

# Bi-Directional Low Capacitance TVS

## 1 Features

- Working voltage: 3.3V、5V、8V、12V、15V、24V
- SOD-323 Package
- 350 Watts peak pulse power (tp=8/20us)
- Transient protection for data lines to
  - IEC 61000-4-2 (ESD)  $\pm 30\text{kV}$  (air)  
 $\pm 30\text{kV}$  (contact)
  - IEC61000-4-4(EFT)40A(5/50ns)
- Low leakage current
- Low clamping voltage
- Solid-state silicon-avalanche technology

## 2 Applications

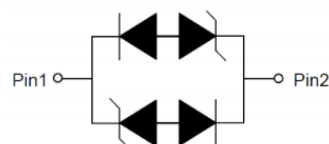
- End Equipment
  - Power lines
  - Personal digital assistants (PDA's)
  - Microprocessors based equipment
  - Notebooks, Desktops, and Servers
  - Cell phone Handsets and Accessories
  - Portable Electronics
  - Peripheral

## 3 Description

The SLVD3XXXCB TVS diode is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebooks, and PDA's. It offers superior electrical characteristics such as low clamping voltage, low leakage current and high surge capability. It is designed to protect sensitive electronic

components which are connected to power lines, from over-stress caused by ESD (Electrostatic Discharge), EFT (Electrical Fast Transients) and Lightning.

## 4 Pin Configuration and Bottom View



**SOD-323**

## 5 Device Information

| PART NUMBER | PACKAGE | BODY SIZE (NOM)  |
|-------------|---------|------------------|
| SLVD3XXXCB  | SOD-323 | 2.50 mm x 1.30mm |

## 6 Absolute maximum Ratings @25°C

| RATING                           | SYMBOL           | VALUE      | UNITS |
|----------------------------------|------------------|------------|-------|
| Peak Pulse Power (tp=8/20μs)     | P <sub>PP</sub>  | 350        | W     |
| Operating Temperature            | T <sub>J</sub>   | -55 to 125 | °C    |
| Lead Soldering Temperature       | T <sub>L</sub>   | 260 (10 s) | °C    |
| Storage Temperature              | T <sub>STG</sub> | -55 to 150 | °C    |
| ESD Protection-Contact Discharge | V <sub>ESD</sub> | $\pm 30$   | kV    |
| ESD Protection-Air Discharge     | V <sub>ESD</sub> | $\pm 30$   | kV    |

**7 Electrical characteristics (@25°C unless otherwise specified)**

| <b>SLVD33L3CB</b>            |           |                                                 |      |      |      |               |
|------------------------------|-----------|-------------------------------------------------|------|------|------|---------------|
| PARAMETER                    | SYMBOL    | CONDITIONS                                      | MIN. | TYP. | MAX. | UNITS         |
| Peak Reverse Working Voltage | $V_{RWM}$ |                                                 |      |      | 3.3  | V             |
| Breakdown Voltage            | $V_{BR}$  | $I_t = 1\text{mA}$                              | 4    |      |      | V             |
| Reverse Leakage Current      | $I_R$     | $V_{RWM} = 3.3\text{V}$ , $T=25^\circ\text{C}$  |      |      | 1    | $\mu\text{A}$ |
| Clamping Voltage             | $V_C$     | $I_{PP} = 1\text{A}$ , $t_P = 8/20\mu\text{s}$  |      |      | 7    | V             |
| Clamping Voltage             | $V_C$     | $I_{PP} = 20\text{A}$ , $t_P = 8/20\mu\text{s}$ |      |      | 16   | V             |
| Junction Capacitance         | $C_j$     | $V_R=0\text{V}$ , $f = 1\text{MHz}$             |      | 1    |      | pF            |
| <b>SLVD35LCB</b>             |           |                                                 |      |      |      |               |
| PARAMETER                    | SYMBOL    | CONDITIONS                                      | MIN. | TYP. | MAX. | UNITS         |
| Peak Reverse Working Voltage | $V_{RWM}$ |                                                 |      |      | 5    | V             |
| Breakdown Voltage            | $V_{BR}$  | $I_t = 1\text{mA}$                              | 6    |      |      | V             |
| Reverse Leakage Current      | $I_R$     | $V_{RWM} = 5\text{V}$ , $T=25^\circ\text{C}$    |      |      | 1    | $\mu\text{A}$ |
| Clamping Voltage             | $V_C$     | $I_{PP} = 1\text{A}$ , $t_P = 8/20\mu\text{s}$  |      |      | 10   | V             |
| Clamping Voltage             | $V_C$     | $I_{PP} = 18\text{A}$ , $t_P = 8/20\mu\text{s}$ |      |      | 20   | V             |
| Junction Capacitance         | $C_j$     | $V_R=0\text{V}$ , $f = 1\text{MHz}$             |      | 1    |      | pF            |
| <b>SLVD38LCB</b>             |           |                                                 |      |      |      |               |
| PARAMETER                    | SYMBOL    | CONDITIONS                                      | MIN. | TYP. | MAX. | UNITS         |
| Peak Reverse Working Voltage | $V_{RWM}$ |                                                 |      |      | 8    | V             |
| Breakdown Voltage            | $V_{BR}$  | $I_t = 1\text{mA}$                              | 8.5  |      |      | V             |
| Reverse Leakage Current      | $I_R$     | $V_{RWM} = 8\text{V}$ , $T=25^\circ\text{C}$    |      |      | 1    | $\mu\text{A}$ |
| Clamping Voltage             | $V_C$     | $I_{PP} = 1\text{A}$ , $t_P = 8/20\mu\text{s}$  |      |      | 13.4 | V             |
| Clamping Voltage             | $V_C$     | $I_{PP} = 16\text{A}$ , $t_P = 8/20\mu\text{s}$ |      |      | 22   | V             |
| Junction Capacitance         | $C_j$     | $V_R=0\text{V}$ , $f = 1\text{MHz}$             |      | 1    |      | pF            |

| SLVD312LCB                   |           |                                 |      |      |      |         |
|------------------------------|-----------|---------------------------------|------|------|------|---------|
| PARAMETER                    | SYMBOL    | CONDITIONS                      | MIN. | TYP. | MAX. | UNITS   |
| Peak Reverse Working Voltage | $V_{RWM}$ |                                 |      |      | 12   | V       |
| Breakdown Voltage            | $V_{BR}$  | $I_t = 1mA$                     | 13.3 |      |      | V       |
| Reverse Leakage Current      | $I_R$     | $V_{RWM} = 12V, T=25^{\circ}C$  |      |      | 1    | $\mu A$ |
| Clamping Voltage             | $V_C$     | $I_{PP} = 1A, t_p = 8/20\mu s$  |      |      | 18   | V       |
| Clamping Voltage             | $V_C$     | $I_{PP} = 14A, t_p = 8/20\mu s$ |      |      | 25   | V       |
| Junction Capacitance         | $C_j$     | $V_R=0V, f = 1MHz$              |      | 1    |      | pF      |
|                              |           |                                 |      |      |      |         |
| SLVD315LCB                   |           |                                 |      |      |      |         |
| PARAMETER                    | SYMBOL    | CONDITIONS                      | MIN. | TYP. | MAX. | UNITS   |
| Peak Reverse Working Voltage | $V_{RWM}$ |                                 |      |      | 15   | V       |
| Breakdown Voltage            | $V_{BR}$  | $I_t = 1mA$                     | 16.7 |      |      | V       |
| Reverse Leakage Current      | $I_R$     | $V_{RWM} = 15V, T=25^{\circ}C$  |      |      | 1    | $\mu A$ |
| Clamping Voltage             | $V_C$     | $I_{PP} = 1A, t_p = 8/20\mu s$  |      |      | 21   | V       |
| Clamping Voltage             | $V_C$     | $I_{PP} = 10A, t_p = 8/20\mu s$ |      |      | 32   | V       |
| Junction Capacitance         | $C_j$     | $V_R=0V, f = 1MHz$              |      | 1    |      | pF      |
|                              |           |                                 |      |      |      |         |
| SLVD324LCB                   |           |                                 |      |      |      |         |
| PARAMETER                    | SYMBOL    | CONDITIONS                      | MIN. | TYP. | MAX. | UNITS   |
| Peak Reverse Working Voltage | $V_{RWM}$ |                                 |      |      | 24   | V       |
| Breakdown Voltage            | $V_{BR}$  | $I_t = 1mA$                     | 25   |      |      | V       |
| Reverse Leakage Current      | $I_R$     | $V_{RWM} = 24V, T=25^{\circ}C$  |      |      | 1    | $\mu A$ |
| Clamping Voltage             | $V_C$     | $I_{PP} = 1A, t_p = 8/20\mu s$  |      |      | 36   | V       |
| Clamping Voltage             | $V_C$     | $I_{PP} = 6A, t_p = 8/20\mu s$  |      |      | 56   | V       |
| Junction Capacitance         | $C_j$     | $V_R=0V, f = 1MHz$              |      | 1    |      | pF      |

## 8 Typical Characteristics

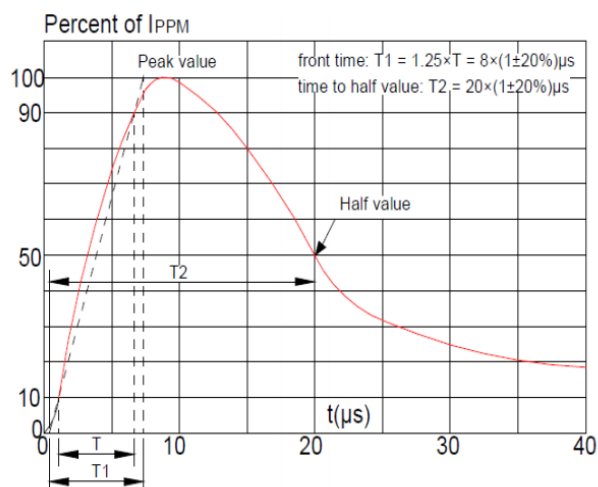


Fig 1. Pulse Waveform (8/20us)

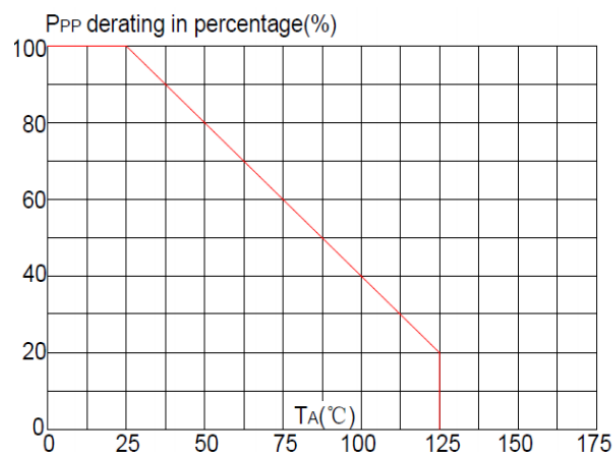


Fig 2. Pulse Derating Curve

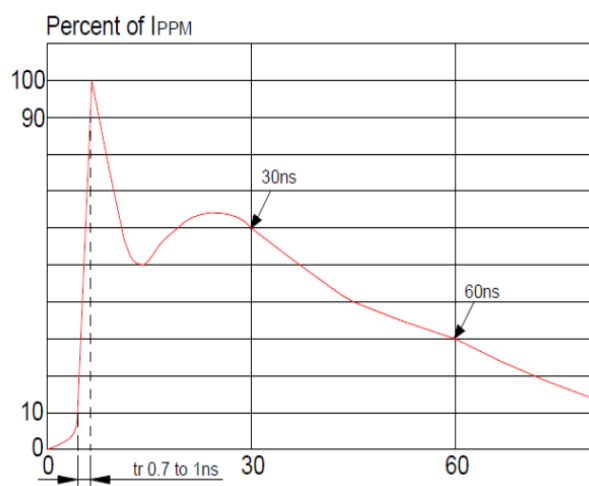
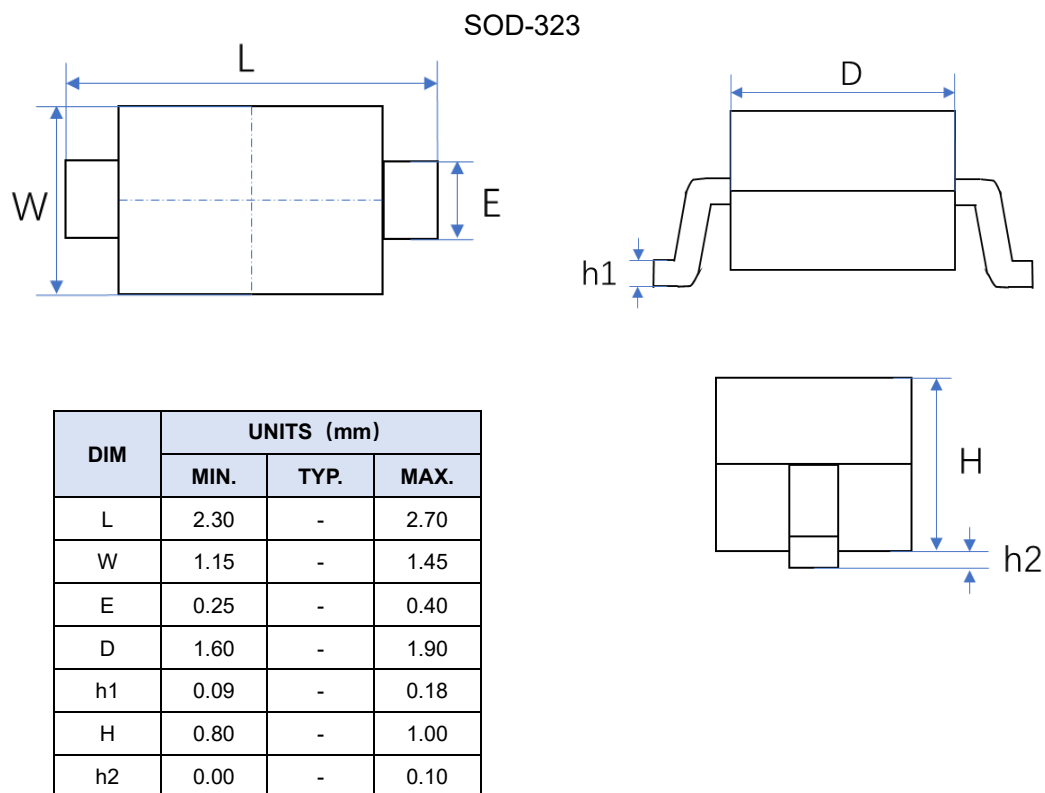
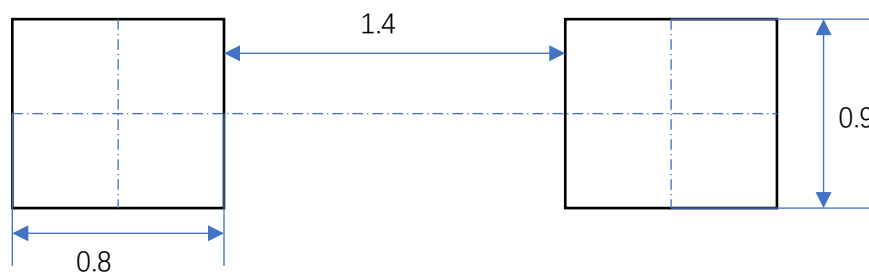


Fig 3. ESD Clamping(8kV Contact Discharge)

## 9 Product dimension



## 10 PCB Layout Footprints (Units: mm)



## 11 Ordering Information

| Part Number | Packaging        | Reel Size |
|-------------|------------------|-----------|
| SLVD3XXXCB  | 3000/Tape & Reel | 7 inch    |