

Features

- ❑ Transient protection for high-speed data lines
IEC 61000-4-2 (ESD) $\pm 20\text{kV}$ (Air)
 $\pm 20\text{kV}$ (Contact)
IEC 61000-4-4 (EFT) 40A (5/50 ns)
Cable Discharge Event (CDE)
- ❑ Package optimized for high-speed lines
- ❑ Ultra-small package (2.5mm×1.0mm×0.55mm)
- ❑ Protects four data lines
- ❑ Low capacitance: 1.2pF
- ❑ Low leakage current: 0.1 μA @ V_{RWM} (Typical)
- ❑ Low clamping voltage
- ❑ ROHS compliant

Description

TS0304TP-3X is an ultra-low capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 1.2 pF only, TS0304TP-3 is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC61000-4-2 (ESD), Level 4 ($\pm 20\text{kV}$ air, $\pm 20\text{kV}$ contact discharge), IEC61000-4-4 (electrical fast transient -EFT)(40A, 5/50 ns), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

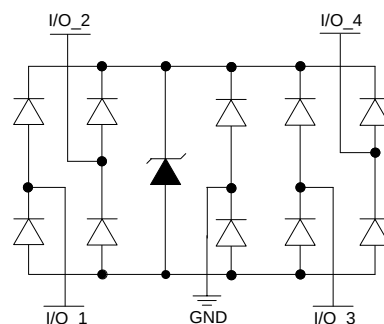
Applications

- ❑ Serial ATA
- ❑ PCI Express
- ❑ Desktops, Servers and Notebooks
- ❑ MDDI Ports
- ❑ USB 2.0/3.0 Power and Data Line Protection
- ❑ Display Ports
- ❑ High Definition Multi-Media Interface (HDMI)
- ❑ Digital Visual Interfaces (DVI)

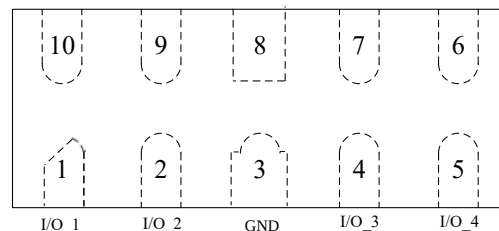
Mechanical Characteristics

- ❑ DFN2510-10L package
- ❑ Marking: Part number
- ❑ Packaging: Tape and Reel

Circuit Diagram



Pin Configuration

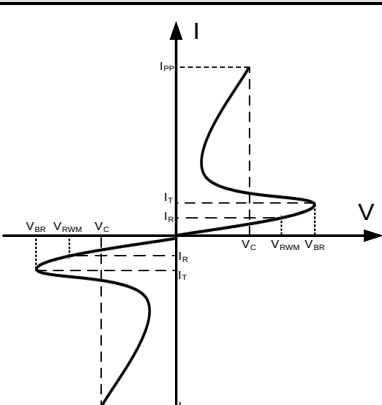


DFN2510-10
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current (8/20 μ s)	12	A
P_{PK}	Peak Pulse Power (8/20 μ s)	50	W
V_{ESD}	ESD per IEC61000-4-2 (Air) ESD per IEC61000-4-2 (Contact)	± 20 ± 20	kV
T_{OPT}	Operating Temperature	-55/+125	°C
T_{STG}	Storage Temperature	-55/+150	°C

Electrical Characteristics (T = 25°C)

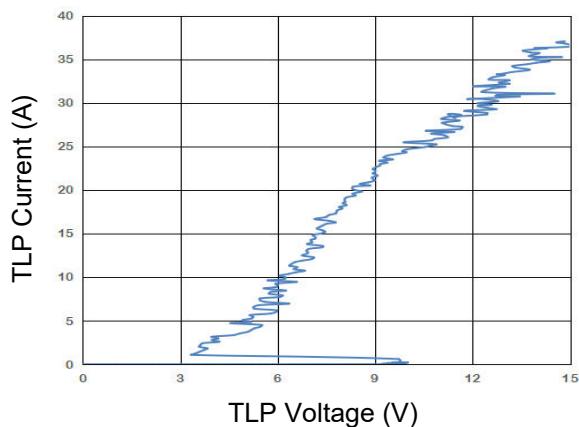
Symbol	Parameter	Diagram
V_{RWM}	Nominal Reverse Working Voltage	
I_R	Reverse Leakage Current @ V_{RWM}	
V_{BR}	Reverse Breakdown Voltage @ I_T	
I_T	Test Current for Reverse Breakdown	
V_C	Clamping Voltage @ I_{PP}	
I_{PP}	Maximum Peak Pulse Current	
C_{ESD}	Parasitic Capacitance	

Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				3.3	V
I_R	$V_{RWM} = 3.3V$, $T = 25^\circ C$ Between I/O and GND		0.1	1.0	μA
V_{BR}	$I_T = 1mA$ Between I/O and GND	5.0			V
V_C	$I_{PP} = 12A$, $t_p = 8/20\mu s$ Between I/O and GND		5.5		V
V_C	$I_{PP} = 8.0A$, $t_p = 100ns^{(1)}$		5.50		V
	$I_{PP} = 16.0A$, $t_p = 100ns^{(1)}$		7.50		V
R_{dyn}	$I_{PP} = 12.0A$, $t_p = 100ns^{(1)}$		0.25		Ω
C_{ESD}	$V_R = 0V$, $f = 1MHz$ Between I/O and GND		1.2		pF
C_{ESD}	$V_R = 0V$, $f = 1MHz$ Between I/O and I/O		0.7		pF

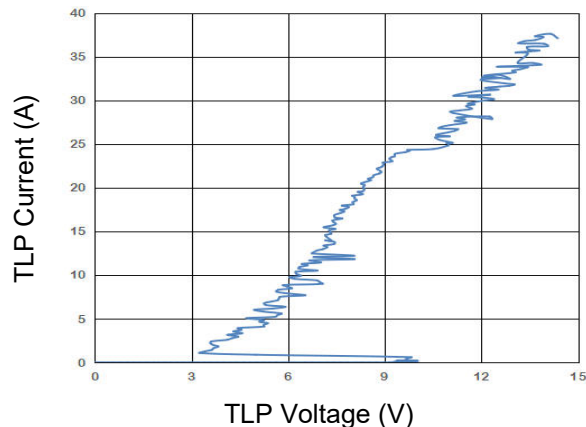
Notes:(1)Measurements performed using a 100ns Transmission Line Pulse(TLP) system,Between I/O and GND.

Typical Performance Characteristics

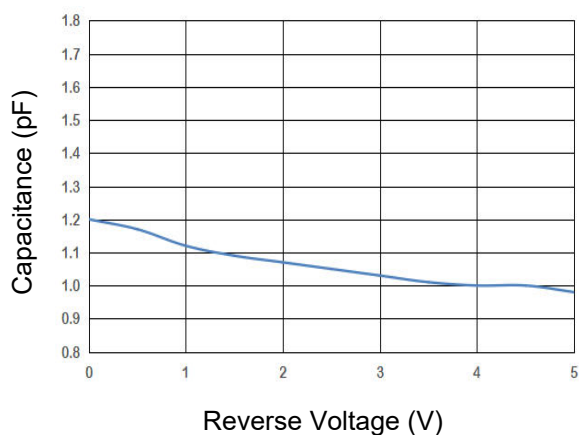
TLP Measurement of I/O to GND



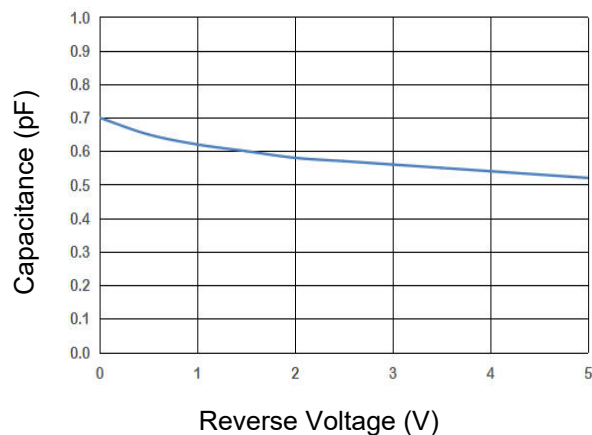
TLP Measurement of I/O to I/O



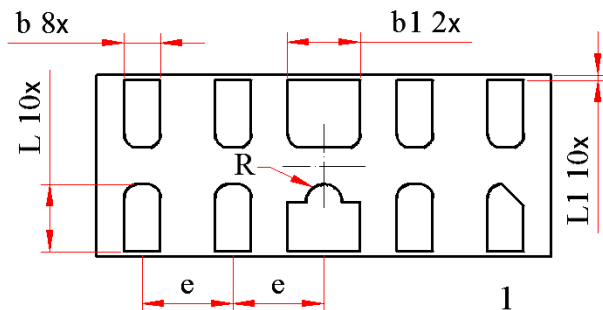
Capacitance vs Reverse Voltage IO to GND



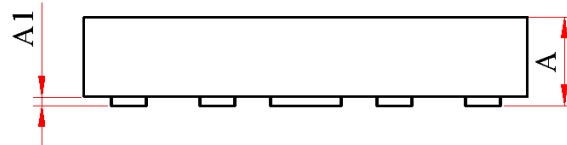
Capacitance vs Reverse Voltage IO to IO



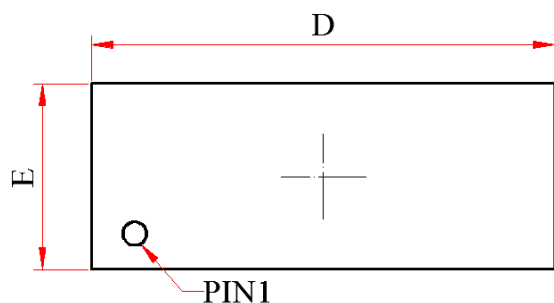
Package Outline, DFN2510-10L



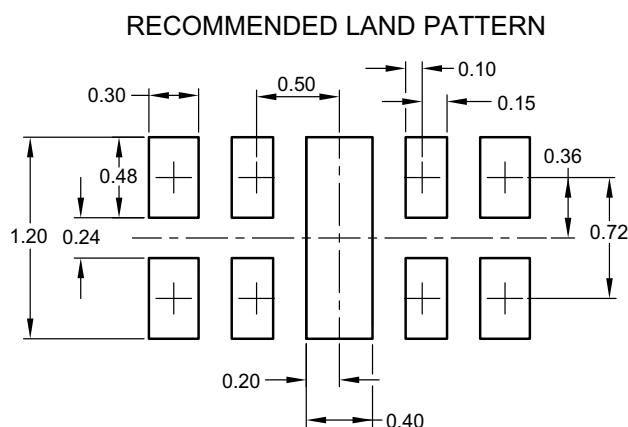
Bottom View



Side View

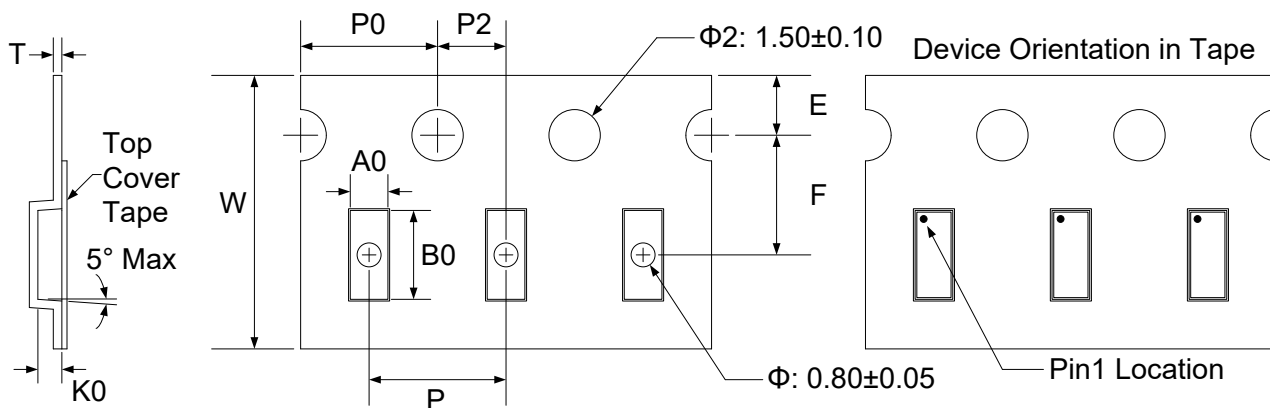


Top View



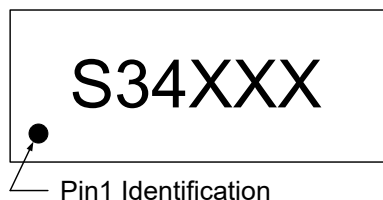
Symbol	Dimension In Millimeters			Dimension In Inches		
	Normal	Min	Max	Normal	Min	Max
A	--	0.450	0.550	--	0.018	0.026
A1	0.050	0.025	0.075	0.002	0.001	0.003
D	2.500	2.450	2.550	0.098	0.096	0.100
E	1.000	0.950	1.050	0.039	0.037	0.041
b	0.200	0.150	0.250	0.008	0.006	0.010
b1	0.400	0.350	0.450	0.016	0.014	0.018
L	0.370	0.320	0.420	0.015	0.013	0.017
L1	0.030	0.000	0.060	0.001	0.000	0.002
R	0.100 REF			0.004 REF		
e	0.500 BSC			0.020 BSC		

Tape and Reel Specification



Symbol	W	A0	B0	K0	E	F	P	P0	P2	T
Dimensions (mm)	8.00+0.3 -0.1	1.23±0.05	2.7±0.05	0.7±0.05	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	0.25±0.02

Marking Codes



Note:

- (1) "S34" is part number, fixed.
- (2) "XXX" is the identification number.

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TS0304TP-3X	3.3V	3,000	7 Inch