

SOT-23 Plastic-Encapsulate TVS/ESD Protection Diodes

DESCRIPTION

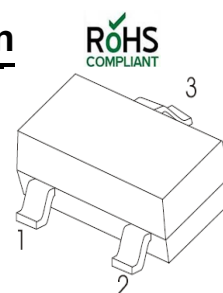
ESD0302TL is an ultra-low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection For high-speed data interfaces. With typical capacitance of 0.2pF (I/O to I/O) only, ESD0302TL is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD), Level 4 ($\pm 15\text{kV}$ air, $\pm 8\text{kV}$ contact discharge), IEC 61000-4-4 (electrical fast transient - EFT) (40A, 5/50 ns), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

ESD0302TL uses ultra-small SOT-23 package. Each ESD0302TL device can protect two high-speed data lines. The combined features of low capacitance, small size and high ESD robustness make ESD0302TL ideal for high-speed data port and high-frequency line applications, The low clamping voltage of the ESD0302TL guarantees a minimum stress on the protected IC.

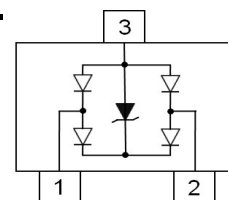
Features

- ◆ Peak Power Dissipation : 56W (8/20 μs)
- ◆ Transient protection for high speed data lines
- ◆ IEC61000-4-2 (ESD) $\pm 15\text{kV}$ (air), $\pm 8\text{kV}$ (contact)
- ◆ IEC61000-4-4 (EFT) 40A (5/50ns)
Cable Discharge Event (CDE)
- ◆ Small package (2.9mm \times 2.4mm \times 1.0mm)
- ◆ Protect two data lines
- ◆ Low clamping voltage
- ◆ Low Capacitance :0.2pF Typical (I/O - I/O)
- ◆ Low leakage current

Pin Configuration



Circuit Diagram



Applications

- ◆ Serial ATA
- ◆ Desktops, Servers and Notebooks
- ◆ PCI Express
- ◆ MDDI Ports
- ◆ USB Data Line Protection
- ◆ Display Ports
- ◆ Digital Visual Interfacs (DVI)

Mechanical Characteristics

- ◆ Package: SOT-23
- ◆ Flammability Rating: UL 94V-0
- ◆ Terminal: Matte tin plated.
- ◆ High temperature soldering guaranteed:
260 $^{\circ}\text{C}$ /10s
- ◆ Marking: 32L
- ◆ Packaging: Tape and Reel

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

| Parameter | Symbol | Value | Unit |
|--|------------------|--------------|--------------------|
| Peak Pulse Power(8/20us) | P _{PP} | 56 | W |
| ESD per IEC 61000-4-2 (Air) | V _{ESD} | ± 20 | KV |
| ESD per IEC 61000-4-2 (Contact) | | ± 20 | |
| Operating Temperature | T _{OPT} | -55 to +125 | $^{\circ}\text{C}$ |
| Storage Temperature | T _{STG} | -55 to +150 | $^{\circ}\text{C}$ |
| Lead Solder Temperature – Maximum (10 Second Duration) | T _L | 260(10 sec.) | $^{\circ}\text{C}$ |

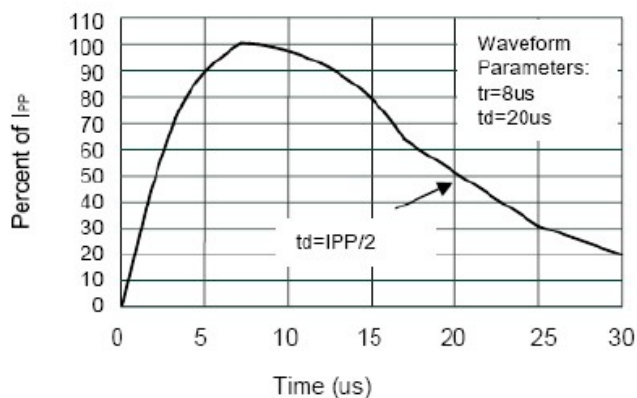
The above data are for reference only.

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

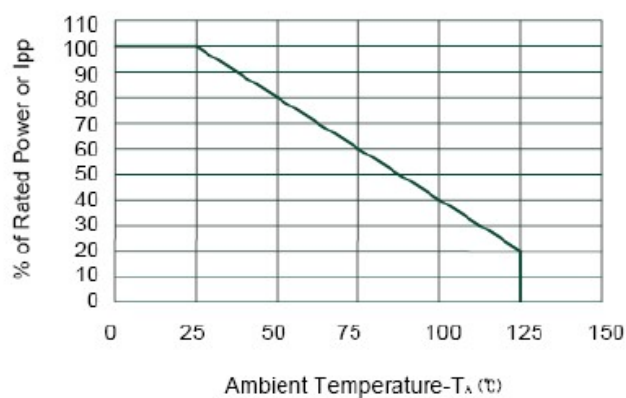
| Symbol | Parameter | Test Condition | Min | Typ | Max | Units |
|-----------|---------------------------|--|-----|-----|-----|-------|
| V_{RWM} | Reverse Working Voltage | I/O to GND | | | 3.3 | V |
| V_{BR} | Reverse Breakdown Voltage | $I_T = 1\text{mA}$ Between I/O and GND | 4.2 | | | V |
| I_R | Reverse Leakage Current | $V_{RWM} = 3.3\text{V}$ Between I/O and GND | | | 100 | nA |
| V_C | Clamping Voltage | $I_{PP} = 1\text{A}, t_p = 8/20\mu\text{s}$ Between I/O and GND | | | 10 | V |
| | | $I_{PP} = 4\text{A}, t_p = 8/20\mu\text{s}$ Between I/O and GND | | | 14 | V |
| V_F | Forward Voltage | $I_T = 10\text{mA}$ Between I/O and GND | | | 1.2 | V |
| C_T | Total Capacitance | $V_R = 0\text{V}, f = 1\text{MHz}$ Between I/O and GND | | 0.4 | | pF |
| | | $V_R = 0\text{V}, f = 1\text{MHz}$ Between I/O and I/O | | 0.2 | | pF |

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ELECTRICAL CHARACTERISTICS CURVE



Pulse Waveform

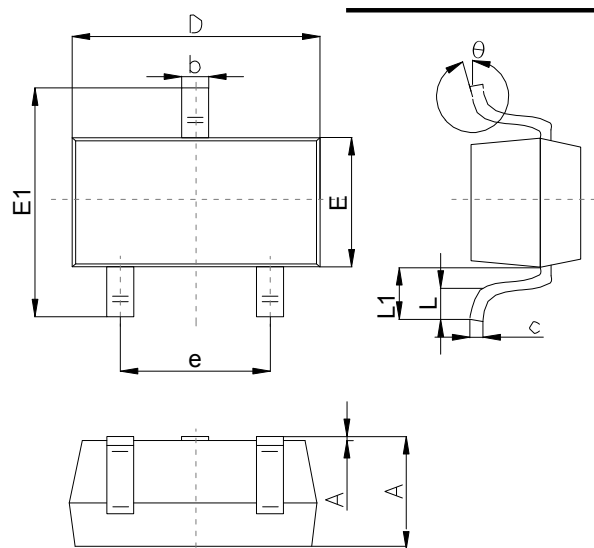


Power Derating Curve

The curve above is for reference only.

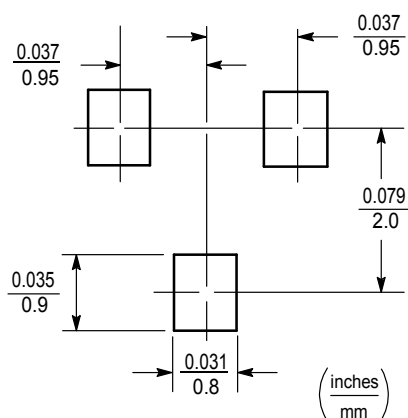
Outline Drawing

SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | |
|----------|---------------------------|------|------|
| | Min | Typ | Max |
| A | 0.89 | 1.00 | 1.40 |
| A1 | 0.01 | 0.06 | 0.10 |
| b | 0.37 | 0.44 | 0.50 |
| c | 0.09 | 0.13 | 0.20 |
| D | 2.80 | 2.90 | 3.10 |
| E | 1.20 | 1.30 | 1.60 |
| E1 | 2.10 | 2.40 | 2.80 |
| e | 1.78 | 1.90 | 2.04 |
| L | 0.10 | | 0.30 |
| L1 | 0.35 | 0.54 | 0.69 |
| θ | 0° | | 10° |

Suggested Pad Layout

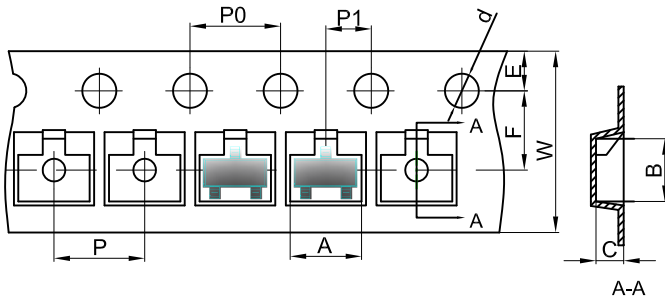


Note:

1. Controlling dimension:in/millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape

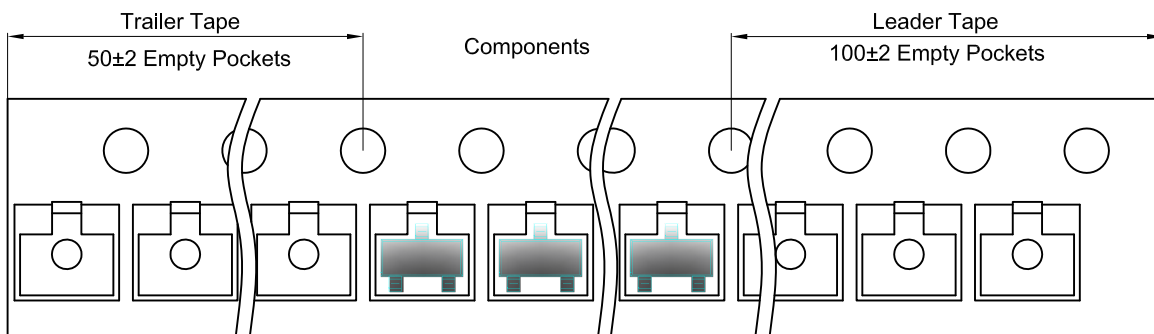


Packaging Description:

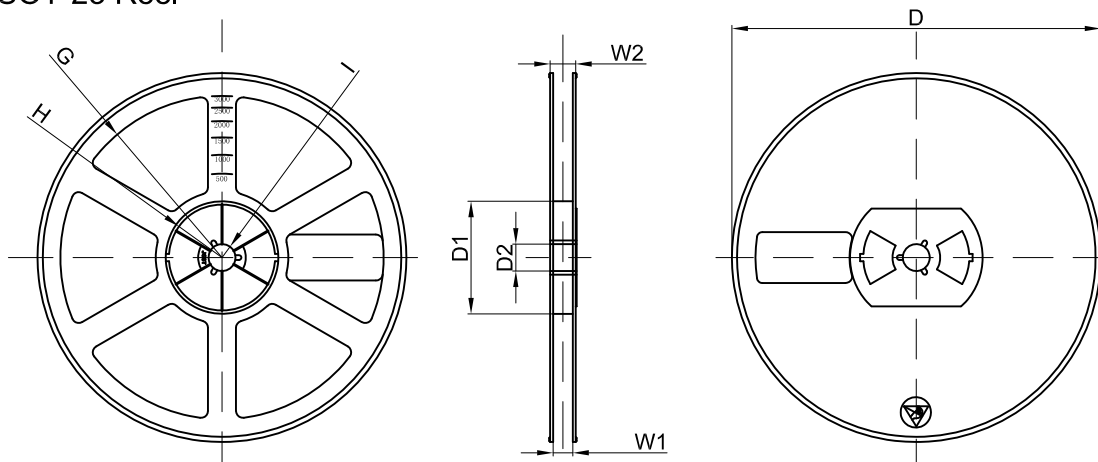
SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter | | | | | | | | | | |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| Pkg type | A | B | C | d | E | F | P0 | P | P1 | W |
| SOT-23 | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

SOT-23 Tape Leader and Trailer



SOT-23 Reel



| Dimensions are in millimeter | | | | | | | | |
|------------------------------|---------|-------|-------|--------|--------|-------|------|-------|
| Reel Option | D | D1 | D2 | G | H | I | W1 | W2 |
| 7" Dia | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

| REEL | Reel Size | Box | Box Size(mm) | Carton | Carton Size(mm) | G.W.(kg) |
|----------|-----------|------------|--------------|-------------|-----------------|----------|
| 3000 pcs | 7 Inch | 45,000 pcs | 203×203×195 | 180,000 pcs | 438×438×220 | |