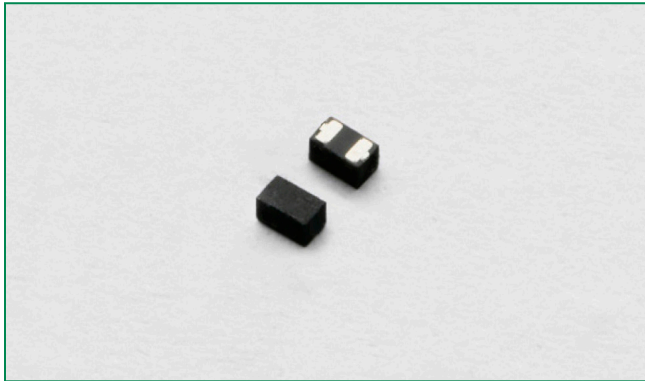


SP3205 0.3pF 4A Unidirectional Diode Array

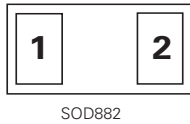


Description

The SP3205 provides low capacitance, unidirectional and a high level of protection for electronic equipment that may experience destructive electrostatic discharges (ESD). The typical capacitance of 0.3pF helps ensure excellent signal integrity on the most challenging consumer electronics interfaces, such as USB 3.1, HDMI, DisplayPort, Thunderbolt and V-by-One®.

It can safely absorb repetitive ESD strikes at ±30kV (contact discharge, IEC 61000-4-2) without performance degradation and safely dissipate 4A of 8/20µs surge current (IEC 61000-4-5 2nd edition).

Pinout



Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 4A (8/20µs as defined in IEC 61000-4-5 2nd edition)
- Low capacitance of 0.3pF (TYP @ V_a=0V)
- Low leakage current of 1nA (TYP) at 3.3V
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)
- AEC-Q101 Qualified

Functional Block Diagram



Applications

- USB 3.1
- HDMI
- DisplayPort
- S-ATA
- NFC

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 ($t_p=8/20\mu s$) | 4 | 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.

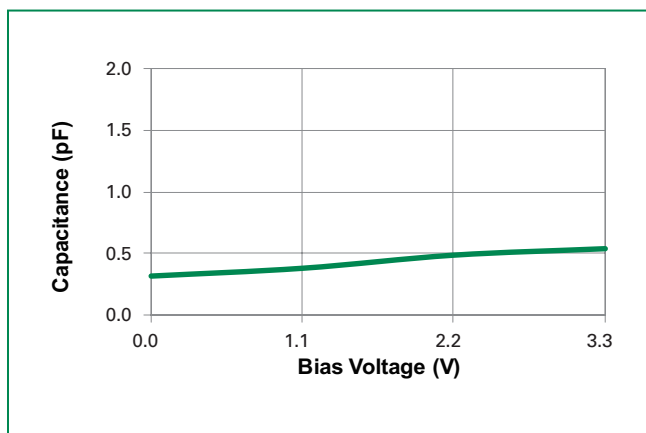
Electrical Characteristics ($T_{OP}=25^\circ C$)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|------------------------------------|--------------|-----------------------------------|----------|-----|-----|----------|
| Reverse Standoff Voltage | V_{RWM} | $I_R=1\mu A$ | | | 3.3 | V |
| Breakdown Voltage | V_{BR} | $I_R=1mA$ | 3.6 | 5.5 | | V |
| Reverse Leakage Current | I_{LEAK} | $V_R=3.3V$ | | 1 | 100 | nA |
| Clamp Voltage ¹ | V_C | $I_{PP}=1A, t_p=8/20\mu s$ | | 7.5 | 9 | V |
| | | $I_{PP}=4A, t_p=8/20\mu s$ | | 9.5 | 12 | V |
| Dynamic Resistance ² | R_{DYN} | TLP, $t_p=100ns$ | | 0.3 | | Ω |
| ESD Withstand Voltage ¹ | 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, $f=1MHz$ | | 0.3 | 0.5 | pF |

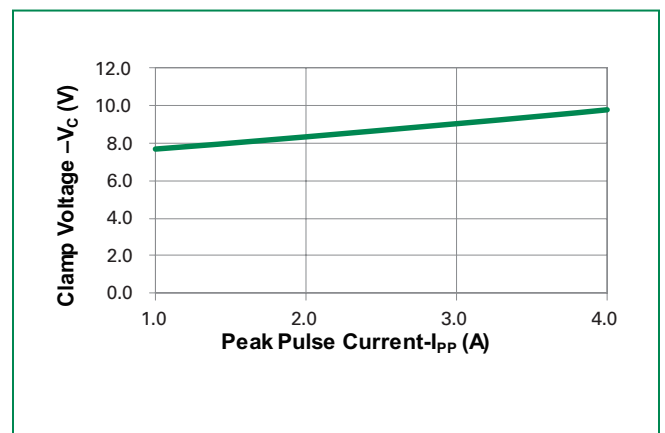
Note:

- 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 $t_2=90ns$

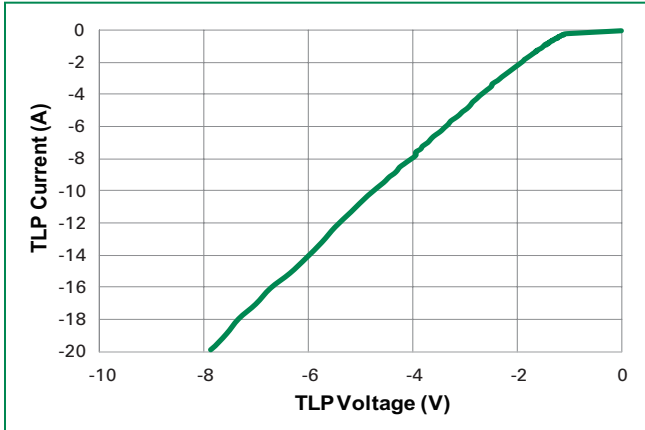
Capacitance vs. Reverse Bias



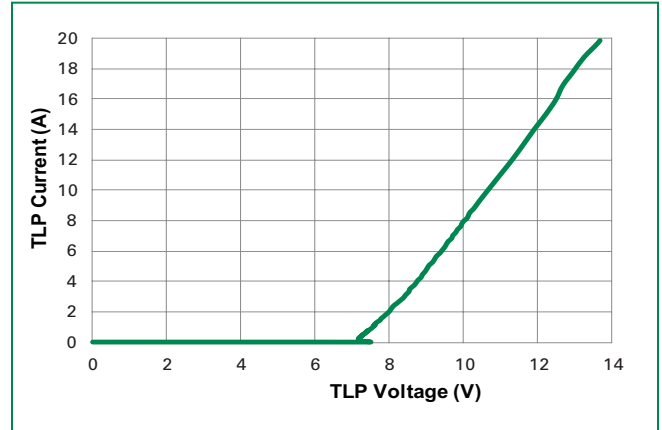
Clamping voltage vs. I_{PP} for 8/20 μs waveshape



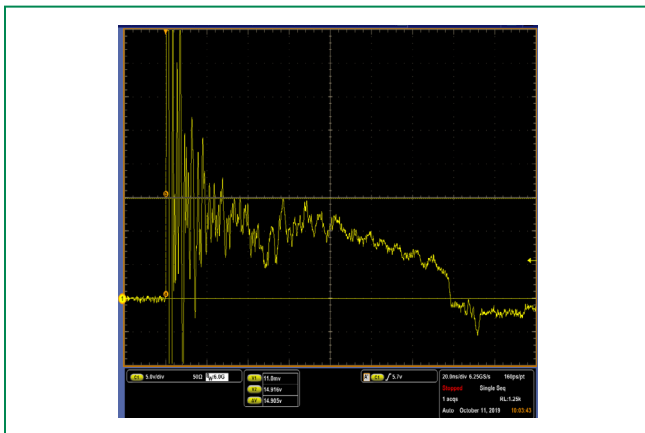
Negative Transmission Line Pulsing (TLP) Plot



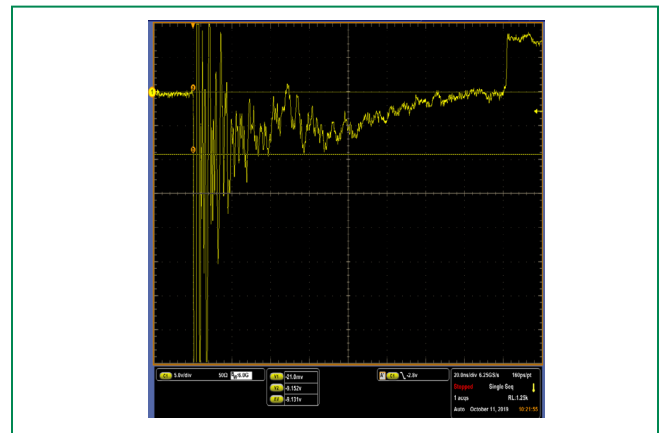
Positive Transmission Line Pulsing (TLP) Plot



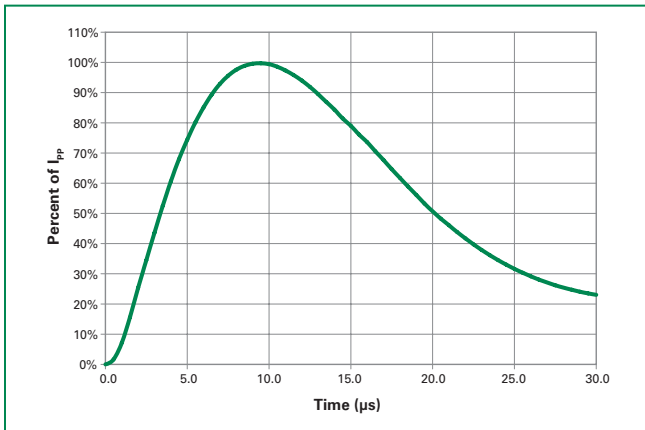
IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage



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

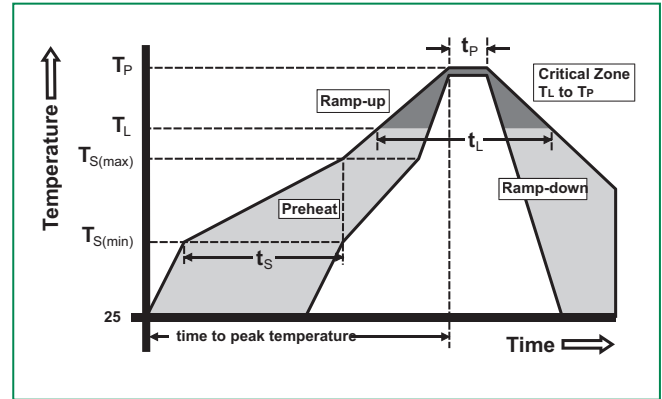


8/20µs Pulse Waveform



Soldering Parameters

| | | |
|--|------------------------------------|-------------------------|
| 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 – 180 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) | | 20 – 40 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. |
|--------------|---------|-----------------|
| SP3205-01ETG | SOD882 | 10,000 |

Product Characteristics

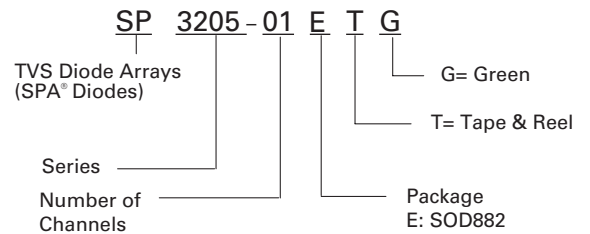
| | |
|---------------------------|--|
| Lead Plating | Pre-Plated Frame |
| Lead material | Copper Alloy |
| Substrate Material | Silicon |
| Body Material | Molded Compound |
| Flammability | UL Recognized compound meeting flammability rating V-0 |

Part Marking System

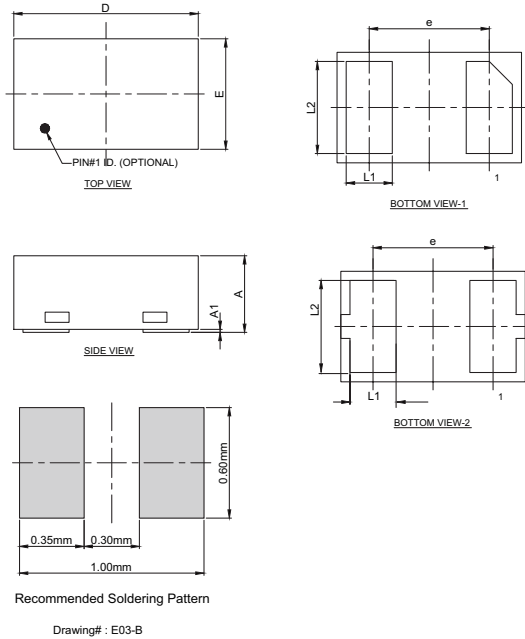


Y : Part code
* : Date code

Part Numbering System

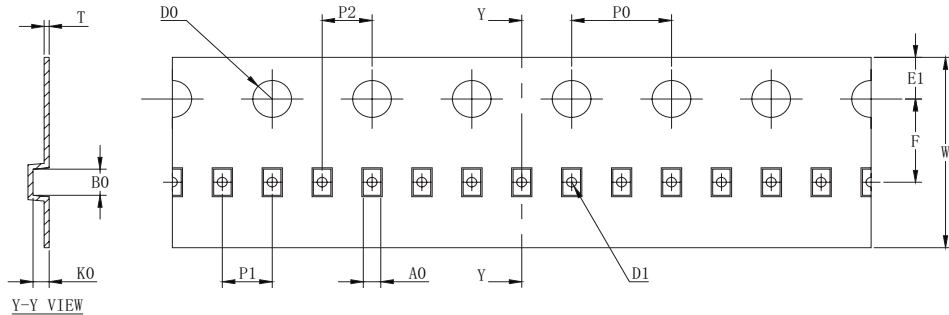


Package Dimensions — SOD882

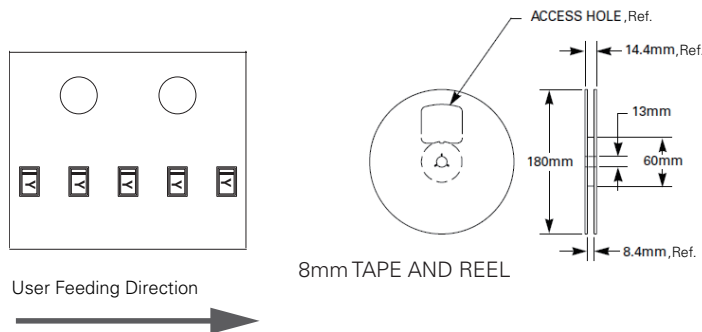


| Symbol | SOD882 | | | | | |
|-----------|-------------|------|------|-----------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min | Typ | Max | Min | Typ | Max |
| A | 0.40 | 0.50 | 0.55 | 0.016 | 0.020 | 0.022 |
| A1 | 0.00 | 0.02 | 0.05 | 0.000 | 0.001 | 0.002 |
| L1 | 0.20 | 0.25 | 0.30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

Embossed Carrier Tape & Reel Specification — SOD882



| Symbol | Millimeters | |
|-----------|-------------|-------|
| | Min | Max |
| A0 | 0.655 | 0.745 |
| B0 | 1.055 | 1.145 |
| D0 | 1.50 | 1.60 |
| D1 | 0.35 | 0.45 |
| E1 | 1.65 | 1.85 |
| F | 3.45 | 3.55 |
| K0 | 0.695 | 0.605 |
| P0 | 3.90 | 4.10 |
| P1 | 1.90 | 2.10 |
| P2 | 1.95 | 2.05 |
| T | 0.15 | 0.25 |
| W | 7.90 | 8.30 |



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