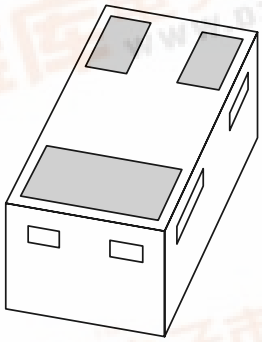
DATA SHEET



PESDxL2UM series
Low capacitance double ESD protection diode

Product specification 2003 Aug 05

Philips Semiconductors

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Low capacitance double ESD protection diode PESDxL2UM series

FEATURES

- Uni-directional ESD protection of two lines or bi-directional ESD protection of one line
- Reverse standoff voltage 3.3 and 5 V
- Low diode capacitance
- Ultra low leakage current
- Leadless ultra small SOT883 surface mount package ($1 \times 0.6 \times 0.5$ mm)
- Board space 1.17 mm^2 (approx. 10% of SOT23)
- ESD protection >15 kV
- IEC 61000-4-2; level 4 (ESD); 15 kV (air) or 8 kV (contact).

APPLICATIONS

- Cellular handsets and accessories
- Portable electronics
- Computers and peripherals
- Communication systems
- Audio and video equipment.

MARKING

TYPE NUMBER	MARKING CODE
PESD3V3L2UM	F2
PESD5V0L2UM	F1

DESCRIPTION

Low capacitance ESD protection diode in a three pad SOT883 leadless ultra small plastic package designed to protect up to two transmission or data lines from ElectroStatic Discharge (ESD) damage.

PINNING

PIN	DESCRIPTION
1	cathode 1
2	cathode 2
3	common anode

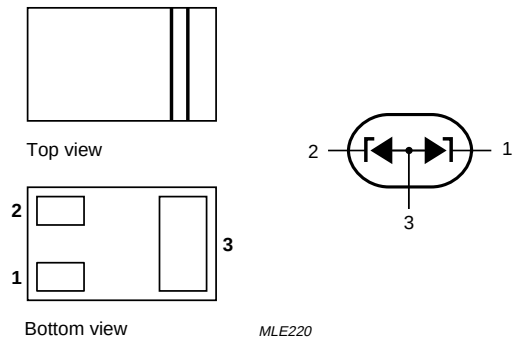


Fig.1 Simplified outline (SOT883) and symbol.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
I_{pp}	peak pulse current	8/20 μs pulse; notes 1, 2 and 3			
	PESD3V3L2UM		–	3	A
	PESD5V0L2UM		–	2.5	A
P_{pp}	peak pulse power	8/20 μs pulse; notes 1, 2 and 3	–	30	W
I_{FSM}	non-repetitive peak forward current	t_p = 1 ms; square pulse	–	3.5	A
I_{ZSM}	non-repetitive peak reverse current	t_p = 1 ms; square pulse			
	PESD3V3L2UM		–	0.9	A
	PESD5V0L2UM		–	0.8	A
P_{tot}	total power dissipation	T_{amb} = 25 °C; note 4	–	250	mW
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 1 ms; square pulse; see Fig.4	–	6	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
ESD	electrostatic discharge	IEC 61000-4-2 (contact discharge)	15	–	kV
		HBM MIL-Std 883	10	–	kV

Notes

1. Non-repetitive current pulse 8/20 μs exponential decay waveform; see Fig.5.
2. Pins 1 and 3 or 2 and 3.
3. Pins 1 and 2.
4. Device mounted on standard printed-circuit board.

ESD standards compliance

IEC 61000-4-2, level 4 (ESD)	>15 kV (air); >8 kV (contact)
HBM MIL-Std 883, class 3	>4 kV

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	all diodes loaded; note 1	500	K/W
		one diode loaded; note 2	290	K/W

Notes

1. Refer to SOT883 standard mounting conditions (footprint), FR4 with 60 μm copper strip line.
2. FR4 single-sided copper 1 cm^2.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per diode						
V_F	forward voltage	I_F = 200 mA	–	1	1.2	V
V_{RWM}	reverse stand-off voltage					
	PESD3V3L2UM		–	–	3.3	V
	PESD5V0L2UM		–	–	5	V
I_{RM}	reverse leakage current					
	PESD3V3L2UM	V_R = 3.3 V	–	75	300	nA
	PESD5V0L2UM	V_R = 5 V	–	5	25	nA
$V_{(CL)R}$	clamping voltage	8/20 μs pulse				
	PESD3V3L2UM	I_{pp} = 1 A; notes 1 and 2	–	–	8	V
		I_{pp} = 3 A; notes 1 and 2	–	–	12	V
		I_{pp} = 1 A; notes 1 and 3	–	–	9	V
		I_{pp} = 3 A; notes 1 and 3	–	–	13	V
	PESD5V0L2UM	I_{pp} = 1 A; notes 1 and 2	–	–	10	V
		I_{pp} = 2.5 A; notes 1 and 2	–	–	13	V
		I_{pp} = 1 A; notes 1 and 3	–	–	11	V
		I_{pp} = 2.5 A; notes 1 and 3	–	–	15	V
V_{BR}	breakdown voltage	I_Z = 1 mA				
	PESD3V3L2UM		5.32	5.6	5.88	V
	PESD5V0L2UM		6.46	6.8	7.14	V
S_Z	temperature coefficient	I_Z = 1 mA				
	PESD3V3L2UM		–	1.3	–	mV/K
	PESD5V0L2UM		–	2.9	–	mV/K
r_{diff}	differential resistance	I_R = 1 mA				
	PESD3V3L2UM		–	–	200	Ω
	PESD5V0L2UM		–	–	100	Ω
C_d	diode capacitance					
	PESD3V3L2UM	f = 1 MHz; V_R = 0	–	22	28	pF
		f = 1 MHz; V_R = 5	–	12	17	pF
	PESD5V0L2UM	f = 1 MHz; V_R = 0	–	16	19	pF
		f = 1 MHz; V_R = 5	–	8	11	pF

Notes

1. Non-repetitive current pulse 8/20 μs exponential decay waveform; see Fig.5.
2. Pins 1 and 3 or 2 and 3.
3. Pins 1 and 2.

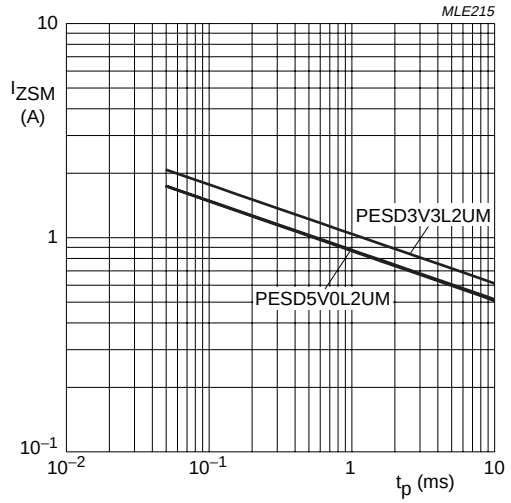
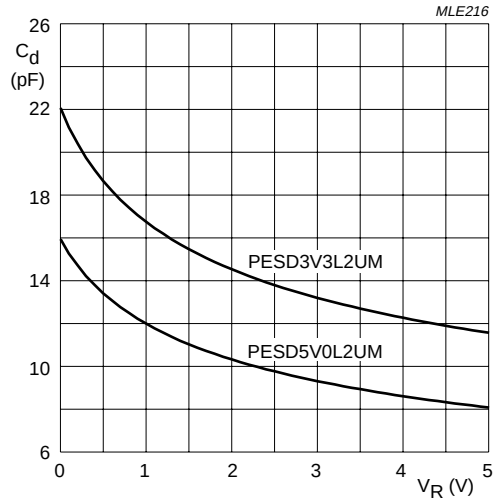
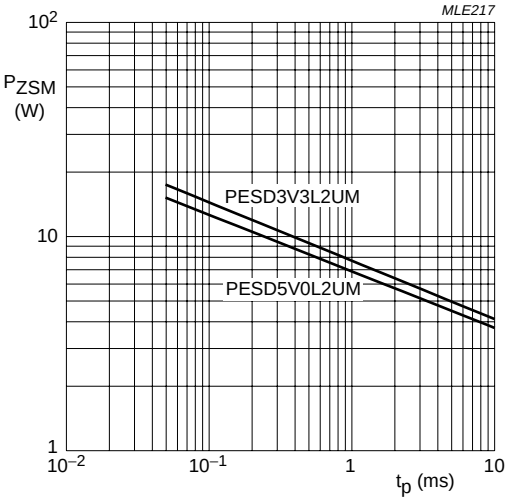


Fig.2 Non-repetitive peak reverse current as a function of pulse time (square pulse).



T_j = 25 °C; f = 1 MHz.

Fig.3 Diode capacitance as a function of reverse voltage; typical values.



$P_{ZSM} = V_{ZSM} \times I_{ZSM}$.
V_{ZSM} is the non-repetitive peak reverse voltage at I_{ZSM}.

Fig.4 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).

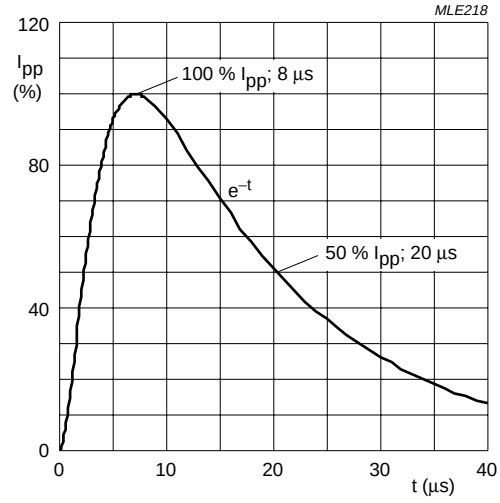
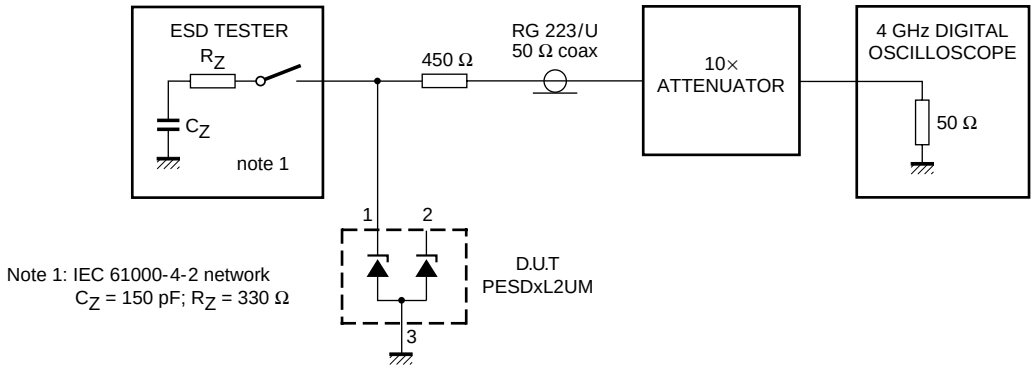
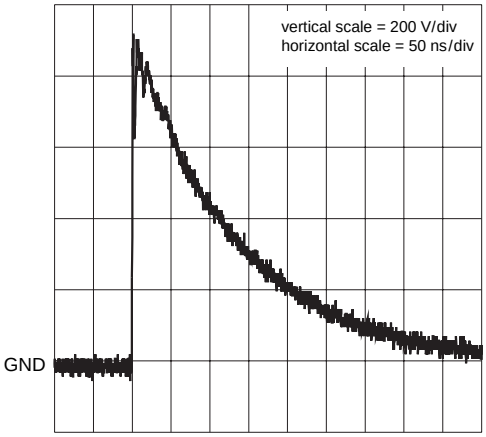


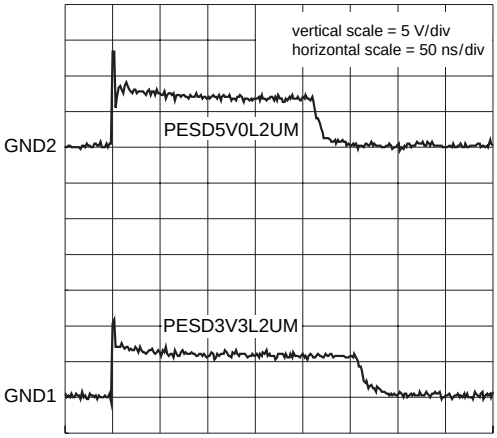
Fig.5 8/20 µs pulse waveform according to IEC 61000-4-5.



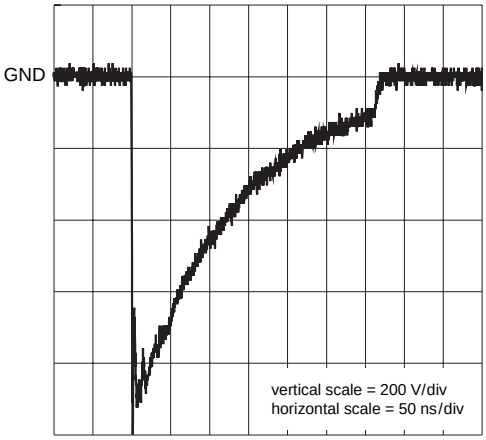
Note 1: IEC 61000-4-2 network
C_Z = 150 pF; R_Z = 330 Ω



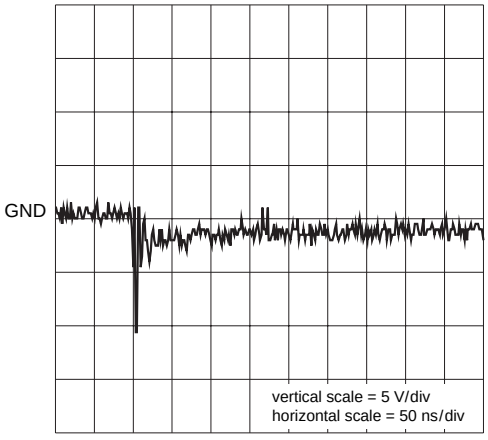
unclamped +1 kV ESD voltage waveform
(IEC 61000-4-2 network)



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



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



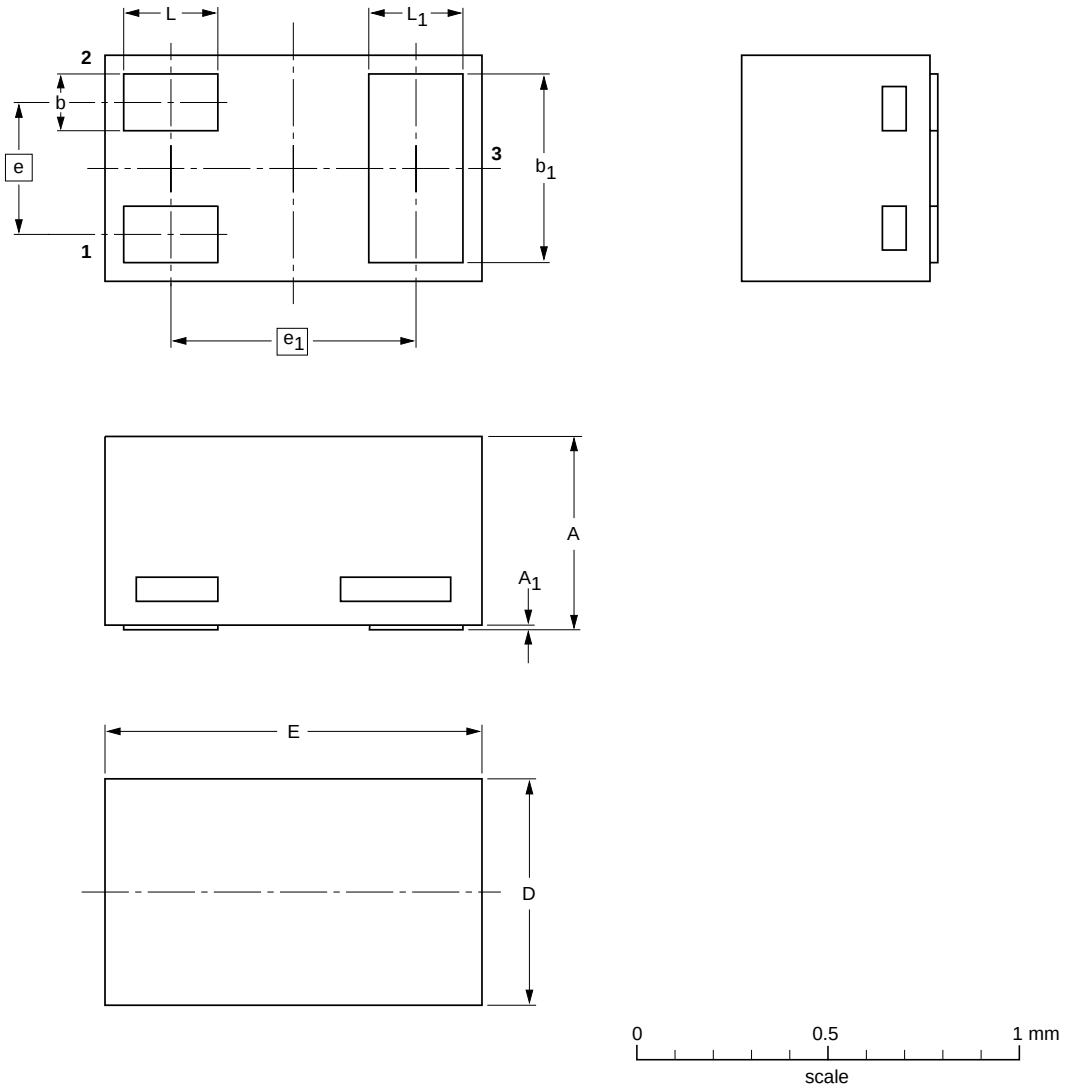
clamped −1 kV ESD voltage waveform
(IEC 61000-4-2 network)

MLE219

Fig.6 ESD clamping test set-up and waveforms.

PACKAGE OUTLINE

Leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.5 mm **SOT883**



DIMENSIONS (mm are the original dimensions)

UNIT	A(1)	A_1 max.	b	b_1	D	E	e	e_1	L	L_1
mm	0.50 0.46	0.03	0.20 0.12	0.55 0.47	0.62 0.55	1.02 0.95	0.35	0.65	0.30 0.22	0.30 0.22

Note

1. Including plating thickness

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT883			SC-101			~~03-02-05~~ 03-04-03

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS(1)	PRODUCT STATUS(2)(3)	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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