

Transient Voltage Suppressors for ESD Protection

General Description

The SLESD5Z Series are designed to protect voltage sensitive components from ESD and transient voltage events. Excellent clamping capability, low leakage, and fast response time, make these parts ideal for ESD protection on designs where board space is at a premium.

Applications

- Cellular phones
- Portable devices
- Digital cameras
- Power supplies

Features

- Small Body Outline Dimensions
- Low Body Height
- Stand-off Voltage: 3.3 V – 12.0 V
- Peak Power up to 200 Watts @ 8 x 20 μ s Pulse
- Low Leakage
- Response Time is Typically < 1 ns

Complies with the following standards

IEC61000-4-2

Level 4 15 kV (air discharge)

8 kV (contact discharge)

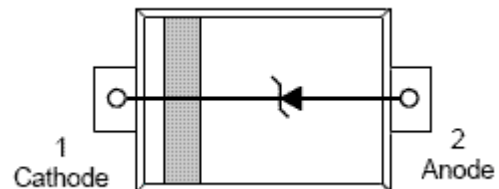
MIL STD 883E - Method 3015-7 Class 3

25 kV HBM (Human Body Model)

Functional diagram



SOD-523

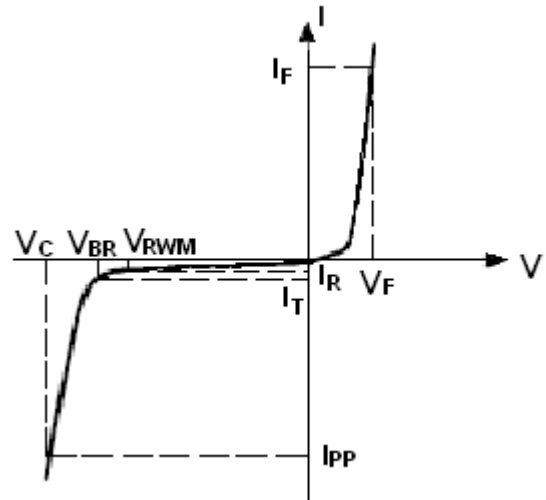


Absolute Ratings ($T_{amb}=25^{\circ}C$)

| Symbol | Parameter | Value | Units |
|-----------|---|---|------------------------|
| P_{PP} | Peak Pulse Power ($t_p = 8/20\mu s$) | 200 | W |
| T_L | Maximum lead temperature for soldering during 10s | 260 | $^{\circ}C$ |
| T_{stg} | Storage Temperature Range | -55 to +155 | $^{\circ}C$ |
| T_{op} | Operating Temperature Range | -40 to +125 | $^{\circ}C$ |
| T_j | Maximum junction temperature | 150 | $^{\circ}C$ |
| | IEC61000-4-2 (ESD) | air discharge contact discharge | ± 15 ± 8 kV |
| | IEC61000-4-4 (EFT) | | 40 A |
| | ESD Voltage | Per Human Body Model Per Machine Model | 25 kV 400 V |

Electrical Parameter

| Symbol | Parameter |
|-----------|---|
| I_{PP} | Maximum Reverse Peak Pulse Current |
| V_C | Clamping Voltage @ I_{PP} |
| V_{RWM} | Working Peak Reverse Voltage |
| I_R | Maximum Reverse Leakage Current @ V_{RWM} |
| I_T | Test Current |
| V_{BR} | Breakdown Voltage @ I_T |
| I_F | Forward Current |
| V_F | Forward Voltage @ I_F |



Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified. $V_F = 0.9V$ at $I_F = 10mA$

| Part Numbers | V_{BR} | | | I_T | V_{RWM} | I_R | V_F | I_F | C |
|--------------|----------|------|------|-------|-----------|-------|-------|-------|--------------|
| | Min. | Typ. | Max. | | | | Max. | | Typ. 0v bias |
| | V | V | V | | | | V | | pF |
| SLESD5Z3V3 | 5.0 | 6.0 | 7.0 | 1 | 3.0 | 1 | 1.25 | 200 | 35 |
| SLESD5Z5V | 6.0 | 6.6 | 7.1 | 1 | 5.0 | 1 | 1.25 | 200 | 30 |
| SLESD5Z6V | 6.8 | 7.4 | 7.9 | 1 | 6.0 | 1 | 1.25 | 200 | 30 |
| SLESD5Z7V | 7.5 | 8.1 | 8.6 | 1 | 7.0 | 1 | 1.25 | 200 | 25 |
| SLESD5Z12V | 13.5 | 14.2 | 15.0 | 1 | 12.0 | 1 | 1.25 | 200 | 25 |

*Surge current waveform per Figure 1.

- V_{BR} is measured with a pulse test current I_T at an ambient temperature of 25°C.

Typical Characteristics

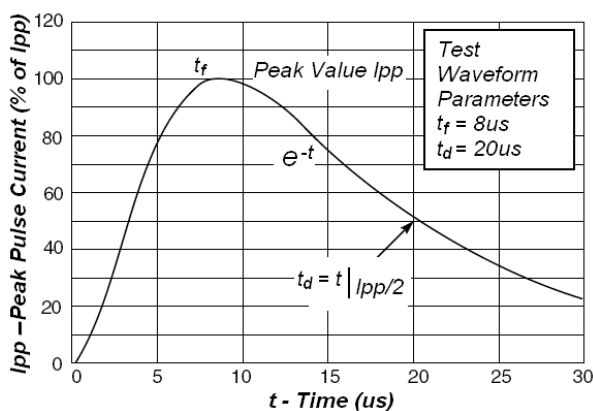


Fig1. Pulse Waveform

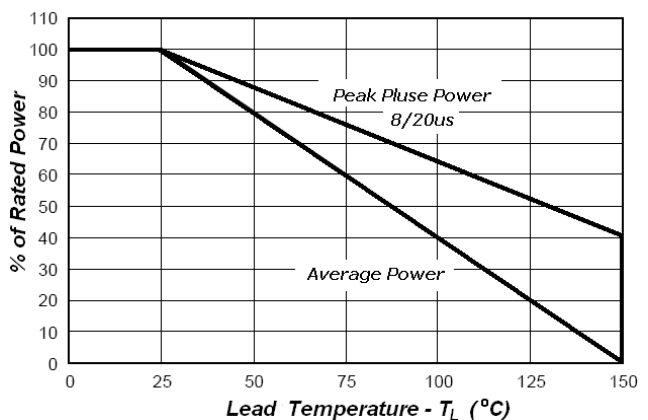


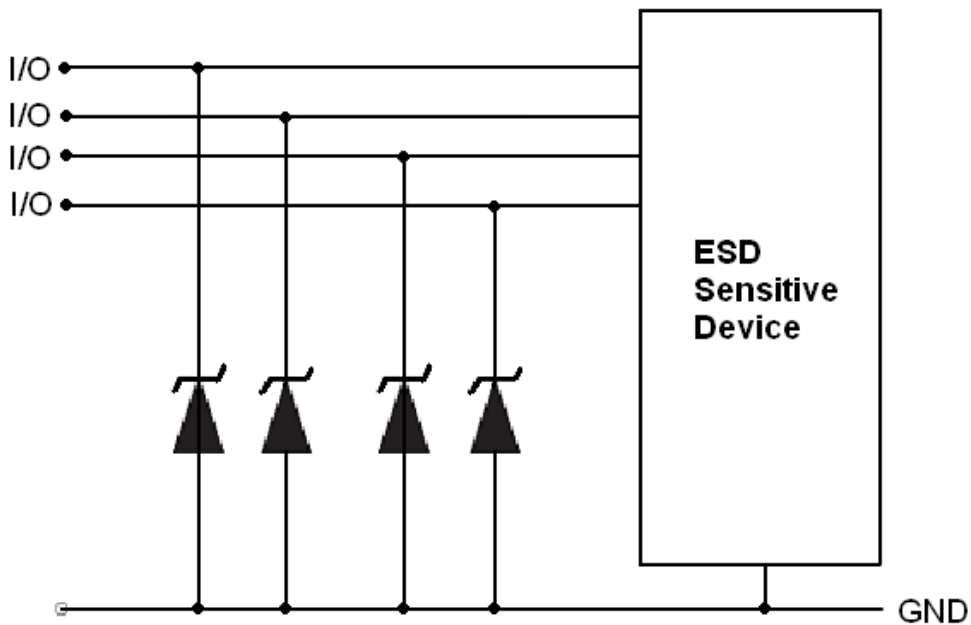
Fig2. Power Derating Curve

Application Note

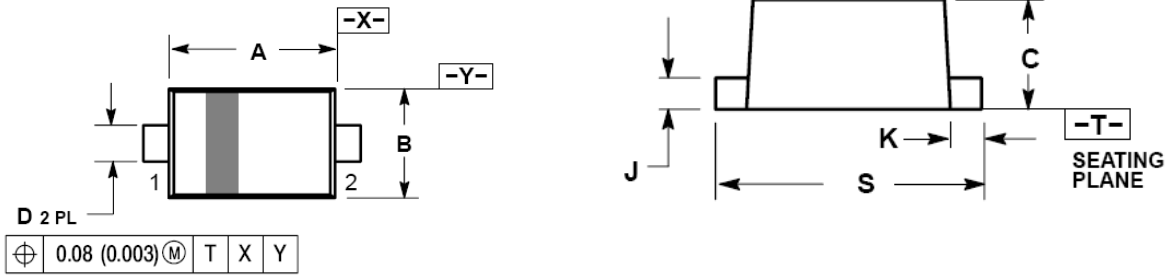
Electrostatic discharge (ESD) is a major cause of failure in electronic systems. Transient Voltage Suppressors (TVS) are an ideal choice for ESD protection. They are capable of clamping the incoming transient to a low enough level such that damage to the protected semiconductor is prevented.

Surface mount TVS offers the best choice for minimal lead inductance. They serve as parallel protection elements, connected between the signal line to ground. As the transient rises above the operating voltage of the device, the TVS becomes a low impedance path diverting the transient current to ground. The SLESD5Z Series is the ideal board level protection of ESD sensitive semiconductor components.

The tiny SOD-523 package allows design flexibility in the design of high density boards where the space saving is at a premium. This enables to shorten the routing and contributes to hardening against ESD.



SOD-523 Mechanical Data



| Dim | Millimeters | | | INCHES | | |
|-----|-------------|------|------|--------|--------|--------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.10 | 1.20 | 1.30 | 0.043 | 0.047 | 0.051 |
| B | 0.70 | 0.80 | 0.90 | 0.028 | 0.032 | 0.035 |
| C | 0.50 | 0.60 | 0.70 | 0.020 | 0.024 | 0.028 |
| D | 0.25 | 0.30 | 0.35 | 0.010 | 0.012 | 0.014 |
| J | 0.07 | 0.14 | 0.20 | 0.0028 | 0.0055 | 0.0079 |
| K | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |
| S | 1.50 | 1.60 | 1.70 | 0.059 | 0.063 | 0.067 |