

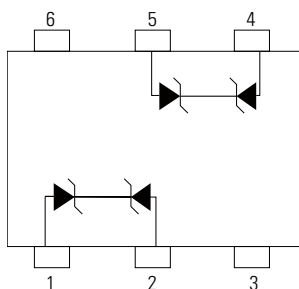
SP3006 Series 0.5pF, 8kV Diode Array



Description

The SP3006 Series includes ultra low capacitance back to-back zener diodes to protect high-speed ports of electronic equipment that may experience destructive electrostatic discharges (ESD). The robust diode can safely absorb repetitive ESD strikes at the maximum level specified in the IEC 61000-4-2 international standard (Level 4, $\pm 8\text{kV}$ contact discharge) without performance degradation. Its very low loading capacitance makes it ideal for protecting high-speed data lines such as USB2.0, USB3.0, HDMI, and IEEE 1394.

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.

Features

- RoHS compliant and lead-free
- ESD protection of $\pm 8\text{kV}$ contact discharge, $\pm 15\text{kV}$ air discharge, (IEC 61000-4-2)
- EFT protection, IEC 61000-4-4, 40A (5/50ns)
- Lightning Protection, IEC 61000-4-5 2nd edition,
- 2.0A (8/20 μs)
- Low capacitance of 0.5pF (@ $V_R=0\text{V}$)
- Low leakage current of 0.5 μA (MAX) at 5V
- Miniature SOT563 package (1.6x1.6x0.5mm) saves board space
- AEC-Q101 qualified

Applications

- Game Consoles
- LCD/ PDP TVs
- DVD Players
- Desktops
- MP3/ PMP
- Digital Cameras
- Set Top Boxes
- Smart Phones
- Notebooks
- Computer Peripherals

Additional Information



Datasheet

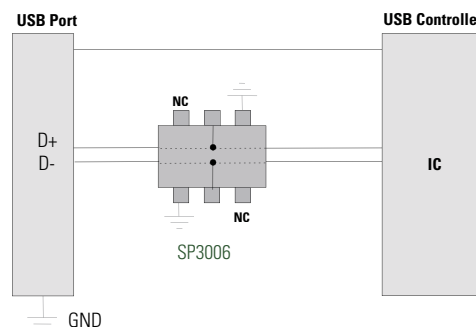


Resources



Samples

Application Example



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current ($t_p=8/20\mu s$)	2.0	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 device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Thermal Information

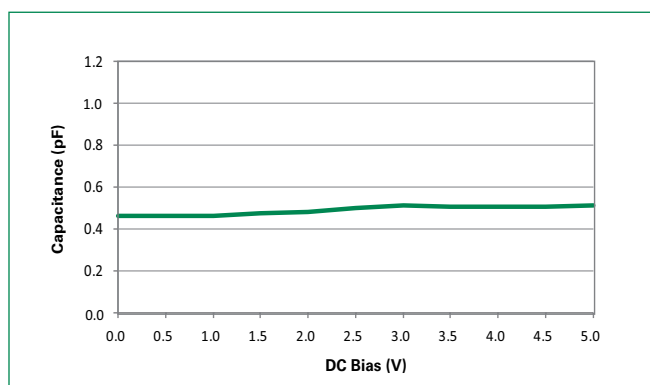
Parameter	Rating	Units
Storage Temperature Range	-55 to 150	°C
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (Soldering 20-40s)	260	°C

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

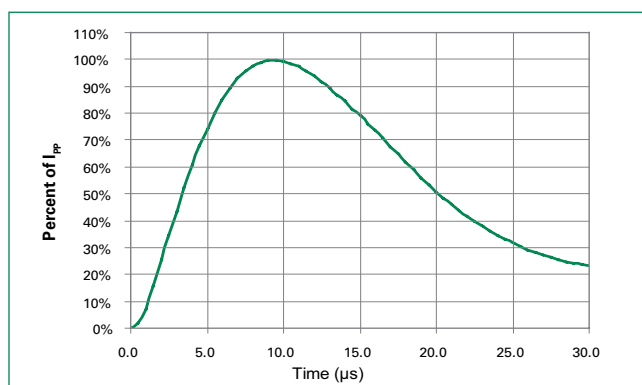
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Breakdown Voltage	V_{BR}	$I_R=5mA$	9.0			V
Reverse Standoff Voltage	V_{RWM}	$I_R \leq 1\mu A$			6	V
Reverse Leakage Current	I_{LEAK}	$V_R=5V$			0.5	μA
Clamp Voltage ¹	V_C	$I_{PP}=1A, t_p=8/20\mu s, Fwd$		12.5		V
		$I_{PP}=2A, t_p=8/20\mu s, Fwd$		15.0		V
ESD Withstand Voltage ¹	V_{ESD}	IEC 61000-4-2 (Contact)	± 8			kV
		IEC 61000-4-2 (Air)	± 15			kV
Diode Capacitance ¹	$C_{V(O-V)}$	Reverse Bias=0V		0.5		pF

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

Capacitance vs. Reverse Voltage

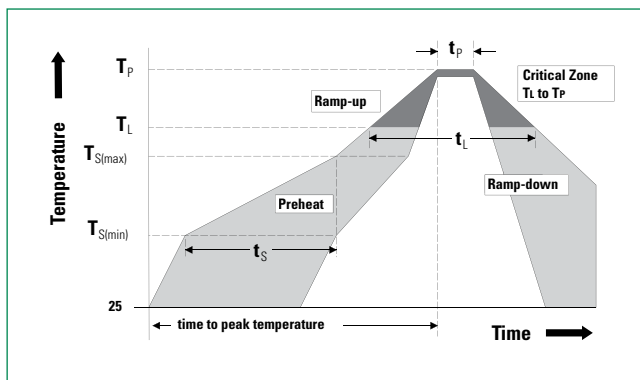


Pulse Waveform



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



Product Characteristics

Lead Plating	Pre-Plated Frame
Lead Material	Copper Alloy
Lead Coplanarity	0.0004 inches (0.102mm)
Substitute Material	Silicon
Body Material	Molded Epoxy
Flammability	UL 94 V-0

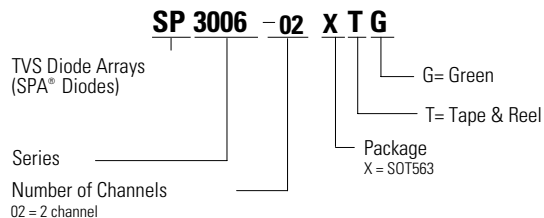
Notes :

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

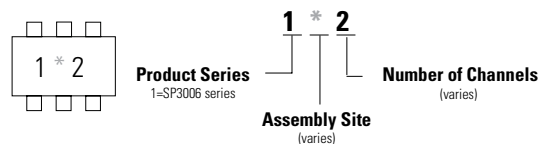
Ordering Information

Part Number	Package	Marking	Min. Order Qty.
SP3006-02XTG	SOT563	1 * 2	3000

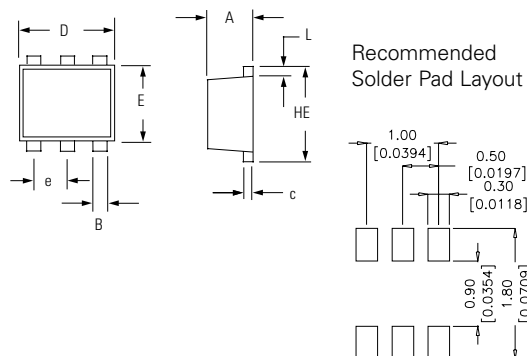
Part Numbering System



Part Marking System

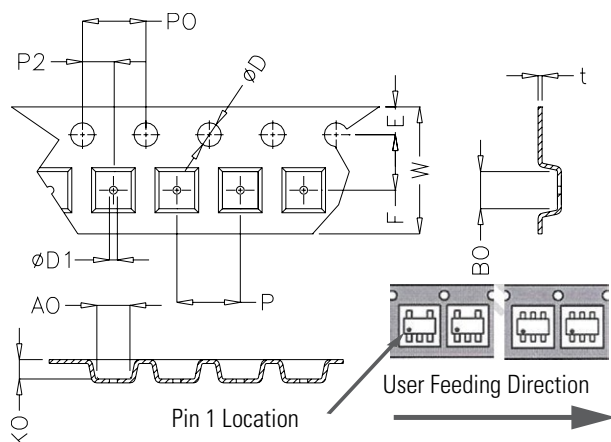


Package Dimensions — SOT563



Package	SOT 563			
Pins	6			
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.50	0.60	0.020	0.024
B	0.17	0.27	0.007	0.011
c	0.08	0.18	0.003	0.007
D	1.50	1.70	0.059	0.067
E	1.10	1.30	0.043	0.051
e	0.50 BSC		0.020 BSC	
L	0.10	0.30	0.004	0.012
HE	1.50	1.70	0.059	0.067

Embossed Carrier Tape & Reel Specifications — SOT563



Symbol	Millimetres		Inches	
	Min	Max	Min	Max
E	1.65	1.85	0.064	0.073
F	3.45	3.55	0.135	0.139
P2	1.95	2.05	0.076	0.081
D	1.40	1.60	0.055	0.063
D1	0.45	0.55	0.017	0.021
P0	3.90	4.10	0.154	0.161
10P0	40.0+/- 0.20		1.574+/-0.008	
W	7.70	8.10	0.303	0.318
P	3.90	4.10	0.153	0.161
A0	1.73	1.83	0.068	0.072
B0	1.73	1.83	0.068	0.072
K0	0.64	0.74	0.025	0.029
t	0.22 max		0.009 max	