Features

- Transient protection for high-speed data lines
  IEC 61000-4-2 (ESD) ±25kV (Air)
  ±22kV (Contact)
- Protects one high-speed data line
- Low reverse current:< 10nA typical (VR=5V)
- Working voltage: 5V
- Low capacitance: 0.25pF typical
- Dynamic resistance: 0.90 Ohms (Typ)
- Solid-state silicon-avalanche technology

Applications

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

Mechanical Characteristics

- DFN0603-2L 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

Description

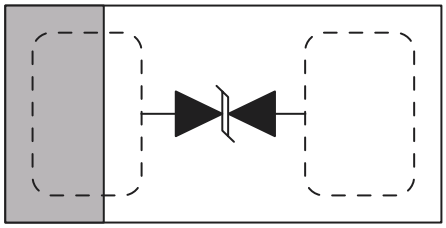
T0501SA are ultra low capacitance ESD protection devices designed to protect high speed data interfaces. They are designed to replace 0201 size mul- tilayer varistors (MLVs) in portable applications such as cell phones,notebook computers, and other portable electronics. This device offers desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation. T0501SA has a typical capacitance of only 0.25pF.This allows it to be used on circuits operating.

T0501SA 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 5 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.

Circuit Diagram

finished with lead-free

Pin Configuration



DFN0603
(Top View)

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Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20μs)	Ppk	100	Watts
Peak Pulse Current (tp = 8/20μs)	I_{PP}	4.5	A
ESD per IEC 61000-4-2 (Air)[1] ESD per IEC 61000-4-2 (Contact)[1]	V_{ESD}	±25 ±22	kV
Operating Temperature	T_J	-55 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Characteristics (T = 25°C)

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	I_t = 1mA	7	9	10	V
Reverse Leakage Current	I_R	V_{RWM} = 5V, T=25°C		0.005	0.100	μA
Clamping Voltage	V_C	I_{PP} = 1A, tp = 8/20μs			11	V
Clamping Voltage	V_C	I_{PP}= 4A, tp = 8/20μs			15	V
Dynamic Resistance[2, 3, 4]	R_D	tp = 100ns		0.90		Ohms
Junction Capacitance	C_j	V_R = 0V, f = 1MHz		0.25	0.4	pF

Notes

1) ESD gun return path connected to ESD ground reference plane.

2) Transmission Line Pulse Test (TLP) Settings: tp= 100ns, tr= 0.2ns, I_{TLP} and V_{TLP} averaging window: t1 = 70ns to t2= 90ns.

3) Dynamic resistance calculated from I_{TLP} = 4A to I_{TLP} = 16A

4) Guaranteed by design. Not production tested

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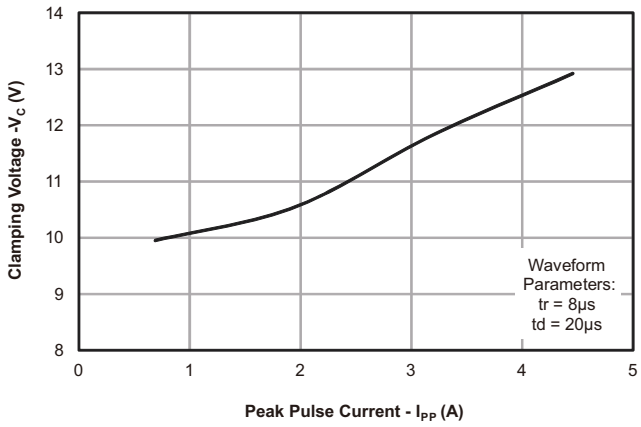
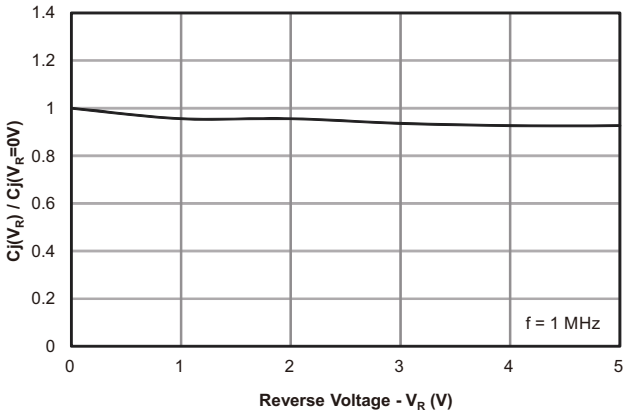
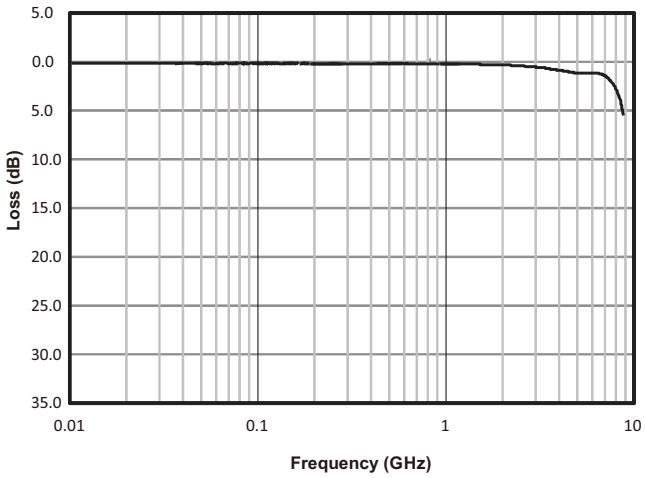
Clamping Voltage vs. Peak Pulse Current



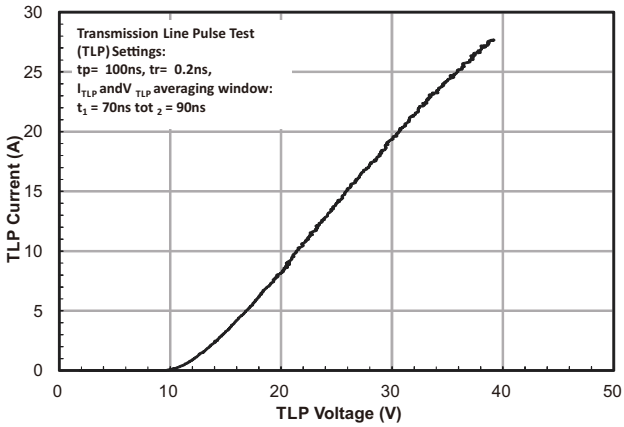
Typical Capacitance vs. Reverse Voltage



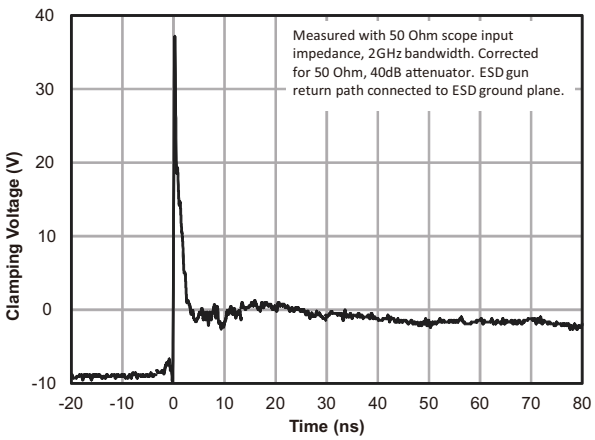
Typical Insertion Loss (S21)



TLP Characteristic

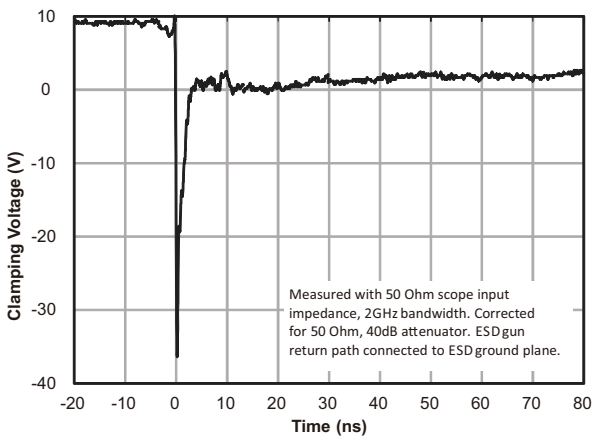


ESD Clamping (+8kV Contact per IEC 61000-4-2)



Time (ns)

ESD Clamping (-8kV Contact per IEC 61000-4-2)



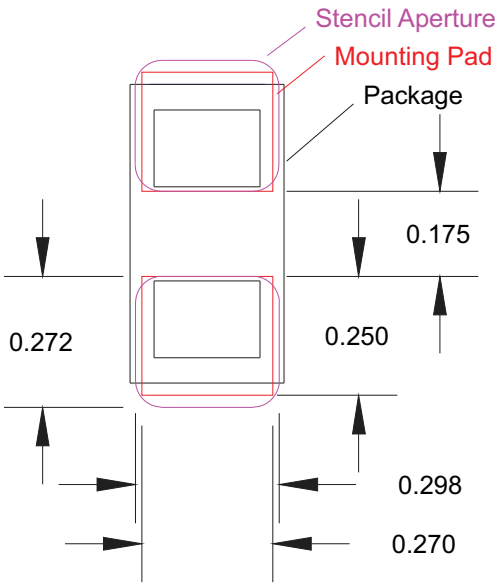
Time (ns)

Application Information

Assembly Guidelines

The small size of this device means that some care must be taken during the mounting process to insure reliable solde joint. The table below provides CITC recommended assembly guidelines for Mounting this device. The figure at the right details CITC recommended aperture based on the below recommendations. Not that these are only recommendations and should serve only as a starting point for design since there are many factors that affect the assembly process. The exact manufacturing parameters will require some experimentation to get the desired solder application.

Recommended Mounting Pattern



Assembly Parameter	Recommendation
Solder Stencil Design	Laser cut, Electro-polished
Aperture shape	Rectangular with rounded corners
Solder Stencil Thickness	0.100 mm (0.004")
Solder Paste Type	Type 4 size sphere or smaller
Solder Reflow Profile	Per JEDEC J-STD-020
PCB Solder Pad Desig	Non-Solder mask defined
PCB Pad Finish	OSP OR NiAu

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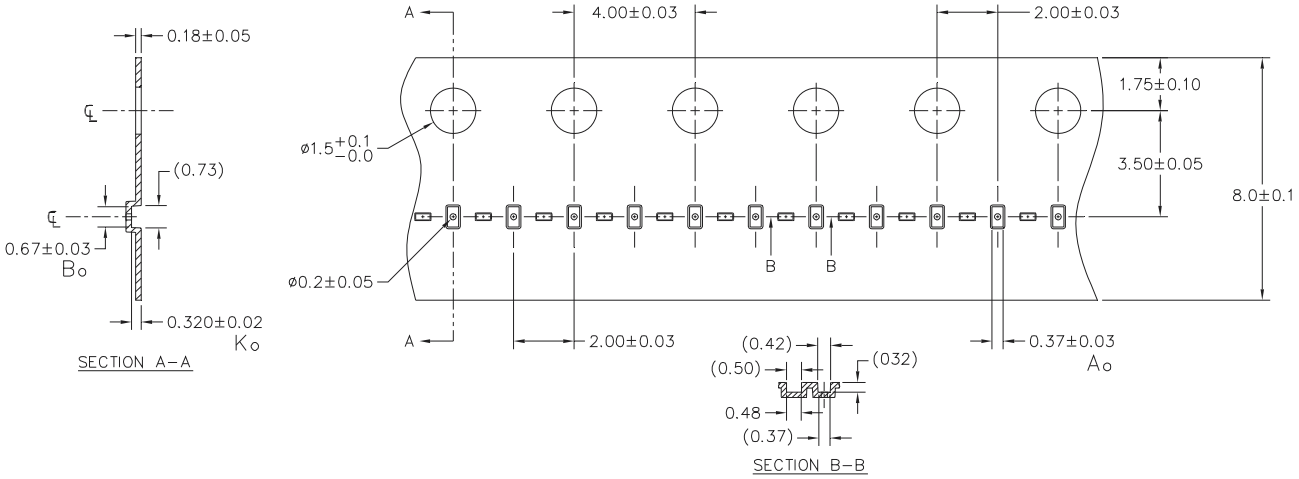
Ordering Information

Part Number	Qty per Reel	Reel Size
T0501SA	10,000	7inch

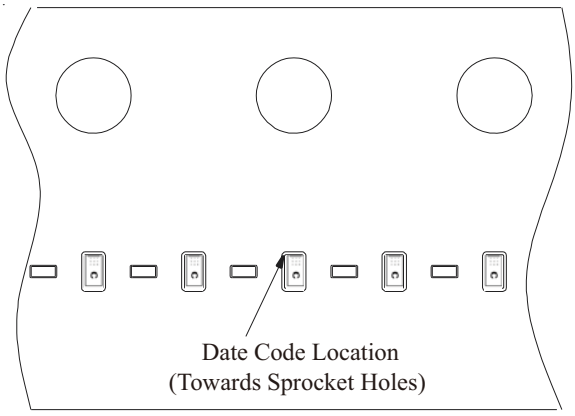
Carries Tape Specification



A0	B0	K0
0.37 +/-0.03	0.67 +/-0.03	0.32 +/-0.02 mm

Note: All dimensions in mm unless otherwise specified

Device Orientation in Tape



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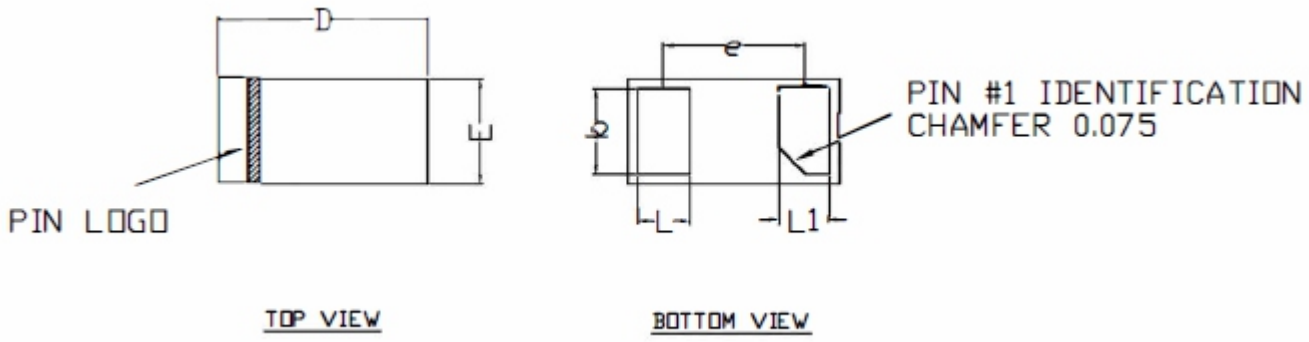
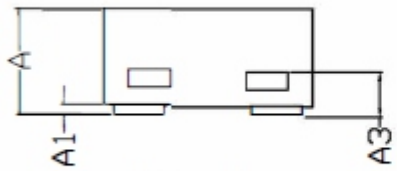
Package Outline

DFN0603-2L package
2 leads
MSL-1





COMMON DIMENSIONS(MM)			
PKG. REF.	X3-EXTREME THIN		
	MIN.	NOM.	MAX
A	>0.23	–	0.33
A1	0.00	–	0.05
A3	0.102REF.		
D	0.55	0.60	0.65
E	0.25	0.30	0.35
b	0.215	0.245	0.275
L	0.115	0.145	0.175
L1	0.115	0.145	0.175
e	0.40BSC		

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