



### Features

- ❑ Transient protection for high-speed data lines  
IEC 61000-4-2 (ESD) ±30kV (Air)  
±30kV (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×0.8mm×0.8mm)
- ❑ Protects one data, control or power line
- ❑ Low capacitance: 15pF (Typical)
- ❑ Low leakage current: 0.1µA @ V<sub>RWM</sub> (Typical)
- ❑ Low clamping voltage
- ❑ Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge

### Description

TT0301MDX is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 15pF only, TT0301MDX 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 (±15 kV 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.

TT0301MDX uses ultra-small SOD-523 package. Each TT0301MDX 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

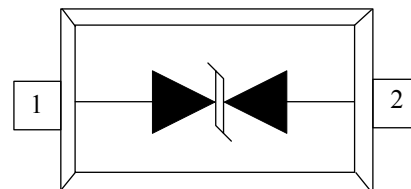
### Mechanical Characteristics

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

### Circuit Diagram



### Pin Configuration



SOD-523  
(Top View)

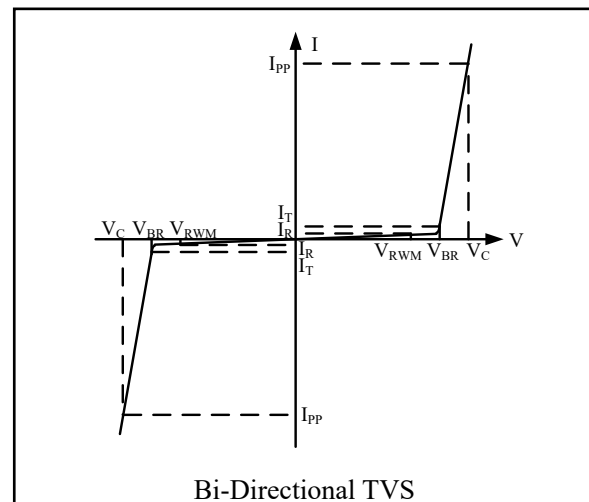


### Absolute Maximum Rating

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Pulse Current( $t_p=8/20\mu s$ )	9	A
$V_{ESD}$	ESD per IEC 61000-4-2(Air) ESD per IEC 61000-4-2 (Contact)	$\pm 30$ $\pm 30$	kV
$T_{OPT}$	Operating Temperature	-55/+125	°C
$T_{STG}$	Storage Temperature	-55/+150	°C

### Electrical Characteristics (T = 25°C)

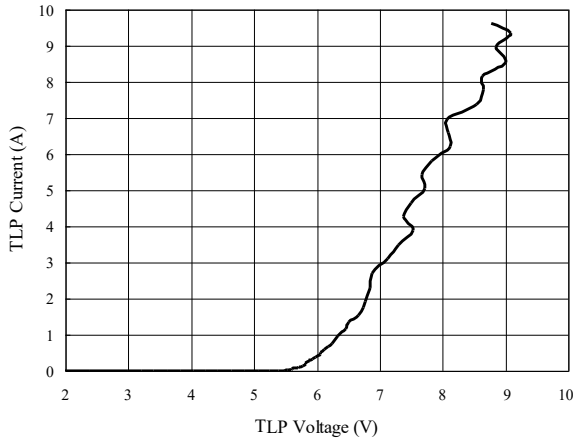
Symbol	Parameter
$V_{RWM}$	Nominal Reverse Working Voltage
$I_R$	Reverse Leakage Current @ $V_{RWM}$
$V_{BR}$	Reverse Breakdown Voltage @ $I_T$
$I_T$	Test Current for Reverse Breakdown
$V_C$	Clamping Voltage @ $I_{PP}$
$I_{PP}$	Maximum Peak Pulse Current
$C_{ESD}$	Parasitic Capacitance
$V_R$	Reverse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



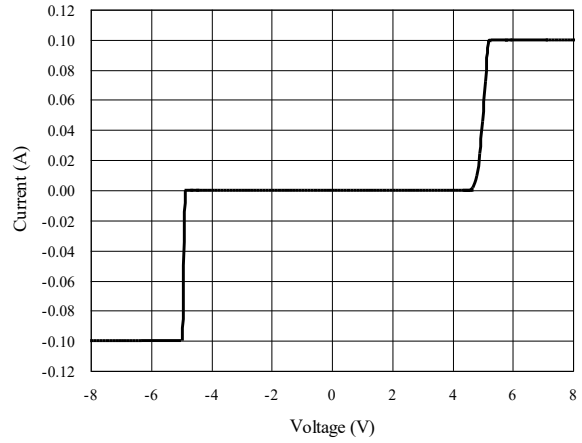
Symbol	Test Condition	Minimum	Typical	Maximum	Units
$V_{RWM}$				3.3	V
$I_R$	$V_{RWM}= 3.3V, T = 25^\circ C$ Between I/O_1 and I/O_2		0.1	1.0	$\mu A$
$V_{BR}$	$I_T = 1mA$ Between I/O_1 and I/O_2	3.8		7.0	V
$V_C$	$I_{PP} = 1A, t_p = 8/20\mu s$ Between I/O_1 and I/O_2			8	V
$V_C$	$I_{PP} = 9A, t_p = 8/20\mu s$ Between I/O_1 and I/O_2			10	V
$C_{ESD}$	$V_R = 0V, f = 1MHz$ Between I/O_1 and I/O_2		15	18	pF



### TLP Measurement of I/O\_1 to I/O\_2

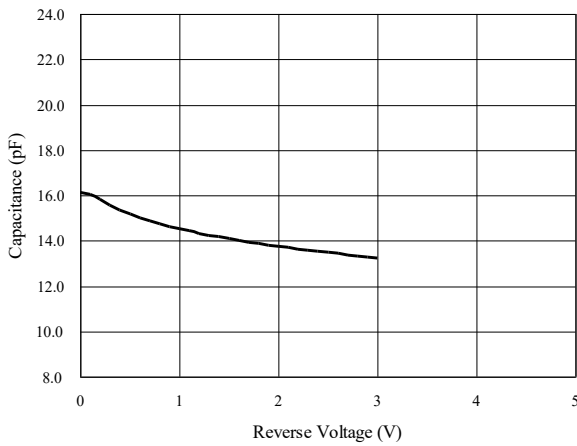


### Voltage Sweeping of I/O\_1 to I/O\_2

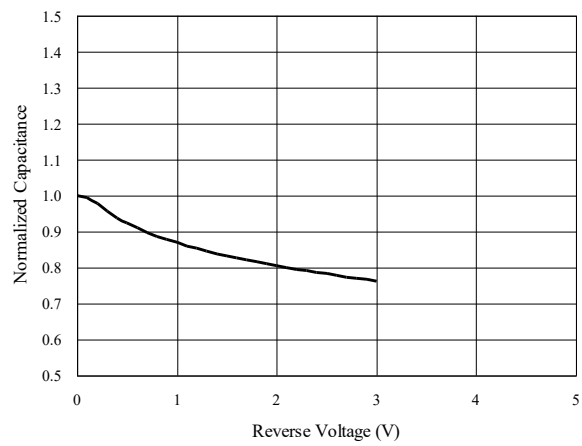


### Capacitance vs. Voltage of I/O\_1 to I/O\_2 (f = 1MHz)

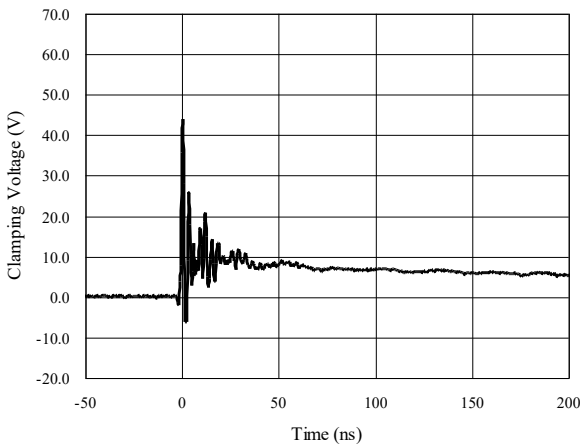
Capacitance vs. Reverse Voltage



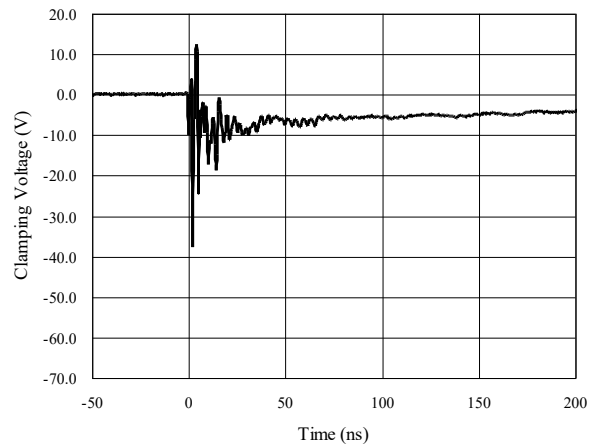
Normalized Capacitance vs. Reverse Voltage



### ESD Clamping of I/O\_1 to I/O\_2 (+8kV Contact per IEC 61000-4-2)

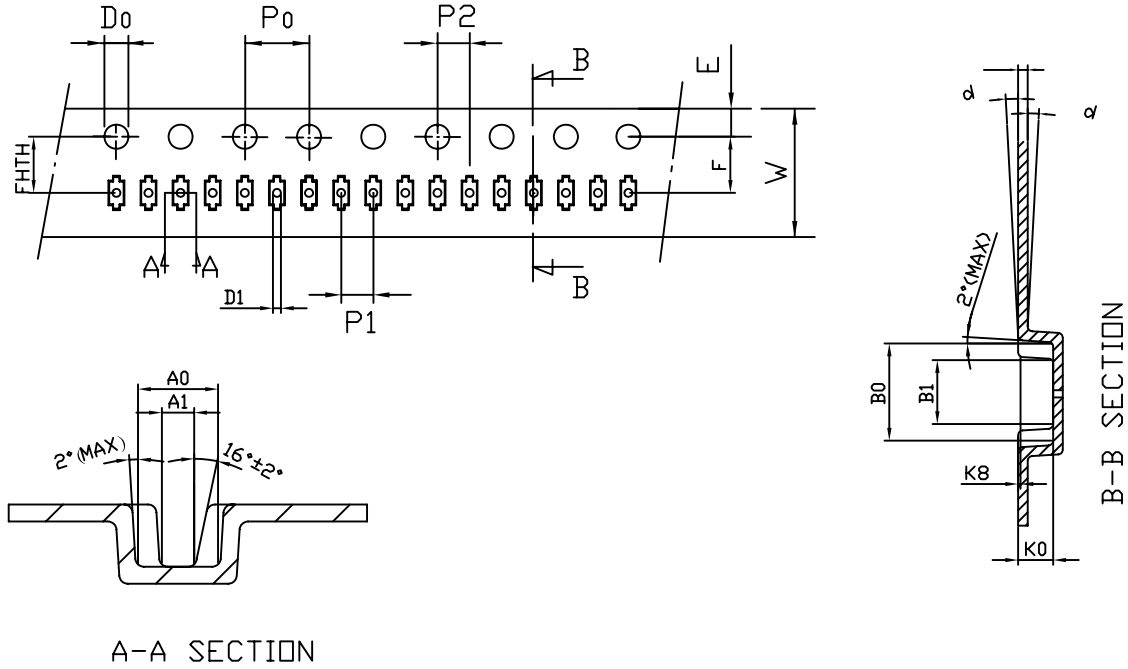


### ESD Clamping of I/O\_1 to I/O\_2 (-8kV Contact per IEC 61000-4-2)





Tape and Reel Specification



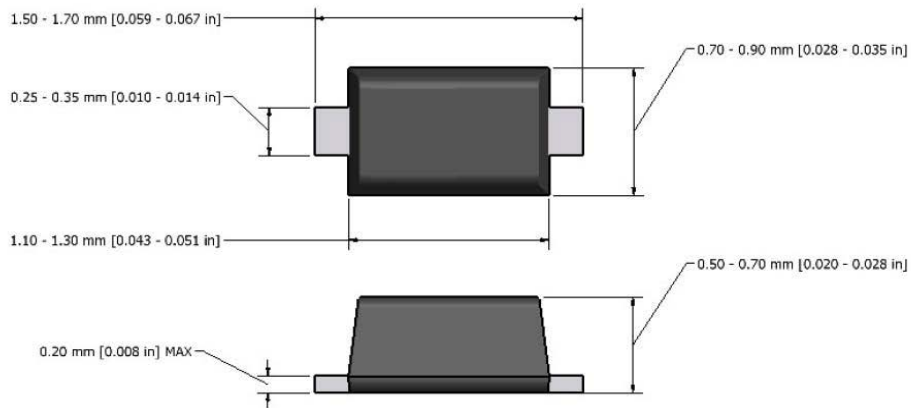
A-A SECTION

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 <sup>+0.10</sup> <sub>-0</sub>	0.50±0.05	1.40±0.05	8.0 <sup>+0.3</sup> <sub>-0.1</sub>	40.0±0.10	0.15MAX
symbol	FHTH							
Spec	3.50±0.05							

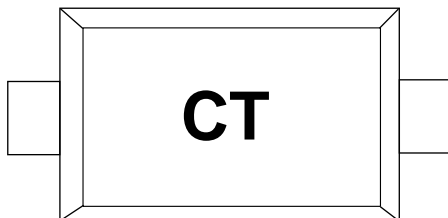
## Package Outline

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



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

## Marking Codes



Note:

- (1) "CT" is part number, fixed

## Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TT0301MDX	3.3V	3,000	7 Inch

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