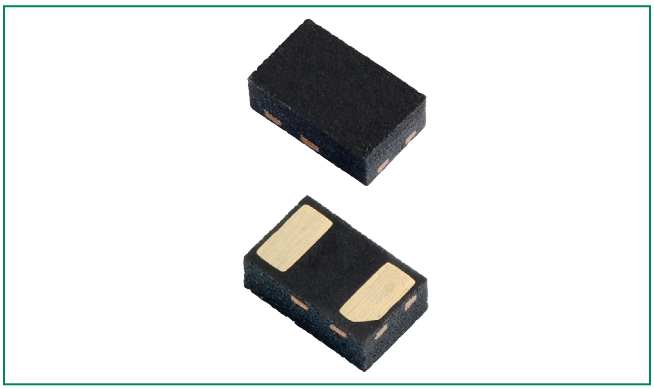
SP1233 20A Discrete Bidirectional TVS Diode

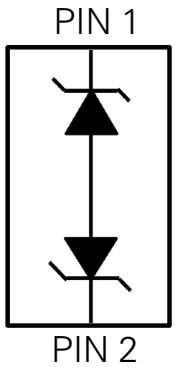
HF RoHS Pb GREEN



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

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)

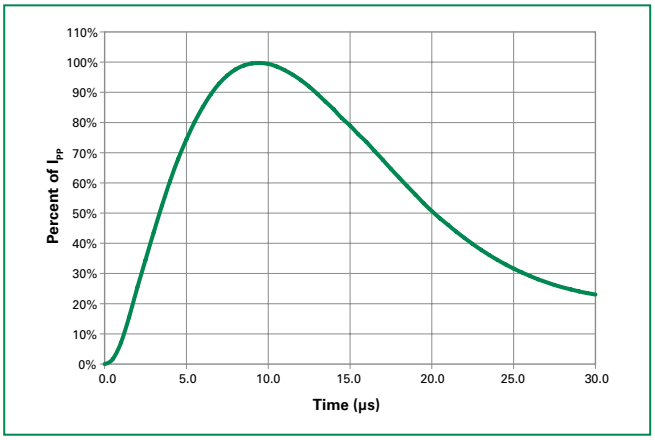
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R≤1µA			3.3	V
Breakdown Voltage	V_{BR}	I_R=1mA		4.2		V
Leakage Current	I_{LEAK}	V_R=3.3V		0.02	0.5	µA
Clamp Voltage[1]	V_C	I_{PP}=10A, t_p=8/20µs, Fwd		6.1		V
		I_{PP}=20A, t_p=8/20µs, Fwd		8.5		V
Dynamic Resistance[2]	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

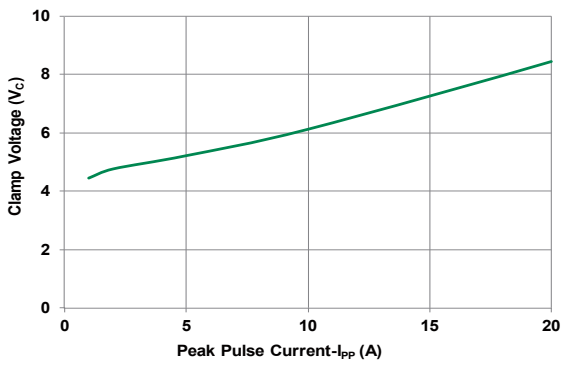
8/20µs Pulse Waveform



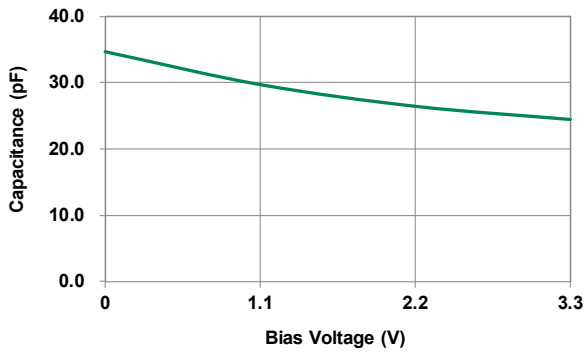
TVS Diode Arrays (SPA® Diodes)

General Purpose ESD Protection - SP1233

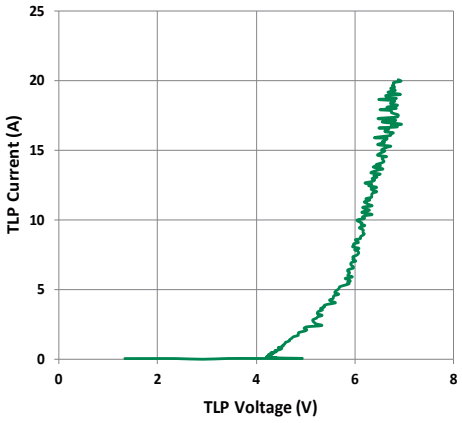
Clamping voltage vs. I_{PP} for 8/20µS waveshape



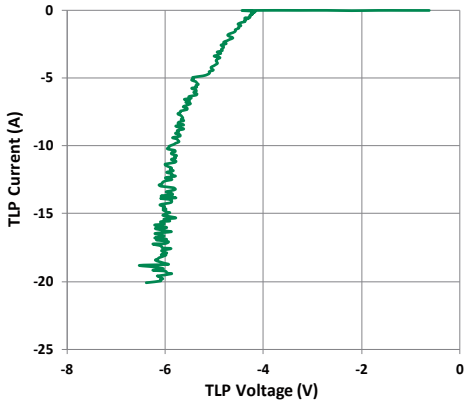
Capacitance vs. Reverse Bias



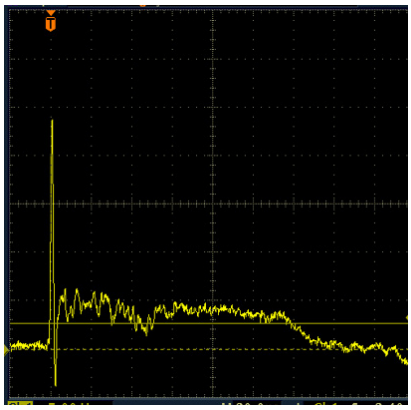
Positive Transmission Line Pulsing (TLP) Plot



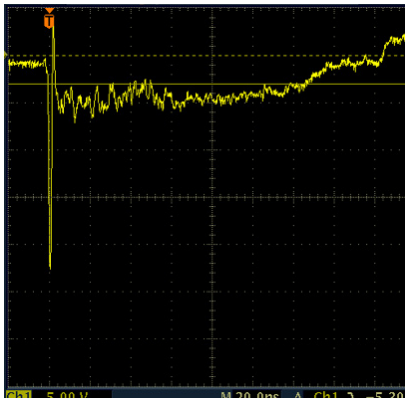
Negative Transmission Line Pulsing (TLP) Plot



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



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



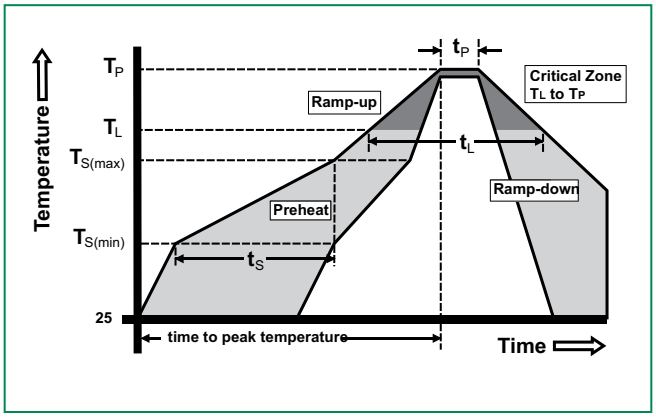
Revision: 01/30/18

TVS Diode Arrays (SPA® Diodes)

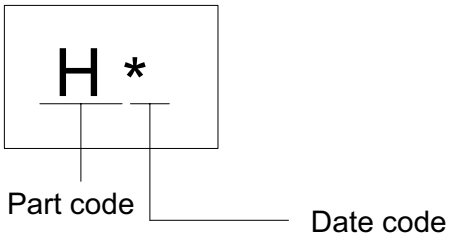
General Purpose ESD Protection - SP1233

Soldering Parameters

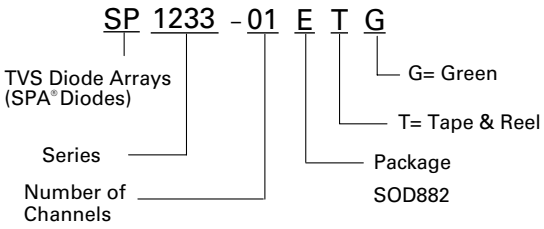
Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus) Temp (T_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature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

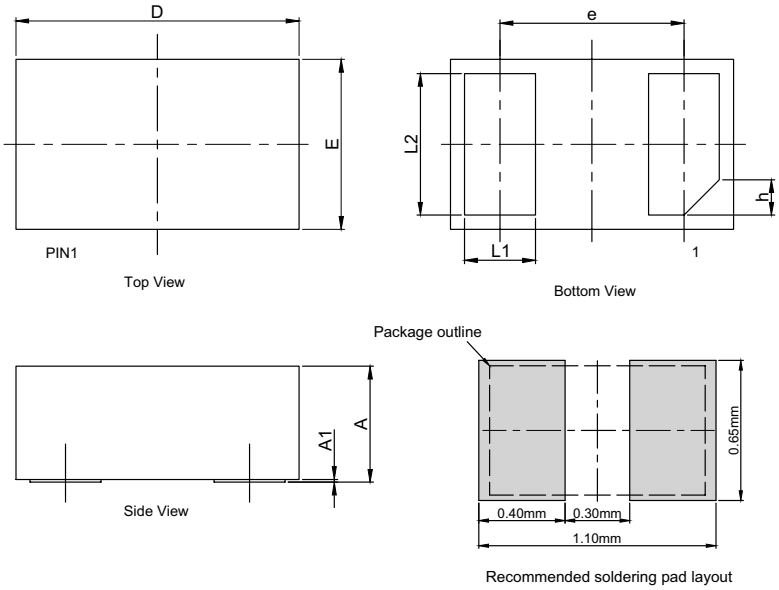
Notes :
1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.

Ordering Information

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

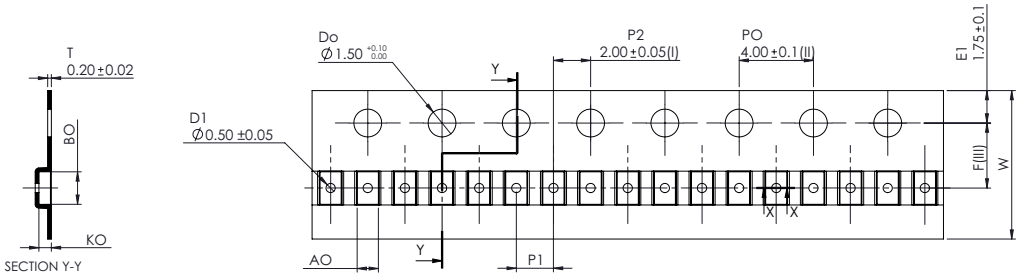
Revision: 01/30/18

Package Dimensions

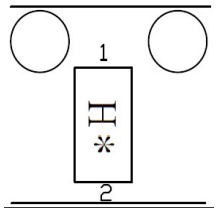


Symbol	SOD882		
	Millimeters		
	Min	Nor	Max
A	0.40	0.45	0.55
A1	-	0.02	0.05
L1	0.20	0.25	0.30
L2	0.45	0.50	0.55
D	0.90	1.00	1.10
E	0.50	0.60	0.70
e	0.65 BSC		
h	0.125 (x 45°)		

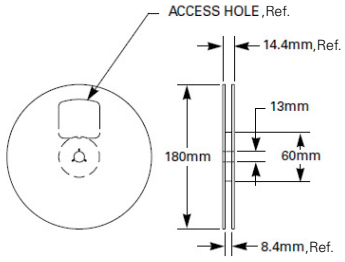
Embossed Carrier Tape & Reel Specification



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