TVS Diode Arrays (SPA® Diodes) Datasheet

SP0115-01ETG

1 V Bidirectional Discrete TVS in SOD882, General Purpose ESD Protection





Pinout



Functional Block Diagram



Description

The SP0115-01ETG features low breakdown/turn on voltages, making them more ideal protectors of low voltage -1.0 to +1.0 V data lines. These robust diodes can safely absorb repetitive ESD strikes above the maximum level specified in IEC 61000-4-2 international standard (Level 4, ± 8 kV contact discharge) without performance degradation.

Features

- ESD, IEC 61000-4-2, ±30 kV contact/air
- EFT, IEC 61000-4-4, 40 A
 (5/50 ns)
- Maximum surge tolerance, IEC 61000-4-5, 2nd edition, 12A (8/20 μs)
- Halogen-free, lead-free and RoHS compliant
- Moisture sensitivity level (MSL-1)

Applications

- Low voltage GPIO for MCU
- Consumer
- Industry
- Medical



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Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I _{PP}	Peak Current ($t_p = 8/20 \ \mu s$)	12	А
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 ($T_{oP} = 25 \text{ °C}$)

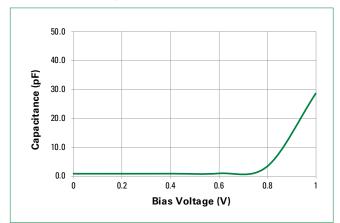
Parameter	Symbol	Test Conditions	Min	Тур	Max	Units
Reverse Standoff Voltage	V _{RWM}				1.0	V
Breakdown Voltage	V _{BR}	I _R = 1 mA	1.4	1.6		V
Reverse Leakage Current	I _{LEAK}	V _R = 1 V			1	μA
Clamp Voltage ¹	V _c	I_{pp} = 1 A, t _p = 8/20 µs, I/O to GND		2.7		V
		$I_{pp} = 12 \text{ A}, t_p = 8/20 \mu \text{s}, I/O \text{ to GND}$		8.5		V
Dynamic Resistance ²	R _{DYN}	TLP, t_p = 100 ns, I/O to GND		0.23		Ω
ESD Withstand Voltage ^{1,3}	V _{esd}	IEC 61000-4-2 (Contct Discharge)	±30			kV
		IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance ¹	C _{IO-GND}	Reverse Bias = 0 V, f = 1MHz, I/O to GND		0.85		pF

Note:

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

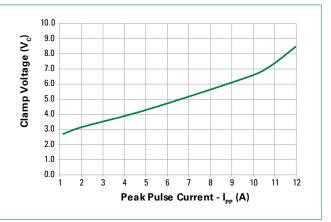
2. Transmission Line Pulse (TLP) with 100ns width, 0.2 ns rise time, and average window t1 = 70 ns to t2 = 90 ns.

3. Device stressed with ten non-repetitive ESD pulses.



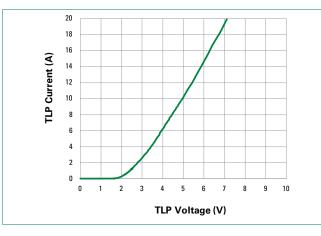
Capacitance vs. Reverse Bias

Clamping Voltage vs $\mathbf{I}_{_{\mathrm{PP}}}$



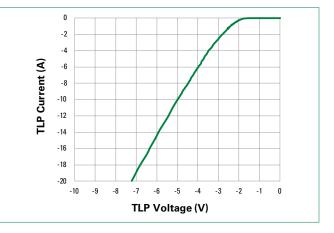


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Positive Transmission Line Pulsing (TLP) Plot

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

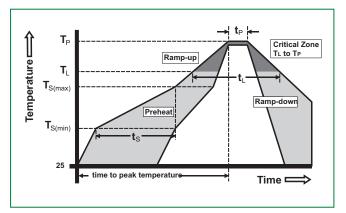


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Soldering Parameters

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	



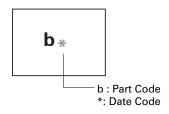
Product Characteristics

Lead plating	Matte tin
Lead material	Copper alloy
Body material	Molded compound
Flammability	UL recognized compound meeting flammability rating V-0

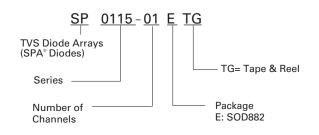
Ordering Information

Part Number	Package	Min. Order Qty.
SP0115-01ETG	SOD882	10000

Part Marking System



Part Numbering System





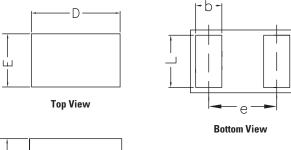
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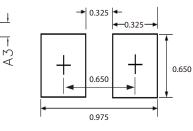
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Side View

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Package Dimensions - SOD882

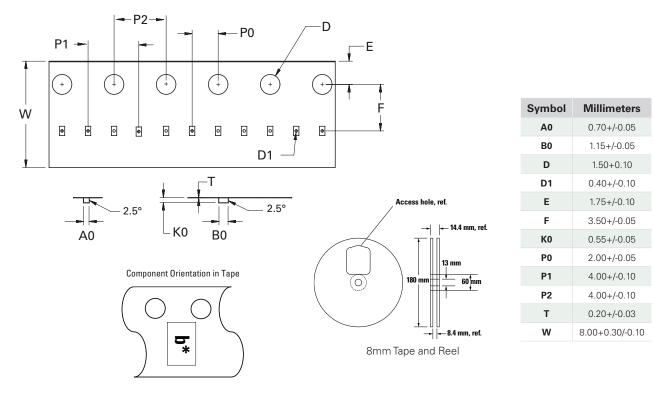




Symbol	Millimeters			
	Min	Nom	Max	
Α	>0.40	-	0.50	
A1	0.00	-	0.05	
A3	0.125 Ref			
D	0.95	1.00	1.05	
Е	0.55	0.60	0.65	
b	0.20	0.25	0.30	
L	0.45	0.50	0.55	
е	0.65 5BSC			

Recommended Soldering Pad Layout (mm)

Embossed Carrier Tape & Reel Specification - SOD882



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