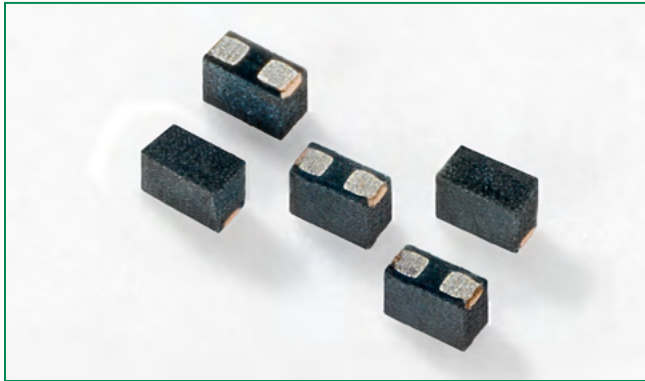


## SP1006 Series 25pF 30kV Unidirectional Discrete TVS



### Pinout



### Functional Block Diagram



### Additional Information



Datasheet



Resources



Samples

### Description

Zener diodes fabricated in a proprietary silicon avalanche technology protect each I/O pin to provide a high level of protection for electronic equipment that may experience destructive electrostatic discharges (ESD). These robust diodes can safely absorb repetitive ESD strikes at  $\pm 30\text{kV}$  (contact discharge, IEC 61000-4-2) without performance degradation. Additionally, each diode can safely dissipate 5A of 8/20 $\mu\text{s}$  surge current (IEC61000-4-5) with very low clamping voltages.

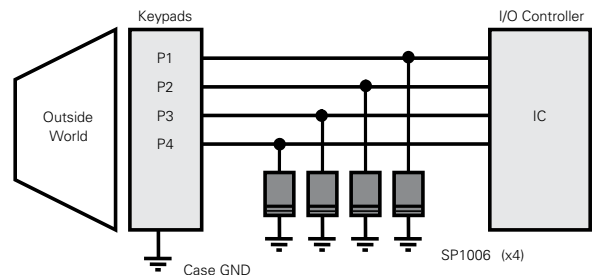
### Features

- ESD, IEC61000-4-2,  $\pm 30\text{kV}$  contact,  $\pm 30\text{kV}$  air
- EFT, IEC61000-4-4, 40A (5/50ns)
- Lightning, IEC61000-4-5, 5A (8/20 $\mu\text{s}$ )
- Low leakage current of 0.5 $\mu\text{A}$  (MAX) at 5V
- Space efficient 0201 footprint

### Applications

- Mobile phones
- Smart phones
- PDAs
- Digital cameras
- Portable navigation devices
- Portable medical devices

### 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 ( $t_p=8/20\mu s$ )	5	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

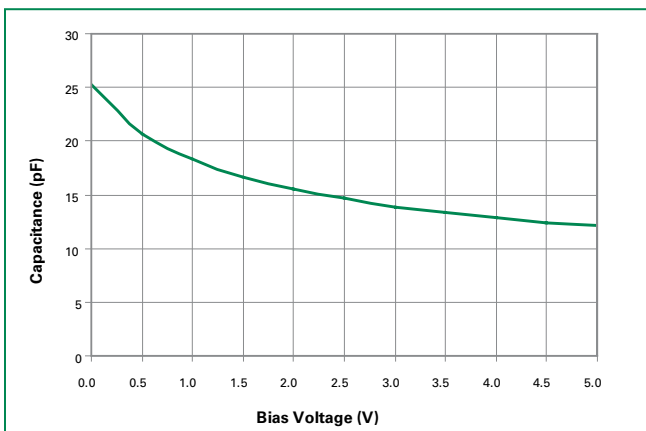
Parameter	Rating	Units
Storage Temperature Range	-55 to 150	°C
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (Soldering 30s)	260	°C

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

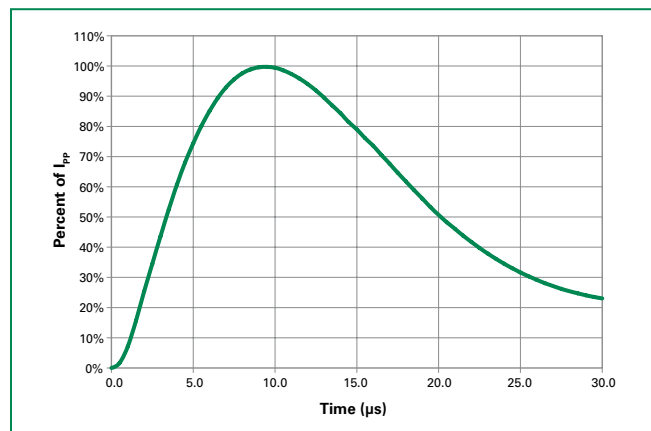
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$				6.0	V
Breakdown Voltage	$V_{BR}$	$I_R=1mA$ (Pin 1 to 2)		7.8		V
Forward Voltage Drop	$V_F$	$I_R=1mA$ (Pin 2 to 1)		0.8		V
Leakage Current	$I_{LEAK}$	$V_R=5V$		0.1	0.5	$\mu A$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=1A, t_p=8/20\mu s$ (Pin 1 to 2)		8.3		V
		$I_{PP}=2A, t_p=8/20\mu s$ (Pin 1 to 2)		9.2		V
Dynamic Resistance	$R_{DYN}$	$(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1})$		0.9		$\Omega$
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC61000-4-2 (Contact Discharge)	$\pm 30$			kV
		IEC61000-4-2 (Air Discharge)	$\pm 30$			kV
Diode Capacitance <sup>1</sup>	$C_D$	Reverse Bias=0V		25		pF
		Reverse Bias=2.5V		15		pF

Note: <sup>1</sup> Parameter is guaranteed by design and/or device characterization.

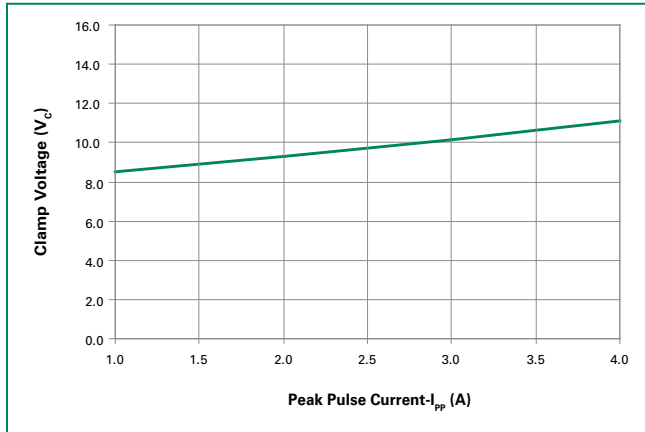
## Capacitance vs. Reverse Bias



## Pulse Waveform

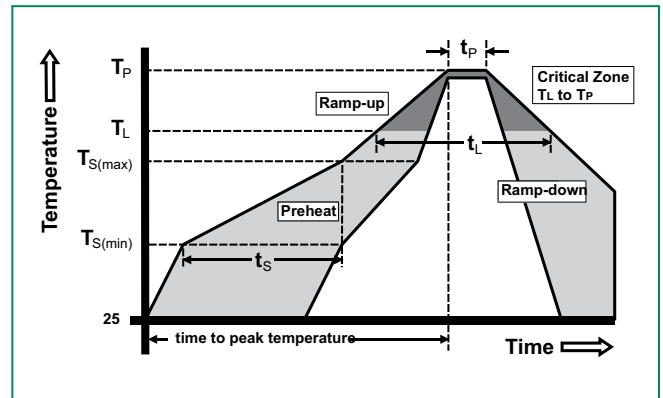


**Clamping Voltage vs. I<sub>pp</sub>**

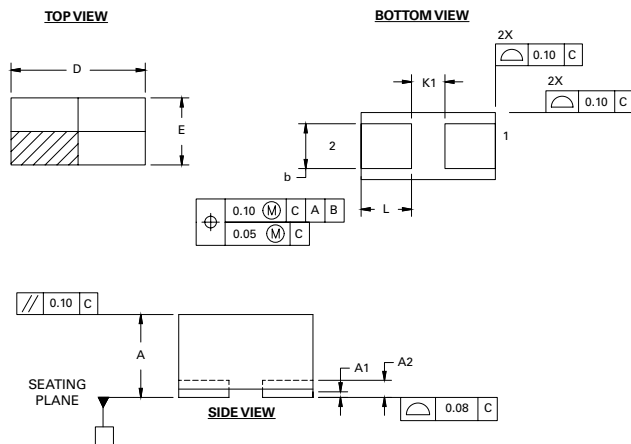


**Soldering Parameters**

Reflow Condition	Pb – Free assembly	
Pre Heat	- Temperature Min (T <sub>s(min)</sub> )	150°C
	- Temperature Max (T <sub>s(max)</sub> )	200°C
	- Time (min to max) (t <sub>s</sub> )	60 – 180 secs
Average ramp up rate (Liquidus) Temp (T <sub>L</sub> ) to peak	3°C/second max	
T <sub>S(max)</sub> to T <sub>L</sub> - Ramp-up Rate	3°C/second max	
Reflow	- Temperature (T <sub>L</sub> ) (Liquidus)	217°C
	- Temperature (t <sub>L</sub> )	60 – 150 seconds
Peak Temperature (T <sub>p</sub> )	260 <sup>+0/-5</sup> °C	
Time within 5°C of actual peak Temperature (t <sub>p</sub> )	20 – 40 seconds	
Ramp-down Rate	6°C/second max	
Time 25°C to peak Temperature (T <sub>p</sub> )	8 minutes Max.	

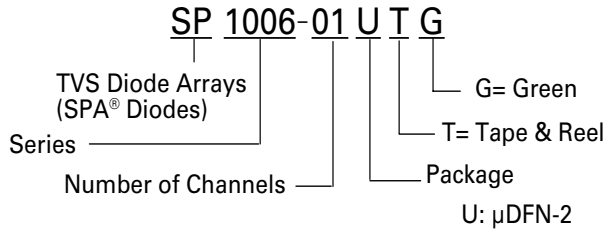


**Package Dimensions – μDFN-2 (0201)**

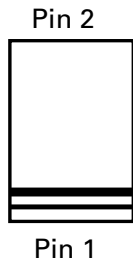


Package	μDFN-2 (0201)			
JEDEC	MO-236			
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
<b>A</b>	0.34	0.40	0.014	0.016
<b>A1</b>	0.00	0.05	0.000	0.002
<b>A2</b>	0.075 REF		0.003 REF	
<b>b</b>	0.20 REF		0.008 REF	
<b>D</b>	0.55	0.65	0.022	0.026
<b>E</b>	0.25	0.35	0.010	0.014
<b>L</b>	0.175	0.275	0.007	0.011
<b>K1</b>	0.15 REF		0.006 REF	

**Part Numbering System**



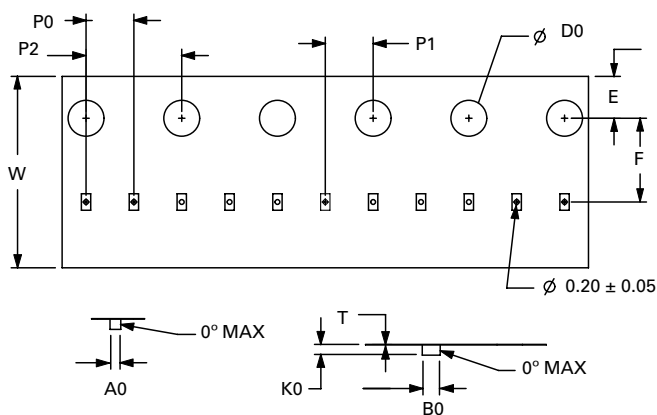
**Part Marking System**



**Ordering Information**

Part Number	Package	Marking	Min. Order Qty.
SP1006-01UTG	$\mu$ DFN-2		10000

**Embossed Carrier Tape & Reel Specification –  $\mu$ DFN-2**



**Product Characteristics**

<b>Lead Plating</b>	Pre-Plated Frame
<b>Lead Material</b>	Copper Alloy
<b>Lead Coplanarity</b>	0.0004 inches (0.102mm)
<b>Substitute Material</b>	Silicon
<b>Body Material</b>	Molded Epoxy
<b>Flammability</b>	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.

Symbol	Millimetres		Inches	
	Min	Max	Min	Max
<b>A0</b>	0.36	0.42	0.014	0.017
<b>B0</b>	0.66	0.72	0.026	0.028
<b>D0</b>	1.40	1.60	0.055	0.063
<b>E</b>	1.65	1.85	0.065	0.073
<b>F</b>	3.45	3.55	0.136	0.140
<b>K0</b>	0.39	0.45	0.015	0.018
<b>P0</b>	1.95	2.05	0.077	0.081
<b>P1</b>	1.95	2.05	0.077	0.081
<b>P2</b>	3.90	4.10	0.154	0.161
<b>T</b>	0.18	0.22	0.007	0.009
<b>W</b>	7.90	8.30	0.311	0.327

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