Features

- Transient protection for high-speed data lines
  - IEC 61000-4-2 (ESD) ±25kV (Air)
  - ±17kV (Contact)
  - IEC 61000-4-4 (EFT) 40A (5/50 ns)
  - Cable Discharge Event (CDE)
- Small package (2.9mm × 2.8mm × 1.4mm)
- Protects two data lines
- Low capacitance: 12 pF Typical(I/O-GND)
- 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

TT0302MLX 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 12 pF only, TT 0302 MLX 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.

TT0302MLX uses small SOT23 package. Each TT0302MLX device can protect two high-speed data lines. The combined features of low capacitance, small size and high ESD robustness make TT0302MLX ideal for high-speed data ports and high-frequency lines.

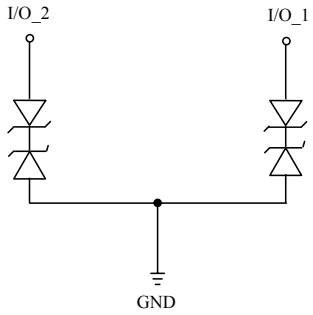
Applications

- Serial ATA
- PCI Express
- Desktops, Servers and Notebooks
- MDDI Ports
- Display Ports
- Digital Visual Interfaces (DVI)

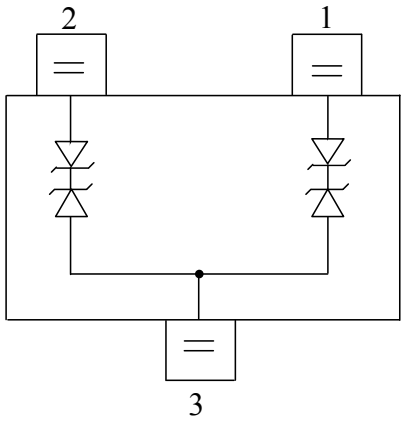
Mechanical Characteristics

- SOT23 Package
- Flammability Rating: UL 94V-0
- Marking: Part number
- Packaging: Tape and Reel

Circuit Diagram



Pin Configuration



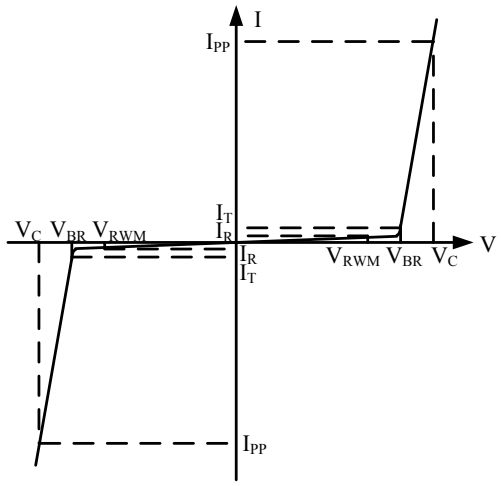
SOT23
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current(tp=8/20us)	5	A
V_{ESD}	ESD per IEC 61000-4-2(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)

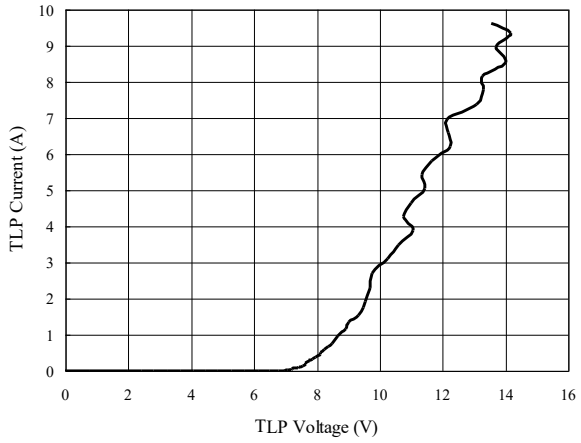
Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Reverse Breakdown Voltage @ I_T
I_T	Test Current for Reverse Breakdown
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance
V_R	Reverse Voltage
f	Small Signal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



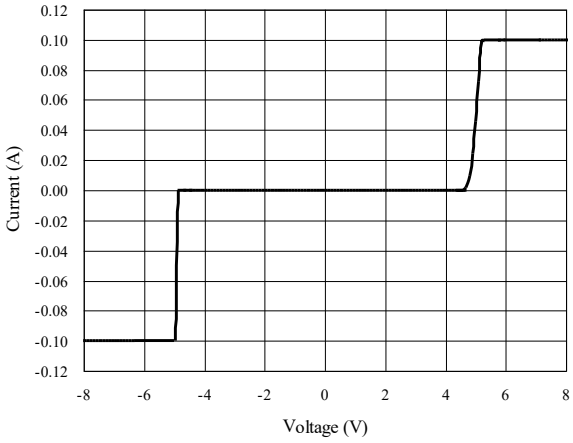
Bi-Directional TVS

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	3.8		6.0	V
V_C	I_{PP} = 1A, t_p = 8/20μs Between I/O and GND			5	V
V_C	I_{PP} = 5A, t_p = 8/20μs Between I/O and GND			7	V
C_{ESD}	V_R = 0V, f = 1MHz Between I/O and GND		12	15	pF

TLP Measurement of I/O to GND

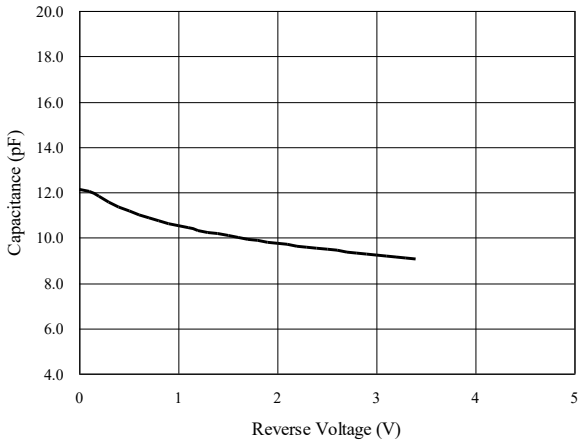


Voltage Sweeping of I/O to GND

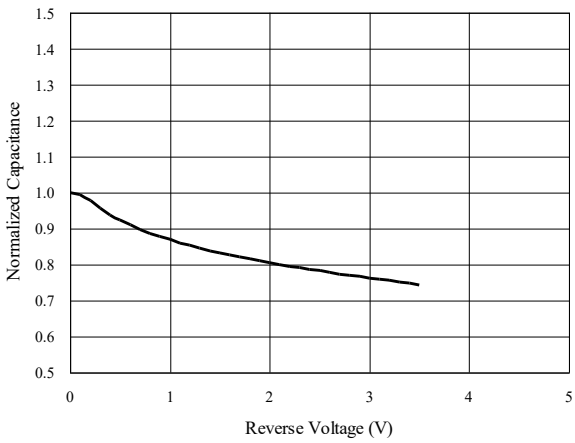


Capacitance vs. Voltage of I/O to GND (f = 1MHz)

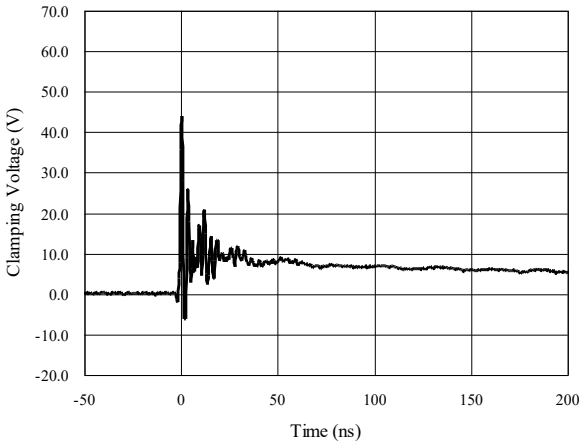
Capacitance *vs.* Reverse Voltage



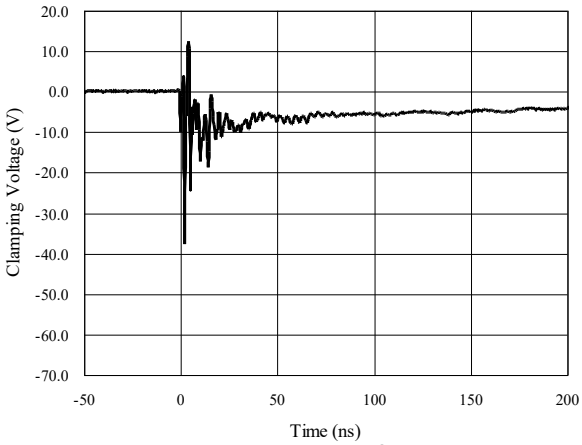
Normalized Capacitance *vs.* Reverse Voltage



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

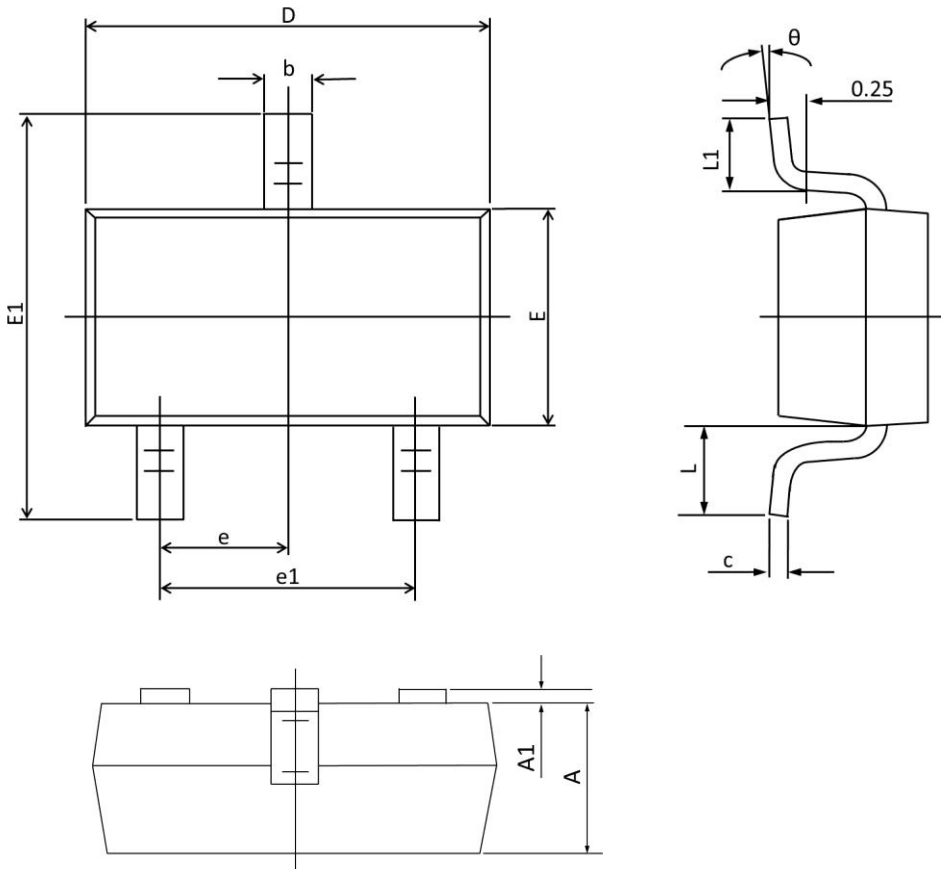


ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)



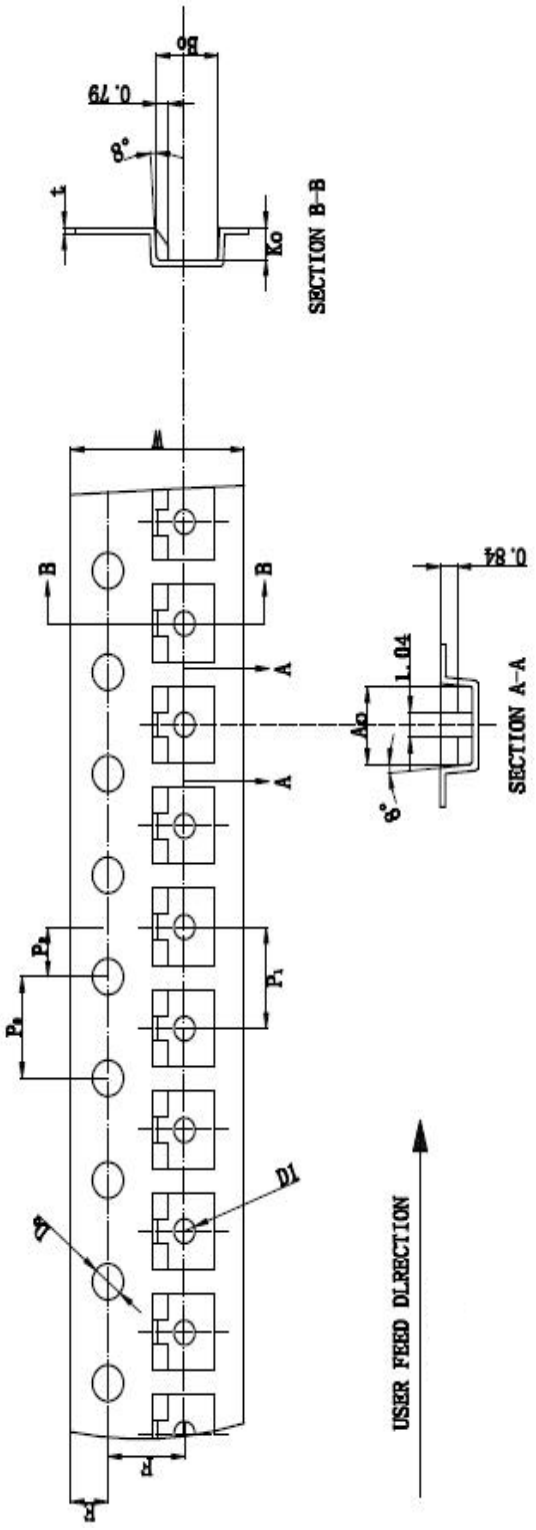
Package Outline Demensions

- SOT23 package
- MSL 3



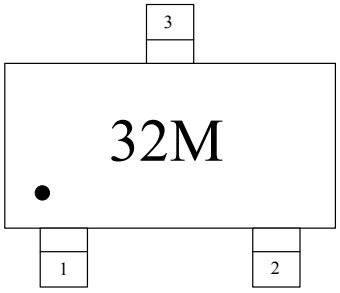
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.000	0.035	0.039
A1	0.000	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.003	0.004
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	1°	7°	1°	7°

Tape and Reel Specification



W	P	E	F	D	D1	Po	Po10	P2	A0	B0	K0	T
8.00	4.00	1.75	3.50	1.50	1.00	4.00	40.00	2.00	3.15	2.77	1.22	0.20
+0.3/-0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.2	±0.05	±0.1	±0.1	±0.1	±0.02

Marking Codes



Note:

(1) "32M" is part number,fixed.

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TT0302MLX	3.3V	3,000	7 Inch