SP4322 0.4pF 11A Bidirectional Diode Array

HF RoHS Pb GREEN

Note: This package image is for example and reference only. for detail package drawing, please refer to the package section in this datasheet.

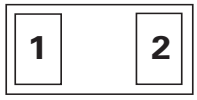
Description

SP4322 is specifically designed to protect high-speed interfaces against ElectroStatic Discharge (ESD), such as DisplayPort interfaces and USB 3.1 Gen 1. The signal line is protected by low line capacitance of 0.4 pF typical.

SP4322 can absorb repetitive ESD strikes above the maximum level specified in the IEC 61000-4-2 international standard without performance degradation and safely dissipate 11A of 8/20μs surge current (IEC 61000-4-5 2nd edition).

Excellent low capacitance, clamping capability, low leakage, and fast response time make this part an ideal solution for protecting high speed data lines.

Pinout

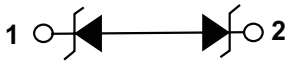


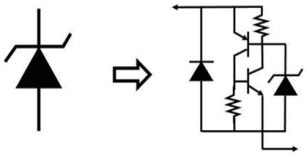
SOD882

Features

- ESD, IEC 61000-4-2, ±18kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 11A (8/20μs as defined in IEC 61000-4-5 2nd edition)
- Low capacitance of 0.4pF (TYP @ V_R=0V)
- Low leakage current of 1nA (TYP) at 5V
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level (MSL-1)
- AEC-Q101 Qualified

Functional Block Diagram





Applications

- USB 3.1
- DisplayPort
- S-ATA
- NFC
- 1G/2.5G/10G Ethernet

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.

Revision: 04/14/20

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20µs)	11	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)

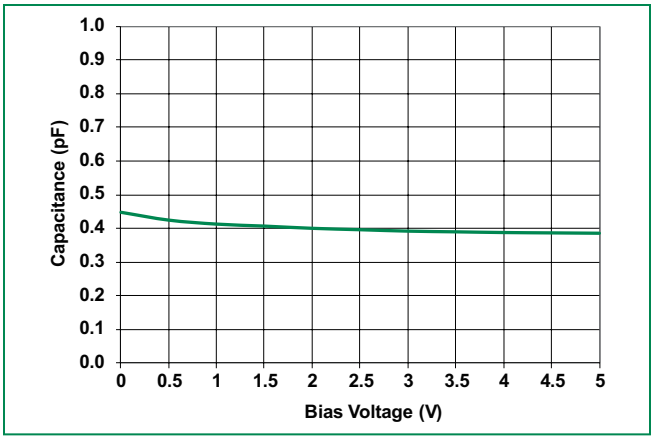
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA			5	V
Breakdown Voltage	V_{BR}	I_R=1mA		9		V
Reverse Leakage Current	I_{LEAK}	V_R=5V		1	100	nA
Holding Voltage	V_{HOLD}	I/O to I/O		2.3		V
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs		4		V
		I_{PP}=11A, t_p=8/20µs		8		V
Dynamic Resistance[2]	R_{DYN}	TLP, t_P=100ns		0.2		Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±18			kV
		IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance[1]	C_{IO-GND}	Reverse Bias=0V, f=1MHz		0.4	0.5	pF

Note:

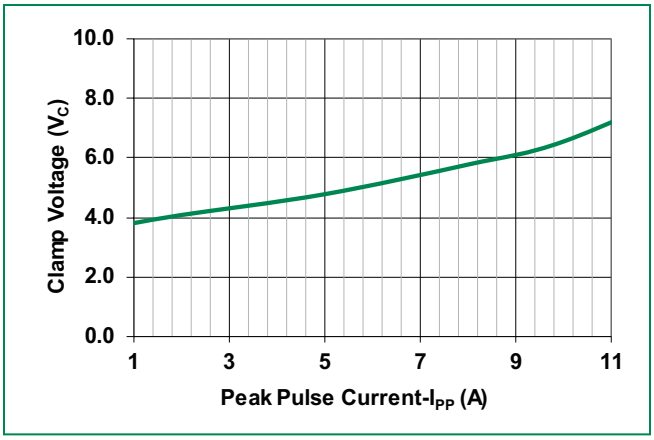
1. Parameter is guaranteed by design and/or component characterization.

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

Capacitance vs. Reverse Bias



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



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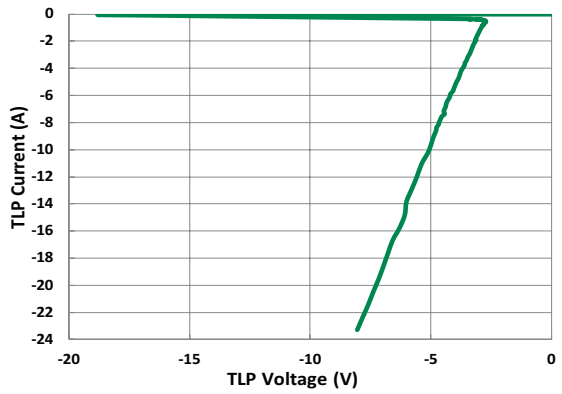
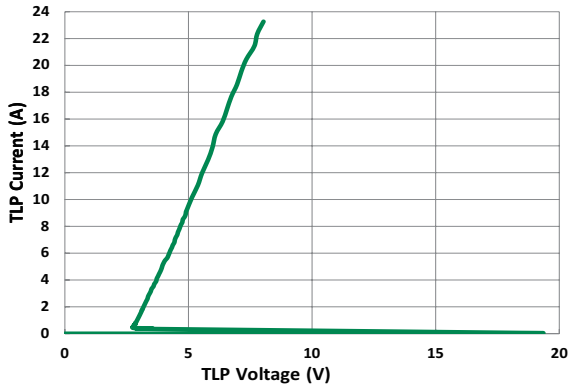
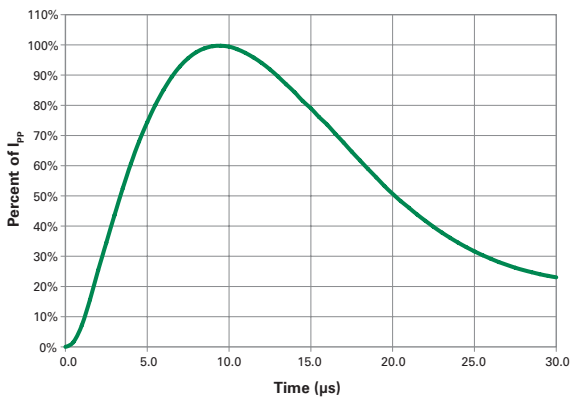
Negative Transmission Line Pulsing (TLP) Plot



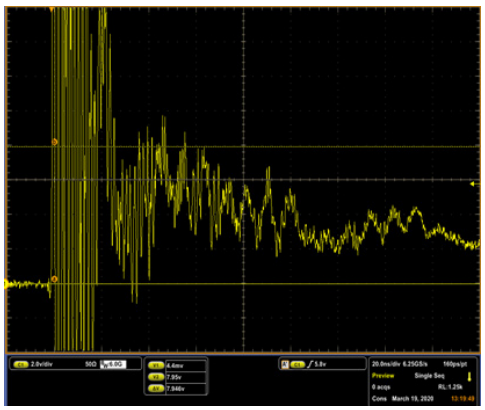
Positive Transmission Line Pulsing (TLP) Plot



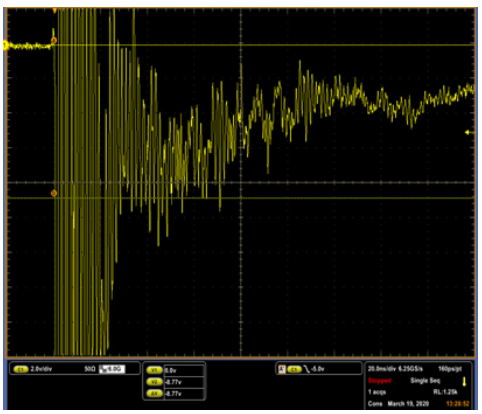
8/20µs Pulse Waveform



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



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



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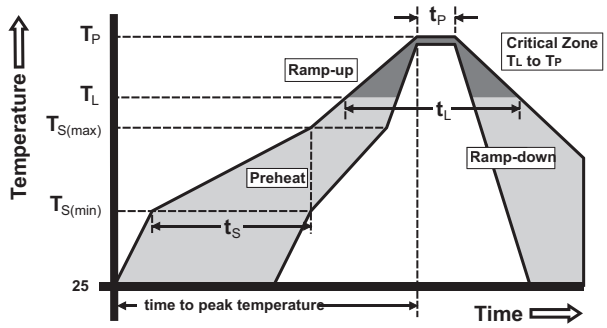
TVS Diode Arrays (SPA® Diodes)

Low Capacitance ESD Protection - SP4322

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



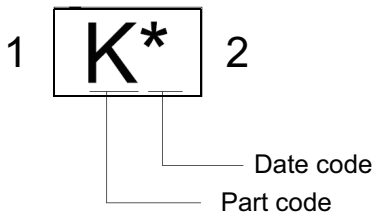
Ordering Information

Part Number	Package	Min. Order Qty.
SP4322-01ETG	SOD882	10,000

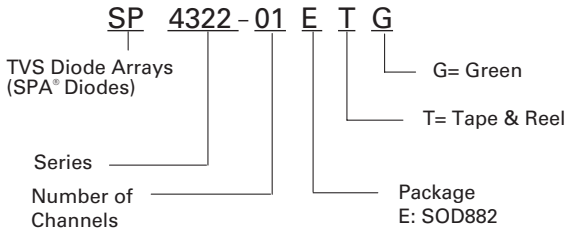
Product Characteristics

Lead Plating	Pre-Plated Frame, 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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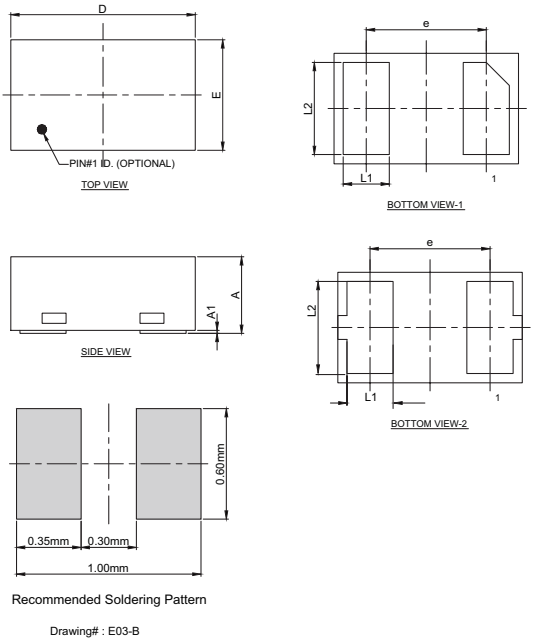
Package Dimensions — SOD882

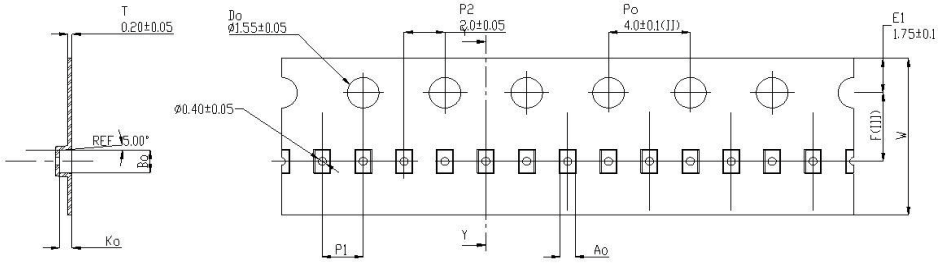


Recommended Soldering Pattern

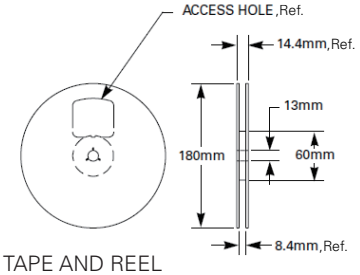
Drawing# : E03-B

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
A0	0.70+/-0.045
B0	1.10+/-0.045
K0	0.65+/-0.045
F	3.50+/-0.05
P1	2.00+/-0.10
W	8.00 + 0.30 -0.10



8mm TAPE AND REEL