PESDxx3U1UT

1.Features

Ultra low capacitance ElectroStatic Discharge (ESD) protection diode in a SOT23 (TO-236AB) small SMD plastic package designed to protect one high-speed data line from the damage caused by ESD and other transients.

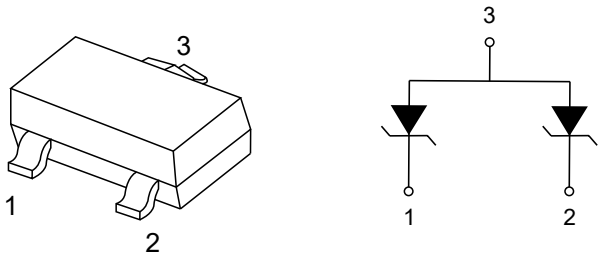
2.Applications

- 10/100/1000 Ethernet
- FireWire
- Communication systems
- Local Area Network (LAN) equipment
- Computers and peripherals
- High-speed data lines

3.Features

- Unidirectional ESD protection of one line
- Ultra low diode capacitance: C_d=0.6pF
- Max. peak pulse power: P_{PP} up to 200W
- Low clamping voltage
- ESD protection > 23 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC 61000-4-5; (surge)

4.Pinning information



SOT-23

5. Quick reference data

Parameter	Symbol	Conditions	Min	Typ	Max	Units
reverse stand-off voltage	V_{RWM}					
PESD3V3U1UT					3.3	V
PESD5V0U1UT					5	V
PESD12VU1UT					12	V
PESD15VU1UT					15	V
PESD24VU1UT					24	V
diode capacitance	C_d	V_R=0V, f=1MHz ①		0.6	1.5	pF

Notes:

① Measured from pin 1 to 2

6.Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Parameter	Symbol	Conditions	Min	Typ	Max	Units
peak pulse power	P_{PP}	8/20 μs ①				
PESD3V3U1UT					80	W
PESD5V0U1UT					80	W
PESD12VU1UT					200	W
PESD15VU1UT					200	W
PESD24VU1UT					200	W
peak pulse current	I_{PP}	8/20 μs ①				
PESD3V3U1UT					5	A
PESD5V0U1UT					5	A
PESD12VU1UT					5	A
PESD15VU1UT					5	A
PESD24VU1UT					3	A
junction temperature	T_J				150	°C
ambient temperature	T_{amb}		-65		150	°C
storage temperature	T_{STG}		-65		150	°C

Notes:

① Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.

7.ESD maximum ratings

Parameter	Symbol	Conditions	Min	Typ	Max	Units
electrostatic discharge voltage	V_{ESD}	IEC 61000-4-2(contact discharge)①②				
PESD3V3U1UT					30	kV
PESD5V0U1UT					30	kV
PESD12VU1UT					30	kV
PESD15VU1UT					30	kV
PESD24VU1UT					23	kV
PESDxU1UT		HBM MIL-STD-883			10	kV

Notes:

① Device stressed with ten non-repetitive ESD pulses.

② Measured from pin 1 to 2.

8.ESD standards compliance

Parameter	Conditions
IEC 61000-4-2; level 4 (ESD)	> 15 kV (air); > 8 kV (contact)
MIL-STD-883; class 3	> 4 kV

9.Characteristics

T_{amb}=25°C unless otherwise specified

Parameter	Symbol	Conditions	Min	Typ	Max	Units
reverse stand-off voltage	V_{RWM}					
PESD3V3U1UT					3.3	V
PESD5V0U1UT					5	V
PESD12VU1UT					12	V
PESD15VU1UT					15	V
PESD24VU1UT					24	V
reverse leakage current	I_{RM}					
PESD3V3U1UT		V_{RWM}=3.3V		0.25	2	μA
PESD5V0U1UT		V_{RWM}=5V		0.03	1	μA
PESD12VU1UT		V_{RWM}=12V		<1	50	nA
PESD15VU1UT		V_{RWM}=15V		<1	50	nA
PESD24VU1UT		V_{RWM}=24V		<1	50	nA
breakdown voltage	V_{BR}	I_R=5mA ②				
PESD3V3U1UT			5.8	6.4	6.9	V
PESD5V0U1UT			7	7.6	8.2	V
PESD12VU1UT			14.2	15	16.7	V
PESD15VU1UT			17.1	18.9	20.3	V
PESD24VU1UT			25.4	27.8	30.3	V
diode capacitance	C_d	f=1MHz; V_R=0V ②		0.6	1.5	pF

Parameter	Symbol	Conditions	Min	Typ	Max	Units
clamping voltage	V_{CL}	① ②				
PESD3V3U1UT		I_{PP}=1A			9	V
		I_{PP}=5A			20	V
PESD5V0U1UT		I_{PP}=1A			12	V
		I_{PP}=5A			21	V
PESD12VU1UT		I_{PP}=1A			23	V
		I_{PP}=5A			39	V
PESD15VU1UT		I_{PP}=1A			28	V
		I_{PP}=5A			53	V
PESD24VU1UT		I_{PP}=1A			40	V
		I_{PP}=3A			76	V
differential resistance	r_{dif}	I_R=1mA				
PESD3V3U1UT					400	Ω
PESD5V0U1UT					80	Ω
PESD12VU1UT					200	Ω
PESD15VU1UT					225	Ω
PESD24VU1UT					300	Ω

Notes:

① Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.

② Measured from pin 1 to 2.

10.Typical characteristic

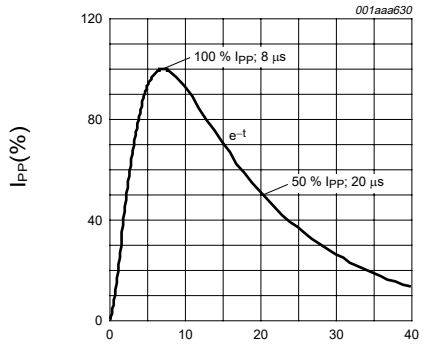


Figure 1: 8/20 µs pulse waveform according to IEC 61000-4-5

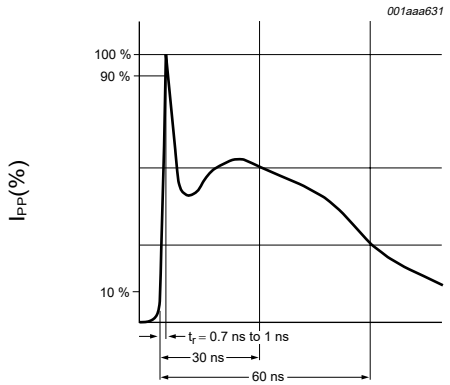


Figure 2: ESD pulse waveform according to IEC 61000-4-2

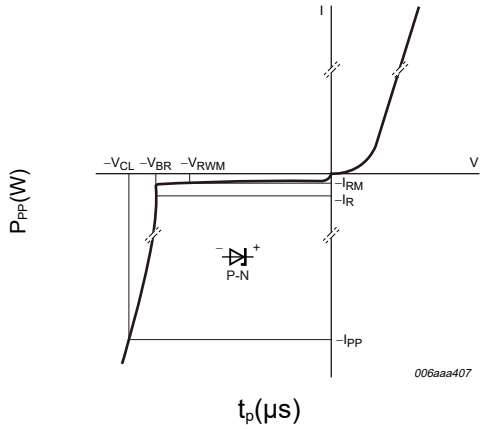


Figure 3: V-I characteristics

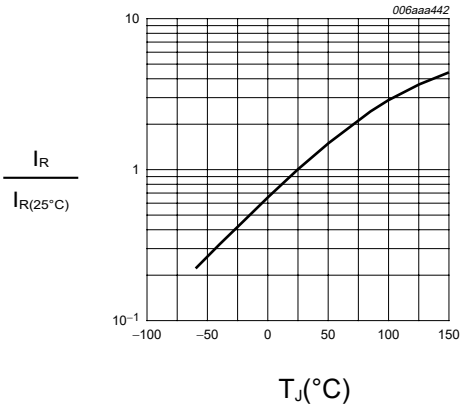
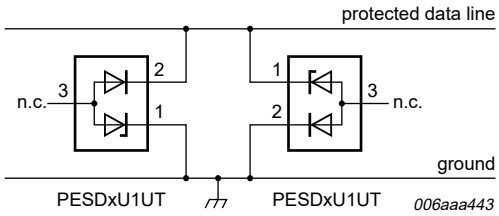


Figure 4: Relative variation of reverse leakage current as a function of junction temperature; typical values

11.Application information

The PESDxU1UT series is designed for protection of high-speed datalines from damage caused by ESD and surge pulses. PESDxU1UT devices combine an ESD protection diode and an ultra low capacitance compensation diode to ensure an effective device capacitance as low as 0.6 pF. The PESDxU1UT series provides a surge capability of up to 200 W per line for an 8/20 μs waveform.



Two PESDxU1UT devices in anti-parallel configuration provide ESD protection in a common-mode application.

The two PESDxU1UT devices should be connected as follows:

protected data line is connected to

device 1 / pin 2

device 2 / pin 1

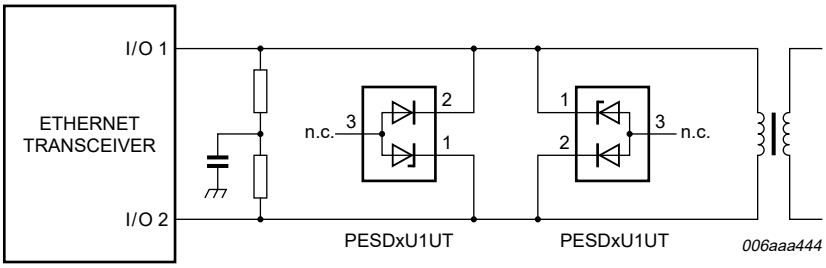
Ground is connected to

device 1 / pin 1

device 2 / pin 2

pin 3 is not connected for both devices

Figure 5. Bidirectional ESD protection of one line, common mode



Two PESDxU1UT devices in anti-parallel configuration provide ESD protection in a differential-mode configuration as e.g. for Ethernet applications.

The two PESDxU1UT should be connected as follows:

I/O line 1 is connected to

device 1 / pin 2

device 2 / pin 1

I/O line 2 is connected to

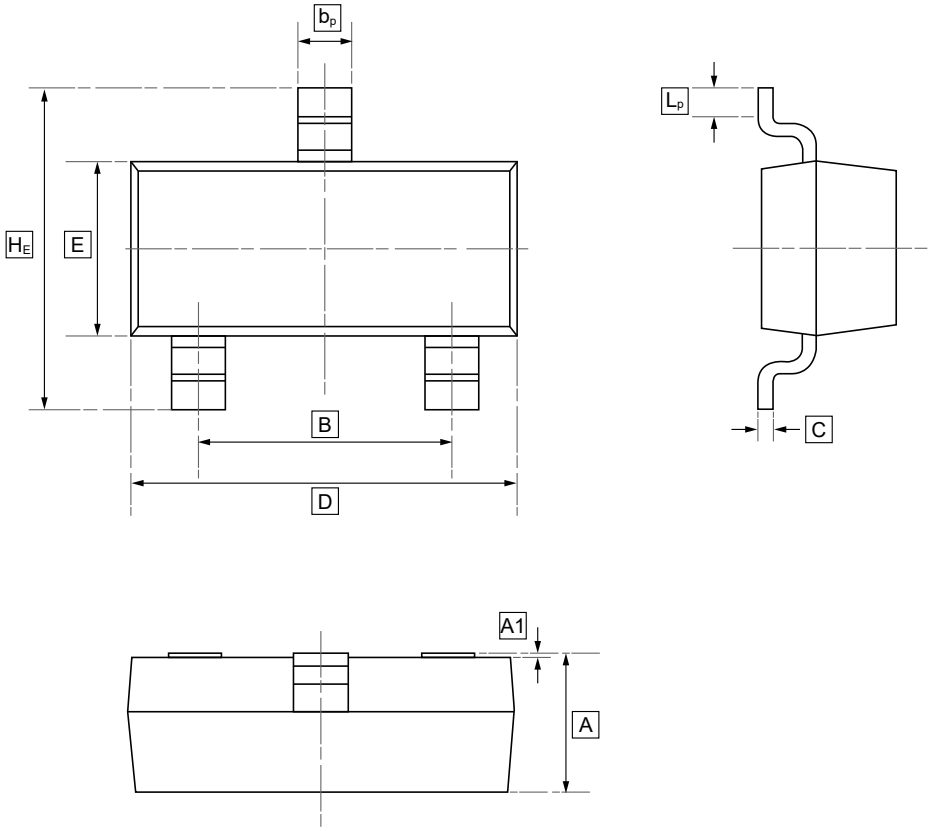
device 1 / pin 1

device 2 / pin 2

pin 3 is not connected for both devices

Fig 6. Differential mode Ethernet protection

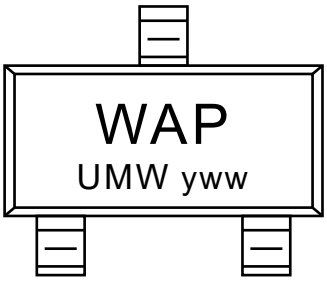
12.SOT-23 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	B	b_p	C	D	E	H_E	A1	L_p
Min	0.95	1.78	0.35	0.08	2.70	1.20	2.20	0.013	0.20
Max	1.40	2.04	0.50	0.19	3.10	1.65	3.00	0.100	0.50

13.Ordering information



yww: Batch Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW PESD3V3U1UT	WAP	SOT-23	3000	Tape and reel
UMW PESD5V0U1UT	WAQ	SOT-23	3000	Tape and reel
UMW PESD12VU1UT	WAR	SOT-23	3000	Tape and reel
UMW PESD15VU1UT	WAS	SOT-23	3000	Tape and reel
UMW PESD24VU1UT	WAT	SOT-23	3000	Tape and reel

14.Disclaimer

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