Features

- Transient protection for high-speed data lines
  - IEC 61000-4-2 (ESD) ±30kV (Air)
  - ±30kV (Contact)
  - IEC 61000-4-4 (EFT) 40A (5/50 ns)
  - Cable Discharge Event (CDE)
- Package optimized for high-speed lines
- Small package (2.9mm × 2.5mm × 1.0mm)
- Protects two data lines
- Low capacitance: 3.5pF Typical @ 0V
- Low leakage current: 0.1μA @ V_{RWM} (Typical)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge

Description

TS0512PMX is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 3.5pF only, TS0512PMX 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), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

TS0512PMX uses small SOT-143 package. Each TS0512PMX device can protect two high-speed data lines. The combined features of low capacitance, small size and high ESD robustness make TS0512PMX ideal for high-speed data ports and high-frequency lines (e.g., USB2.0) applications. The low clamping voltage of the TS0512PMX guarantees a minimum stress on the protected IC.

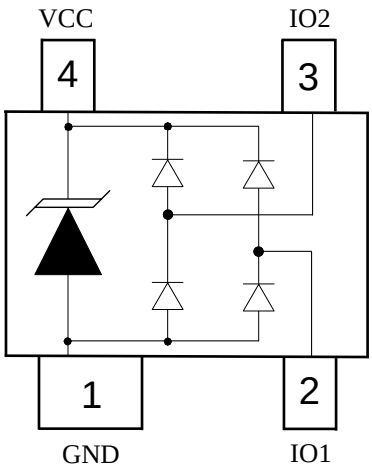
Applications

- USB2.0 Power and Data Line Protection
- Digital Visual Interfaces (DVI)
- 10/100/1000M Ethernet Interfaces
- Desktops, Servers and Notebooks
- SIM Ports
- Monitors and Flat Panel Displays
- Video Graphics Cards

Mechanical Characteristics

- SOT-143 package
- Flammability Rating: UL 94V-0
- Marking: Part number etc
- Packaging: Tape and Reel

Pin Configuration



SOT-143

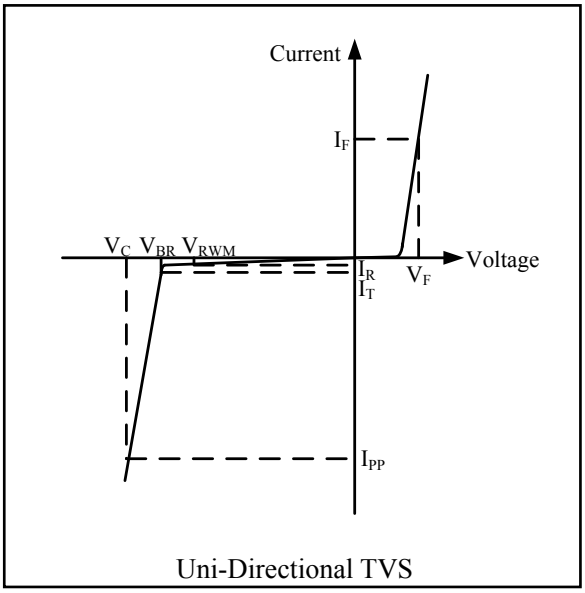
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current (8/20μs)	18	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	-55/+125	°C
T_{STG}	Storage Temperature	-55/+150	°C

Electrical Characteristics (T = 25°C)

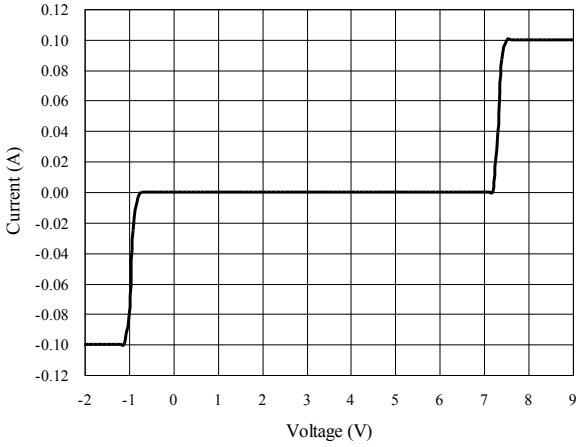
Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Reverse Breakdown Voltage @ I_T
I_T	Test Current for Reverse Breakdown
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance
V_R	Reverse Voltage
f	Small Signal Frequency
I_F	Forward Current
V_F	Forward Voltage @ I_F



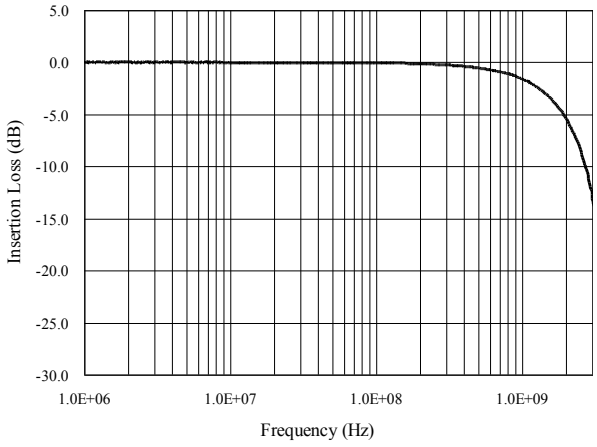
Uni-Directional TVS

Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				5.0	V
I_R	V_{RWM} = 5V, T = 25°C Between I/O and GND		0.1	1.0	μA
V_{BR}	I_T = 1mA Between I/O and GND	6.0	7.0	9.0	V
V_F	I_F = 15mA			1.2	V
V_C	I_{PP} = 1A, t_p = 8/20μs Between I/O and GND			12	V
V_C	I_{PP} = 5A, t_p = 8/20μs Between I/O and GND			17	V
C_{ESD}	V_R = 0V, f = 1MHz Between I/O and GND		3.5	5.0	pF
C_{ESD}	V_R = 0V, f = 1MHz Between I/O and I/O		1.5	2.5	pF

Voltage Sweeping of I/O to GND

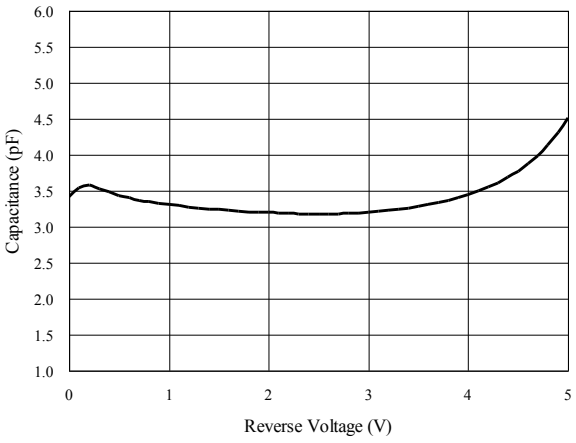


Insertion Loss S21 of I/O to GND

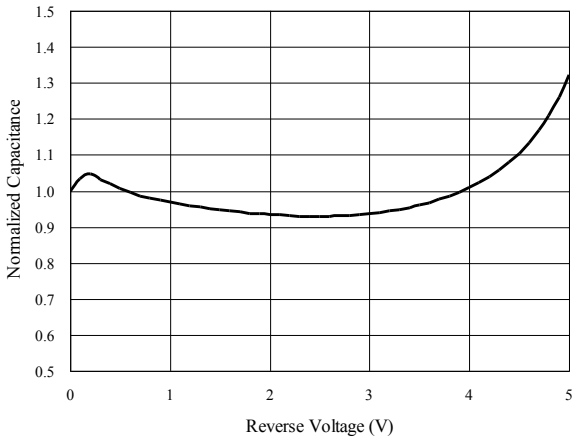


Capacitance *vs.* Voltage of I/O to GND (f = 1MHz)

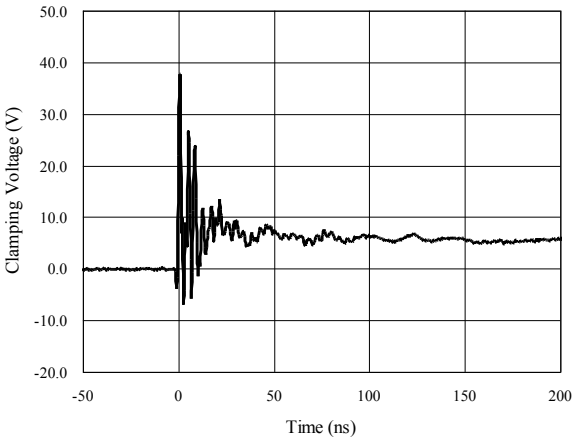
Capacitance *vs.* Reverse Voltage



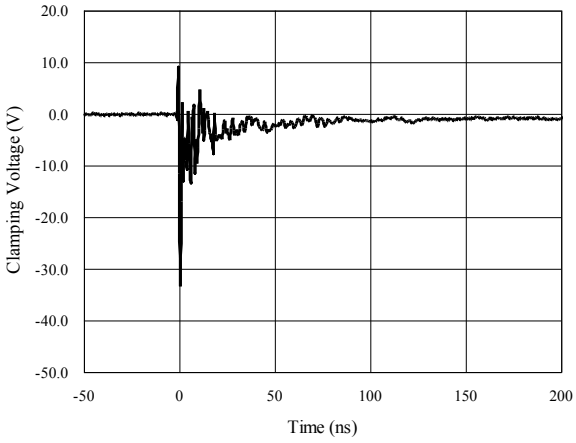
Normalized Capacitance *vs.* Reverse Voltage



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

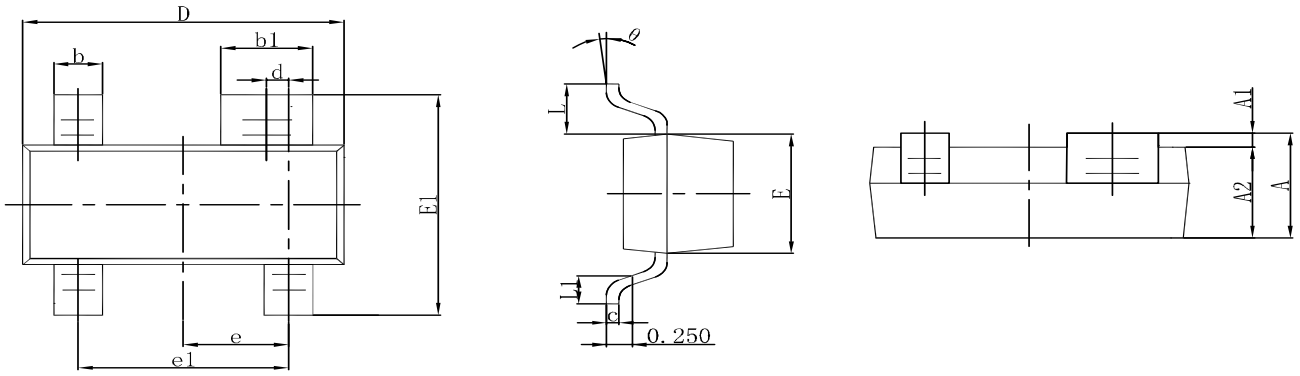


ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)



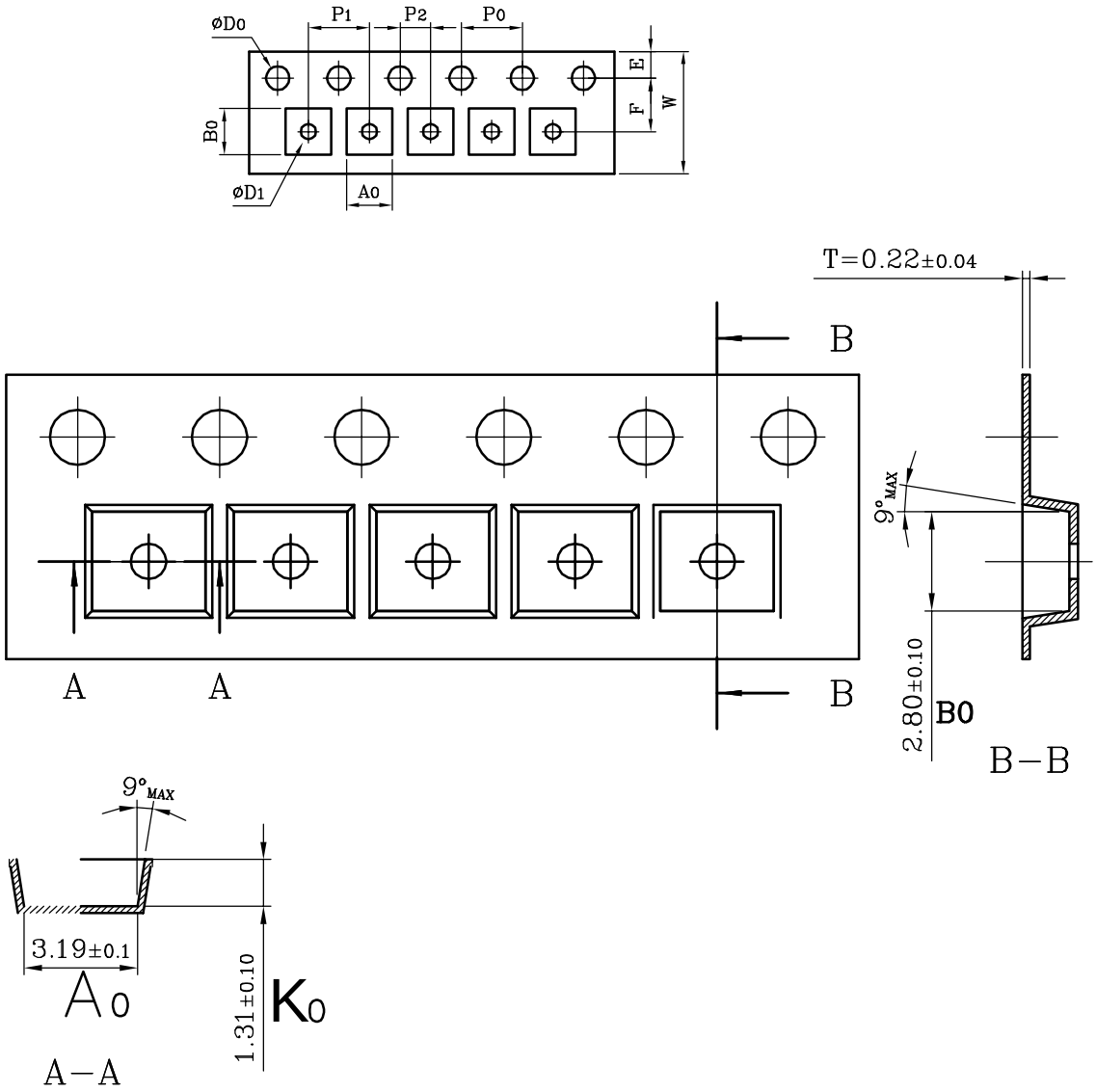
Package Outline

- SOT-143 package



Symbol	Dimensions in millimeter		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
b1	0.750	0.900	0.030	0.035
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
d	0.200 TYP.		0.008 TYP.	
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

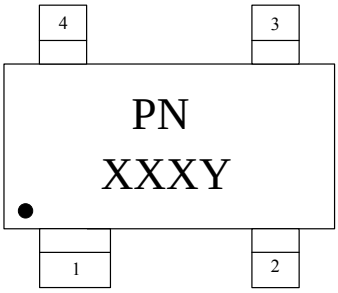
Tape and Reel Specification



(UNIT:mm)

Symbol	W	P1	E	F	D0	D1	P0	P2	10P0
Dimensions	$8.00^{+0.30}_{-0.10}$	4.0±0.1	1.75±0.1	3.5±0.10	$1.5^{+0.10}_{-0}$	$1.0^{+0.10}_{-0.05}$	4.0±0.1	2±0.05	40±0.2
Symbol	A0	A1	B0	B1	K0	K1	T		
Dimensions	3.19±0.10		2.80±0.10		1.31±0.10		0.22±0.04		

Marking Codes



Note:

(1) PN is "S2M", and is part number,fixed.

(2) "XXX" is the last 3 characters of the wafer's Lot No., "Y" is the internal code.

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TS0512PMX	5V	3,000	7 Inch