

Ultra Low Capacitance TVS/ESD Protection Diode

DESCRIPTION

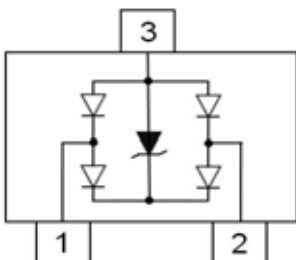
TEP0502T5D is an ultra-low capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 0.2 pF (I/O to I/O) only, TEP0502T5D is designed to protect parasitic-sensitive systems against over-voltage 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.

TEP0502T5D uses small SOT-523 package. Each TEP0502T5D device can protect two high-speed data lines. The combined features of low capacitance, small size and high ESD robustness make TEP0502T5D ideal for high-speed data port and high-frequency line applications. The low clamping voltage of the TEP0502T5D guarantees a minimum stress on the protected IC.

ORDERING INFORMATION

- ✧ Device: TEP0502T5D
- ✧ Package: SOT-523
- ✧ Marking: 52L
- ✧ Material: Halogen free
- ✧ Packing: Tape & Reel
- ✧ Quantity per reel: 3,000pcs

PIN CONFIGURATION



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)
- ✧ Small package (1.6mm×0.8mm×0.75mm)
- ✧ Protects two data lines
- ✧ Low capacitance: 0.2pF Typical (I/O-I/O)
- ✧ Low leakage current
- ✧ Low clamping voltage
- ✧ P/N suffix V means AEC-Q101 qualified, e.g:TEP0502T5DV

MECHANICAL DATA

- ✧ SOT-523 package
- ✧ Flammability Rating: UL 94V-0
- ✧ Packaging: Tape and Reel
- ✧ High temperature soldering guaranteed:260/10s
- ✧ Reel size: 7 inch
- ✧ MSL1

APPLICATIONS

- ✧ Serial ATA
- ✧ Desktops, Servers and Notebooks
- ✧ PCI Express
- ✧ MDDI Ports
- ✧ USB Data Line Protection
- ✧ HDMI Ports
- ✧ Digital Visual Interfaces (DVI)

PACKAGE OUTLINE



ABSOLUTE MAXIMUM RATING (T_{amb}=25°C, unless otherwise specified)

Symbol	Parameter	Value	Units
P _{PP}	Peak Pulse Power (8/20μs)	60	W
V _{ESD}	ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	±20 ±20	kV
T _{OPT}	Operating Temperature	-55/+125	°C
T _{STG}	Storage Temperature	-55/+125	°C

ELECTRICAL CHARACTERISTICS (T_{amb}=25°C, unless otherwise specified)

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
V _{RWM}	Reverse Working Voltage	I/O to GND			5.0	V
V _{BR}	Reverse Breakdown Voltage	I _T = 1mA Between I/O and GND	6.0			V
I _R	Reverse Leakage Current	V _{RWM} = 5V Between I/O and GND			100	nA
V _F	Forward Voltage	I _T = 10mA Between I/O and GND			1.2	V
V _C	Clamping Voltage	I _{PP} = 1A, t _p = 8/20μs Between I/O and GND			10	V
		I _{PP} = 4A, t _p = 8/20μs Between I/O and GND			15	V
C _T	Total Capacitance	V _R = 0V, f = 1MHz Between I/O and GND		0.4	0.6	pF
		V _R = 0V, f = 1MHz Between I/O and I/O		0.2	0.3	pF

RATING AND CHARACTERISTICS CURVES (TEP0502T5D)

Fig 1 Power Derating Curve

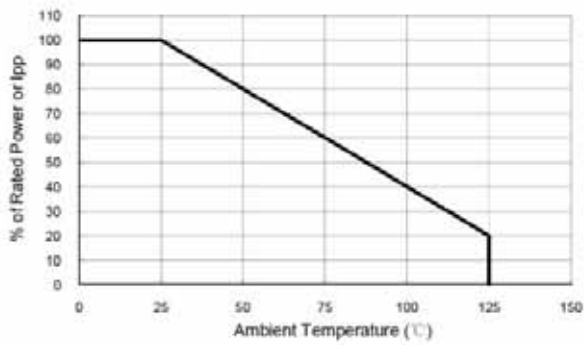


Fig 2 Clamping Voltage vs Peak Pulse Current

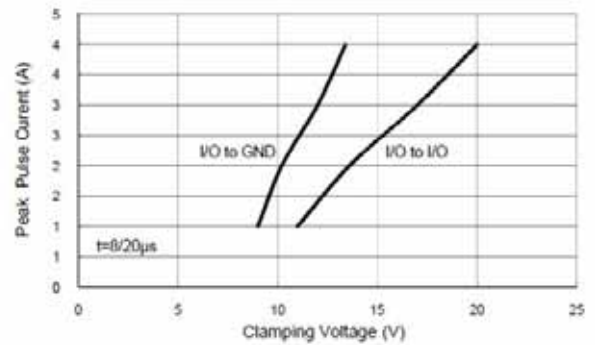


Fig 3 Voltage Sweeping of I/O to I/O

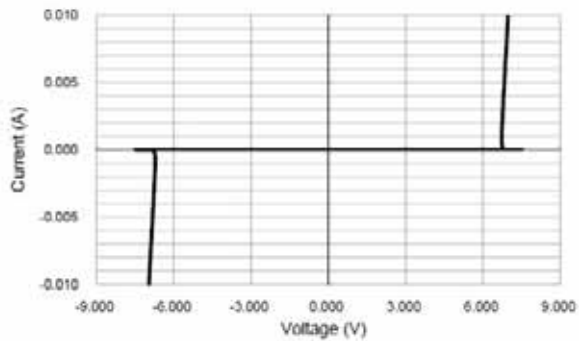


Fig 4 Voltage vs Capacitance

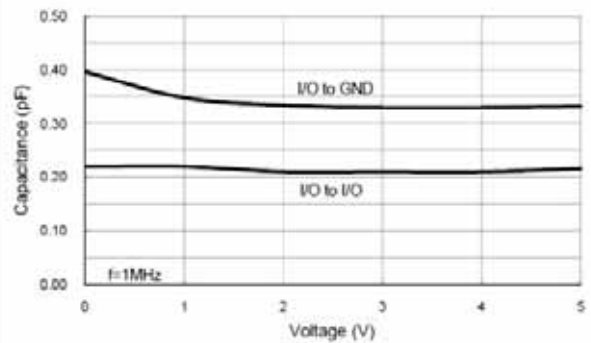


Fig 5 ESD Clamping of I/O to GND
(+8kV Contact per IEC 61000-4-2)

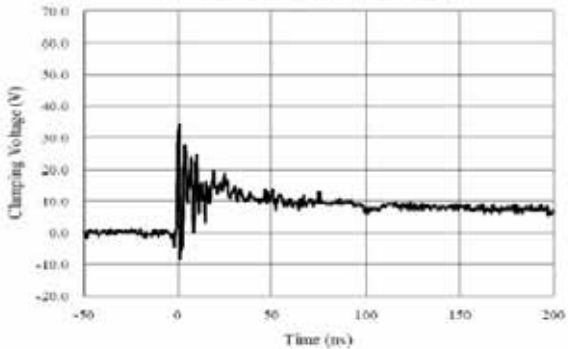
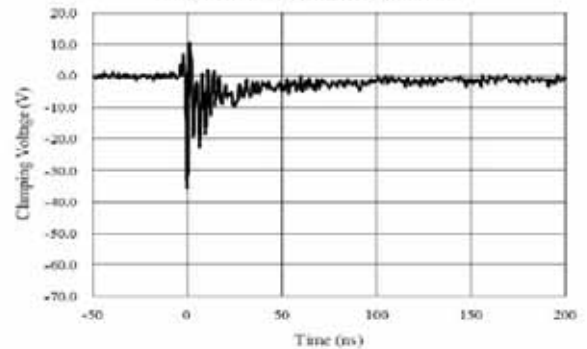
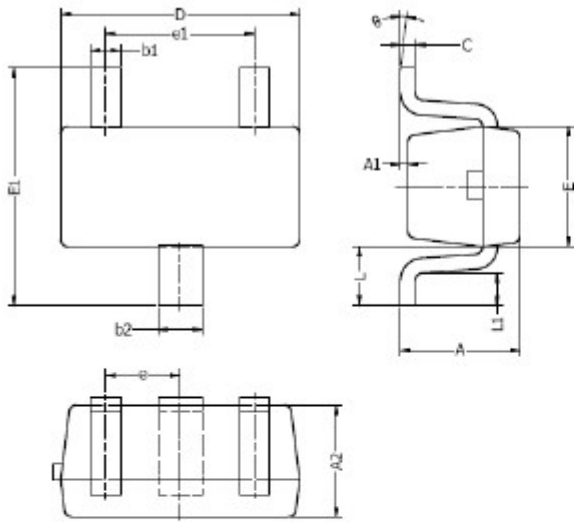


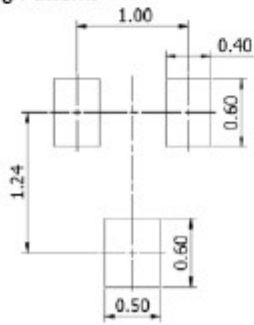
Fig 6 ESD Clamping of I/O to GND
(-8kV Contact per IEC 61000-4-2)



SOT-523 PACKAGE OUTLINE DIMENSIONS



Typical Soldering Pattern:



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.90	0.028	0.035
A1	0.00	0.10	0.000	0.004
A2	0.70	0.80	0.028	0.031
b1	0.15	0.25	0.006	0.010
b2	0.25	0.35	0.010	0.014
c	0.10	0.20	0.004	0.008
D	1.50	1.70	0.059	0.067
E	0.70	0.90	0.028	0.035
E1	1.45	1.75	0.057	0.069
e	0.50 TYP.		0.020 TYP.	
e1	0.90	1.10	0.035	0.043
L	0.40 REF.		0.016 REF.	
L1	0.10	0.30	0.004	0.012
θ	0°	8°	0°	8°

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