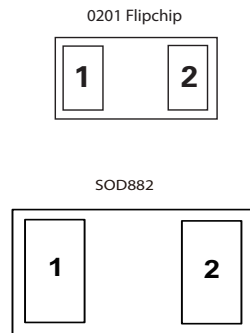


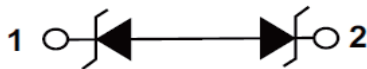
**SP3118 Series 0.3pF 10KV Bidirectional Discrete TVS**



**Pinout**



**Functional Block Diagram**



**Description**

The SP3118 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.

**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 18V
- Space efficient 0201 and 0402 footprint
- Halogen free, Lead free and RoHS compliant
- SP3118-01ETG MSL Level 1

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

### Thermal Information

Parameter	Rating	Units
Maximum Lead Temperature (Soldering 20-40s)	260	°C

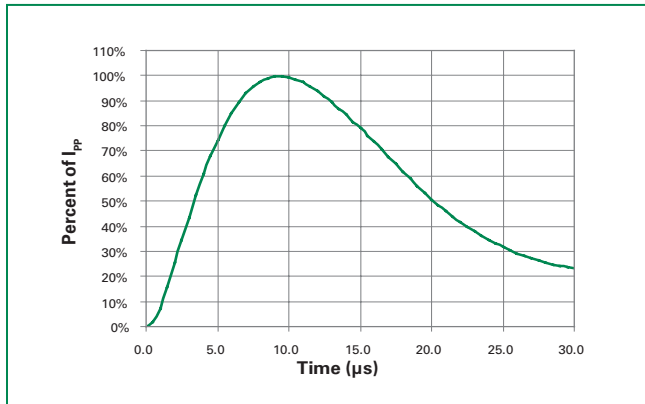
### Electrical Characteristics ( $T_{OP}=25^\circ C$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$				18	V
Reverse Leakage Current	$I_{LEAK}$	$V_R=18V$ with 1pin at GND		10	50	nA
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=1A, t_p=8/20\mu s$ , Fwd		31	35	V
		$I_{PP}=2A, t_p=8/20\mu s$ , Fwd		34	38	V
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact)	$\pm 10$			kV
		IEC 61000-4-2 (Air)	$\pm 15$			kV
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p=100ns$ , I/O to GND		0.75		$\Omega$
Diode Capacitance <sup>1</sup>	$C_{I/O-I/O}$	Reverse Bias=0V, f=1 MHz		0.3	0.45	pF

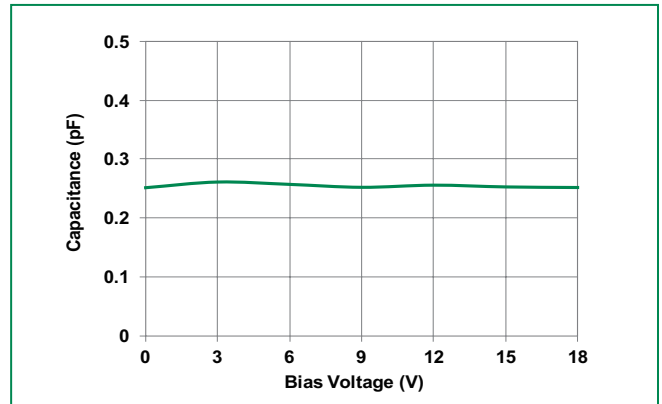
Note: 1. Parameter is guaranteed by design and/or component characterization.

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

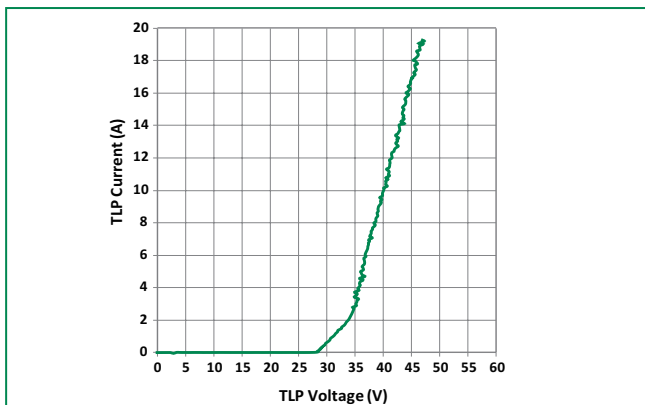
### 8/20 $\mu s$ Pulse Waveform



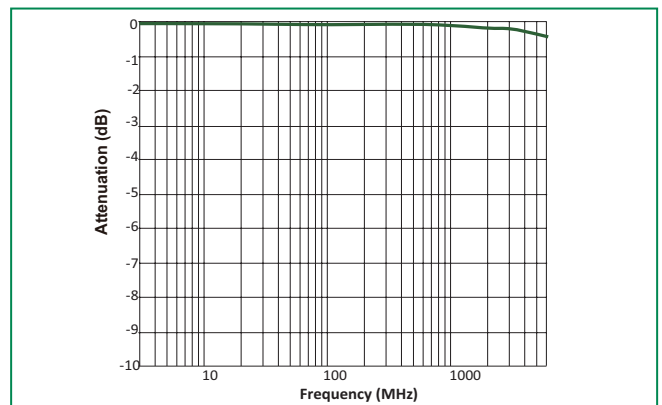
### Capacitance vs. Reverse Bias



### Transmission Line Pulsing (TLP) Plot

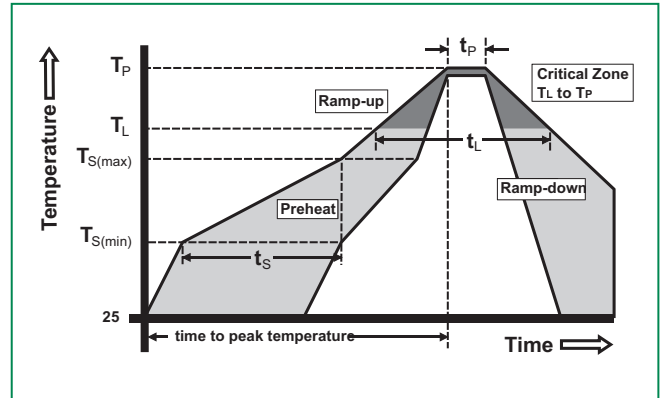


### Insertion Loss (S21)

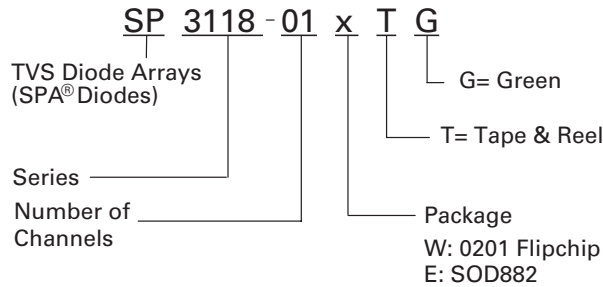


**Soldering Parameters**

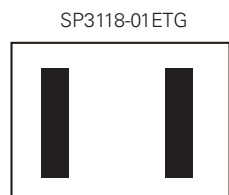
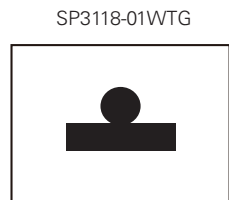
Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 180 secs
Average ramp up rate (Liquidus) Temp ( $T_L$ ) to peak		3°C/second max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/second max
Reflow	- 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



**Part Numbering System**



**Part Marking 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 Recognized epoxy meeting flammability rating V-0.

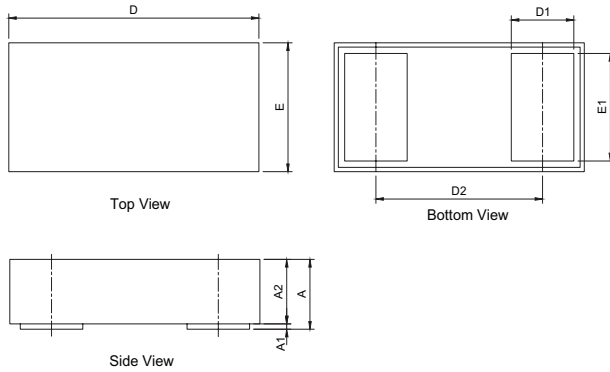
Notes :

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.

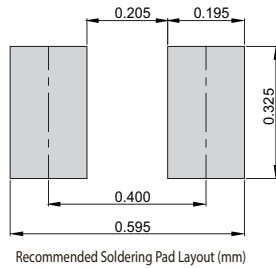
**Ordering Information**

Part Number	Package	Marking	Min. Order Qty.	Packaging Option	P0/P1	Packaging Specification
SP3118-01WTG	0201 Flipchip		10000	Tape & Reel – 8mm tape/7" reel	4mm/2mm	EIA RS-481
SP3118-01ETG	SOD882		10000	Tape & Reel – 8mm tape/7" reel	4mm/2mm	EIA RS-481

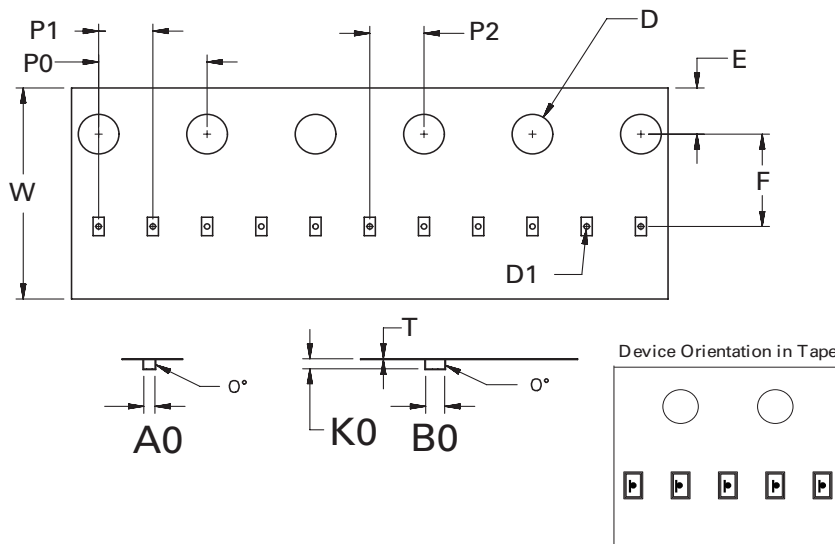
**Package Dimensions – 0201 Flipchip**



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



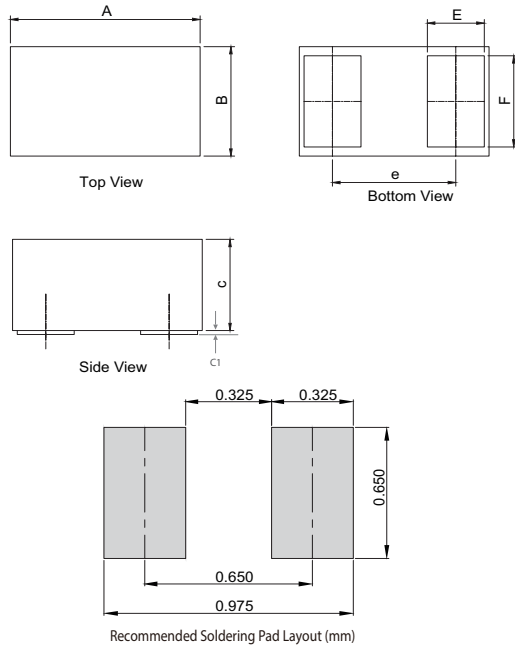
**Embossed Carrier Tape & Reel Specification – 0201 Flipchip**



Symbol	Millimeters
<b>A0</b>	0.41 +/- 0.03
<b>B0</b>	0.70 +/- 0.03
<b>D</b>	ø 1.50 + 0.10
<b>D1</b>	ø 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

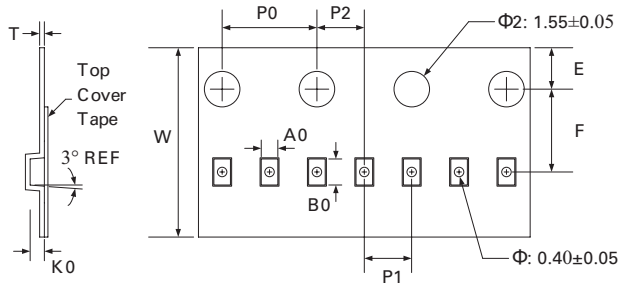
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**Package Dimensions – SOD882**

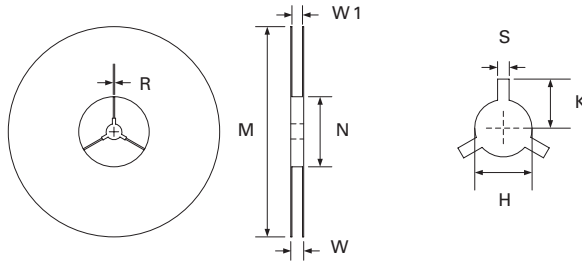


Symbol	Package	SOD882		
	JEDEC	MO-236		
	Millimeters		Inches	
	Min	Max	Min	Max
<b>A</b>	0.90	1.10	0.035	0.043
<b>B</b>	0.50	0.70	0.020	0.028
<b>C</b>	0.40	0.60	0.016	0.024
<b>C1</b>	0.00	0.05	0.000	0.002
<b>E</b>	0.20	0.35	0.008	0.014
<b>F</b>	0.45	0.55	0.018	0.022
<b>e</b>	0.65 BSC		0.026 BSC	

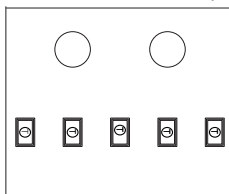
**Embossed Carrier Tape & Reel Specification – SOD882**



**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>	1770	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