

## TVS Diode Arrays

### TVS Avalanche Diode in a Chip Scale Package

## SP0501BACT

The product is a silicon P/N structure tailored for ESD protection and is offered in the standard EIA 0402 size. The single channel Chip Scale device is used to help protect sensitive digital or analog input circuits on data, signal, or control lines with voltage levels up to 5VDC. The bipolar device is ideal for protection where AC signals are present.

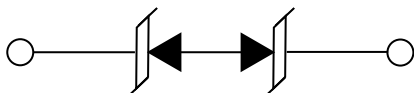
The state-of-the-art device is designed to suppress ESD and other transient over-voltage events to meet the International Electrotechnical Compatability (EMC transient immunity standarts IEC 61000-4-2 for Electrosatic Discharge Requirements). The monolithic silicon device is comprised of specially designed structures for transient voltage suppression (TVS). The size and shape of these structures has been tailored for transient protection. The low capacitance and clamp voltage are ideal for high speed signal line protection.

### Ordering Information

| Part Number | Diode Channels | Bumps | Package Size<br>mils (mm) | Quantity Per<br>Reel |
|-------------|----------------|-------|---------------------------|----------------------|
| SP0501BACT  | 1              | 2     | 40x20 (1x 0.5)            | 3500                 |

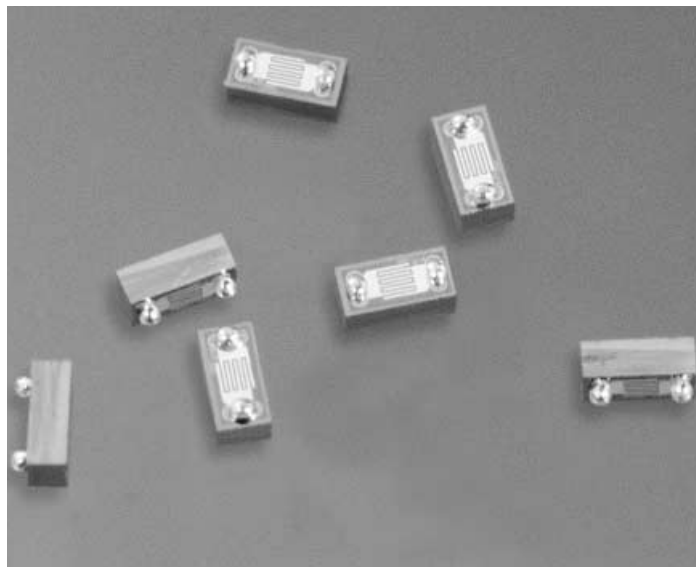
### Schematic

SP0501BAC



### Features

- Single channel suppressor in an EIA 0402 device size
- ESD Capability
  - IEC 61000-4-2, Direct Discharge .....30kV (Level 4)
  - IEC 61000-4-2, Air Discharge .....30kV (Level 4)
  - MIL STD 883D (Method 3015.7) .....30kV
- Signal line protection for applications up to 5VDC
- Fast response time .....< 1ns
- Low input capacitance .....30pF Typical
- Low clamp voltage (8kV test) .....13V Typical
- Low input leakage .....1nA @ 3.3V Typical
- Operating temperature range.....-40°C to 85°C



### Applications

- Cell phone handsets
- Personal Digital Assistants (PDA)
- Portable handheld equipment (Laptop, Palmtop computers)
- Computer port, keyboard (USB1.1)
- Set-Top Box (Audio and Video ports)
- PCMCIA cards

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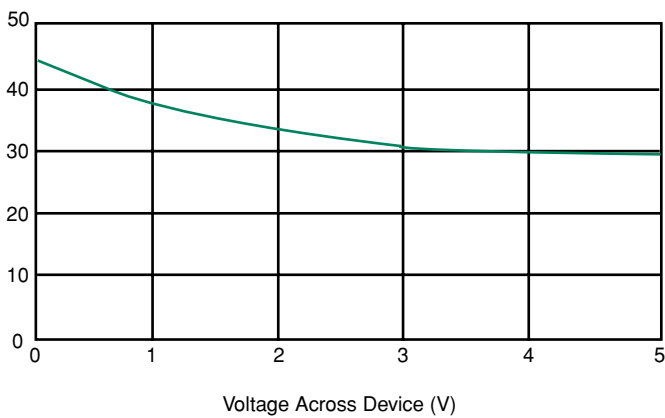
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### SP0501BACT

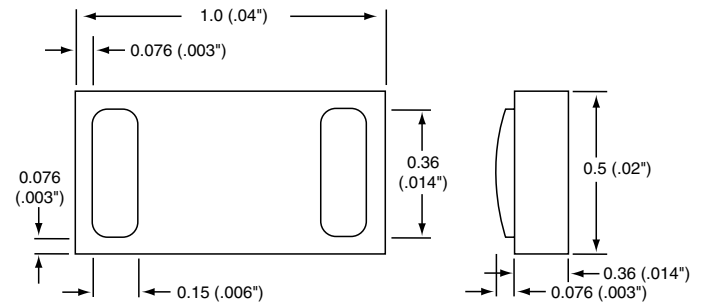
#### Electrical Specifications $T_A = 25^\circ\text{C}$ Unless Otherwise Specified

| PARAMETER                        | TEST CONDITIONS     | MIN       | TYPICAL | MAX   | UNITS            |
|----------------------------------|---------------------|-----------|---------|-------|------------------|
| Reverse Standoff Voltage         | $I = 10\mu\text{A}$ | $\pm 5.9$ | -       | -     | V                |
| Reverse Standoff Leakage Current | $V = 5.5\text{V}$   |           | 1       | 100   | $\mu\text{A}$    |
| Signal Clamp Voltage             |                     |           |         |       |                  |
| Positive                         | $I = 10\text{mA}$   | 6.0       | 7.5     | 9.2   | V                |
| Negative                         | $I = 10\text{mA}$   | -9.2      | - 7.5   | - 6.0 | V                |
| Clamp Voltage during ESD         |                     |           |         |       |                  |
| MIL-STD 883D (Method 3015.7)     | 8kV                 |           | 13      |       | V                |
| ESD Test Level                   |                     |           |         |       | V                |
| IEC-61000-4-2, Contact discharge |                     | 30        |         |       | kV               |
| MIL-STD-883D Method 3015 (HBM)   |                     | 30        |         |       | kV               |
| Capacitance                      | 5V @ 1Mhz           |           | 30      |       | pF               |
| Turn on/off Time                 |                     |           | <1      |       | ns               |
| Temperature Range                |                     |           |         |       |                  |
| Operating                        |                     | -40       |         | 85    | $^\circ\text{C}$ |
| Storage                          |                     | -65       |         | 150   | $^\circ\text{C}$ |

Typical Device Capacitance vs. Voltage



Outline Drawing



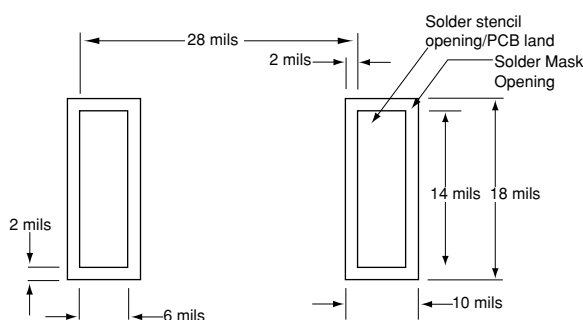
NOTE\*\* Metal Bump: 63/37 (Sn/Pb) alloy

## TVS Diode Arrays

### TVS Avalanche Diode in a Chip Scale Package

## SP0501BACT

| Printed Circuit Board Recommendations |                                                                 |
|---------------------------------------|-----------------------------------------------------------------|
| Pad Size in PCB                       | 14 x 6 mils (0.356 x 0.152mm)                                   |
| Pad Shape                             | Rectangle                                                       |
| Pad Definition                        | Non Solder Mask Defined Pads (NSMD)                             |
| Solder Mask Opening                   | 18 x 10 mils (0.457 x 0.254mm)                                  |
| Solder Stencil Thickness              | 6 mils (0.152mm)                                                |
| Solder Stencil Aperture Opening       | 14 x 6 mils (0.356 x 0.152mm)                                   |
| Solder Flux Ratio                     | 50/50                                                           |
| Solder Paste Type                     | No Clean                                                        |
| Board Trace Finish                    | Organic Solderable Preservative (OSP)<br>(Enteck: Cu Plus 106A) |



### Typical Solder Reflow Thermal Profile (No-Clean Flux)

