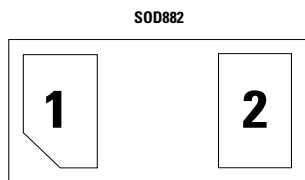


## SP1250 50A Discrete Unidirectional TVS Diode



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

### Pinout



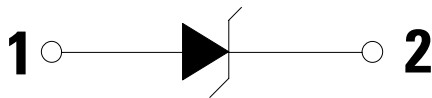
### Description

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)

### Functional Block Diagram



### 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.

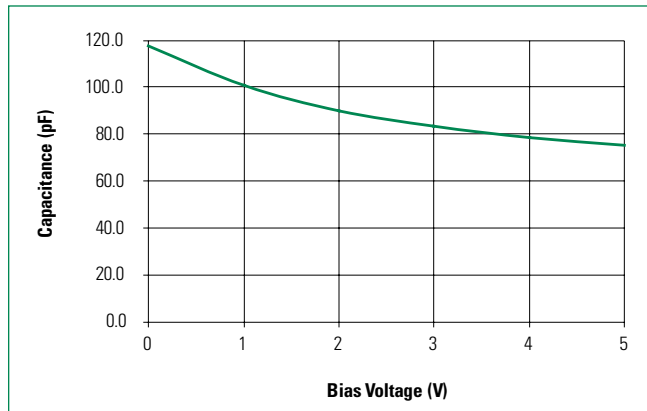
### Electrical Characteristics ( $T_{OP}=25^{\circ}C$ )

| Parameter                          | Symbol       | Test Conditions                   | Min      | Typ  | Max | Units    |
|------------------------------------|--------------|-----------------------------------|----------|------|-----|----------|
| Reverse Standoff Voltage           | $V_{RWM}$    | $I_R=1\mu A$                      | -        | -    | 5   | V        |
| Breakdown Voltage                  | $V_{BR}$     | $I_R=1mA$                         | 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       |

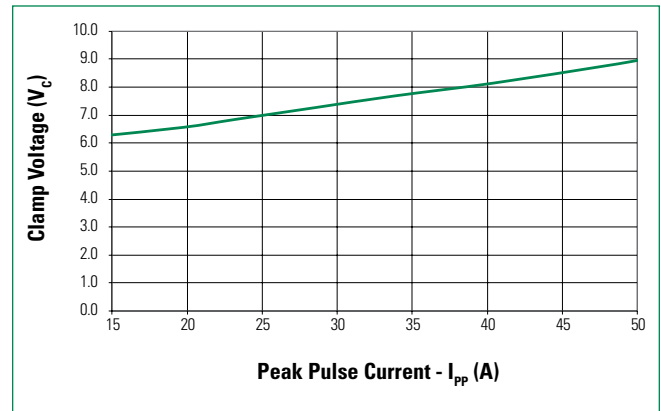
**Note:**

- Parameter is guaranteed by design and/or component characterization.
- Transmission Line Pulse (TLP) with 100ns width, 0.2ns rise time, and average window  $t_1=70ns$  to  $t_2=90ns$

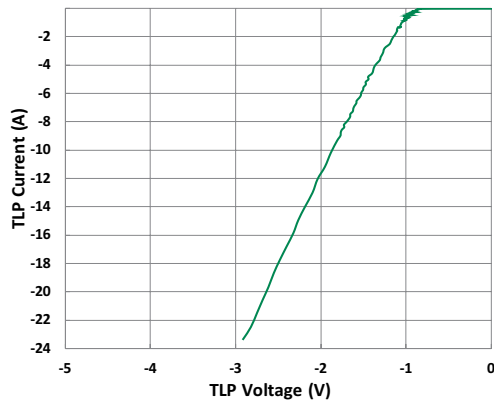
### Capacitance vs. Reverse Bias



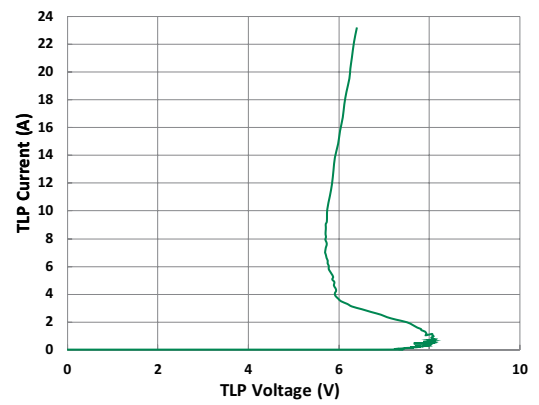
### Clamping voltage vs. $I_{PP}$ for 8/20 $\mu s$ waveshape



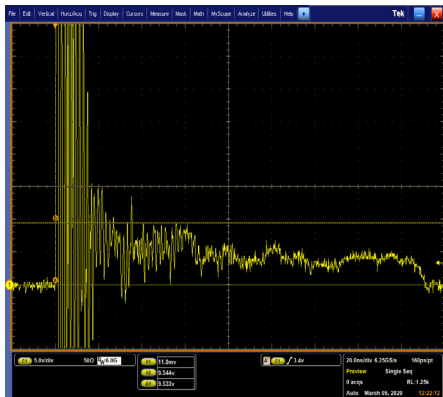
**Negative Transmission Line Pulsing (TLP) Plot**



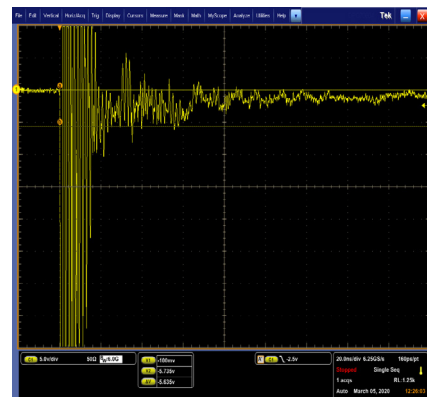
**Positive Transmission Line Pulsing (TLP) Plot**



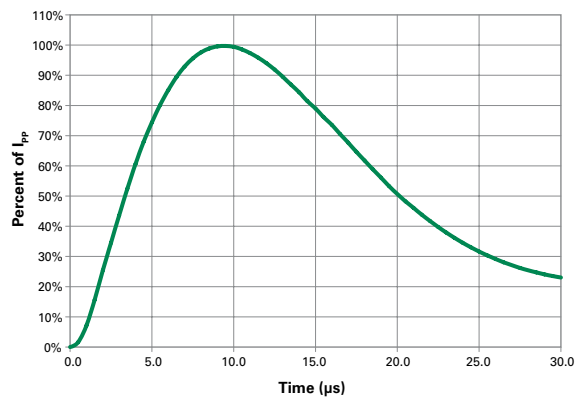
**IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage**



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

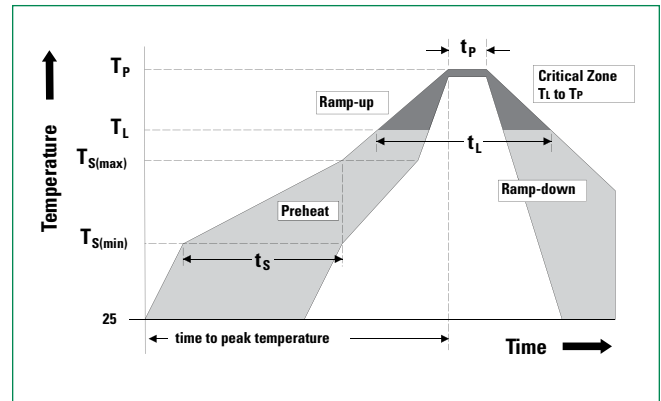


**8/20μs Pulse Waveform**



### 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                   |



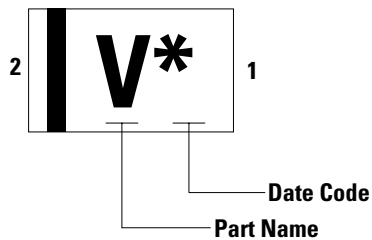
### Ordering Information

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

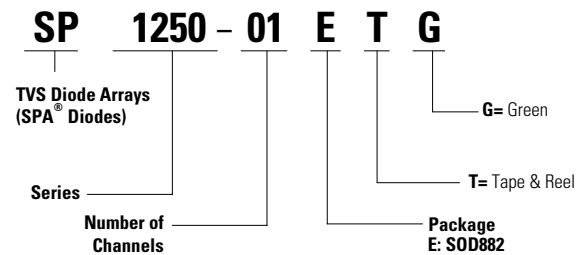
### Product Characteristics

|                           |                                                        |
|---------------------------|--------------------------------------------------------|
| <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 |

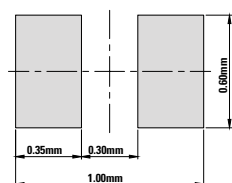
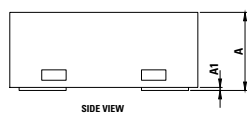
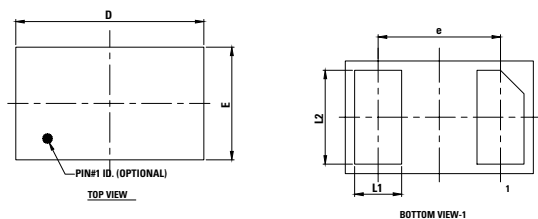
### Part Marking System



### Part Numbering System



### Package Dimensions — SOD882

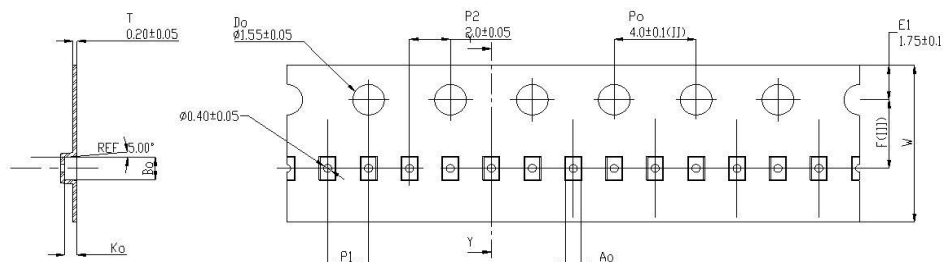


Recommended Soldering Pattern

Drawing#: E03-B

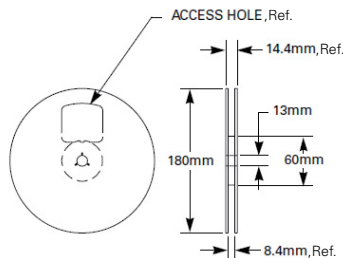
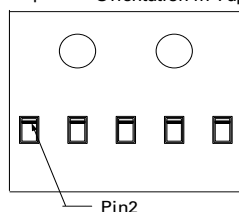
| Symbol    | SOD882      |      |      |           |       |       |
|-----------|-------------|------|------|-----------|-------|-------|
|           | Millimeters |      |      | Inches    |       |       |
|           | Min         | Typ  | Max  | Min       | Typ   | Max   |
| <b>A</b>  | 0.40        | 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