

## Low Capacitance TVS/ESD Protection Diode

### DESCRIPTION

TEP81302LC is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With minimum capacitance of 12pF only, TEP81302LC 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 ( $\pm 15\text{kV}$  air,  $\pm 8\text{kV}$  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.

TEP81302LC uses ultra-small DFN0603 package. Each TEP81302LC device can protect one data line. It offers system designers flexibility to protect single data line where space is a premium concern.

### ORDERING INFORMATION

- ✧ Device: TEP81302LC
- ✧ Package: DFN0603
- ✧ Marking: Y
- ✧ 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)  $\pm 15\text{kV}$  (Air)
  - $\pm 8\text{kV}$  (Contact)
  - IEC 61000-4-4 (EFT) 40A (5/50 ns)
  - Cable Discharge Event (CDE)
- ✧ Package optimized for high-speed lines
- ✧ Ultra-small package (0.6mm $\times$ 0.3mm $\times$ 0.3mm)
- ✧ Protects one data, control or power line
- ✧ Low capacitance: 12pF (Typical)
- ✧ Low leakage current: 100nA @  $V_{RWM}$  (Typical)
- ✧ Low clamping voltage
- ✧ Each I/O pin can withstand over 1000 ESD strikes for  $\pm 8\text{kV}$  contact discharge

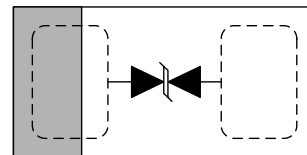
### MACHANICAL DATA

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

### APPLICATIONS

- ✧ Portable Electronics
- ✧ Desktops, Servers and Notebooks
- ✧ Cellular Phones
- ✧ MP3 Ports
- ✧ Digital Ports
- ✧ Subscriber Identity Module (SIM) card

### PIN CONFIGURATION



**ABSOLUTE MAXIMUM RATING**

Symbol	Parameter	Value	Units
$P_{PK}$	Peak Pulse Power (8/20 $\mu$ s)	50	W
$I_{PK}$	Peak Pulse Current (8/20 $\mu$ s)	4	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	$^{\circ}$ C
$T_{STG}$	Storage Temperature	-55/+150	$^{\circ}$ C

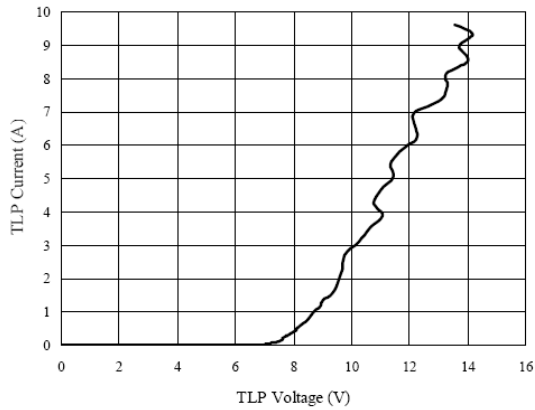
**ELECTRICAL CHARACTERISTICS ( $T_{amb}=25^{\circ}$  C)**

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
$V_{RWM}$	Reverse Working Voltage				5.0	V
$V_{BR}$	Reverse Breakdown Voltage	$I_T = 1\text{mA}$	5.5			V
$I_R$	Reverse Leakage Current	$V_{RWM} = 5\text{V}$			1.0	$\mu$ A
$V_{C1}$	Clamping Voltage 1	$I_{PP} = 1\text{A}$ , $t_p = 8/20\mu\text{s}$			10	V
$V_{C2}$	Clamping Voltage 2	$I_{PP} = 4\text{A}$ , $t_p = 8/20\mu\text{s}$			12.5	V
$C_J$	Junction Capacitance	$V_R = 0\text{V}$ , $f = 1\text{MHz}$		12	15	pF

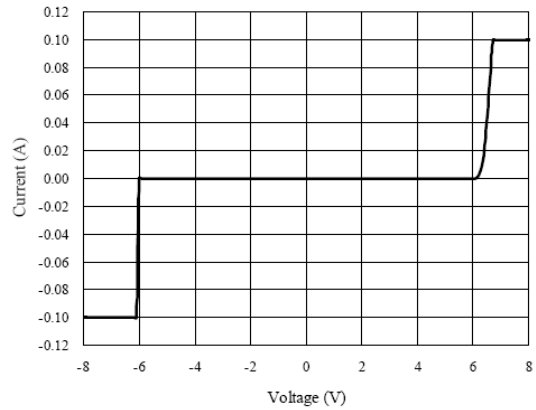
# RATING AND CHARACTERISTIC CURVES (TEP81302LC)

## ELECTRICAL CHARACTERISTICS CURVE

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

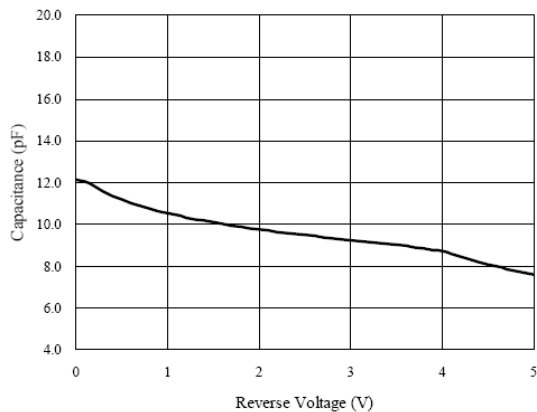


### Voltage Sweeping of I/O\_1 to I/O\_2

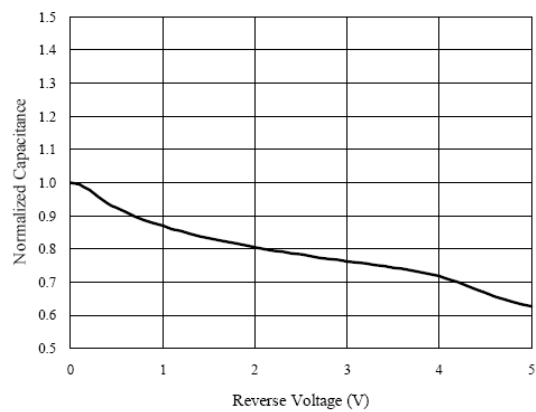


## Capacitance vs. Voltage of I/O\_1 to I/O\_2 (f = 1MHz)

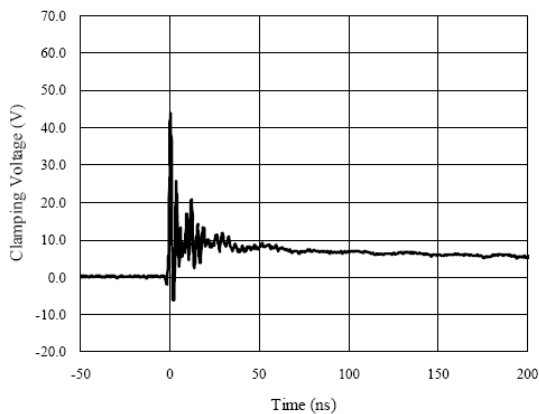
### Capacitance vs. Reverse Voltage



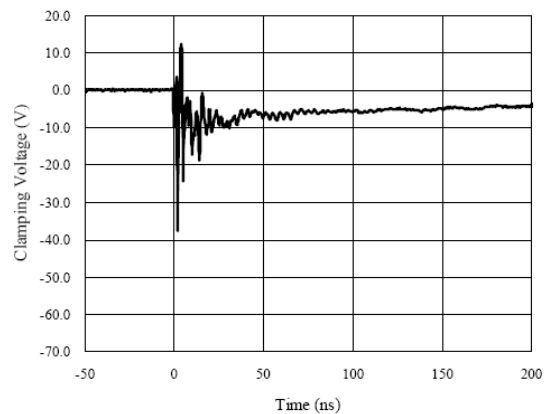
### Normalized Capacitance vs. Reverse Voltage



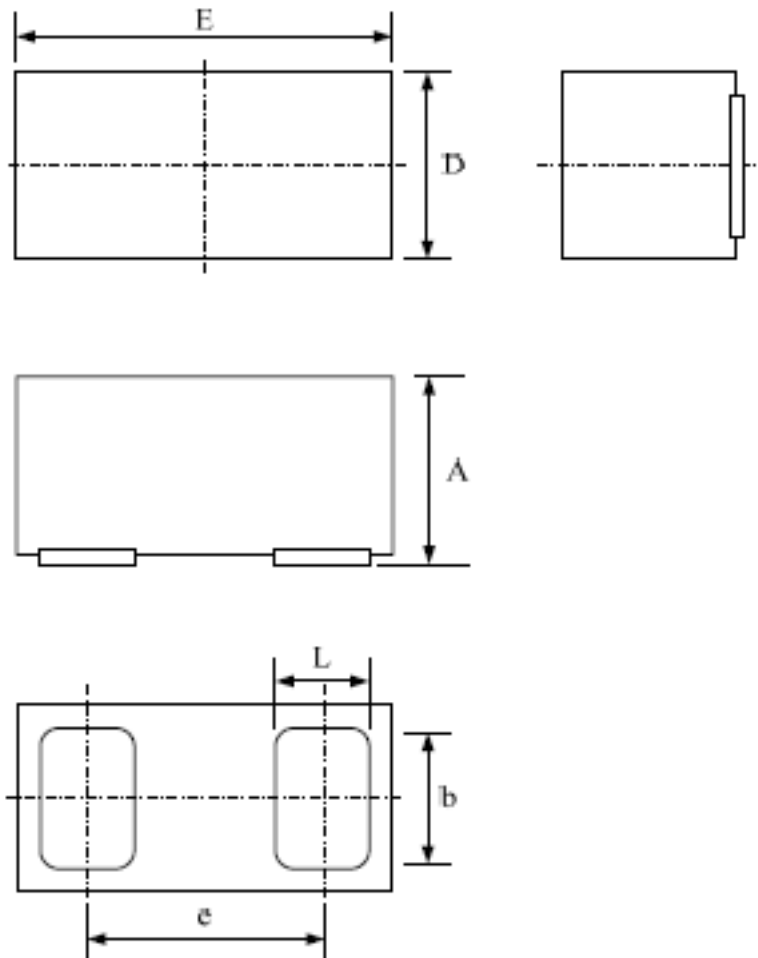
### ESD Clamping of I/O\_1 to I/O\_2 (+8kV Contact per IEC 61000-4-2)



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



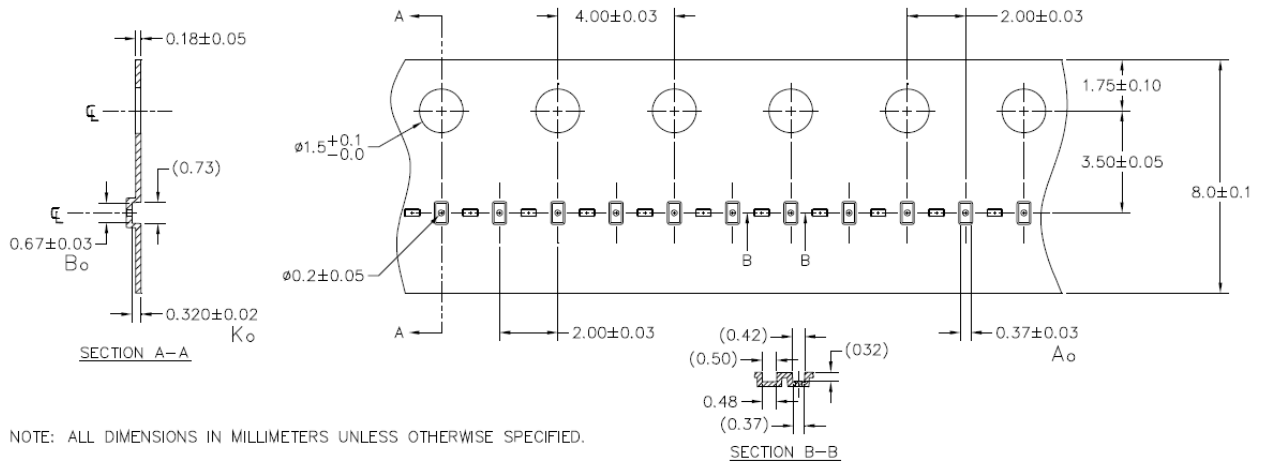
## DFN0603 PACKAGE OUTLINE DIMENSIONS



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

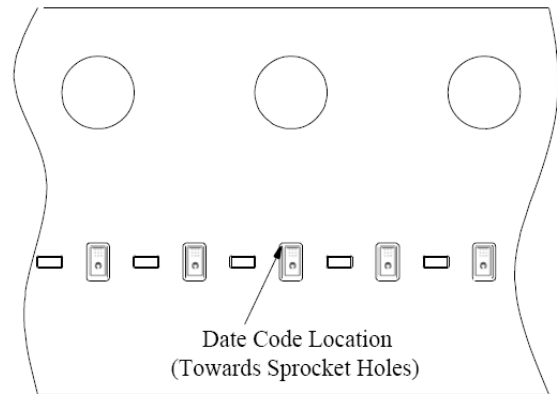
## Carrier Tape



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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