

DESCRIPTION

ESD0502T5L 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 0.2pF (I/O to I/O) only, ESD0502T5L 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.

ESD0502T5L uses small SOT-523 package. Each ESD0502T5L device can protect two high-speed data lines. The combined features of low capacitance, small size and high ESD robustness make ESD0502T5L ideal for high-speed data port and high-frequency line applications. The low clamping voltage of the ESD0502T5L guarantees a minimum stress on the protected IC.

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 $\times$ 0.8mm $\times$ 0.75mm)
- ✧ Protects two data lines
- ✧ Low capacitance: 0.2pF Typical (I/O-I/O)
- ✧ Low leakage current
- ✧ Low clamping voltage

MACHANICAL DATA

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

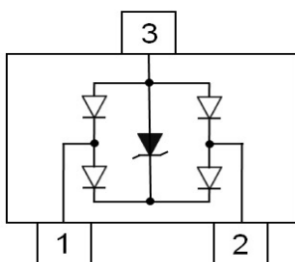
ORDERING INFORMATION

- ✧ Device: ESD0502T5L
- ✧ Package: SOT-523
- ✧ Marking: 52L
- ✧ Material: Halogen free
- ✧ Packing: Tape & Reel
- ✧ Quantity per reel: 3,000pcs

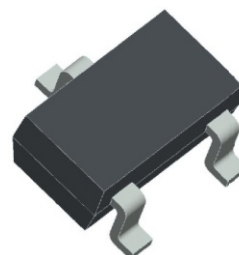
APPLICATIONS

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

PIN CONFIGURATION



PACKAGE OUTLINE



ABSOLUTE MAXIMUM RATING

Symbol	Parameter	Value	Units
P_{PP}	Peak Pulse Power (8/20 μ s)	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 ($T_{amb}=25^{\circ}C$)

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	$I_{PP} = 1A, t_p = 8/20\mu s$ Between I/O and GND			10	V
		$I_{PP} = 4A, t_p = 8/20\mu s$ 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

ELECTRICAL CHARACTERISTICS CURVE

Fig 1 Power Derating Curve

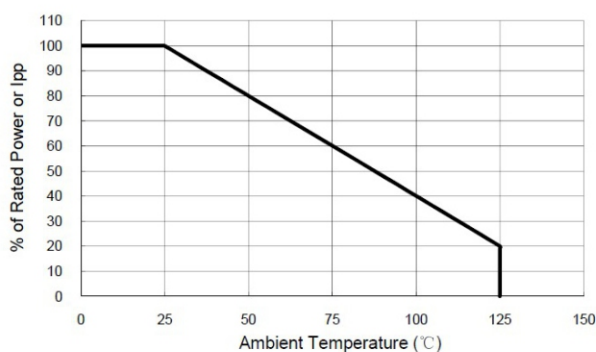


Fig 2 Clamping Voltage vs Peak Pulse Current

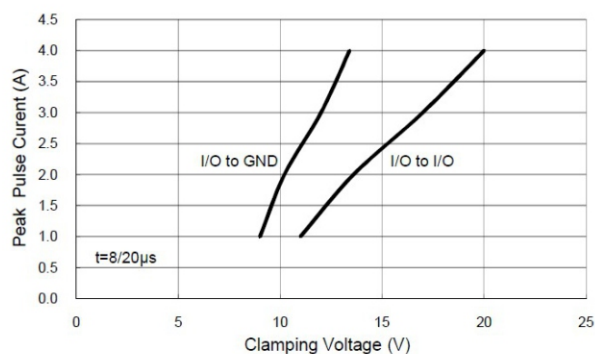


Fig 3 Voltage Sweeping of I/O to I/O

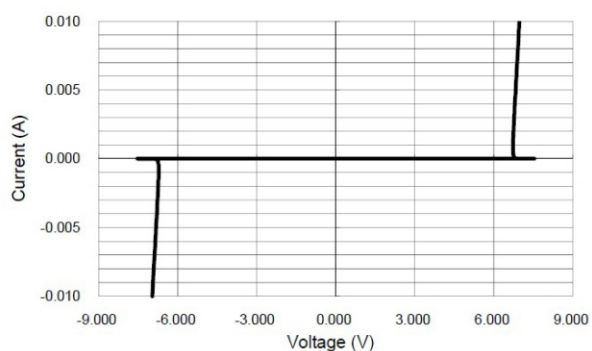


Fig 4 Voltage vs Capacitance

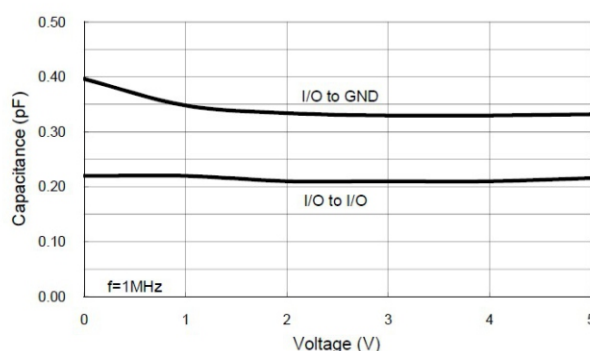


Fig 5 ESD Clamping of I/O to GND
(+8kV Contact per IEC 61000-4-2)

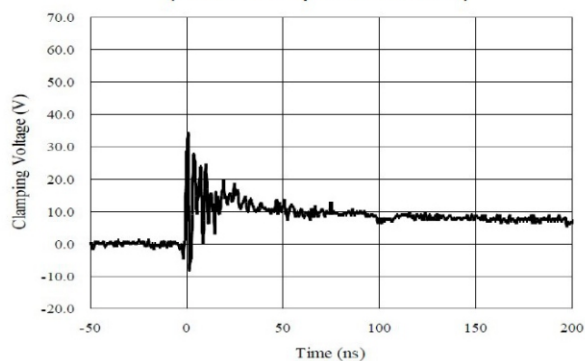
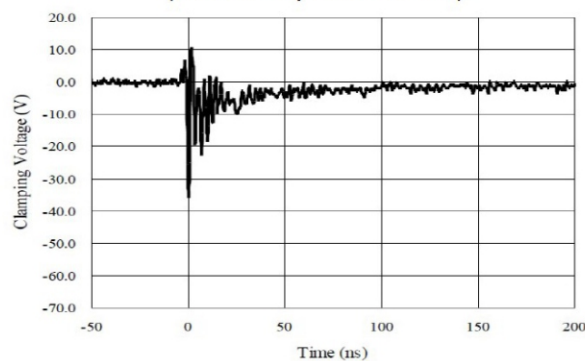
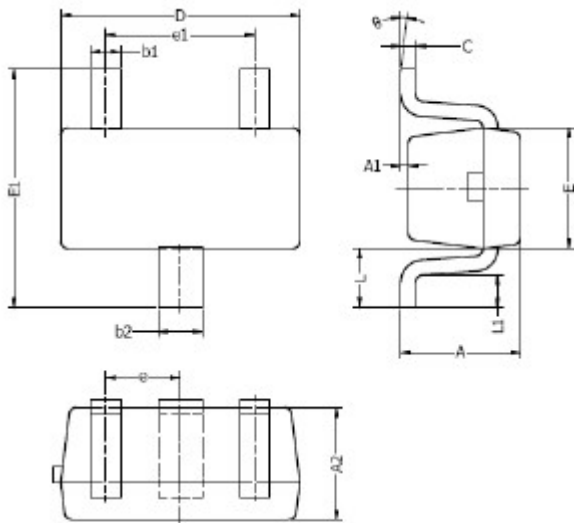


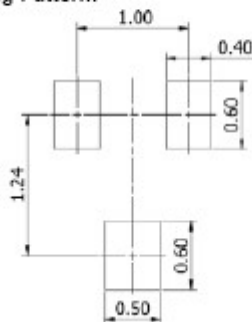
Fig 6 ESD Clamping of I/O to GND
(-8kV Contact per IEC 61000-4-2)



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°