

SP1008 Series

6pF 15kV Bidirectional Discrete TVS Protection



Description

The SP1008 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 above the maximum level specified in the IEC 61000-4-2 international standard ($\pm 15\text{kV}$ contact discharge) without performance degradation. The back-to-back configuration provides symmetrical ESD protection for data lines when AC signals are present.

Features & Benefits

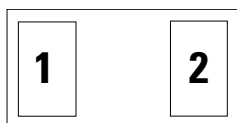
- RoHS compliant, Halogen-free and Lead-free
- ESD, IEC 61000-4-2, $\pm 15\text{kV}$ contact, $\pm 15\text{kV}$ air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 3A (8/20 μs as defined in IEC 61000-4-5 2nd Edition)
- Low capacitance of 6pF (@ $V_R=5\text{V}$)
- Low leakage current of 0.1 μA at 5V
- Space efficient 0201 footprint

Web Resources



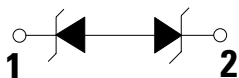
Download ECAD models, order samples, and find technical resources at www.littelfuse.com

Pinout



Note: Drawing not to scale

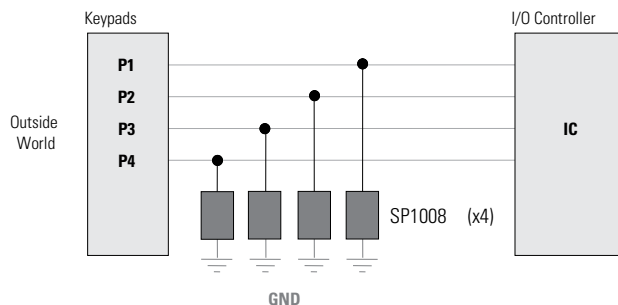
Functional Block Diagram



Applications

- Mobile phones
- MP3/PMP
- PDA
- Camcorders
- Smart phones
- External storage
- Tablets
- Digital cameras

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.

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Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current ($t_p=8/20\mu s$)	3.0	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 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.

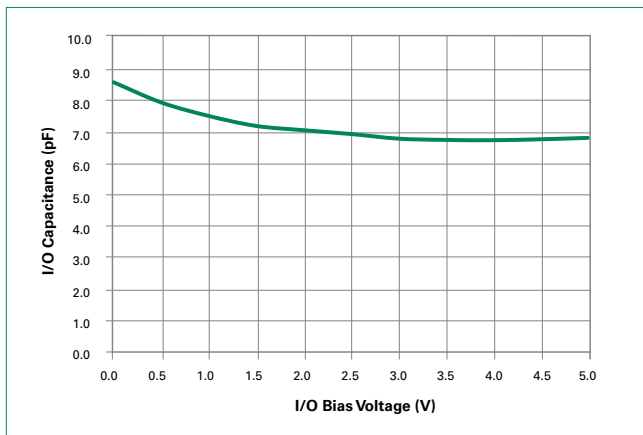
Electrical Characteristics ($T_{OP}=25^\circ C$)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}				6.0	V
Breakdown Voltage	V_{BR}	$I_R=1mA$		7.0	8.5	V
Leakage Current	I_{LEAK}	$V_R=5V$ with 1 pin at GND		0.1		μA
Clamp Voltage ¹	V_C	$I_{PP}=1A, t_p=8/20\mu s$		10.7		V
		$I_{PP}=2A, t_p=8/20\mu s$		12.0		V
Dynamic Resistance	R_{DYN}	$(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1})$		1.3		Ω
ESD Withstand Voltage ¹	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	± 15			kV
		IEC 61000-4-2 (Air Discharge)	± 15			kV
Diode Capacitance ¹	C_D	Reverse Bias=5.0V		6	9	pF

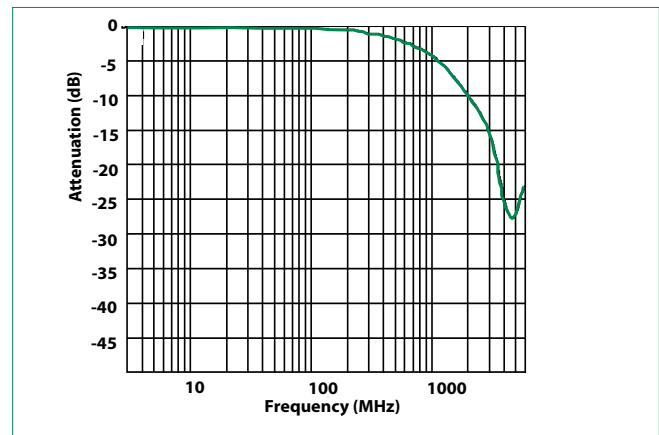
Note:

¹Parameter is guaranteed by design and/or device characterization.

Capacitance vs. Reverse Bias



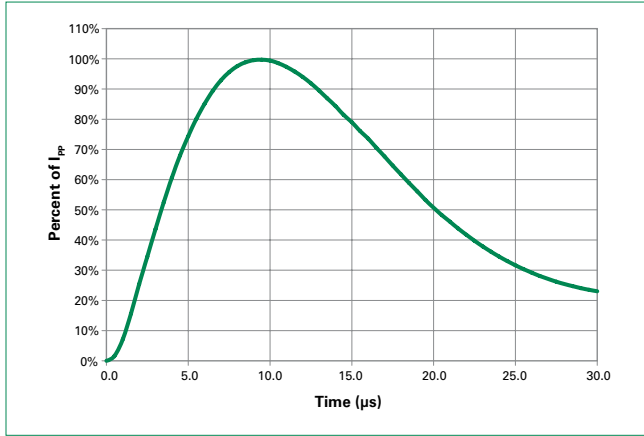
Insertion Loss (S21) I/O to GND



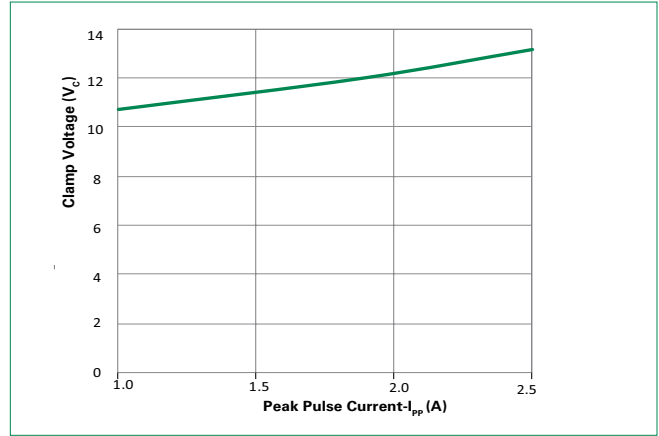
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Pulse Waveform

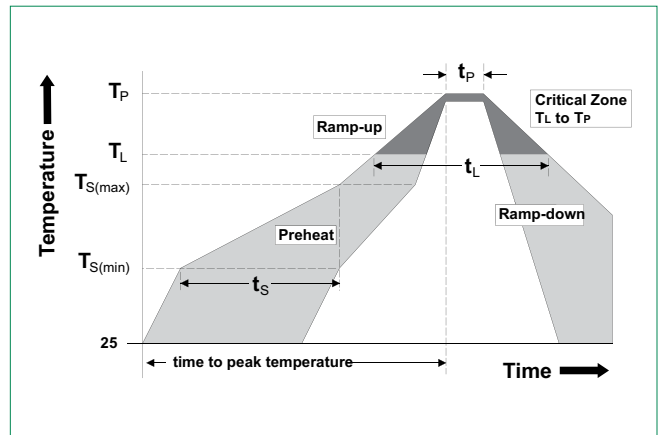


Clamping Voltage vs. IPP

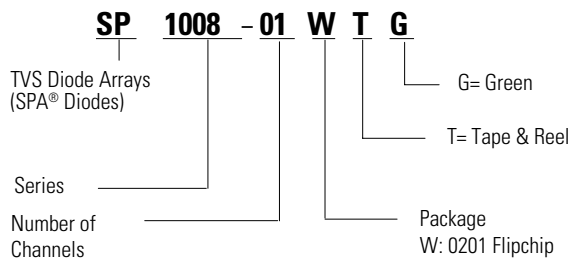


Soldering Parameters

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 – 120 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 ^{+0/-5} °C	
Time within 5°C of actual peak Temperature (t_p)	30 seconds	
Ramp-down Rate	6°C/second max	
Time 25°C to peak Temperature (T_p)	8 minutes Max.	
Do not exceed	260°C	



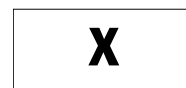
Part Numbering System



Ordering Information

Part Number	Package	Min. Order Qty.
SP1008-01WTG	0201 Flipchip	10000

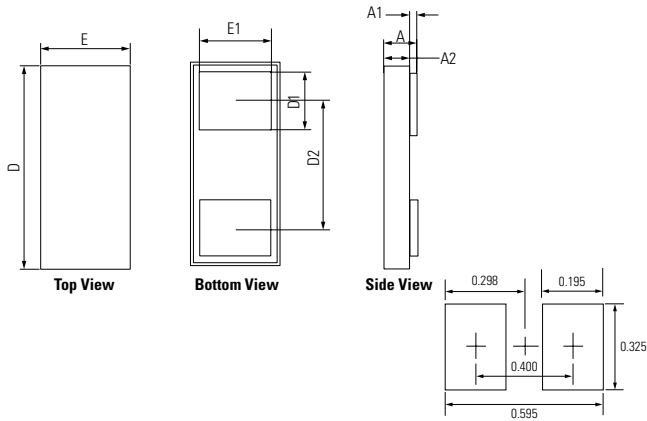
Part Marking System



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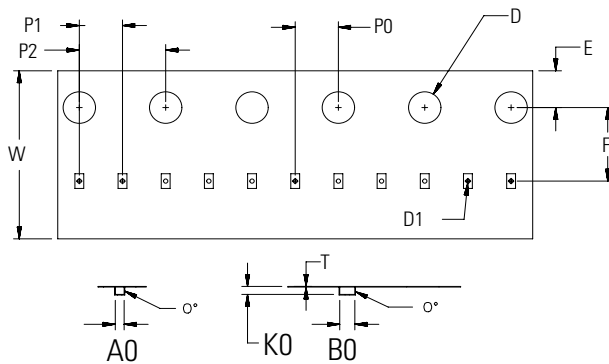
Package Dimensions — 0201 Flipchip



Recommended Soldering Pad Layout (mm)

Symbol	0201 Flipchip			
	Millimeters		Inches	
	Min	Max	Min	Max
D	0.605	0.655	0.0238	0.0258
E	0.305	0.345	0.0120	0.0140
D1	0.145	0.155	0.0057	0.0061
E1	0.245	0.255	0.0096	0.0100
D2	0.400 BSC		0.0157 BSC	
A	0.273	0.329	0.0107	0.0130
A2	0.265	0.315	0.0104	0.0124
A1	0.008	0.014	0.0003	0.0006

Embossed Carrier Tape & Reel Specification — 0201 Flipchip



Symbol	Millimeters
A0	0.41±0.03
B0	0.70±0.03
D	∅ 1.50 + 0.10
D1	∅ 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

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