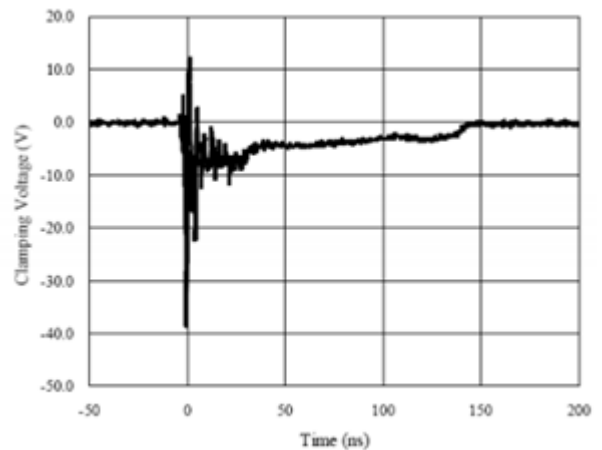


FIGURE 6

ESD Clamping of I/O to GND

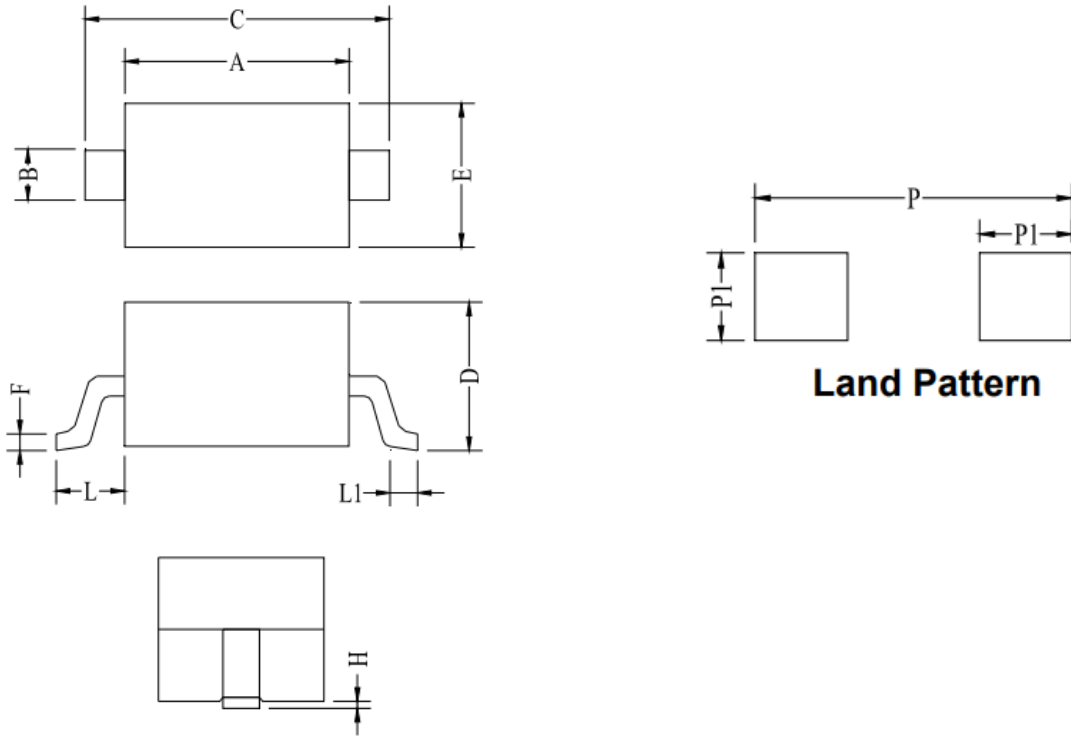
(-8 kV Contact Per IEC 61000-4-2)

# ESD Protection Diodes

Ultra-Low Capacitance ESD and Transient Voltage Protection

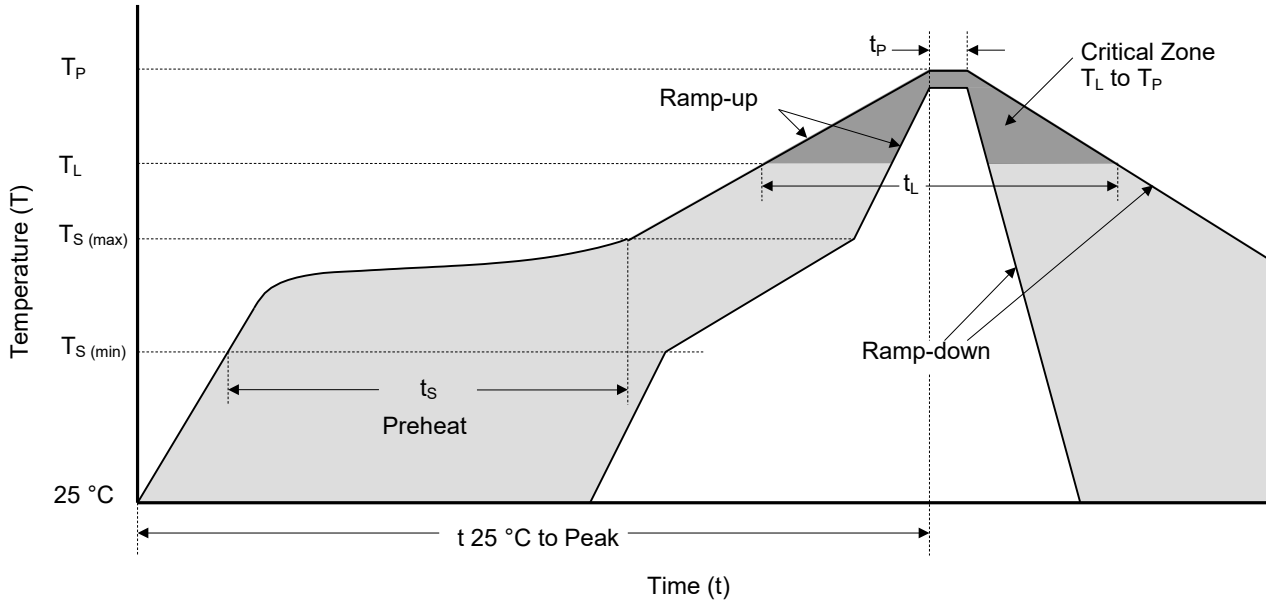
SD0310D32U SOD323

## Package Dimensions - SOD323



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.60	1.80	0.063	0.071
B	0.25	0.40	0.010	0.016
C	2.30	2.80	0.091	0.110
D	0.80	1.10	0.031	0.043
E	1.20	1.40	0.047	0.055
F	0.08	0.18	0.003	0.007
L	0.475 Ref.		0.019 Ref.	
L1	0.25	0.40	0.010	0.016
H	0.00	0.14	0.000	0.006
P	3.00		0.118	
P1	0.80		0.031	

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.