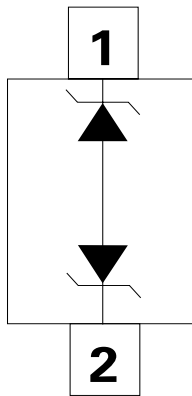


**SP1326 15pF 30kV Bidirectional Discrete TVS**



**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.

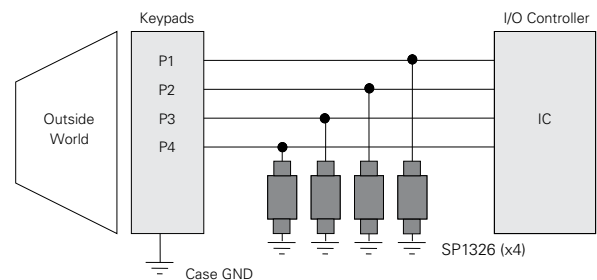
**Features**

- 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 ( $T_{OP}=25^\circ C$ )

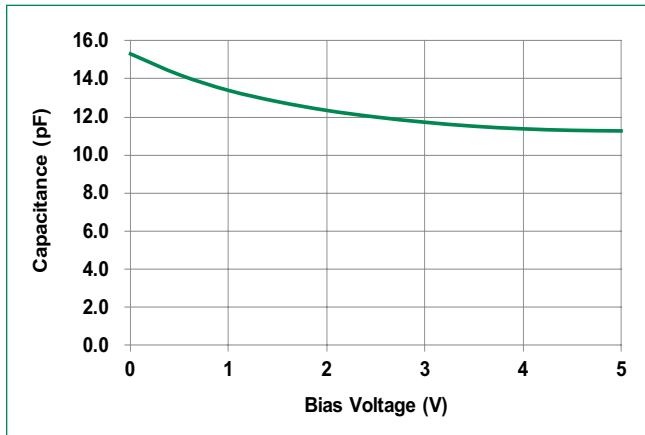
| Parameter                          | Symbol        | Test Conditions                        | Min      | Typ  | Max | Units    |
|------------------------------------|---------------|----------------------------------------|----------|------|-----|----------|
| Reverse Standoff Voltage           | $V_{RWM}$     | $I_R=1\mu A$                           |          |      | 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:**

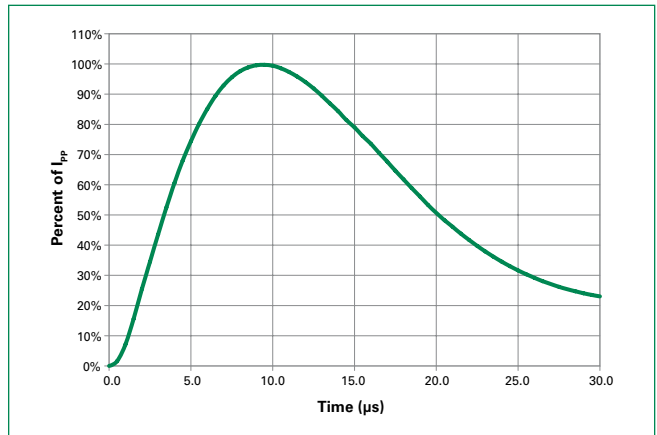
<sup>1</sup> Parameter is guaranteed by design and/or component characterization.

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

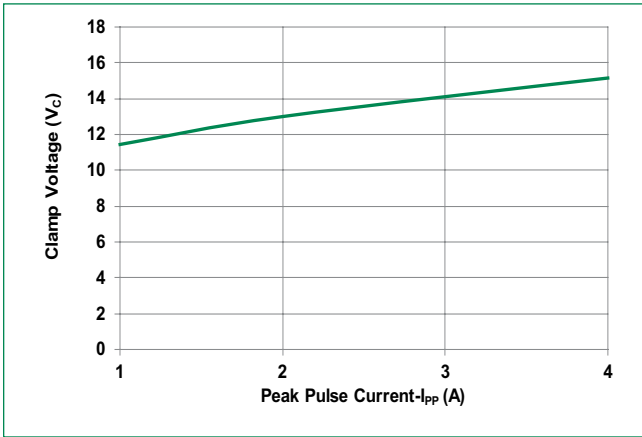
### Capacitance vs. Reverse Bias



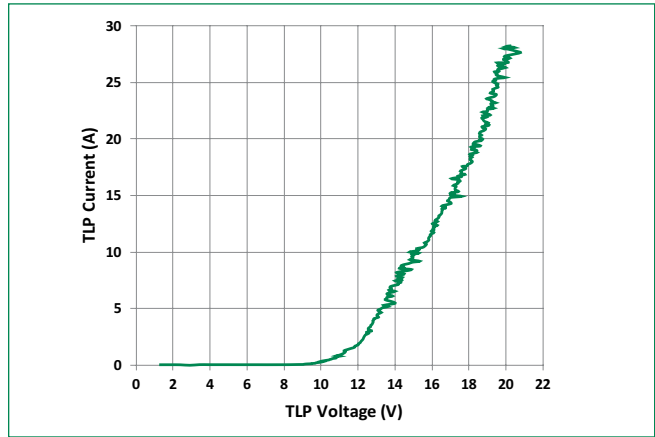
### 8/20 $\mu s$ Pulse Waveform



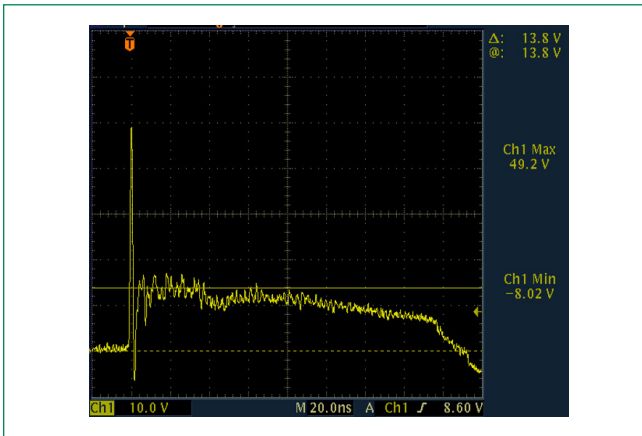
**Clamping voltage vs.  $I_{pp}$  for 8/20 $\mu$ S waveshape**



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

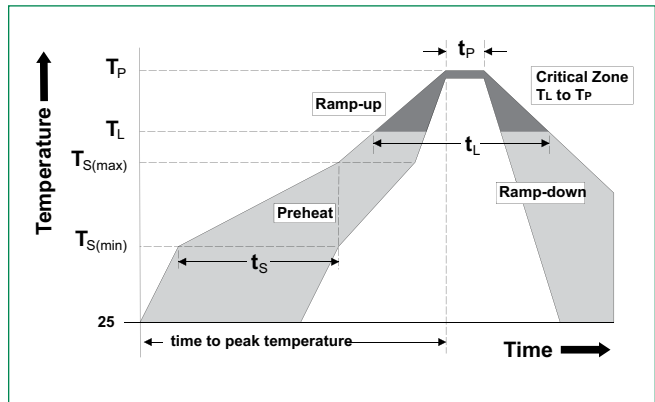


**IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage**

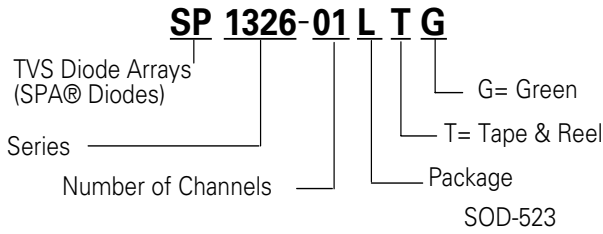


**Soldering Parameters**

|                                                                        |                                    |                    |
|------------------------------------------------------------------------|------------------------------------|--------------------|
| <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. |

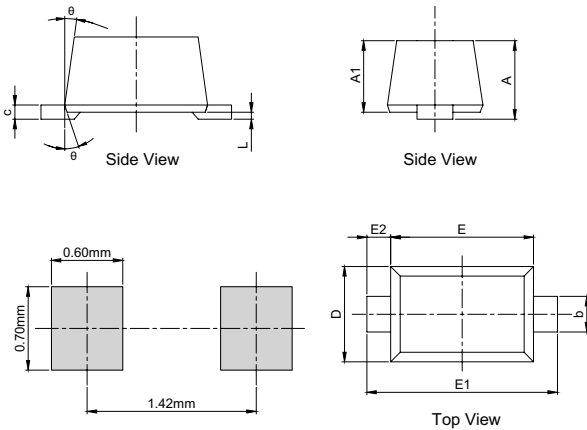
**Ordering Information**

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

**Part Marking System**

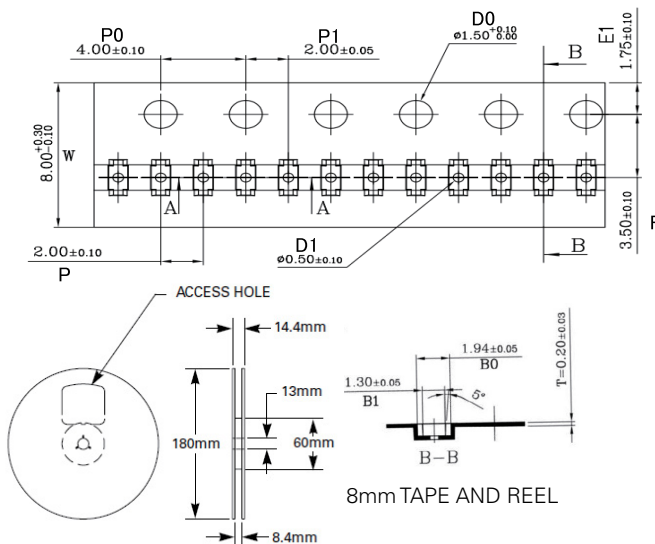


**Package Dimensions – SOD-523**



| 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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