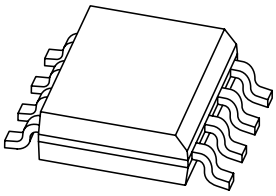
DATA SHEET



PESD5V0L6US

Low capacitance 6-fold ESD protection diode array in SO8 package

Product specification

2004 Feb 18

Philips
Semiconductors

Low capacitance 6-fold ESD protection diode array in SO8 package

PESD5V0L6US

FEATURES

- Unidirectional ESD protection of up to 6 lines
- Bidirectional ESD protection of up to 5 lines
- Low diode capacitance
- Max. peak pulse power: P_{pp} = 35 W at t_p = 8/20 µs
- Low clamping voltage: $V_{(CL)R}$ = 15 V at I_{pp} = 2.5 A
- Ultra low leakage current: I_{RM} = 8 nA at V_{RWM} = 5 V
- ESD protection up to 20 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC-61000-4-5 (surge); I_{pp} = 2.5 A at t_p = 8/20 µs.

APPLICATIONS

- Computers and peripherals
- Communication systems
- Audio and video equipment
- High speed data lines
- Parallel ports.

DESCRIPTION

Low capacitance 6-fold ESD protection diode array in a small S08 plastic package designed to protect up to six transmission or data lines against damage caused by ElectroStatic Discharge (ESD) and other transients.

MARKING

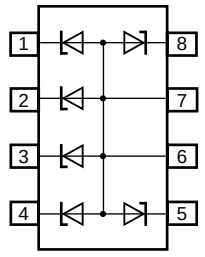
TYPE NUMBER	MARKING CODE
PESD5V0L6US	5V0L6US

QUICK REFERENCE DATA

SYMBOL	PARAMETER	VALUE	UNIT
V_{RWM}	reverse stand-off voltage	5	V
C_d	diode capacitance; V_R = 0 V; f = 1 MHz	16	pF
	number of protected lines	6	

PINNING

PIN	DESCRIPTION
1, 2, 3, 4, 5, 8	cathodes
6, 7	common anode



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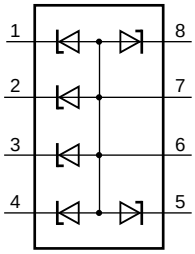


sym004

Fig.1 Simplified outline (SO8) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PESD5V0L6US	SO8	plastic small outline package; 8 leads; body width 3.9 mm	SOT96-1

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
P_{pp}	peak pulse power	8/20 μs pulse; notes 1 and 2	–	35	W
I_{pp}	peak pulse current	8/20 μs pulse; notes 1 and 2	–	2.5	A
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C
T_{stg}	storage temperature		–65	+150	°C

Notes

1. Non-repetitive current pulse 8/20 μs exponential decay waveform; see Fig.2.
2. Measured from pin 1, 2, 3, 4, 5 or 8 to pin 6 or 7.

ESD maximum ratings

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
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 ESD pulses; see Fig.3.
2. Measured from pin 1, 2, 3, 4, 5 or 8 to pin 6 or 7.

ESD standards compliance

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

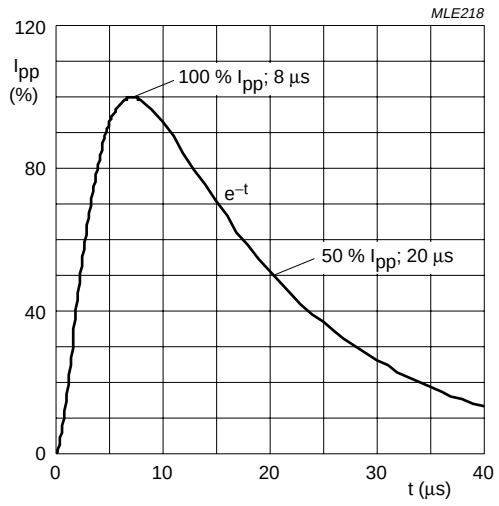


Fig.2 8/20 µs pulse waveform according to IEC 61000-4-5.

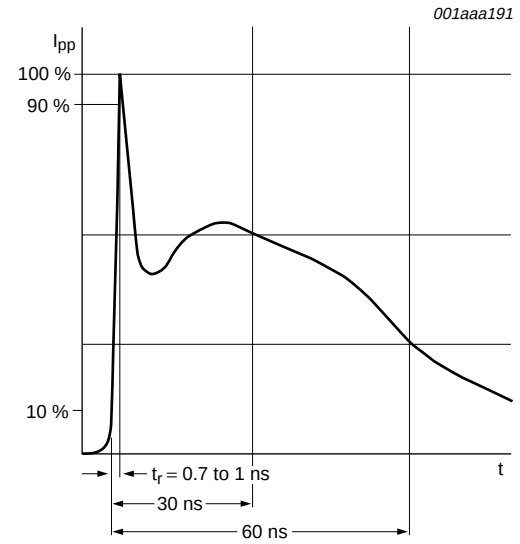


Fig.3 ElectroStatic Discharge (ESD) pulse waveform according to IEC 61000-4-2.

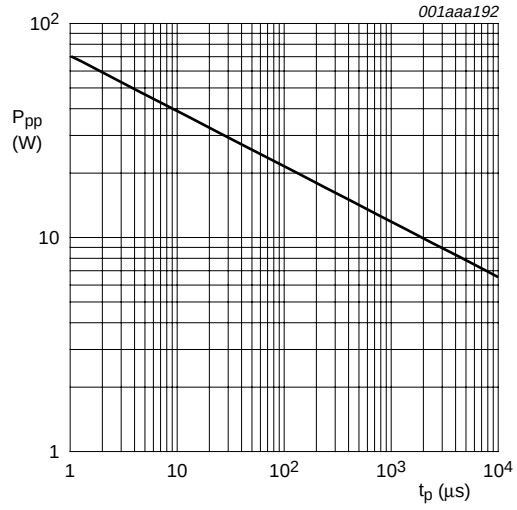
ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per diode						
V_{RWM}	reverse stand-off voltage		–	–	5	V
I_{RM}	reverse leakage current	V_{RWM} = 5 V	–	8	25	nA
$V_{(CL)R}$	clamping voltage	notes 1 and 2				
		I_{pp} = 1 A	–	–	10	V
		I_{pp} = 2.5 A	–	–	15	V
V_{BR}	breakdown voltage	I_R = 1 mA	6.4	6.8	7.2	V
R_{diff}	differential resistance	I_R = 1 mA	–	–	100	Ω
C_d	diode capacitance	V_R = 0 V; f = 1 MHz	–	16	19	pF

Notes

1. Non-repetitive current pulse 8/20 µs exponential decay waveform; see Fig.2.
2. Measured between each cathode on pins 1, 2, 3, 4, 5, 8 and anode on pin 6 or 7.



T_{amb} = 25 °C.
t_p = 8/20 µs exponential decay waveform; see Fig.2.

Fig.4 Peak pulse power dissipation as a function of pulse time; typical values.

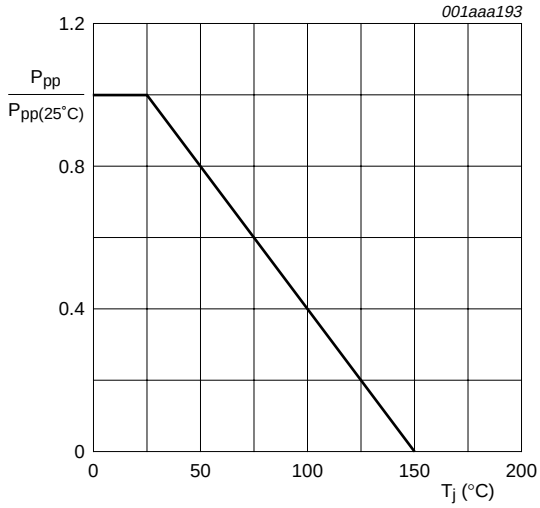
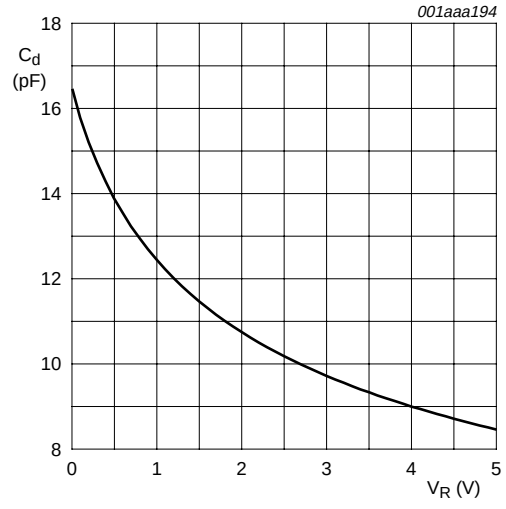


Fig.5 Relative variation of peak pulse power as a function of junction temperature; typical values.



T_{amb} = 25 °C; f = 1 MHz.

Fig.6 Diode capacitance as a function of reverse voltage; typical values.

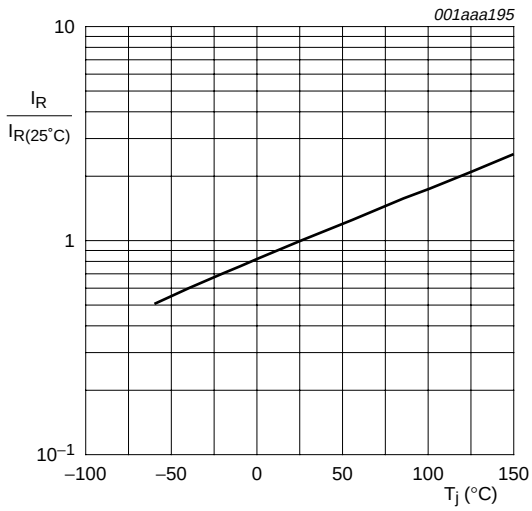


Fig.7 Relative variation of reverse leakage current as a function of junction temperature; typical values.

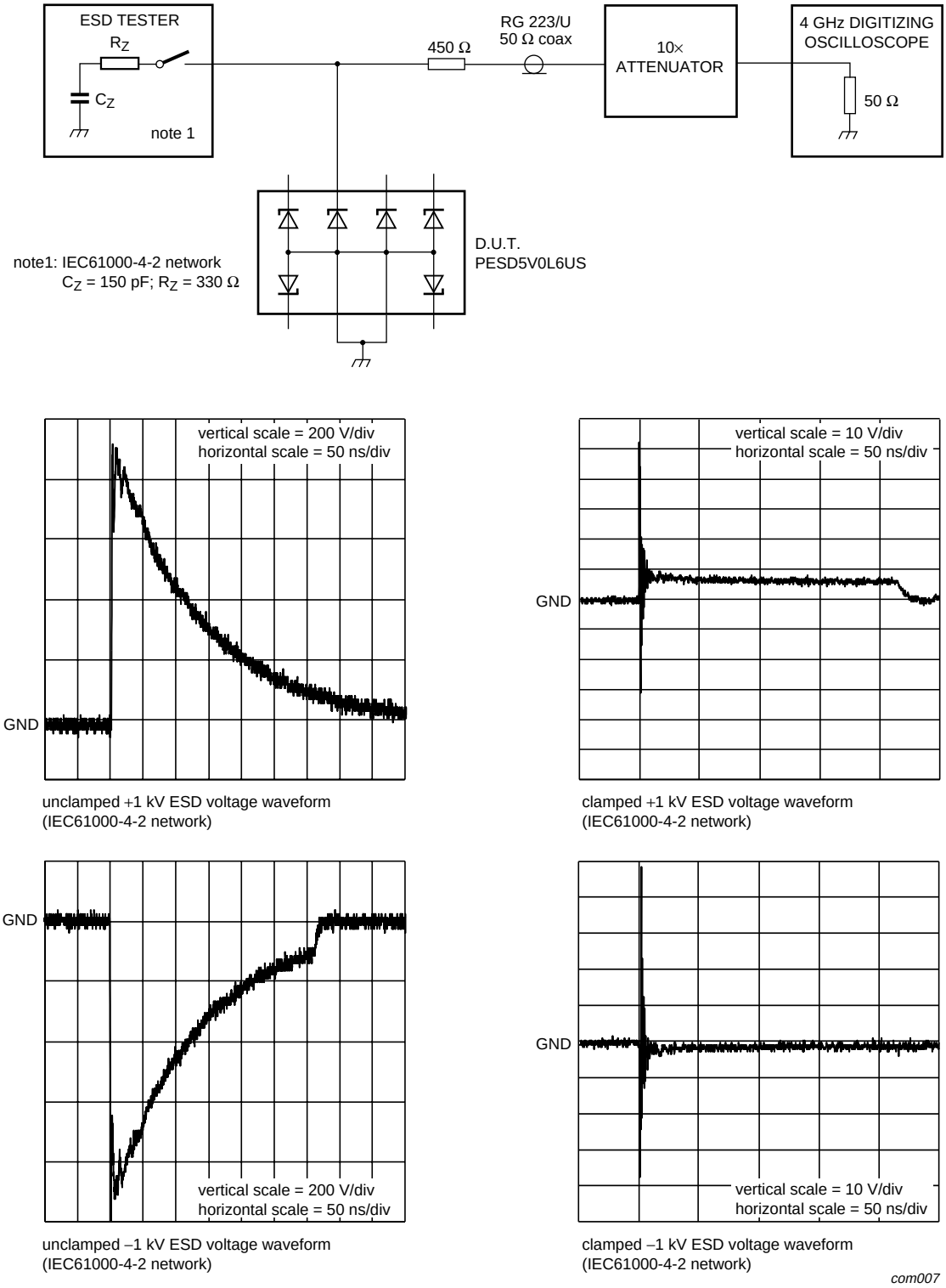


Fig.8 ESD clamping test set-up and waveforms.

APPLICATION INFORMATION

The PESD5V0L6US can protect up to six lines against damage caused by unidirectional ElectroStatic Discharge (ESD) and surge pulses. The PESD5V0L6US can protect lines whose signal polarities are above or below ground. PESD5V0L6US provides a surge capability of 35 Watts peak pulse power per line for a 8/20 μs waveform.

Typical application

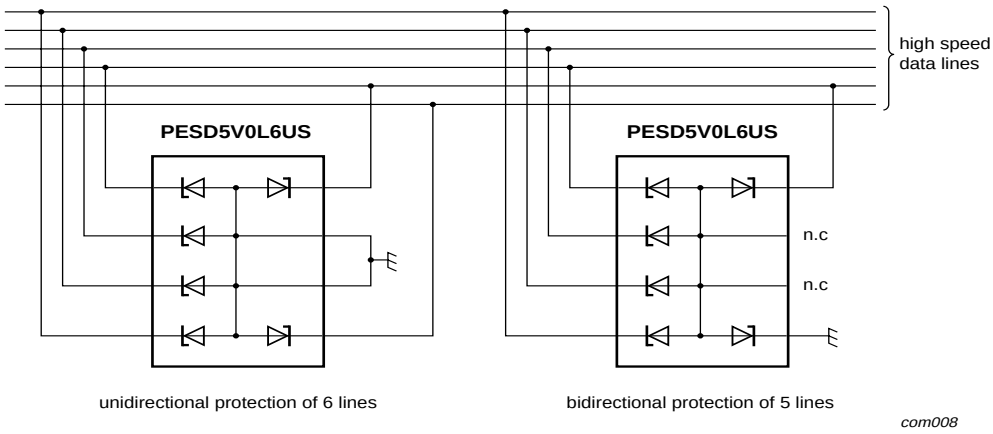


Fig.9 Typical application: ESD protection of data lines.

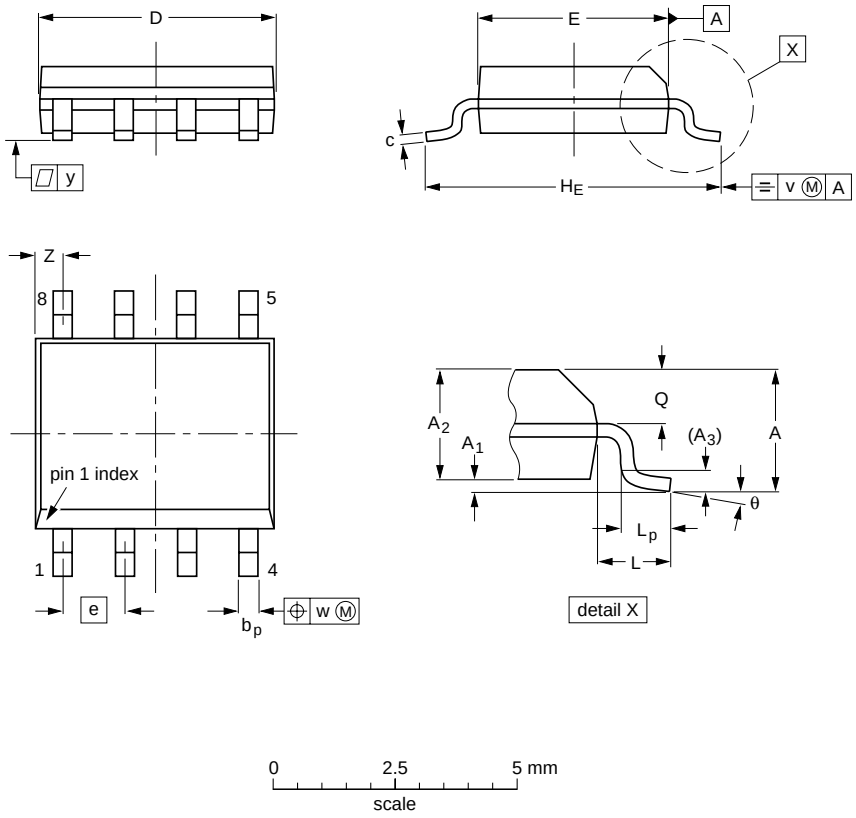
Circuit board layout and protection device placement

Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

- Place the PESD5V0L6US as close as possible to the input terminal or connector.
- Minimize the path length between the PESD5V0L6US and the protected line.
- Keep parallel signal paths to a minimum.
- Avoid running protected conductors in parallel with unprotected conductors.
- Minimize all printed-circuit board conductive loops including power and ground loops.
- Minimize the length of transient return paths to ground.
- Avoid using shared transient return paths to a common ground point.
- Ground planes should be used whenever possible.
- Use vias for multi-layer printed-circuit boards.

PACKAGE OUTLINE

SO8: plastic small outline package; 8 leads; body width 3.9 mm **SOT96-1**



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(2)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	5.0 4.8	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8^o 0^o
inches	0.069	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.20 0.19	0.16 0.15	0.05	0.244 0.228	0.041	0.039 0.016	0.028 0.024	0.01	0.01	0.004	0.028 0.012	

Notes

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.
2. Plastic or metal protrusions of 0.25 mm (0.01 inch) maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT96-1	076E03	MS-012				~~99-12-27~~ 03-02-18

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS(1)	PRODUCT STATUS(2)(3)	DEFINITION
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3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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