



Features

- ❑ Transient protection for high-speed data lines
IEC 61000-4-2 (ESD) ±30kV (Air)
±30kV (Contact)
- ❑ Low leakage current: 10nA @ V_{RWM} (Typical)
- ❑ Low operating and clamping voltage
- ❑ Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge
- ❑ ROHS compliant

Description

TS0301TEX is an ultra-low capacitance ESD and Surge Protector designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. TS0301TEX 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 (±15kV air, ±8kV contact discharge), IEC 61000-4-4 (electrical fast transient - EFT) (40A, 5/50 ns), IEC 61000-4-5 (Surge) (20 A, 8/20µs), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

TS0301TEX is in an SOD-323 package. The combined features of ultra-low capacitance and high ESD robustness make TS0301TEX ideal for applications where arrays are not practical. The low clamping voltage of the TS0301TEX guarantees a minimum stress on the protected IC.

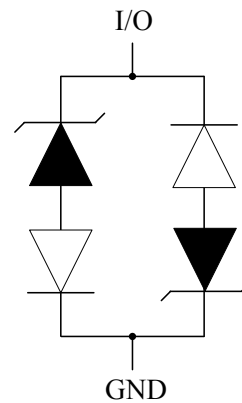
Applications

- ❑ Desktops, Servers and Notebooks
- ❑ Cellular Phones
- ❑ Portable Instruments
- ❑ Analog Inputs

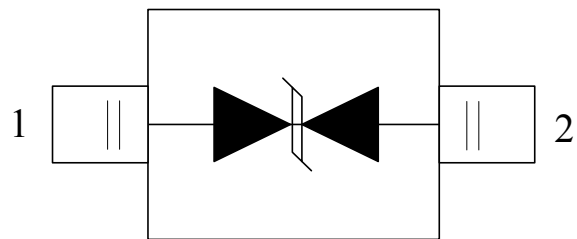
Mechanical Characteristics

- ❑ SOD-323 package
- ❑ Flammability Rating: UL 94V-0
- ❑ Marking: Part number
- ❑ Packaging: Tape and Reel

Circuit Diagram



Pin Configuration



SOD-323
(Top View)

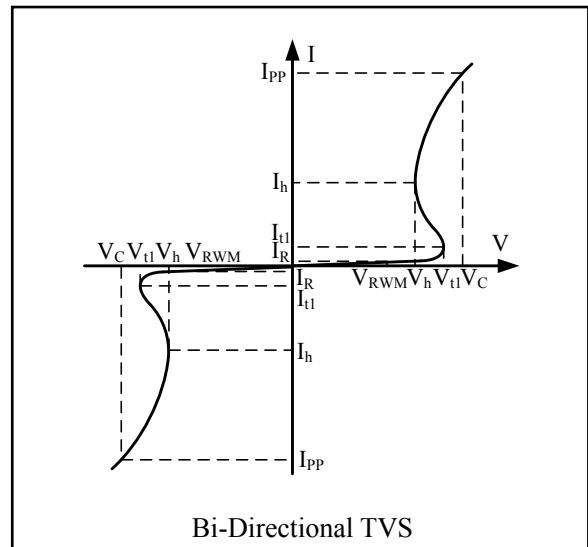


Absolute Maximum Rating

Symbol	Parameter	Value	Units
P _{PK}	Peak Pulse Power (8/20μs)	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	-45 to +85	°C
T _{STG}	Storage Temperature	-55 to +150	°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}
V _{CR}	Reverse Clamping Voltage @ I _{PP}
I _{PP}	Maximum Peak Pulse Current
C _{ESD}	Parasitic Capacitance

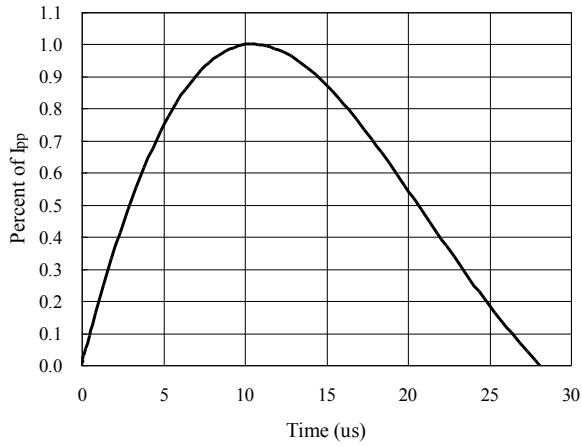


Bi-Directional TVS

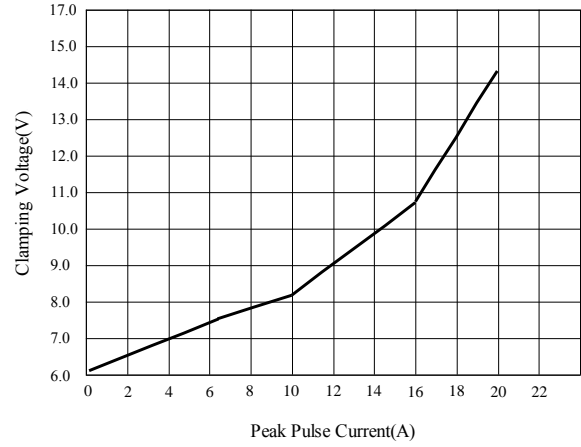
Symbol	Test Condition	Minimum	Typical	Maximum	Units
V _{RWM}				3.3	V
I _R	V _{RWM} = 3.3V, T = 25°C		0.01	0.5	μA
V _{t1}	I _{t1} = 1μA	6.0		7.5	V
V _h	I _h = 10mA	4.0		5.0	V
V _C	I _{PP} = 1A, t _p = 8/20μs		5.5		V
V _C	I _{PP} = 10A, t _p = 8/20μs		10.0		V
V _C	I _{PP} = 20A, t _p = 8/20μs		17.5		V
C _{ESD}	V _R = 0V, f = 1MHz		0.7		pF
C _{ESD}	V _R = 3.3V, f = 1MHz		0.75		pF



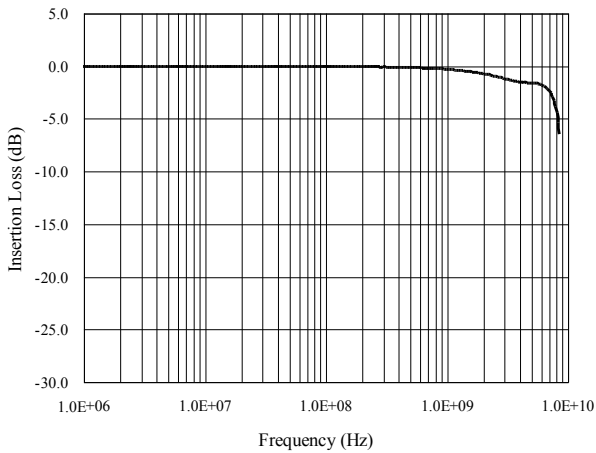
8/20 μ s Pulse Waveform



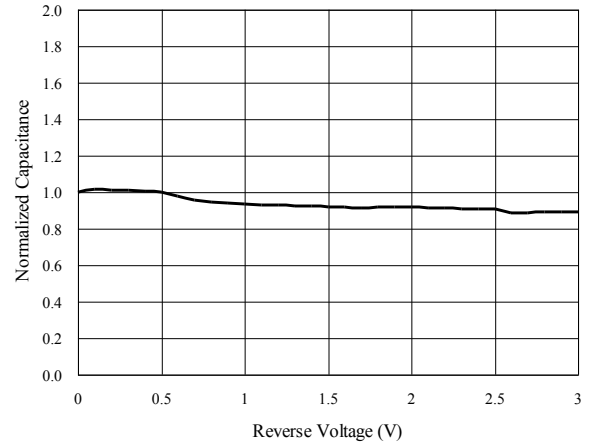
Clamping Voltage V_C vs. Current I_{PP}



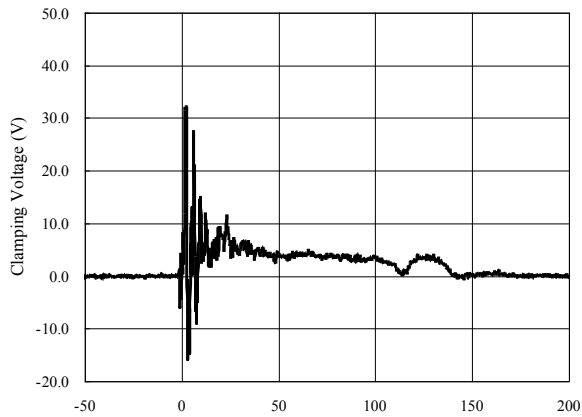
Insertion Loss S21



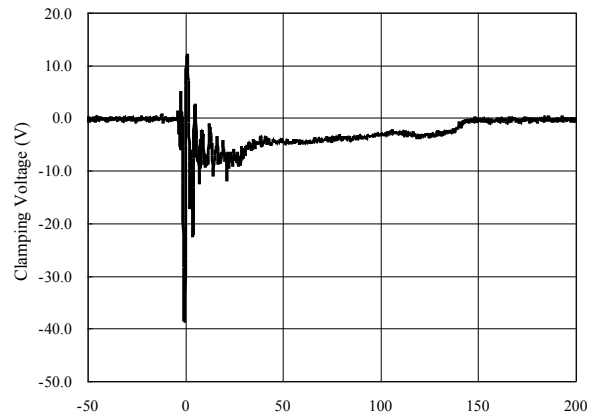
Normalized Capacitance vs. Voltage



ESD Clamping of I/O to GND (+8kV Contact per IEC 61000-4-2)



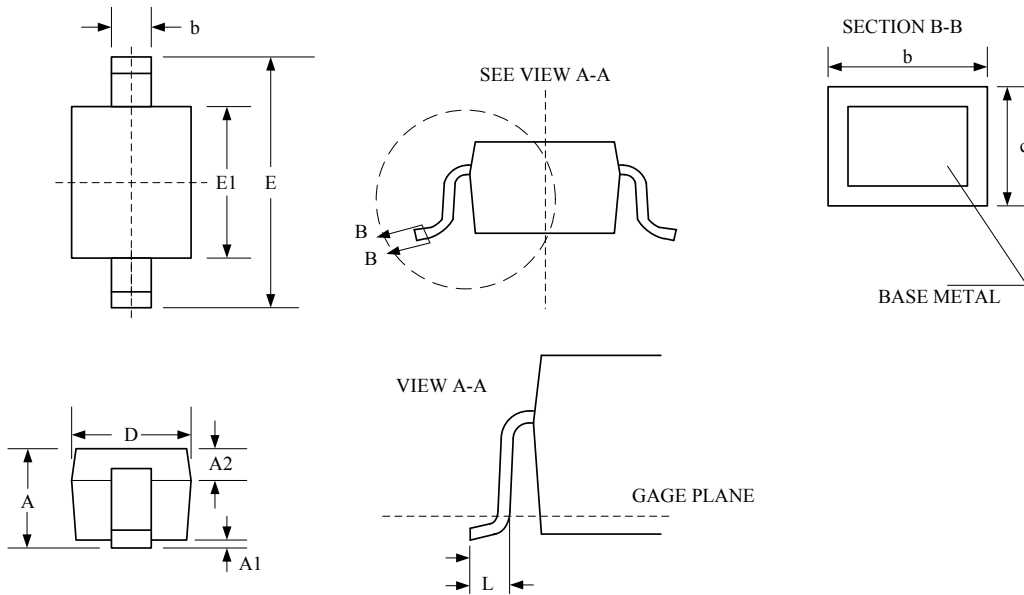
ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)





Package Outline

□ SOD-323 Package

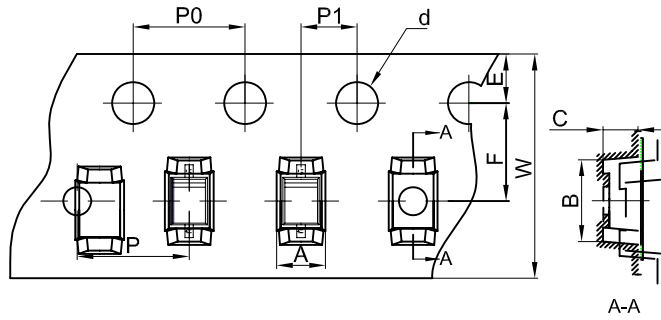


Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions (mm)			Dimensions (Inches)		
	Minimum	Typical	Maximum	Minimum	Typical	Maximum
A	0.910	—	1.170	0.036	—	0.046
A1	0.000	—	0.100	0.000	—	0.004
A2	0.300	—	0.400	0.012	—	0.016
b	0.330	—	0.430	0.013	—	0.017
c	0.130	—	0.200	0.005	—	0.008
D	1.180	1.280	1.370	0.044	0.050	0.054
E	2.460	2.590	2.720	0.097	0.102	0.107
E1	1.500	1.640	1.780	0.060	0.065	0.070
L	0.250	0.350	0.450	0.010	0.014	0.018

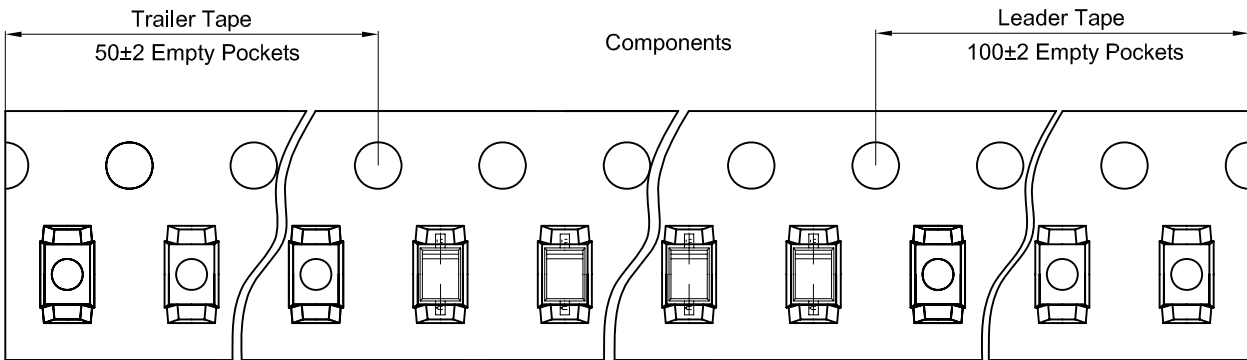


Tape and Reel Specification

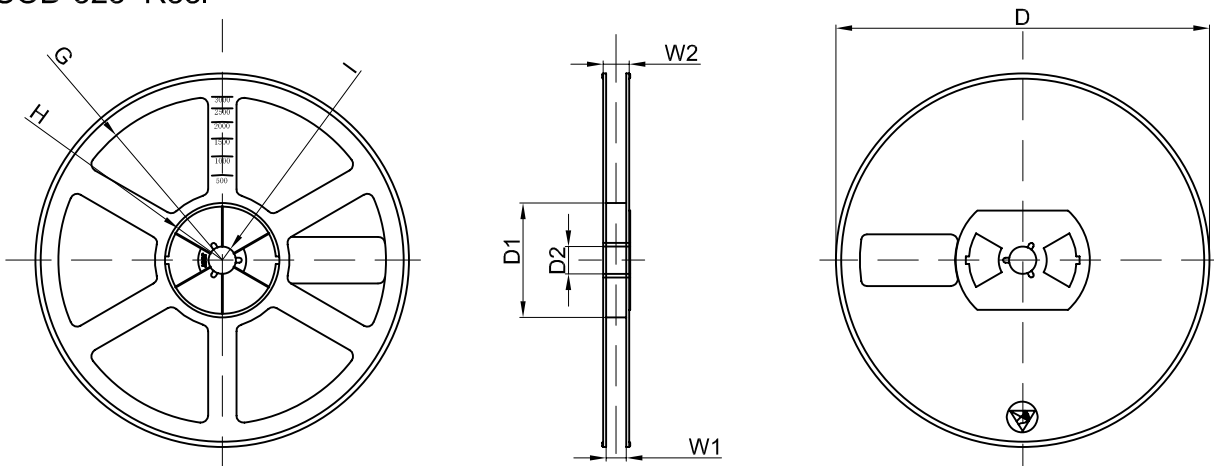


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOD-323	1.46	2.90	1.25	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00
(Tolerance)	+/-0.05	+/-0.05	+/-0.05	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+0.3/-0.1

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
Tolerance	+/-2	+/-1	+/-1	+/-1	+/-1	+/-1	+/-1	+/-1

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



Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TS0301TEX	3.3V	3,000	7 Inch

Note:

(1) "CC" or "HH" is the part number, fixed.