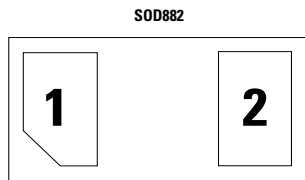


## SP1250 50A Discrete Unidirectional TVS Diode

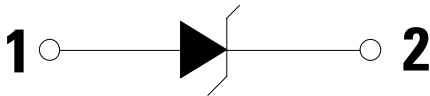


**Note:** This package image is for example and reference only. For detail package drawing, please refer to the package section in this datasheet.

### Pinout



### Functional Block Diagram



### Description

The SP1250 unidirectional TVS is fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment. The SP1250 TVS can safely absorb repetitive ESD strikes of  $\pm 30$  kV (contact and air discharge as defined in IEC 61000-4-2) without any performance degradation. Additionally, each TVS can safely dissipate a 50A 8/20 $\mu$ s surge event as defined in IEC 61000-4-5 2<sup>nd</sup> edition.

### Features

- ESD, IEC 61000-4-2,  $\pm 30$ kV contact,  $\pm 30$ kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 50A (8/20 $\mu$ s as defined in IEC 61000-4-5 2<sup>nd</sup> edition)
- Low leakage current of 0.02 $\mu$ A (TYP) at 5V
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)

### Applications

- VBUS Protection
- Portable Battery
- Switches / Buttons
- Test Equipment / Instrumentation
- Medical Equipment
- Notebooks / Desktops / Servers
- Computer Peripherals
- Point-of-Sale Terminals

**Life Support Note:**

**Not Intended for Use in Life Support or Life Saving Applications**

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Current ( $t_p=8/20\mu s$ )	50	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.

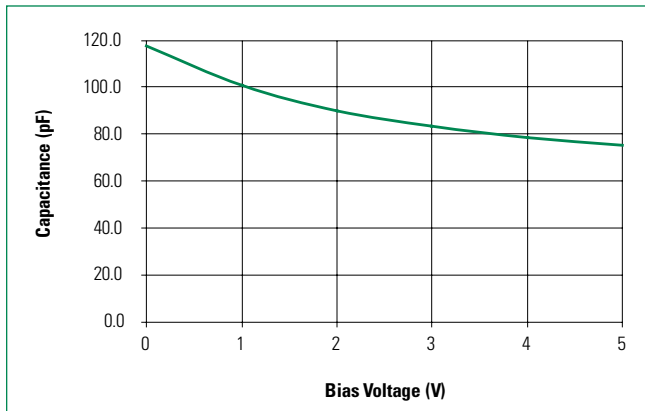
### Electrical Characteristics ( $T_{OP}=25^\circ C$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$	$I_R=1\mu A$	-	-	5	V
Breakdown Voltage	$V_{BR}$	$I_R=1 mA$	5.1	5.5	-	V
Reverse Leakage Current	$I_{LEAK}$	$V_R=5V$	-	0.02	0.1	$\mu A$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=50A, t_p=8/20\mu s$	-	8.7	10	V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p=100ns$	-	0.05	-	$\Omega$
ESD Withstand Voltage <sup>1</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, $f=1MHz$	-	120	-	pF

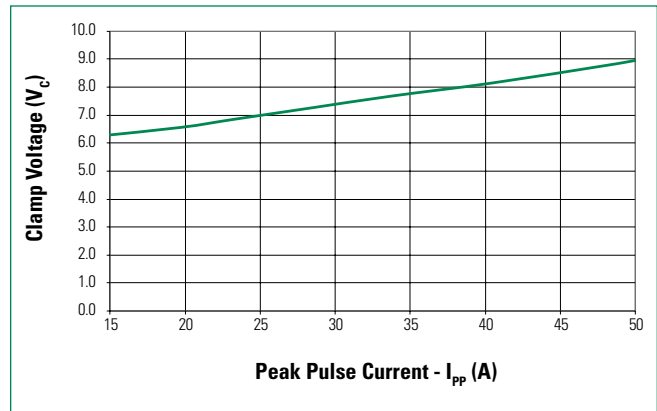
**Note:**

- Parameter is guaranteed by design and/or component characterization.
- Transmission Line Pulse (TLP) with 100ns width, 0.2ns rise time, and average window  $t1=70ns$  to  $t2=90ns$

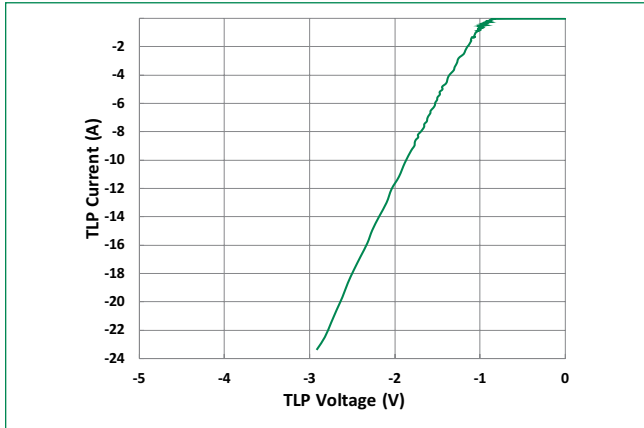
### Capacitance vs. Reverse Bias



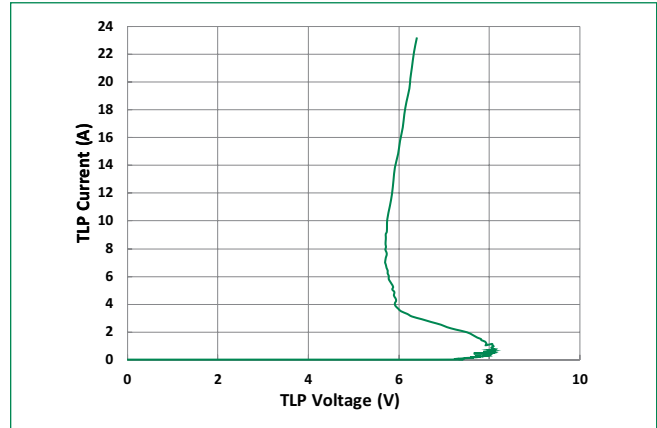
### Clamping voltage vs. $I_{PP}$ for 8/20 $\mu s$ waveshape



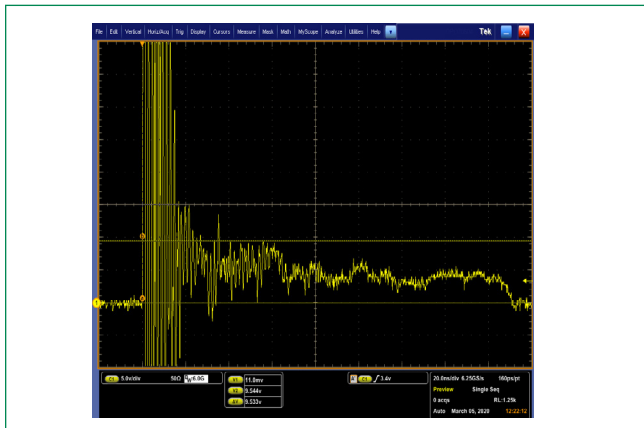
**Negative Transmission Line Pulsing (TLP) Plot**



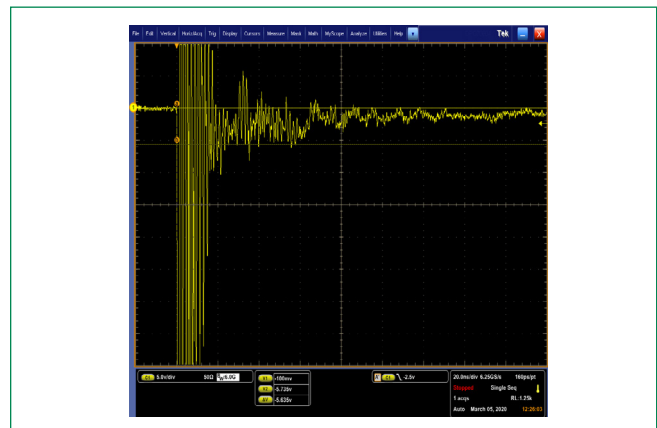
**Positive Transmission Line Pulsing (TLP) Plot**



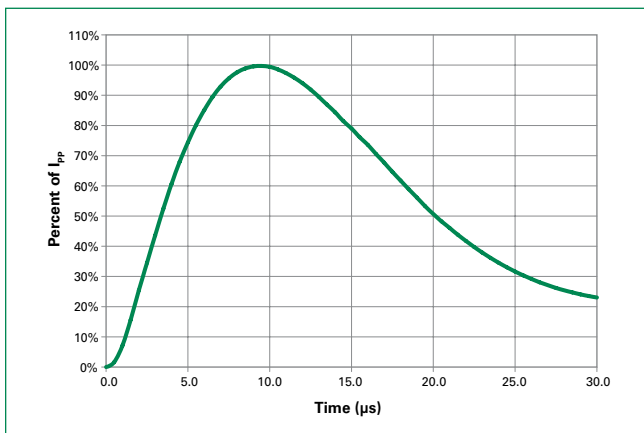
**IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage**



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

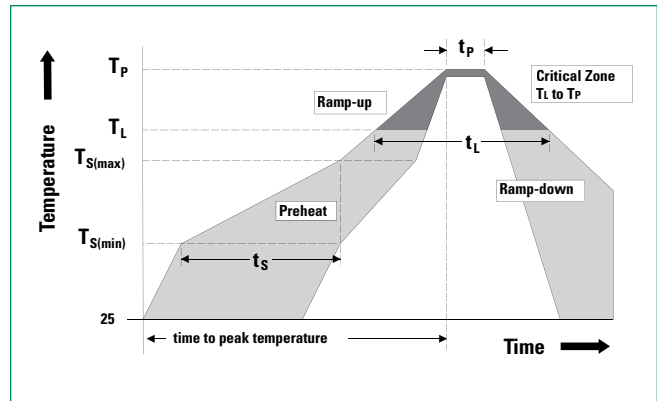


**8/20µs Pulse Waveform**



### 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 – 180 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>		20 – 40 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



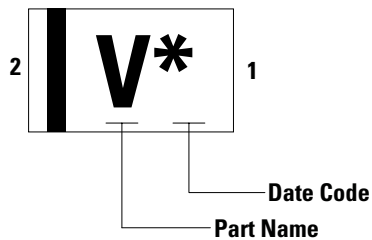
### Ordering Information

Part Number	Package	Min. Order Qty.
SP1250-01ETG	SOD882	10,000

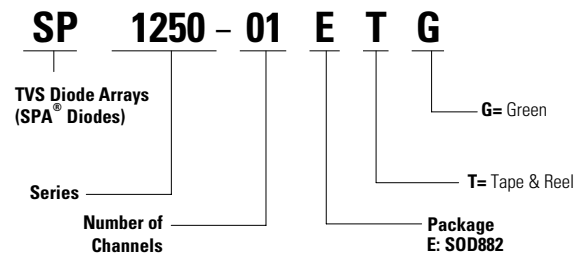
### Product Characteristics

<b>Lead Plating</b>	Matte Tin
<b>Lead material</b>	Copper Alloy
<b>Substrate Material</b>	Silicon
<b>Body Material</b>	Molded Compound
<b>Flammability</b>	UL Recognized compound meeting flammability rating V-0

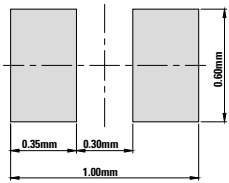
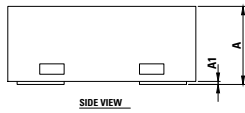
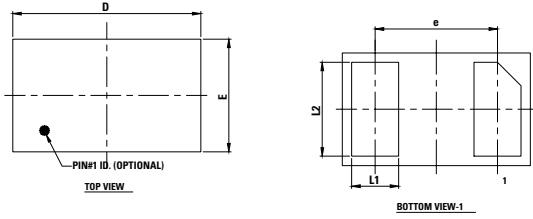
### Part Marking System



### Part Numbering System



**Package Dimensions — SOD882**

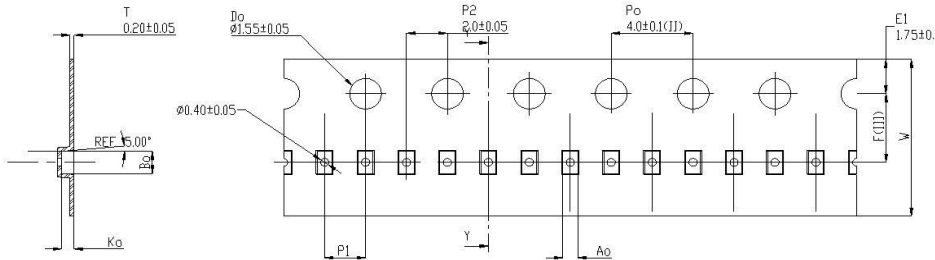


Recommended Soldering Pattern

Drawing#: E03-B

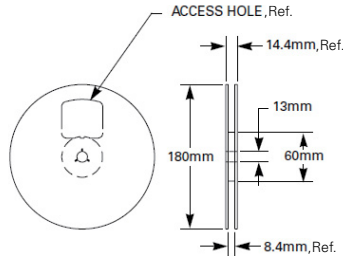
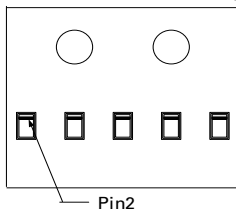
Symbol	SOD882					
	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
<b>A</b>	0.40	0.50	0.55	0.016	0.020	0.022
<b>A1</b>	0.00	0.02	0.05	0.000	0.001	0.002
<b>L1</b>	0.20	0.25	0.30	0.008	0.010	0.012
<b>L2</b>	0.45	0.50	0.55	0.018	0.020	0.022
<b>D</b>	0.95	1.00	1.05	0.037	0.039	0.041
<b>E</b>	0.55	0.60	0.65	0.022	0.024	0.026
<b>e</b>	0.65 BSC			0.026 BSC		

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



Symbol	Millimeters
<b>A0</b>	0.70+/-0.045
<b>B0</b>	1.10+/-0.045
<b>K0</b>	0.65+/-0.045
<b>F</b>	3.50+/-0.05
<b>P1</b>	2.00+/-0.10
<b>W</b>	8.00 + 0.30 -0.10

Component Orientation in Tape



8mm TAPE AND REEL