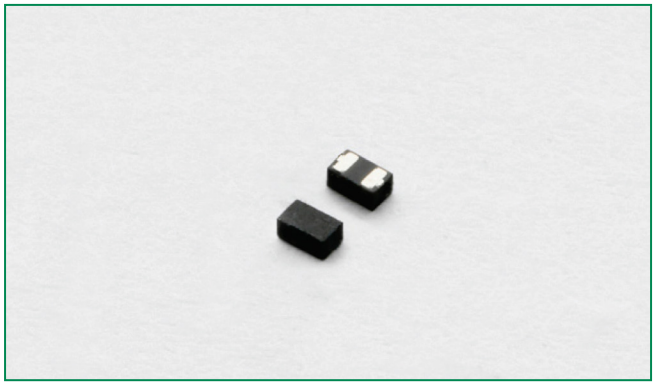
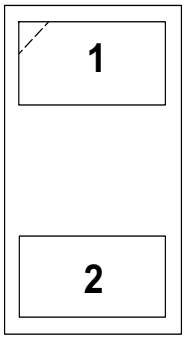
SP3031 Series 0.8pF 10kV Unidirectional Discrete TVS

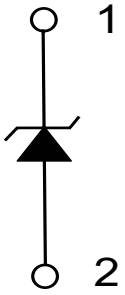
HF RoHS Pb GREEN



Pinout



Functional Block Diagram



Additional Information

Datasheet | Resources | Samples

Description

The SP3031 is a single channel low capacitance diode that provides protection for electronic equipment that may experience destructive electrostatic discharges (ESD). This robust diode can safely absorb repetitive ESD strikes above the maximum level specified in the IEC 61000-4-2 international standard (Level 4, ±8 kV contact discharge and ±15 kV air discharge) without performance degradation. The low loading capacitance makes it ideal for protecting high speed data lines.

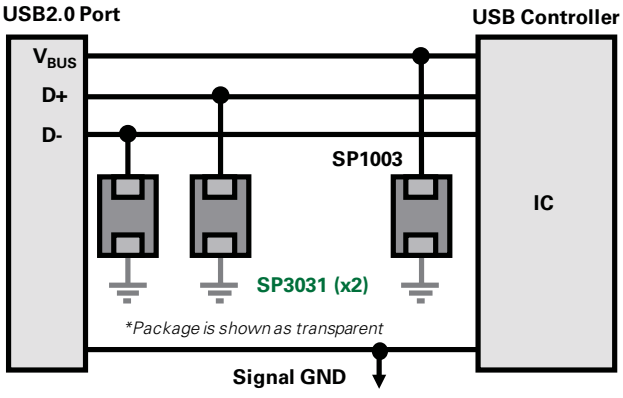
Features

- RoHS compliant, lead-free and halogen-free
- ESD protection of ±10kV contact discharge, ±15kV air discharge, (IEC 61000-4-2)
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning protection, IEC 61000-4-5, 2nd Edition: 8/20 Surge, 5A Surge
- Low capacitance of 0.8pF @ V_R=0V
- Low leakage current of 1µA at 5V

Applications

- USB 2.0, Ethernet
- MHL/MIPI/MDDI
- HDMI, Display Port, eSATA
- Set Top Boxes, Game Consoles
- Smart Phones
- External Storage
- Ultrabooks, Notebooks
- Tablets, eReaders

USB2.0 Application Example



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.

Revised: 01/24/18

TVS Diode Arrays (SPA® Diodes)

Low Capacitance ESD Protection - SP3031 Series

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20µs)	5.0	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.

Thermal Information

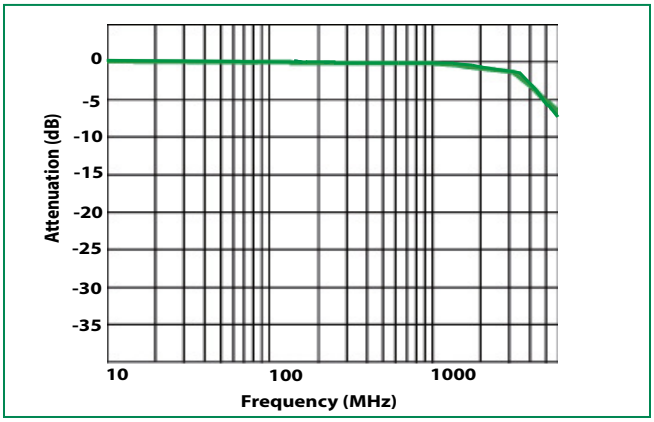
Parameter	Rating	Units
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (Soldering 20-40s)	260	°C

Electrical Characteristics (T_{OP}=25°C)

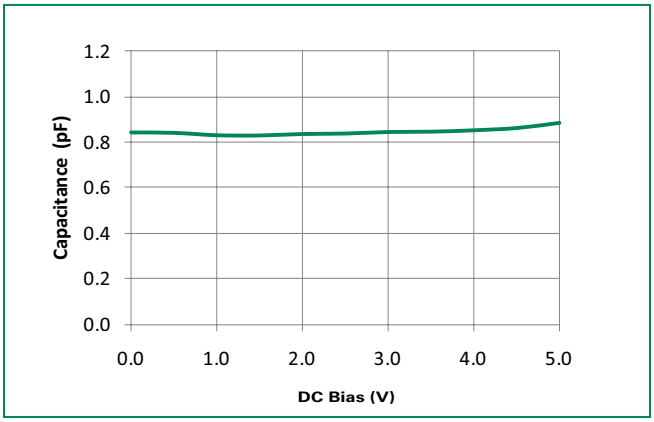
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}				5.0	V
Reverse Breakdown Voltage	V_{BR}	1_R=1mA	6.0			V
Reverse Leakage Current	I_{LEAK}	V_R=5V with 1pin at GND			1	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd		6.9		V
		I_{PP}=2A, t_p=8/20µs, Fwd		7.5		V
Dynamic Resistance	R_{DYN}	$(V_{C2}-V_{C1})/(I_{PP2}-I_{PP1})$		0.6		Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact)	±10			kV
		IEC 61000-4-2 (Air)	±15			kV
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V		0.8		pF

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

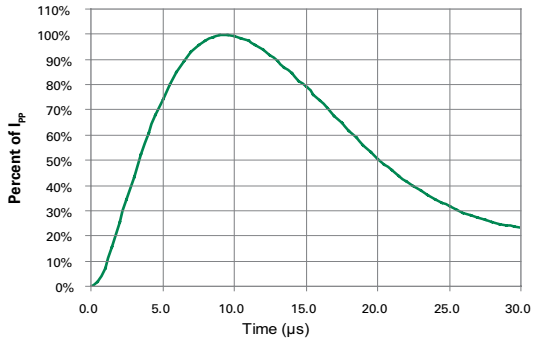
Insertion Loss (S21) I/O to GND



Capacitance vs. Reverse Voltage



8/20µs Waveform



Revised: 01/24/18

Product Characteristics

Lead Plating	Pre-Plated Frame or Matte Tin
Lead Material	Copper Alloy
Substitute Material	Silicon
Body Material	Molded Epoxy
Flammability	UL Recognized epoxy meeting flammability rating V-0

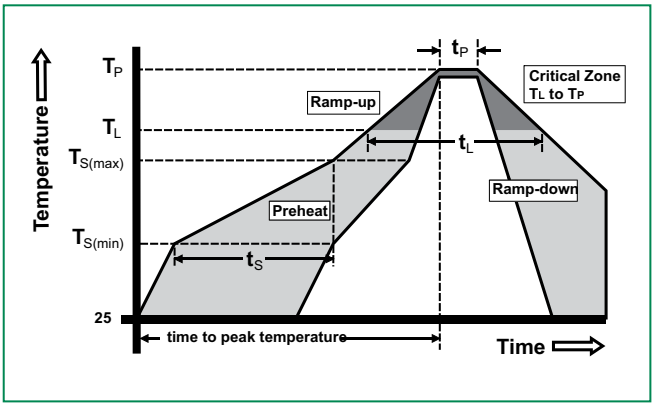
Notes :
1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
5. Package surface matte finish VDI 11-13.

Ordering Information

Part Number	Package	Marking	Min. Order Qty.
SP3031-01ETG	SOD882	•f	10000

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

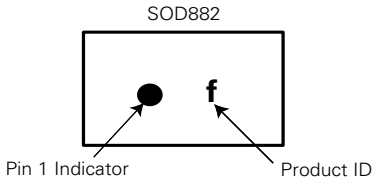


Part Numbering System

SP 3031 - 01 E T G

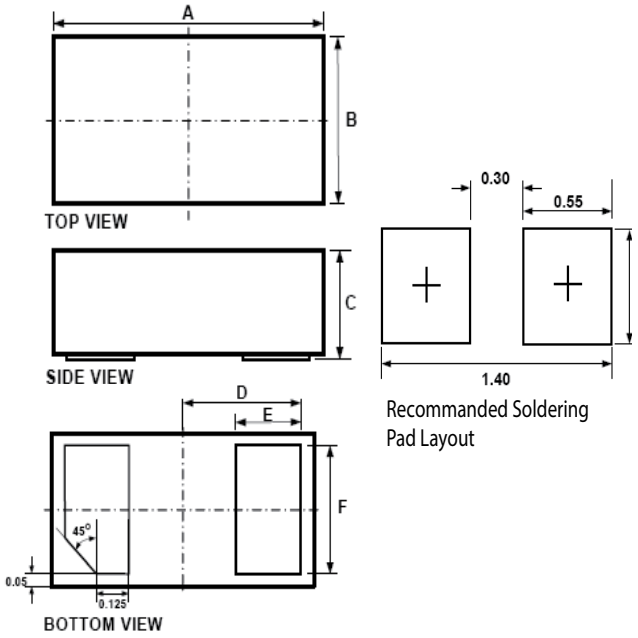
- SP 3031: TVS Diode Arrays (SPA® Diodes) — Series
- 01: Number of Channels
- E: Package — E: SOD882
- T: T= Tape & Reel
- G: G= Green

Part Marking System



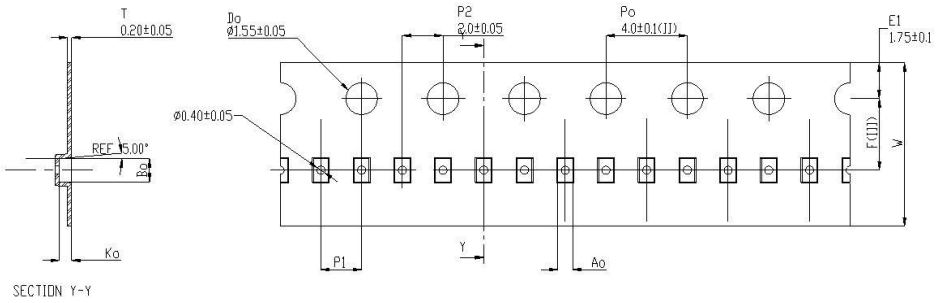
Revised: 01/24/18

Package Dimensions — SOD882

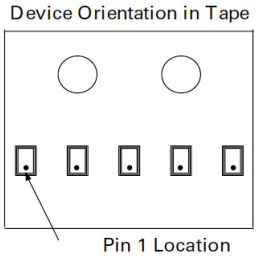


Symbol	Package	SOD882				
	JEDEC	MO-236				
		Millimeters			Inches	
		Min	Typ	Max	Min	Typ	Max
A		0.90	1.00	1.10	0.035	0.039	0.043
B		0.50	0.60	0.70	0.020	0.024	0.028
C		0.40	0.50	0.60	0.016	0.020	0.024
D			0.45			0.018	
E		0.20	0.25	0.35	0.008	0.010	0.012
F		0.45	0.50	0.55	0.018	0.020	0.022

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



Notes :
1. All dimensions are in millimeters