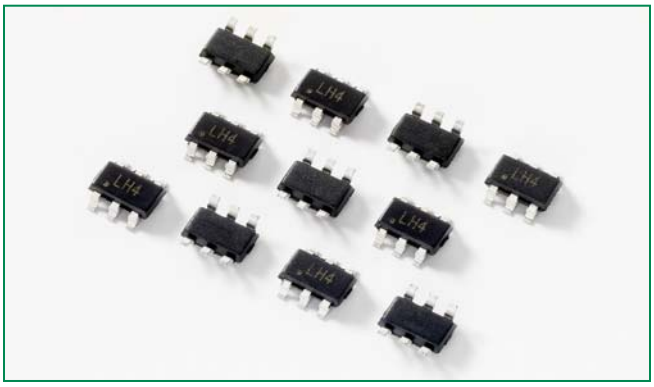
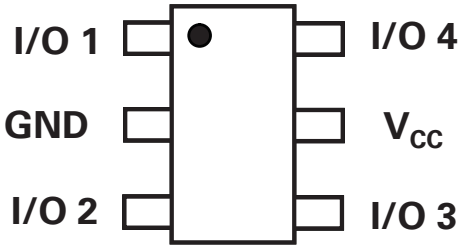
RoHS Pb GREEN SP3050 Lead-Free/Green Series



Description

The SP3050 integrates low capacitance rail-to-rail diodes with an additional zener diode to protect each I/O pin against ESD and high surge events. This robust device can safely absorb surge current per IEC61000-4-5 (t_p=8/20µs) without performance degradation and a minimum ±20kV ESD per IEC61000-4-2. Their very low loading capacitance also makes them ideal for protecting high speed signal pins.

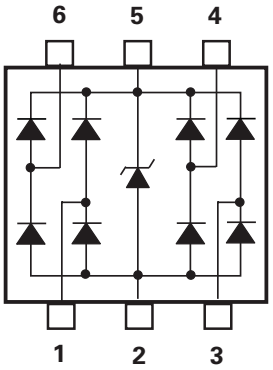
Pinout



Features

- ESD, IEC61000-4-2, ±20kV contact, ±30kV air
- EFT, IEC61000-4-4, 40A (5/50ns)
- Lightning, IEC61000-4-5, 10A (8/20µs)
- Low capacitance of 2pF (TYP) per I/O
- Low leakage current of 0.5µA (MAX) at 5V
- Small SOT23-6 packaging

Functional Block Diagram



Applications

- LCD/PDP TVs
- Monitors
- Notebooks
- 10/100/1000 Ethernet
- Firewire
- Set Top Boxes
- Flat Panel Displays
- Portable Medical

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20µs)[1]	10.0	A
T_{OP}	Operating Temperature	-40 to 85	°C
T_{STOR}	Storage Temperature	-50 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.

[1]Non-repetitive pulse per waveform on page 3

Thermal Information

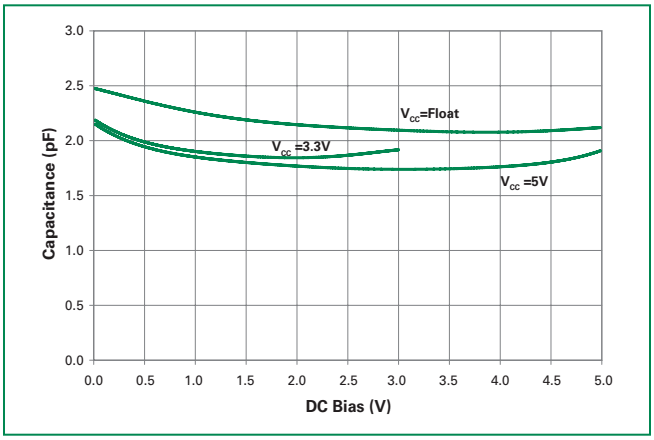
Parameter	Rating	Units
Storage Temperature Range	-65 to 150	°C
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (Soldering 10s)	260	°C

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

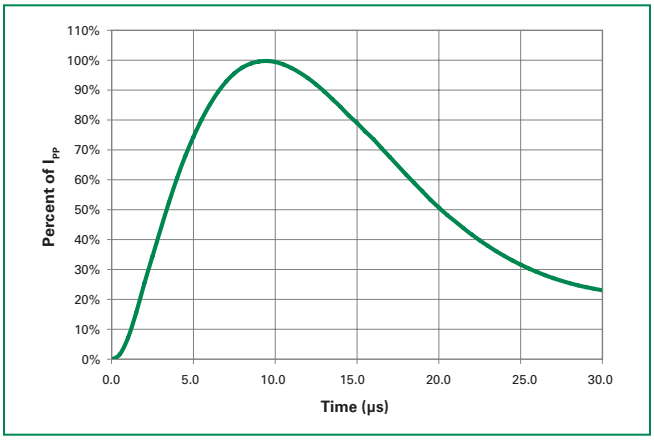
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	$I_R \leq 1\mu A$			6.0	V
Reverse Leakage Current	I_{LEAK}	V_R=5V		0.1	0.5	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, I/O to GND[2]		8.8	10.0	V
		I_{PP}=5A, t_p=8/20µs, I/O to GND[2]		11.5	13.0	V
		I_{PP}=8A, t_p=8/20µs, I/O to GND[2]		13.2	15.0	V
ESD Withstand Voltage[1]	V_{ESD}	IEC61000-4-2 (Contact)	±20			kV
		IEC61000-4-2 (Air)	±30			kV
Diode Capacitance[1]	$C_{I/O-GND}$	Reverse Bias=0V		2.4	3.0	pF
		Reverse Bias=1.65V		2.0		pF
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V		1.2		pF

Notes: [1] Parameter is guaranteed by design and/or device characterization.
[2] Repetitive pulse per waveform on page 3.

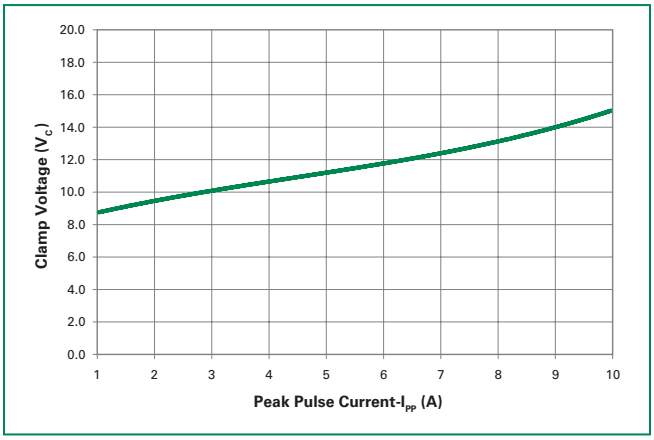
Capacitance vs. Reverse Bias



Pulse Waveform



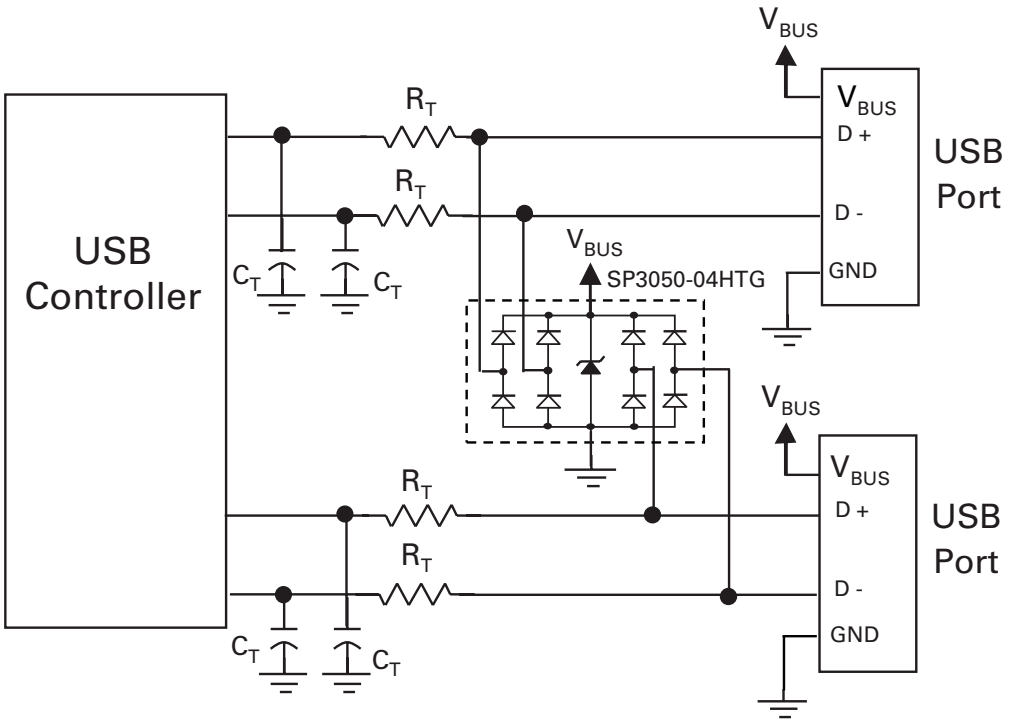
Clamping Voltage vs. I_{PP}



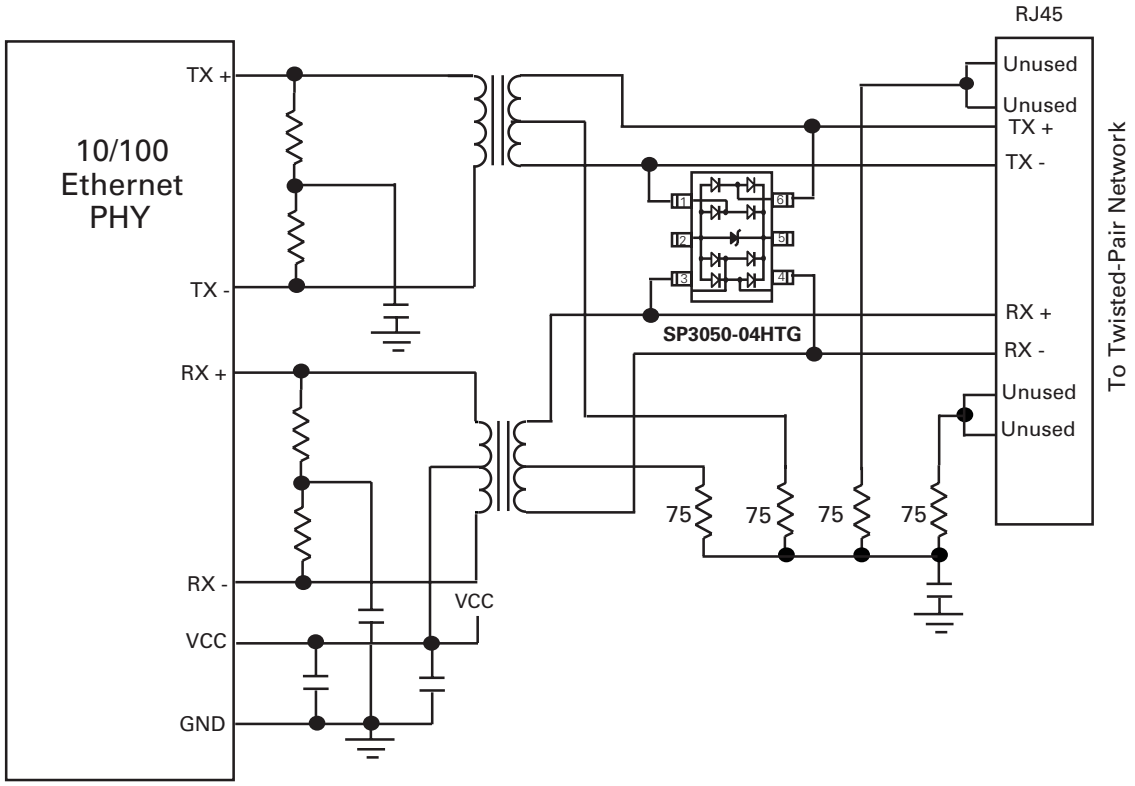
Lead-Free/Green SP3050

Application Example

Dual Port Protection

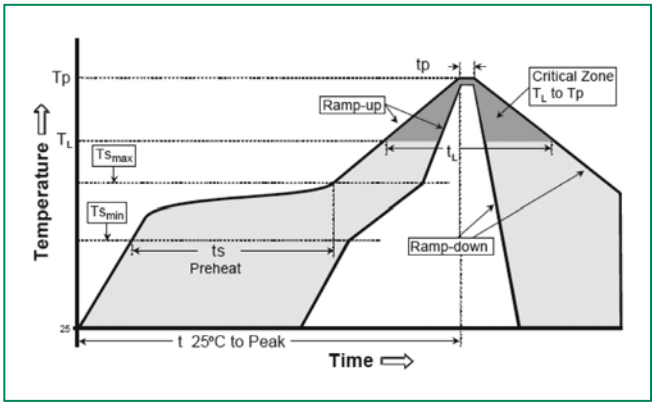


10/100 Ethernet Differential Protection

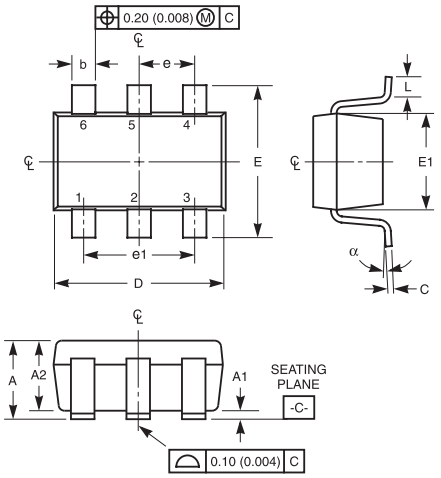


Soldering Parameters

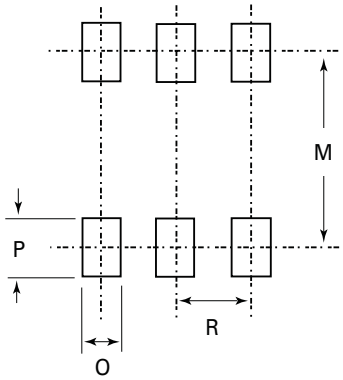
Reflow Condition		Pb – Free assembly
Pre Heat	-Temperature Min ($T_{s(min)}$)	150°C
	-Temperature Max ($T_{s(max)}$)	200°C
	-Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus) Temp (T_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	-Temperature (T_L) (Liquidus)	217°C
	-Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_P)		$250^{+0/-5}$ °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



Package Dimensions - SOT23-6



Recommended Solder Pad Layout

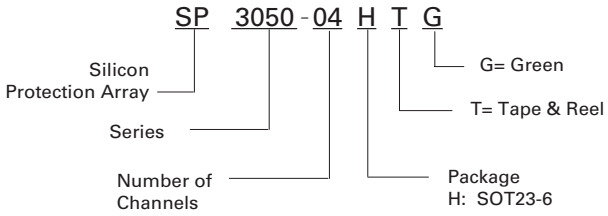


Package	SOT23-6				
Pins	6				
JEDEC	MO-203 Issue A				
	Millimeters		Inches		Notes
	Min	Max	Min	Max	
A	0.900	1.450	0.035	0.057	-
A1	0.000	0.150	0.000	0.006	-
A2	0.900	1.300	0.035	0.051	-
b	0.350	0.500	0.0138	0.0196	-
C	0.080	0.220	0.0031	0.009	-
D	2.800	3.000	0.11	0.118	3
E	2.600	3.000	0.102	0.118	-
E1	1.500	1.750	0.06	0.069	3
e	0.95 Ref		0.0374 ref		-
e1	1.9 Ref		0.0748 Ref		-
L	0.100	0.600	0.004	0.023	4,5
N	6		6		6
a	0°	10°	0°	10°	-
M		2.590		0.102	-
O		0.690		.027 TYP	-
P		0.990		.039 TYP	-
R		0.950		0.038	-

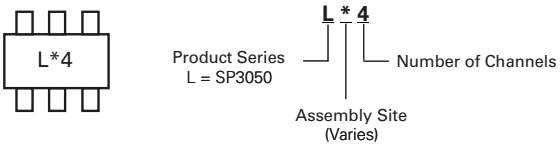
Notes:

1. Dimensioning and tolerances per ANSI 14.5M-1982.
2. Package conforms to EIAJ SC-74 (1992).
3. Dimensions D and E1 are exclusive of mold flash, protrusions, or gate burrs.
4. Footlenth L measured at reference to seating plane.
5. "L" is the length of flat foot surface for soldering to substrate.
6. "N" is the number of terminal positions.
7. Controling dimension: MILLIMETER. Converted inch dimensions are not necessarily exact.

Part Numbering System



Part Marking System



Product Characteristics

Lead Plating	Matte Tin
Lead Material	Copper Alloy
Lead Coplanarity	0.0004 inches (0.102mm)
Subsitute Material	Silicon
Body Material	Molded Epoxy
Flammability	UL94-V-0

Notes :

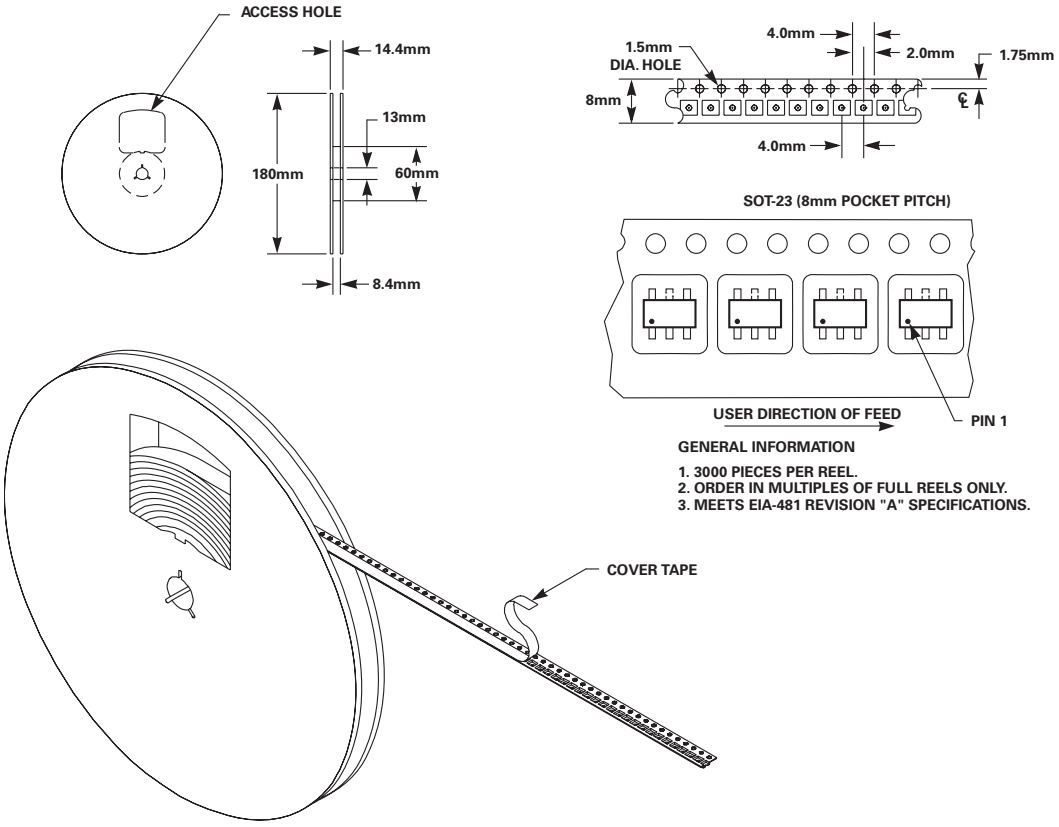
1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. All specifications comply to JEDEC SPEC MO-223 Issue A
5. Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
6. Package surface matte finish VDI 11-13.

Ordering Information

Part Number	Package	Marking	Min. Order Qty.
SP3050-04HTG	SOT23-6	L*4	3000

Embossed Carrier Tape & Reel Specification -- SOT23-6

8mm TAPE AND REEL



GENERAL INFORMATION

1. 3000 PIECES PER REEL.
2. ORDER IN MULTIPLES OF FULL REELS ONLY.
3. MEETS EIA-481 REVISION "A" SPECIFICATIONS.

Lead-Free/Green SP3050