

Features

- ❑ Transient protection for high-speed data lines
IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (Air)
 $\pm 30\text{kV}$ (Contact)
IEC 61000-4-4 (EFT) 40A (5/50 ns)
Cable Discharge Event (CDE)
- ❑ Package optimized for high-speed lines
- ❑ Ultra-small package (1.6mm $\times$ 0.8mm $\times$ 0.6mm)
- ❑ Protects one data, control or power line
- ❑ Low capacitance: 12pF (Typical)
- ❑ Low leakage current: $0.1\mu\text{A}$ @ V_{RWM} (Typical)
- ❑ Low clamping voltage
- ❑ Each I/O pin can withstand over 1000 ESD strikes for $\pm 8\text{kV}$ contact discharge

Description

TT0501MDX is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 12pF only, TT0501MDX 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.

TT0501MD uses ultra-small SOD523 package. Each TT0501MD device can protect one data line. It offers system designers flexibility to protect single data line where space is a premium concern.

Applications

- ❑ Portable Electronics
- ❑ Desktops, Servers and Notebooks
- ❑ Cellular Phones
- ❑ MP3 Ports
- ❑ Digital Camera Ports

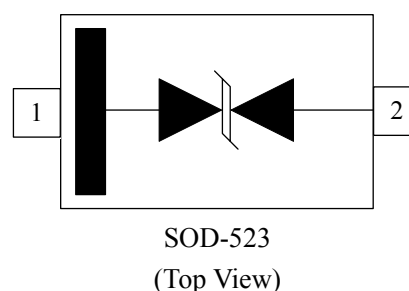
Mechanical Characteristics

- ❑ SOD-523 package
- ❑ Flammability Rating: UL 94V-0
- ❑ Marking: Part number
- ❑ Packaging: Tape and Reel

Circuit Diagram



Pin Configuration

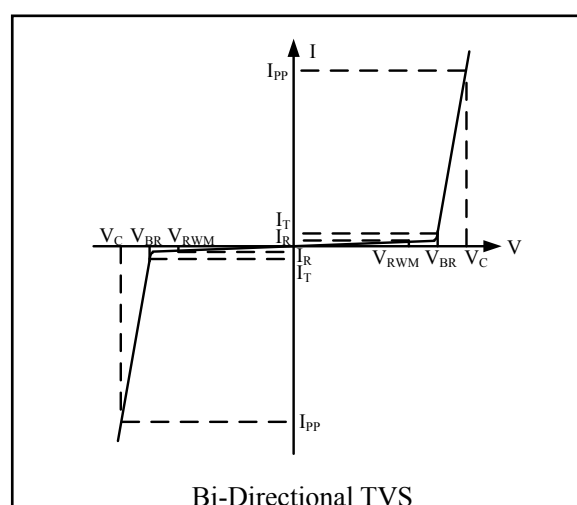


Absolute Maximum Rating

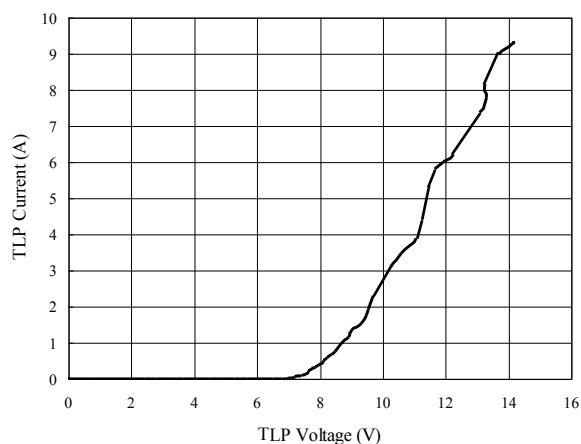
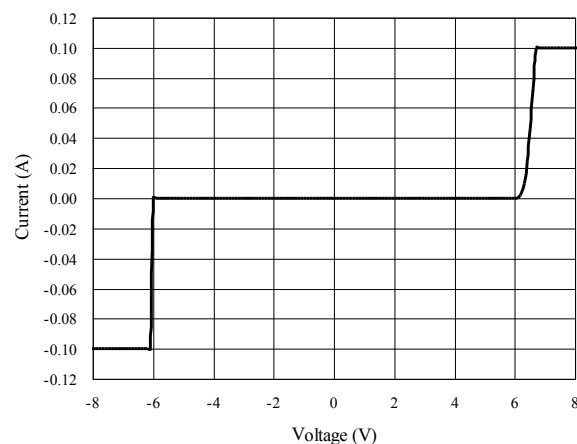
Symbol	Parameter	Value	Units
I_{PP}	Peak Pulse Current($t_p=8/20\mu s$)	5	A
V_{ESD}	ESD per IEC 61000-4-2(Air) ESD per IEC 61000-4-2 (Contact)	± 30 ± 30	kV
T_{OPT}	Operating Temperature	-55/+125	°C
T_{STG}	Storage Temperature	-55/+150	°C

Electrical Characteristics (T = 25°C)

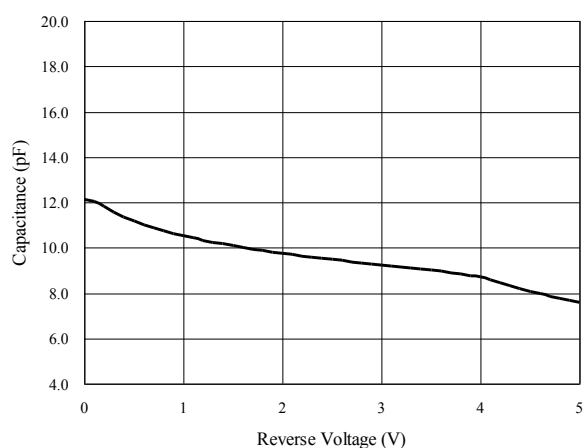
Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Reverse Breakdown Voltage @ I_T
I_T	Test Current for Reverse Breakdown
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance
V_R	Reverse Voltage
f	Small Signal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



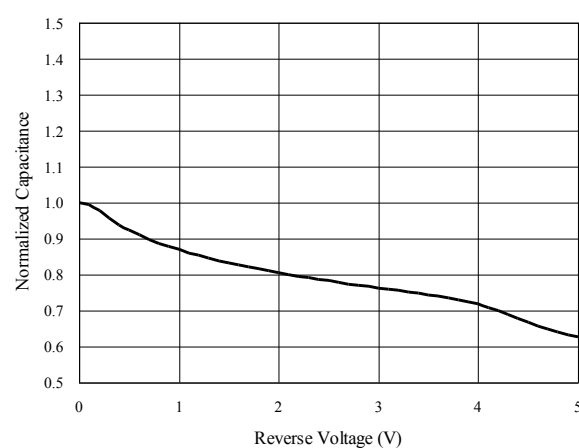
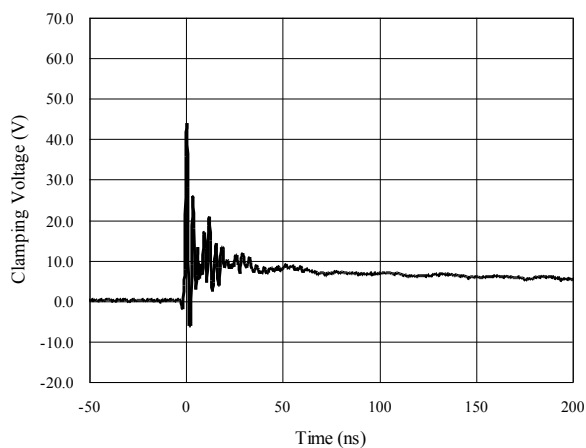
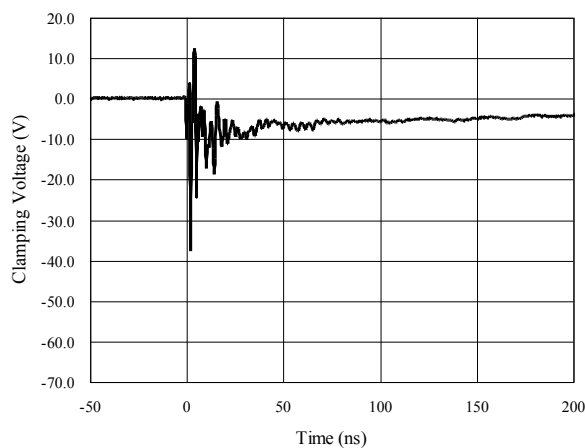
Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				5.0	V
I_R	$V_{RWM} = 5V$, T = 25°C Between I/O_1 and I/O_2		0.1	1.0	μA
V_{BR}	$I_T = 1mA$ Between I/O_1 and I/O_2	5.5	6.0	8.0	V
V_C	$I_{PP} = 1A$, $t_p = 8/20\mu s$ Between I/O_1 and I/O_2			10	V
V_C	$I_{PP} = 5A$, $t_p = 8/20\mu s$ Between I/O_1 and I/O_2			15	V
C_{ESD}	$V_R = 0V$, f = 1MHz Between I/O_1 and I/O_2	10	12	15	pF

TLP Measurement of I/O_1 to I/O_2

Voltage Sweeping of I/O_1 to I/O_2

Capacitance vs. Voltage of I/O_1 to I/O_2 (f = 1MHz)

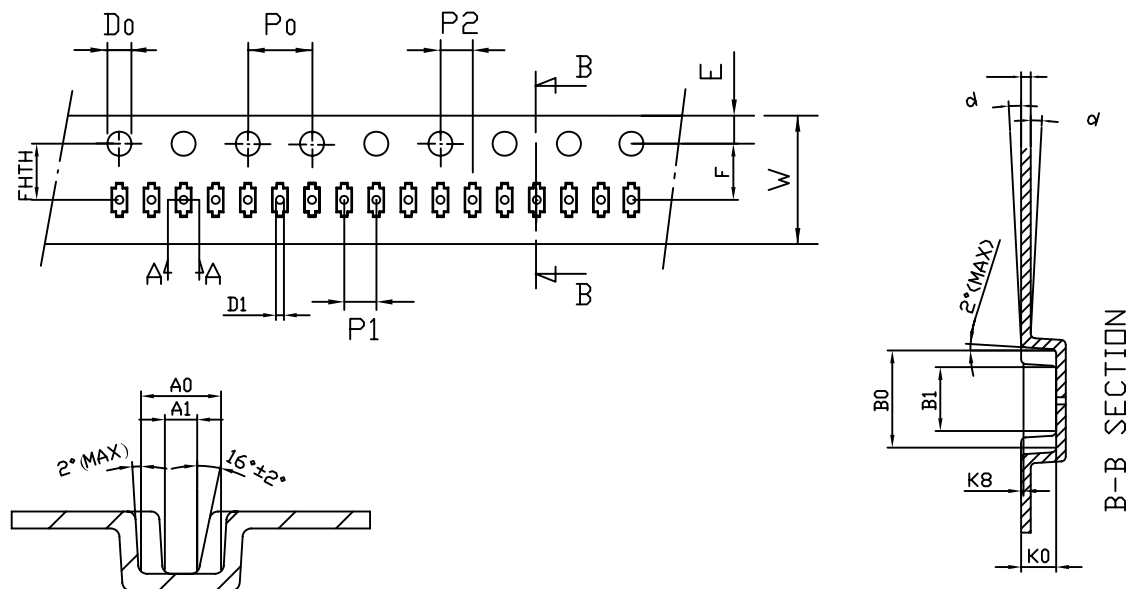
Capacitance vs. Reverse Voltage



Normalized Capacitance vs. Reverse Voltage


**ESD Clamping of I/O_1 to I/O_2
(+8kV Contact per IEC 61000-4-2)**

**ESD Clamping of I/O_1 to I/O_2
(-8kV Contact per IEC 61000-4-2)**


Tape and Reel Specification



A-A SECTION

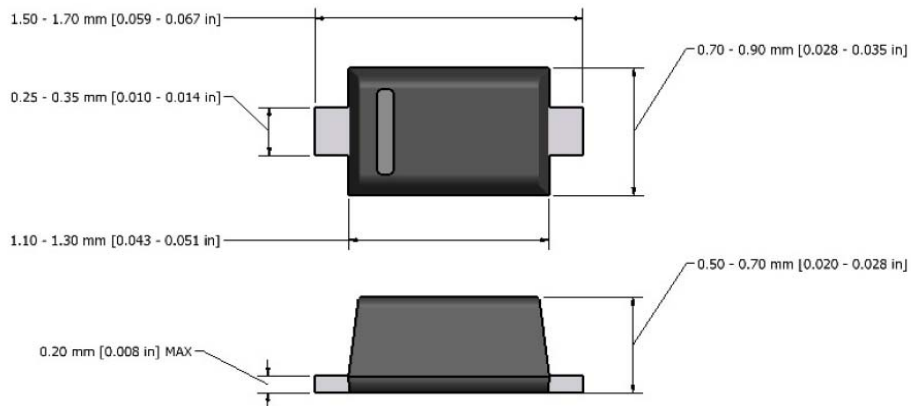
B-B SECTION

unit:mm

symbol	A0	B0	K0	P0	P1	P2	A1	T
Spec	0.90±0.05	1.95±0.05	0.73±0.05	4.0±0.10	2.0±0.05	2.0±0.05	0.39±0.05	0.20±0.02
symbol	E	F	D0	D1	B2	W	10P0	K8
Spec	1.75±0.10	3.50±0.05	1.50 ^{+0.10} ₋₀	0.50±0.05	1.40±0.05	8.0 ^{+0.3} _{-0.1}	40.0±0.10	0.15MAX
symbol	FHTH							
Spec	3.50±0.05							

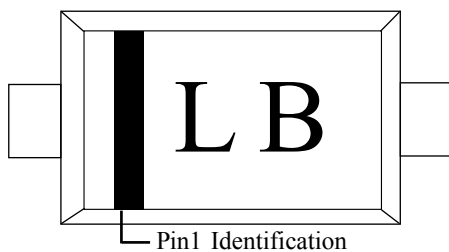
Package Outline

- ❑ SOD-523 package
- ❑ 2 leads, very small package



Note: Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

Marking Codes



Note:

(1) "LB" is part number, fixed

Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TT0501MDX	5V	3,000	7 Inch