UMW PESD1LIN

1.Features

PESD1LIN in a very small SOD323 Surface-Mounted Device (SMD) plastic package designed to protect one automotive Local Interconnect Network (LIN) bus line from the damage caused by ElectroStatic Discharge (ESD) and other transients.

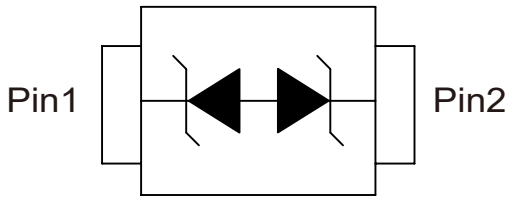
2.Applications

- LIN-bus protection
- Automotive applications

3.Features and benefits

- ESD protection of one automotive LIN-bus line
- Asymmetrical diode configuration ensures an optimized protection against ElectroMagnetic Interferences (EMI) of a LIN Electronic Control Unit (ECU)
- Max. peak pulse power: PPP = 160 W at t_p=8/20μs
- Low clamping voltage: V_{CL}=40V at I_{PP}=1A
- Ultra low leakage current: I_{RM}< 1nA
- ESD protection of up to 23 kV
- IEC 61000-4-2, level 4 (ESD)
- IEC 61000-4-5 (surge); I_{PP}=3A at tp=8/20μs

4.Pinning information



SOD-323

5. Quick reference data

T_{amb}=25°C unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Units
reverse standoff voltage	V_{RWM}					
PESD1LIN (PIN1 TO PIN2, 15V)					15	V
PESD1LIN (PIN2 TO PIN1, 24 V)					24	V
diode capacitance	C_d	V_R=0V, f=1MHz		13	17	pF

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}	t_p=8/20μs ①			160	W
peak pulse current	I_{PP}	t_p=8/20μs ①			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) ①			23	kV
		MIL-STD-883 (human body model)			10	kV

Notes:

① Device stressed with ten non-repetitive ESD pulses.

8.ESD standards compliance

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

9.Electrical Characteristic (T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
reverse standoff voltage	V_{RWM}					
PESD1LIN (PIN1 TO PIN2, 15V)					15	V
PESD1LIN (PIN2 TO PIN1, 24V)					24	V
reverse leakage current	I_{RM}					
PESD1LIN (PIN1 TO PIN2, 15V)		V_{RWM}=15V		<1	50	nA
PESD1LIN (PIN2 TO PIN1, 24V)		V_{RWM}=24V		<1	50	nA
breakdown voltage	V_{BR}	I_R=5mA				
PESD1LIN (PIN1 TO PIN2, 15V)			17.1	18.9	20.3	V
PESD1LIN (PIN2 TO PIN1, 24V)			25.4	27.8	30.3	V
diode capacitance	C_d	V_R=0V, f=1MHz		13	17	pF
clamping voltage	V_{CL}	①				
PESD1LIN (PIN1 TO PIN2, 15V)		I_{PP}=1A			25	V
		I_{PP}=5A			44	V
PESD1LIN (PIN2 TO PIN1, 24V)		I_{PP}=1A			40	V
		I_{PP}=3A			70	V
differential resistance	r_{dif}					
PESD1LIN (PIN1 TO PIN2, 15V)		I_R=1mA			225	Ω
PESD1LIN (PIN2 TO PIN1, 24V)		I_R=1mA			300	Ω

Notes:

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

10.1Typical characteristic

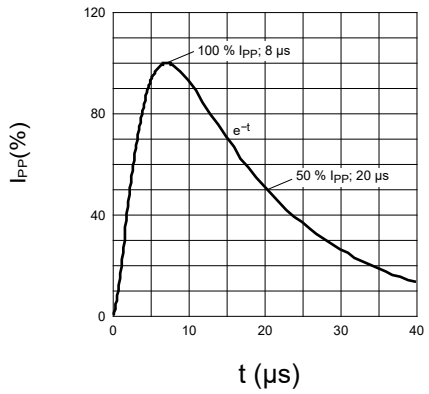


Figure 1: 8/20 µs pulse waveform according to IEC 61000-4-5

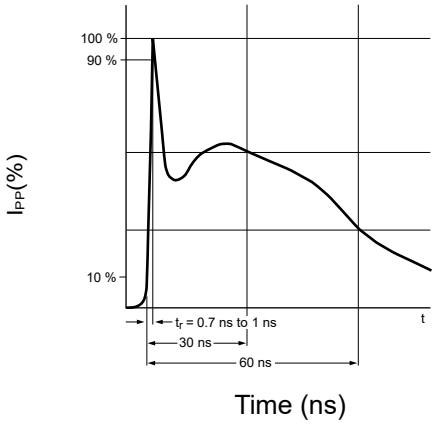


Figure 2: ESD pulse waveform according to IEC 61000-4-2

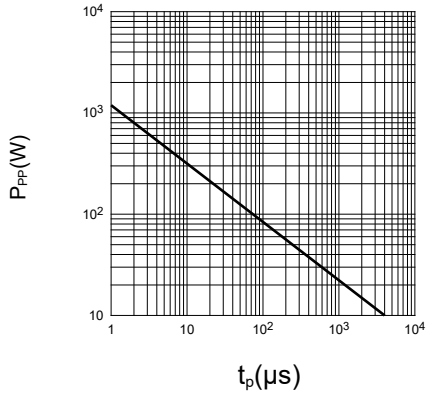


Figure 3: Peak pulse power as a function of exponential pulseduration; typical values

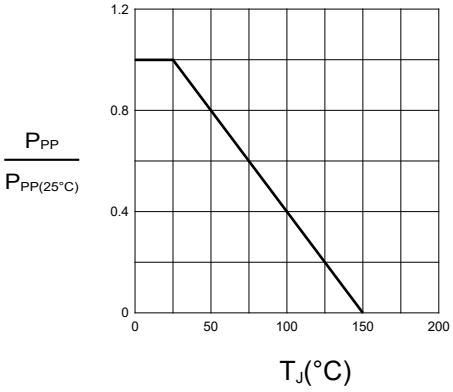


Figure 4: Relative variation of peak pulse power as a function of junction temperature; typical values

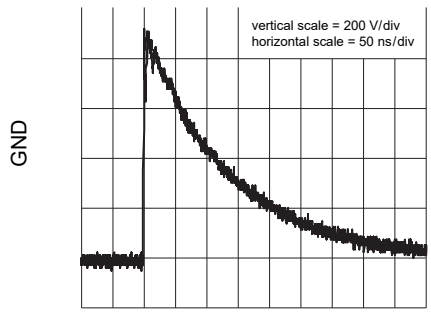


Figure 5: unclamped +1 kV ESD voltage waveform (IEC 61000-4-2 network)

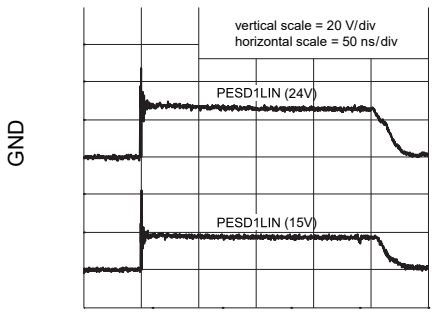


Figure 6: clamped +1 kV ESD voltage waveform (IEC 61000-4-2 network)

10.2Typical characteristic

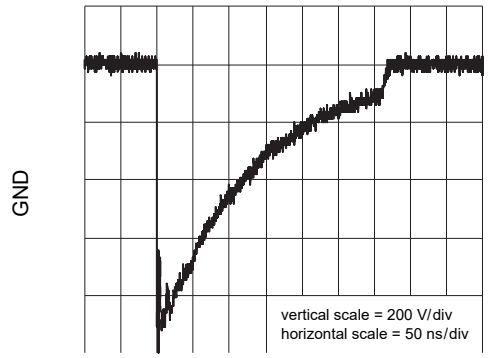


Figure 7: unclamped −1 kV ESD voltage waveform (IEC 61000-4-2 network)

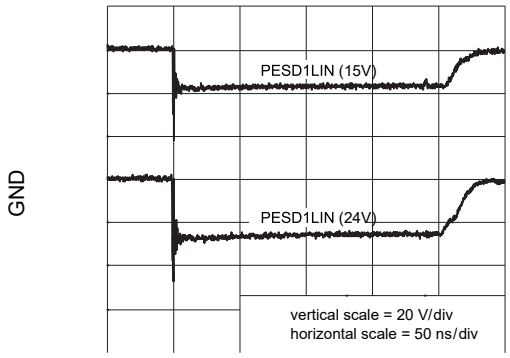
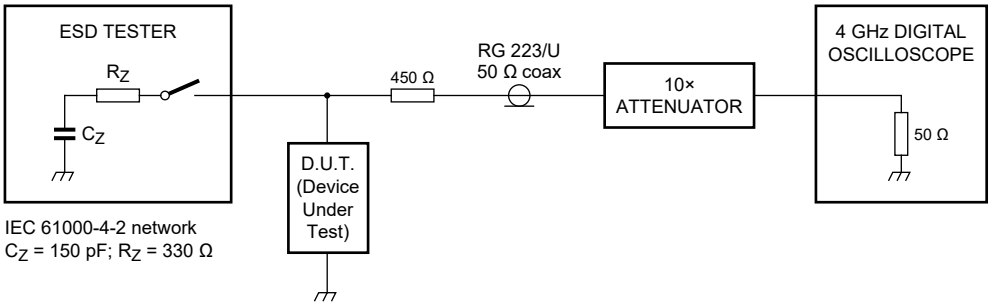


Figure 8: clamped −1 kV ESD voltage waveform (IEC 61000-4-2 network)

11.Application information



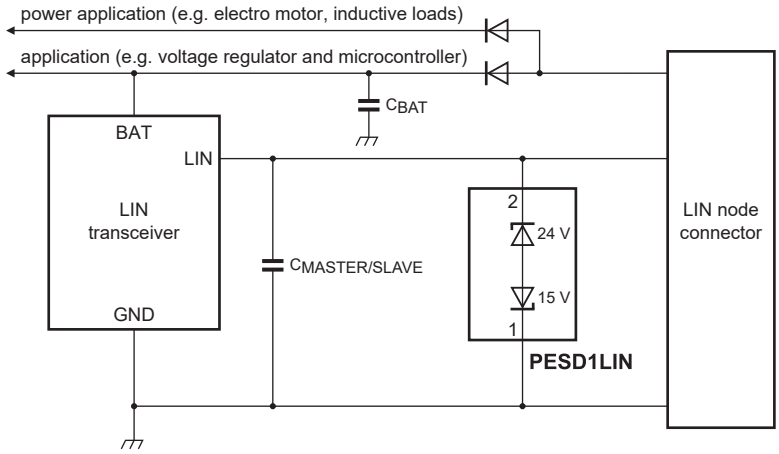


Figure 8: Typical application: ESD protection of one automotive LIN-bus line

The PESD1LIN is designed for the protection of one LIN-bus signal line from the damage caused by ESD and surge pulses. The PESD1LIN provides a surge capability of up to 160 W per line for a 8/20 μs waveform.

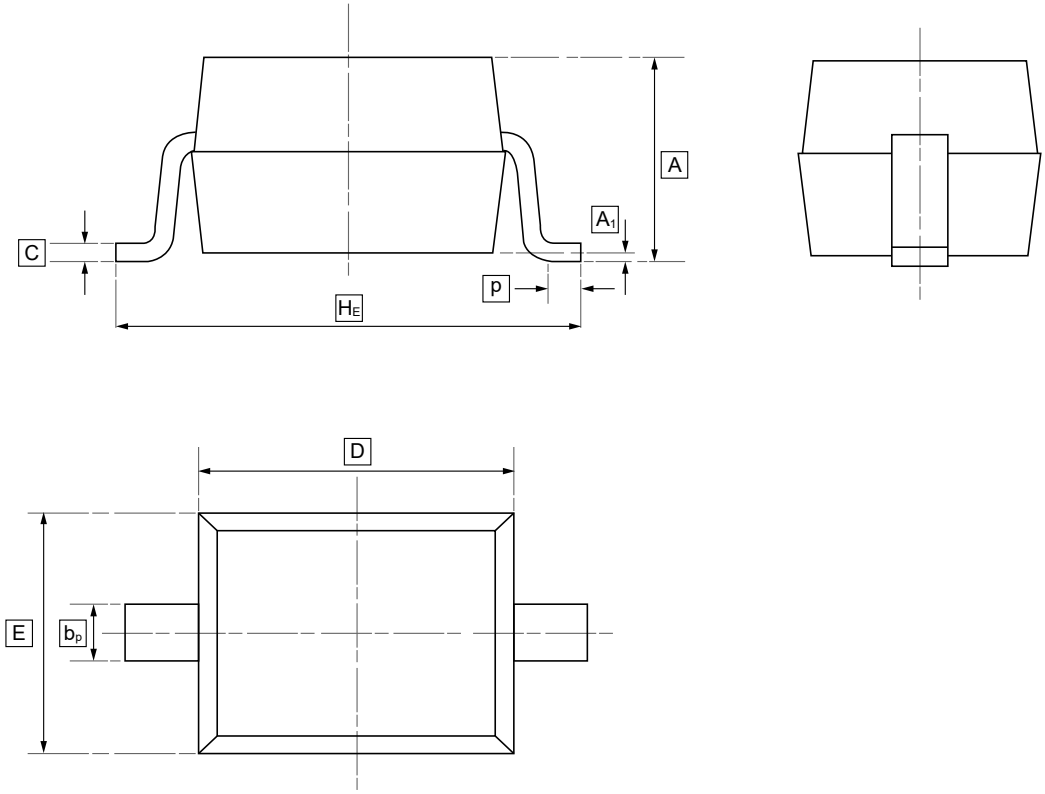
Circuit board layout and protection device placement

Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients.

The following guidelines are recommended:

1. Place the PESD1LIN as close to the input terminal or connector as possible.
2. The path length between the PESD1LIN and the protected line should be minimized.
3. Keep parallel signal paths to a minimum.
4. Avoid running protection conductors in parallel with unprotected conductor.
5. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
6. Minimize the length of the transient return path to ground.
7. Avoid using shared transient return paths to a common ground point.
8. Ground planes should be used whenever possible. For multilayer PCBs, use ground vias.

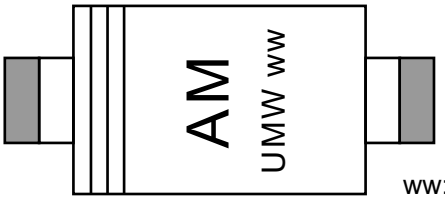
12.SOD-323 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	b_p	C	D	E	H_E	A_1	p
Min	0.80	0.25	0.10	1.50	1.15	2.30	0.01	0.20
Max	1.20	0.40	0.15	1.80	1.35	2.80	0.10	0.50

13.Ordering information



ww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW PESD1LIN	SOD-323	3000	Tape and reel

14.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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