

## Ultra Low Capacitance TVS/ESD Protection Diode

### DESCRIPTION

TEP0501SALC is an ultra-low capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 0.2 pF only, TEP0501SALC 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 ( $\pm 25\text{kV}$  air,  $\pm 22\text{kV}$  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. TEP0501SALC uses ultra-small DFN0603 package. Each TEP0501SALC device can protect one high-speed data line. It offers system designers flexibility to protect single data line where space is a premium concern. The combined features of low capacitance, ultra-small size and high ESD robustness make TEP0501SALC ideal for high-speed data port and high-frequency line (e.g., USB 2.0 & antenna line) applications, such as cellular phones and HD visual devices.

### ORDERING INFORMATION

- ✧ Device: TEP0501SALC
- ✧ Package: DFN0603
- ✧ Marking: Marking Code + Date Code
- ✧ Material: Halogen free
- ✧ Packing: Tape & Reel
- ✧ Quantity per reel: 10,000pcs

### CIRCUIT DIAGRAM



### FEATURES

- ✧ Transient protection for high-speed data lines  
IEC 61000-4-2 (ESD)  $\pm 25\text{kV}$  (Air)  
 $\pm 22\text{kV}$  (Contact)  
IEC 61000-4-4 (EFT) 40A (5/50 ns)  
Cable Discharge Event (CDE)
- ✧ Package optimized for high-speed lines
- ✧ Ultra-small package (0.6mmx0.3mmx0.25mm)
- ✧ Protects one data, control or power line
- ✧ Low capacitance: 0.2pF (Typical)
- ✧ Low leakage current
- ✧ Low clamping voltage
- ✧ Lead finish: NiAu

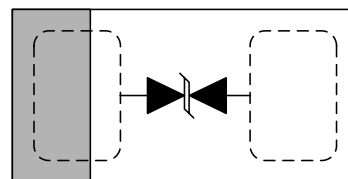
### MACHANICAL DATA

- ✧ DFN0603 package
- ✧ Flammability Rating: UL 94V-0
- ✧ Packaging: Tape and Reel
- ✧ High temperature soldering guaranteed:  $260^{\circ}\text{C}$  /10s
- ✧ Reel size: 7 inch

### APPLICATIONS

- ✧ Serial ATA
- ✧ Desktops, Servers and Notebooks
- ✧ Cellular Phones
- ✧ MDDI Ports
- ✧ USB2.0 Power and Data Line Protection
- ✧ Display Ports
- ✧ Digital Visual Interfaces (DVI)

### PIN CONFIGURATION



**ABSOLUTE MAXIMUM RATING**

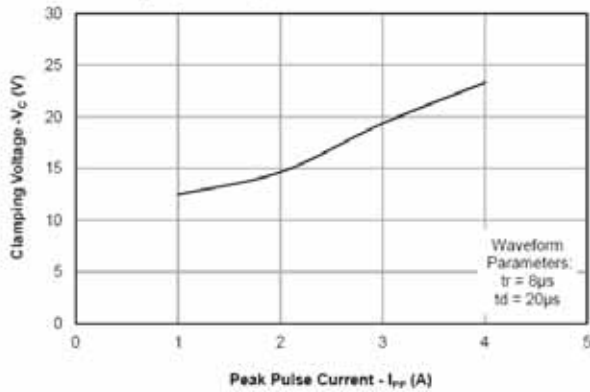
Symbol	Parameter	Value	Units
P <sub>PP</sub>	Peak Pulse Power (8/20μs)	100	W
I <sub>PP</sub>	Peak Pulse Current (8/20μs)	4.5	A
V <sub>ESD</sub>	ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	±25 ±22	kV
T <sub>OPT</sub>	Operating Temperature	-55/+125	°C
T <sub>STG</sub>	Storage Temperature	-55/+150	°C

**ELECTRICAL CHARACTERISTICS (T<sub>amb</sub>=25°C)**

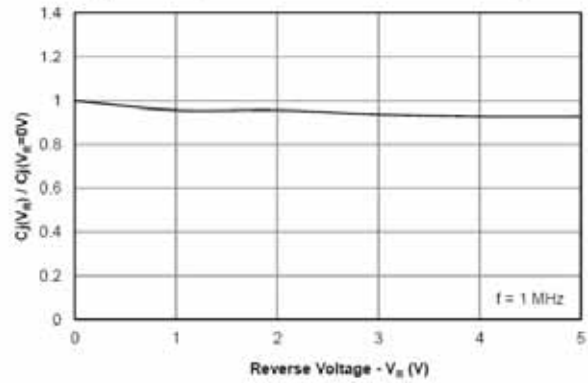
Symbol	Parameter	Test Condition	Min	Typ	Max	Units
V <sub>RWM</sub>	Reverse Working Voltage				5.0	V
V <sub>BR</sub>	Reverse Breakdown Voltage	I <sub>T</sub> = 1mA	7.0		11.0	V
I <sub>R</sub>	Reverse Leakage Current	V <sub>RWM</sub> = 5V		0.01	1.0	μA
V <sub>C</sub>	Clamping Voltage	I <sub>PP</sub> = 1A, t <sub>p</sub> = 8/20μs			12	V
V <sub>C</sub>	Clamping Voltage	I <sub>PP</sub> = 4A, t <sub>p</sub> = 8/20μs			20	V
C <sub>J</sub>	Junction Capacitance	V <sub>R</sub> = 0V, f = 1MHz		0.2	0.4	pF
C <sub>L</sub>	Line capacitance	V <sub>R</sub> = 0V, f = 1MHz			0.2	pF

## RATING AND CHARACTERISTIC CURVES (TEP0501SALC)

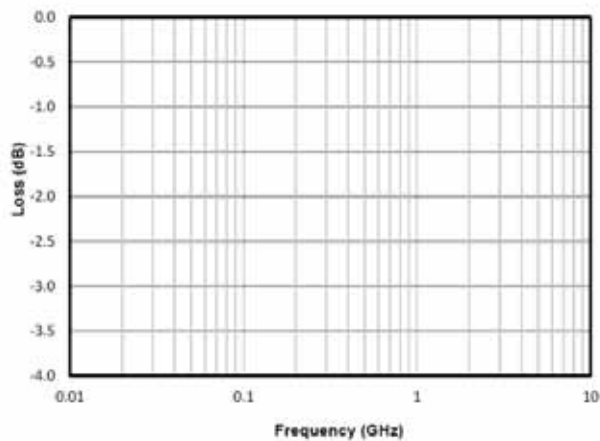
**Clamping Voltage vs. Peak Pulse Current**



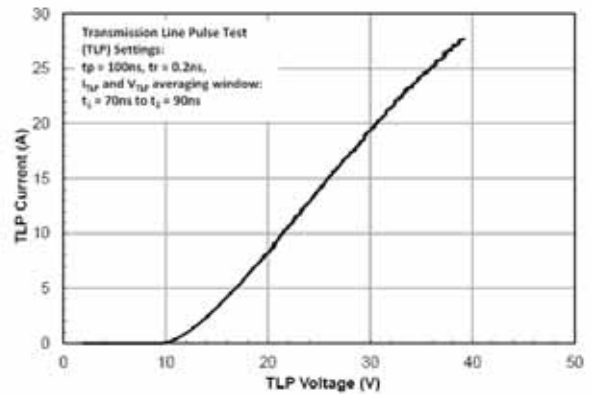
**Typical Capacitance vs. Reverse Voltage**



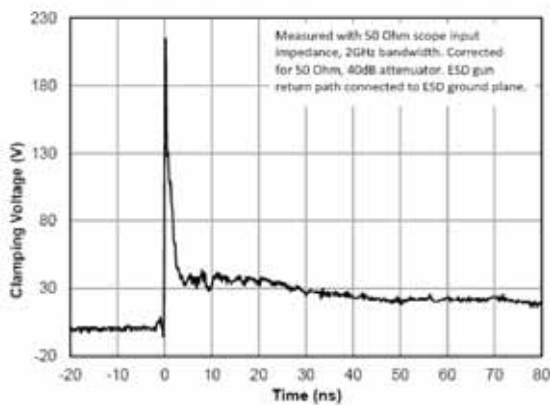
**Typical Insertion Loss (S21)**



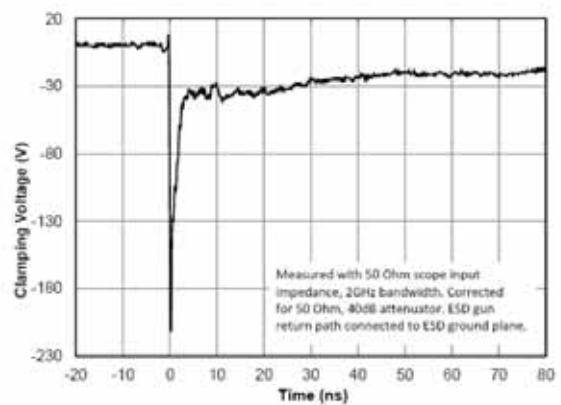
**TLP Characteristic**



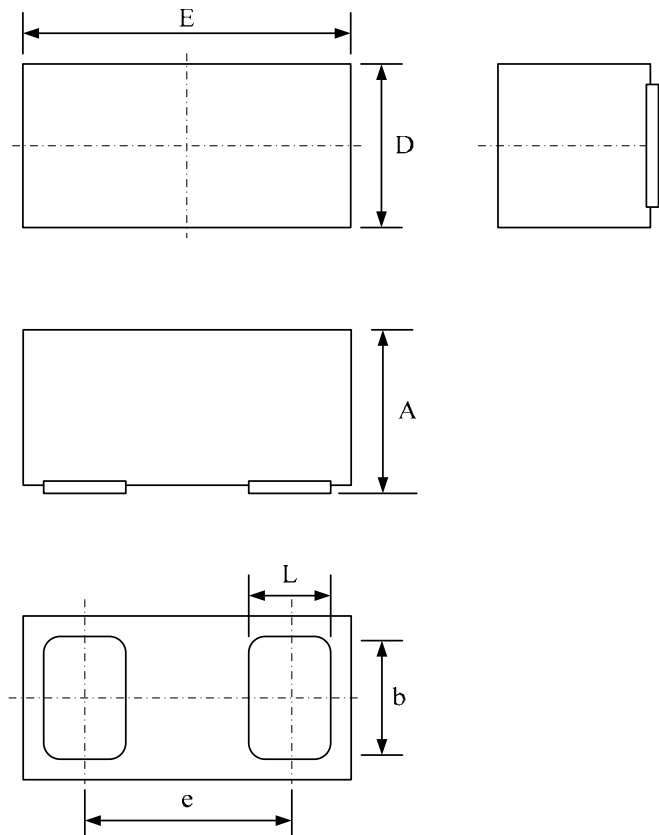
**ESD Clamping (+8kV Contact per IEC 61000-4-2)**



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



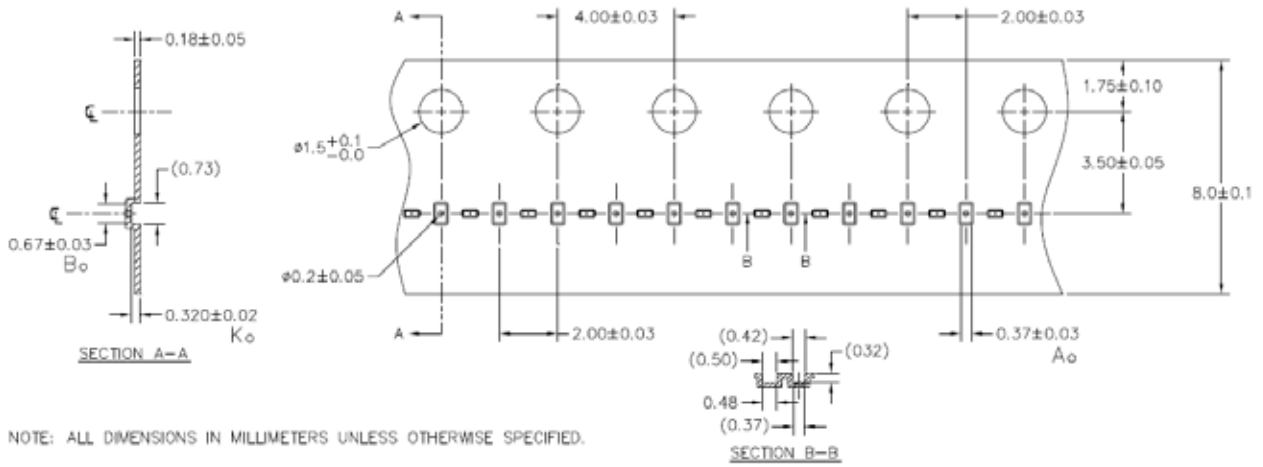
## DFN0603 PACKAGE OUTLINE DIMENSIONS



Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions (mm)			Dimensions (Inches)		
	Minimum	Typical	Maximum	Minimum	Typical	Maximum
A	0.280	0.300	0.320	0.011	0.012	0.013
b	0.220	—	0.280	0.009	—	0.011
D	0.275	0.300	0.325	0.011	0.012	0.013
E	0.575	0.600	0.625	0.023	0.024	0.025
e	—	0.380	—	—	0.015	—
L	0.140	—	0.200	0.005	—	0.008

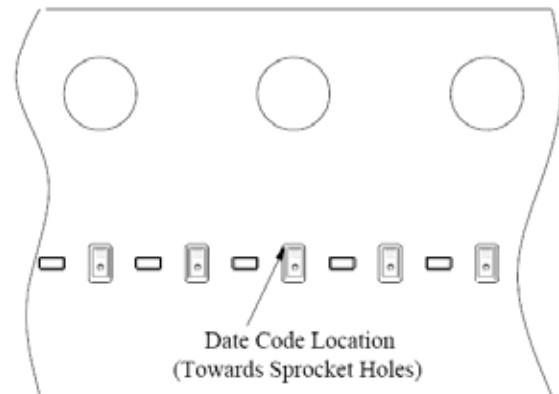
## Carrier Tape



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



## Packing Quantity

Reel		Inner Box		Carton	
Size	Quantity Per Reel	Size	Quantity Per Reel	Size	Quantity Per Reel
7 (inch)	10,000pcs	210*208*203 (mm)	150,000pcs	440*440*230 (mm)	600,000pcs
7 (inch)	10,000pcs	183*188*80 (mm)	60,000pcs	386*265*215 (mm)	360,000pcs

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