

# uClamp3301H

## Description

The  $\mu$ Clamp™ series of Transient Voltage Suppressors (TVS) are designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and PDAs. They offer superior electrical characteristics such as lower clamping voltage and no device degradation when compared to MLVs. They are designed to protect sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD), lightning, electrical fast transients (EFT), and cable discharge events (CDE).

The  $\mu$ clamp™3301H is constructed using Semtech's proprietary EPD process technology. The EPD process provides low standoff voltages with significant reductions in leakage currents and capacitance over silicon-avalanche diode processes. They feature a true operating voltage of 3.3 volts for superior protection when compared to traditional pn junction devices.

The  $\mu$ clamp3301H is in a SOD-523 package and will protect one unidirectional line. They give the designer the flexibility to protect one line in applications where arrays are not practical.

They may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (15kV air, 8kV contact discharge).

## Features

- ◆ Transient protection for data lines to **IEC 61000-4-2 (ESD) 20kV (air), 10kV (contact) IEC 61000-4-4 (EFT) 40A (tp = 5/50ns) Cable Discharge Event (CDE)**
- ◆ Ultra-small SOD-523 package (1.7 x 0.9 x 0.7mm)
- ◆ Protects one I/O or power line
- ◆ Low clamping voltage
- ◆ Working voltage: 3.3V
- ◆ Low leakage current
- ◆ Solid-state silicon-avalanche technology

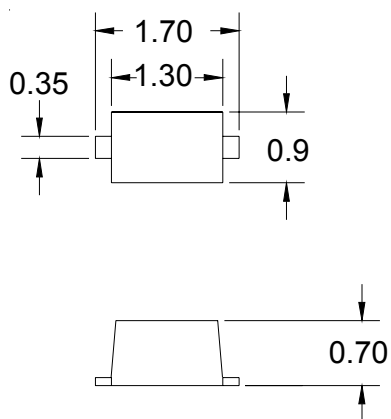
## Mechanical Characteristics

- ◆ EIAJ SOD-523 package
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Marking : Marking code, cathode band
- ◆ Packaging : Tape and Reel per EIA 481
- ◆ Lead Finish: Matte tin

## Applications

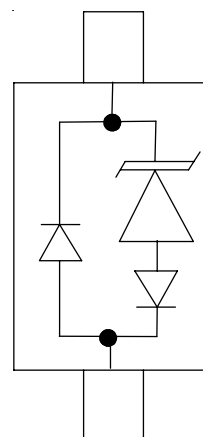
- ◆ Cellular Handsets & Accessories
- ◆ Cordless Phones
- ◆ Personal Digital Assistants (PDAs)
- ◆ Notebooks & Handhelds
- ◆ Portable Instrumentation
- ◆ Digital Cameras
- ◆ Peripherals
- ◆ MP3 Players

## Dimensions



Maximum Dimensions (mm)

## Schematic & PIN Configuration



SOD-523 (Top View)



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## Absolute Maximum Rating

| Rating   | Symbol           | Value            | Units |
|--|------------------|------------------|-------|
| Peak Pulse Power (tp = 8/20μs)                                 | P <sub>pk</sub>  | 40               | Watts |
| Maximum Peak Pulse Current (tp = 8/20μs)                       | I <sub>pp</sub>  | 5                | Amps  |
| ESD per IEC 61000-4-2 (Air)<br>ESD per IEC 61000-4-2 (Contact) | V <sub>pp</sub>  | +/- 20<br>+/- 15 | kV    |
| Lead Soldering Temperature                                     | T <sub>L</sub>   | 260 (10 sec.)    | °C    |
| Operating Temperature  | T <sub>J</sub>   | -55 to +125      | °C    |
| Storage Temperature  | T <sub>STG</sub> | -55 to +150      | °C    |

## Electrical Characteristics (T=25°C)

| Parameter                 | Symbol           | Conditions  | Minimum | Typical | Maximum | Units |
|---------------------------|------------------|---|---------|---------|---------|-------|
| Reverse Stand-Off Voltage | V <sub>RWM</sub> |   |         |         | 3.3     | V     |
| Punch-Through Voltage     | V <sub>PT</sub>  | I <sub>PT</sub> = 2μA                             | 3.5     |         |         | V     |
| Snap-Back Voltage         | V <sub>SB</sub>  | I <sub>SB</sub> = 50mA                            | 2.8     |         |         | V     |
| Reverse Leakage Current   | I <sub>R</sub>   | V <sub>RWM</sub> = 3.3V                           |         | 0.05    | 0.5     | μA    |
| Clamping Voltage          | V <sub>C</sub>   | I <sub>pp</sub> = 1A, tp = 8/20μs                 |         |         | 5.5     | V     |
| Clamping Voltage          | V <sub>C</sub>   | I <sub>pp</sub> = 5A, tp = 8/20μs                 |         |         | 8.0     | V     |
| Reverse Clamping Voltage  | V <sub>CR</sub>  | I <sub>pp</sub> = 1A, tp = 8/20μs                 |         |         | 2.4     | V     |
| Junction Capacitance      | C <sub>j</sub>   | I/O pin to Gnd<br>V <sub>R</sub> = 0V, f = 1MHz   |         | 25      | 30      | pF    |
|                           |                  | I/O pin to Gnd<br>V <sub>R</sub> = 3.3V, f = 1MHz |         | 14      |         | pF    |