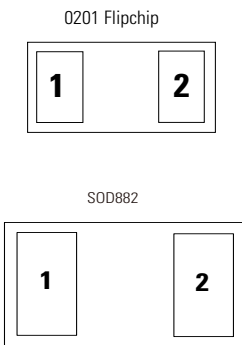


**SP3130 Series 0.3pF 10KV Bidirectional Discrete TVS**



**Pinout**



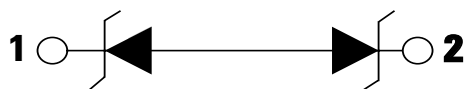
**Description**

The SP3130 includes back-to-back TVS diodes fabricated in a proprietary silicon avalanche technology to provide protection for electronic equipment that may experience destructive electrostatic discharges (ESD). These robust diodes can safely absorb repetitive ESD strikes up to the maximum level specified in the IEC 61000-4-2 international standard without performance degradation. The back-to-back configuration provides symmetrical ESD protection for data lines when AC signals are present.

**Features**

- ESD protection of  $\pm 10\text{kV}$  contact discharge,  $\pm 15\text{kV}$  air discharge, (IEC 61000-4-2)
- EFT protection, IEC 61000-4-4, 40A ( $t_p=5/50\text{ns}$ )
- Lightning Protection, IEC 61000-4-5 2<sup>nd</sup> edition, 2A ( $t_p=8/20\mu\text{s}$ )
- Low capacitance of 0.3pF @  $V_R=0\text{V}$
- Low leakage current of 50nA (max) at 28V
- Space efficient 0201 and 0402 footprint
- Halogen free, Lead free and RoHS compliant
- AEC-Q101 qualified (SOD882)

**Functional Block Diagram**



**Applications**

- Tablets
- Ultrabook
- eReader
- Smart Phones
- Digital Cameras
- MP3/ PMP
- Set Top Boxes
- Portable Medical
- NFC and FeliCa

### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Current ( $t_p=8/20\mu\text{s}$ )	2.0	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 device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

### Thermal Information

Parameter	Rating	Units
Storage Temperature Range	-55 to 150	°C
Maximum Lead Temperature (Soldering 20-40s)	260	°C

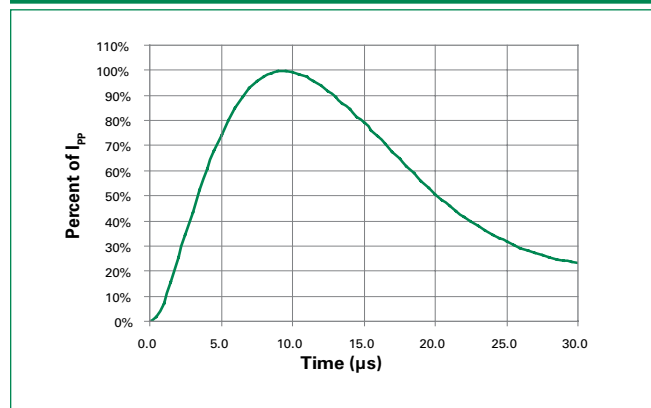
### Electrical Characteristics ( $T_{OP}=25^\circ\text{C}$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$				28	V
Reverse Leakage Current	$I_{LEAK}$	$V_R=28\text{V}$ with 1 pin at GND		10	50	nA
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=1\text{A}$ , $t_p=8/20\mu\text{s}$ , Fwd		39	44	V
		$I_{PP}=2\text{A}$ , $t_p=8/20\mu\text{s}$ , Fwd		42	48	V
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC61000-4-2 (Contact)	±10			kV
		IEC61000-4-2 (Air)	±15			kV
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p=100\text{ns}$ , I/O to GND		1.0		$\Omega$
Diode Capacitance <sup>1</sup>	$C_{I/O-I/O}$	Reverse Bias=0V, $f=1\text{MHz}$		0.3	0.45	pF

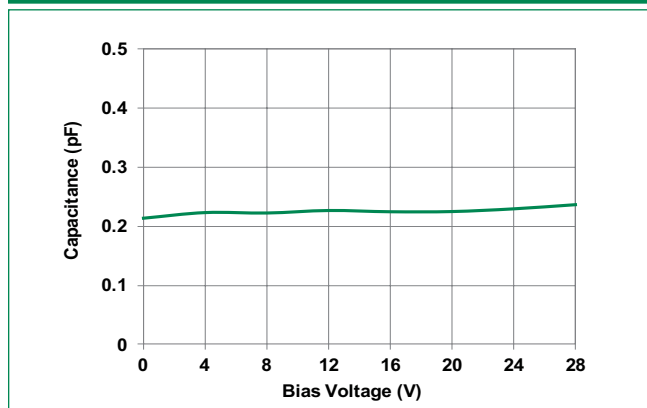
**Note: 1.** Parameter is guaranteed by design and/or device characterization.

**2.** Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window  $t_1=70\text{ns}$  to  $t_2=90\text{ns}$

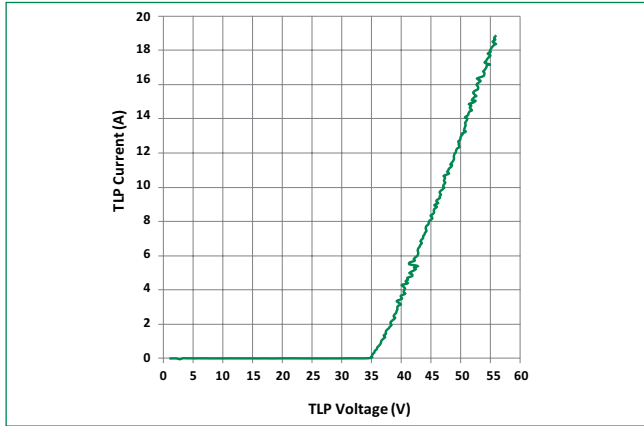
### 8/20 $\mu\text{s}$ Pulse Waveform



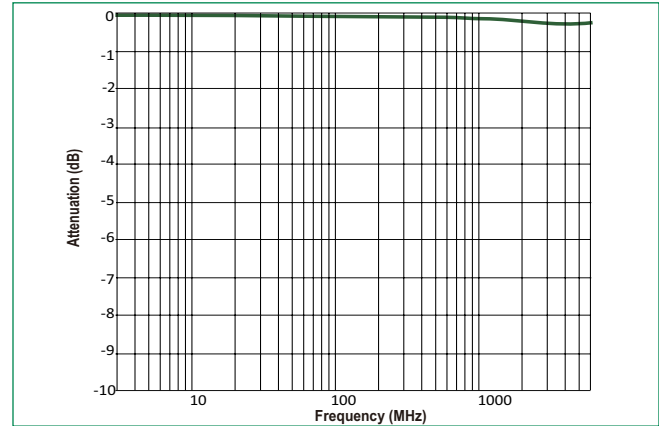
### Capacitance vs. Reverse Bias



### Transmission Line Pulsing (TLP) Plot

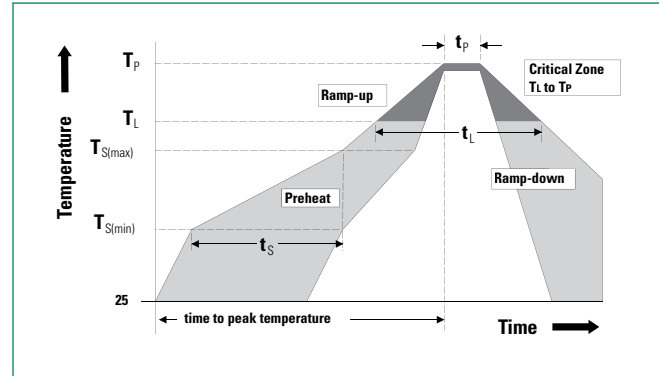


### Insertion Loss (S21)

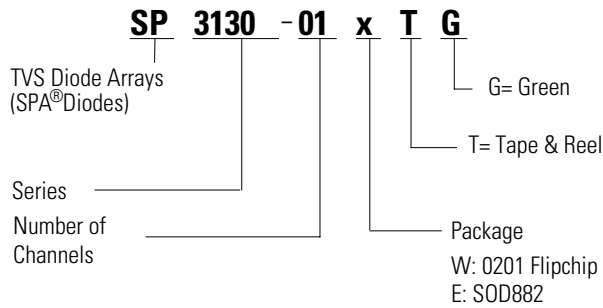


### Soldering Parameters

<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



### Part Numbering System



### Product Characteristics of 0201 Flipchip

Lead Plating	Sn
Lead Material	Copper
Lead Coplanarity	6µm(max)
Substrate material	Silicon
Body Material	Silicon

### Product Characteristics of SOD882

Lead Plating	Pre-Plated Frame
Lead Material	Copper Alloy
Lead Coplanarity	0.004 inches(0.102mm)
Substrate material	Silicon
Body Material	Molded Epoxy
Flammability	UL 94 V-0

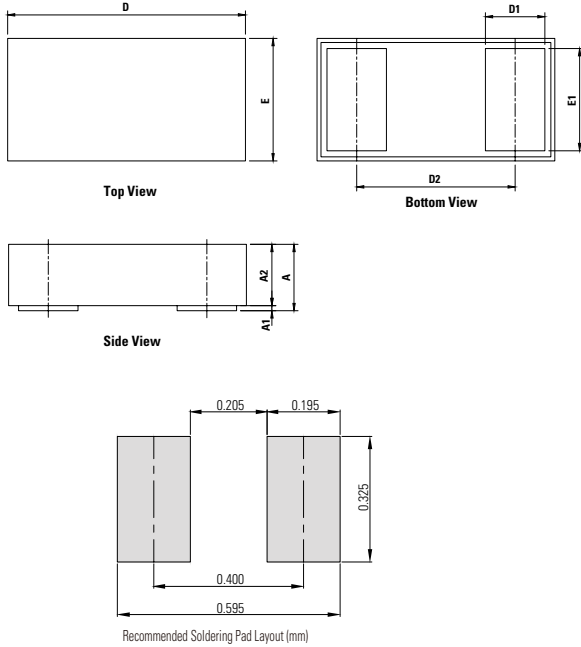
**Notes :**

1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
5. Package surface matte finish VDI 11-13.

### Ordering Information

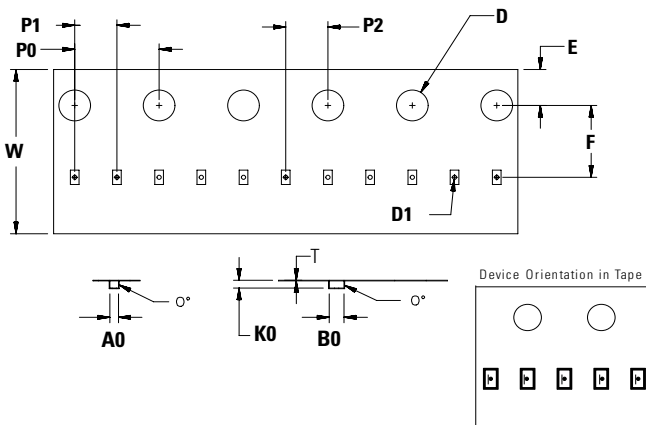
Part Number	Package	Min. Order Qty.	Packaging Option	P0/P1	Packaging Specification
SP3130-01WTG	0201 Flipchip	10000	Tape & Reel – 8mm tape/7" reel	4mm/2mm	EIA RS-481
SP3130-01ETG	SOD882	10000	Tape & Reel – 8mm tape/7" reel	4mm/2mm	EIA RS-481

### Package Dimensions — 0201 Flipchip



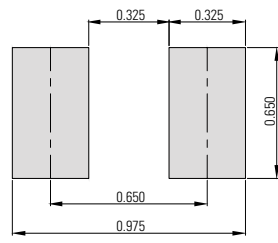
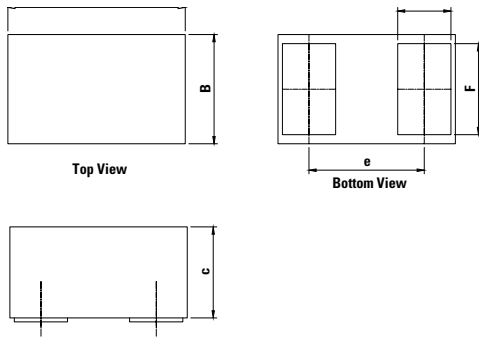
Symbol	0201 Flipchip			
	Millimeters		Inches	
	Min	Max	Min	Max
<b>D</b>	0.605	0.655	0.0238	0.0258
<b>E</b>	0.305	0.355	0.0120	0.0140
<b>D1</b>	0.145	0.155	0.0057	0.0061
<b>E1</b>	0.245	0.255	0.0096	0.0100
<b>D2</b>	0.400 BSC		0.0157 BSC	
<b>A</b>	0.273	0.329	0.0107	0.0130
<b>A2</b>	0.265	0.315	0.0104	0.0124
<b>A1</b>	0.008	0.014	0.0003	0.0006

### Embossed Carrier Tape & Reel Specification — 0201 Flipchip



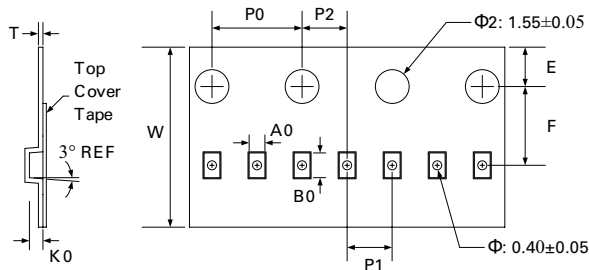
Symbol	Millimeters
<b>A0</b>	0.41 +/- 0.03
<b>B0</b>	0.70 +/- 0.03
<b>D</b>	∅ 1.50 +/- 0.10
<b>D1</b>	∅ 0.20 +/- 0.05
<b>E</b>	1.75 +/- 0.10
<b>F</b>	3.50 +/- 0.05
<b>K0</b>	0.38 +/- 0.03
<b>P0</b>	4.00 +/- 0.10
<b>P1</b>	2.00 +/- 0.05
<b>P2</b>	2.00 +/- 0.05
<b>W</b>	8.00 + 0.30 / - 0.10
<b>T</b>	0.23 +/- 0.02

**Package Dimensions — SOD882**

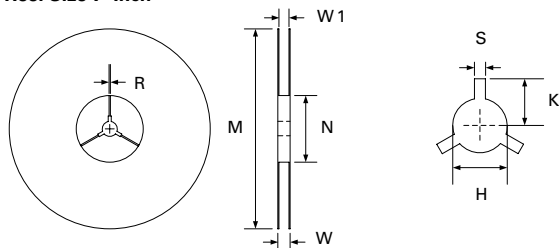


Symbol	Package		SOD882	
	JEDEC		MO-236	
	Millimeters		Inches	
	Min	Max	Min	Max
<b>A</b>	0.90	1.10	0.035	0.043
<b>B</b>	0.50	0.70	0.020	0.028
<b>C</b>	0.40	0.60	0.016	0.024
<b>E</b>	0.20	0.35	0.008	0.014
<b>F</b>	0.45	0.55	0.018	0.022
<b>e</b>	0.65 BSC		0.026 BSC	

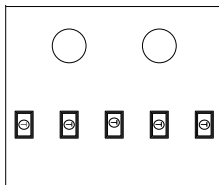
**Embossed Carrier Tape & Reel Specification — SOD882**



**Reel Size 7 Inch**



**Device Orientation in Tape**



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

Symbol	Reel Dimensions (Size $\Phi 178$ )	
	Millimetres	
	Min	Max
<b>M</b>	177.0	179.0
<b>N</b>	59.0	61.0
<b>W</b>	11.0	12.0
<b>W1</b>	8.5	9.5
<b>H</b>	12.5	13.5
<b>S</b>	1.9	2.1
<b>K</b>	10.8	11.2
<b>R</b>	0.95	1.05

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