Features

- Transient protection for high-speed data lines
  - IEC 61000-4-2 (ESD) ±25kV (Air)
  - ±20kV (Contact)
  - IEC 61000-4-4 (EFT) 40A (5/50 ns)
  - Cable Discharge Event (CDE)
- Package optimized for high-speed lines
- Ultra-small package (1.0mm × 0.6mm × 0.4mm)
- Protects one data, control or power line
- Low capacitance: 0.5pF (Typical)
- 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

Description

TT0311TC 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 0.5pF only, TT0311TC is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD) (±10kV air, ±10kV 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.

TT0311TC uses ultra-small SOD-923 package .Each TT0311TC device can protect one high-speed data line. It offers system designers flexibility to protect single data line where space is a premium concern. The combined features of low capacitance, ultra-small size and high ESD robustness make TT0311TC ideal for high-speed data port and high-frequency line (e.g., HDMI & antenna line) applications, such as cellular phones and HD visual devices.

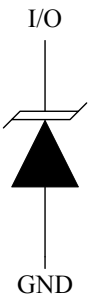
Applications

- Serial ATA
- PCI Express
- Desktops, Servers and Notebooks
- Cellular Phones
- MDDI Ports
- USB2.0/3.0 Power and Data Line Protection
- Display Ports
- High Definition Multi-Media Interface (HDMI)
- Digital Visual Interfaces (DVI)

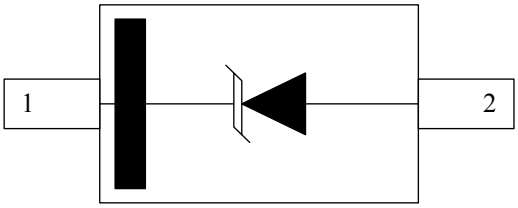
Mechanical Characteristics

- SOD-923 package
- Flammability Rating: UL 94V-0
- Marking: Part number
- Packaging: Tape and Reel

Circuit Diagram



Pin Configuration



SOD-923

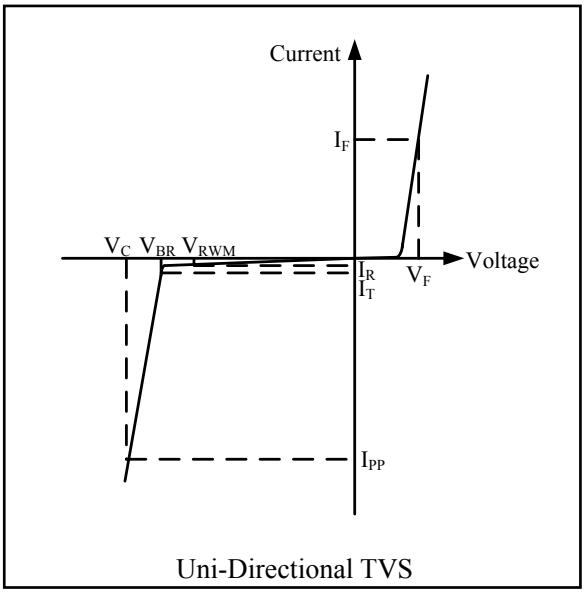
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current(tp=8/20us)(I/O pins)	4.5	A
V_{ESD}	ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	±25 ±20	kV
T_{OPT}	Operating Temperature	-55/+125	°C
T_{STG}	Storage Temperature	-55/+150	°C

Electrical Characteristics (T = 25°C)

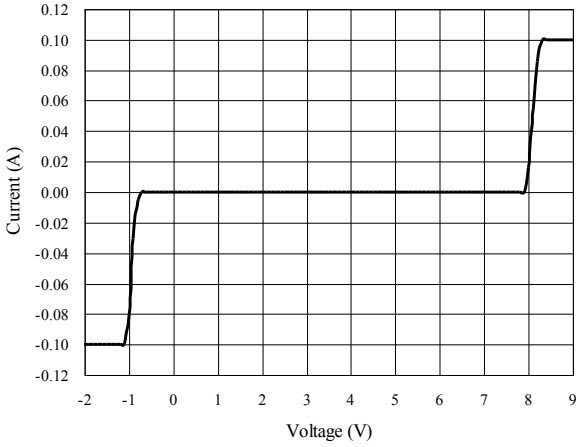
Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Reverse Breakdown Voltage @ I_T
I_T	Test Current for Reverse Breakdown
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance
V_R	Reverse Voltage
f	Small Signal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



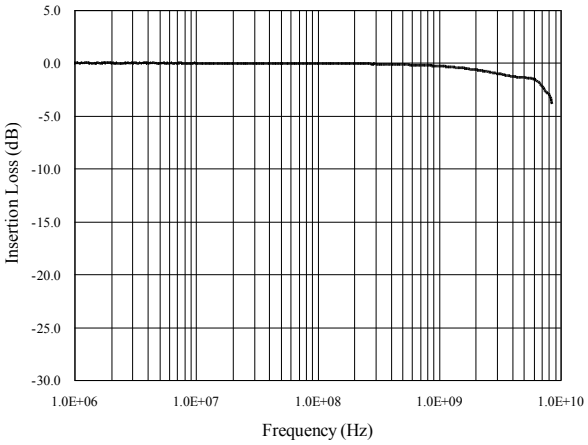
Uni-Directional TVS

Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				3.3	V
I_R	V_{RWM} = 3.3V, 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	V
V_C	I_{PP} = 1A, t_p = 8/20μs Between I/O and GND			8.0	V
C_{ESD}	V_R = 0V, f = 1MHz Between I/O and GND		0.5	0.8	pF

Voltage Sweeping of I/O to GND

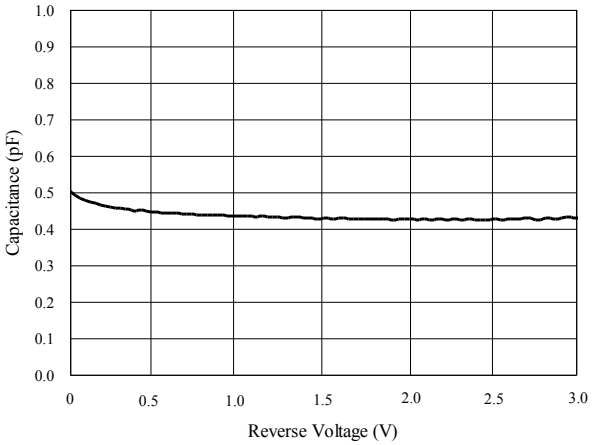


Insertion Loss S21 of I/O to GND

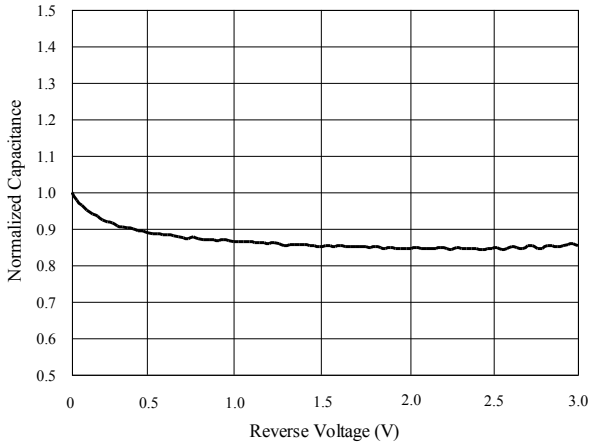


Capacitance *vs.* Voltage of I/O to GND (f = 1MHz)

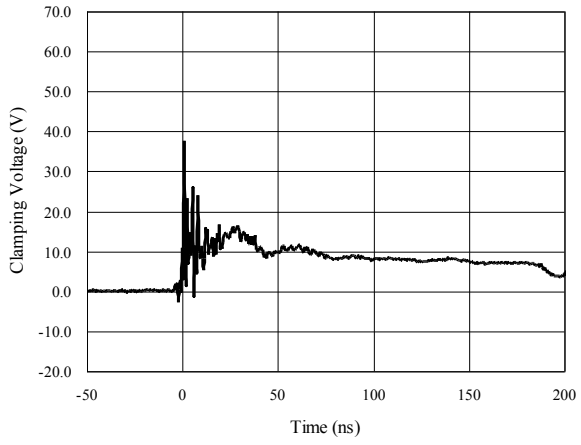
Capacitance *vs.* Reverse Voltage



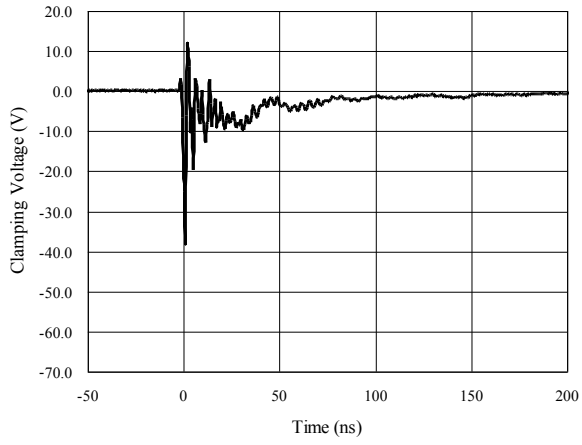
Normalized Capacitance *vs.* Reverse Voltage



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

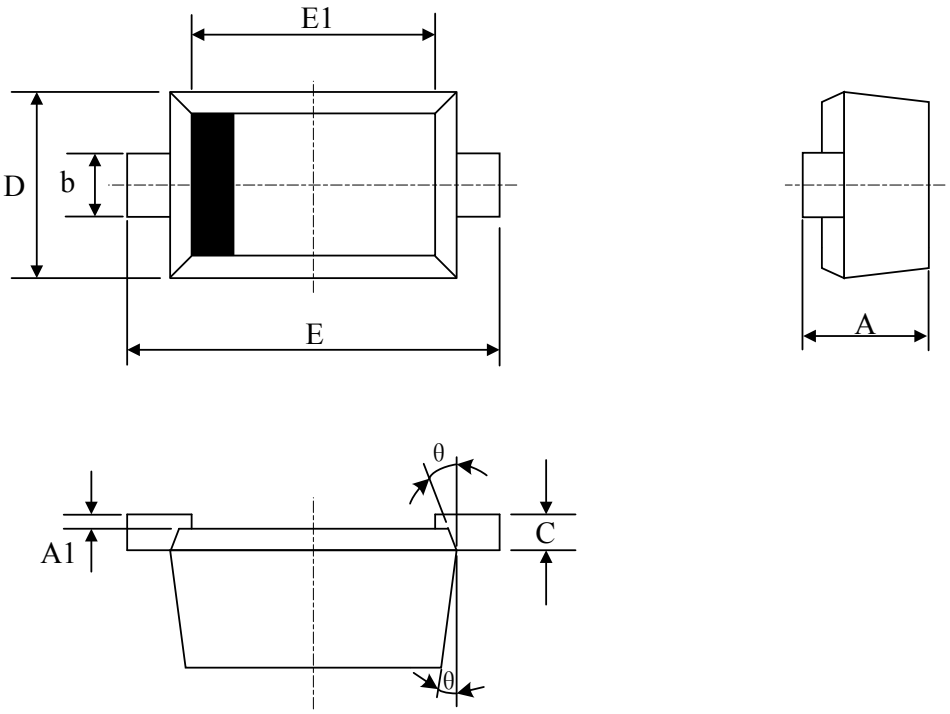


ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)



Package Outline

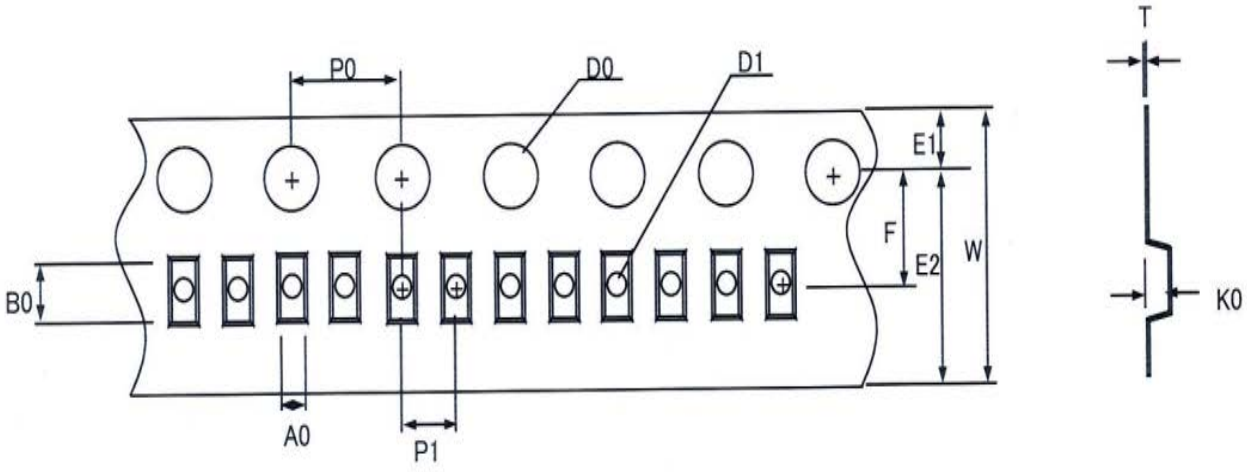
- SOD-923 package
- 2 leads, very small package
- MSL-1



Package Dimensions (Controlling dimensions are in millimeters)

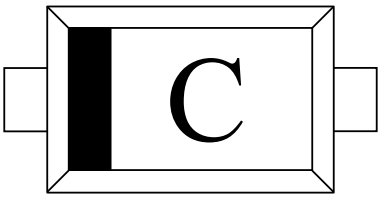
Symbol	Dimensions (mm)		Dimensions (Inches)	
	Minimum	Maximum	Minimum	Maximum
A	0.350	0.430	0.014	0.017
A1	0.000	0.050	0.000	0.002
b	0.170	0.270	0.007	0.011
C		0.150		0.006
D	0.550	0.650	0.022	0.026
E	0.900	1.100	0.035	0.043
E1	0.750	0.850	0.030	0.033
θ	7° REF.		7° REF.	

Tape and Reel Specification



ITEM	Dimensions (mm)
A0	0.67 +/- 0.05
B0	1.12 +/- 0.05
W	8.0 +/- 0.2
D0	1.55 +/- 0.05
D1	0.50 +/- 0.05
E1	1.75 +/- 0.10
E2	6.25 MIN
F	3.50 +/- 0.10
P0	4.0 +/- 0.05
P1	2.0 +/- 0.05
K0	0.52 +/- 0.05 *1
T	0.20 +/- 0.020

Marking Codes



Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TT0311TC	3.3V	10,000	7 Inch

Note:
(1) "C" is part number , fixed .