

SP0115-01ETG

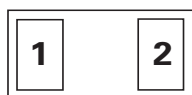
1 V Bidirectional Discrete TVS in SOD882, General Purpose ESD Protection

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, ± 8 kV contact discharge) without performance degradation.

Pinout



Features

- ESD, IEC 61000-4-2, ± 30 kV contact/air
- EFT, IEC 61000-4-4, 40 A (5/50 ns)
- Maximum surge tolerance, IEC 61000-4-5, 2nd edition, 12A (8/20 μ 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 |

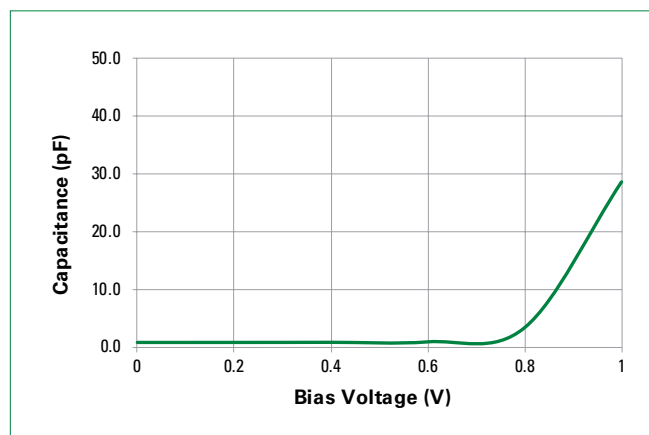
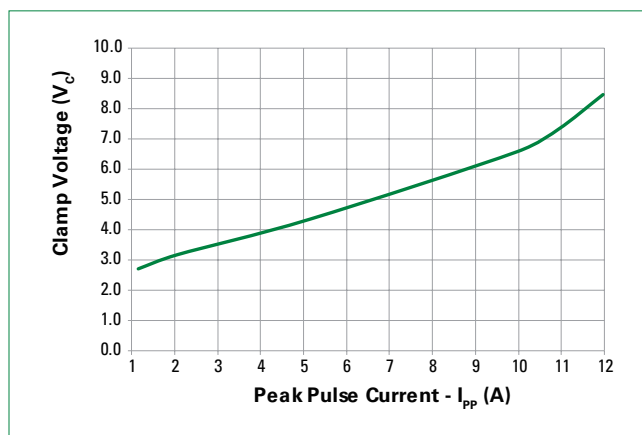
CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

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 | μA |
| Clamp Voltage ¹ | 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 ² | R_{DYN} | TLP, $t_p = 100 \text{ ns}$, I/O to GND | | 0.23 | | Ω |
| ESD Withstand Voltage ^{1,3} | V_{ESD} | IEC 61000-4-2 (Contact Discharge) | ± 30 | | | kV |
| | | IEC 61000-4-2 (Air Discharge) | ± 30 | | | kV |
| Diode Capacitance ¹ | C_{IO-GND} | Reverse Bias = 0V, $f = 1 \text{ MHz}$, I/O to GND | | 0.85 | | pF |

Note:

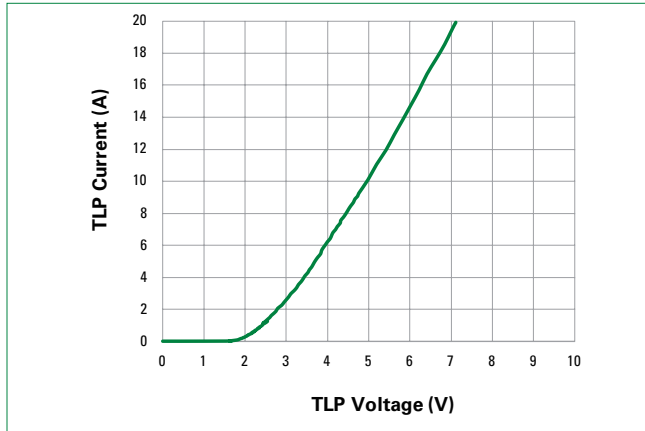
- Parameter is guaranteed by design and/or component characterization.
- Transmission Line Pulse (TLP) with 100ns width, 0.2 ns rise time, and average window $t_1 = 70 \text{ ns}$ to $t_2 = 90 \text{ ns}$.
- Device stressed with ten non-repetitive ESD pulses.

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

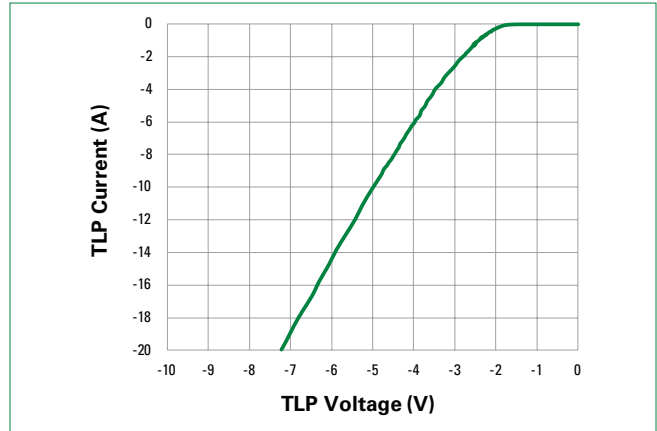
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Positive Transmission Line Pulsing (TLP) Plot



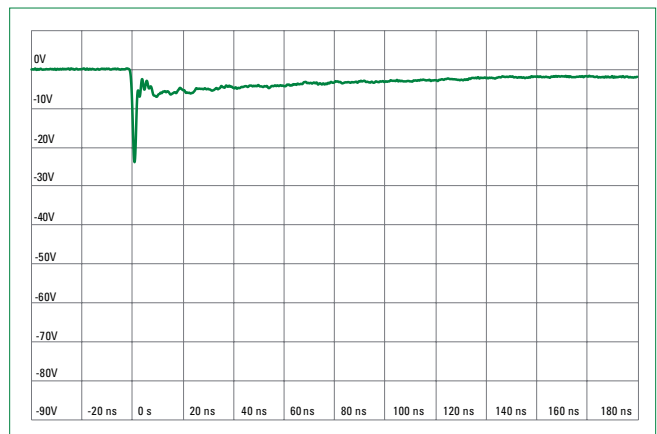
Negative Transmission Line Pulsing (TLP) Plot



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



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



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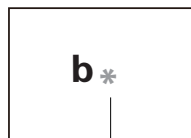
Soldering Parameters

| | | |
|--|------------------------------------|-------------------------|
| Reflow condition | | Pb – 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 secs |
| 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 |
| | - Temperature (t_L) | 60 – 150 seconds |
| Peak temperature (T_p) | | 260 ^{+0/-5} °C |
| Time within 5 °C of actual peak temperature (t_p) | | 30 seconds |
| Ramp-down rate | | 6 °C/second max |
| Time 25 °C to peak temperature (T_p) | | 8 minutes max |
| Do not exceed | | 260 °C |

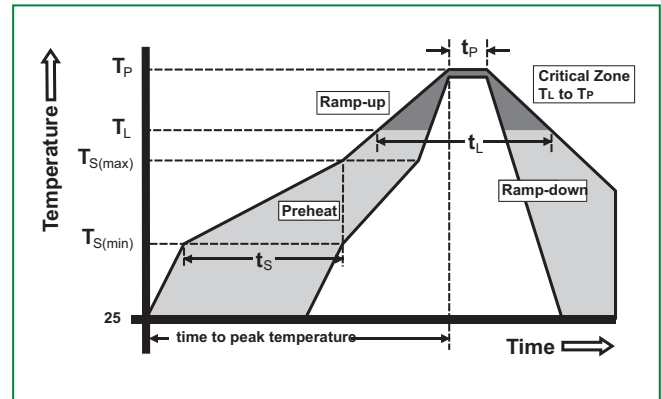
Ordering Information

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

Part Marking System



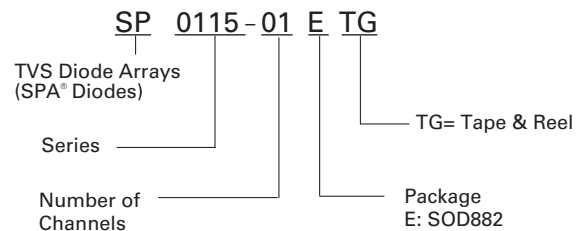
b : Part Code
* : Date Code



Product Characteristics

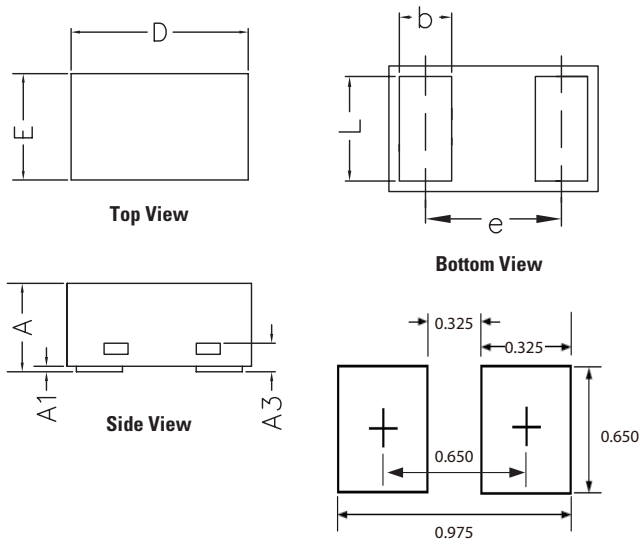
| | |
|----------------------|--|
| Lead plating | Matte tin |
| Lead material | Copper alloy |
| Body material | Molded compound |
| Flammability | UL recognized compound meeting flammability rating V-0 |

Part Numbering System

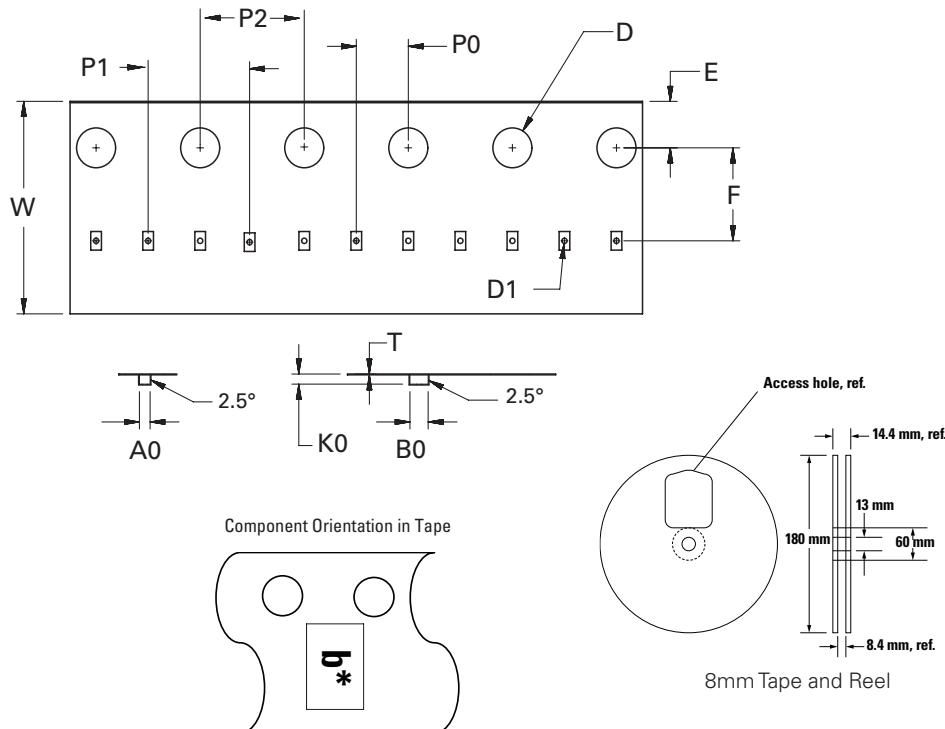


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Package Dimensions – SOD882**Recommended Soldering Pad Layout (mm)**

| 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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