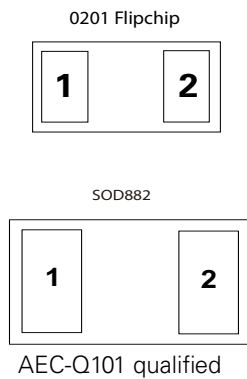


**SP1007 Series 5pF 8kV Bidirectional Discrete TVS**



**Pinout**



**Description**

The SP1007 diodes are fabricated in a proprietary back-to-back silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment. The SP1007 TVS can safely absorb repetitive ESD strikes at the maximum level specified in IEC 61000-4-2 international standard (Level 4, ±8kV contact discharge) without performance degradation. The back-to-back configuration provides symmetrical ESD protection for data lines when AC signals are present.

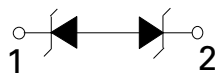
**Features**

- ESD, IEC 61000-4-2, ±8kV contact, ±15kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 2A (8/20 as defined in IEC 61000-4-5 2<sup>nd</sup> edition)
- Low capacitance of 5pF (TYP @ V<sub>R</sub>=5V)
- Low leakage current of 0.1µA at 5V
- Space efficient 0201 and 0402 footprint
- AEC-Q101 qualified for SOD882 package
- Moisture Sensitivity Level (MSL -1) for SOD882 package
- Halogen free, lead free and RoHS compliant

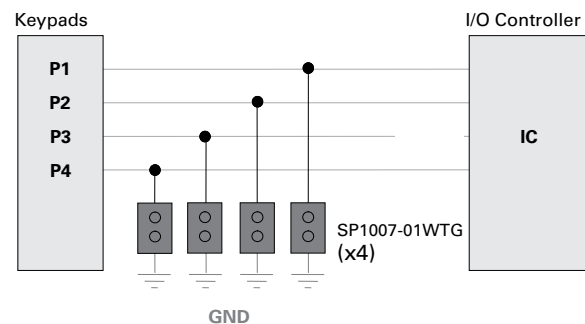
**Applications**

- Mobile Phones
- Smart Phones
- Camcorders
- Portable Medical
- Digital Cameras
- MP3/PMP
- Portable Navigation Components
- Tablets
- Point of Sale Terminals

**Functional Block Diagram**



**Application Example**



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

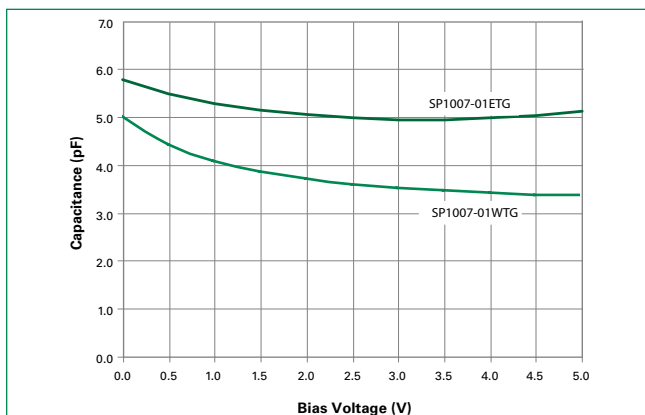
### Electrical Characteristics ( $T_{OP}=25^\circ C$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$	$I_R = 1\mu A$	-	-	6.0	V
Breakdown Voltage	$V_{BR}$	$I_R = 1mA$	-	8.5	9.5	V
Reverse Leakage Current	$I_{LEAK}$	$V_R = 5V$	-	0.1	0.5	$\mu A$
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p = 100ns$ , I/O to GND	-	0.8	-	$\Omega$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{pp}=1A, t_p=8/20\mu s$ , Fwd	-	10	50	V
		$I_{pp}=2A, t_p=8/20\mu s$ , Fwd		12		
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact Discharge)	$\pm 8$	-	-	kV
		IEC 61000-4-2 (Air Discharge)	$\pm 15$	-	-	kV
Diode Capacitance <sup>1</sup>	$C_{VO-VO}$	Reverse Bias=0V f =1MHZ	-	5	6	pF

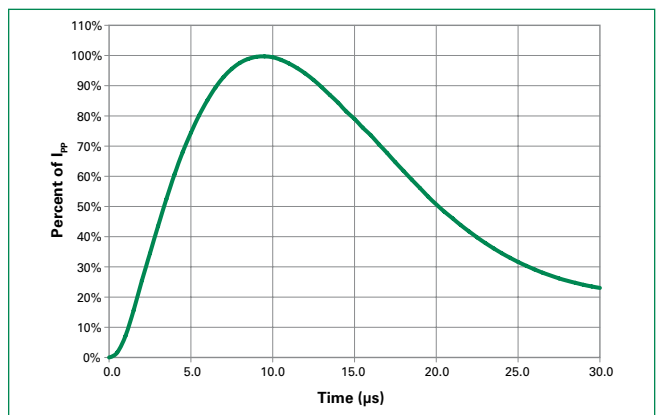
Note:

- 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  $t_2=90ns$

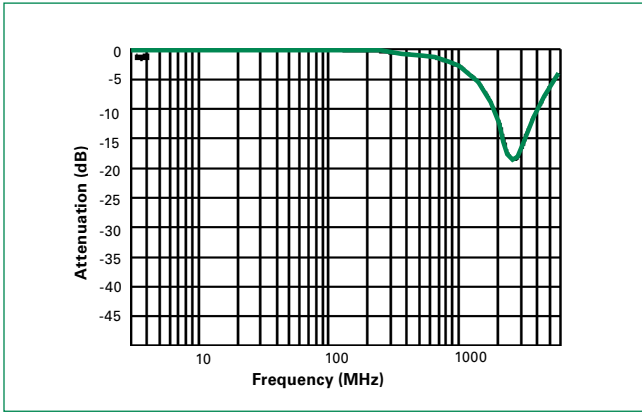
### Capacitance vs. Reverse Bias



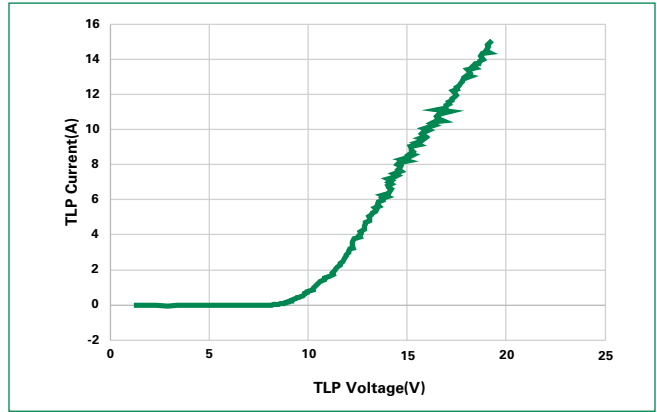
### 8/20 $\mu s$ Pulse Waveform



**Insertion Loss (S21) I/O to GND**



**Transmission Line Pulsing(TLP) Plot**

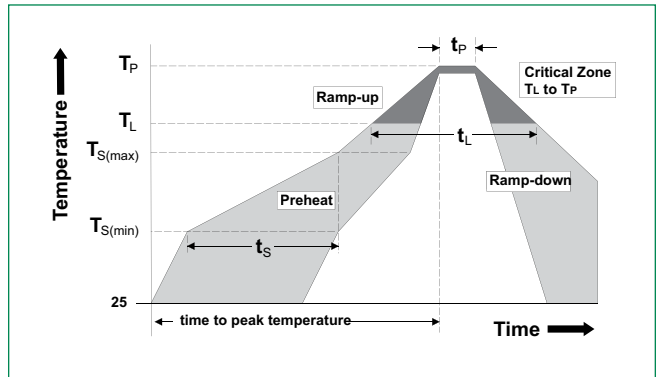


**Product Characteristics of SOD-882 Package**

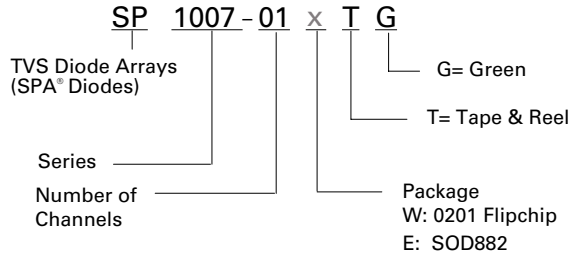
<b>Lead Plating</b>	Pre-Plated Frame
<b>Lead Material</b>	Copper Alloy
<b>Substrate material</b>	Silicon
<b>Body Material</b>	Molded Compound
<b>Flammability</b>	UL Recognized compound meeting flammability rating V-0

**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**



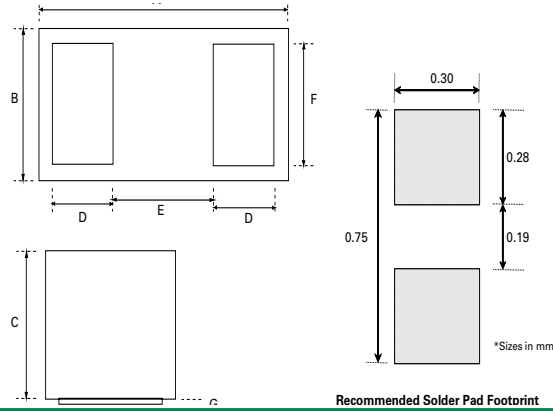
**Ordering Information**

Part Number	Package	Min. Order Qty.
SP1007-01WTG	0201 Flipchip	10000
SP1007-01ETG	SOD882	10000

**Part Marking System**

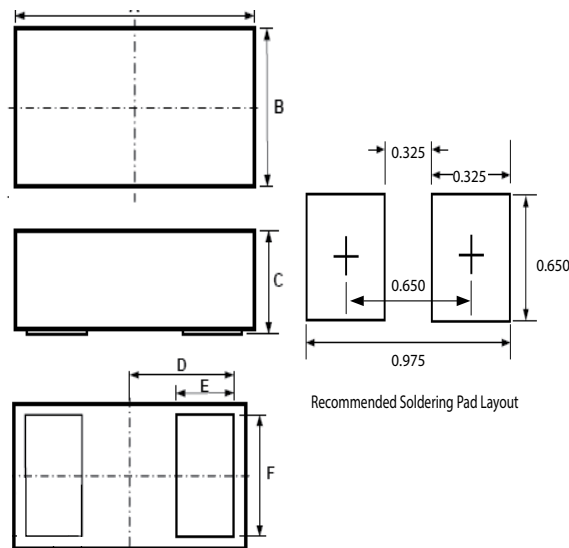


**Package Dimensions — 0201 Flip Chip**



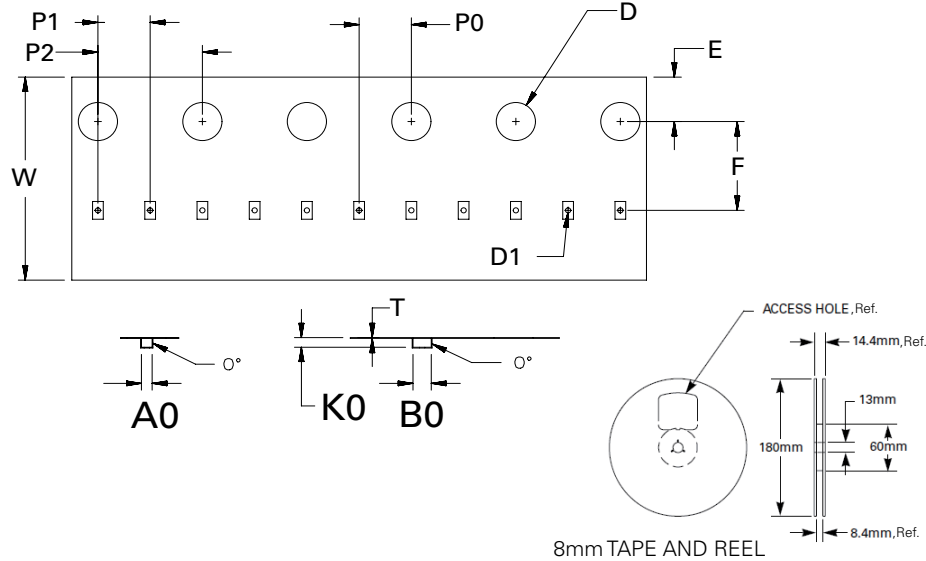
Symbol	0201 Flipchip					
	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.595	0.620	0.645	0.0234	0.0244	0.0254
B	0.295	0.320	0.345	0.0116	0.0126	0.0136
C	0.245	0.275	0.305	0.0096	0.0108	0.0120
D	0.145	0.150	0.155	0.0057	0.0059	0.0061
E	0.245	0.250	0.255	0.0096	0.0098	0.0100
F	0.245	0.250	0.255	0.0096	0.0098	0.0100
G	0.005	0.010	0.015	0.0002	0.0004	0.0006

**Package Dimensions — SOD882**



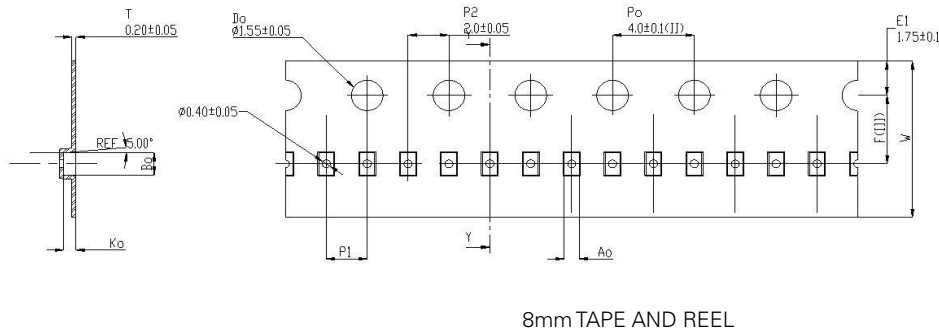
Symbol	Package	SOD882					
	JEDEC	MO-236					
		Millimeters			Inches		
		Min	Typ	Max	Min	Typ	Max
A		0.95	1.00	1.05	0.037	0.039	0.041
B		0.55	0.60	0.65	0.022	0.024	0.026
C		0.50	0.55	0.60	0.020	0.022	0.024
D			0.45			0.018	
E		0.20	0.25	0.30	0.008	0.010	0.012
F		0.45	0.50	0.55	0.018	0.020	0.022

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



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

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



Symbol	Millimeters
A0	0.70+/-0.045
B0	1.10+/-0.045
K0	0.65+/-0.045
F	3.50+/-0.05
P1	2.00+/-0.10
W	8.00 + 0.30 -0.10

**Disclaimer Notice** - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <http://www.littelfuse.com/disclaimer-electronics>.