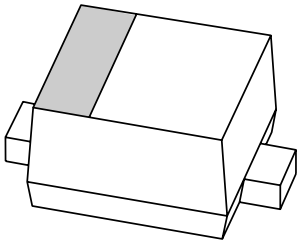
DATA SHEET



PESD5V0S1BB

Low capacitance bi-directional ESD protection diode in SOD523 package

Product specification

2004 Mar 04

Philips Semiconductors

PHILIPS

Low capacitance bi-directional ESD protection diode in SOD523 package

PESD5V0S1BB

FEATURES

- Bi-directional ESD protection of one line
- Low diode capacitance
- Maximum peak pulse power: P_{pp} = 130 W at t_p = 8/20 µs
- Low clamping voltage: $V_{CL(R)}$ = 14 V at I_{pp} = 12 A
- Ultra low leakage current: I_{RM} = 5 nA at V_{RWM} = 5 V
- ESD protection 30 kV bi-directional
- IEC 61000-4-2; level 4 (ESD)
- IEC-61000-4-5 (surge); I_{pp} = 12 A at t_p = 8/20 µs.

APPLICATIONS

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

DESCRIPTION

Low capacitance ESD protection diode array in the ultra small SOD523 plastic package designed to protect one data line from ElectroStatic Discharge (ESD) damage.

MARKING

TYPE NUMBER	MARKING CODE
PESD5V0S1BB	L7

QUICK REFERENCE DATA

SYMBOL	PARAMETER	VALUE	UNIT
V_{RWM}	reverse standoff voltage	5	V
C_d	diode capacitance	35	pF
	number of protected lines	1	

PINNING

PIN	DESCRIPTION
1	anode 1
2	anode 2

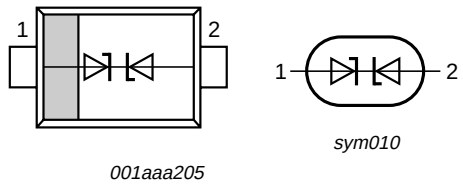


Fig.1 Simplified outline (SOD523) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PESD5V0S1BB	–	plastic surface mounted package; 2 leads	SOD523

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	–	130	W
I_{pp}	peak pulse current	8/20 μs pulse; notes 1 and 2	–	12	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 between pins 1 and 2.

ESD maximum ratings

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
ESD	electrostatic discharge	IEC 61000-4-2 (contact discharge); notes 1 and 2	30	kV
		HBM MIL-Std 883; note 2	10	kV

Notes

1. Device stressed with ten non-repetitive ElectroStatic Discharge (ESD) pulses; see Fig.3.
2. Measured between pins 1 and 2.

ESD standards compliance

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

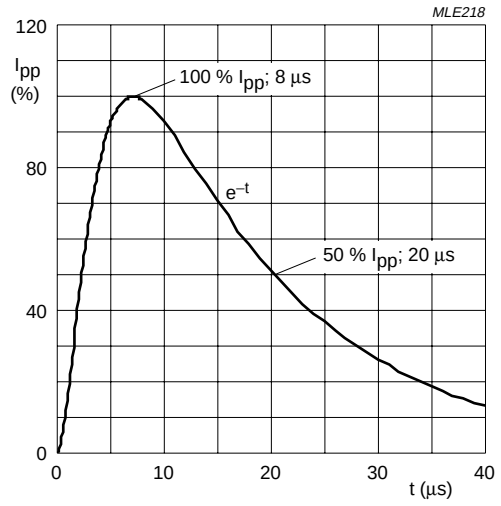


Fig.2 8/20 µs pulse waveform according to IEC 61000-4-5.

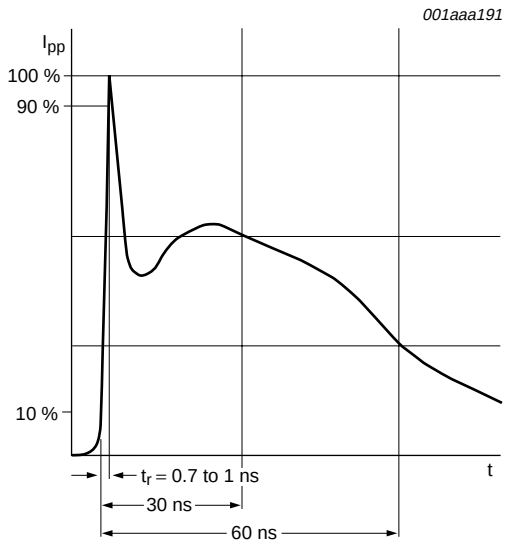


Fig.3 ElectroStatic Discharge (ESD) pulse waveform according to IEC 61000-4-2.

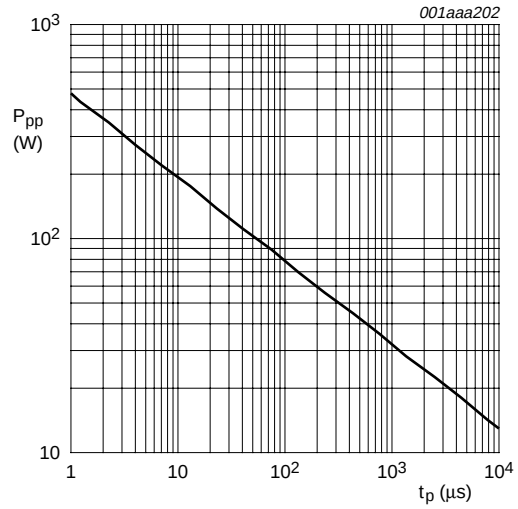
ELECTRICAL CHARACTERISTICS

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	–	5	100	nA
V_{BR}	breakdown voltage	I_Z = 1 mA	5.5	–	9.5	V
C_d	diode capacitance	f = 1 MHz; V_R = 0 V	–	35	45	pF
$V_{(CL)R}$	clamping voltage	notes 1 and 2				
		I_{pp} = 1 A	–	–	10	V
		I_{pp} = 12 A	–	–	14	V
r_{diff}	differential resistance	I_R = 1 mA	–	–	50	Ω

Notes

1. Non-repetitive current pulse 8/20 µs exponential decay waveform, see Fig.2.
2. Measured between pins 1 and 2.



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.

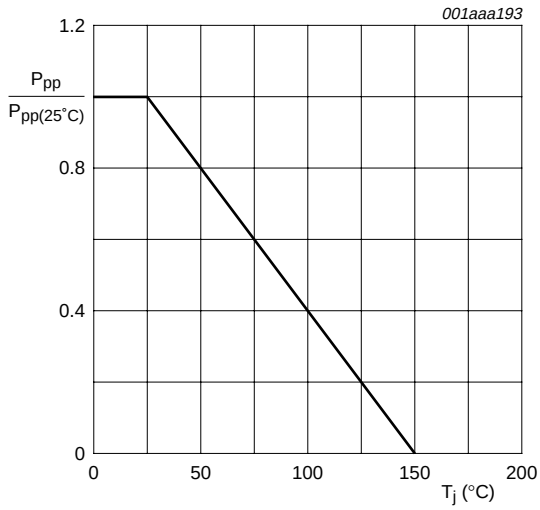
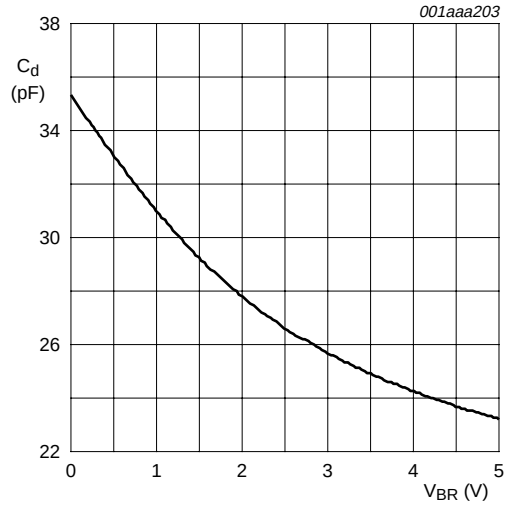


Fig.5 Relative variation of peak pulse power as a function of junction temperature; typical values.



T_{amb} = 25 °C; f = 1 MHz.

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

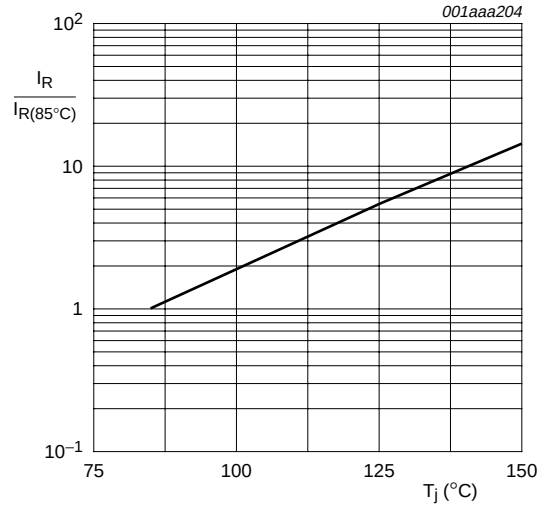
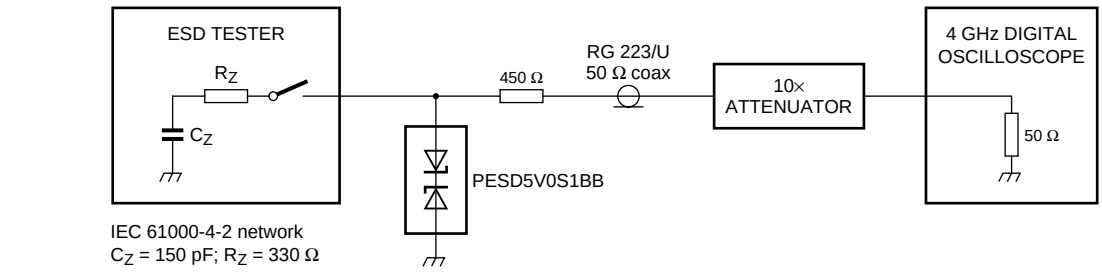
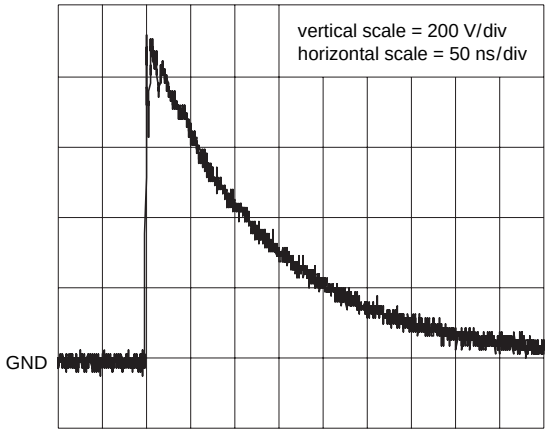


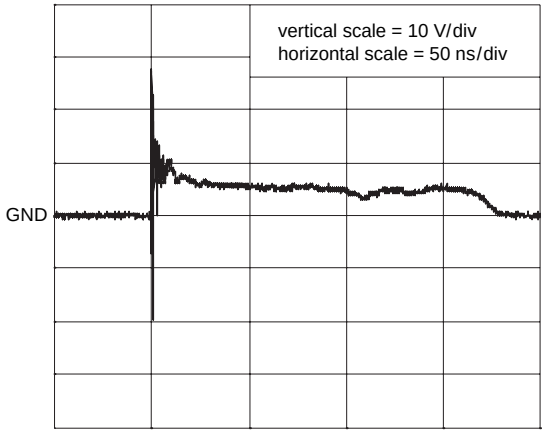
Fig.7 Relative variation of reverse leakage current as a function of junction temperature; typical values.



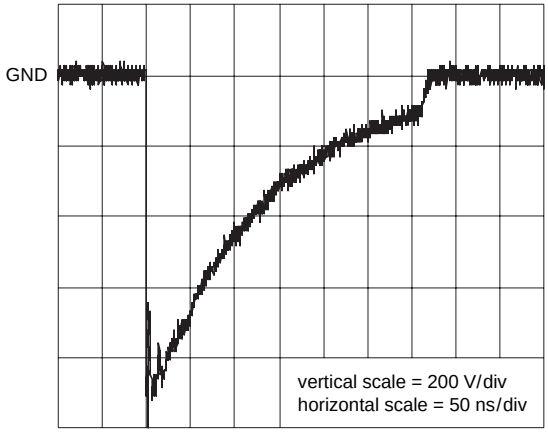
IEC 61000-4-2 network
C_Z = 150 pF; R_Z = 330 Ω



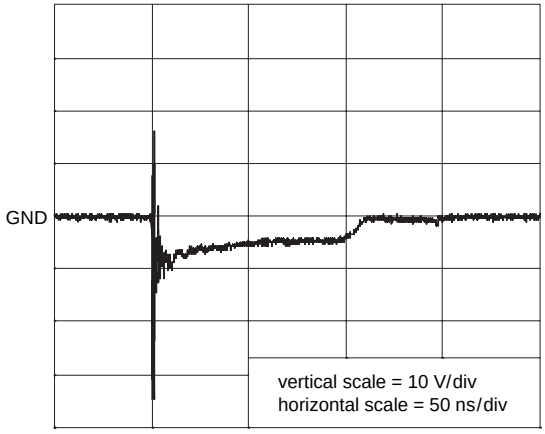
unclamped +1 kV ESD voltage waveform
(IEC61000-4-2 network)



clamped +1 kV ESD voltage waveform
(IEC61000-4-2 network)



unclamped −1 kV ESD voltage waveform
(IEC61000-4-2 network)



clamped −1 kV ESD voltage waveform
(IEC61000-4-2 network)

001aaa207

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

APPLICATION INFORMATION

The PESD5V0S1BB is designed for the bi-directional protection of one data line from the damage caused by ElectroStatic Discharge (ESD) and surge pulses. The PESD5V0S1BB may be used on lines where the signal polarities are above or below ground. PESD5V0S1BB can withstand and provides protection from a surge of 130 watt peak pulse power surge per line for a 8/20 μs waveform.

Typical application

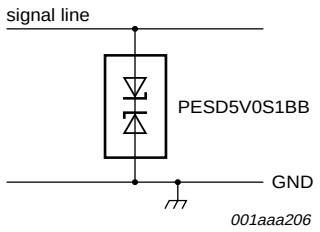


Fig.9 Typical application for bi-directional protection of one line.

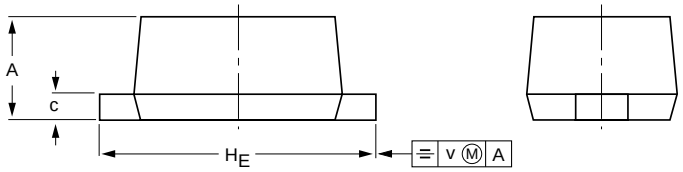
Circuit board layout and protection device placement

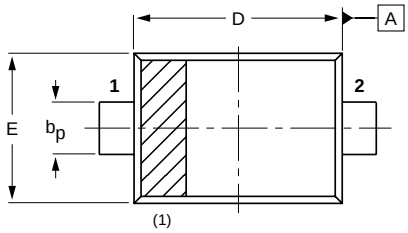
Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

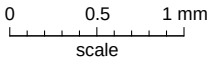
1. The protection device should be placed as closely as possible to the input terminal or connector.
2. The path length between the protection device and the protected line should be as short as possible.
3. Parallel signal paths should be kept to a minimum.
4. Running protected conductors in parallel with unprotected conductors should be avoided.
5. All printed-circuit board conductive loops (including power and group loops) should be kept to a minimum.
6. The length of the transient return path to ground should be kept to a minimum.
7. The use of shared transient return paths to a common ground point should be avoided.
8. Ground planes should be used whenever possible.
9. For multilayer printed-circuit boards, ground vias should be used.

PACKAGE OUTLINE

Plastic surface mounted package; 2 leads **SOD523**







DIMENSIONS (mm are the original dimensions)

UNIT	A	b_p	c	D	E	H_E	v
mm	0.65 0.58	0.34 0.26	0.17 0.11	1.25 1.15	0.85 0.75	1.65 1.55	0.1

Note

1. The marking bar indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOD523			SC-79			~~98-11-25~~ 02-12-13

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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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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