

Features

- ☐ Transient protection for high-speed data lines
IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (Air)
 $\pm 30\text{kV}$ (Contact)
IEC 61000-4-4 (EFT) 80A (5/50ns)
IEC 61000-4-5 (Lightning) 10A (8/20us)
- ☐ Protects one I/O line (bidirectional)
- ☐ Low clamping voltage
- ☐ Working voltages : 15.0V
- ☐ Low leakage current
- ☐ Response Time is < 1 ns
- ☐ GREEN Part and RoHS Compliant

Description

TS1501VE is an ultra-low capacitance ESD and Surge Protector designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. TS1501VE 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), IEC 61000-4-5 (Surge) (10A, 8/20 μs), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

TS1501VE is in an SOD-323 package. The combined features of ultra-low capacitance and high ESD robustness make TS1501VE ideal for applications where arrays are not practical. The low clamping voltage of the TS1501VE guarantees a minimum stress on the protected IC.

Applications

- ☐ Cell Phone Handsets and Accessories
- ☐ Microprocessor based equipment
- ☐ Personal Digital Assistants (PDA's)
- ☐ Notebooks, Desktops, and Servers
- ☐ Portable Instrumentation
- ☐ Peripherals
- ☐ USB Interface

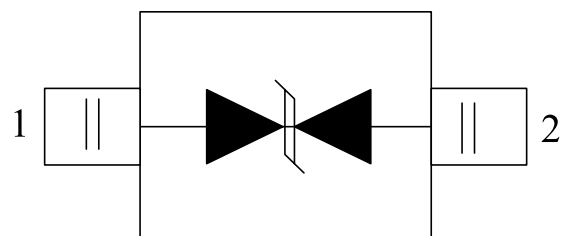
Mechanical Characteristics

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

Ordering Information

- ☐ Package: SOD-323
- ☐ Material: Halogen free
- ☐ Packing: Tape & Reel
- ☐ Quantity per reel: 3,000pcs

Pin Configuration



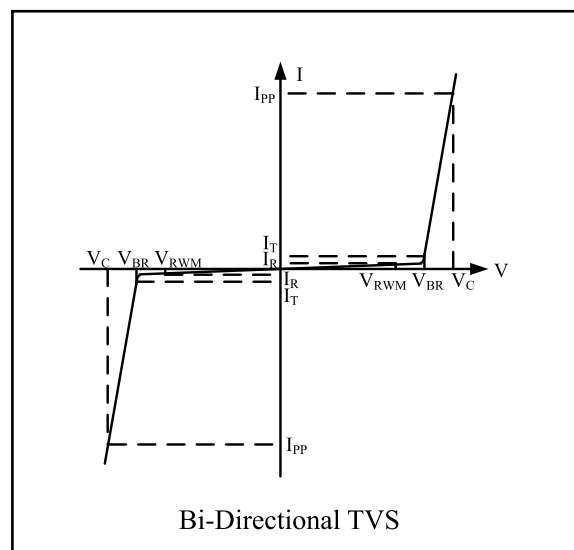
(Top View)

**Absolute Maximum Rating**

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current (8/20 μ s)	10	A
P_{PK}	Peak Pulse Power (8/20 μ s)	350	Watts
V_{ESD}	ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	± 30 ± 30	kV
T_{OPT}	Operating Temperature	-55 to +150	°C
T_{STG}	Storage Temperature	-55 to +150	°C
T_{LST}	Lead Soldering Temperature	260	°C

Electrical Characteristics (T = 25°C)

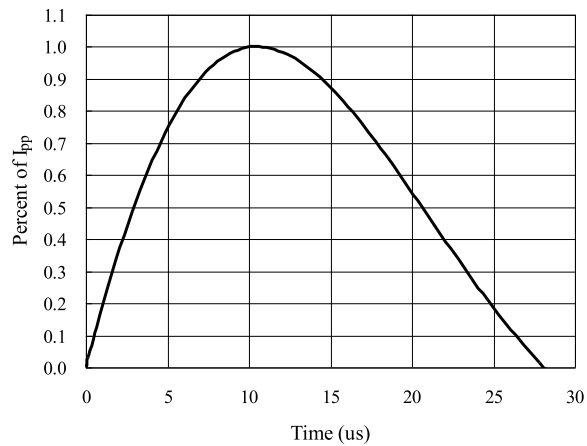
Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{t1}	Trigger Voltage
I_{t1}	Trigger Current @ V_{t1}
V_h	Holding Voltage
I_h	Holding Current @ V_h
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance
C_{Δ}	Variation in C_{ESD} with Reverse Bias



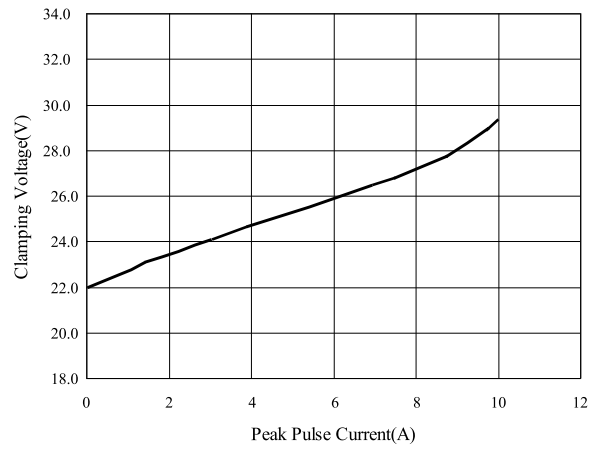
Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				15.0	V
I_R	$V_{RWM} = 15.0V, T = 25^{\circ}C$		0.01	0.1	μA
V_{BR}	$I_T = 1mA$	16.7			V
V_C	$I_{PP} = 1A, t_p = 8/20\mu s$			22.0	V
V_C	$I_{PP} = 10A, t_p = 8/20\mu s$			35.0	V
C_{ESD}	$V_R = 0V, f = 1MHz$		1.5	2.0	pF



8/20 μ s Pulse Waveform

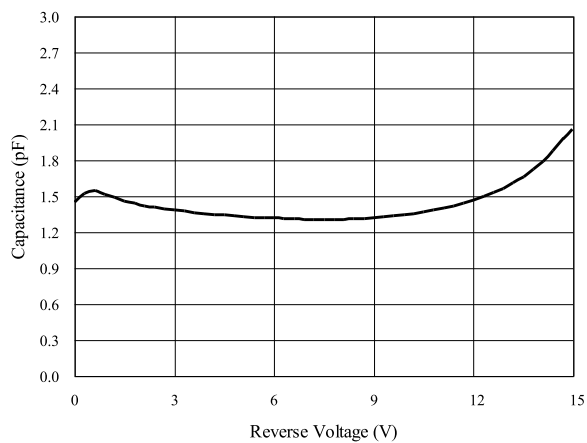


Clamping Voltage V_C vs. Current I_{PP}

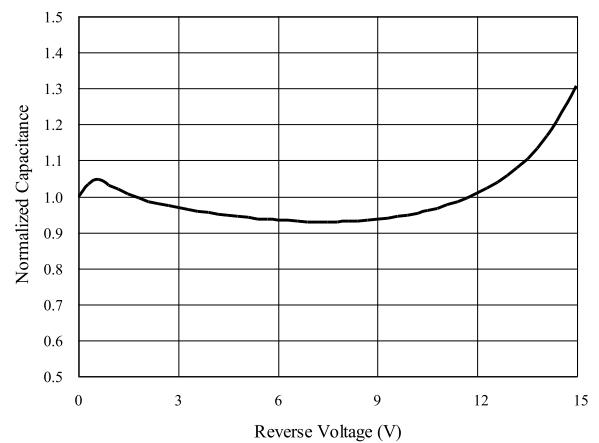


Capacitance vs. Voltage of I/O to GND (f = 1MHz)

Capacitance vs. Reverse Voltage



Normalized Capacitance vs. Reverse Voltage



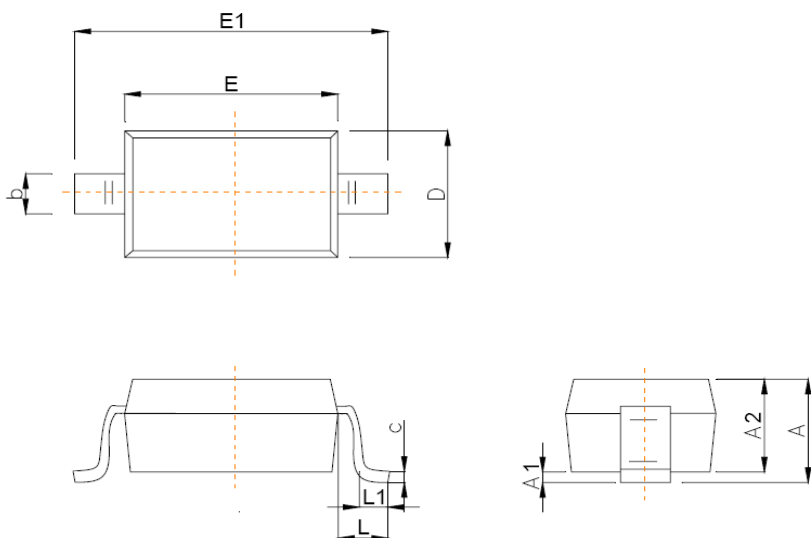
Package Outline

□ SOD-323 package

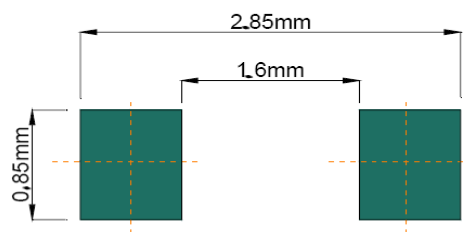
□ MSL-3 Level



Package Outline Dimensions

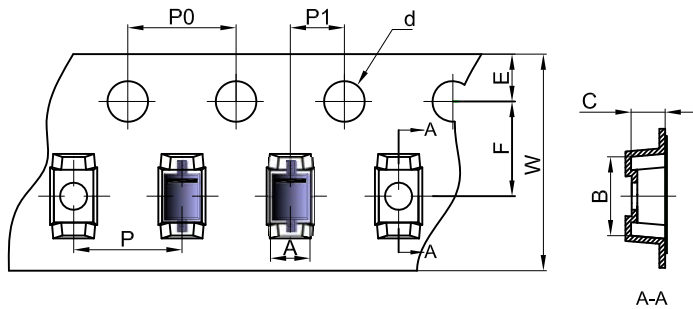


Symbol	Dimensions In Millimeters	
	Min	Max
A		1.00
A1	0.000	0.100
A2	0.800	0.900
b	0.250	0.350
c	0.080	0.150
D	1.200	1.400
E	1.600	1.800
E1	2.500	2.700
e	1.800	2.040
L	0.475 REF	
L1	0.250	0.400
θ	0°	8°



Recommended Pad outline

Tape and Reel Specification

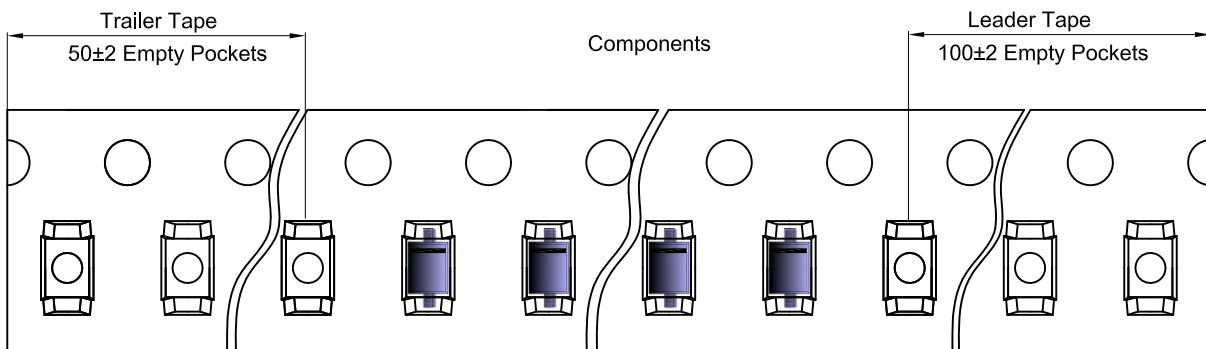


Packaging Description:

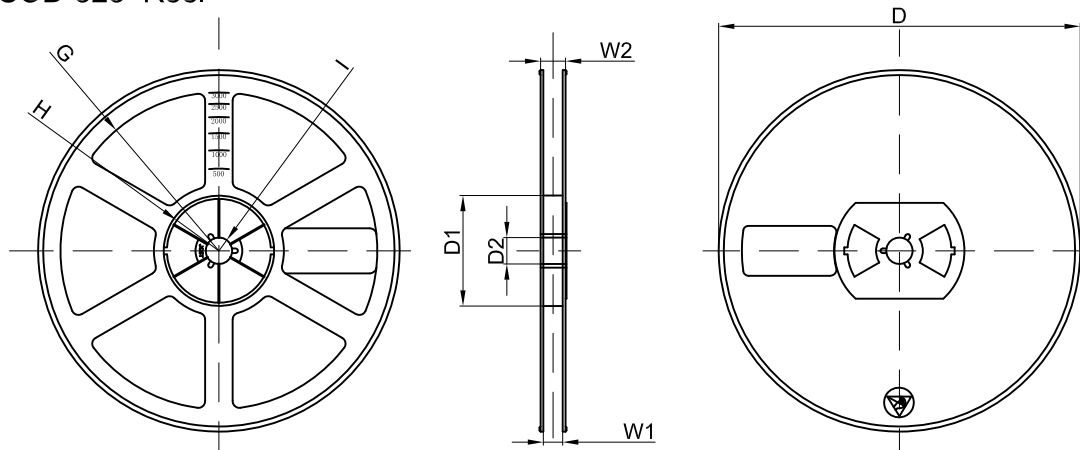
SOD-323 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts 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
SOD-323	1.48	3.3	1.25	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOD-323 Tape Leader and Trailer



SOD-323 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	

Marking Codes**Note:**

(1) C0VE is the Part Number, fixed.

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TS1501VEX	15.0V	3,000	7 Inch