

## Features

- ❑ IEC61000-4-2 (ESD)            +/-30kV (air),  
                                         +/-30KV(contact)
- IEC61000-4-4 (EFT) 40A (5/50 ns)
- ❑ 350 Watts Peak Pulse Power per (tp=8/20us)
- ❑ Protects one I/O line (bidirectional)
- ❑ Working voltages : 3.3V, 5V,8V,12V,15V,18V,  
                                         24V,36V,48V
- ❑ Low leakage current
- ❑ ROHS compliant

## Description

The TSxx11LE Series is designed for applications requiring transient overvoltage protection capability. They are intended for use in voltage and ESD sensitive equipment such as computers, printers, business machines, communication systems, medical equipment and other applications. These devices are ideal for situations where board space is at a premium.

This series has been specifically designed to protect sensitive components which are connected to power data and transmission lines from overvoltage caused by ESD(electrostatic discharge), CDE (Cable Discharge Events), and EFT (electrical fast transients).

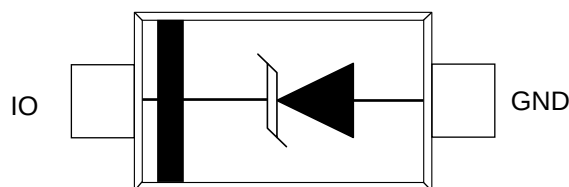
## Applications

- ❑ Cell Phone Handsets and Accessories
- ❑ Microprocessor based equipment
- ❑ Personal Digital Assistants (PDA's)
- ❑ Notebooks, Desktops, and Servers
- ❑ Portable Instrumentation
- ❑ Networking and Telecom
- ❑ Serial and Parallel Ports.
- ❑ Peripherals

## Mechanical Characteristics

- ❑ SOD-323 Package
- ❑ Flammability Rating: UL 94V-0
- ❑ Packaging: Tape and Reel
- ❑ High temperature soldering guaranteed:260°C/10s
- ❑ Reel size: 7 inch

## Pin Configuration



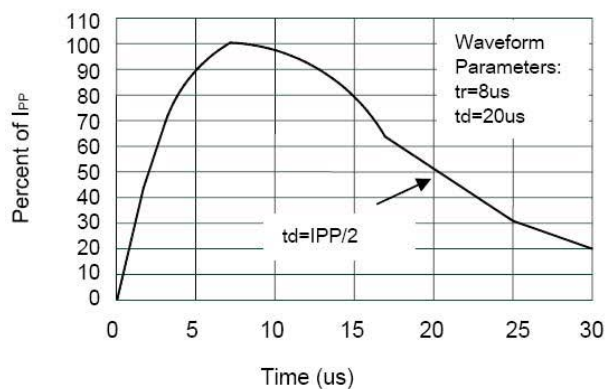
SOD-323 (Top View)

## Absolute Maximum Rating

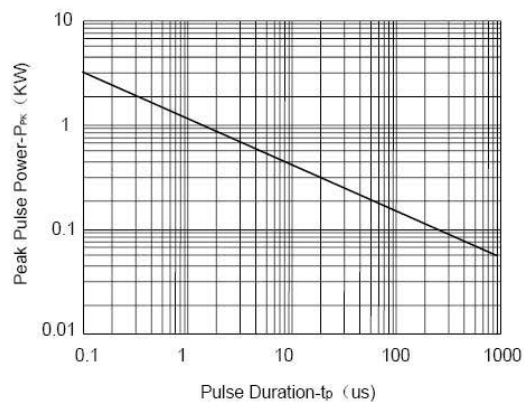
| Symbol                 | Parameter                       | Value         | Units |
|------------------------|---------------------------------|---------------|-------|
| <b>V<sub>ESD</sub></b> | ESD per IEC 61000-4-2 (Air)     | ±30           | kV    |
|                        | ESD per IEC 61000-4-2 (Contact) | ±30           |       |
| <b>P<sub>PP</sub></b>  | Peak Pulse Power (8/20μs)       | 350           | W     |
| <b>T<sub>OPT</sub></b> | Operating Temperature           | -55/+150      | °C    |
| <b>T<sub>STG</sub></b> | Storage Temperature             | -55/+150      | °C    |
| <b>T<sub>L</sub></b>   | Lead Soldering Temperature      | 260 (10 sec.) | °C    |

## Electrical Characteristics (T = 25°C)

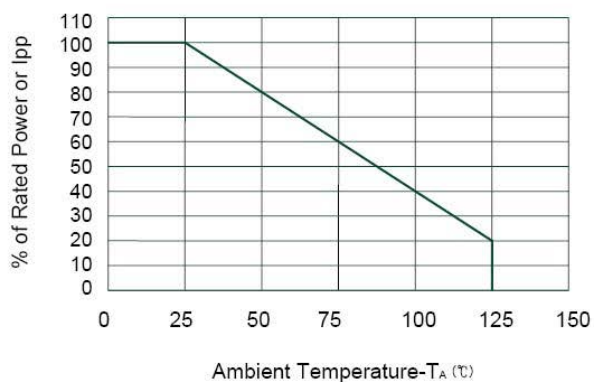
| PART<br>NUMBER | V <sub>RWM</sub><br>(V)<br>(max.) | V <sub>B</sub><br>(V)<br>(min.) | I <sub>T</sub><br>(mA) | V <sub>C@1A</sub><br>(V)<br>(max.) | V <sub>C</sub><br>(V)<br>(max.) (@A) |    | I <sub>R</sub><br>(μA)<br>(max.) | C <sub>T</sub><br>(pF)<br>(max.) | DEVICE<br>MARKING |
|----------------|-----------------------------------|---------------------------------|------------------------|------------------------------------|--------------------------------------|----|----------------------------------|----------------------------------|-------------------|
| TS0311LE       | 3.3                               | 4.5                             | 1                      | 6                                  | 13                                   | 15 | 0.1                              | 500                              | 03W               |
| TS0511LE       | 5                                 | 6.0                             | 1                      | 10                                 | 24                                   | 19 | 0.1                              | 160                              | 05W               |
| TS0811LE       | 8                                 | 9.2                             | 1                      | 15                                 | 28                                   | 15 | 0.1                              | 140                              | 08W               |
| TS1211LE       | 12                                | 13.3                            | 1                      | 19                                 | 32                                   | 13 | 0.1                              | 120                              | 12W               |
| TS1511LE       | 15                                | 16.7                            | 1                      | 24                                 | 36                                   | 10 | 0.1                              | 100                              | 15W               |
| TS1811LE       | 18                                | 20.4                            | 1                      | 28                                 | 45                                   | 8  | 0.1                              | 80                               | 18W               |
| TS2411LE       | 24                                | 26.7                            | 1                      | 36                                 | 50                                   | 7  | 0.1                              | 60                               | 24W               |
| TS3611LE       | 36                                | 40.0                            | 1                      | 50                                 | 60                                   | 6  | 0.1                              | 40                               | 36W               |
| TS4811LE       | 48                                | 52.0                            | 1                      | 65                                 | 70                                   | 5  | 0.1                              | 40                               | 48W               |



**Pulse Waveform**



**Non-Repetitive Peak Pulse Power vs. Pulse Time**



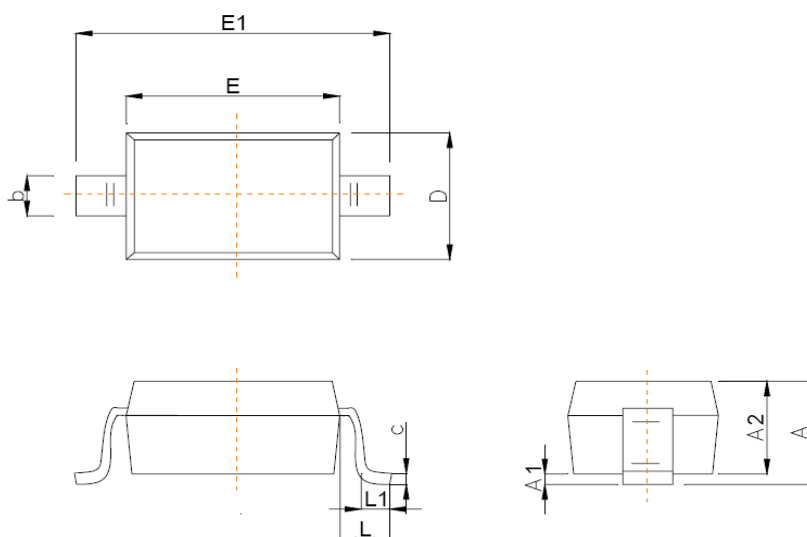
**Power Derating Curve**

## Package Outline

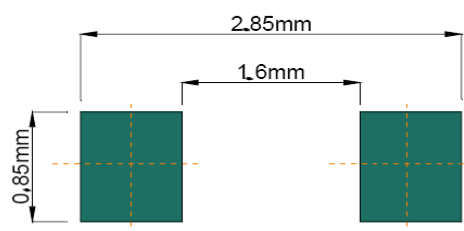
□ SOD-323 package



## Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       |
|--------|---------------------------|-------|
|        | Min                       | Max   |
| A      |                           | 1.00  |
| A1     | 0.000                     | 0.100 |
| A2     | 0.800                     | 0.900 |
| b      | 0.250                     | 0.350 |
| c      | 0.080                     | 0.150 |
| D      | 1.200                     | 1.400 |
| E      | 1.600                     | 1.800 |
| E1     | 2.500                     | 2.700 |
| e      | 1.800                     | 2.040 |
| L      | 0.475 REF                 |       |
| L1     | 0.250                     | 0.400 |
| θ      | 0°                        | 8°    |



**Recommended Pad outline**