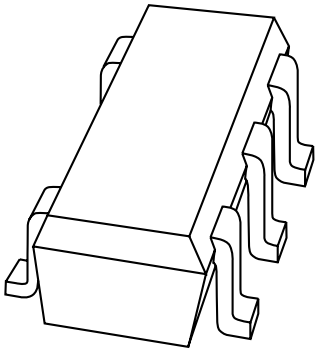
DATA SHEET



PESDxL4UG series

Low capacitance quadruple ESD protection diode array in SOT353 package

Product specification

2004 Mar 23

Philips
Semiconductors

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Low capacitance quadruple ESD protection diode array in SOT353 package

PESDxL4UG series

FEATURES

- Uni-directional ESD protection of up to four lines
- Low diode capacitance
- Maximum peak pulse power: P_{pp} = 30 W at t_p = 8/20µs
- Low clamping voltage: $V_{CL(R)}$ = 12 V at I_{pp} = 3 A
- Ultra low leakage current: I_{RM} = 5 nA at V_{RWM} = 5 V
- ESD protection > 20 kV
- IEC 61000-4-2; level 4 (ESD).

APPLICATIONS

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

DESCRIPTION

ESD protection diode arrays designed to protect up to four transmissions or data lines from ElectroStatic Discharge (ESD) damage and other transients.

MARKING

TYPE NUMBER	MARKING
PESD3V3L4UG	L1
PESD5V0L4UG	L2

QUICK REFERENCE DATA

SYMBOL	PARAMETER	VALUE	UNIT
V_{RWM}	reverse standoff voltage		
	PESD3V3L4UG	3.3	V
	PESD5V0L4UG	5	V
C_d	diode capacitance		
	PESD3V3L4UG	22	pF
	PESD5V0L4UG	16	pF
	number of protected lines	4	

PINNING

PIN	DESCRIPTION
1	cathode 1
2	common anode
3	cathode 2
4	cathode 3
5	cathode 4

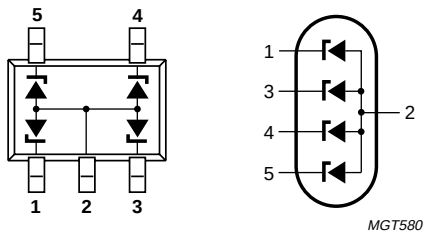


Fig.1 Simplified outline (SOT353) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PESD3V3L4UG	–	plastic surface mounted package; 5 leads	SOT353
PESD5V0L4UG	–	plastic surface mounted package; 5 leads	SOT353

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; notes 1 and 2			
	PESD3V3L4UG		–	3	A
	PESD5V0L4UG		–	2.5	A
P_{pp}	peak pulse power	8/20 μs; notes 1 and 2	–	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			
	PESD3V3L4UG		–	0.9	A
	PESD5V0L4UG		–	0.8	A
P_{tot}	total power dissipation	T_{amb} = 25 °C; note 3	–	300	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
T_{amb}	operating ambient temperature		–65	+150	°C

Notes

1. Non-repetitive current pulse 8/20 μs exponentially decaying waveform; see Fig.5.
2. Between any of pins 1, 3, 4 or 5 and pin 2.
3. Device mounted on standard printed-circuit board.

ESD maximum ratings

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
Per diode				
ESD	electrostatic discharge capability	IEC 61000-4-2 (contact discharge); notes 1 and 2	20	kV
		HBM MIL-Std 883	10	kV

Notes

1. Device stressed with ten non-repetitive Electrostatic Discharge (ESD) pulses.
2. Measured from any of pins 1, 3, 4, or 5 to pin 2.

ESD standards compliance

STANDARD	CONDITION
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
$R_{th(j-a)}$	thermal resistance from junction to ambient	all diodes loaded	410	K/W
$R_{th(j-s)}$	thermal resistance from junction to solder point	one diode loaded; note 1	200	K/W
		all diodes loaded; note 1	185	K/W

Note

1. Solder point of common anode (pin 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
I_{RM}	reverse leakage current					
	PESD3V3L4UG	V_{RWM} = 3.3 V	–	75	300	nA
	PESD5V0L4UG	V_{RWM} = 5 V	–	5	25	nA
$V_{CL(R)}$	clamping voltage					
	PESD3V3L4UG	I_{pp} = 1 A; notes 1 and 2	–	–	8	V
		I_{pp} = 3 A; notes 1 and 2	–	–	12	V
	PESD5V0L4UG	I_{pp} = 1 A; notes 1 and 2	–	–	10	V
		I_{pp} = 2.5 A; notes 1 and 2	–	–	13	V
V_{RWM}	reverse stand-off voltage					
	PESD3V3L4UG		–	–	3.3	V
	PESD5V0L4UG		–	–	5	V
V_{BR}	breakdown voltage	I_Z = 1 mA				
	PESD3V3L4UG		5.32	5.6	5.88	V
	PESD5V0L4UG		6.46	6.8	7.14	V
r_{diff}	differential resistance	I_R = 1 mA				
	PESD3V3L4UG		–	–	200	Ω
	PESD5V0L4UG		–	–	100	Ω
C_d	diode capacitance					
	PESD3V3L4UG	V_R = 0 V; f = 1 MHz	–	22	28	pF
		V_R = 5 V; f = 1 MHz	–	12	17	pF
	PESD5V0L4UG	V_R = 0 V; f = 1 MHz	–	16	19	pF
		V_R = 5 V; f = 1 MHz	–	8	11	pF

Notes

1. Non-repetitive current pulse 8 × 20 ms exponentially decay waveform; see Fig.5.
2. Between any of pins 1, 3, 4 or 5 and pin 2.

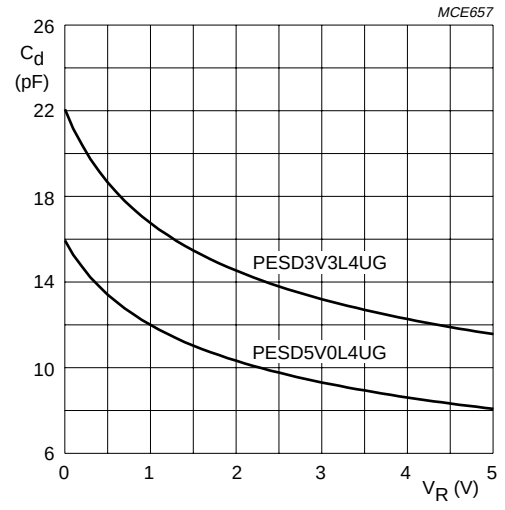


Fig.2 Diode capacitance as a function of reverse voltage; typical values.

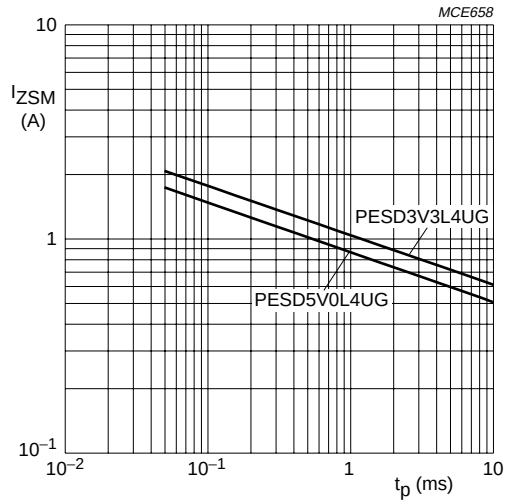


Fig.3 Maximum non-repetitive peak reverse current as a function of pulse time.

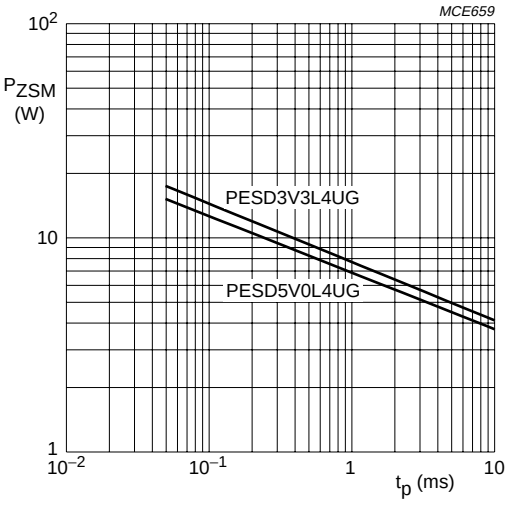


Fig.4 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).

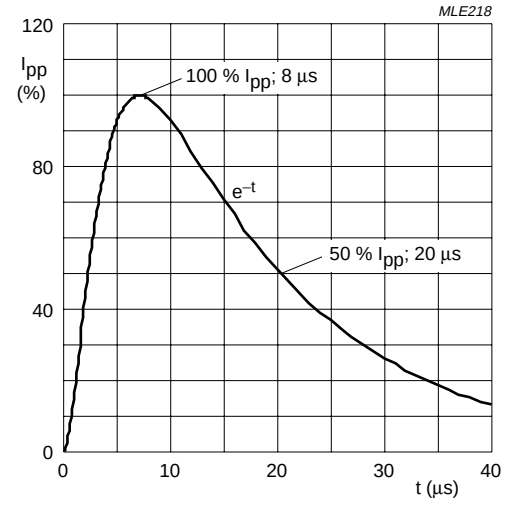
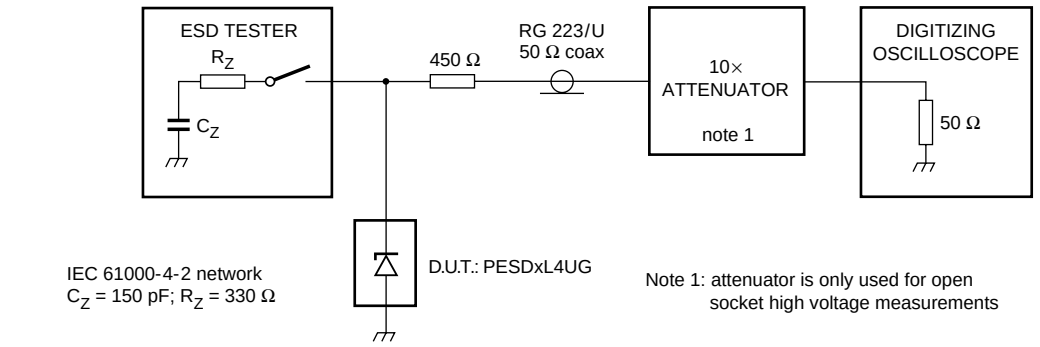
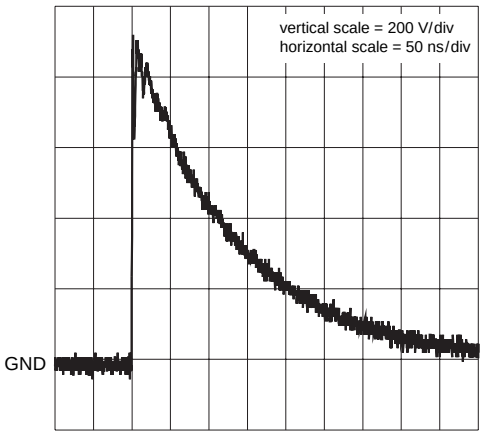
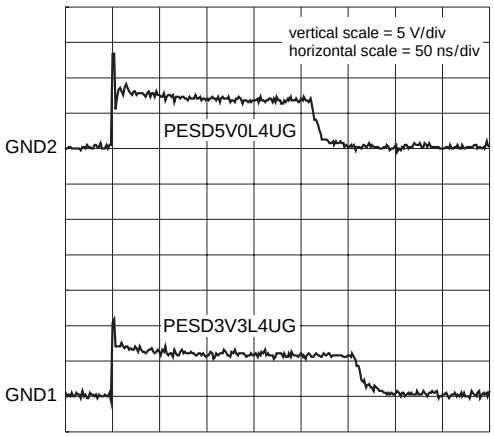


Fig.5 8/20 µs pulse waveform according to IEC 61000-4-5.

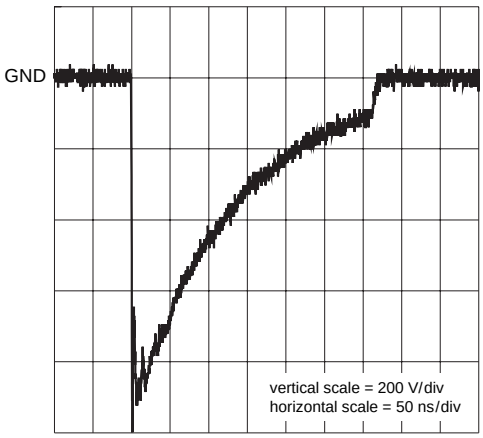




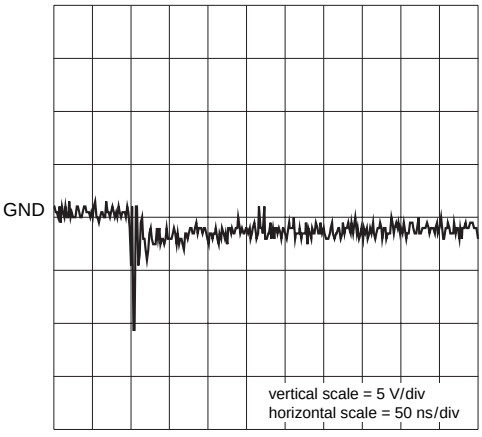
unclamped +1 kV ESD voltage waveform (IEC 61000-4-2 network)



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



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



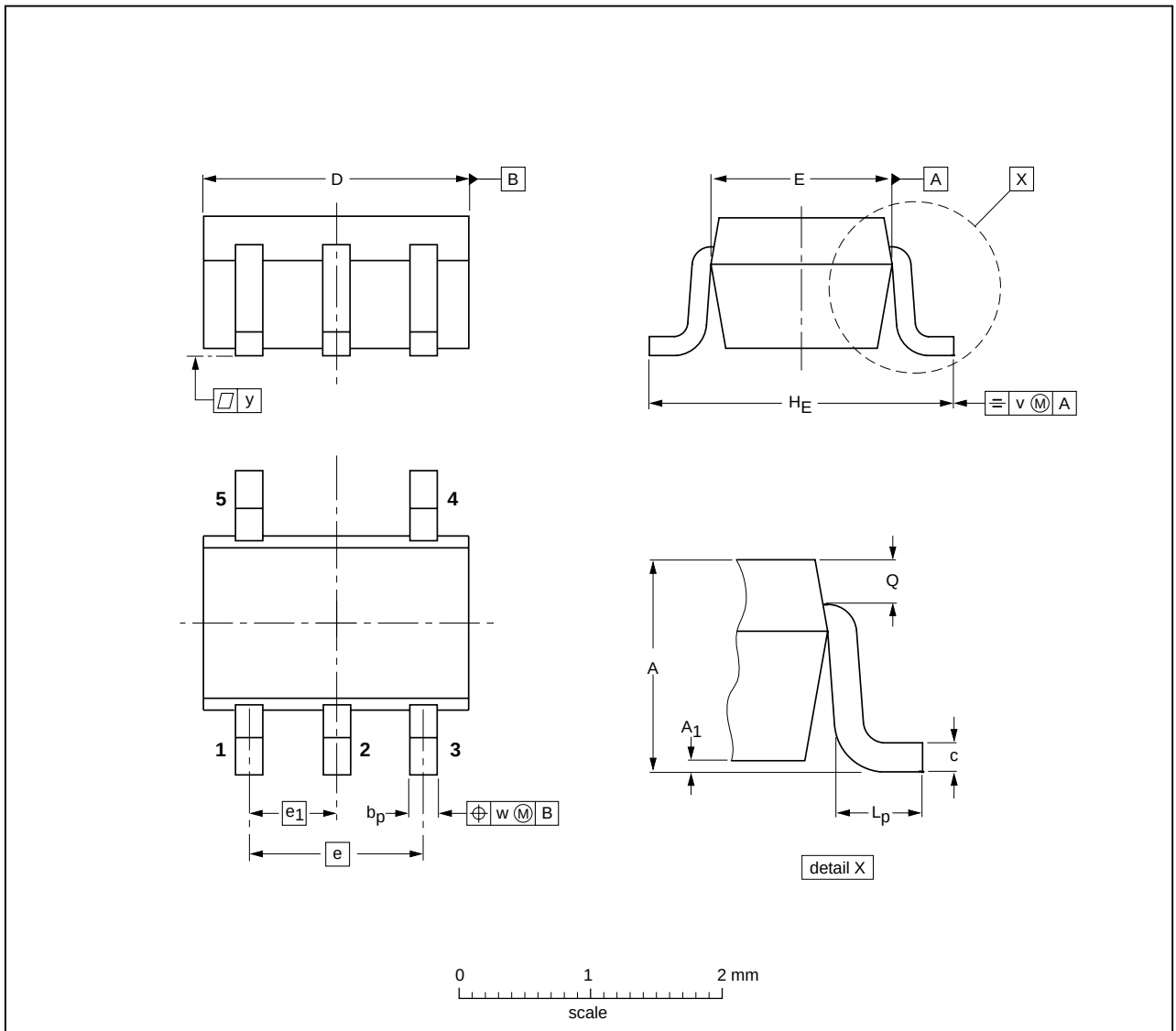
clamped −1 kV ESD voltage waveform (IEC 61000-4-2 network)

mce656

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

PACKAGE OUTLINE

Plastic surface mounted package; 5 leads **SOT353**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E (2)	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT353			SC-88A			97-02-28

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS(1)	PRODUCT STATUS(2)(3)	DEFINITION
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Contact information

For additional information please visit **http://www.semiconductors.philips.com**. Fax: **+31 40 27 24825**
For sales offices addresses send e-mail to: **sales.addresses@www.semiconductors.philips.com**.

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