

**Features**

- Ultra low capacitance: 0.3pF typical (I/O to I/O)
- Ultra low leakage: nA level
- Low operating voltage: 5V
- Low clamping voltage
- Up to 2 data lines protects
- JEDEC SOT-523 package
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test  
Air discharge: ±15kV  
Contact discharge: ±8kV
  - IEC61000-4-4 (EFT) 40A (5/50ns)
  - IEC61000-4-5 (Lightning) 5A (8/20µs)
- RoHS Compliant

**Description**

The ESD0521LM1 is an ultra low capacitance TVS array, 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 ESD0521LM1 has very low capacitance with a typical value at 0.3pF, and complies with the IEC 61000-4-2 (ESD) standard with ±15kV air and ±8kV contact discharge. It is assembled into a 3-pin lead-free SOT-523 package. The combination of small size, low capacitance and high level of ESD protection makes it ideal for HDMI, MDDI, antenna circuits, USB 2.0, and Infiniband circuits.

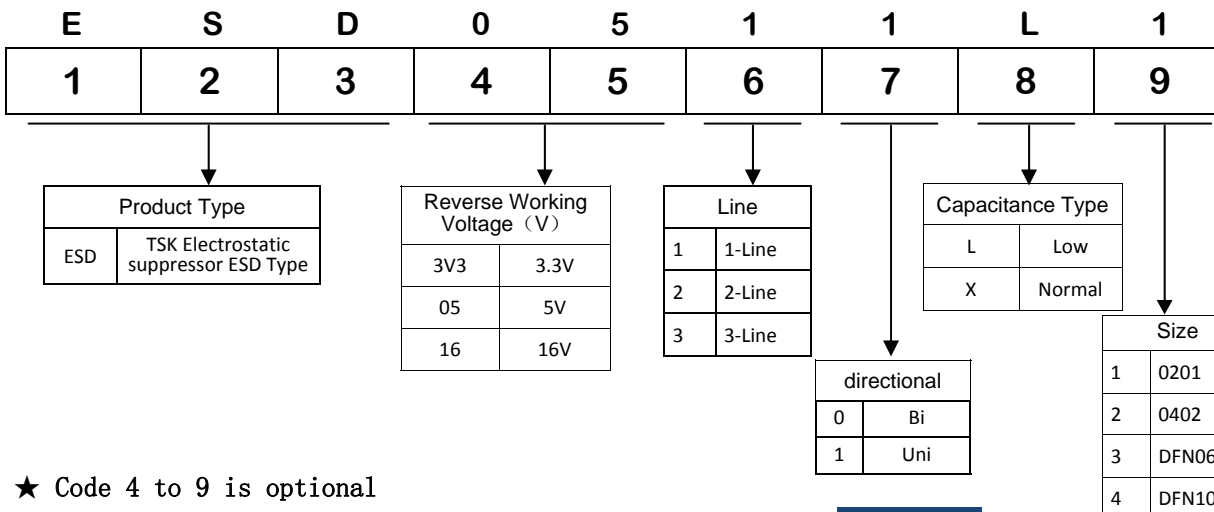
**Mechanical Characteristics**

- Package: SOT-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

**Applications**

- Mobile Display Digital Interface (MDDI)
- USB 2.0
- Photodetector Protection
- HBT Power Amplifier Protection
- Infiniband Transceiver Protection
- Firewire Ports

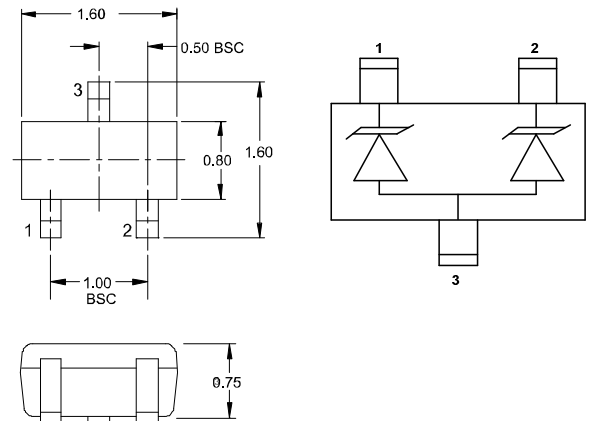
**Part Number Code**



★ Code 4 to 9 is optional



**Dimensions and Pin Configuration**



SOT-523 outline      Circuit and Pin Schematic

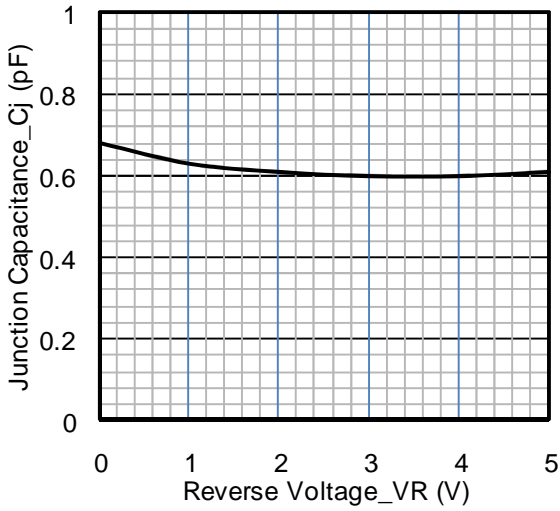
### Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$ unless otherwise specified)

| Parameter                                | Symbol           | Value       | Unit               |
|--|------------------|-------------|--------------------|
| Peak Pulse Power (8/20 $\mu\text{s}$ )   | Ppk              | 90          | W                  |
| Peak Pulse Current (8/20 $\mu\text{s}$ ) | I <sub>PP</sub>  | 5           | A                  |
| ESD per IEC 61000-4-2 (Air)              | V <sub>ESD</sub> | $\pm 15$    | kV                 |
| ESD per IEC 61000-4-2 (Contact)          |                  | $\pm 8$     |                    |
| Operating Temperature Range              | T <sub>J</sub>   | -55 to +125 | $^{\circ}\text{C}$ |
| Storage Temperature Range                | T <sub>stg</sub> | -55 to +150 | $^{\circ}\text{C}$ |

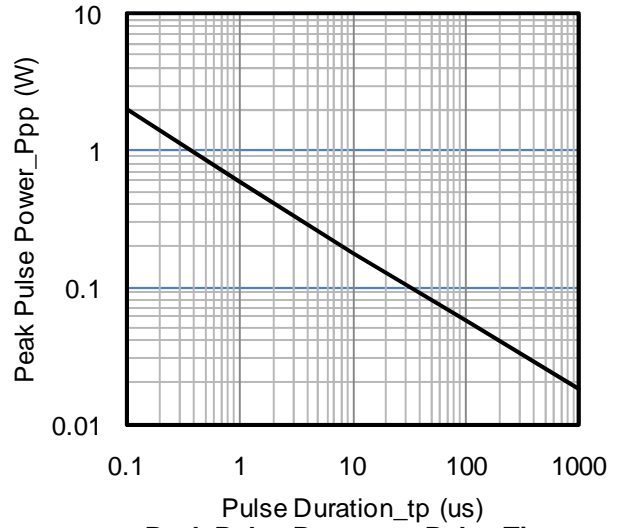
### Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise specified)

| Parameter               | Symbol           | Min | Typ | Max | Unit          | Test Condition   |
|-------------------------|------------------|-----|-----|-----|---------------|--|
| Reverse Working Voltage | V <sub>RWM</sub> |     |     | 5   | V             | Pin 1 or pin 2 to pin 3 and between pin 1 and pin 2                        |
| Breakdown Voltage       | V <sub>BR</sub>  | 6   |     |     | V             | I <sub>T</sub> = 1mA, pin 1 or pin 2 to pin 3                              |
| Reverse Leakage Current | I <sub>R</sub>   |     |     | 0.5 | $\mu\text{A}$ | V <sub>RWM</sub> = 5V, pin 1 or pin 2 to pin 3 and between pin 1 and pin 2 |
| Clamping Voltage        | V <sub>C</sub>   |     |     | 10  | V             | I <sub>PP</sub> = 1A (8 x 20 $\mu\text{s}$ pulse), pin 1 pin 2             |
| Clamping Voltage        | V <sub>C</sub>   |     |     | 18  | V             | I <sub>PP</sub> = 5A (8 x 20 $\mu\text{s}$ pulse), pin 1 or pin 2 to pin 3 |
| Junction Capacitance    | C <sub>J</sub>   |     | 0.3 |     | pF            | V <sub>R</sub> = 0V, f = 1MHz, pin 1 to pin 2                              |
| Junction Capacitance    | C <sub>J</sub>   |     | 0.6 | 0.8 | pF            | V <sub>R</sub> = 0V, f = 1MHz, pin 1 or pin 2 to pin 3                     |

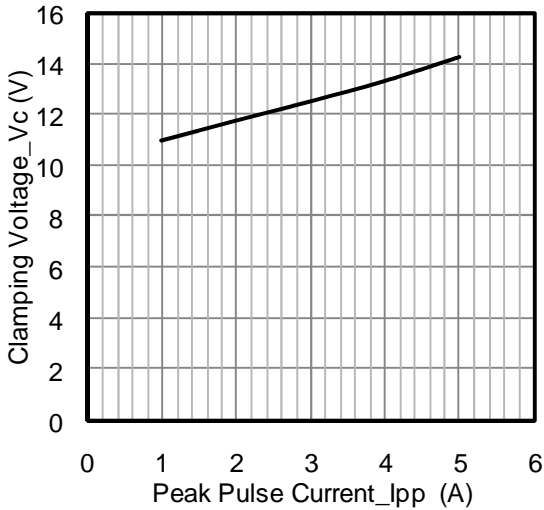
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



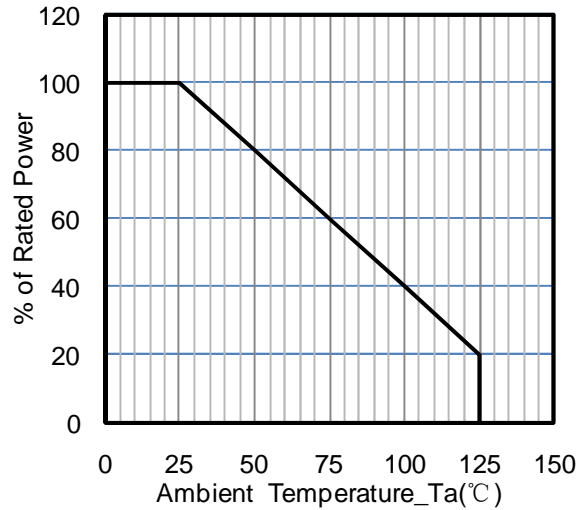
Junction Capacitance vs. Reverse Voltage



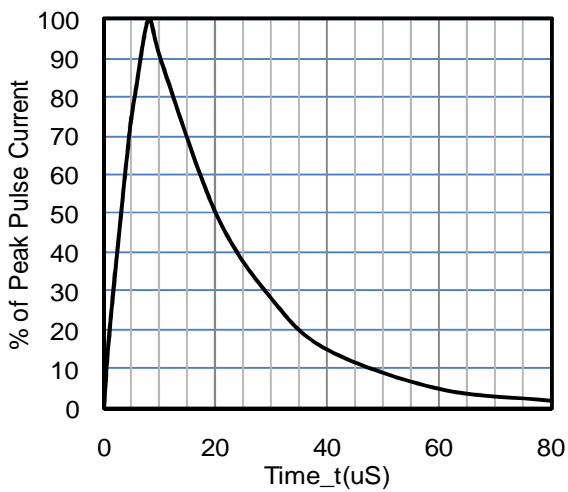
Peak Pulse Power vs. Pulse Time



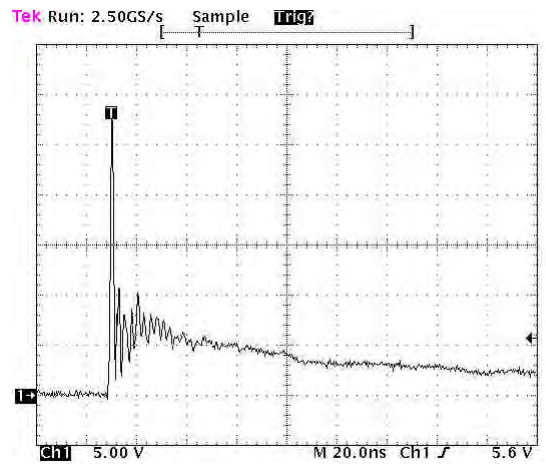
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



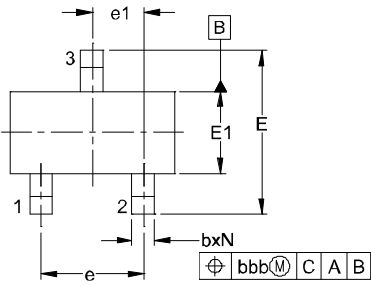
8 X 20uS Pulse Waveform



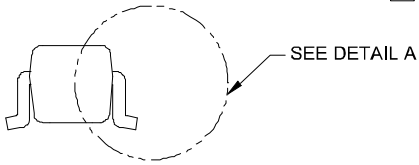
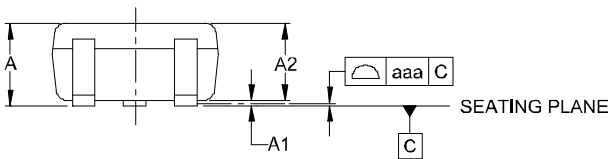
ESD Clamping Voltage

8 kV Contact per IEC61000-4-2

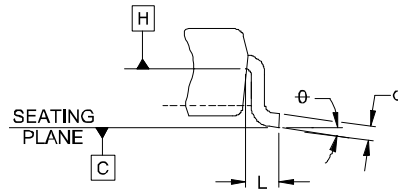
SOT-523 Package Outline Drawing



| DIM      | INCHES   |      |      | MILLIMETERS |      |      |
|----------|----------|------|------|-------------|------|------|
|          | MIN      | NOM  | MAX  | MIN         | NOM  | MAX  |
| A        | .023     | -    | .035 | 0.60        | -    | 0.90 |
| A1       | .000     | -    | .004 | 0.00        | -    | 0.10 |
| A2       | .023     | .030 | .031 | 0.60        | 0.75 | 0.80 |
| b        | .005     | -    | .012 | 0.15        | -    | 0.30 |
| c        | .003     | -    | .008 | 0.10        | -    | 0.20 |
| D        | .059     | .063 | .067 | 1.50        | 1.60 | 1.70 |
| E        | .057     | .063 | .069 | 1.45        | 1.60 | 1.75 |
| E1       | .029     | .031 | .033 | 0.75        | 0.80 | 0.85 |
| e        | .039 BSC |      |      | 1.00 BSC    |      |      |
| e1       | .020 BSC |      |      | 0.50 BSC    |      |      |
| L        | (.009)   |      |      | (0.22)      |      |      |
| N        | 3        |      |      | 3           |      |      |
| $\theta$ | 0°       | -    | 8°   | 0°          | -    | 8°   |
| aaa      | .004     |      |      | 0.10        |      |      |
| bbb      | .008     |      |      | 0.20        |      |      |

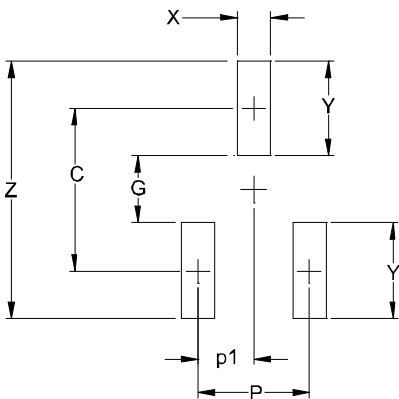


SIDE VIEW



DETAIL A

Suggested Land Pattern



| DIM | DIMENSIONS |             |
|-----|------------|-------------|
|     | INCHES     | MILLIMETERS |
| C   | (.055)     | (1.40)      |
| P   | .039       | 1.00        |
| p1  | .020       | 0.50        |
| G   | .024       | 0.60        |
| X   | .016       | 0.40        |
| Y   | .031       | 0.80        |
| Z   | .087       | 2.20        |

Ordering Information

| Part Number | Packaging        | Reel Size |
|-------------|------------------|-----------|
| ESD0521LM1  | 3000/Tape & Reel | 7 inch    |