

**Features**

- Ultra low capacitance: 0.25pF typical
- Ultra low leakage: nA level
- Ultra low operating voltage: 3.3V
- Low clamping voltage
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test  
Air discharge: ±25kV  
Contact discharge: ±20kV
  - IEC61000-4-4 (EFT) 40A (5/50ns)
  - IEC61000-4-5 (Lightning) 5A (8/20µs)
- RoHS Compliant

**Mechanical Characteristics**

- Package: SOD-523
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below

**Applications**

- Cellular Handsets and Accessories
- Display Ports
- MDDI Ports
- USB Ports
- Digital Video Interface (DVI)
- PCI Express and Serial SATA Ports

**Part Number Code**

|          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| <b>E</b> | <b>S</b> | <b>D</b> | <b>0</b> | <b>5</b> | <b>1</b> | <b>1</b> | <b>L</b> | <b>1</b> |
| <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> | <b>8</b> | <b>9</b> |

|              |                                       |
|--------------|---------------------------------------|
| Product Type |                                       |
| ESD          | TSK Electrostatic suppressor ESD Type |

|                             |      |
|-----------------------------|------|
| Reverse Working Voltage (V) |      |
| 3V3                         | 3.3V |
| 05                          | 5V   |
| 16                          | 16V  |

|      |        |
|------|--------|
| Line |        |
| 1    | 1-Line |
| 2    | 2-Line |
| 3    | 3-Line |

|                  |        |
|------------------|--------|
| Capacitance Type |        |
| L                | Low    |
| X                | Normal |

|             |     |
|-------------|-----|
| directional |     |
| 0           | Bi  |
| 1           | Uni |

|      |         |
|------|---------|
| Size |         |
| 1    | O201    |
| 2    | O402    |
| 3    | DFN0603 |
| 4    | DFN1006 |

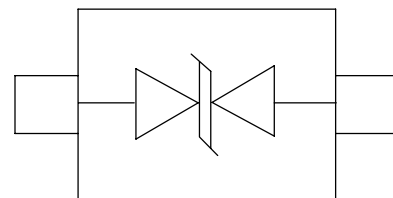
★ Code 4 to 9 is optional

**Description**

The ESD3V310LH is a bi-directional TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The ESD3V310LH has an ultra-low capacitance with a typical value at 0.25pF, and complies with the IEC 61000-4-2 (ESD) standard with ±15kV air and ±8kV contact discharge. It is assembled into a SOD- 523 leadfree package. The small size, ultra-low capacitance and high ESD surge protection make ESD3V310LH an ideal choice to protect cell phone, digital video inter-faces and other high speed ports.



**Dimensions and Pin Configuration**



Circuit and Pin Schematic

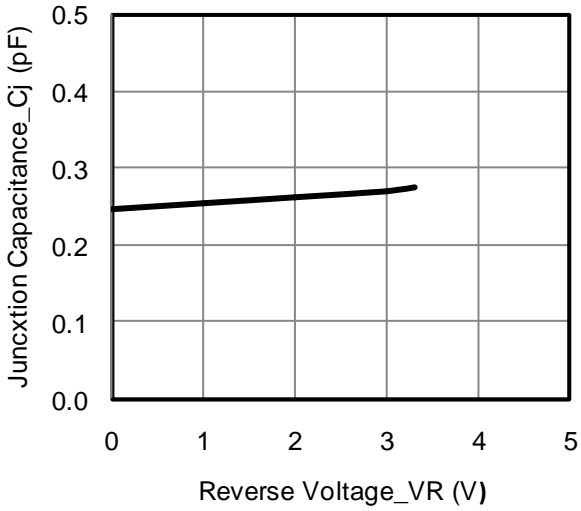
### Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$ unless otherwise specified)

| Parameter                                | Symbol | Value       | Unit               |
|--|--------|-------------|--------------------|
| Peak Pulse Power (8/20 $\mu\text{s}$ )   | Ppk    | 100         | W                  |
| Peak Pulse Current (8/20 $\mu\text{s}$ ) | IPP    | 5           | A                  |
| ESD per IEC 61000-4-2 (Air)              | VESD   | $\pm 25$    | kV                 |
| ESD per IEC 61000-4-2 (Contact)          |        | $\pm 20$    |                    |
| Operating Temperature Range              | TJ     | -55 to +125 | $^{\circ}\text{C}$ |
| Storage Temperature Range                | Tstg   | -55 to +150 | $^{\circ}\text{C}$ |

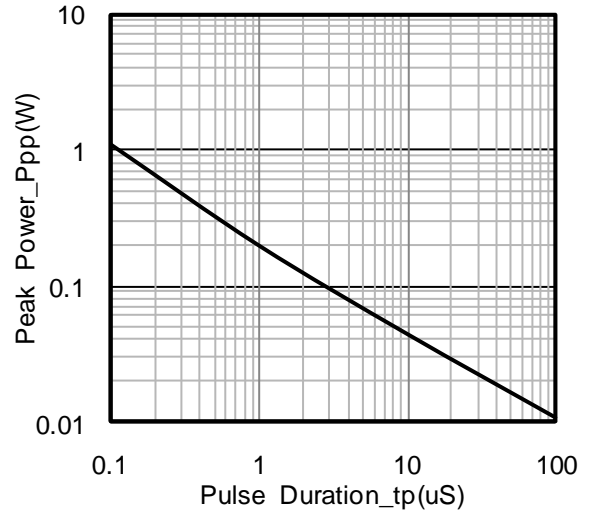
### Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise specified)

| Parameter               | Symbol | Min | Typ  | Max  | Unit          | Test Condition                                    |
|-------------------------|--------|-----|------|------|---------------|---|
| Reverse Working Voltage | VRWM   |     |      | 3.3  | V             |   |
| Breakdown Voltage       | VBR    | 5   |      |      | V             | $I_T = 1\text{mA}$                                |
| Reverse Leakage Current | $I_R$  |     |      | 0.05 | $\mu\text{A}$ | $VRWM = 3.3\text{V}$                              |
| Clamping Voltage        | VC     |     |      | 10   | V             | $I_{PP} = 1\text{A}$ (8 x 20 $\mu\text{s}$ pulse) |
| Clamping Voltage        | VC     |     |      | 20   | V             | $I_{PP} = 5\text{A}$ (8 x 20 $\mu\text{s}$ pulse) |
| Junction Capacitance    | CJ     |     | 0.25 | 0.3  | pF            | $VR = 0\text{V}$ , $f = 1\text{MHz}$              |

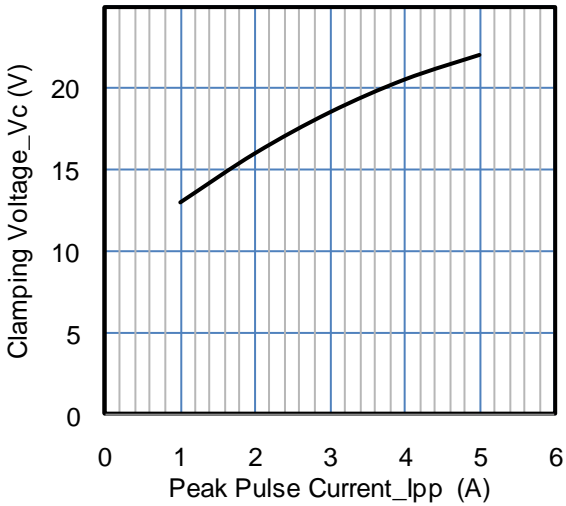
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



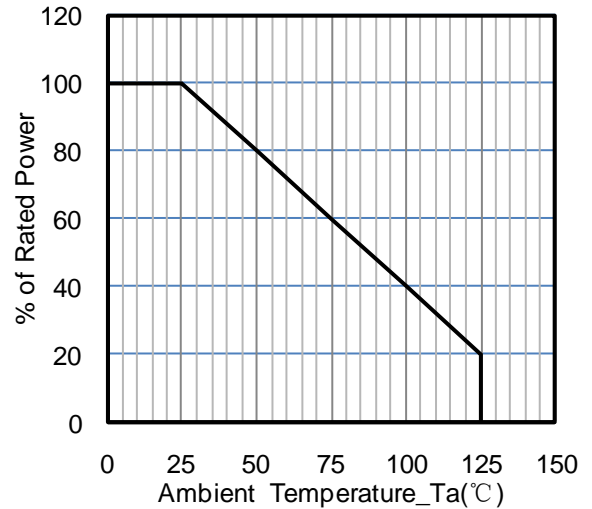
Junction Capacitance vs. Reverse Voltage



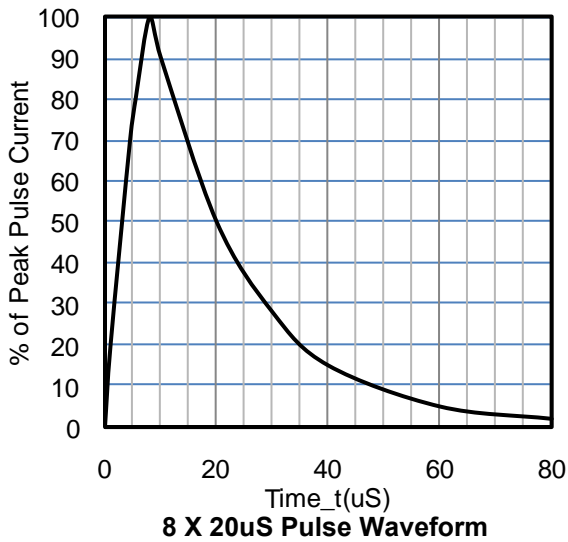
Peak Pulse Power vs. Pulse Time



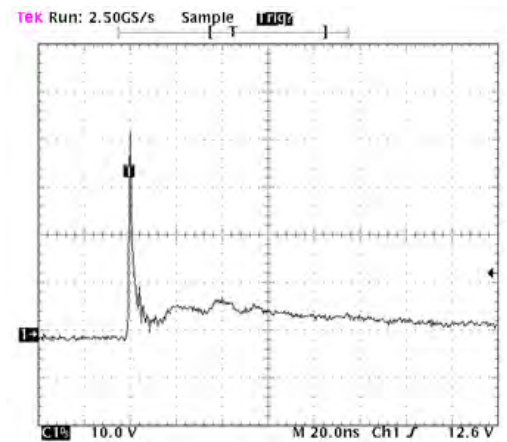
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



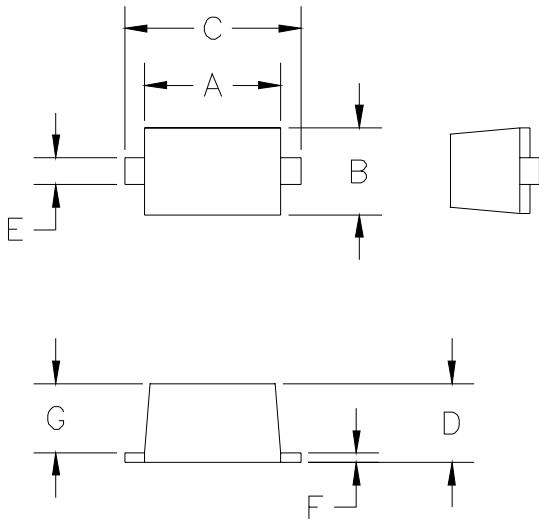
8 X 20uS Pulse Waveform



ESD Clamping Voltage

8 kV Contact per IEC61000-4-2

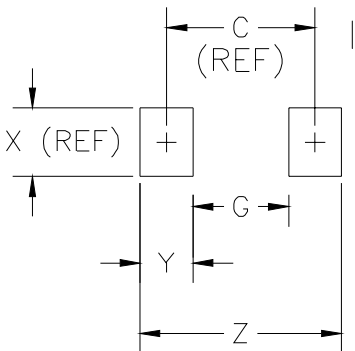
SOD-523 Package Outline Drawing



| DIM <sup>N</sup> | INCHES |      | MM [1] |      | NOTE |
|------------------|--------|------|--------|------|------|
|                  | MIN    | MAX  | MIN    | MAX  |      |
| A                | .043   | .051 | 1.10   | 1.30 | —    |
| B                | .028   | .035 | 0.70   | 0.90 | —    |
| C                | .059   | .067 | 1.50   | 1.70 | —    |
| D                | .020   | .028 | 0.50   | 0.70 | —    |
| E                | .010   | .014 | 0.25   | 0.35 | —    |
| F                | .004   | .008 | 0.10   | 0.20 | —    |
| G                | .020   | .028 | 0.50   | 0.70 | —    |

[1] CONTROLLING DIMENSION: MILLIMETERS

Suggested Land Pattern



| DIM <sup>N</sup> | INCHES |      | MM [1] |      | NOTE |
|------------------|--------|------|--------|------|------|
|                  | MIN    | MAX  | MIN    | MAX  |      |
| C                | —      | .067 | —      | 1.70 | REF  |
| G                | —      | .043 | —      | 1.10 | —    |
| X                | —      | .031 | —      | 0.80 | REF  |
| Y                | —      | .024 | —      | 0.60 | —    |
| Z                | —      | .091 | —      | 2.30 | —    |

[1] CONTROLLING DIMENSION: MILLIMETERS

Ordering Information

| Part Number | Packaging        | Reel Size |
|-------------|------------------|-----------|
| ESD3V310LH  | 3000/Tape & Reel | 7 inch    |