# SP1212

## 12A Discrete Unidirectional TVS Diode

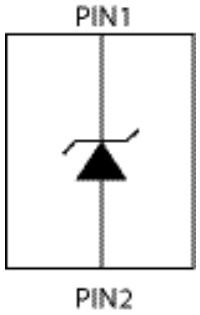
**OBSOLETE** **DATE:** 9/30/2021 **PCN/ECN#** ESU270-62
**REPLACED BY:** SP1250-01ETG

RoHS Pb GREEN

## Additional Information

Resources | Accessories | Samples

### Pinout and Functional Block Diagram




## Description

The SP1212 unidirectional TVS is fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment. The SP1212 TVS can safely absorb repetitive ESD strikes of ±30 kV (contact and air discharge as defined in IEC 61000-4-2) without any performance degradation. Additionally, each TVS can safely dissipate a 12A 8/20 surge event as defined in IEC 61000-4-5 2nd Edition.

## Features & Benefits

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 12A (8/20µs as defined in IEC 61000-4-5 2nd edition)
- AEC-Q101 qualified
- Lead free and RoHS compliant
- Moisture Sensitivity Level(MSL -1)

## Applications

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





Revised: GD. 06/10/21

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### Absolute Maximum Ratings

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $P_{pk}$ | Peak Pulse Power ($t_p$=8/20µs) | 250 | W |
| $T_{OP}$ | 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.

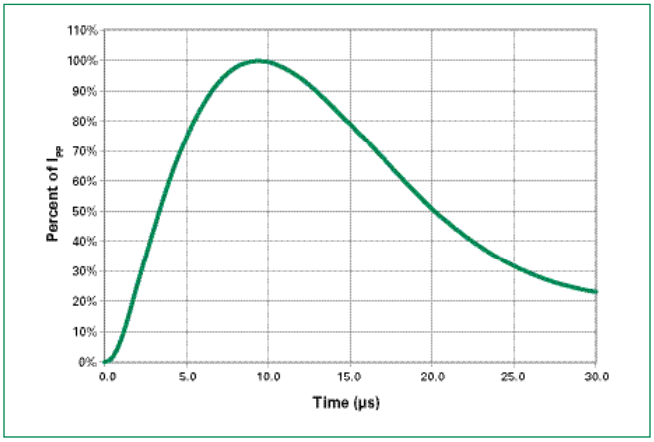
### Electrical Characteristics ($T_{OP}$=25°C)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Reverse Standoff Voltage | $V_{RWM}$ | $I_R$=1µA | | | 5.0 | V |
| Breakdown Voltage | $V_{BR}$ | $I_R$=1mA | | 7.0 | | V |
| Reverse Leakage Current | $I_{LEAK}$ | $V_R$=5V | | 0.1 | 0.5 | µA |
| Clamp Voltage[1] | $V_C$ | $I_{PP}$=1A, $t_p$=8/20µs | | 7.5 | | V |
| | | $I_{PP}$=12A, $t_p$=8/20µs | | 9.7 | | V |
| Dynamic Resistance[2] | $R_{DYN}$ | TLP, $t_P$=100ns, I/O to GND | | 0.33 | | Ω |
| Peak Pulse Current | $I_{pp}$ | $t_p$=8/20µs | | 12 | | A |
| 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] | $C_{I/O-GND}$ | Reverse Bias=0V, f=1MHz | | 290 | | pF |

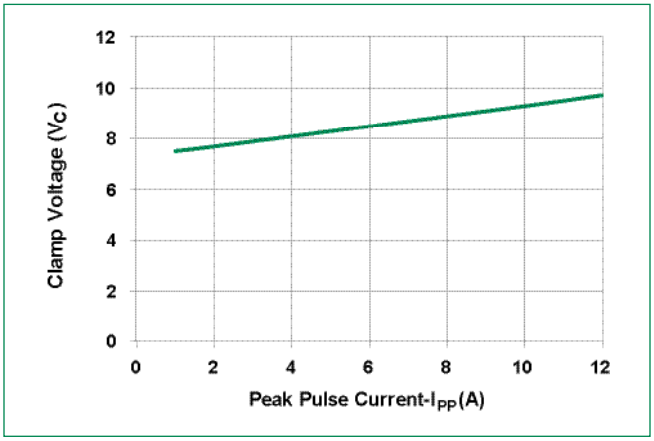
**Note:**

1. Parameter is guaranteed by design and/or component characterization.
2. Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1=70ns to t2= 90ns

### 8/20µs Pulse Waveform




### Clamping Voltage vs IPP for 8/20µs waveshape



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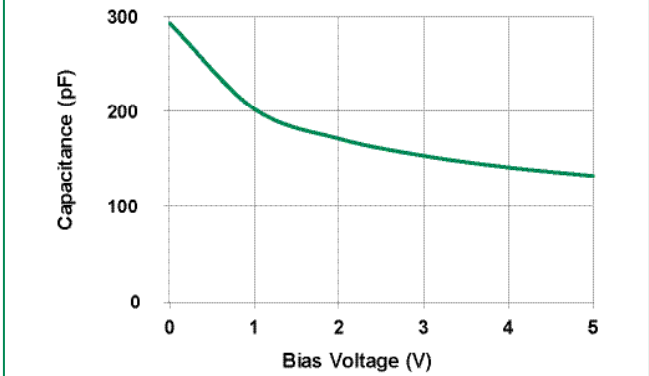
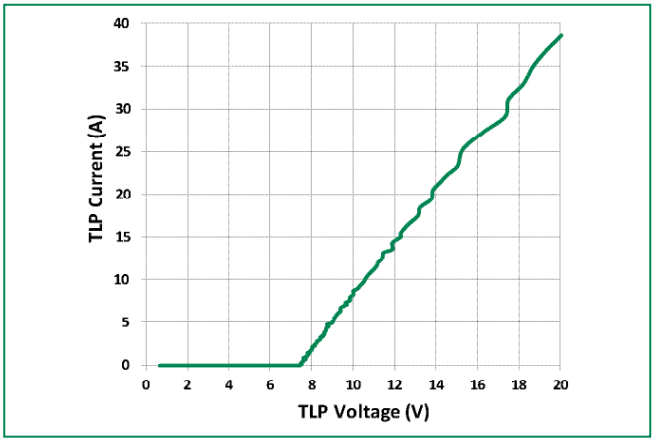
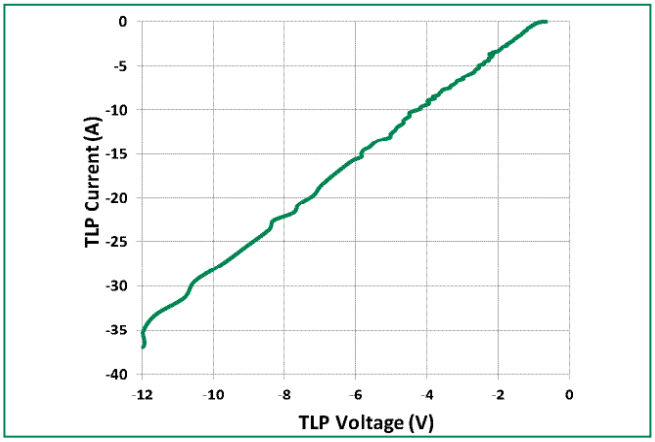
### Capacitance vs. Bias



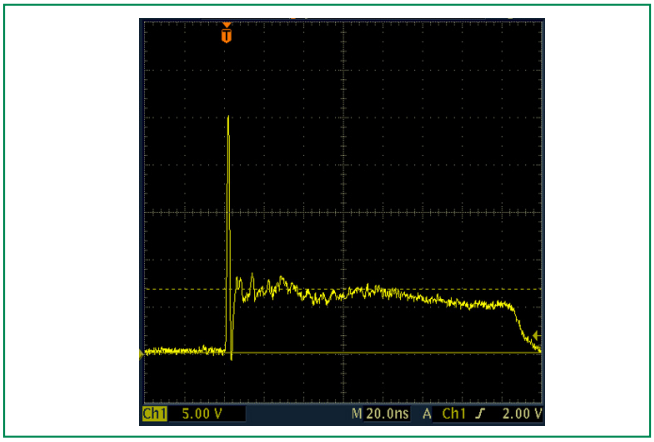

### Positive Transmission Line Pulsing (TLP) Plot



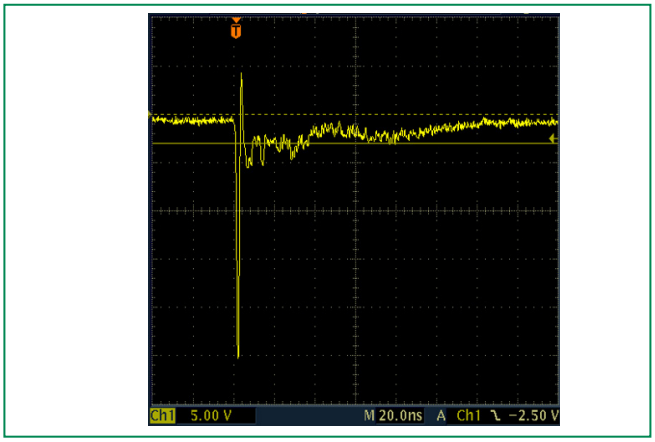

### Negative Transmission Line Pulsing (TLP) Plot




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




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



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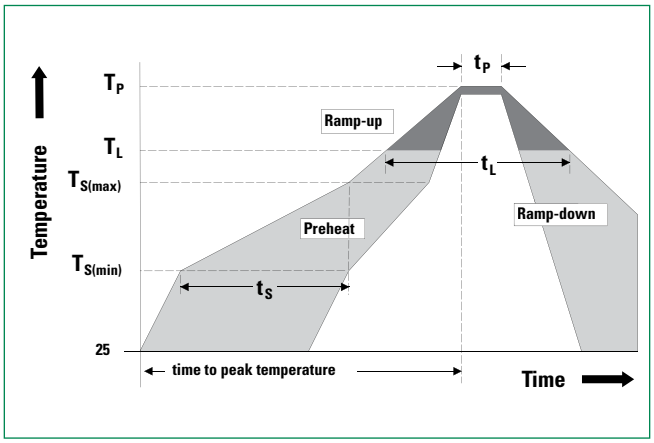
## 12A Discrete Unidirectional TVS Diode

## 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 |



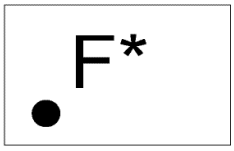

### Ordering Information

| Part Number | Package | Min. Order Qty. |
|---|---|---|
| SP1212-01ETG | SOD882 | 10000 |

### Product Characteristics

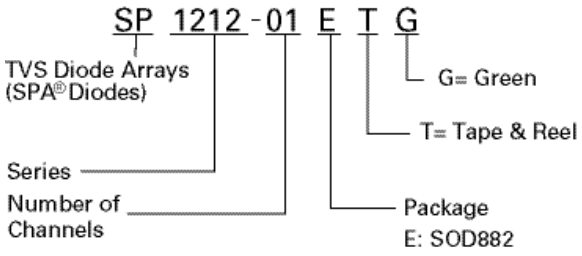
| | |
|---|---|
| **Lead Plating** | Matte Tin |
| **Lead Material** | Copper Alloy |
| **Substrate Material** | Silicon |
| **Body Material** | Molded Compound |
| **Flammability** | UL Recognized compound meeting flammability rating V-0 |

### Part Marking System



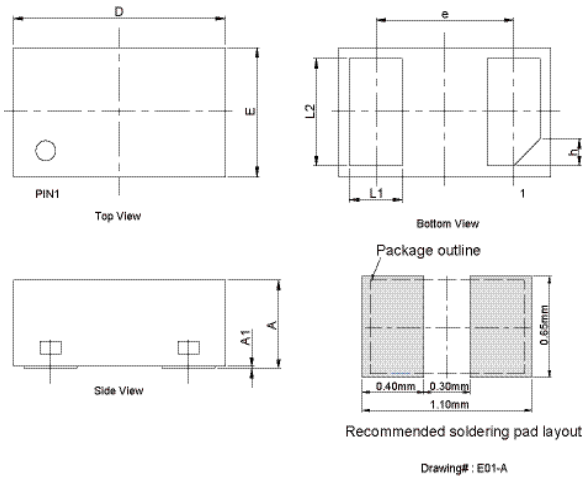

F = Part Code
* = Date Code

### Part Numbering System



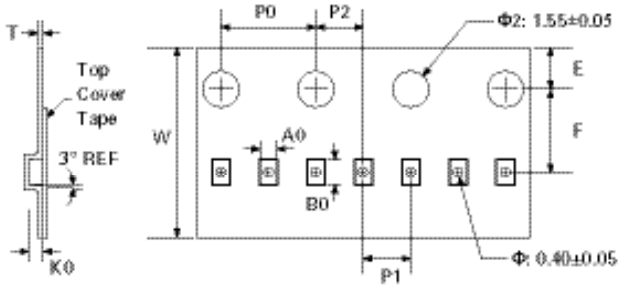
# SP1212
## 12A Discrete Unidirectional TVS Diode

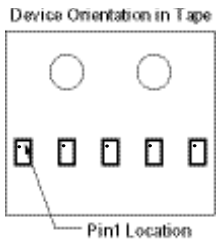
## Package Dimensions — SOD882

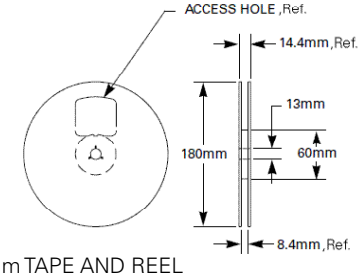



| Symbol | Package | SOD882 | | | | |
|---|---|---|---|---|---|---|
| | JEDEC | MO-236 | | | | |
| | | Millimeters | | | Inches | |
| | | Min | Typ | Max | Min | Typ | Max |
| A | | 0.50 | 0.55 | 0.60 | 0.020 | 0.022 | 0.024 |
| A1 | | 0.00 | 0.02 | 0.05 | 0.000 | 0.001 | 0.002 |
| L1 | | 0.20 | 0.25 | 0.30 | 0.008 | 0.010 | 0.012 |
| L2 | | 0.45 | 0.50 | 0.55 | 0.018 | 0.020 | 0.022 |
| D | | 0.90 | 1.00 | 1.10 | 0.035 | 0.039 | 0.043 |
| E | | 0.50 | 0.60 | 0.70 | 0.020 | 0.024 | 0.028 |
| e | | 0.65 BSC | | | 0.026 BSC | | |
| h | | 0.125 ( x 45° ) | | | 0.005 ( x 45° ) | | |

## Embossed Carrier Tape & Reel Specification — SOD882




8mm TAPE AND REEL

| Tape Dimensions | | |
|---|---|---|
| Symbol | Millimeters | |
| | Min | Max |
| A0 | 0.65 | 0.75 |
| B0 | 1.10 | 1.20 |
| K0 | 0.50 | 0.60 |
| E | 1.65 | 1.85 |
| F | 3.45 | 3.55 |
| P0 | 3.90 | 4.10 |
| P1 | 1.90 | 2.10 |
| P2 | 1.95 | 2.05 |
| T | 1.95 | 2.05 |
| W | 7.90 | 8.10 |



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