



### Features

- ❑ Transient protection for high-speed data lines
  - IEC 61000-4-2 (ESD) ±30kV (Air)
  - ±30kV (Contact)
  - IEC 61000-4-4 (EFT) 40A (5/50ns)
  - IEC 61000-4-5(Lightning) 25A (8/20us)
- ❑ Low leakage current: 10nA @ V<sub>RWM</sub> (Typical)
- ❑ Low operating and clamping voltage
- ❑ Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge
- ❑ ROHS compliant

### Description

TS0321TDX is an ultra-low capacitance ESD and Surge Protector designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces.

TS0321TDX 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) (25 A, 8/20µs), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

TS0321TDX is in an DFN1610-2L package. The combined features of ultra-low capacitance and high ESD robustness make TS0321TDX ideal for applications where arrays are not practical. The low clamping voltage of the TS0321TDX guarantees a minimum stress on the protected IC.

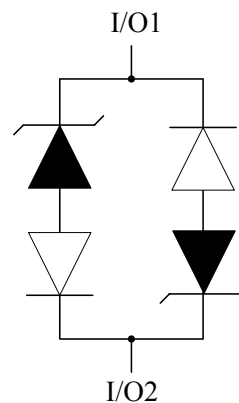
### Applications

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

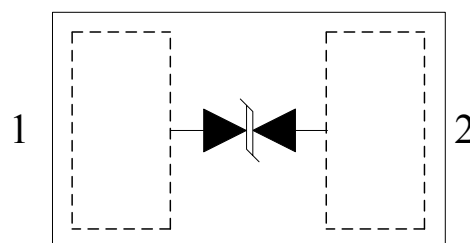
### Mechanical Characteristics

- ❑ DFN1610-2L Package
- ❑ Flammability Rating: UL 94V-0
- ❑ Marking: Part number
- ❑ Packaging: Tape and Reel

### Circuit Diagram



### Pin Configuration



DFN1610-2L  
(Top View)

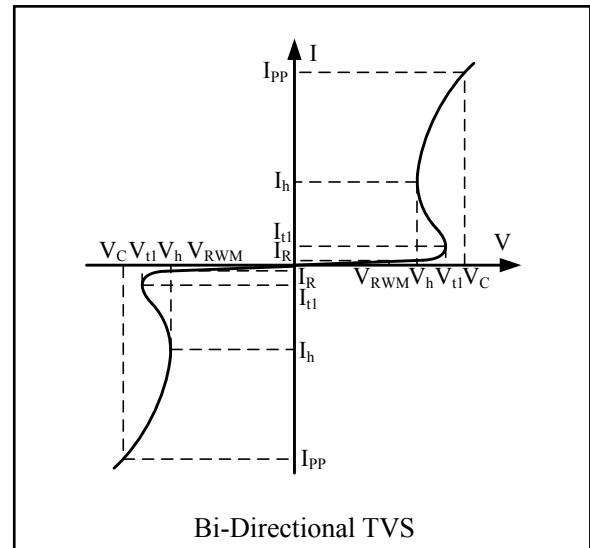


### Absolute Maximum Rating

Symbol	Parameter	Value	Units
P <sub>PK</sub>	Peak Pulse Power (8/20μs)	350	Watts
V <sub>ESD</sub>	ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	±30 ±30	kV
T <sub>OPT</sub>	Operating Temperature	-45 to +85	°C
T <sub>STG</sub>	Storage Temperature	-55 to +150	°C

### Electrical Characteristics (T = 25°C)

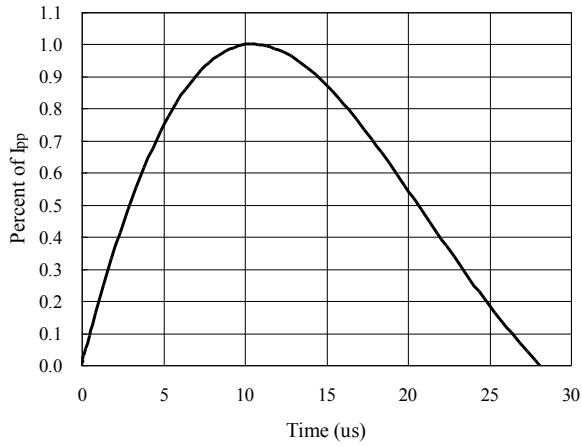
Symbol	Parameter
V <sub>RWM</sub>	Nominal Reverse Working Voltage
I <sub>R</sub>	Reverse Leakage Current @ V <sub>RWM</sub>
V <sub>t1</sub>	Trigger Voltage
I <sub>t1</sub>	Trigger Current @ V <sub>t1</sub>
V <sub>h</sub>	Holding Voltage
I <sub>h</sub>	Holding Current @ V <sub>h</sub>
V <sub>C</sub>	Clamping Voltage @ I <sub>PP</sub>
V <sub>CR</sub>	Reverse Clamping Voltage @ I <sub>PP</sub>
I <sub>PP</sub>	Maximum Peak Pulse Current
C <sub>ESD</sub>	Parasitic Capacitance



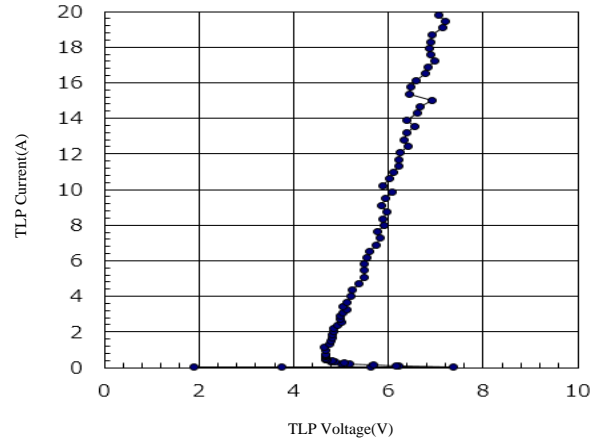
Symbol	Test Condition	Minimum	Typical	Maximum	Units
V <sub>RWM</sub>				3.3	V
I <sub>R</sub>	V <sub>RWM</sub> = 3.3V, T = 25°C		0.01	0.1	μA
V <sub>t1</sub>	I <sub>t1</sub> = 1μA	6.0		7.5	V
V <sub>h</sub>	I <sub>h</sub> = 10mA	4.0		5.0	V
V <sub>C</sub>	I <sub>PP</sub> = 1A, t <sub>p</sub> = 8/20μs			8.0	V
V <sub>C</sub>	I <sub>PP</sub> = 25A, t <sub>p</sub> = 8/20μs			16.0	V
C <sub>ESD</sub>	V <sub>R</sub> = 0V, f = 1MHz		0.6		pF



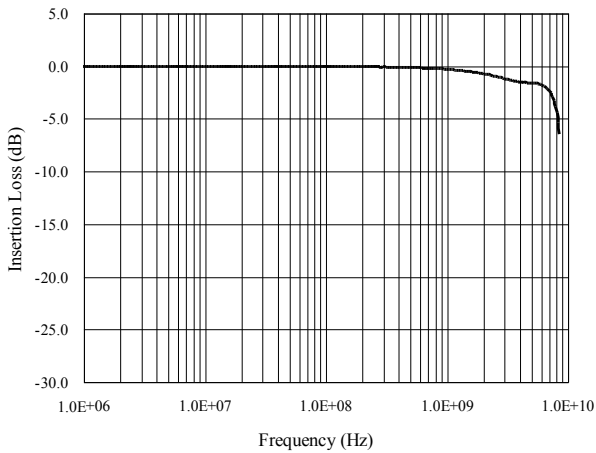
8/20µs Pulse Waveform



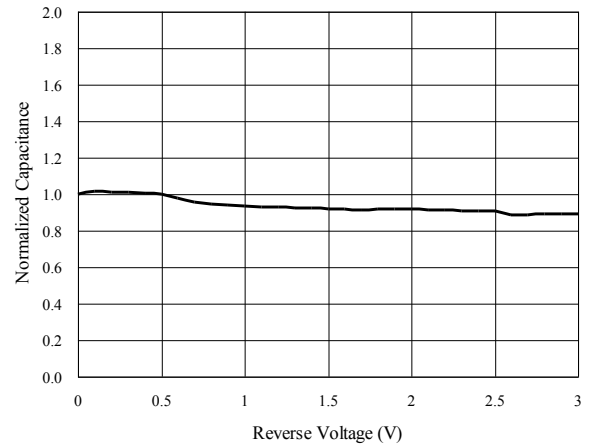
TLP Measurement of I/O to I/O



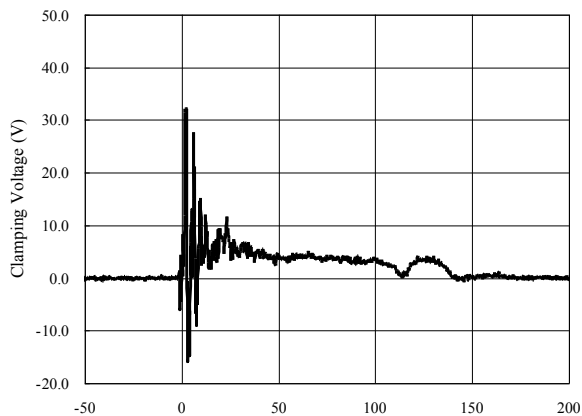
Insertion Loss S21



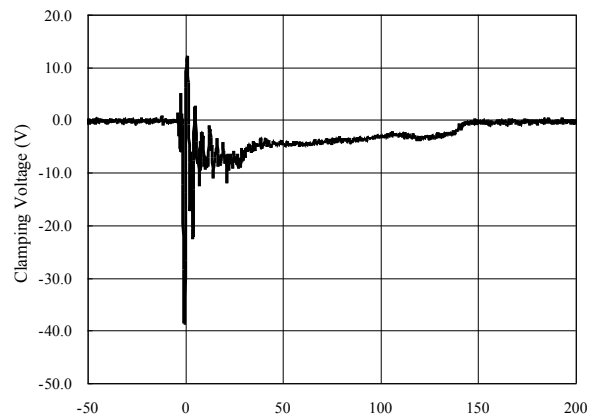
Normalized Capacitance vs. Voltage



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



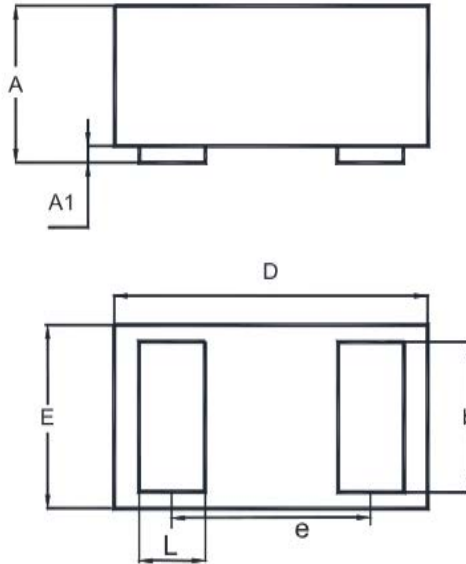
ESD Clamping of I/O to I/O  
(-8kV Contact per IEC 61000-4-2)





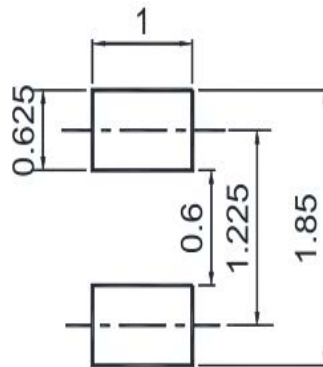
## Package Outline Demensions

□ DFN1610-2L Package



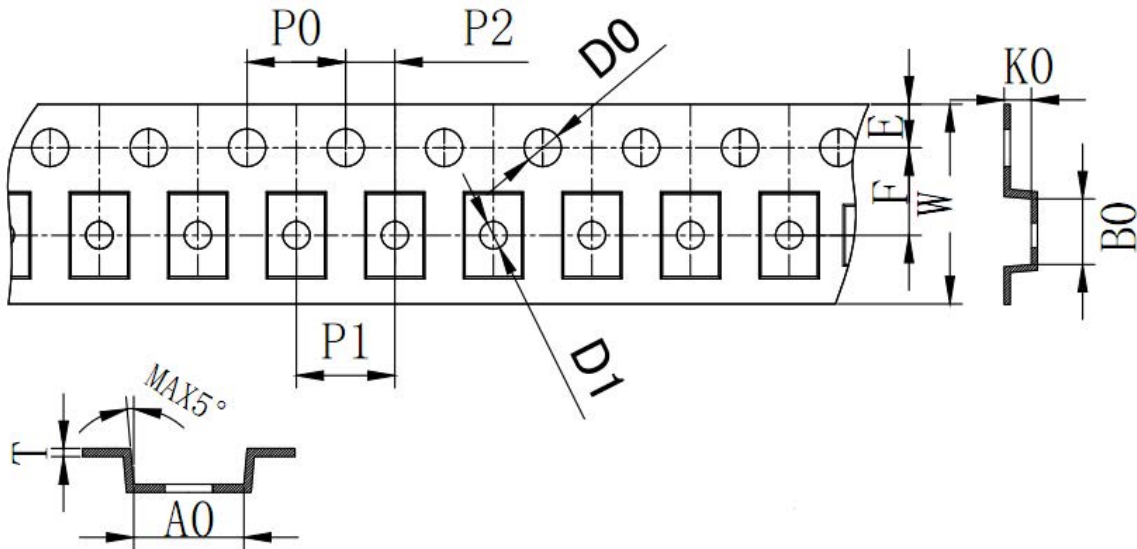
UNIT	A	A1	b	D	E	e	L
mm	0.55	0.05	0.95	1.65	1.05	1.1	0.45
	0.45	0	0.85	1.55	0.95		0.35

### Recommended Soldering Footprint



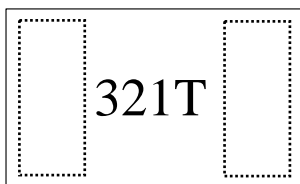


### Tape and Reel Specification



SYMBOL	A0	B0	K0	P0	P1	P2
SPEC	1.15±0.05	1.80±0.05	0.63±0.05	4.00±0.10	2.00±0.10	2.00±0.05
SYMBOL	T	E	F	D0	D1	W
SPEC	0.20±0.05	1.75±0.10	3.50±0.05	1.55±0.05	0.60 <sup>+0.10</sup> <sub>-0</sub>	8.00 <sup>+0.30</sup> <sub>-0.10</sub>

### Marking Codes



Note:

- (1) "321T" is part number, fixed
- (2) no cathode line and date code

### Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TS0321TDX	3.3V	3,000	7 Inch