Features

- Transient protection for high-speed data lines
  - IEC 61000-4-2 (ESD) ±27kV (Air)
  - ±17kV (Contact)
  - IEC 61000-4-4 (EFT) 40A (5/50 ns)
  - Cable Discharge Event (CDE)
- Small package (1.6mm × 1.2mm × 0.55mm)
- Protects four data lines
- Low capacitance: 0.3pF Typical (I/O-I/O)
- 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
- ROHS compliant

Description

TT0514TGX 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 0.3pF only, TT0514TGX 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.

TT0514TGX uses small SOT-553 package. Each TT0514TGX device can protect four high-speed data lines. The combined features of low capacitance, small size and high ESD robustness make TT0514TGX ideal for high-speed data ports and high-frequency lines (e.g., HDMI & DVI) applications. The low clamping voltage of the TT0514TGX guarantees a minimum stress on the protected IC.

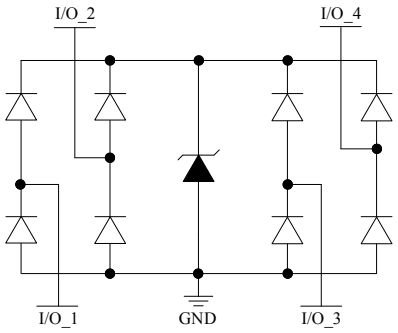
Applications

- 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)

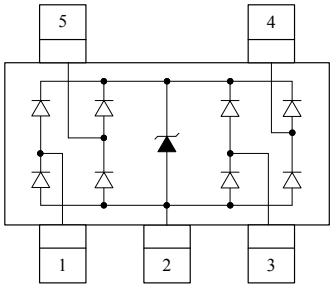
Mechanical Characteristics

- SOT-553 package
- Flammability Rating: UL 94V-0
- Marking: Part number
- Packaging: Tape and Reel

Circuit Diagram



Pin Configuration



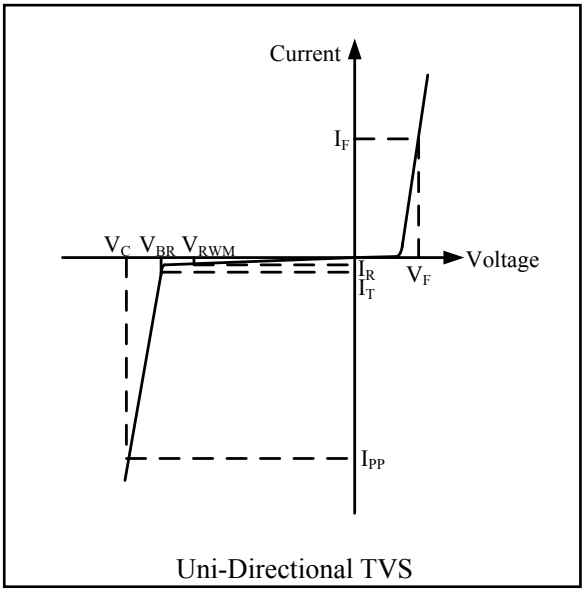
SOT-553
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current (8/20μs)	4	A
P_{PK}	Peak Pulse Power (8/20μs)	40	Watts
V_{ESD}	ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	±27 ±17	kV
T_{OPT}	Operating Temperature	-55 to +125	°C
T_{STG}	Storage Temperature	-55 to +150	°C

Electrical Characteristics (T = 25°C)

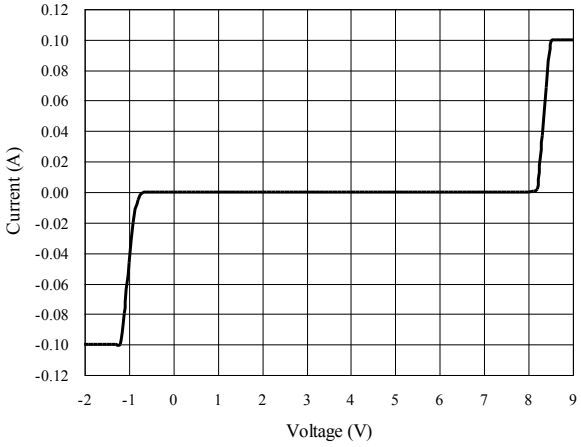
Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Reverse Breakdown Voltage @ I_T
I_T	Test Current for Reverse Breakdown
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance
V_R	Reverse Voltage
f	Small Signal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



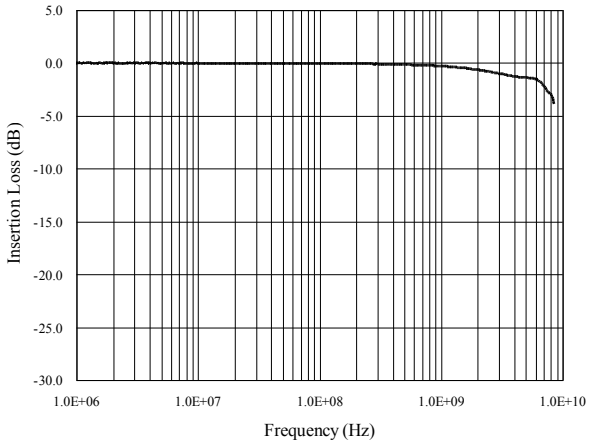
Uni-Directional TVS

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	8.0	10.0	V
V_C	I_{PP} = 1A, t_p = 8/20μs Between I/O and GND			11	V
V_C	I_{PP} = 4A, t_p = 8/20μs Between I/O and GND			12	V
C_{ESD}	V_R = 0V, f = 1MHz Between I/O and GND		0.6	0.8	pF
C_{ESD}	V_R = 0V, f = 1MHz Between I/O and I/O		0.3	0.4	pF

Voltage Sweeping of I/O to GND

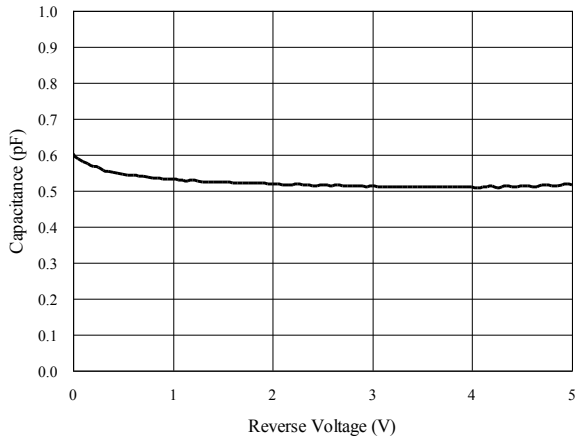


Insertion Loss S21 of I/O to GND

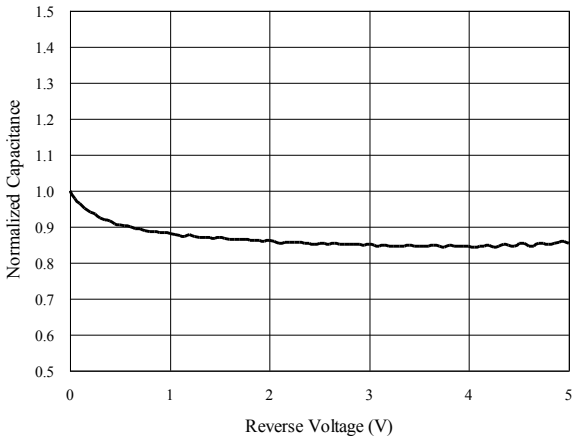


Capacitance *vs.* Voltage of I/O to GND (f = 1MHz)

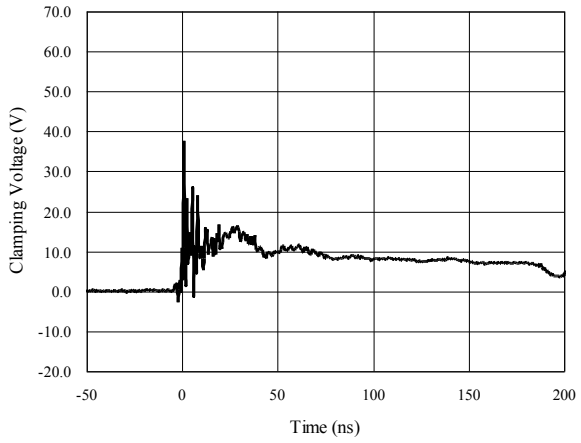
Capacitance *vs.* Reverse Voltage



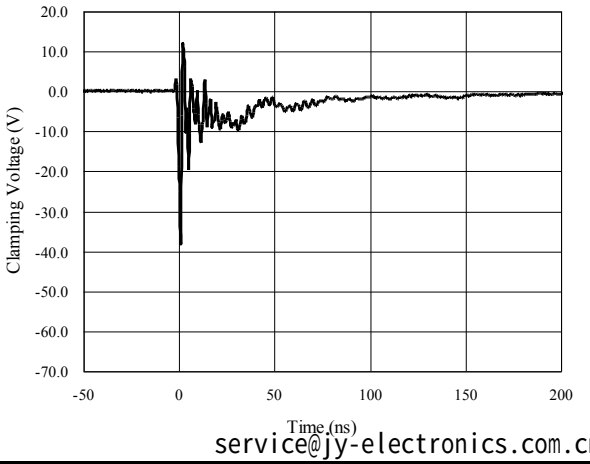
Normalized Capacitance *vs.* Reverse Voltage



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

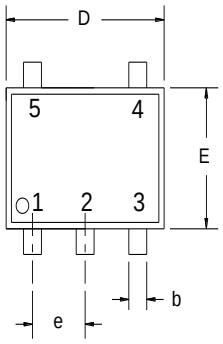


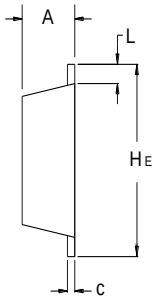
ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)



Package Outline

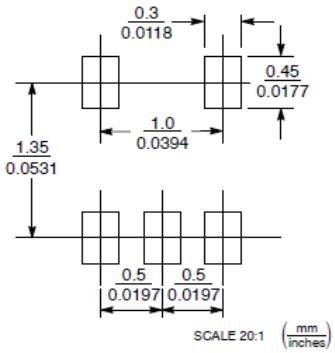
❑ SOT-553 package



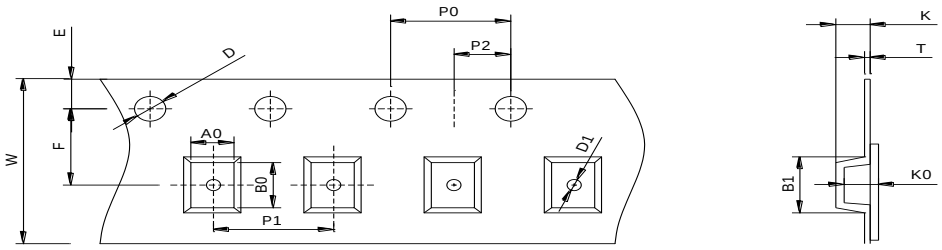


Dim	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.525	0.60	0.021	0.024
b	0.17	0.27	0.007	0.011
c	0.09	0.16	0.004	0.006
D	1.50	1.70	0.059	0.067
E	1.10	1.30	0.043	0.051
e	0.50BSC		0.020BSC	
L	0.10	0.30	0.004	0.012
HE	1.50	1.70	0.059	0.067

Recommended Pad outline

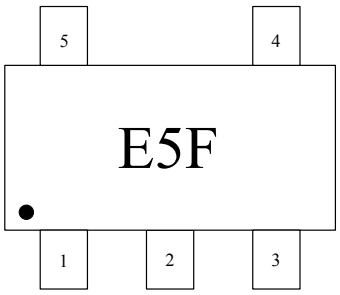


SOT553 Reel Dim



Package	Chip Size	Pocket Size B0×A0×K0(mm)	Tape Width	Reel Diameter	Quantity Per Reel	P0	P1
SOT553	1.70×1.70×0.60	1.80×1.80×0.70	8mm	178mm(7")	3000	4mm	4mm
D0	D1	E	F	K	T	W	
1.5mm	0.2mm	1.75mm	3.5mm	0.65mm	0.2mm	8mm	

Marking Codes



Note:

(1) "E5F" is part number, fixed.

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TT0514TGX	5V	3,000	7 Inch

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