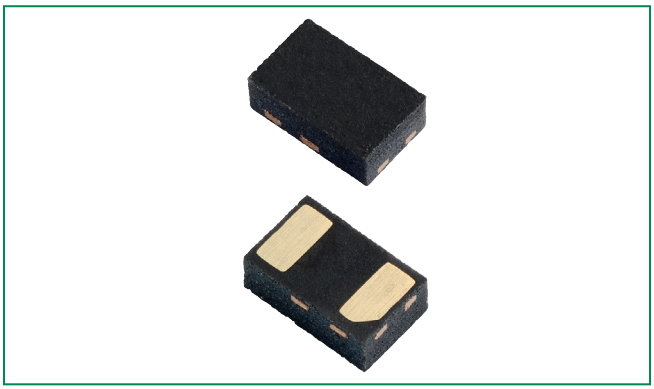
SP1233 20A Discrete Bidirectional TVS Diode

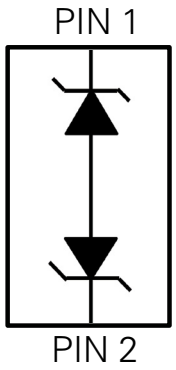
HF RoHS Pb GREEN



Description

The SP1233 includes TVS diodes fabricated in a proprietary silicon avalanche technology to protect each I/O pin and 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 ±30kV (contact discharge, IEC61000-4-2) without performance degradation. Additionally, the SP1233 offers up to 20A 8/20 surge rating with low clamping voltages

Pinout and Functional Block Diagram



Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 20A (8/20 as defined in IEC 61000-4-5 2nd edition)
- Low clamping voltage
- Low leakage current
- AEC-Q101 qualified
- Moisture Sensitivity Level(MSL -1)
- Halogen free, lead free and RoHS compliant

Applications

- Switches / Buttons
- Test Equipment / Instrumentation
- Point-of-Sale Terminals
- Medical Equipment
- Notebooks / Desktops / Servers
- Computer Peripherals

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.

©2018 Littelfuse, Inc.
Specifications are subject to change without notice.
Revision: 01/30/18

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{pp}	Peak Pulse Current (t_p=8/20µs)	20	A
P_{pk}	Peak Pulse Power (tp=8/20µs)	180	W
T_{OP}	Operating Temperature	-40 to 125	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

Notes:

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)

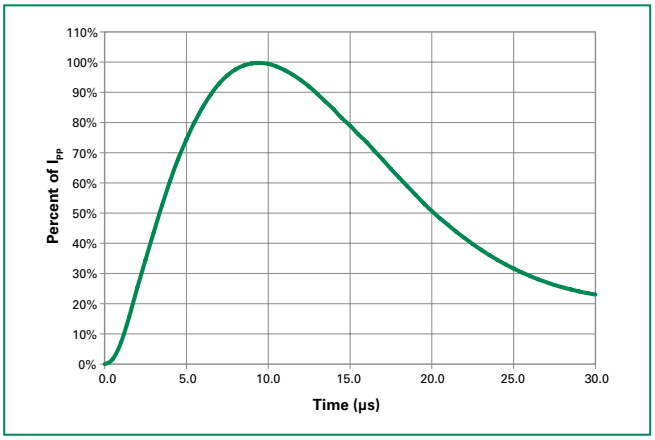
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R≤1µA			3.3	V
Breakdown Voltage	V_{BR}	I_R=1mA		4.2		V
Leakage Current	I_{LEAK}	V_R=3.3V		0.02	0.5	µA
Clamp Voltage[1]	V_C	I_{PP}=10A, t_p=8/20µs, Fwd		6.1		V
		I_{PP}=20A, t_p=8/20µs, Fwd		8.5		V
Dynamic Resistance[2]	R_{DYN}	TLP, t_P=100ns, I/O to GND		0.07		Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs			20	A
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_D	Reverse Bias=0V, f=1MHz		35		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

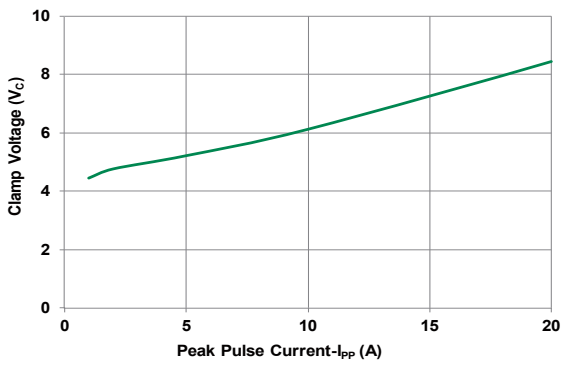


©2018 Littelfuse, Inc.
Specifications are subject to change without notice.

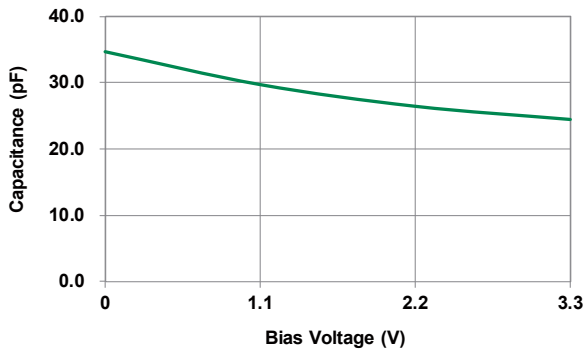
TVS Diode Arrays (SPA® Diodes)

General Purpose ESD Protection - SP1233

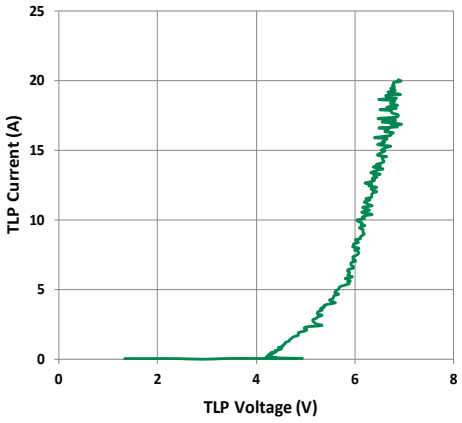
Clamping voltage vs. I_{PP} for 8/20µS waveshape



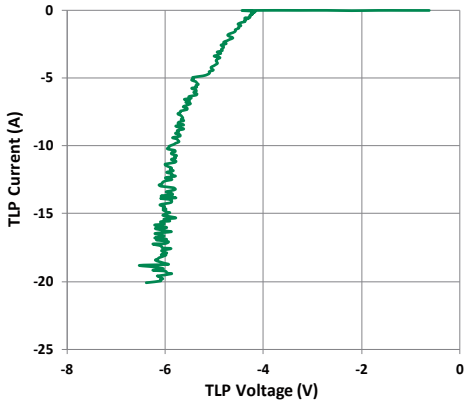
Capacitance vs. Reverse Bias



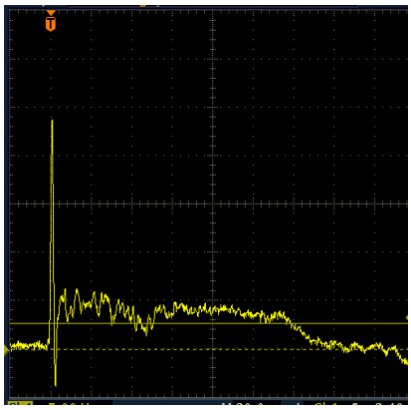
Positive Transmission Line Pulsing (TLP) Plot



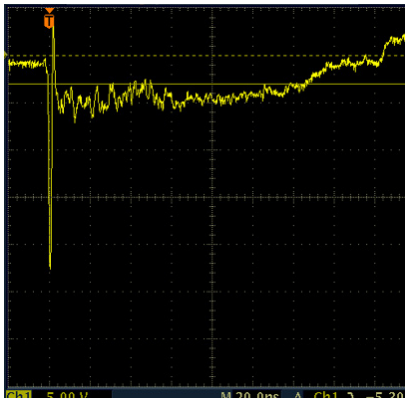
Negative Transmission Line Pulsing (TLP) Plot



IEC 61000–4–2 +8 kV Contact ESD Clamping Voltage



IEC 61000–4–2 -8 kV Contact ESD Clamping Voltage



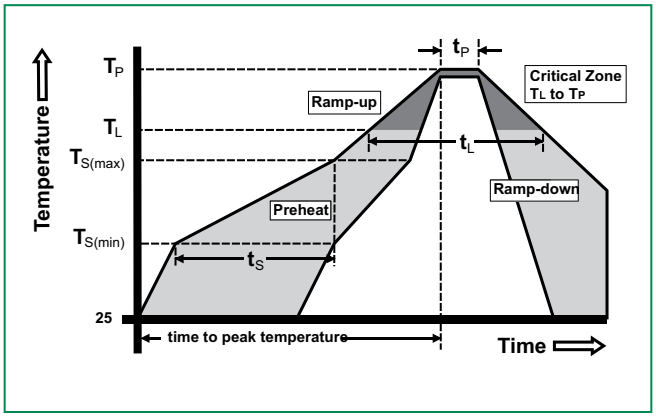
©2018 Littelfuse, Inc.
Specifications are subject to change without notice.
Revision: 01/30/18

TVS Diode Arrays (SPA® Diodes)

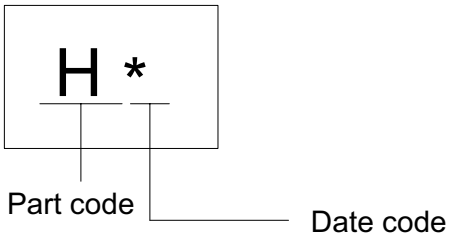
General Purpose ESD Protection - SP1233

Soldering Parameters

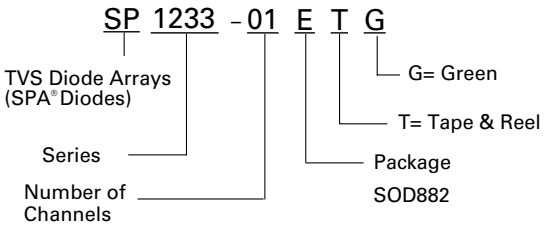
Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus) Temp (T_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (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



Part Marking System



Part Numbering System



Product Characteristics

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

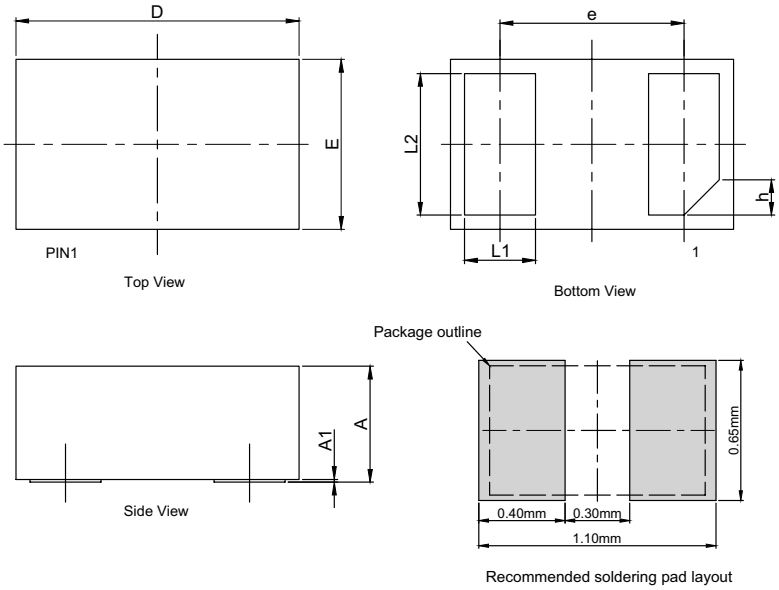
Notes :
1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.

Ordering Information

Part Number	Package	Marking	Min. Order Qty.
SP1233-01ETG	SOD882	H*	10,000

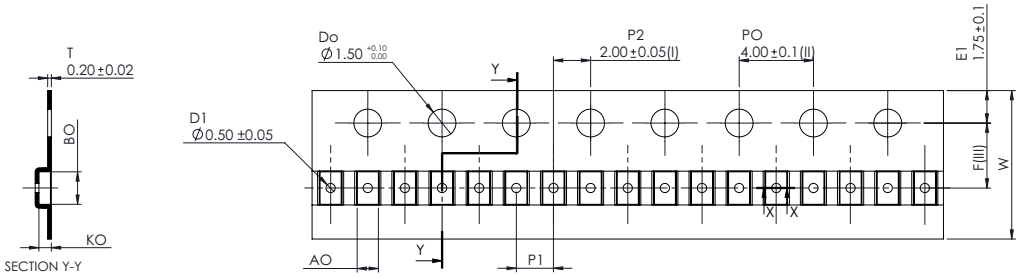
©2018 Littelfuse, Inc.
Specifications are subject to change without notice.
Revision: 01/30/18

Package Dimensions

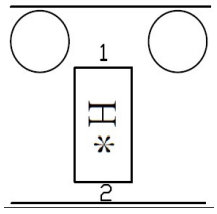


Symbol	SOD882		
	Millimeters		
	Min	Nor	Max
A	0.40	0.45	0.55
A1	-	0.02	0.05
L1	0.20	0.25	0.30
L2	0.45	0.50	0.55
D	0.90	1.00	1.10
E	0.50	0.60	0.70
e	0.65 BSC		
h	0.125 (x 45°)		

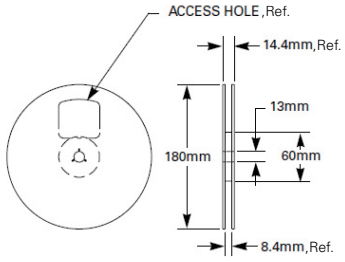
Embossed Carrier Tape & Reel Specification



Symbol	Millimeters
A0	1.14 +/- 0.03
B0	1.75 +/- 0.03
K0	0.67 +/- 0.05
F	3.50 +/- 0.05
P1	2.00 +/- 0.10
W	8.00 +/- 0.10



Device Orientation in Tape



8mm TAPE AND REEL

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at http://www.littelfuse.com/disclaimer-electronics.

©2018 Littelfuse, Inc.
Specifications are subject to change without notice.