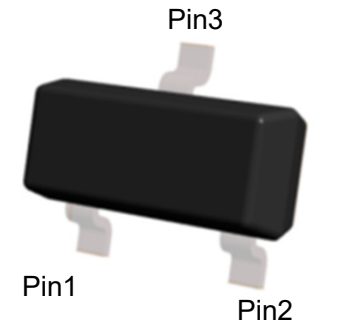
Uni-directional Low Capacitance ESD Protector

Description

The PESDLC23T5VUA is a TVS designed to protect I/O or data lines from the damaging effects of ESD. It is low capacitance transient voltage suppressors for high speed data interface that designed to protect sensitive electronics from damage or latch-up due to ESD lightning, and other voltage induced transient events.

The SOT-23 is a very small package which allows space saving on high density printed circuit board and also gives the designer the flexibility to provide two I/O lines protection.

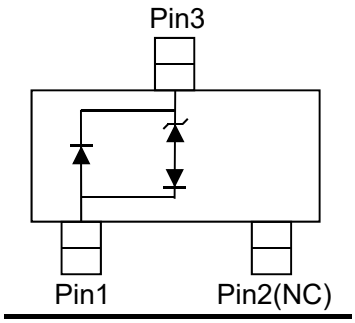
All pins are rated to withstand 30kV ESD pulses using the IEC61000-4-2 air discharge method, which can meet the requirement of level 4.



SOT-23(Top View)

Feature

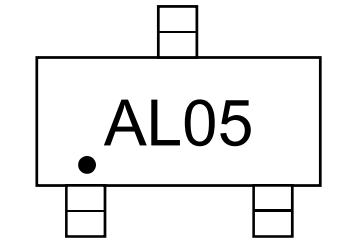
- 160W peak pulse power (tp=8/20μs) :
- SOT-23 Package
- Protects two Uni-directional lines
- Working voltage: 5V
- Low leakage current
- Low clamping voltage
- RoHS Compliant
- Transient Protection for High Speed Data Lines to IEC61000-4-2(ESD)±30kV(air),±30kV(Contact)



Circuit Diagram

Applications

- High-definition multimedia interface(HDMI)
- Mobile display digital interface(MDDI)
- RF/Antenna circuits
- USB 2.0&firewire ports
- HBT power amp protection
- Transceiver protection



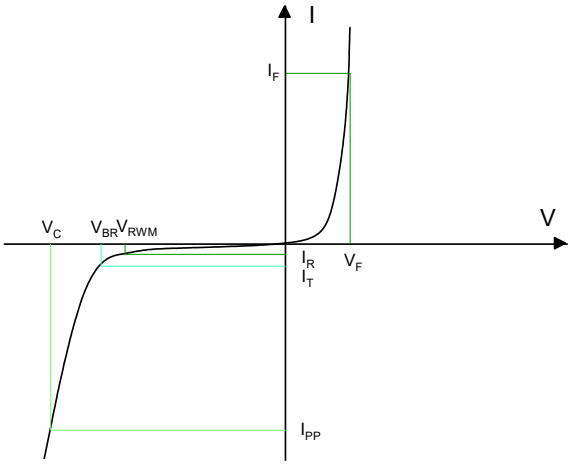
Marking (Top View)

Mechanical Characteristics

- Lead finish:100% matte Sn(Tin)
- Mounting position: Any
- Qualified max reflow temperature:260℃
- Pure tin plating: 7 ~ 17 um
- Pin flatness:≤3mil

Electronics Parameter

Symbol	Parameter
V_{RWM}	Peak Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
P_{PP}	Peak Pulse Power
C_J	Junction Capacitance
I_F	Forward Current
V_F	Forward Voltage @ I_F



Electrical characteristics per line@25℃ (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Peak Reverse Working Voltage	V_{RWM}	-	-	-	5.0	V
Breakdown Voltage	V_{BR}	I_t = 1mA	6.0	-	9.0	V
Reverse Leakage Current	I_R	V_{RWM} = 5V	-	-	1.0	μA
Clamping Voltage[1)]	V_C	TLP = 16A, t_p = 100ns	-	10.7	-	V
Dynamic resistance[1)]	R_{DYN}	-	-	0.12	-	Ω
Clamping Voltage[2)]	V_C	I_{PP} = 5A,t_P = 8/20μs	-	9.5	11.5	V
		I_{PP} = 14A,t_P = 8/20μs	-	11.5	13.5	V
Junction Capacitance	C_J	V_R = 0V,f = 1MHz	-	1.5	2.4	pF

Notes:
1.TLP parameter: Z_0=50Ω, t_p=100ns, t_r=2ns, averaging window from 70ns to 90ns. R_{DYN} is calculated from 4A to 16A.
2.Non-repetitive current pulse, according to IEC61000-4-5.

Absolute maximum rating@25℃

Rating	Symbol	Value	Units
Peak Pulse Power (t_P = 8/20μs)	P_{PP}	160	W
Peak Pulse Current (t_P = 8/20μs)	I_{PP}	14	A
Lead Soldering Temperature	T_L	260 (10 sec)	℃
Junction and Storage Temperature Range	T_J,T_{STG}	-55~+150	℃
ESD Protection-Contact Discharge	V_{ESD}	±30	kV
ESD Protection-Air Discharge	V_{ESD}	±30	kV

Typical Characteristics

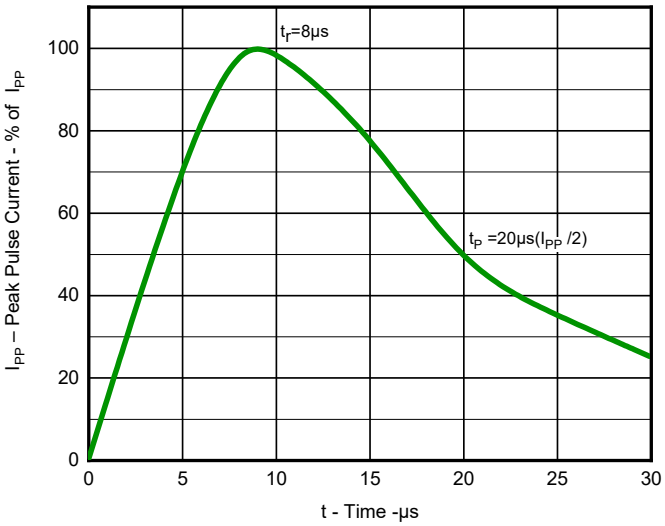


Fig 1.Pulse Waveform(8/20μs)

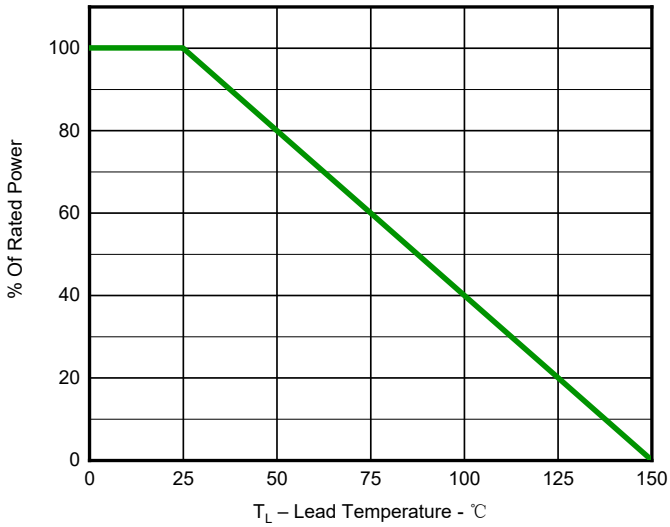


Fig 2.Power Derating Curve

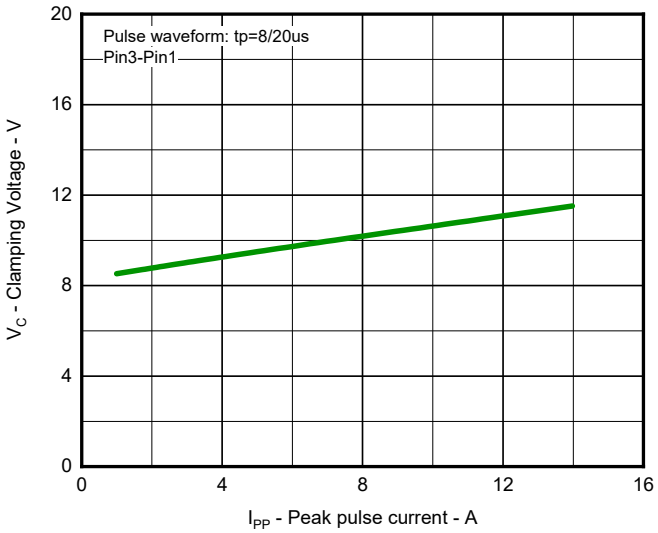


Fig 3. Clamping voltage vs. Peak pulse current

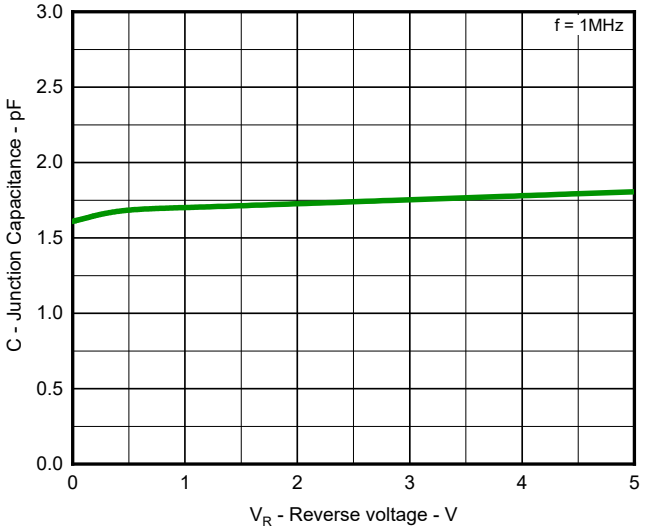


Fig 4. Capacitance vs. Reveres voltage

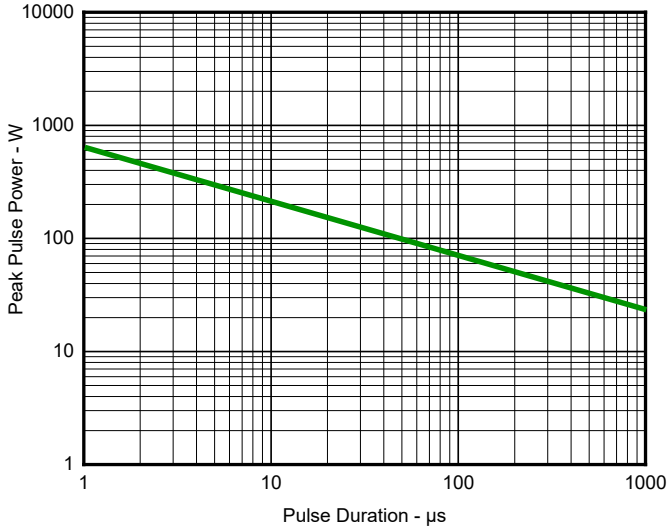


Fig 5. Non Repetitive Peak Pulse Power vs. Pulse time

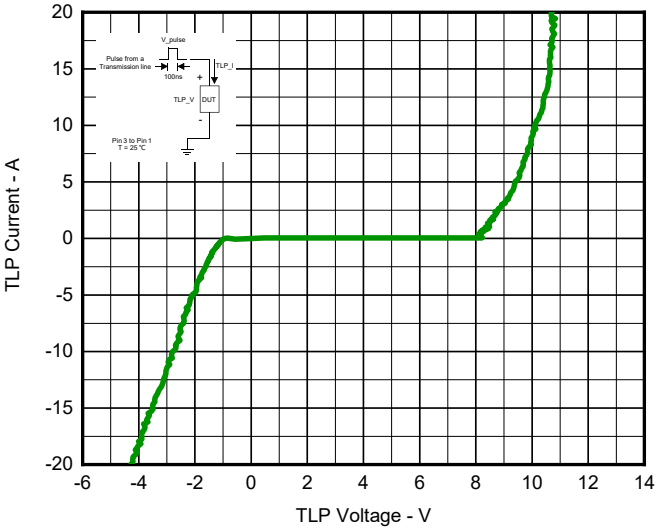


Fig 6. TLP Measurement

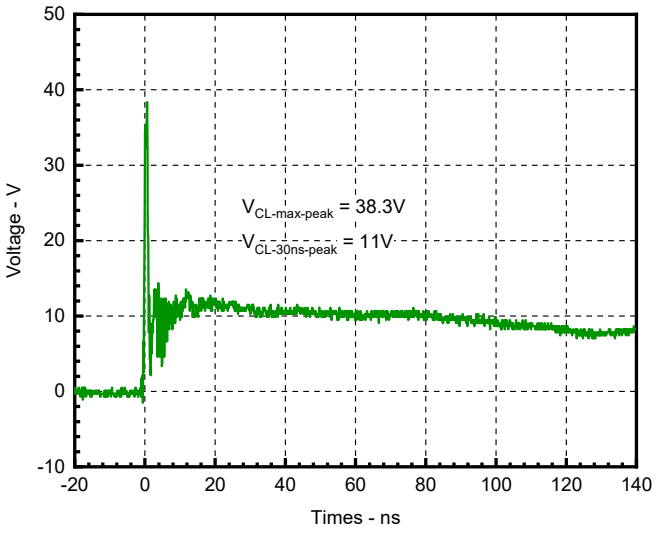


Fig 7. Clamping Voltage at IEC61000-4-2 +8kV Pulse Waveform

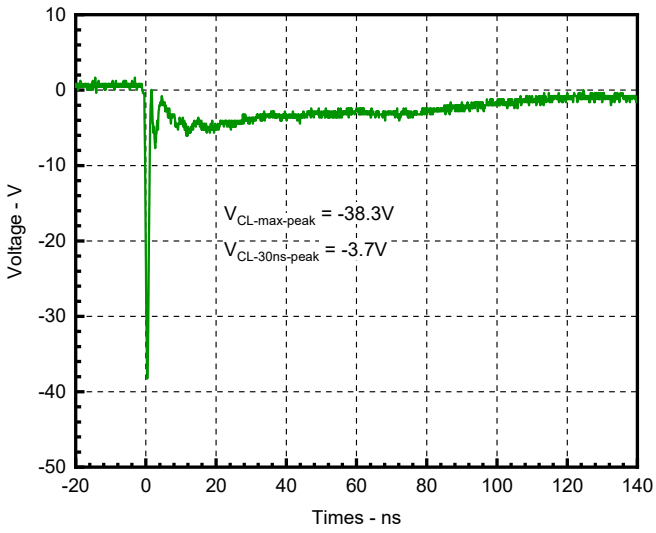
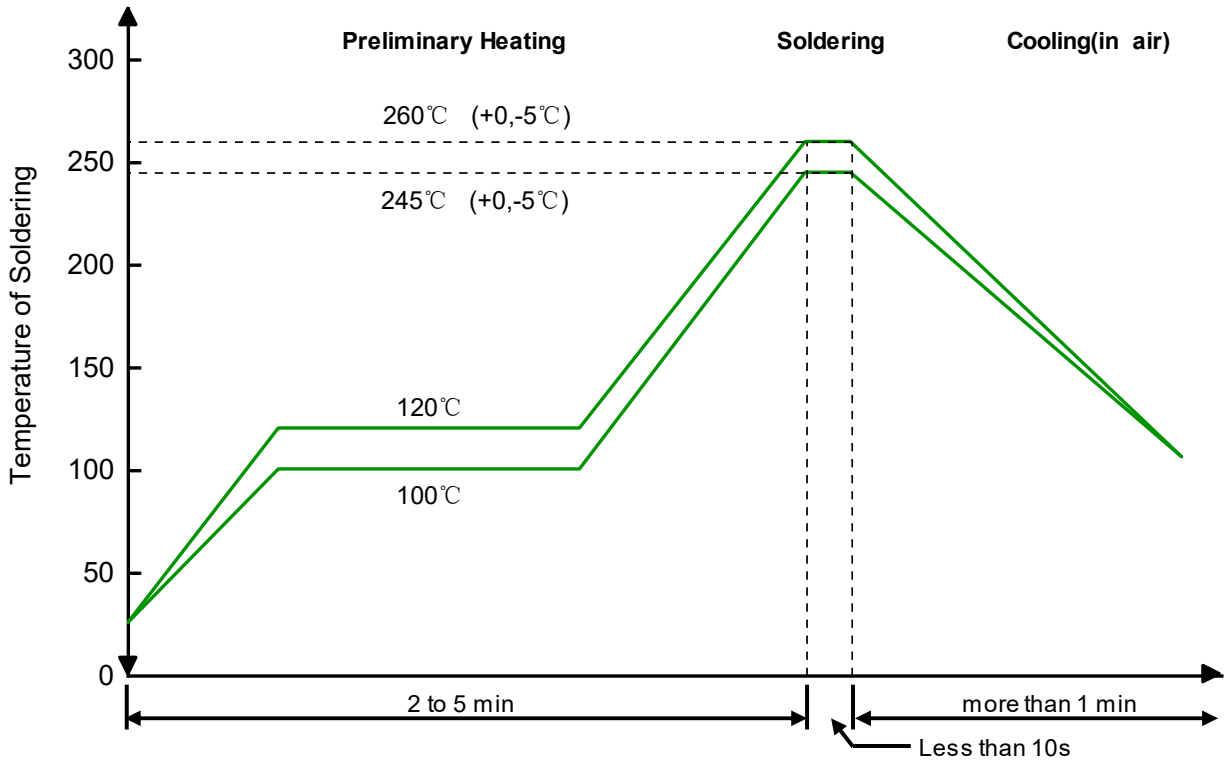


Fig 8. Clamping Voltage at IEC61000-4-2 -8kV Pulse Waveform

Solder Reflow Recommendation



Remark: Pb free for 260℃; Pb for 245℃.

PCB Design

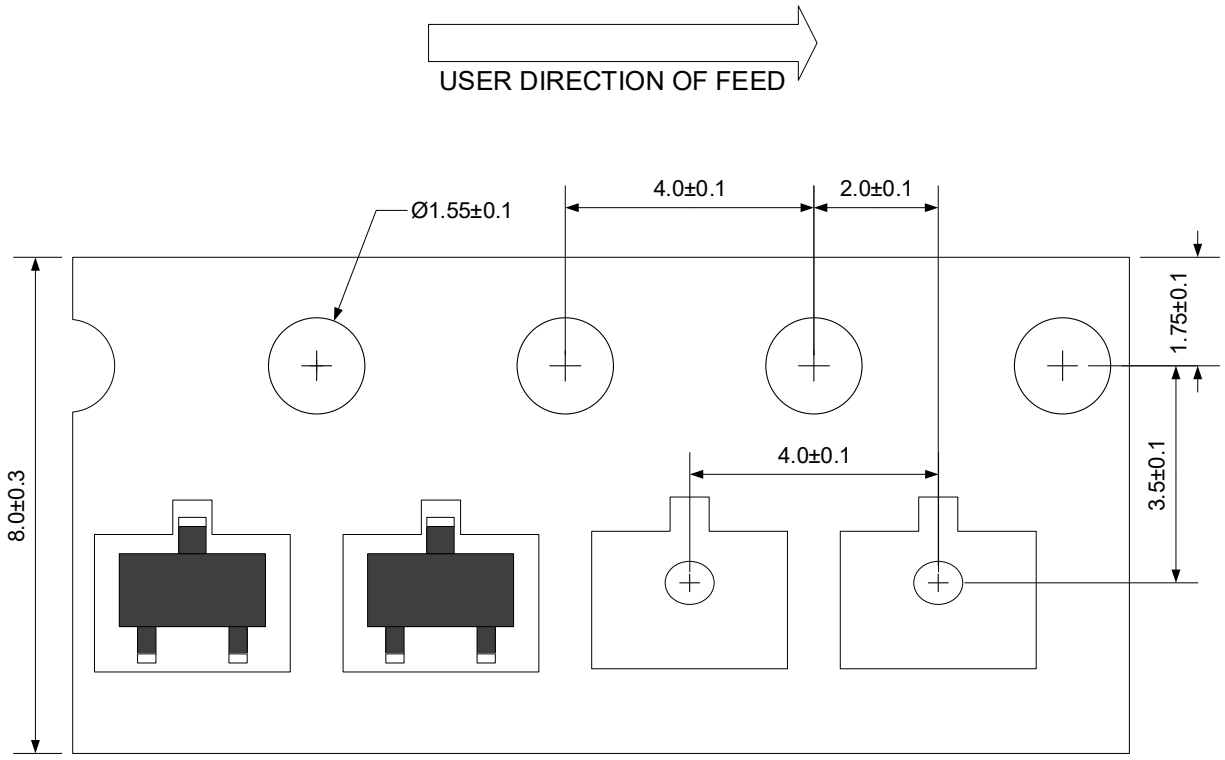
For TVS diodes a low-ohmic and low-inductive path to chassis earth is absolutely mandatory in order to achieve good ESD protection. Novices in the area of ESD protection should take following suggestions to heart:

- Do not use stubs, but place the cathode of the TVS diode directly on the signal trace.
- Do not make false economies and save copper for the ground connection.
- Place via holes to ground as close as possible to the anode of the TVS diode.
- Use as many via holes as possible for the ground connection.
- Keep the length of via holes in mind! The longer the more inductance they will have.

Ordering information

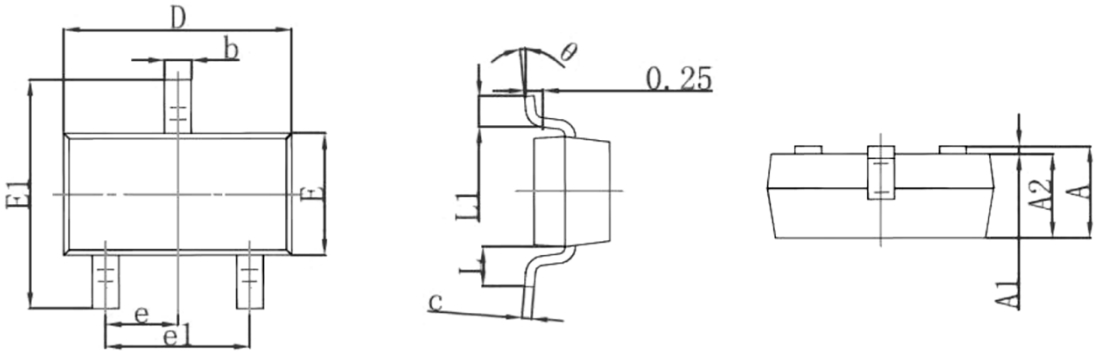
Device	Package	Reel	Shipping
PESDLC23T5VUA	SOT-23 (Pb-Free)	7"	3000 / Tape & Reel

Load with information

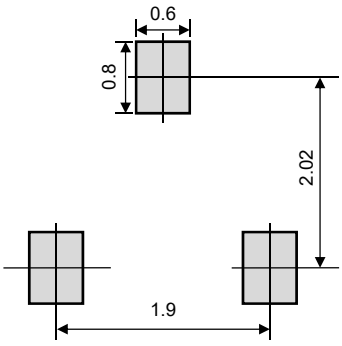


Unit:mm

Product dimension (SOT-23)



Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 Typ.		0.037 Typ.	
e1	1.800	2.000	0.071	0.079
L	0.550 Ref.		0.022 Ref.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°



Unit:mm

Suggested PCB Layout

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