TS0301PEX

Low Capacitance ESD/Surge Protection

Features

- Transient protection for high-speed data lines
  - IEC 61000-4-2 (ESD) ±30kV (Air)
    ±30kV (Contact)
  - IEC 61000-4-4 (EFT) 80A (5/50 ns)
  - IEC 61000-4-5 (Surge) 40A (8/20μs)
- Package optimized for high-speed lines
- Provides protection for one line pair
- Low capacitance: 4.5pF (Typical)
- Low leakage current: 0.01uA @ V_{RWM} (Typical)
- Low operating and clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge
- ROHS compliant

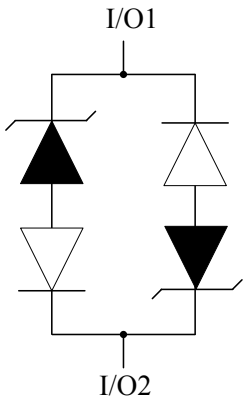
Applications

- Portable instruments
- Desktops, Servers and Notebooks
- Cellular Phones
- MP3 Players
- Keypads, Side Keys

Mechanical Characteristics

- SOD323 package
- Flammability Rating: UL 94V-0
- Marking: Part number
- Packaging: Tape and Reel

Circuit Diagram

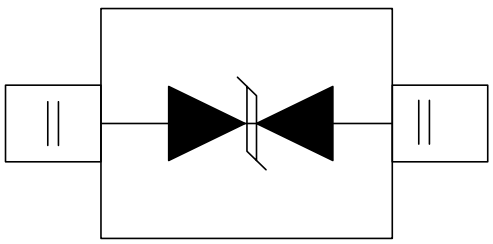


Description

TS0301PEX is a low-capacitance Transient Voltage Suppressor (TVS) array designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 4.5pF only, TS0301PEX 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) (35A, 8/20μs), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

TS0301PEX is in a SOD323 package. Each TS0301PEX device can protect one high-speed line pair. The "flow-thru" design minimizes trace inductance and reduces voltage overshoot associated with ESD events. The combined features of low capacitance and high ESD robustness make TS0301PEX ideal for portable applications such as cellular phones and MP3 players. The low clamping voltage of the TS0301PEX guarantees a minimum stress on the protected IC.

Pin Configuration



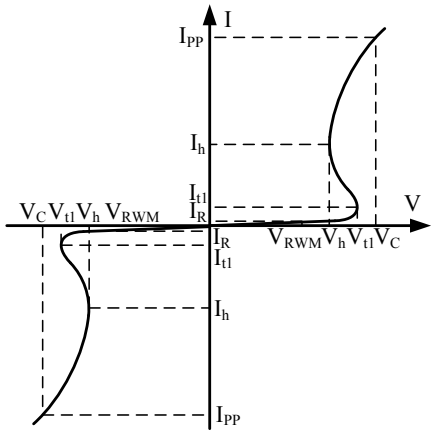
SOD-323
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current (8/20μs)	35	A
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)

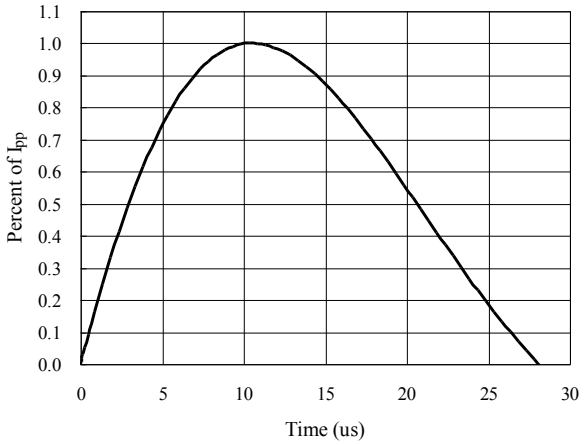
Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{t1}	Trigger Voltage
I_{t1}	Trigger Current @ V_{t1}
V_h	Holding Voltage
I_h	Holding Current @ V_h
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance
C_Δ	Variation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



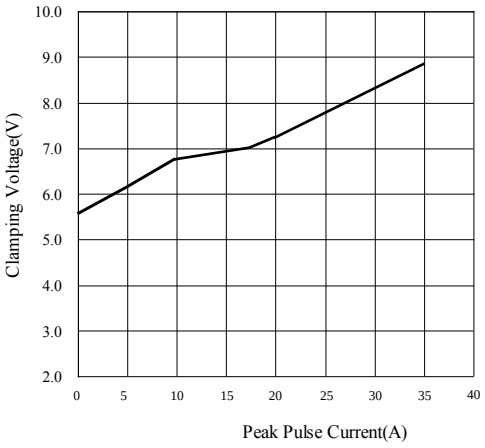
Bi-Directional TVS

Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				3.3	V
I_R	V_{RWM} = 3.3V, T = 25°C		0.01	0.1	μA
V_{t1}	I_{t1} = 100nA	5.0		6.0	V
V_h	I_h = 10mA	3.0		4.0	V
V_C	I_{PP} = 1A, t_p = 8/20μs			6.0	V
V_C	I_{PP} = 35A, t_p = 8/20μs			10.0	V
C_{ESD}	V_R = 0V, f = 1MHz		4.5		pF

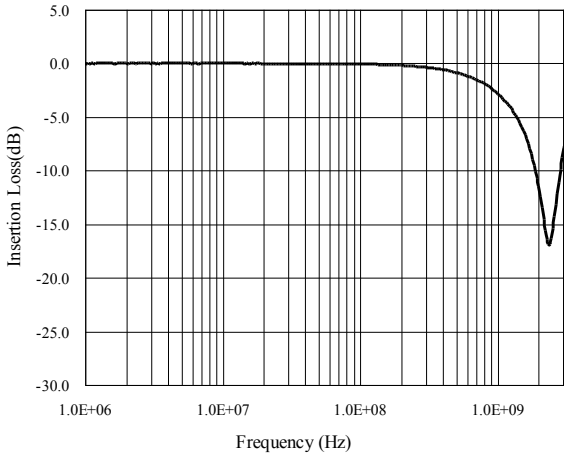
8/20μs Pulse Waveform



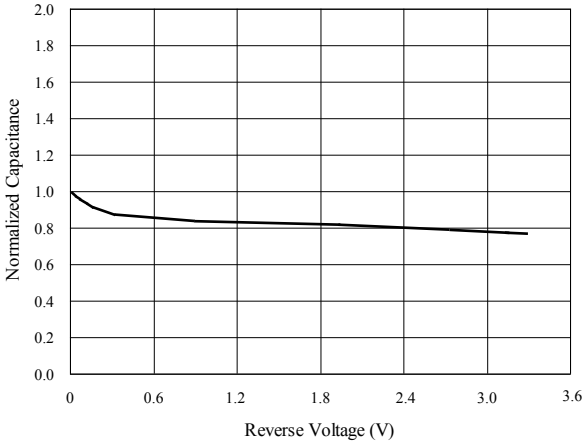
Clamping Voltage V_C vs. Current I_{PP}



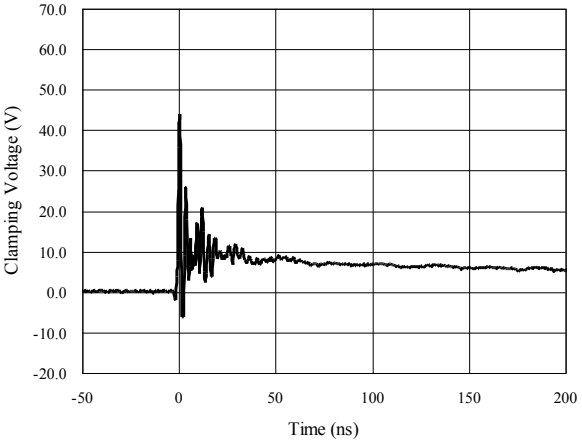
Insertion Loss S21



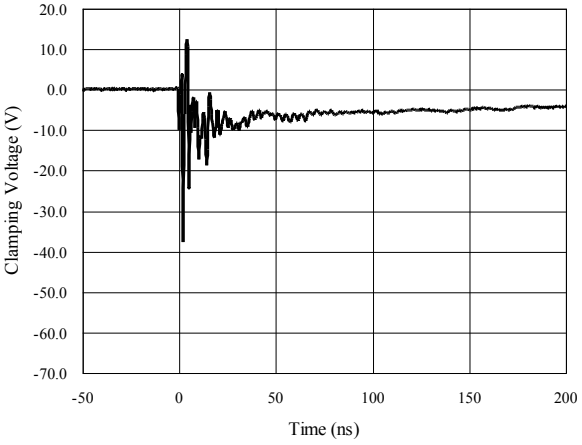
Normalized Capacitance vs. Voltage



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

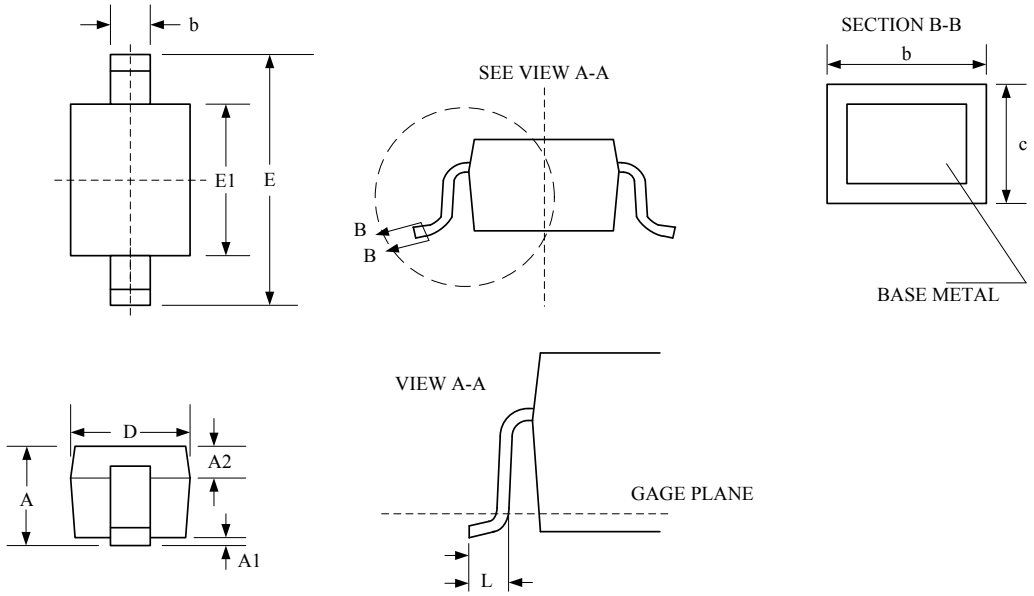


ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)



Package Outline

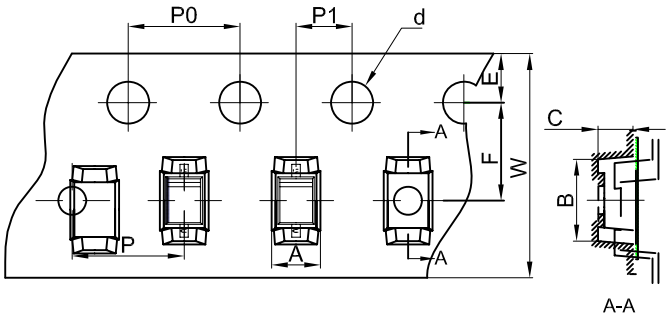
- ❑ SOD-323 Package
- ❑ MSL-3



Package Dimensions (Controlling dimensions are in millimeters)

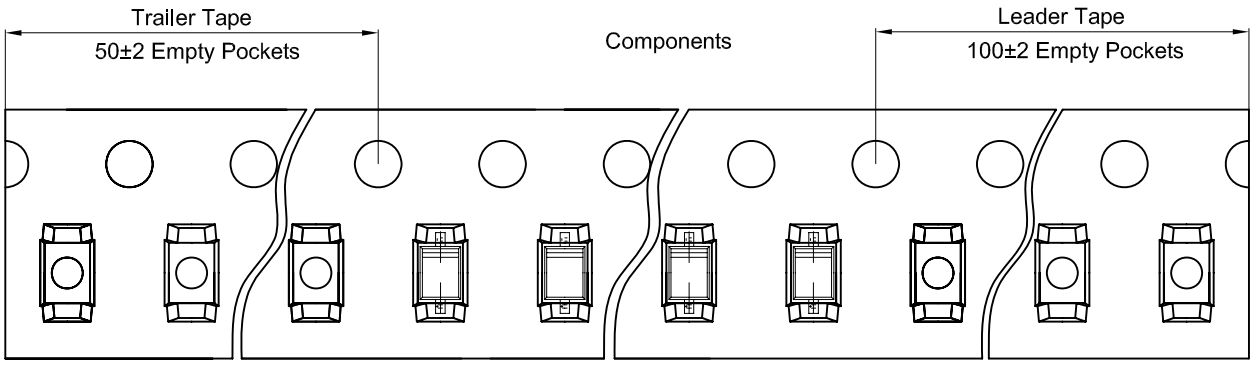
Symbol	Dimensions (mm)			Dimensions (Inches)		
	Minimum	Typical	Maximum	Minimum	Typical	Maximum
A	0.910	—	1.170	0.036	—	0.046
A1	0.000	—	0.100	0.000	—	0.004
A2	0.300	—	0.400	0.012	—	0.016
b	0.330	—	0.430	0.013	—	0.017
c	0.130	—	0.200	0.005	—	0.008
D	1.180	1.280	1.370	0.044	0.050	0.054
E	2.460	2.590	2.720	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

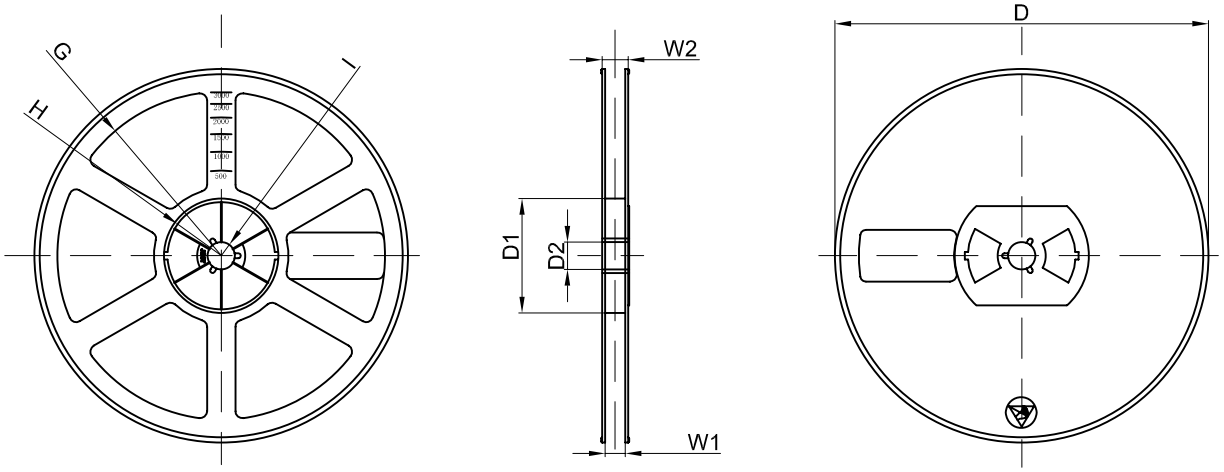


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOD-323	1.46	2.90	1.25	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00
(Tolerance)	+/-0.05	+/-0.05	+/-0.05	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+0.3/-0.1

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

30PE

Note:

(1) "30PE" is part number, fixed

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TS0301PEX	3.3V	3,000	7 Inch

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Global Electronic Components Distributor

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JY:

JY1106-ADJBX TS0421LEX TS1811LD-CX TT0514TLX JY2126AX TT0301MAX TT0314TPX JY9425X TS0334PLX TS0512PMX TT0201SAX JY1103-H330QX SMCJ20AX TNM01K20FX B5819WX P3100SCX TL431 TP6063F-TDX TS2411LEX TT0401TBX TT1501SBX JY2312X P0300SCX RCLAMP0524P JY1103-H390BX JY1117E50AX MMBT3906X TS0321LEX TT0511TEX JY1106-180EX