

## 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 × 0.6mm)
- ❑ Protects one data, control or power line
- ❑ Low capacitance: 7.5pF (Typical)
- ❑ Low leakage current: 0.1μA @ V<sub>RWM</sub>(MAX)
- ❑ Low clamping voltage
- ❑ Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge
- ❑ ROHS compliant
- ❑ AEC-Q101 qualified

## Description

TTA 0501 MD X is a low -capacitance Transient Voltage Suppressor (TVS ) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 7.5 pF only , TTA 0501 MDX 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.

TTA 0501 MDX uses ultra -small SOD -523 package . Each TTA0501MDX 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

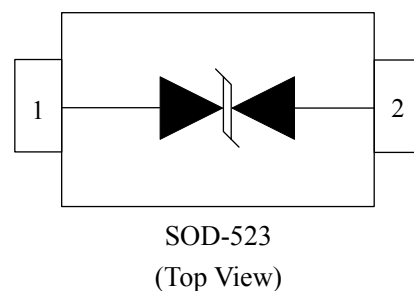
## Mechanical Characteristics

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

## Circuit Diagram



## Pin Configuration

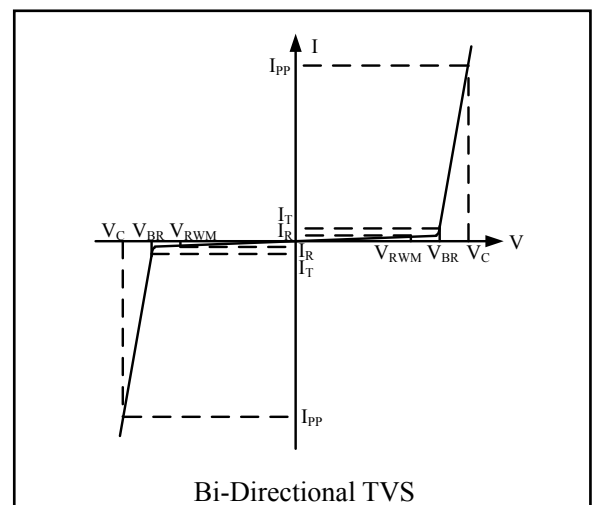


### Absolute Maximum Rating

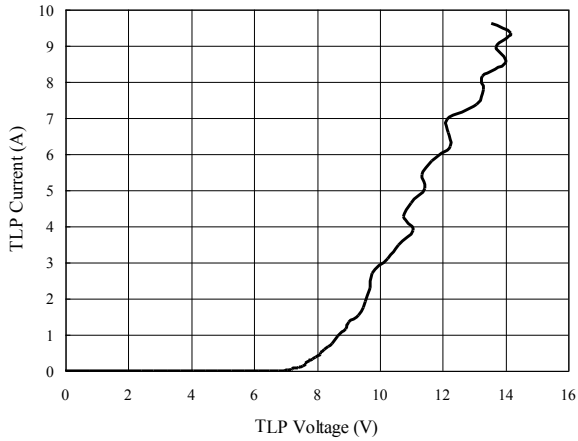
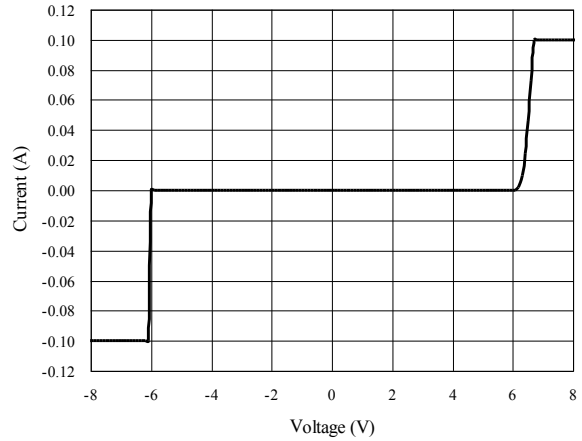
Symbol	Parameter	Value	Units
$V_{ESD}$	ESD per IEC 61000-4-2 (Air)	±30	kV
	ESD per IEC 61000-4-2 (Contact)	±30	
$T_{OPT}$	Operating Temperature	-55/+125	°C
$T_{STG}$	Storage Temperature	-55/+150	°C

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

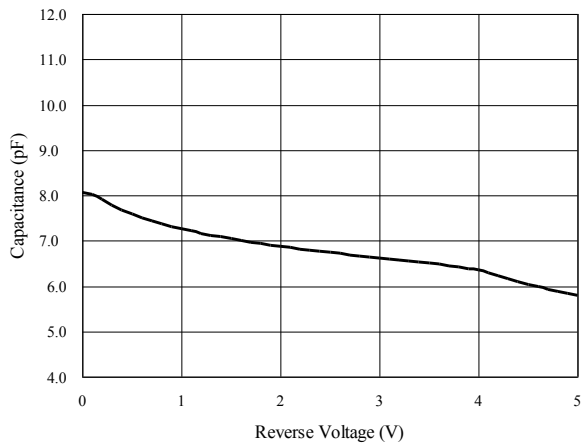
Symbol	Parameter
$V_{RWM}$	Nominal Reverse Working Voltage
$I_R$	Reverse Leakage Current @ $V_{RWM}$
$V_{BR}$	Reverse Breakdown Voltage @ $I_T$
$I_T$	Test Current for Reverse Breakdown
$V_C$	Clamping Voltage @ $I_{PP}$
$I_{PP}$	Maximum Peak Pulse Current
$C_{ESD}$	Parasitic Capacitance
$V_R$	Reverse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



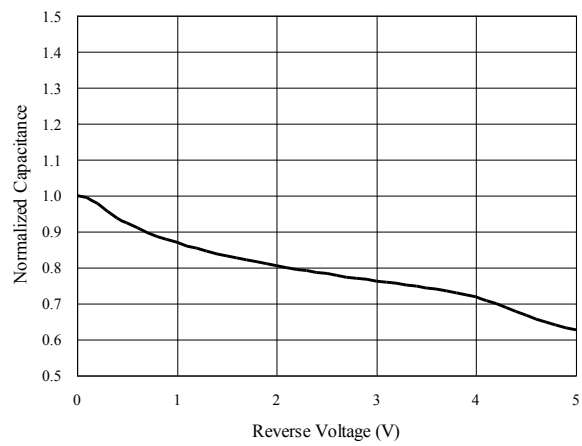
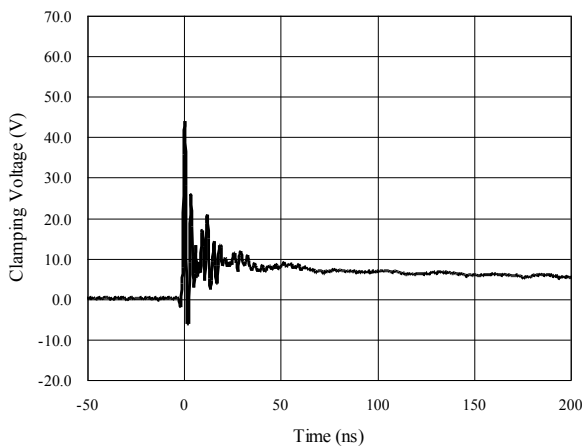
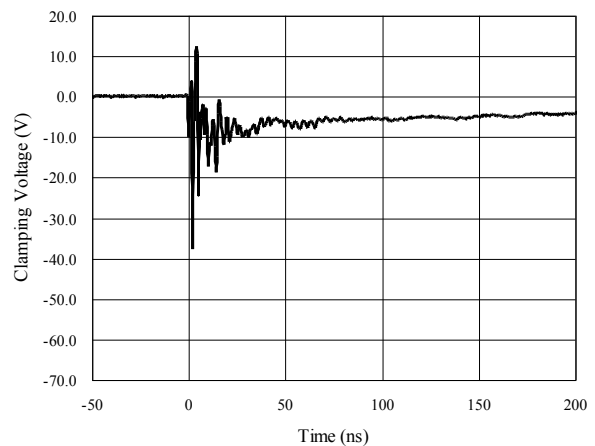
Symbol	Test Condition	Minimum	Typical	Maximum	Units
$V_{RWM}$				5.0	V
$I_R$	$V_{RWM} = 5V, T = 25^\circ C$ Between I/O_1 and I/O_2			0.1	μA
$V_{BR}$	$I_T = 1mA$ Between I/O_1 and I/O_2	5.5			V
$V_C$	$I_{PP} = 1A, t_p = 8/20\mu s$ Between I/O_1 and I/O_2			10	V
$V_C$	$I_{PP} = 5A, t_p = 8/20\mu s$ Between I/O_1 and I/O_2			15.5	V
$C_{ESD}$	$V_R = 0V, f = 1MHz$ Between I/O_1 and I/O_2		7.5	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)**

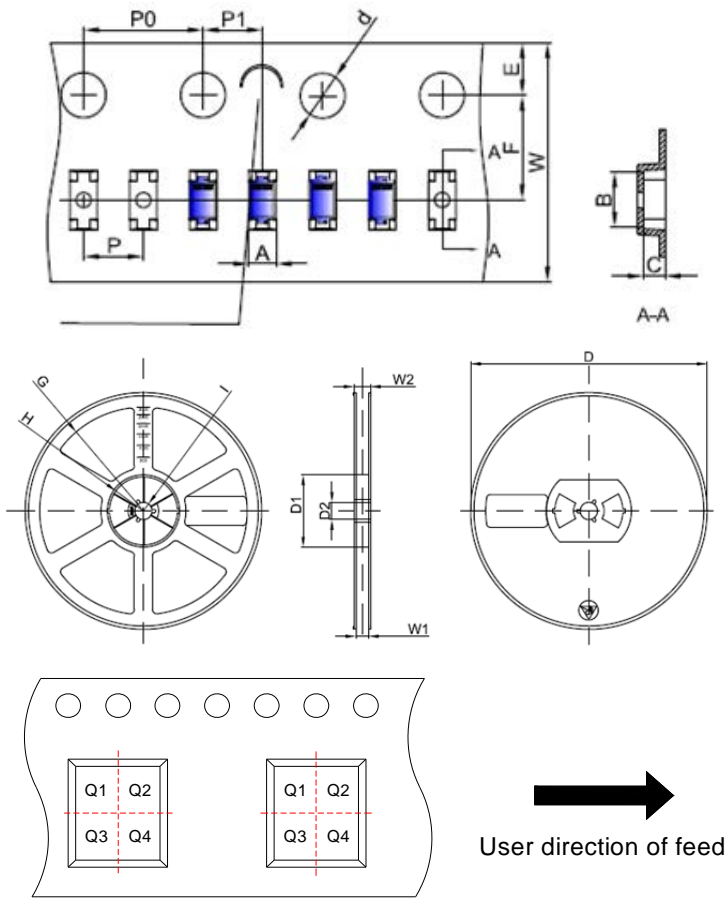
Capacitance vs. Reverse Voltage



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



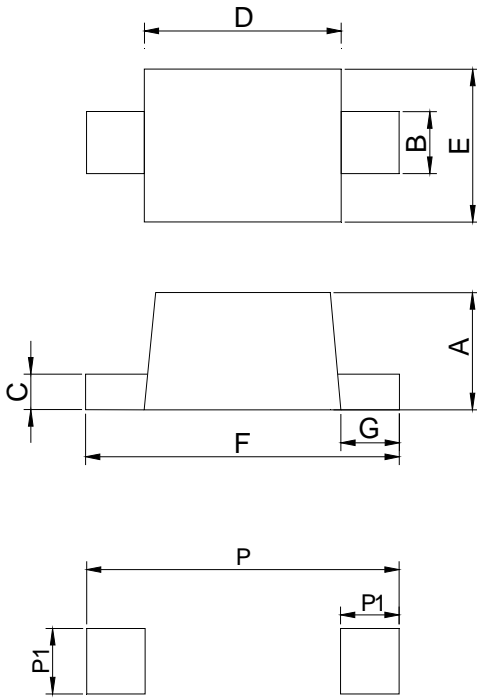
Pin 1 quadrant: Q1&Q2

#### Packaging Description:

SOD-523 parts are shipped in tape. The carrier tape is made from a dissipative(carbon filled) polycarbonate resin. The cover tape is a multilayer film(heat activated adhesive in nature)primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 5,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and made of polystyrene plastic(anti-static coated).

Symbol	Millimeters	Inches
	Typ.	Typ.
A	0.90	0.035
B	1.94	0.076
C	0.73	0.029
d	Φ1.50	Φ0.059
E	1.75	0.069
F	3.50	0.138
P0	4.00	0.157
P	2.00	0.079
P1	2.00	0.079
W	8.00	0.315
D	Φ178	Φ7.008
D1	54.40	2.142
D2	13.00	0.512
G	R78.00	R3.071
H	R25.60	R1.008
I	R6.50	R0.256
W1	9.50	0.374
W2	12.30	0.484

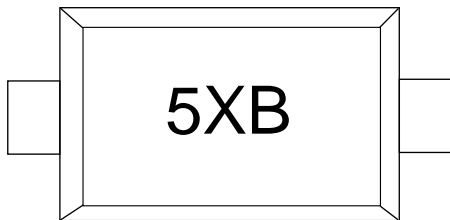
### Package Outline



**Land Pattern**

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.50	0.70	0.020	0.028
B	0.25	0.35	0.010	0.014
C	0.07	0.20	0.0028	0.0079
D	1.10	1.30	0.043	0.051
E	0.70	0.90	0.028	0.035
F	1.50	1.70	0.059	0.067
G	0.15	0.25	0.006	0.010
P1	0.40		0.016	
P	1.80		0.072	

### Marking Codes



Note:

- (1) "5XB" is part number, fixed

### Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
TTA0501MDX	5V	3,000	7 Inch

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