Littelfuse
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TVS Diode Arrays (SPA® Diodes)

General Purpose ESD Protection - SC1333-01ETG

PRELIMINARY & CONFIDENTIAL

Littelfuse, Inc. has characterized initial samples of this device and is currently conducting reliability testing. Parts numbers and specifications are subject to change until the datasheet is made final.

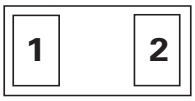
SC1333 8pF 30kV Bidirectional Discrete TVS

HF RoHS Pb GREEN

Description

The SC1333 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 SC1333 TVS can safely absorb repetitive ESD strikes at the maximum level specified in the 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. Additionally, the SC1333 offers up to 5A 8/20µs surge rating with low clamping voltages.

Pinout



Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 5A (8/20µs as defined in IEC 61000-4-5 2nd edition)
- Low capacitance of 8pF (TYP @ V_R=0V)
- Low leakage current of 1nA (TYP) at 3.3V
- Space Efficient 0402
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL-1)

Functional Block Diagram

Applications

- Mobile Phones
- Smart Phones
- Portable Medical
- MP3/PMP
- Portable Navigation Components
- Tablets
- Small Size Panel
- Point of Sale Terminals

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Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20μs)	5	A
T_{OP}	Operating Temperature	-40 to 125	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

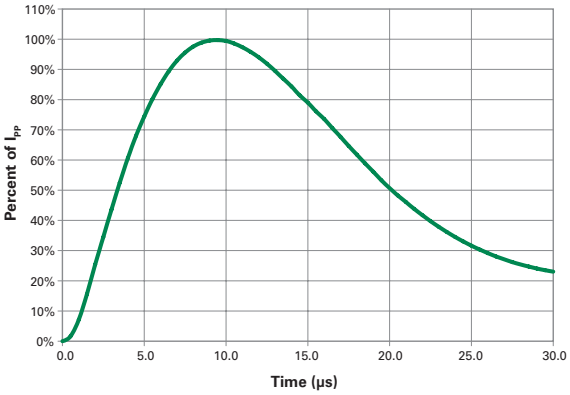
CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Electrical Characteristics (T_{OP}=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1μA			3.3	V
Breakdown Voltage	V_{BR}	I_R=1mA	3.5	4.5		V
Reverse Leakage Current	I_{LEAK}	V_R=3.3V		1	50	nA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20μs, I/O to I/O		5	7	V
		I_{PP}=5A, t_p=8/20μs, I/O to I/O		7.5	9	V
Dynamic Resistance[2]	R_{DYN}	TLP, t_P=100ns, I/O to I/O		0.3		Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30			kV
		IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance[1]	$C_{IO-I/O}$	Reverse Bias=0V, f=1MHz		8	10	pF

Note:
1. Parameter is guaranteed by design and/or component characterization.
2. Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1=70ns to t2= 90ns

8/20μs Pulse Waveform



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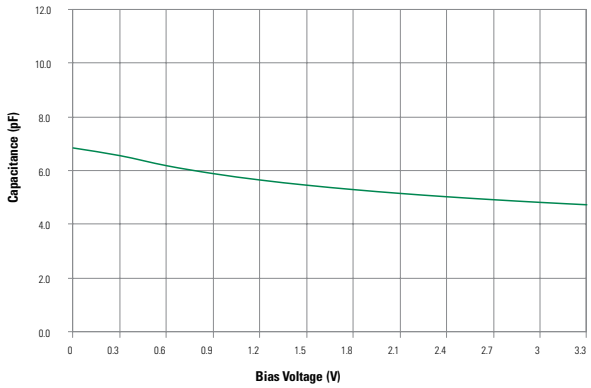
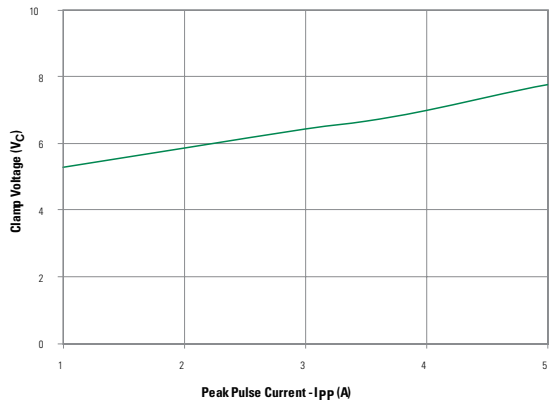
General Purpose ESD Protection - SP1027

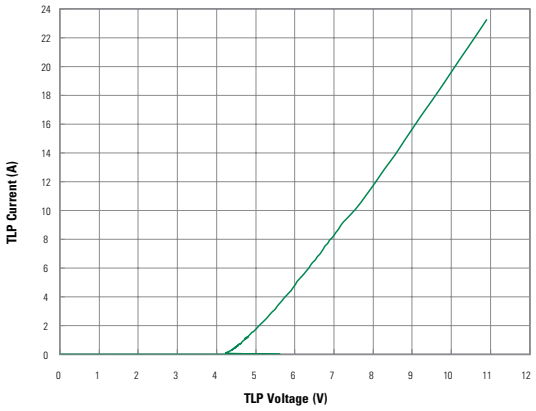
Capacitance vs Reverse Bias



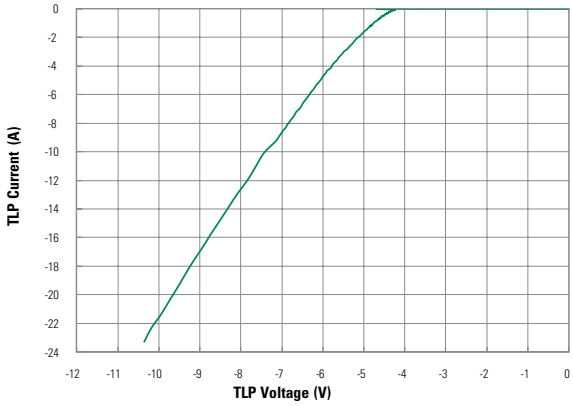
Clamping Voltage vs I_{PP}



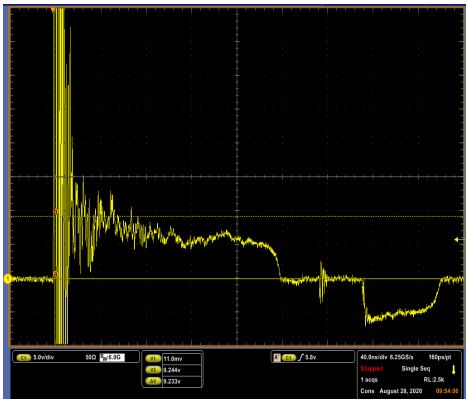
Positive TLP



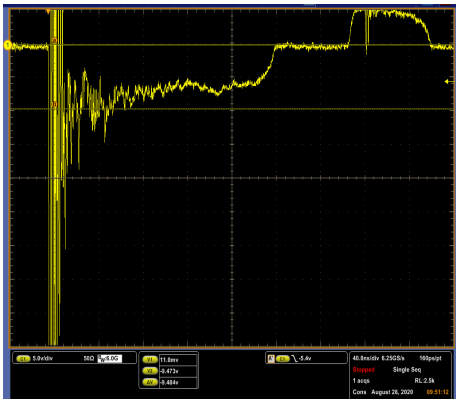
Negative TLP



IEC Contact Discharge at +8 kV



IEC Contact Discharge at -8 kV



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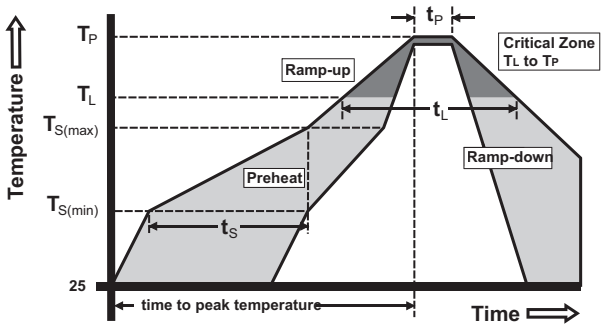
TVS Diode Arrays (SPA® Diodes)

General Purpose ESD Protection - SC1333-01ETG

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 – 180 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)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		260°C



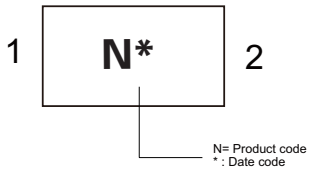
Ordering Information

Part Number	Package	Min. Order Qty.
SC1333-01ETG	0402 DFN	10000

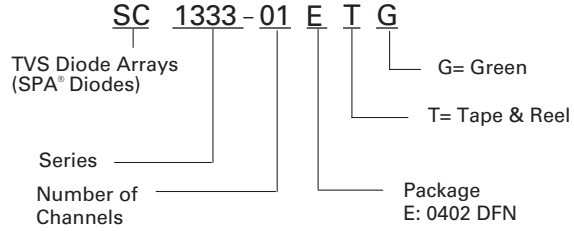
Product Characteristics

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

Part Marking System



Part Numbering System



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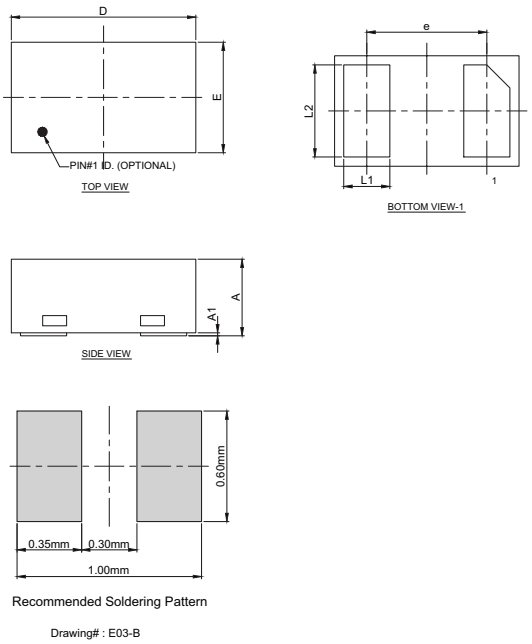
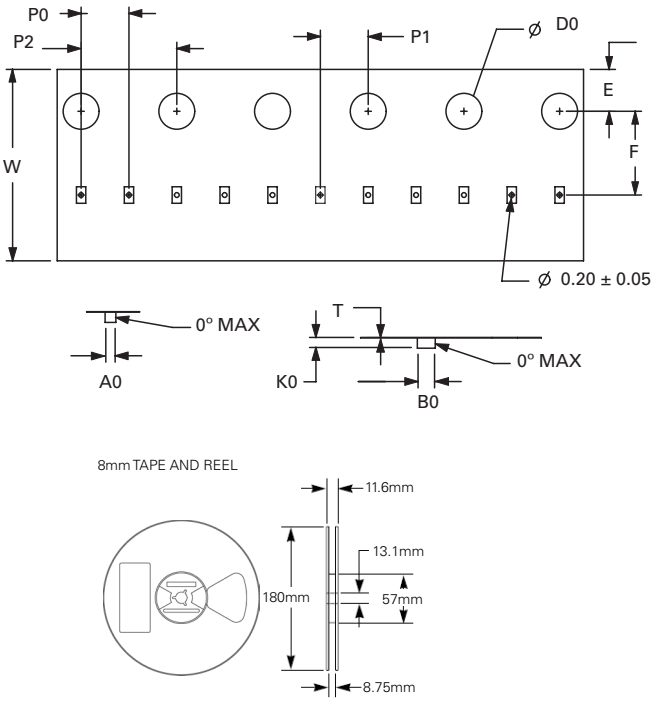
Package Dimensions — SOD882



Symbol	SOD882					
	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.40	0.50	0.55	0.016	0.020	0.022
A1	0.00	0.02	0.05	0.000	0.001	0.002
L1	0.20	0.25	0.30	0.008	0.010	0.012
L2	0.45	0.50	0.55	0.018	0.020	0.022
D	0.95	1.00	1.05	0.037	0.039	0.041
E	0.55	0.60	0.65	0.022	0.024	0.026
e	0.65 BSC			0.026 BSC		

Embossed Carrier Tape & Reel Specification — SOD882



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A0	0.33	0.40	0.013	0.016
B0	0.63	0.70	0.025	0.028
D0	1.40	1.60	0.055	0.063
E	1.65	1.85	0.065	0.073
F	3.45	3.55	0.136	0.140
K0	0.30	0.39	0.012	0.015
P0	1.90	2.10	0.075	0.083
P1	1.95	2.05	0.077	0.081
P2	3.90	4.10	0.154	0.161
T	0.13	0.25	0.005	0.010
W	7.90	8.30	0.311	0.327

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