

## Features

- ❑ Transient protection for high-speed data lines  
IEC 61000-4-2 (ESD) ±12kV (Air)  
±10kV (Contact)
- ❑ Protects one high-speed data line
- ❑ Low reverse current:<10nA typical (VR=1.0V)
- ❑ Working voltage: 1.0V
- ❑ Low capacitance: 0.15pF(Typical)
- ❑ Solid-state silicon-avalanche technology

## Description

TT0201SAX are ultra low capacitance ESD protection devices designed to protect high speed data interfaces. They are designed to replace 0201 size mul-tilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and other portable electronics. This device offers desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation . TT0201SAX has a typical capacitance of only 0.15pF. This allows it to be used on circuits operating.

TT0201SAX is in a 2-pin DFN0603 package. It measures 0.6 x 0.3 mm with a nominal height of only 0.25mm. Leads are finished with lead-free NiAu. Each device will protect one line operating at 1.0 volts . It gives the designer the flexibility to protect single lines in applications where arrays are not practical . The combination of small size and high ESD surge capability makes them ideal for use in portable applications such as cellular phones , digital cameras , and MP3 players.

## Applications

- ❑ HDMI 1.3/1.4 and HDMI 2.0
- ❑ USB 2.0 and USB 3.0/3.1/4.0
- ❑ MHL
- ❑ LVDS Interfaces
- ❑ FM Antenna
- ❑ PCI Express
- ❑ eSATA Interfaces

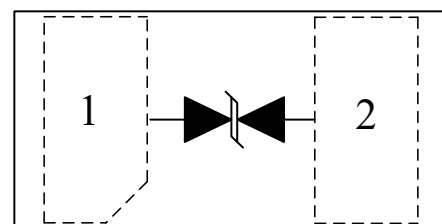
## Mechanical Characteristics

- ❑ DFN0603 package
- ❑ Pb-Free, Halogen Free, RoHS/WEEE Compliant
- ❑ Nominal Dimensions: 0.6 x 0.3 x 0.25 mm
- ❑ Lead Finish: NiAu
- ❑ Molding compound flammability rating: UL 94V-0
- ❑ Packaging : Tape and Reel

## Circuit Diagram



## Pin Configuration



DFN0603  
(Top View)

### Absolute Maximum Rating

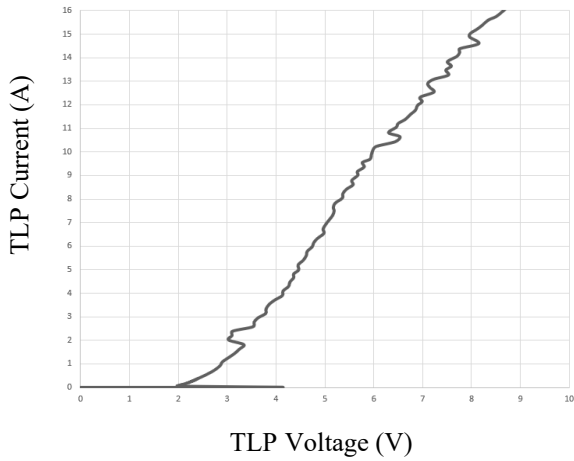
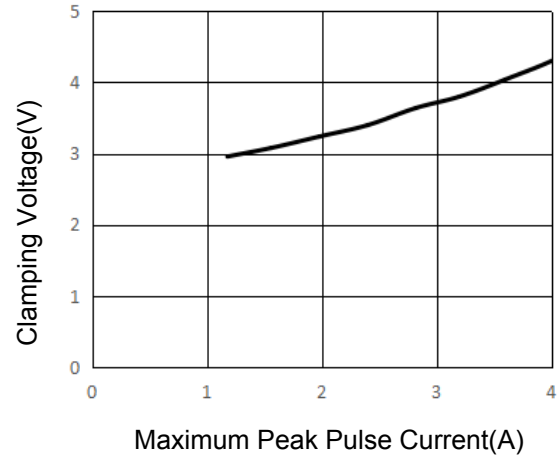
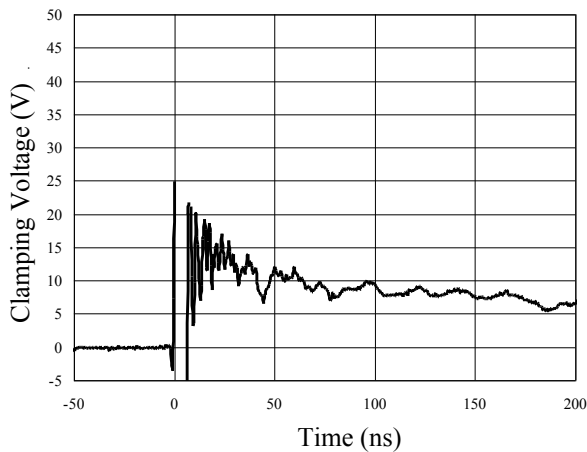
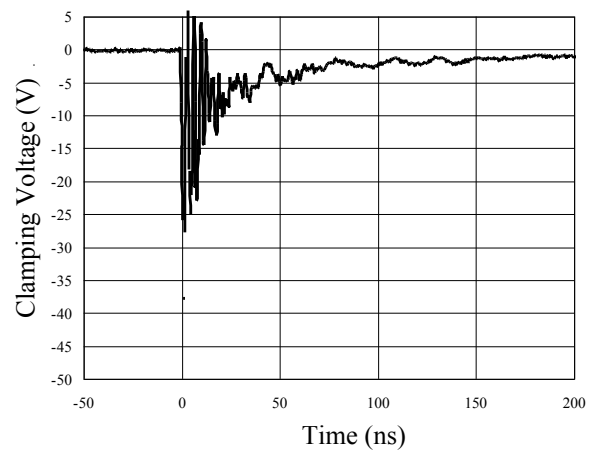
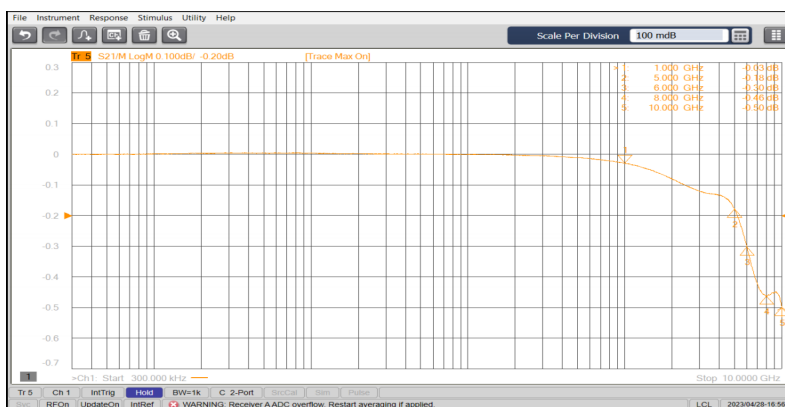
Rating	Symbol	Value	Units
Peak Pulse Current (tp = 8/20μs)	I <sub>PP</sub>	4	A
Peak Pulse Power (tp = 8/20μs)	PPK	20	W
ESD per IEC 61000-4-2 (Air) <sup>1</sup> ESD per IEC 61000-4-2 (Contact) <sup>1</sup>	V <sub>ESD</sub>	±12 ±10	kV
Operating Temperature	T <sub>J</sub>	-55 to +125	°C
Storage Temperature	T <sub>STG</sub>	-55 to +150	°C

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

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V <sub>RWM</sub>				1.0	V
Reverse Breakdown Voltage	V <sub>BR</sub>	I <sub>t</sub> = 1mA	1.2			V
Reverse Leakage Current	I <sub>R</sub>	V <sub>RWM</sub> = 1.0V, T=25°C			0.1	μA
Clamping Voltage	V <sub>C</sub>	I <sub>PP</sub> = 1A, tp = 8/20μs		3.0		V
Clamping Voltage	V <sub>C</sub>	I <sub>PP</sub> = 4A, tp = 8/20μs		4.3		V
Clamping Voltage	V <sub>C</sub>	I <sub>TLP</sub> = 8A, tp = 100ns		5.0		
Clamping Voltage	V <sub>C</sub>	I <sub>TLP</sub> = 16A, tp = 100ns		8.4		
Dynamic Resistance <sup>2, 3, 4</sup>	R <sub>D</sub>	tp = 100ns		0.43		Ohms
Junction Capacitance	C <sub>j</sub>	V <sub>R</sub> = 0V, f = 1MHz		0.15		pF

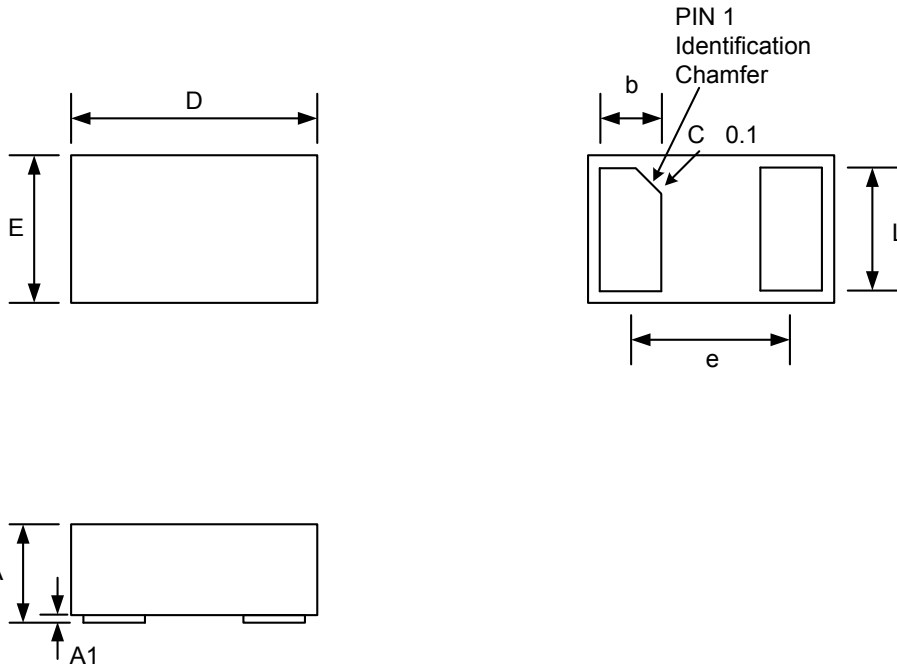
#### Notes

- ESD gun return path connected to ESD ground reference plane.
- Transmission Line Pulse Test (TLP) Settings: tp = 100ns, tr = 0.2ns, I<sub>TLP</sub> and V<sub>TLP</sub>  
averaging window: t1 = 70ns to t2 = 90ns.
- Dynamic resistance calculated from I<sub>TLP</sub> = 4A to I<sub>TLP</sub> = 16A
- Guaranteed by design. Not production tested

**TLP Measurement of I/O to I/O**

**8/20us Current IO to IO**

**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)**

**Insertion Loss S21 of I/O to I/O**


### Package Outline

- DFN0603 package
- 2 leads
- MSL-1



Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Minimum	Maximum	Minimum	Maximum
A	0.270	0.330	0.011	0.013
A1	0.000	0.050	0.000	0.002
D	0.600	0.640	0.023	0.025
E	0.300	0.340	0.011	0.013
b	0.115	0.175	0.005	0.007
e	0.400 BSC		0.016 BSC	
L	0.215	0.275	0.008	0.011



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