

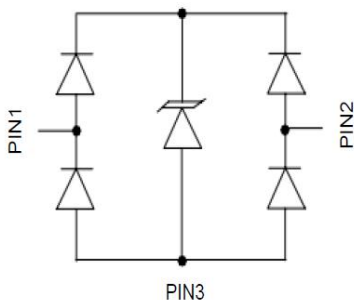
Description

The SEH0512S2 is an uni-directional TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The SEH0512S2 has an ultra-low capacitance with a typical value at 0.3pF, and complies with the IEC 61000-4-2 (ESD) standard with $\pm 25\text{kV}$ air and $\pm 20\text{kV}$ contact discharge. It is assembled into a lead-free SOT-23 package. The small size, ultra-low capacitance and high ESD surge protection make SEH0512S2 an ideal choice to protect cell phone, digital video interfaces and other high speed ports.

Features

- Ultra low capacitance: 0.3pF typical
- Working voltage: 5V
- Low clamping voltage
- Protects two data lines
- Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 25\text{kV}$
 - Contact discharge: $\pm 20\text{kV}$
 - IEC61000-4-5 (Lightning) 5A (8/20 μs)
- RoHS Compliant

Dimensions & Symbol (Unit: mm Max)



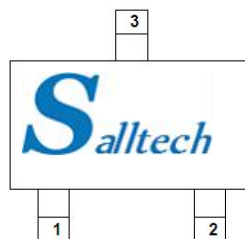
Mechanical Characteristics

- Package: SOT-23
- Lead Finish: Matte Tin
- Case Material: "Green" Molding Compound.
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Below

Applications

- Cellular Handsets and Accessories
- Display Ports
- MDDI Ports
- USB 2.0 and 3.0 Ports
- HDMI 1.3 and 1.4
- Digital Visual Interface (DVI)
- PCI Express and Serial SATA Ports
- Notebook Computer

Marking Information



Details marking code reference specification of approval list

Ordering information

Part Number	Packaging	Reel Size
SEH0512S2	3000/Tape & Reel	7 inch

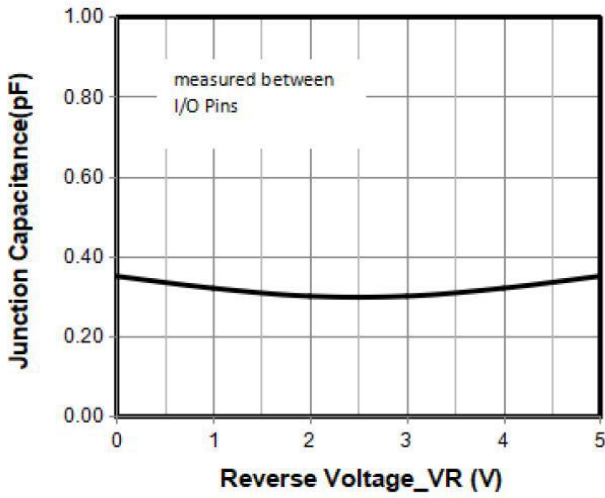
Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power ($t_p=8/20\mu\text{s}$ waveform)	P_{ppp}	80	W
Peak Pulse Current (8/20 μs)	I_{pp}	5	A
ESD per IEC 61000-4-2 (Air)	VESD	± 25	kV
ESD per IEC 61000-4-2 (Contact)		± 20	
Operating Temperature Range	T_J	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^{\circ}\text{C}$

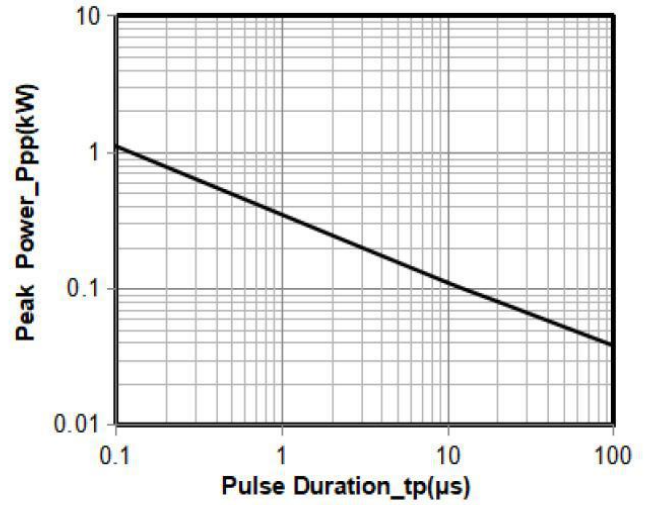
Electrical characteristics ($T_A=25^{\circ}\text{C}$)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			5	V	
Breakdown Voltage	V_{BR}	6			V	$I_T = 1\text{mA}$
Reverse Leakage Current	I_R			0.5	μA	$V_{RWM} = 5.0\text{V}$
Clamping Voltage	V_C			9	V	$I_{PP} = 1\text{A}$ (8 x 20 μs pulse), pin1 or pin2 to pin3
Clamping Voltage	V_C			16	V	$I_{PP} = 5\text{A}$ (8 x 20 μs pulse), pin1 or pin2 to pin3
Junction Capacitance	C_J		0.3	0.4	pF	$V_R = 0\text{V}$, $f = 1\text{MHz}$, between I/O pins, between pin1 and pin2
Junction Capacitance	C_J		0.6	0.8	pF	$V_R = 0\text{V}$, $f = 1\text{MHz}$, any I/O pin to ground, between pin1 or pin2 to pin3

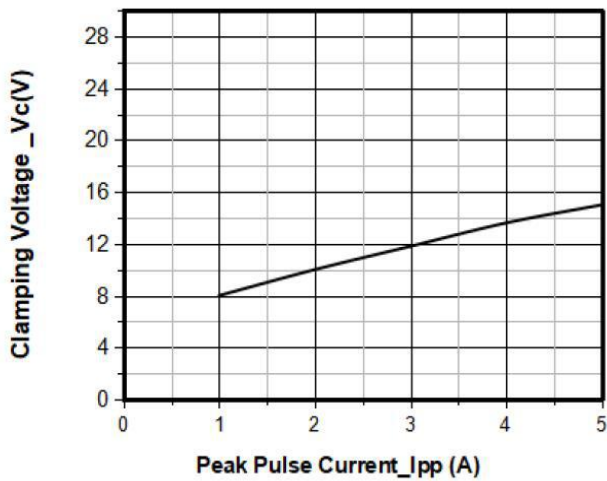
Typical Performance Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise Specified)



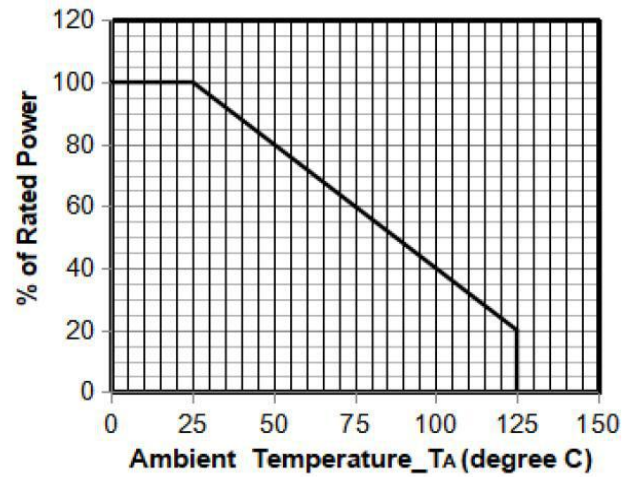
Junction Capacitance vs. Reverse Voltage



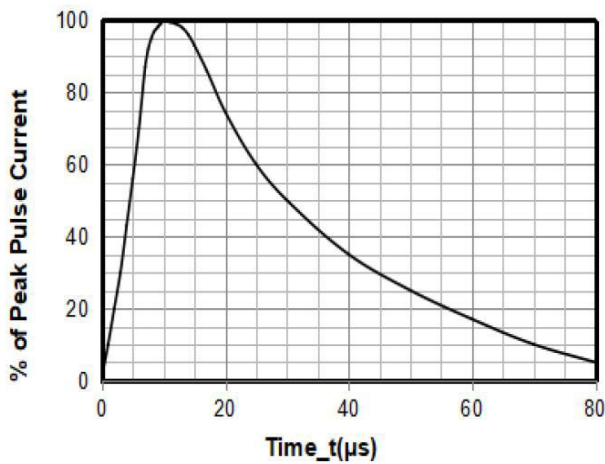
Peak Pulse Power vs. Pulse Time



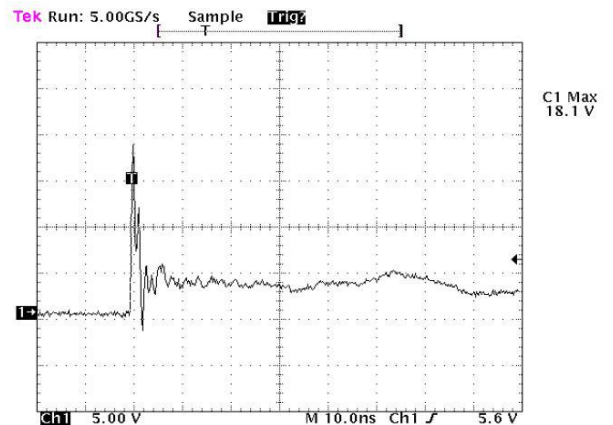
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



8 X 20μs Pulse Waveform



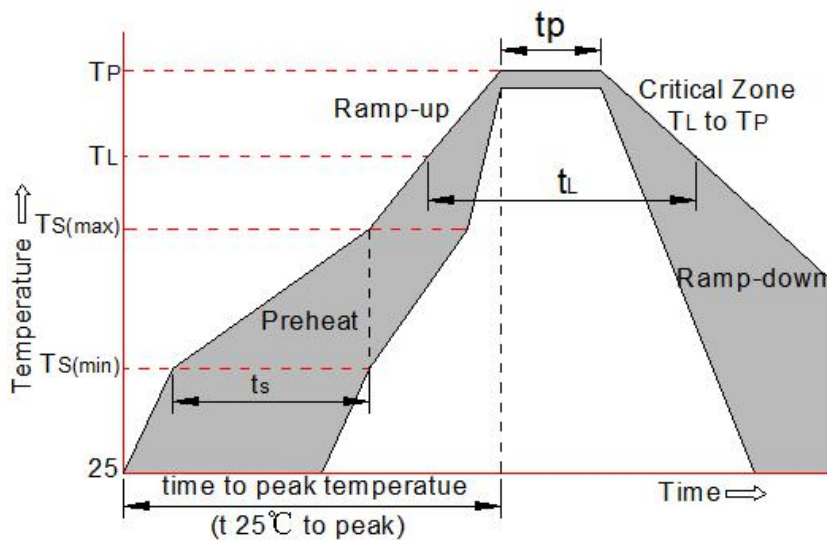
Note: Data is taken with a 10x attenuator

ESD Clamping Voltage

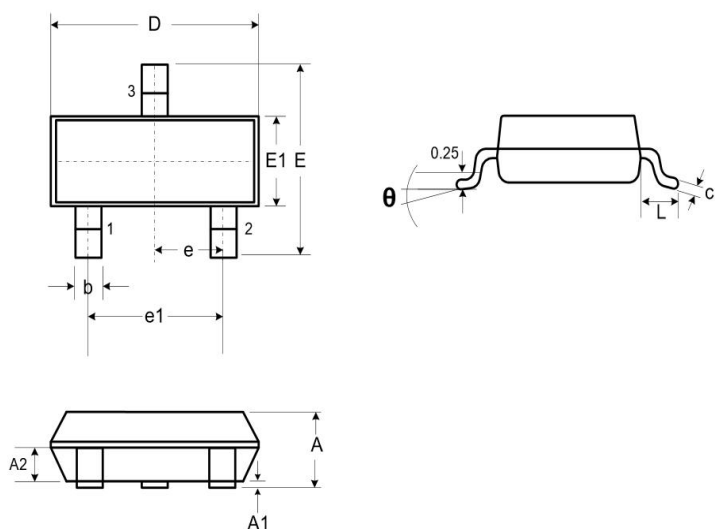
8 kV Contact per IEC61000-4-2

Soldering Parameters

Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (t_s)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L) (Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_p)		8 min. Max
Do not exceed		+260°C

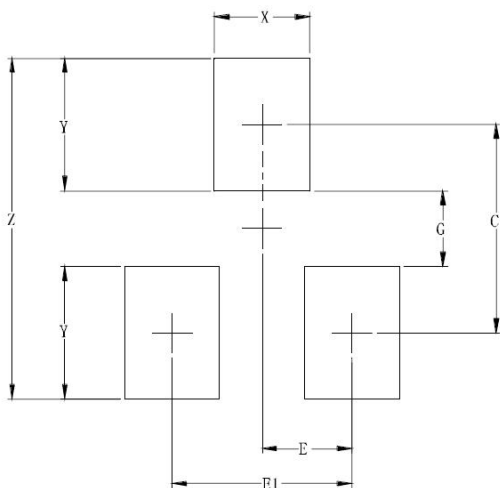


Package Mechanical Data



SYM	DIMENSIONS					
	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.035	-	.044	0.89	-	1.12
A1	.000	-	.004	0.01	-	0.10
A2	.035	.037	.040	0.88	0.95	1.02
b	0.012	-	.020	0.30	-	0.51
c	0.03	-	.007	0.08	-	0.18
D	.110	.114	.120	2.80	2.90	3.04
E	.082	.093	.104	2.10	2.37	2.64
E1	.047	.051	.055	1.20	1.30	1.40
e	.075			1.90		
e1	.037			0.95		
L	.015	.020	.024	0.40	0.50	0.60
L1	.022			0.55		
N	3			3		
θ	0°	-	8°	0°	-	8°

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
C	.087	2.20
E	.037	0.95
E1	.075	1.90
G	.031	0.80
X1	.039	1.00
Y	.055	1.40
Z	.141	3.60

Contact Information

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