

# SP0115-01ETG

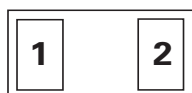
## 1 V Bidirectional Discrete TVS in SOD882, General Purpose ESD Protection

**HF** **RoHS** **Pb**

### Description

The SP0115-01ETG features low breakdown/turn on voltages, making them more ideal protectors of low voltage -1.0 to +1.0 V data lines. These robust diodes can safely absorb repetitive ESD strikes above the maximum level specified in IEC 61000-4-2 international standard (Level 4,  $\pm 8$  kV contact discharge) without performance degradation.

### Pinout



### Features

- ESD, IEC 61000-4-2,  $\pm 30$  kV contact/air
- EFT, IEC 61000-4-4, 40 A (5/50 ns)
- Maximum surge tolerance, IEC 61000-4-5, 2<sup>nd</sup> edition, 12A (8/20  $\mu$ s)
- Halogen-free, lead-free and RoHS compliant
- Moisture sensitivity level (MSL-1)

### Functional Block Diagram



### Applications

- Low voltage GPIO for MCU
- Consumer
- Industry
- Medical

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### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Current ( $t_p = 8/20 \mu\text{s}$ )	12	A
$T_{OP}$	Operating Temperature	-40 to 125	°C
$T_{STOR}$	Storage Temperature	-55 to 150	°C

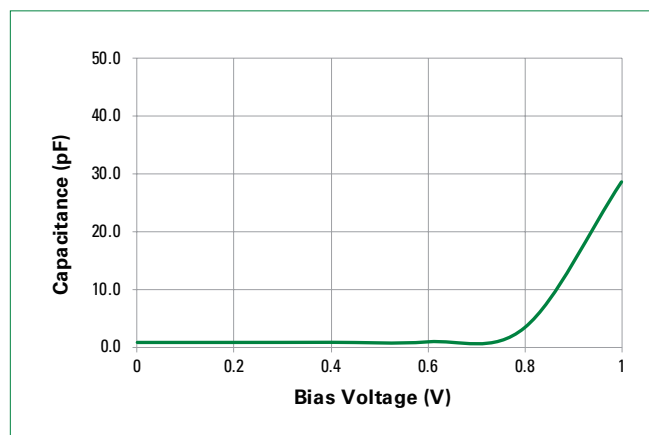
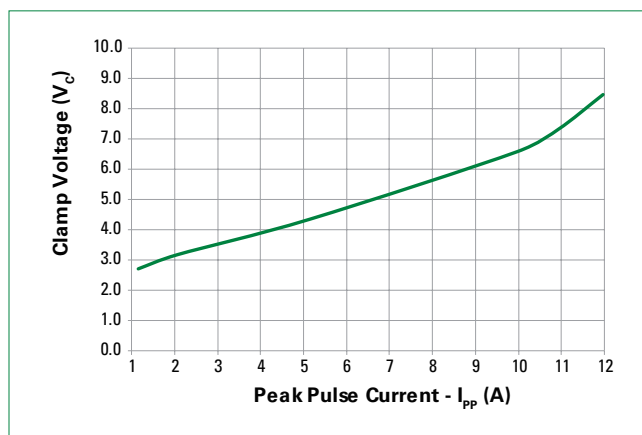
**CAUTION:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

### Electrical Characteristics ( $T_{OP} = 25 \text{ }^\circ\text{C}$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$				1.0	V
Breakdown Voltage	$V_{BR}$	$I_R = 1 \text{ mA}$	1.4	1.6		V
Reverse Leakage Current	$I_{LEAK}$	$V_R = 1 \text{ V}$			1	$\mu\text{A}$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP} = 1 \text{ A}$ , $t_p = 8/20 \mu\text{s}$ , I/O to GND		2.7		V
		$I_{PP} = 12 \text{ A}$ , $t_p = 8/20 \mu\text{s}$ , I/O to GND		8.5		V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p = 100 \text{ ns}$ , I/O to GND		0.23		$\Omega$
ESD Withstand Voltage <sup>1,3</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact Discharge)	$\pm 30$			kV
		IEC 61000-4-2 (Air Discharge)	$\pm 30$			kV
Diode Capacitance <sup>1</sup>	$C_{IO-GND}$	Reverse Bias = 0V, $f = 1 \text{ MHz}$ , I/O to GND		0.85		pF

**Note:**

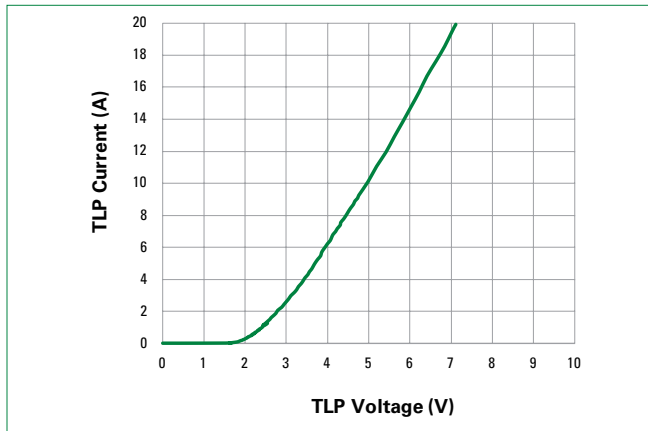
- Parameter is guaranteed by design and/or component characterization.
- Transmission Line Pulse (TLP) with 100ns width, 0.2 ns rise time, and average window  $t_1 = 70 \text{ ns}$  to  $t_2 = 90 \text{ ns}$ .
- Device stressed with ten non-repetitive ESD pulses.

**Capacitance vs. Reverse Bias****Clamping Voltage vs  $I_{PP}$** 

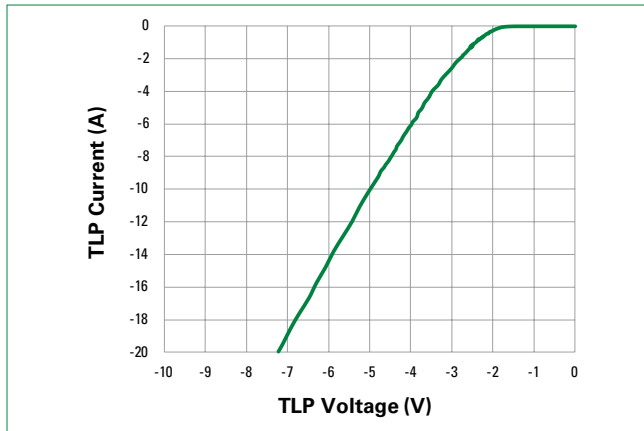
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Positive Transmission Line Pulsing (TLP) Plot



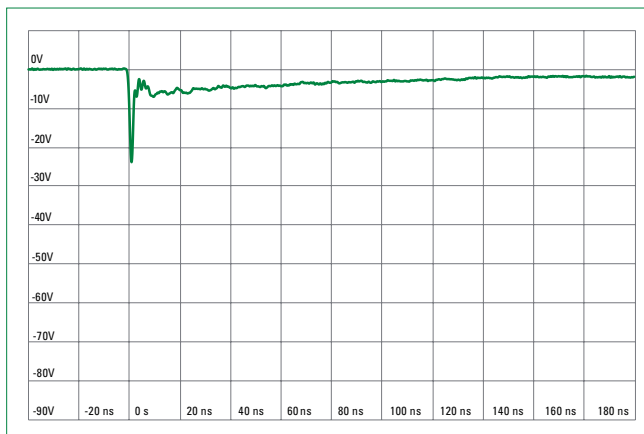
Negative Transmission Line Pulsing (TLP) Plot



IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage



IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage



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## 1 V Bidirectional Discrete TVS in SOD882, General Purpose ESD Protection

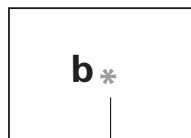
### Soldering Parameters

<b>Reflow condition</b>		Pb – Free assembly
<b>Pre Heat</b>	- Temperature min ( $T_{s(min)}$ )	150 °C
	- Temperature max ( $T_{s(max)}$ )	200 °C
	- Time (min to max) ( $t_s$ )	60 – 120 secs
<b>Average ramp up rate (Liquidus) temp (<math>T_L</math>) to peak</b>		3 °C/second max
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up rate</b>		3 °C/second max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217 °C
	- Temperature ( $t_L$ )	60 – 150 seconds
<b>Peak temperature (<math>T_p</math>)</b>		260 <sup>+0/-5</sup> °C
<b>Time within 5 °C of actual peak temperature (<math>t_p</math>)</b>		30 seconds
<b>Ramp-down rate</b>		6 °C/second max
<b>Time 25 °C to peak temperature (<math>T_p</math>)</b>		8 minutes max
<b>Do not exceed</b>		260 °C

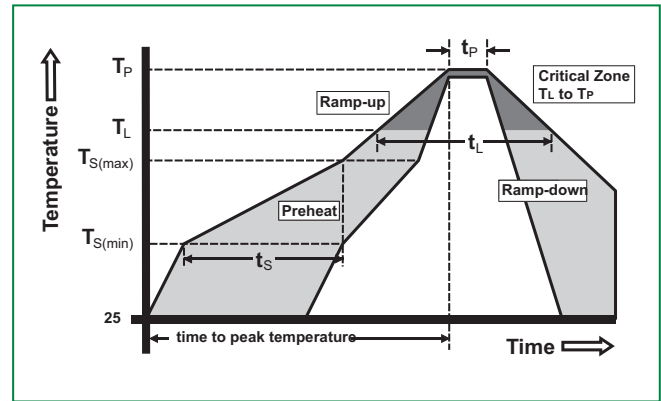
### Ordering Information

Part Number	Package	Min. Order Qty.
SP0115-01ETG	SOD882	10000

### Part Marking System



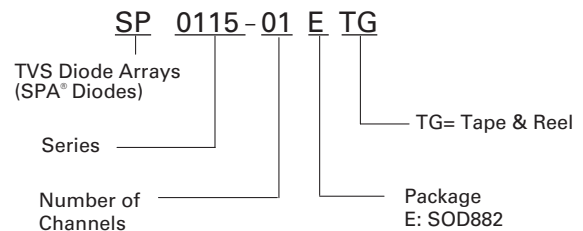
b : Part Code  
\* : Date Code



### Product Characteristics

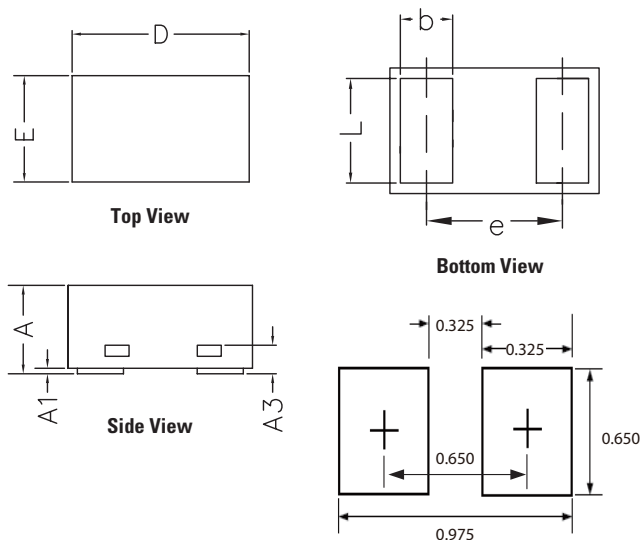
<b>Lead plating</b>	Matte tin
<b>Lead material</b>	Copper alloy
<b>Body material</b>	Molded compound
<b>Flammability</b>	UL recognized compound meeting flammability rating V-0

### Part Numbering System

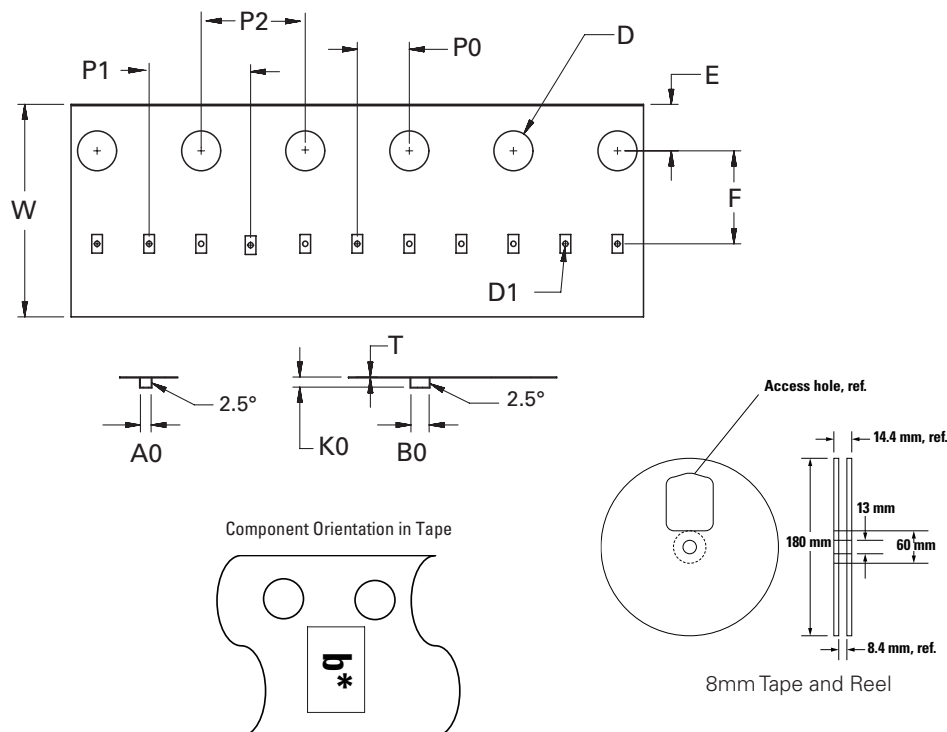


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**Package Dimensions – SOD882****Recommended Soldering Pad Layout (mm)**

Symbol	Millimeters		
	Min	Nom	Max
A	>0.40	-	0.50
A1	0.00	-	0.05
A3	0.125 Ref		
D	0.95	1.00	1.05
E	0.55	0.60	0.65
b	0.20	0.25	0.30
L	0.45	0.50	0.55
e	0.65 5BSC		

**Embossed Carrier Tape & Reel Specification – SOD882**

Symbol	Millimeters
A0	0.70+/-0.05
B0	1.15+/-0.05
D	1.50+0.10
D1	0.40+/-0.10
E	1.75+/-0.10
F	3.50+/-0.05
K0	0.55+/-0.05
P0	2.00+/-0.05
P1	4.00+/-0.10
P2	4.00+/-0.10
T	0.20+/-0.03
W	8.00+0.30/-0.10

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