

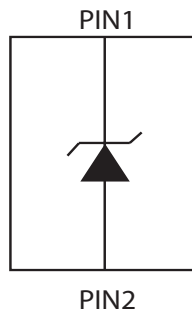
## SP1220 20A Discrete Unidirectional TVS Diode



### Description

The SP1220 unidirectional TVS is fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment. The SP1220 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 20A 8/20 surge event as defined in IEC 61000-4-5 2<sup>nd</sup> Edition.

### Pinout and Functional Block Diagram



### Features

- ESD, IEC 61000-4-2,  $\pm 30$ kV contact,  $\pm 30$ kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 20A (8/20 as defined in IEC 61000-4-5 2<sup>nd</sup> 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

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
$P_{pk}$	Peak Pulse Power ( $t_p=8/20\mu s$ )	250	W
$T_{OP}$	Operating Temperature	-40 to 125	°C
$T_{STOR}$	Storage Temperature	-55 to 150	°C

Notes:

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.

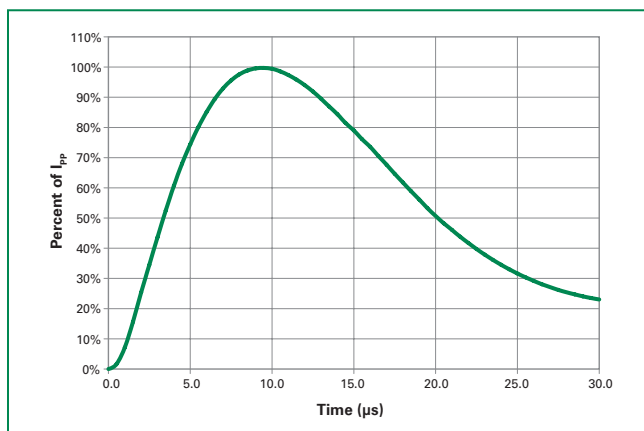
### Electrical Characteristics ( $T_{OP}=25^\circ C$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$	$I_R=1\mu A$			5.75	V
Breakdown Voltage	$V_{BR}$	$I_R=1 mA$		7.0	9.5	V
Reverse Leakage Current	$I_{LEAK}$	$V_R=5.75V$			1.0	$\mu A$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=1A, t_p=8/20\mu s$		7.5		V
		$I_{PP}=20A, t_p=8/20\mu s$			11.0	V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p=100ns$ , I/O to GND		0.33		$\Omega$
Peak Pulse Current	$I_{PP}$	$t_p=8/20\mu s$	20			A
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>	$C_{I/O-GND}$	Reverse Bias=0V, $f=1MHz$		290		pF

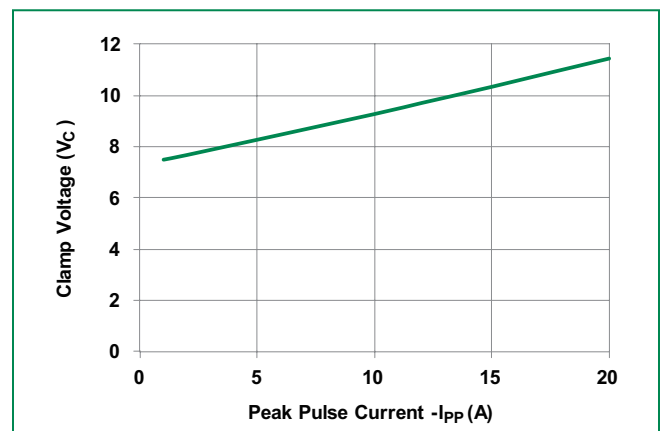
Note:

- Parameter is guaranteed by design and/or component characterization.
- Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window  $t_1=70ns$  to  $t_2=90ns$

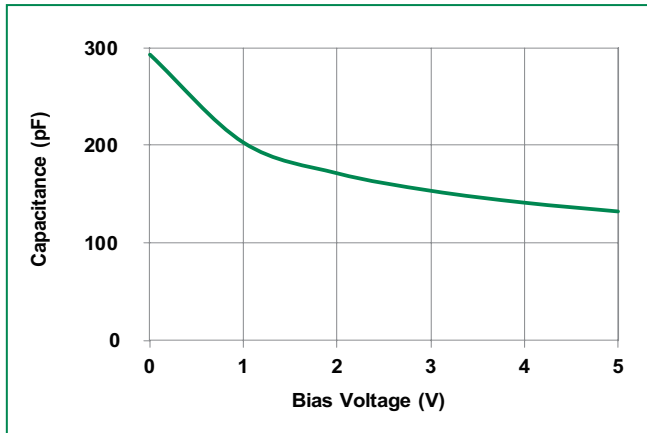
### 8/20 $\mu s$ Pulse Waveform



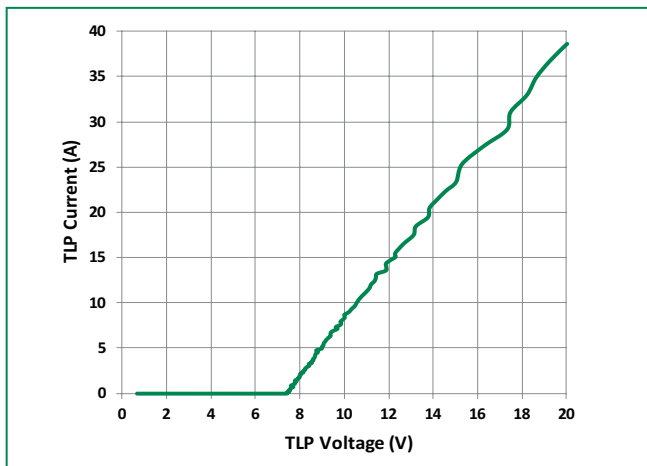
### Clamping Voltage vs $I_{PP}$ for 8/20 $\mu s$ Waveshape



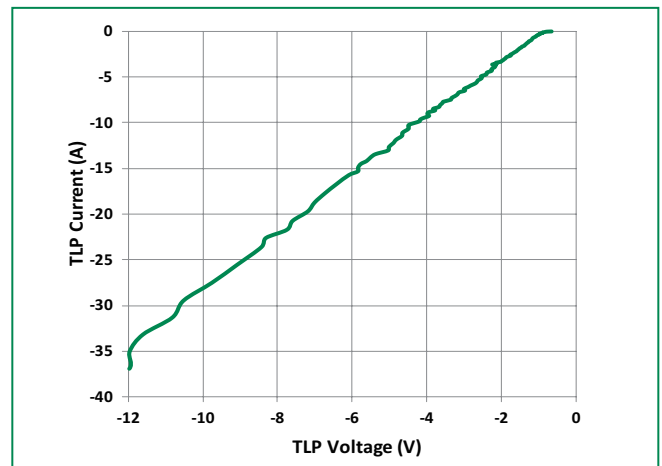
**Capacitance vs. Bias**



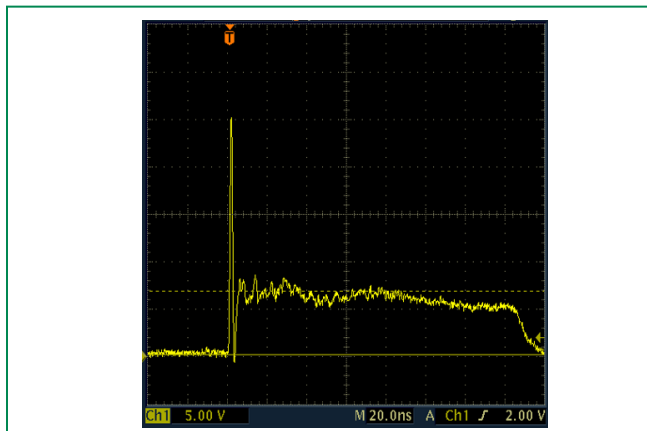
**Positive Transmission Line Pulsing (TLP) Plot**



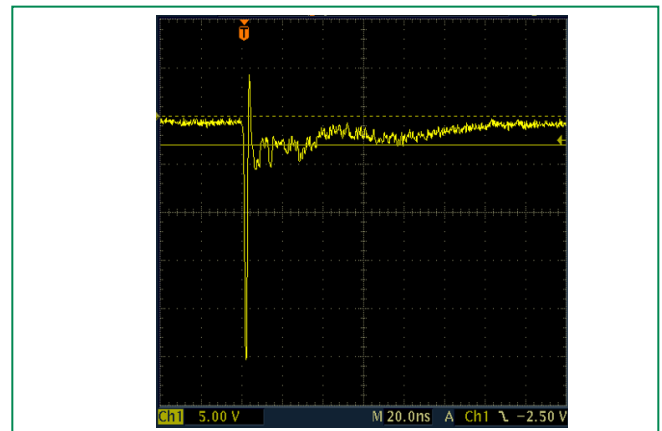
**Negative Transmission Line Pulsing (TLP) Plot**



**IEC61000-4-2 +8 kV Contact ESD Clamping Voltage**

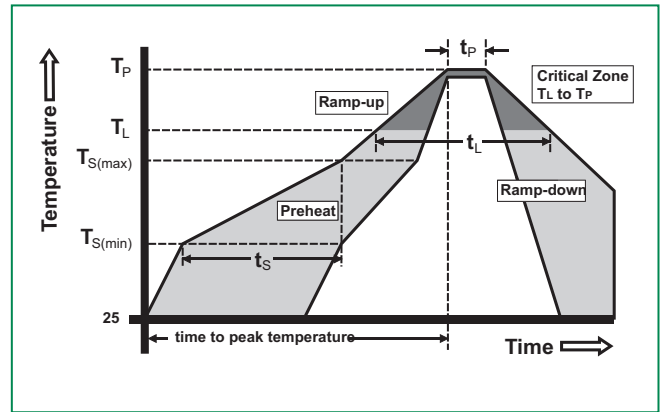


**IEC61000-4-2 -8 kV Contact ESD Clamping Voltage**



**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 <sup>+0/-5</sup> °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



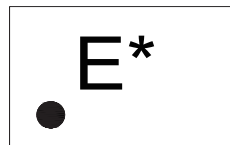
**Ordering Information**

Part Number	Package	Min. Order Qty.
SP1220-01ETG	SOD882	10000

**Product Characteristics**

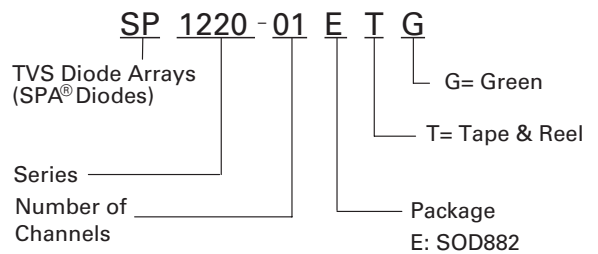
<b>Lead Plating</b>	Matte Tin
<b>Lead Material</b>	Copper Alloy
<b>Substrate Material</b>	Silicon
<b>Body Material</b>	Molded Compound
<b>Flammability</b>	UL Recognized compound meeting flammability rating V-0

**Part Marking System**

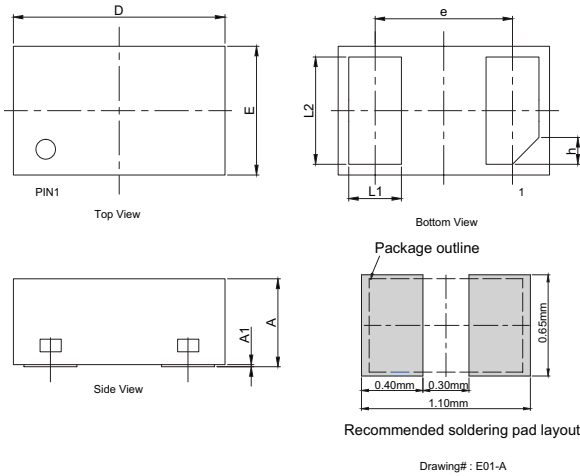


E = Part Code  
\* = Date Code

**Part Numbering System**

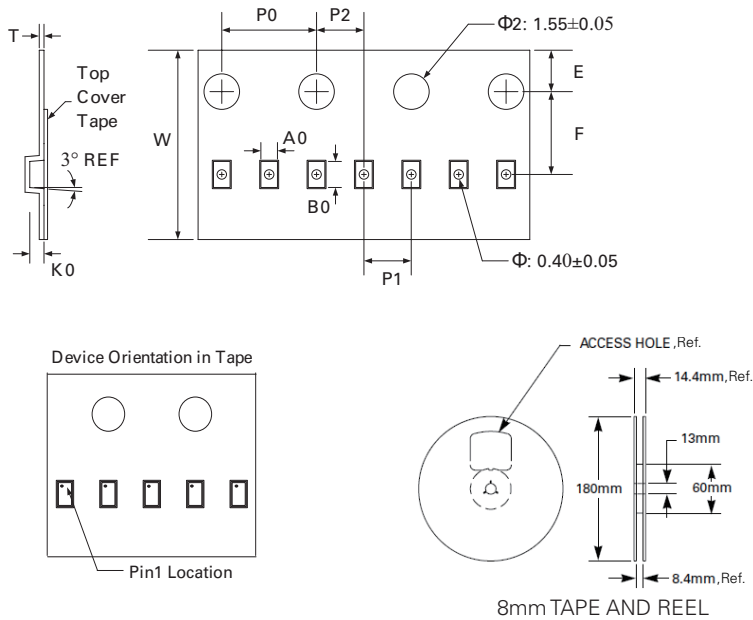


**Package Dimensions — SOD882**



Symbol	Package	SOD882				
	JEDEC	MO-236				
	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
<b>A</b>	0.50	0.55	0.60	0.020	0.022	0.024
<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>	0.90	1.00	1.10	0.035	0.039	0.043
<b>E</b>	0.50	0.60	0.70	0.020	0.024	0.028
<b>e</b>	0.65 BSC			0.026 BSC		
<b>h</b>	0.125 ( x 45° )			0.005 ( x 45° )		

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



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

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