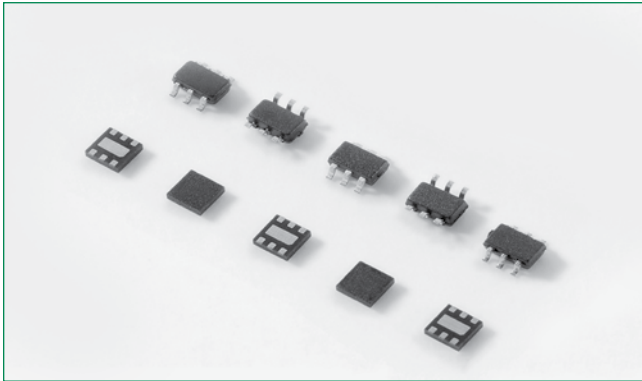
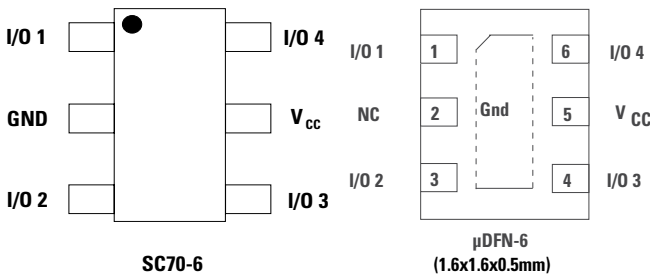


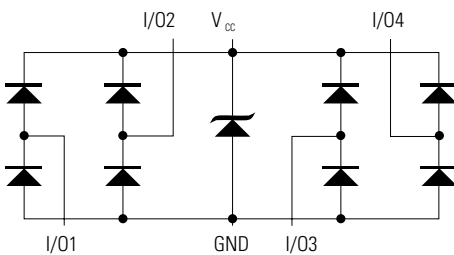
SP3002 Series 0.85pF Diode Array



Pinout



Functional Block Diagram



Additional Information



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.

Description

The SP3002 has ultra low capacitance rail-to-rail diodes with an additional zener diode fabricated in a proprietary silicon avalanche technology to protect each I/O pin providing a high level of protection for electronic equipment that may experience destructive electrostatic discharges (ESD). These robust diodes can safely absorb repetitive ESD strikes at the maximum level (Level 4) specified in the IEC 61000-4-2 international standard without performance degradation. Their very low loading capacitance also makes them ideal for protecting high speed signal pins such as HDMI, DVI, USB2.0, and IEEE 1394.

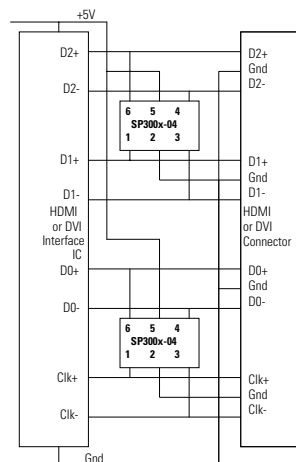
Features

- Low capacitance of 0.85 pF (TYP) per I/O
- ESD protection of ±12kV contact discharge, ±15kV air discharge, (IEC 61000-4-2)
- EFT protection, IEC 61000-4-4, 40A (5/50ns)
- Low leakage current of 0.5µA (MAX) at 5V
- Small packaging options saves board space
- Lightning Protection, IEC 61000-4-5, 2nd edition 4.5A (8/20µs)
- RoHS-Compliant and Lead-Free
- AEC-Q101 qualified

Applications

- Computer Peripherals
- Mobile Phones
- PDA's
- Digital Cameras
- Network Hardware/Ports
- Test Equipment
- Medical Equipment

Application Example



A single 4 channel SP300x-04 device can be used to protect four of the data lines in a HDMI/DVI interface. Two (2) SP300x-04 devices provide protection for the main data lines. Low voltage ASIC HDMI/DVI drivers can also be protected with the SP300x-04, the +V_{CC} pins on the SP300x-04 can be substituted with a suitable bypass capacitor or in some backdrive applications the +V_{CC} of the SP300x-04 can be floated or NC.

Absolute Maximum Ratings

| Symbol | Parameter | Value | Units |
|------------|----------------------------------|------------|-------|
| I_{PP} | Peak Current ($t_p=8/20\mu s$) | 4.5 | 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

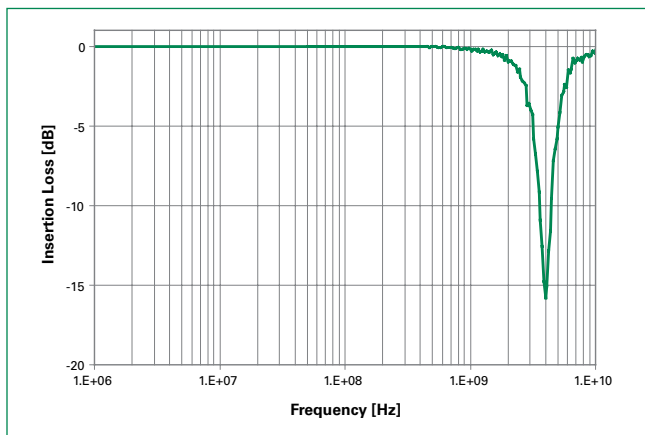
| Parameter | Rating | Units |
|---|------------|-------|
| Storage Temperature Range | -55 to 150 | °C |
| Maximum Junction Temperature | 150 | °C |
| Maximum Lead Temperature (Soldering 20-40s) | 260 | °C |

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

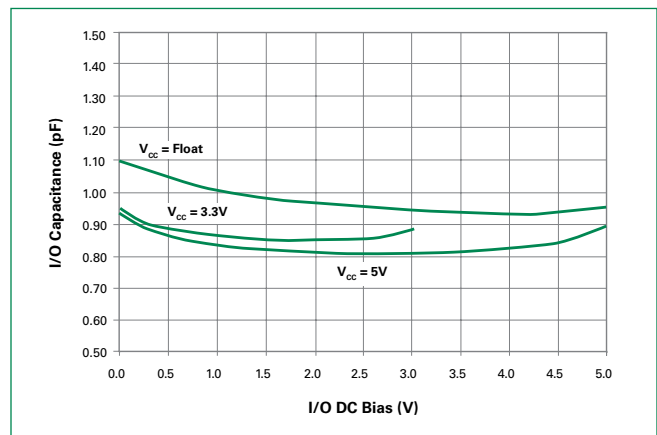
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|------------------------------------|---------------|---------------------------------|----------|------|------|---------|
| Reverse Standoff Voltage | V_{RWM} | $I_R \leq 1\mu A$ | | | 6.0 | V |
| Reverse Leakage Current | I_{LEAK} | $V_R=5V$ | | | 0.5 | μA |
| Clamp Voltage ¹ | V_C | $I_{PP}=1A, t_p=8/20\mu s, Fwd$ | | 9.5 | 11.0 | V |
| | | $I_{PP}=2A, t_p=8/20\mu s, Fwd$ | | 10.6 | 13.0 | V |
| ESD Withstand Voltage ¹ | V_{ESD} | IEC61000-4-2 (Contact) | ± 12 | | | kV |
| | | IEC61000-4-2 (Air) | ± 15 | | | kV |
| Diode Capacitance ¹ | $C_{I/O-GND}$ | Reverse Bias=0V | 0.95 | 1.1 | 1.25 | pF |
| | | Reverse Bias=1.65V | 0.7 | 0.85 | 1.0 | pF |
| Diode Capacitance ¹ | $C_{I/O-I/O}$ | Reverse Bias=0V | | 0.5 | | pF |

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

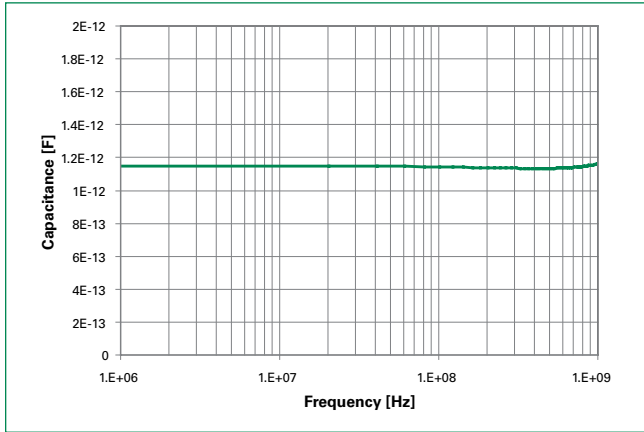
Insertion Loss (S21) I/O to GND



Capacitance vs. Bias Voltage



Capacitance vs. Frequency

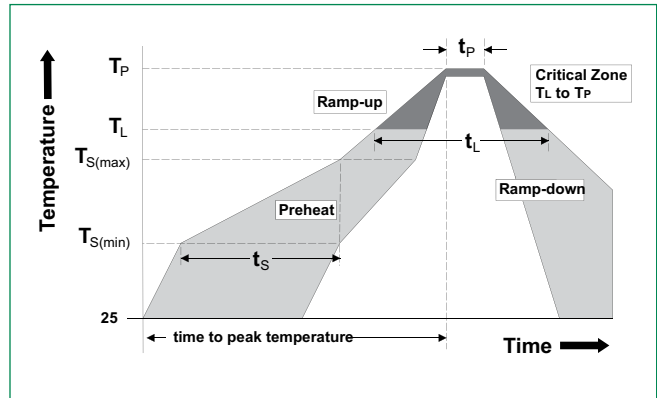


Product Characteristics

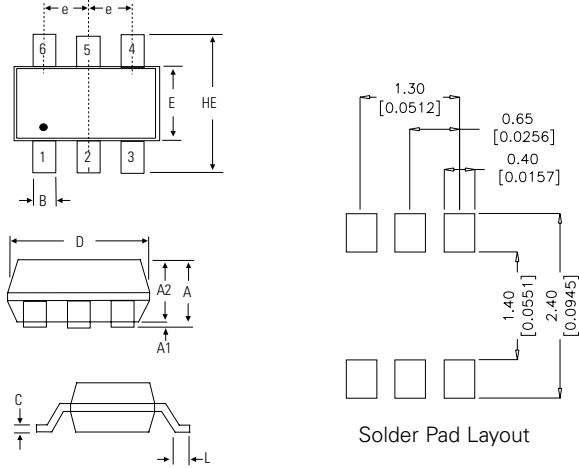
| | |
|----------------------------|--|
| Lead Plating | SC70: Matte Tin μDFN: Pre-Plated Frame |
| Lead Material | Copper Alloy |
| Lead Coplanarity | 0.0004 inches (0.102mm) |
| Substitute Material | Silicon |
| Body Material | Molded Epoxy |
| Flammability | UL Recognized compound meeting flammability rating V-0 |

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 | |

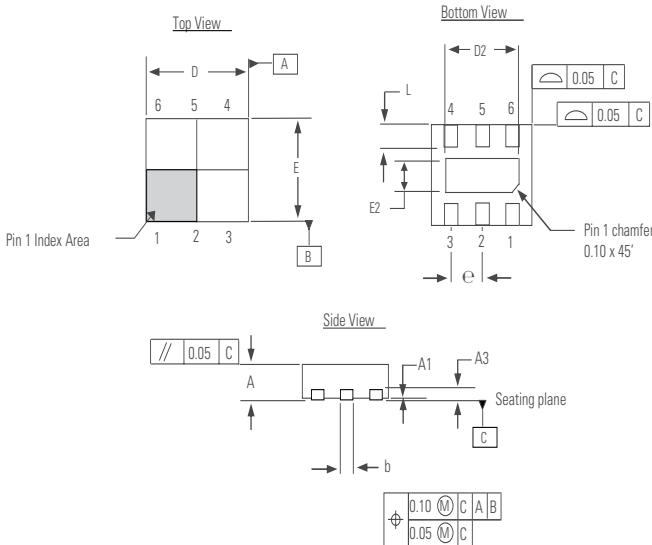


Package Dimensions — SC70-6



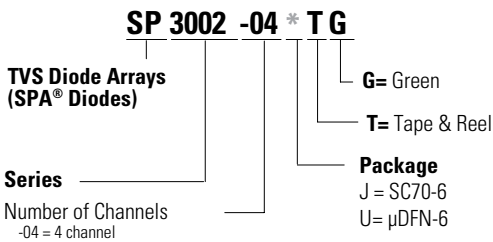
| Package | SC70-6 | | | |
|---------|-------------|------|-----------|-------|
| Pins | 6 | | | |
| JEDEC | MO-203 | | | |
| Symbol | Millimeters | | Inches | |
| | Min | Max | Min | Max |
| A | 0.80 | 1.10 | 0.031 | 0.043 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| A2 | 0.70 | 1.00 | 0.028 | 0.039 |
| B | 0.15 | 0.30 | 0.006 | 0.012 |
| c | 0.08 | 0.25 | 0.003 | 0.010 |
| D | 1.85 | 2.25 | 0.073 | 0.089 |
| E | 1.15 | 1.35 | 0.045 | 0.053 |
| e | 0.65 BSC | | 0.026 BSC | |
| HE | 2.00 | 2.40 | 0.079 | 0.094 |
| L | 0.26 | 0.46 | 0.010 | 0.018 |

Package Dimensions — μDFN-6 (1.6x1.6x0.5mm)



| Package | μDFN-6 (1.6x1.6x0.5mm) | | | |
|---------|------------------------|------|-----------|-------|
| JEDEC | MO-229 | | | |
| Symbol | Millimeters | | Inches | |
| | Min | Max | Min | Max |
| A | 0.45 | 0.55 | 0.018 | 0.022 |
| A1 | 0.00 | 0.05 | 0.000 | 0.002 |
| A3 | 0.127 Ref | | 0.005 Ref | |
| b | 0.20 | 0.30 | 0.008 | 0.012 |
| D | 1.50 | 1.70 | 0.060 | 0.067 |
| D2 | 1.05 | 1.30 | 0.042 | 0.052 |
| E | 1.50 | 1.70 | 0.060 | 0.067 |
| E2 | 0.40 | 0.65 | 0.016 | 0.026 |
| e | 0.50 Ref | | 0.020 Ref | |
| L | 0.25 | 0.40 | 0.010 | 0.016 |

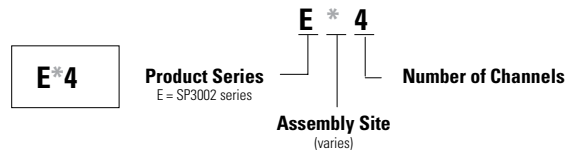
Part Numbering System



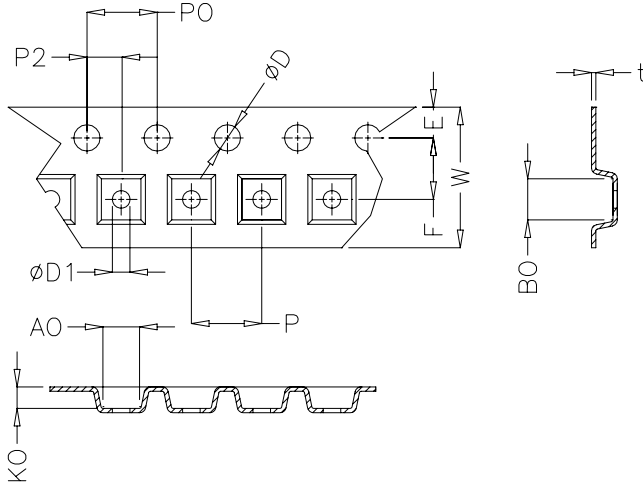
Ordering Information

| Part Number | Package | Marking | Min. Order Qty. |
|--------------|------------------------|---------|-----------------|
| SP3002-04JTG | SC70-6 | E * 4 | 3000 |
| SP3002-04UTG | μDFN-6 (1.6x1.6x0.5mm) | E * 4 | 3000 |

Part Marking System

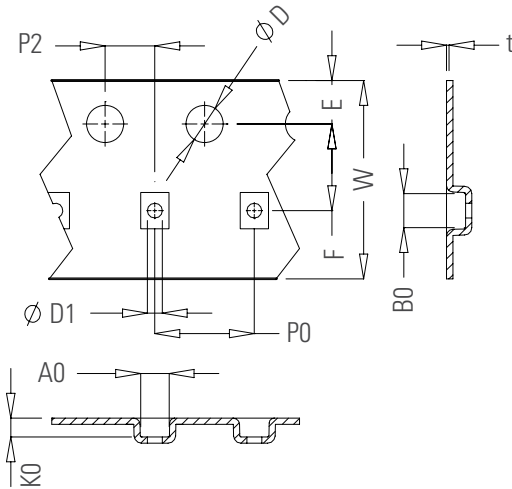


Embossed Carrier Tape & Reel Specification – SC70-6



| 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 | 0.077 | 0.081 |
| D | 1.40 | 1.60 | 0.055 | 0.063 |
| D1 | 1.00 | 1.25 | 0.039 | 0.049 |
| 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 | 2.14 | 2.34 | 0.084 | 0.092 |
| B0 | 2.24 | 2.44 | 0.088 | 0.096 |
| K0 | 1.12 | 1.32 | 0.044 | 0.052 |
| t | 0.27 Max | | 0.010 Max | |

Embossed Carrier Tape & Reel Specification – µDFN-6 (1.6x1.6x0.5mm)



| Symbol | Millimetres | | Inches | |
|--------|-------------|------|-----------|------|
| | Min | Max | Min | Max |
| E | 1.65 | 1.85 | 0.06 | 0.07 |
| F | 3.45 | 3.55 | 0.14 | 0.14 |
| D1 | 1.00 | 1.25 | 0.04 | 0.05 |
| D | 1.50 MIN | | 0.06 MIN | |
| P0 | 3.90 | 4.10 | 0.15 | 0.16 |
| 10P0 | 40.0± 0.20 | | 1.57±0.01 | |
| W | 7.90 | 8.30 | 0.31 | 0.33 |
| P2 | 1.95 | 2.05 | 0.08 | 0.08 |
| A0 | 1.78 | 1.88 | 0.07 | 0.07 |
| B0 | 1.78 | 1.88 | 0.07 | 0.07 |
| K0 | 0.84 | 0.94 | 0.03 | 0.04 |
| t | 0.25 TYP | | 0.01 TYP | |

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <http://www.littelfuse.com/disclaimer-electronics>.

© 2020 Littelfuse, Inc.
Specifications are subject to change without notice.
Revised: 03/23/20

单击下面可查看定价，库存，交付和生命周期等信息

[>>Littelfuse\(美国力特\)](#)