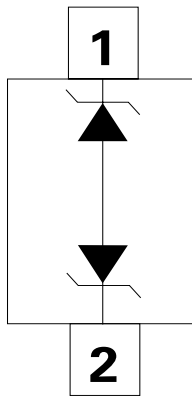


# SP1326 15pF 30kV Bidirectional Discrete TVS

**AUTOMOTIVE GRADE** **HF** **RoHS** **GREEN**



## Pinout and Functional Block Diagram



## Description

The SP1326 back-to-back diodes are fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment. The SP1326 TVS can safely absorb repetitive ESD strikes at  $\pm 30\text{kV}$  (contact and air discharge, IEC 61000-4-2) without performance degradation. Additionally, each diode can safely dissipate 4A of 8/20 $\mu\text{s}$  surge current (IEC 61000-4-5 2<sup>nd</sup> edition) with very low clamping voltages.

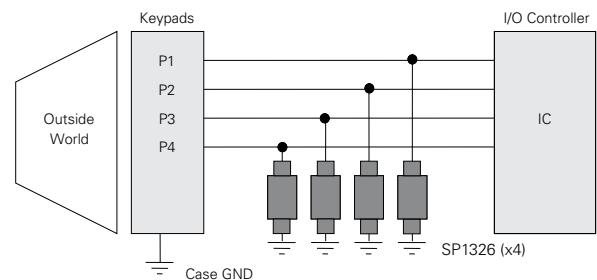
## Features

- ESD, IEC 61000-4-2,  $\pm 30\text{kV}$  contact,  $\pm 30\text{kV}$  air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 4A (8/20 $\mu\text{s}$  as defined in IEC 61000-4-5 2<sup>nd</sup> edition)
- AEC-Q101 qualified and PPAP capable
- Low leakage current of 0.02 $\mu\text{A}$  (TYP) at 5V
- Space efficient
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)

## Applications

- Mobile phones
- Smart phones
- Smart watches
- Tablets
- Portable navigation components
- Portable medical components

## 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 Pulse Current ( $t_p=8/20\mu s$ )	4	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 ( $T_{OP}=25^\circ C$ )

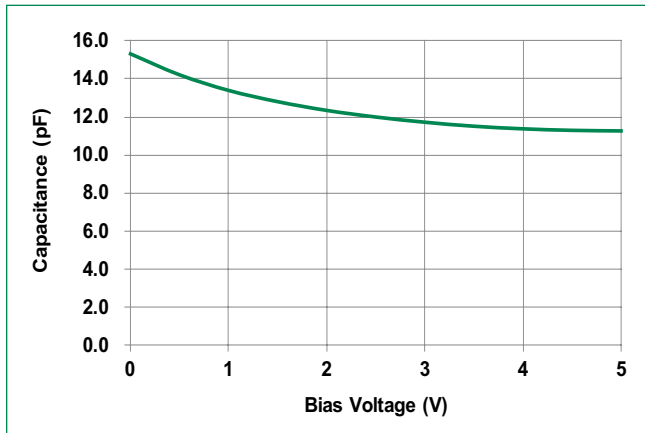
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$	$I_R=1\mu A$			6.0	V
Breakdown Voltage	$V_{BR}$	$I_R=1mA$		7.8		V
Reverse Leakage Current	$I_{LEAK}$	$V_R=5V$		0.02	0.5	$\mu A$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=1A, t_p=8/20\mu s, I/O$ to I/O		12.0		V
		$I_{PP}=4A, t_p=8/20\mu s, I/O$ to I/O		15.5		V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p=100ns, I/O$ to I/O		0.35		$\Omega$
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>	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz		15		pF
		Reverse Bias=2.5V, f=1MHz		12		pF

**Note:**

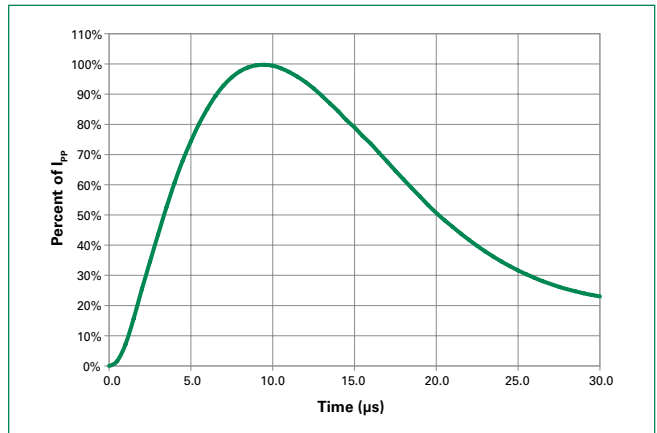
<sup>1</sup> Parameter is guaranteed by design and/or component characterization.

<sup>2</sup> Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window  $t1=70ns$  to  $t2=90ns$

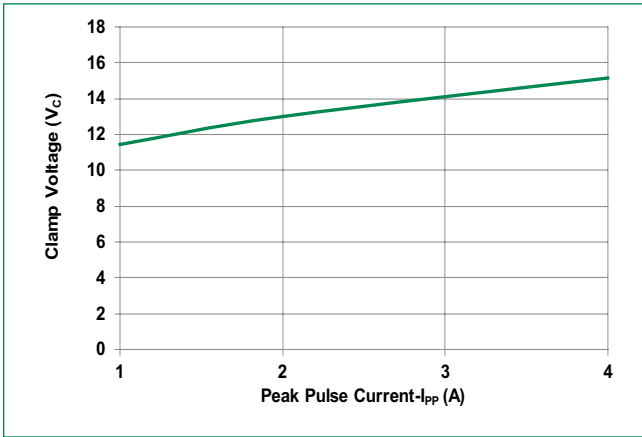
### Capacitance vs. Reverse Bias



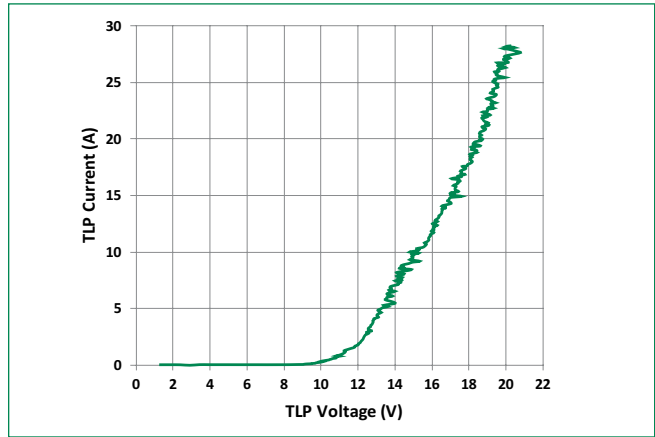
### 8/20 $\mu s$ Pulse Waveform



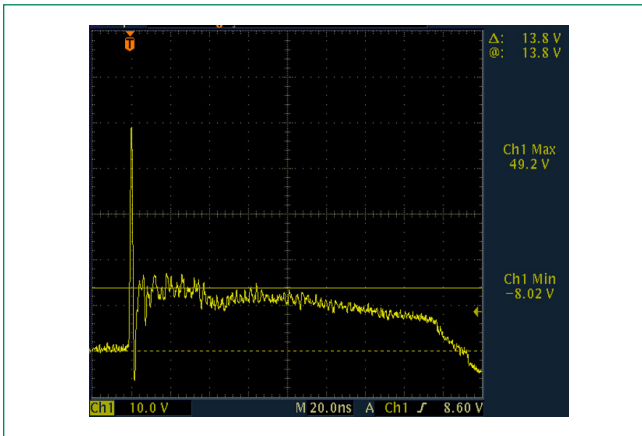
**Clamping voltage vs.  $I_{pp}$  for 8/20 $\mu$ S waveshape**



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

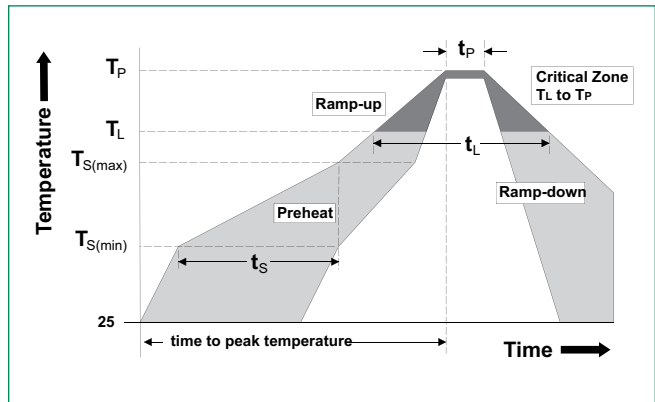


**IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage**

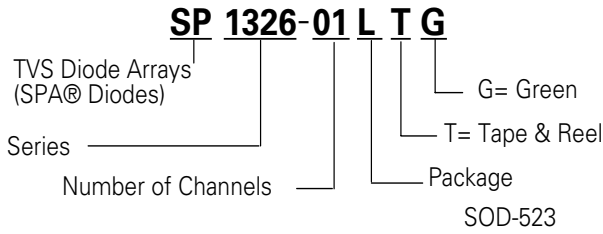


**Soldering Parameters**

<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 $^{+0.5}$ °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.



**Part Numbering System**



**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.

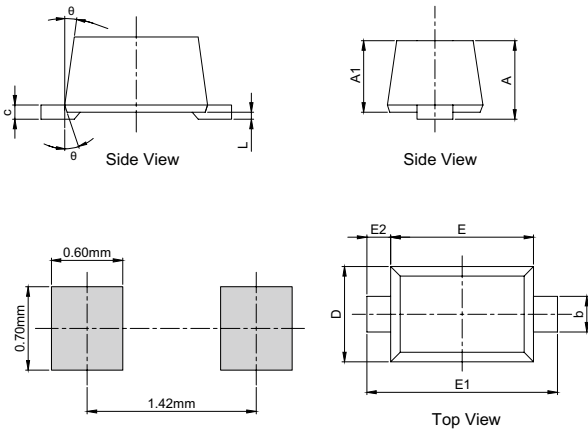
**Ordering Information**

Part Number	Package	Min. Order Qty.
SP1326-01LTG	SOD-523	5000

**Part Marking System**

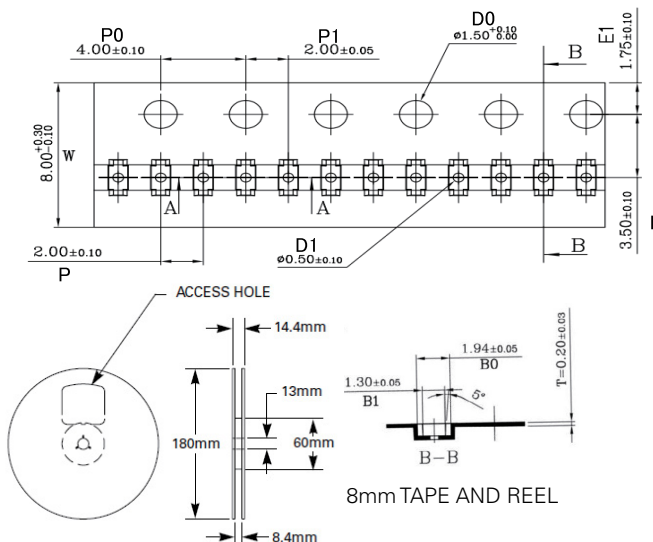


**Package Dimensions – SOD-523**



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
<b>A</b>	0.51	0.77	0.020	0.030
<b>A1</b>	0.50	0.70	0.020	0.028
<b>b</b>	0.25	0.35	0.010	0.014
<b>c</b>	0.08	0.15	0.003	0.006
<b>D</b>	0.75	0.85	0.030	0.033
<b>E</b>	1.10	1.30	0.043	0.051
<b>E1</b>	1.50	1.70	0.059	0.067
<b>E2</b>	0.20 REF		0.001 REF	
<b>L</b>	0.01	0.07	0.000	0.003
<b>Ø</b>	7° REF		7° REF	

**Embossed Carrier Tape & Reel Specification – SOD-523**



Symbol	Millimetres		Inches	
	Min	Max	Min	Max
<b>A0</b>	0.91	1.01	0.036	0.040
<b>B0</b>	1.89	1.99	0.074	0.078
<b>D0</b>	1.50	1.60	0.059	0.063
<b>D1</b>	0.40	0.60	0.016	0.024
<b>E1</b>	1.65	1.85	0.065	0.073
<b>F</b>	3.40	3.60	0.134	0.142
<b>P0</b>	3.90	4.10	0.154	0.161
<b>P</b>	1.90	2.10	0.075	0.083
<b>P1</b>	1.95	2.05	0.077	0.081
<b>K0</b>	0.68	0.78	0.027	0.031
<b>T</b>	0.17	0.23	0.007	0.009
<b>W</b>	7.90	8.30	0.311	0.327

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