

SP1220

20A Discrete Unidirectional TVS Diode

OBSOLETE DATE: 9/30/2021 PCN/ECN# ESU270-62
REPLACED BY: SP1250-01ETG



Description

The SP1220 unidirectional TVS is fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment. The SP1220 TVS can safely absorb repetitive ESD strikes of ± 30 kV (contact and air discharge as defined in IEC 61000-4-2) without any performance degradation. Additionally, each TVS can safely dissipate a 20A 8/20 surge event as defined in IEC 61000-4-5 2nd Edition.

Features & Benefits

- ESD, IEC 61000-4-2, ± 30 kV contact, ± 30 kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 20A (8/20 μ s as defined in IEC 61000-4-5 2nd Edition)
- AEC-Q101 qualified
- Lead-Free and RoHS-Compliant
- Moisture Sensitivity Level (MSL -1)

Additional Information



Resources



Accessories

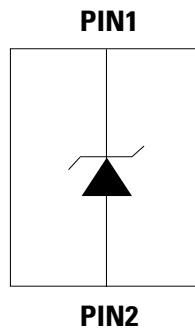


Samples

Applications

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

Pinout and Functional Block Diagram



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
P_{pk}	Peak Pulse Power ($t_p=8/20\mu s$)	250	W
T_{OP}	Operating Temperature	-40 to 125	$^{\circ}C$
T_{STOR}	Storage Temperature	-55 to 150	$^{\circ}C$

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.

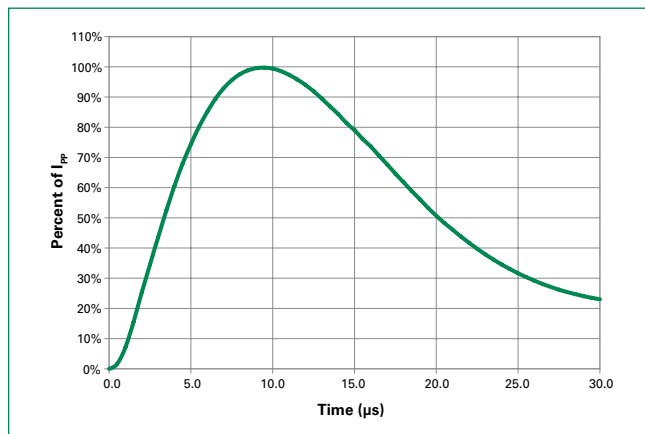
Electrical Characteristics ($T_{OP}=25^{\circ}C$)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	$I_R=1\mu A$			5.0	V
Breakdown Voltage	V_{BR}	$I_R=1mA$		7.0	9.5	V
Reverse Leakage Current	I_{LEAK}	$V_R=5.75V$			1.0	μA
Clamp Voltage ¹	V_C	$I_{PP}=1A, t_p=8/20\mu s$		7.5		V
		$I_{PP}=20A, t_p=8/20\mu s$			11.0	V
Dynamic Resistance ²	R_{DYN}	TLP, $t_p=100ns$, I/O to GND		0.33		Ω
Peak Pulse Current	I_{PP}	$t_p=8/20\mu s$	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	$C_{I/O-GND}$	Reverse Bias=0V, $f=1MHz$		290		pF

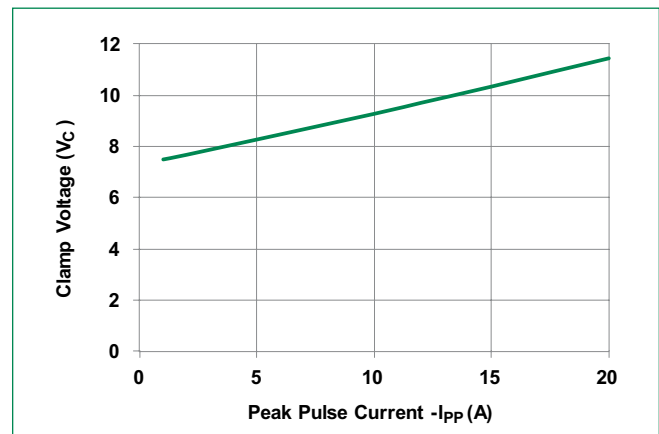
Note:

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

8/20 μs Pulse Waveform



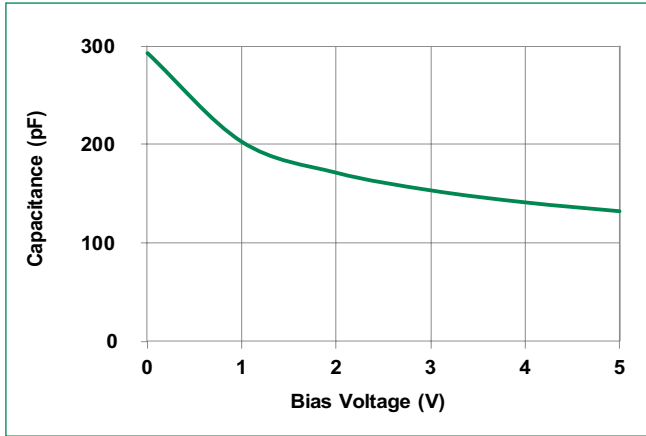
Clamping Voltage vs I_{PP} for 8/20 μs waveshape



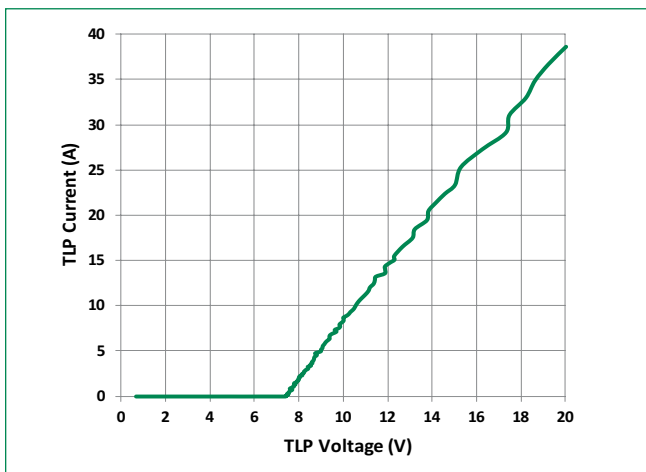
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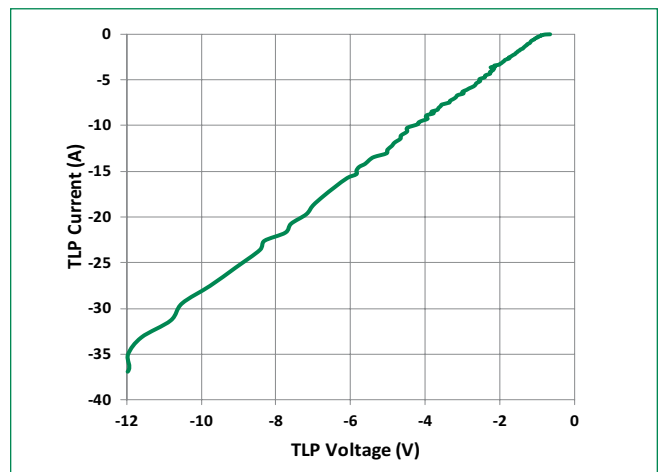
Capacitance vs. Bias



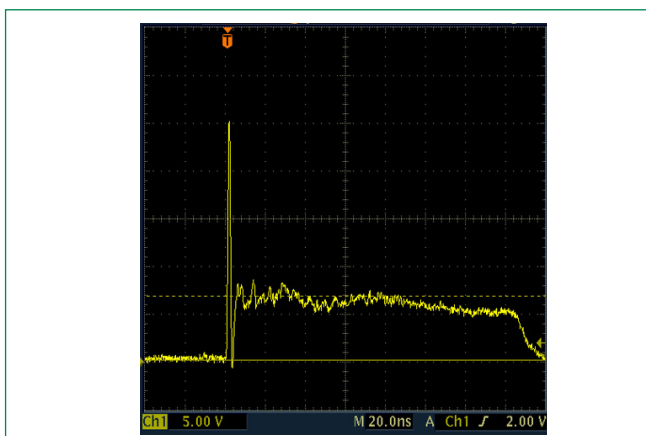
Positive Transmission Line Pulsing (TLP) Plot



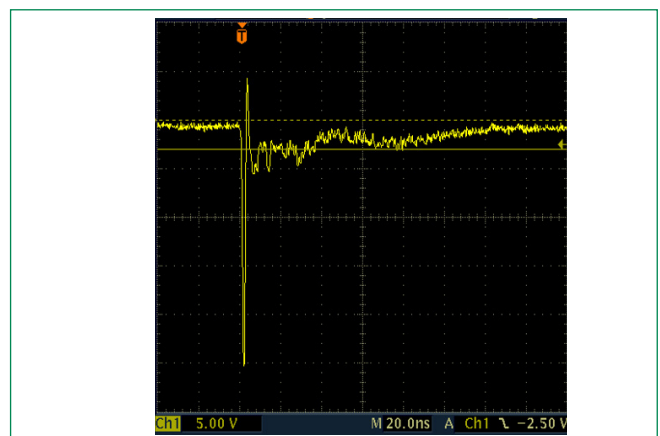
Negative Transmission Line Pulsing (TLP) Plot



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

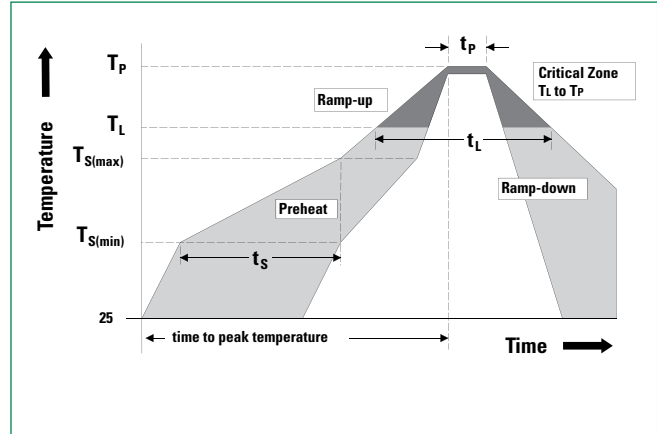


IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage



SP1220**20A Discrete Unidirectional TVS Diode****Soldering Parameters**

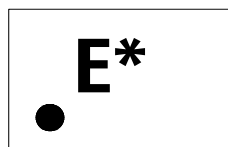
Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus) Temp (T_L) to peak		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature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

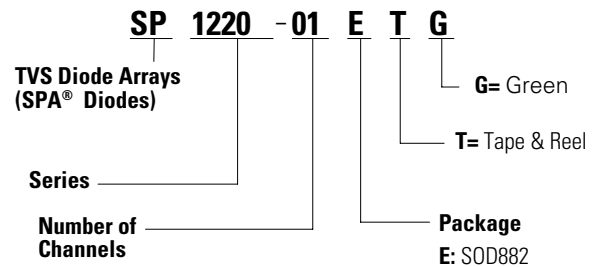
Part Number	Package	Min. Order Qty.
SP1220-01ETG	SOD882	10000

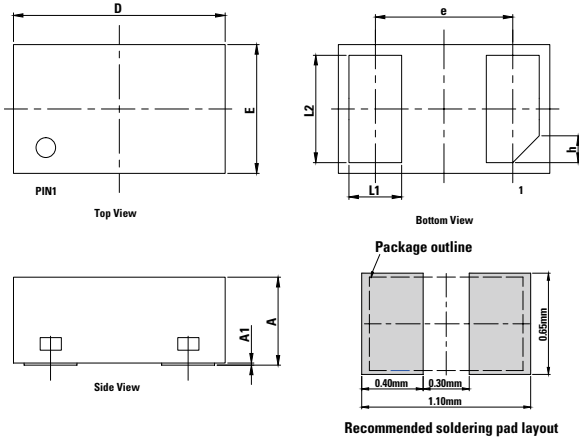
Product Characteristics

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

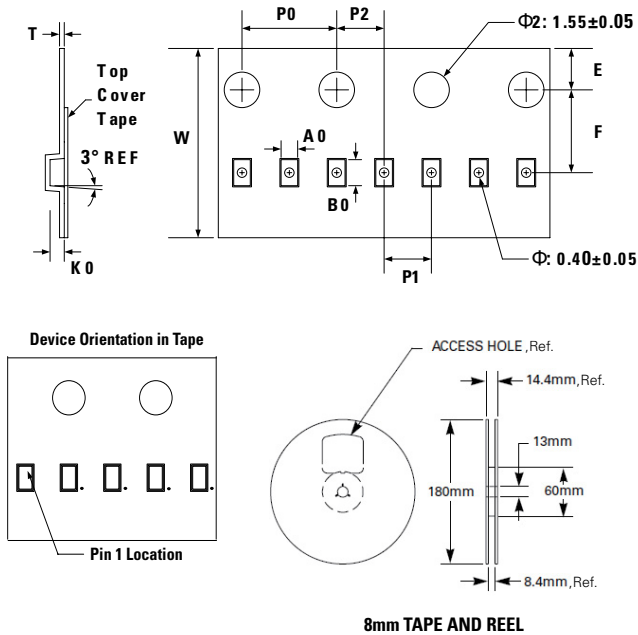
Part Marking System

E = Part Code
*** = Date Code**

Part Numbering System

SP1220**20A Discrete Unidirectional TVS Diode****Package Dimensions – SOD882**

Symbol	Package		SOD882			
	JEDEC		MO-236			
	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.50	0.55	0.60	0.020	0.022	0.024
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	0.90	1.00	1.10	0.035	0.039	0.043
E	0.50	0.60	0.70	0.020	0.024	0.028
e	0.65 BSC			0.026 BSC		
h	0.125 (x 45°)			0.005 (x 45°)		

Embossed Carrier Tape & Reel Specification – SOD882

Symbol	Tape Dimensions	
	Millimeters	
	Min	Max
A0	0.65	0.75
B0	1.10	1.20
K0	0.50	0.60
E	1.65	1.85
F	3.45	3.55
P0	3.90	4.10
P1	1.90	2.10
P2	1.95	2.05
T	1.95	2.05
W	7.90	8.10

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