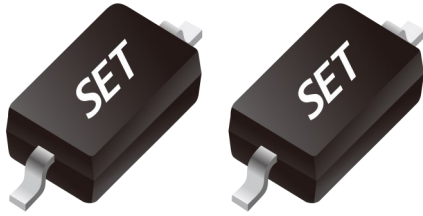


ESD Protection Diodes

Single Line Uni-directional ESD and Transient Voltage Protection

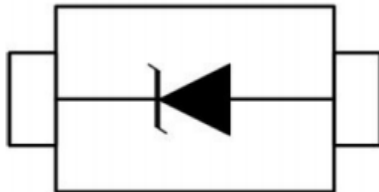
SD05A4D32G1 SOD323



Description

The SD05A4D32G1 TVS diode is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebooks, and PDA's. It offers superior electrical characteristics such as low clamping voltage, low leakage current and high surge capability. It is designed to protect sensitive electronic components which are connected to power lines, from over-stress caused by ESD (Electrostatic Discharge), EFT (Electrical Fast Transients) and Lightning.

Pinout and Functional Block Diagram



The SD05A4D32G1 is in a SOD-323 package and will protect one single line for unidirectional. It may be used to provide ESD protection up to ± 30 kV (Contact and air discharge) according to IEC61000-4-2, and used to protect USB voltage bus pin (8 / 20 μ s) according to IEC61000-4-5.

Applications

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

Features

- IEC61000-4-2 (ESD) ± 30 kV (air), ± 30 kV (contact)
- Peak power dissipation: 2800 W@8 / 20 μ s
- Low clamping voltage
- Low leakage current
- Solid-state silicon-avalanche technology
- 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
SD05A4D32G1	SOD323	5H	7" T&R	3000 PCS

Limiting Values

(T_A = 25 °C, unless otherwise specified)

Symbol	Parameter	Conditions	Min	Max	Unit
V _{ESD}	Electrostatic Discharge Voltage	IEC 61000-4-2; Contact Discharge	-	30	kV
		IEC 61000-4-2; Air Discharge	-	30	kV
P _{PP}	Peak Pulse Power (8 / 20 μ s)	-	-	2800	W
T _A	Operating Temperature Range	-	-55	125	°C
T _{stg}	Storage Temperature Range	-	-55	150	°C

ESD Protection Diodes

Single Line Uni-directional ESD and Transient Voltage Protection

SD05A4D32G1 SOD323

Electrical Characteristics

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

Symbol	Parameter	Conditions	Min	Typ.	Max	Unit
V_{RWM}	Reverse Working Voltage	-	-	-	5.0	V
V_{BR}	Breakdown Voltage	$I_T = 1\text{ mA}$	6.0	7.0	8.0	V
I_R	Reverse Leakage Current	$V_{RWM} = 5\text{ V}$	-	-	1	μA
I_{PP}	Peak Pulse Current	$t_p = 8 / 20\text{ }\mu\text{s}$	-	-	140	A
V_{C1}	Clamping Voltage 1	$I_{PP} = 50\text{ A}$, $t_p = 8 / 20\text{ }\mu\text{s}$	-	-	13	V
V_{C2}	Clamping Voltage 2	$I_{PP} = 100\text{ A}$, $t_p = 8 / 20\text{ }\mu\text{s}$	-	-	17	V
V_{C3}	Clamping Voltage 3	$I_{PP} = 140\text{ A}$, $t_p = 8 / 20\text{ }\mu\text{s}$	-	-	20	V
C_J	Junction Capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$ Between I/O pins	900	980	1050	pF

ESD Protection Diodes

Single Line Uni-directional ESD and Transient Voltage Protection

SD05A4D32G1 SOD323

Performance Curve for Reference

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

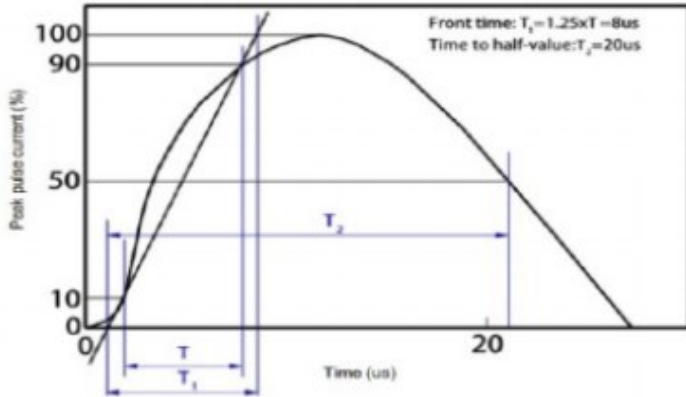


FIGURE 1

8 / 20 μs Waveform Per IEC61000-4-5

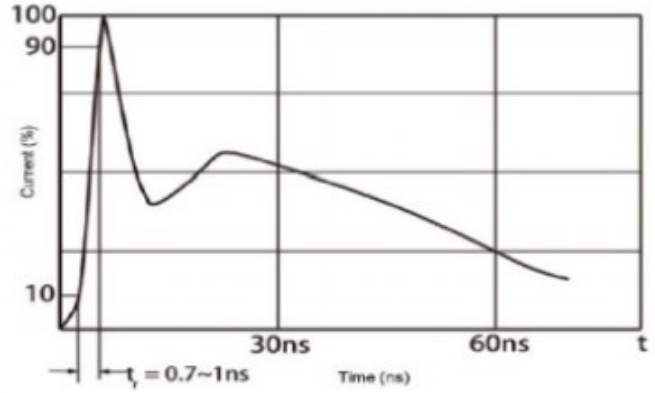


FIGURE 2

Contact Discharge Current Waveform Per IEC 61000-4-2

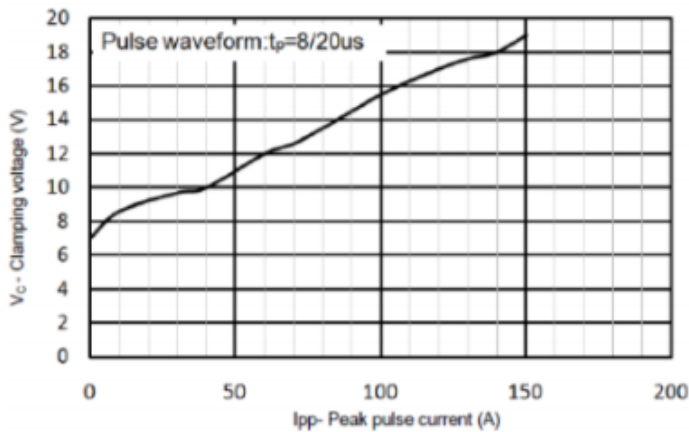


FIGURE 3

Clamping Voltage VS. Peak Pulse Current

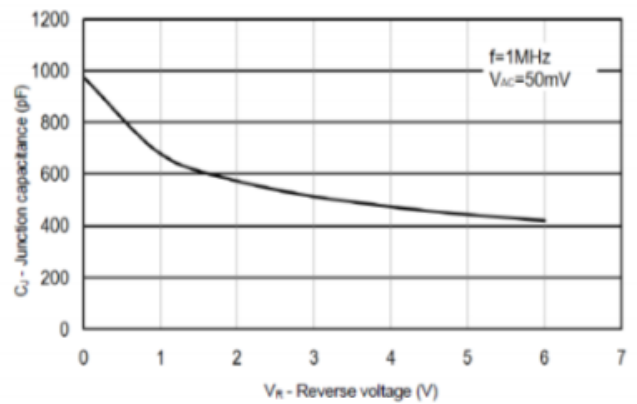


FIGURE 4

Capacitance VS. Reverse Voltage

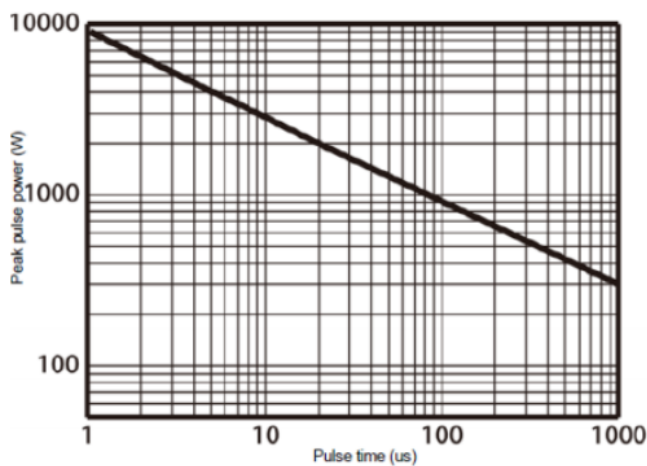


FIGURE 5

Non-Repetitive Peak Pulse Power VS. Pulse Time

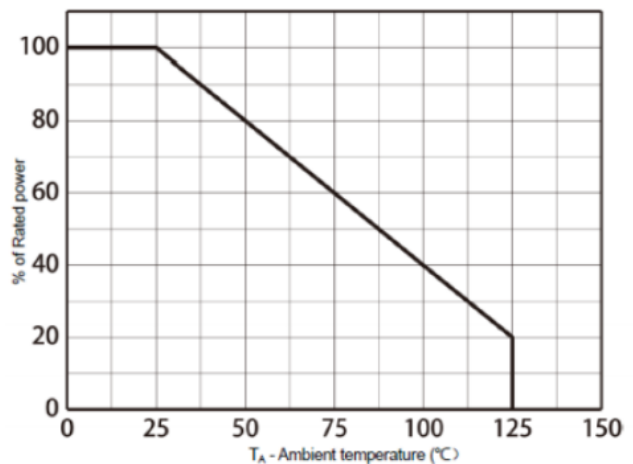


FIGURE 6

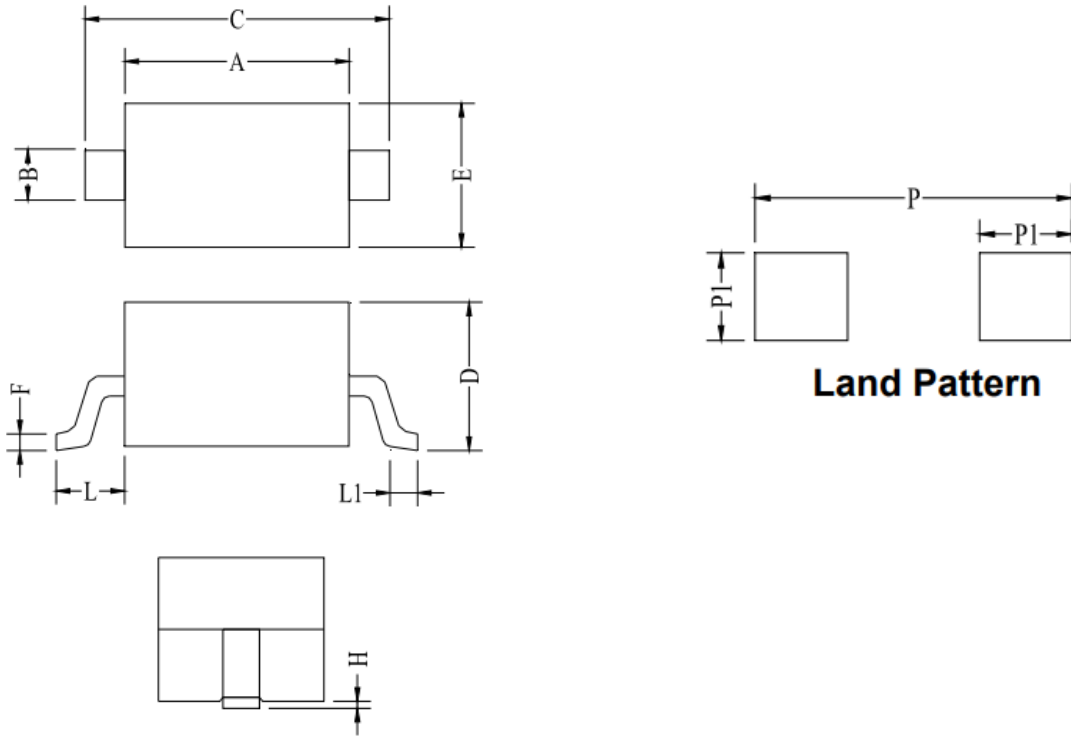
Power Derating VS. Ambient Temperature

ESD Protection Diodes

Single Line Uni-directional ESD and Transient Voltage Protection

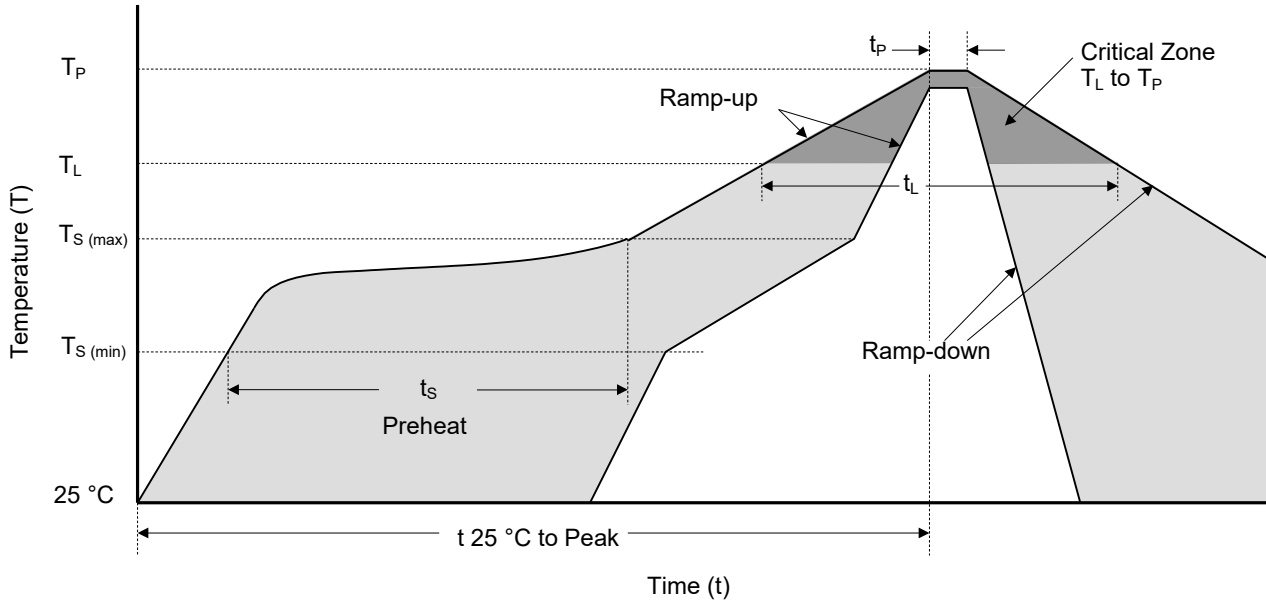
SD05A4D32G1 SOD323

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 ^{+0/-5} °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



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.