

Features

- ❑ Transient protection for high-speed data lines
 - IEC 61000-4-2 (ESD) $\pm 25\text{kV}$ (Air)
 - $\pm 17\text{kV}$ (Contact)
 - IEC 61000-4-4 (EFT) 40A (5/50 ns)
 - Cable Discharge Event (CDE)
- ❑ Protects five data lines
- ❑ Low capacitance: 0.6pF Typical (I/O-GND)
- ❑ Low leakage current: 0.1 μA @ V_{RWM} (Typical)
- ❑ Low clamping voltage
- ❑ Each I/O pin can withstand over 1000 ESD strikes for $\pm 8\text{kV}$ contact discharge
- ❑ Green Part

Description

TT0515THX is a low capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 0.6pF only, TT0515TH 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), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

TT0515THX uses small SOT563 package. Each TT0515THX device can protect five high-speed data lines. The combined features of low capacitance, small size and

high ESD robustness make TT0515THX ideal for high-speed data ports and high-frequency lines (e.g., HDMI & DVI) applications. The low clamping voltage of the TT0515THX guarantees a minimum stress on the protected IC.

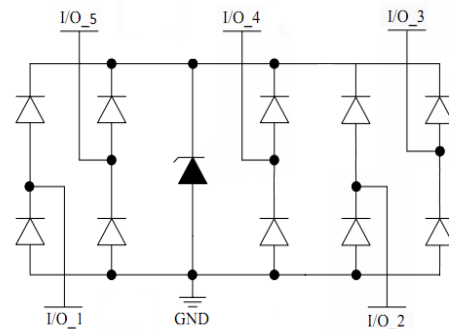
Applications

- ❑ Video Graphics Cards
- ❑ Desktops, Servers and Notebooks
- ❑ IEEE 1394 Ports
- ❑ USB2.0 Power and Data Line Protection
- ❑ Display Ports
- ❑ SIM Ports

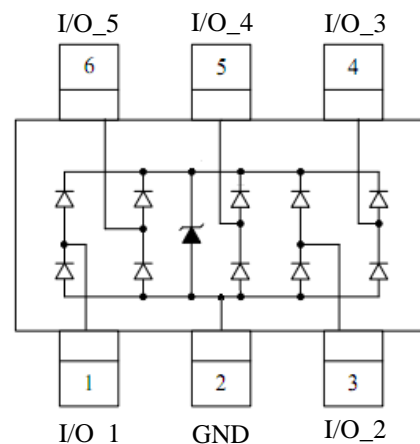
Mechanical Characteristics

- ❑ SOT563 package
- ❑ Flammability Rating: UL 94V-0
- ❑ Marking: Part number
- ❑ Packaging: Tape and Reel

Circuit Diagram



Pin Configuration



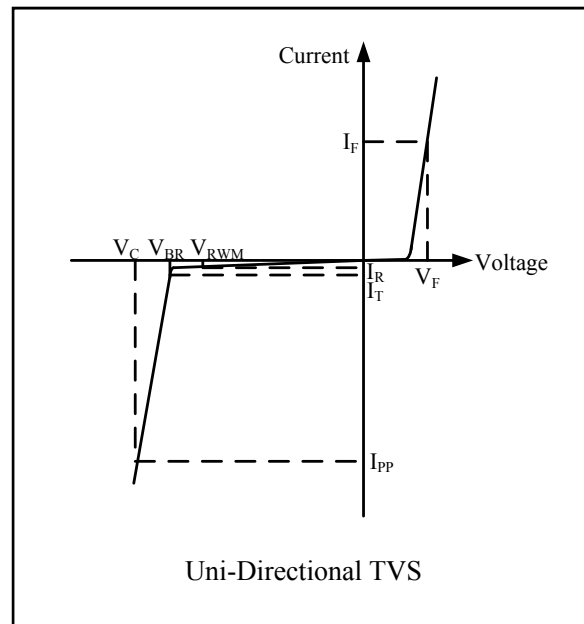
SOT-563
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current($t_p=8/20\mu s$)	4	A
V_{ESD}	ESD per IEC61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	± 25 ± 17	kV
T_{OPT}	Operating Temperature	-55/+125	°C
T_{STG}	Storage Temperature	-55/+150	°C

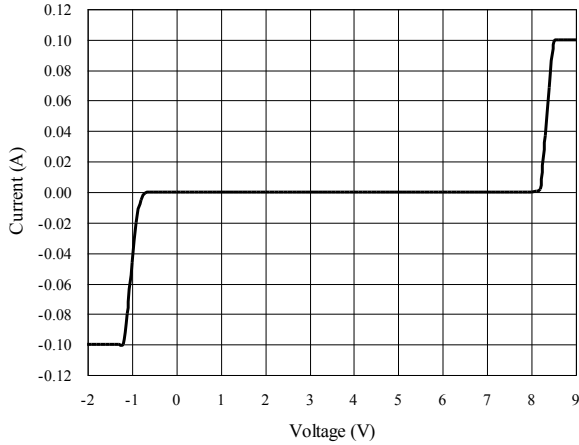
Electrical Characteristics (T = 25°C)

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

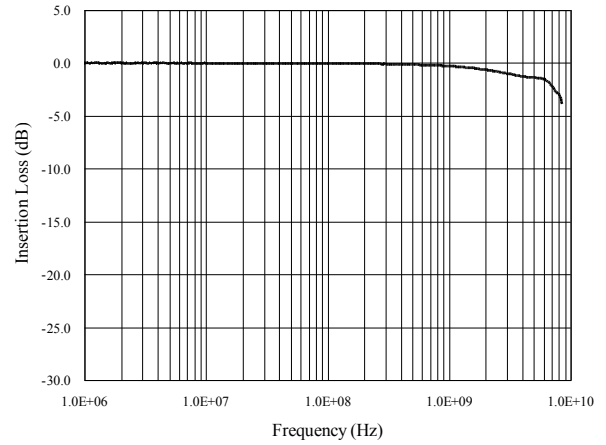


Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				3.3	V
I_R	$V_{RWM} = 5V, T = 25^\circ C$ Between I/O and GND		0.1	1.0	μA
V_{BR}	$I_T = 1mA$ Between I/O and GND	6.0			V
V_C	$I_{PP} = 1A, t_p = 8/20\mu s$ Between I/O and GND			9.0	V
V_C	$I_{PP} = 4A, t_p = 8/20\mu s$ Between I/O and GND			11.0	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

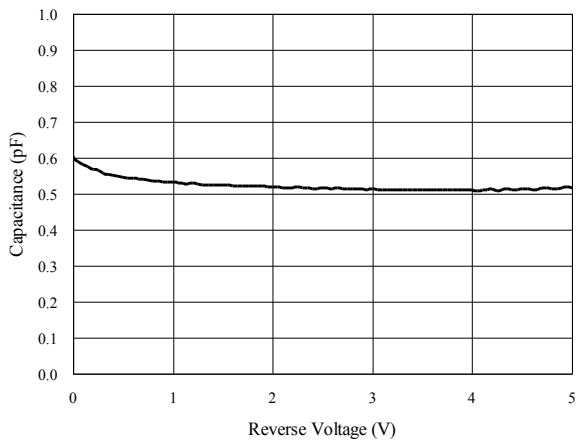


Insertion Loss S21 of I/O to GND

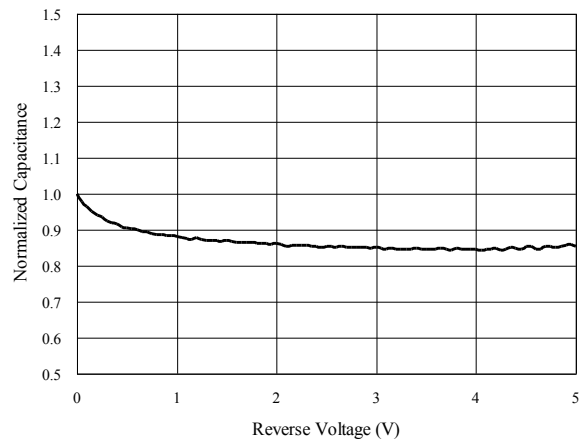


Capacitance vs. Voltage of I/O to GND (f = 1MHz)

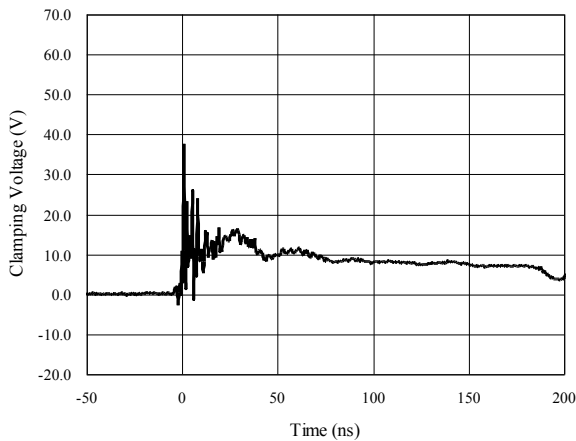
Capacitance vs. Reverse Voltage



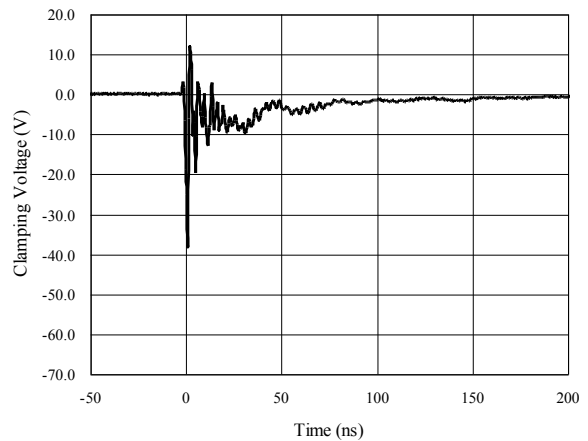
Normalized Capacitance vs. Reverse Voltage



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

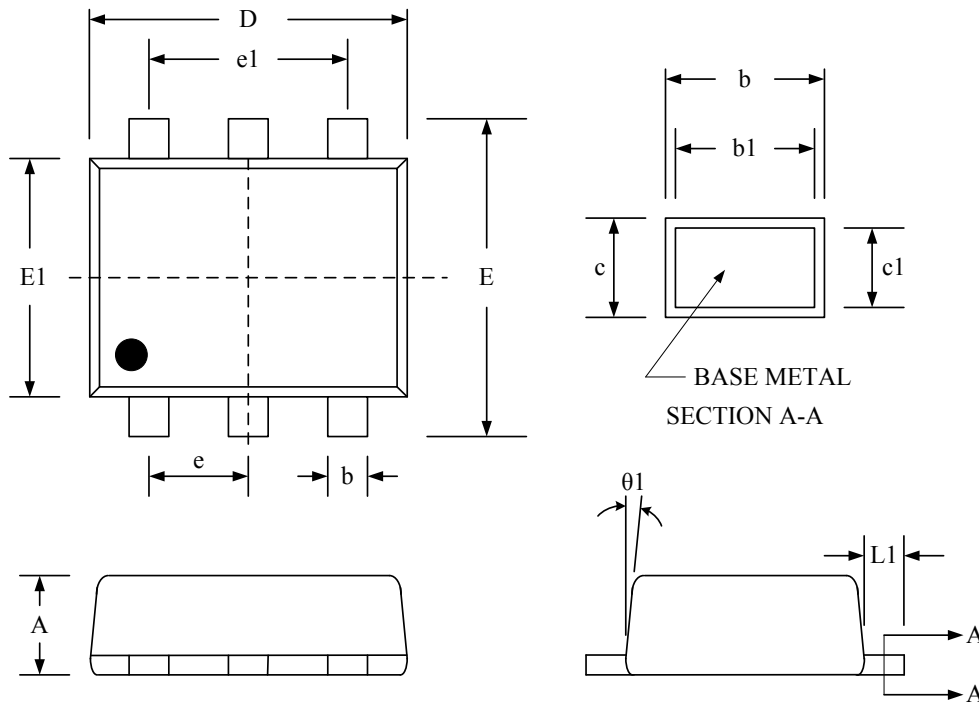


ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)



Package Outline

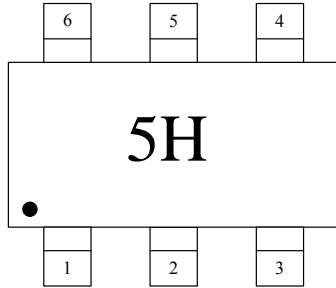
- SOT-563 package
- Plastic surface-mounted package
- MSL-3 Level



Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions (mm)			Dimensions (Inches)		
	Minimum	Typical	Maximum	Minimum	Typical	Maximum
A	0.50	0.55	0.60	0.020	0.022	0.024
b	0.17	-	0.27	0.007	-	0.011
b1	0.17	0.20	0.23	0.007	0.008	0.009
c	0.08	-	0.18	0.003	-	0.007
c1	0.08	0.10	0.15	0.003	0.004	0.006
D	1.60 BSC			0.063 BSC		
E	1.50	1.60	1.70	0.059	0.063	0.067
E1	1.20 BSC			0.047 BSC		
e	0.50 BSC			0.020 BSC		
e1	1.00 BSC			0.040 BSC		
θ_1	0°	-	10°	0°	-	10°
L1	0.14	0.20	0.27	0.006	0.008	0.011

Marking Codes



Note:

(1) “5H” is part number, fixed.

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TT0515THX	3.3V	3,000	7 Inch

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