

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) 40A (5/50 ns)
 - IEC 61000-4-5 (Surge) 23A (8/20 μs)
- ❑ Package optimized for high-speed lines
- ❑ Provides protection for two line pairs
- ❑ Low capacitance: 2.5pF @ 0V (Typical)
- ❑ Low leakage current: 0.01 μA @ V_{RWM} (Typical)
- ❑ Low operating and clamping voltage
- ❑ Each I/O pin can withstand over 1000 ESD strikes for $\pm 8\text{kV}$ contact discharge

Description

TS3314PR-4X 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 2.5pF only, TS3314PR-4X 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) (23A, 8/20 μs), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

TS3314PR-4X is in aDFN2.6*2.6-10L package. Each TS3314PR-4X device can protect two high-speed line pairs. The combined features of low capacitance and high ESD robustness make TS3314PR-4X ideal for high-speed data port and high-frequency line (e.g., Gigabit Ethernet Ports) applications. The low clamping voltage of the TS3314PR-4X guarantees a minimum stress on the protected IC.

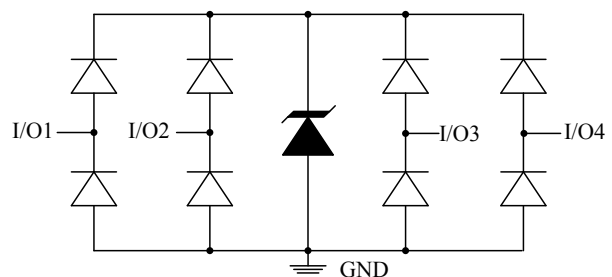
Applications

- ❑ 10/100/1000M Ethernet Ports
- ❑ WAN/LAN Equipment
- ❑ Desktops, Servers and Notebooks
- ❑ Cellular Phones
- ❑ Switching Systems

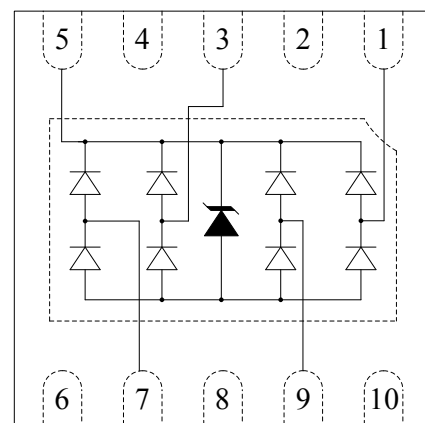
Mechanical Characteristics

- ❑ DFN2.6*2.6-10L package
- ❑ Flammability Rating: UL 94V-0
- ❑ Marking: Part number, Date
- ❑ Packaging: Tape and Reel

Circuit Diagram



Pin Configuration



DFN2.6*2.6-10L
(Top View)



Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current (8/20 μ s)	23	A
P_{PK}	Peak Pulse Power (8/20 μ s)	150	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 +125	°C
T_{STG}	Storage Temperature	-55 to +150	°C

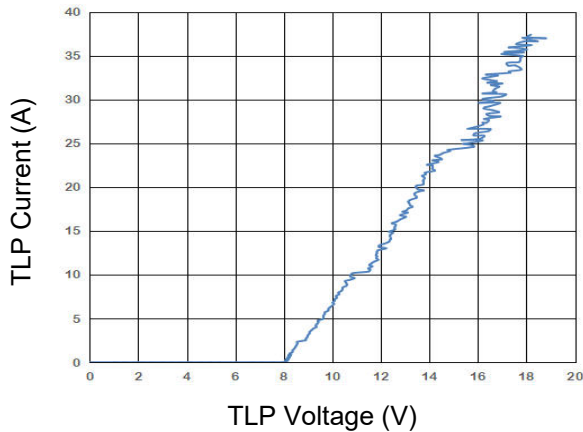
Electrical Characteristics (T = 25°C)

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	
I_F	Forward Current	
V_F	Forward Voltage @ I_F	

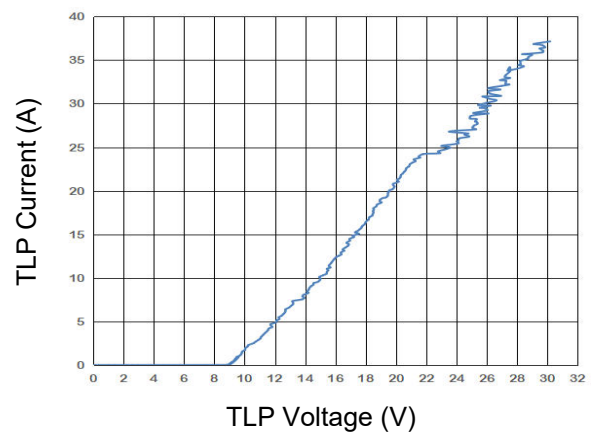
Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				3.3	V
I_R	$V_{RWM} = 3.3V$, $T = 25^\circ C$		0.01	0.1	μA
V_{BR}	$I_T = 1mA$	6.0			V
V_C	$I_{PP} = 10A$, $t_p = 8/20\mu s$ (Each Line)			5.0	V
V_C	$I_{PP} = 23A$, $t_p = 8/20\mu s$ (Each Line)			8.0	V
C_{ESD}	Between I/O Pins and Ground $V_R = 0V$, $f = 1MHz$		2.5	3.5	pF
C_{ESD}	Between I/O Pins $V_R = 0V$, $f = 1MHz$		1.2	2.0	pF

Typical Performance Characteristics

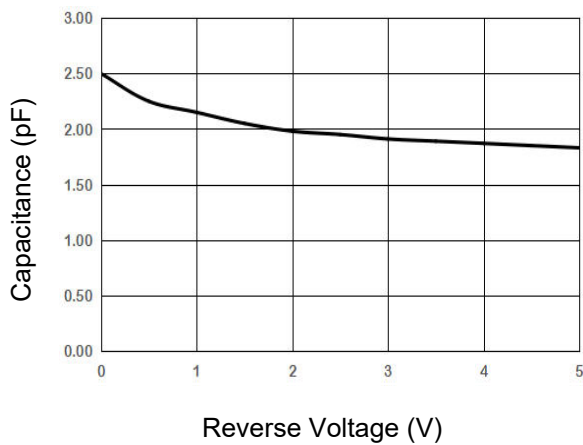
TLP Measurement of I/O to GND



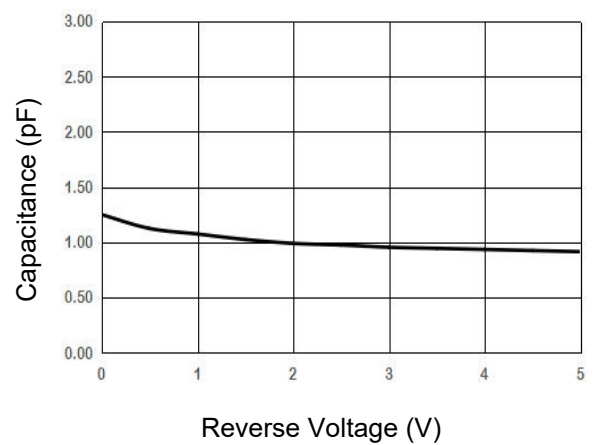
TLP Measurement of I/O to I/O



Capacitance vs Reverse Voltage IO to GND



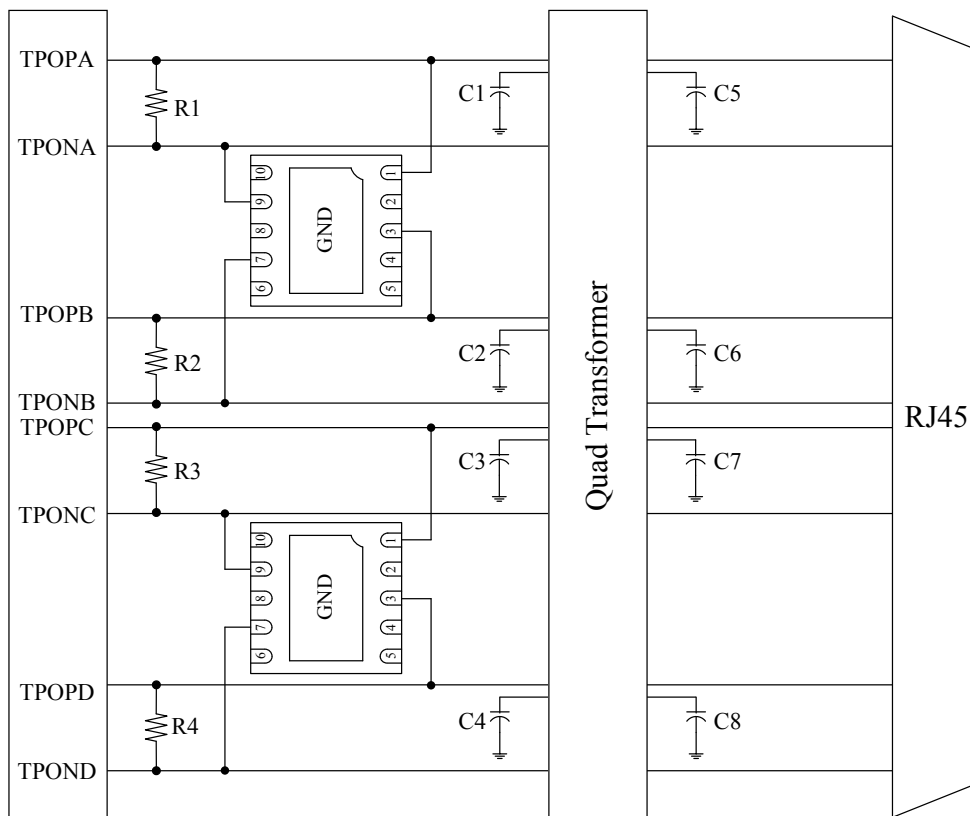
Capacitance vs Reverse Voltage IO to IO



Application Information

Electronic equipment is susceptible to damage caused by a variety of sources, including Electrostatic Discharge (ESD), Electrical Fast Transients (EFT) and Lightning strikes. The TS3314PR-4X was designed to protect the sensitive equipment from damage which may be induced by such transient events. This product can be configured in different connections to meet the requirement of common-mode and differential-mode as follows:

Gigabit Ethernet Protection



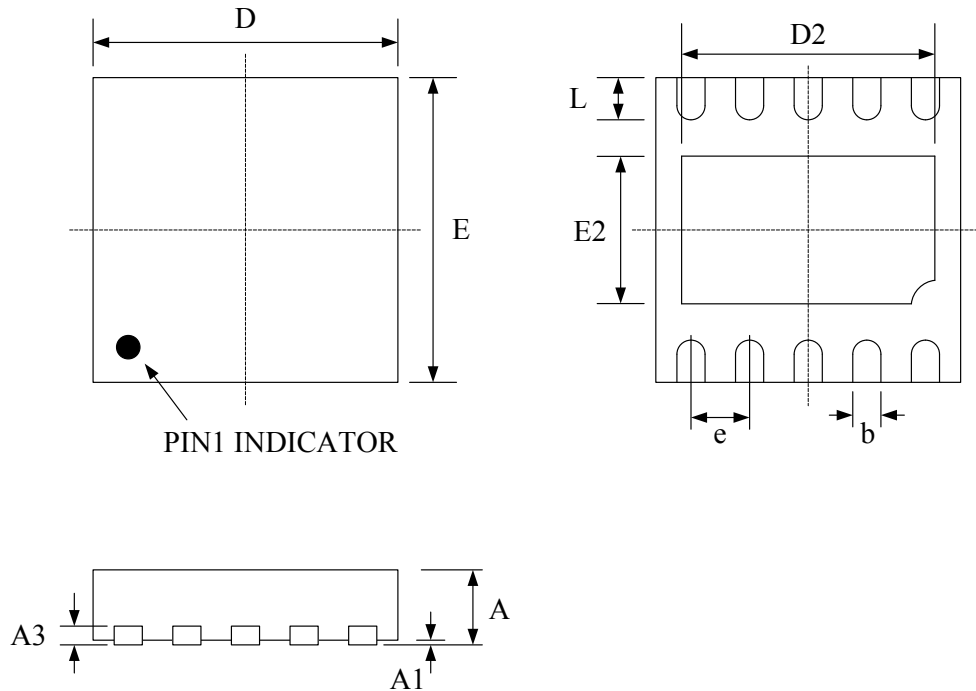
Schematic Diagram for Gigabit Ethernet ESD/Surge Protection using TS3314PR-4X

NOTE:

DO NOT connect pin5 of TS3314PR-4 to a DC supply.

Package Outline

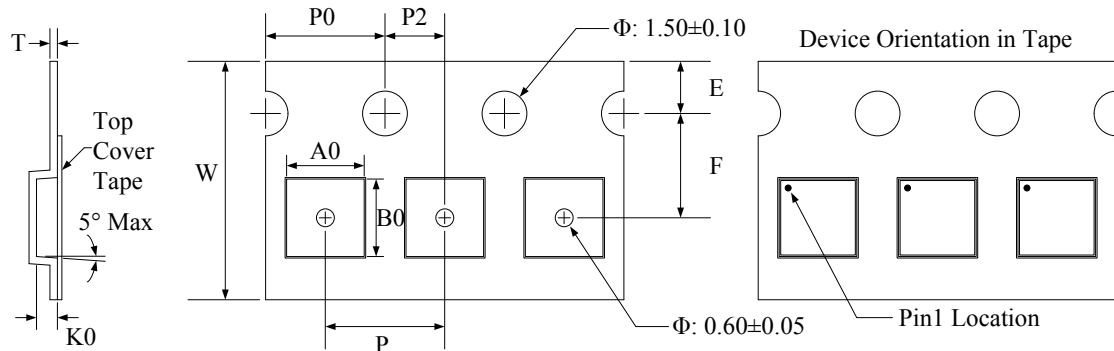
□ DFN2.6×2.6-10L package



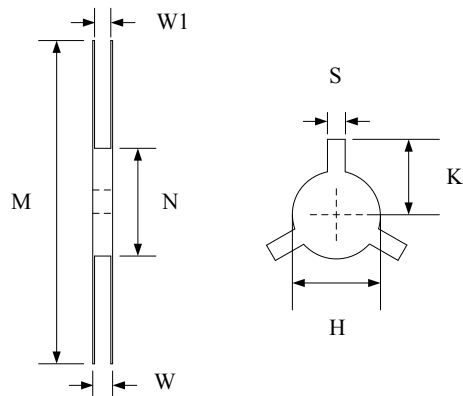
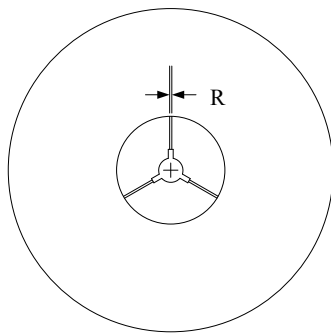
Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions (mm)			Dimensions (Inches)		
	Minimum	Typical	Maximum	Minimum	Typical	Maximum
A	0.500	0.550	0.600	0.020	0.022	0.024
A1	0.000	—	0.050	0.000	—	0.002
A3	0.15 REF			0.006 REF		
b	0.200	0.250	0.300	0.008	0.010	0.012
D	2.550	2.600	2.650	0.100	0.102	0.104
D2	2.000	2.150	2.250	0.079	0.085	0.089
e	0.500 BSC			0.020 BSC		
E	2.550	2.600	2.650	0.100	0.102	0.104
E2	1.110	1.260	1.360	0.044	0.050	0.054
L	0.250	0.350	0.450	0.010	0.014	0.018

Tape and Reel Specification

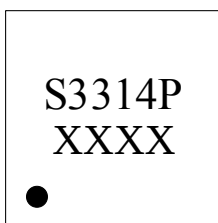


Symbol	W	A0	B0	K0	E	F	P	P0	P2	T
Dimensions (mm)	8.00+0.3 -0.1	2.74±0.05	2.74±0.05	0.72±0.05	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	0.25±0.02



Symbol	Reel Size	M	N	W	W1	H	S	K	R
Dimensions (mm)	Φ178	178.0±1.0	60.0±1.0	11.5±0.5	9.0±0.5	13.0±0.5	2.0±0.1	11.0±0.2	1.0±0.05

Marking Codes



Note:

- (1) “S3314P” is the part number, fixed.
- (2) “XXXX” is internal code.

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TS3314PR-4X	3.3V	3,000	7 Inch