

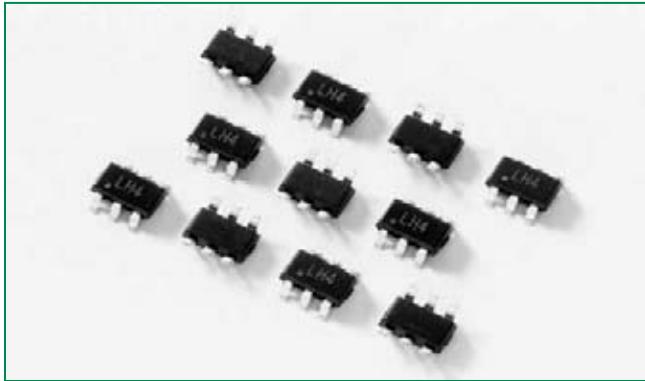
NOT RECOMMENDED FOR NEW DESIGNS

SP3050-04HTG is eventually going to be replaced by the SRV05-4HTG TVS Diode Array with identical form, fit, and function. Please use this device for new or future designs and more detail can be found on Littelfuse.com

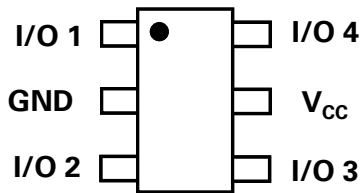
Description



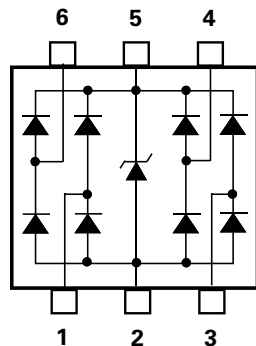
SP3050 Series 6V 10A Rail Clamp Array



Pinout



Functional Block Diagram



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 ($t_p=8/20\mu s$) without performance degradation and a minimum $\pm 20kV$ ESD per IEC61000-4-2. Their very low loading capacitance also makes them ideal for protecting high speed signal pins.

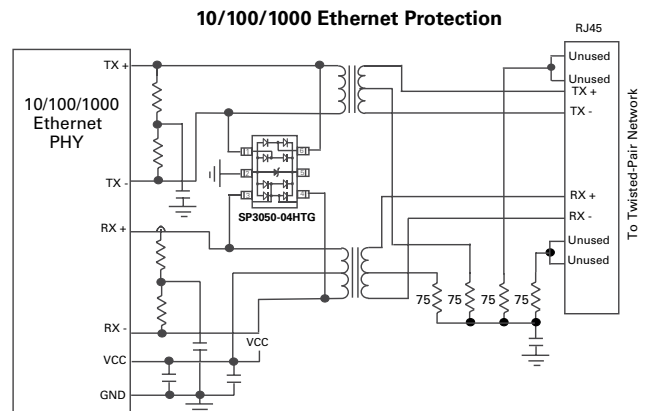
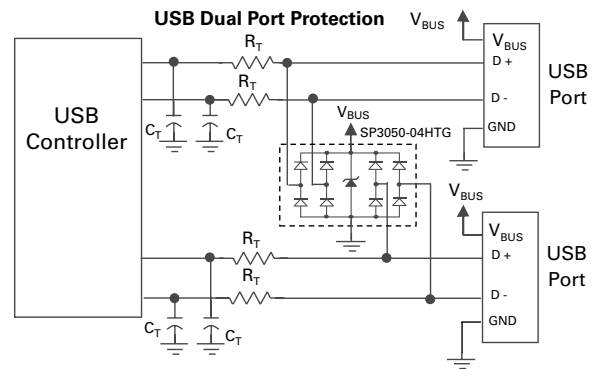
Features

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

Applications

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

Application Examples



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.

NOT RECOMMENDED FOR NEW DESIGNS

SP3050-04HTG is eventually going to be replaced by the SRV05-4HTG TVS Diode Array with identical form, fit, and function. Please use this device for new or future designs and more detail can be found on Littelfuse.com

Absolute Maximum Ratings

| Symbol | Parameter | Value | Units |
|------------|---|------------|-------|
| I_{PP} | Peak Current ($t_p=8/20\mu s$) ¹ | 10 | A |
| P_{PK} | Peak Pulse Power ($t_p=8/20\mu s$) | 150 | W |
| 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.

¹Non-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 20-40s) | 260 | °C |

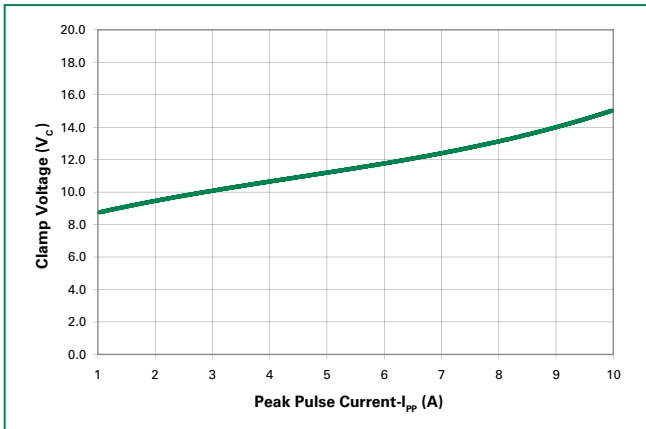
Electrical Characteristics ($T_{OP}=25^\circ C$)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|------------------------------------|---------------|---|----------|------|------|----------|
| Reverse Standoff Voltage | V_{RWM} | $I_R \leq 1\mu A$ | | | 6.0 | V |
| Reverse Voltage Drop | V_R | $I_R = 1mA$ | | 8.0 | | V |
| Reverse Leakage Current | I_{LEAK} | $V_R=5V$ | | 0.1 | 0.5 | μA |
| Clamp Voltage ¹ | V_C | $I_{PP}=1A, t_p=8/20\mu s, I/O$ to GND ² | | 8.8 | 10.0 | V |
| | | $I_{PP}=5A, t_p=8/20\mu s, I/O$ to GND ² | | 11.5 | 13.0 | V |
| | | $I_{PP}=8A, t_p=8/20\mu s, I/O$ to GND ² | | 13.2 | 15.0 | V |
| Dynamic Resistance | R_{DYN} | $(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1})$ | | 0.7 | | Ω |
| 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.

Clamping Voltage vs. I_{PP}



Product Characteristics

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

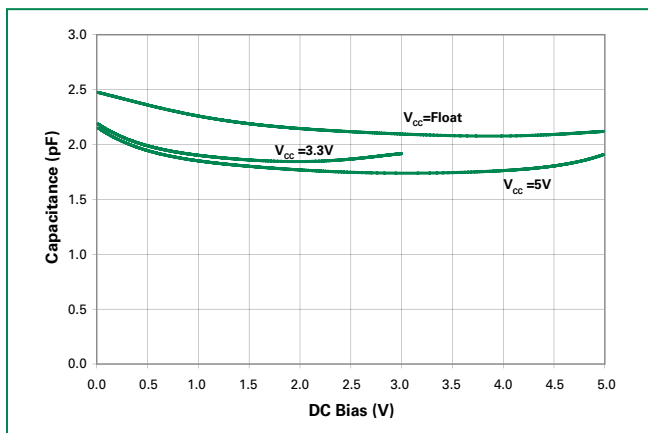
Notes :

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.

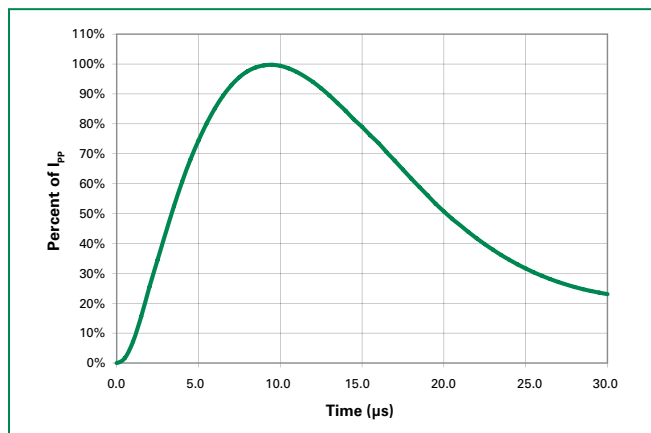
NOT RECOMMENDED FOR NEW DESIGNS
 Expertise Applied | Answers Delivered

SP3050-04HTG is eventually going to be replaced by the *SRV05-4HTG TVS Diode Array* with identical form, fit, and function. Please use this device for new or future designs and more detail can be found on Littelfuse.com

Capacitance vs. Reverse Bias

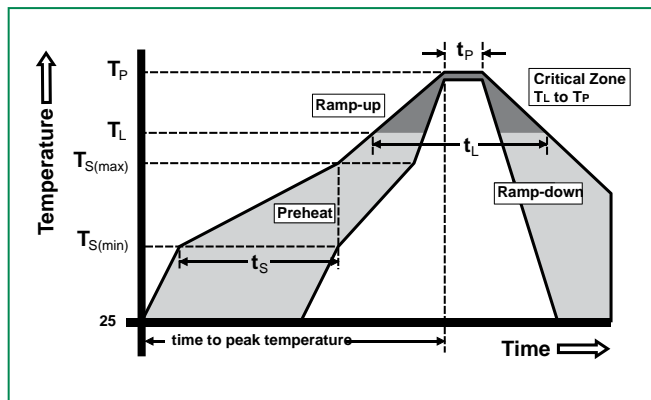


Pulse Waveform

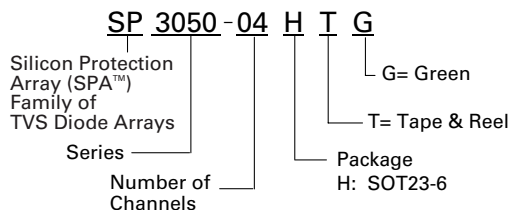


Soldering Parameters

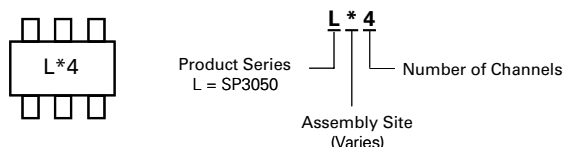
| | | |
|--|------------------------------------|-------------------------|
| Reflow Condition | | Pb – Free assembly |
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150°C |
| | - Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60 – 180 secs |
| Average ramp up rate (Liquidus) 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 |



Part Numbering System



Part Marking System



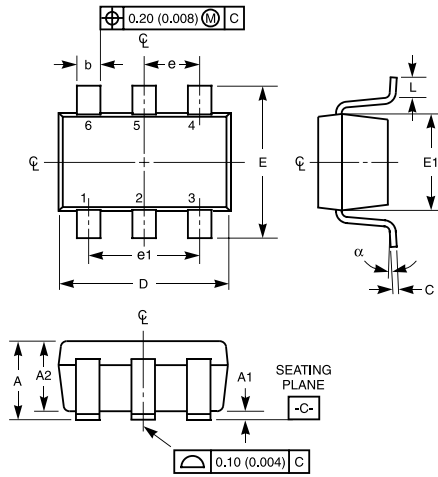
Ordering Information

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

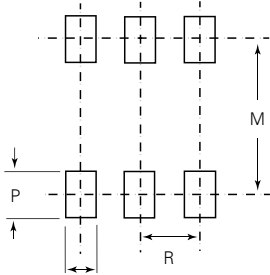
NOT RECOMMENDED FOR NEW DESIGNS

SP3050-04HTG is eventually going to be replaced by the **SRV05-4HTG TVS Diode Array** with identical form, fit, and function. Please use this device for new or future designs and more detail can be found on Littelfuse.com

Package Dimensions – SOT23-6



Recommended Solder Pad Layout



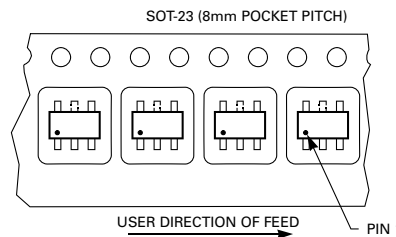
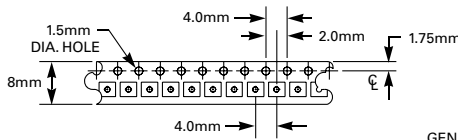
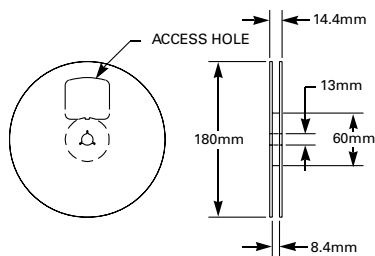
| Package | SOT23-6 | | | | |
|-----------|----------------|-------|------------|--------|-------|
| Pins | 6 | | | | |
| JEDEC | MO-203 Issue A | | | | |
| | Millimeters | | Inches | | Notes |
| | Min | Max | Min | Max | |
| A | 0.900 | 1.450 | 0.035 | 0.057 | - |
| A1 | 0.000 | 0.150 | 0.000 | 0.006 | - |
| 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. Footlength 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. Controlling dimension: MILLIMETER. Converted inch dimensions are not necessarily exact.

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.