PESD5V0S1BB

Bidirectional ESD protection diode

14 April 2023 **Product data sheet**

1. General description

Bidirectional ElectroStatic Discharge (ESD) protection diode in an ultra-small and flat lead SOD523 plastic package designed to protect one signal line from the damage caused by ESD and other transients.

2. Features and benefits

- Bidirectional ESD protection of one line
- Max. peak pulse power: P_{PPM} = 130 W
- Low clamping voltage: $V_{(CL)R}$ = 14 V
- Ultra low leakage current: I_{RM} = 5 nA
- ESD protection > 30 kV
- IEC 61000-4-2, level 4 (ESD)
- IEC 61000-4-5 (surge); I_{PPM} = 12 A
- Ultra small SMD plastic package

3. Applications

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

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	T_{amb} = 25 °C		-	-	5	V
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_{amb} = 25 °C		-	35	45	pF

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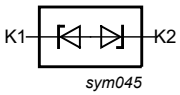
5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)	 SC-79 (SOD523)	
2	K2	cathode (diode 2)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD5V0S1BB	SC-79	plastic, surface-mounted package; 2 leads; 1.2 mm x 0.8 mm x 0.6 mm body	SOD523

7. Marking

Table 4. Marking codes

Type number	Marking code
PESD5V0S1BB	L7

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
P_{PPM}	rated peak pulse power	t_p = 8/20 µs	[1] [2]	-	130	W
I_{PPM}	rated peak pulse current		[1] [2]	-	12	A
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°C
ESD maximum ratings						
V_{ESD}	electrostatic discharge voltage	IEC 61000-4-2 (contact discharge)	[2] [3]	-	30	kV
		HBM MIL-Std 883		-	10	kV

[1] Non-repetitive current pulse 8/20 µs exponentially decaying waveform according to IEC 61000-4-5.
[2] Measured from pin 1 to pin 2.
[3] Device stressed with ten non-repetitive ElectroStatic Discharge (ESD) pulses.

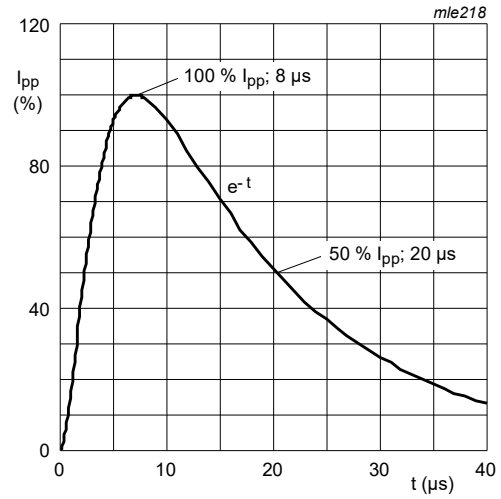


Fig. 1. 8/20 µs pulse waveform according to IEC 61000-4-5

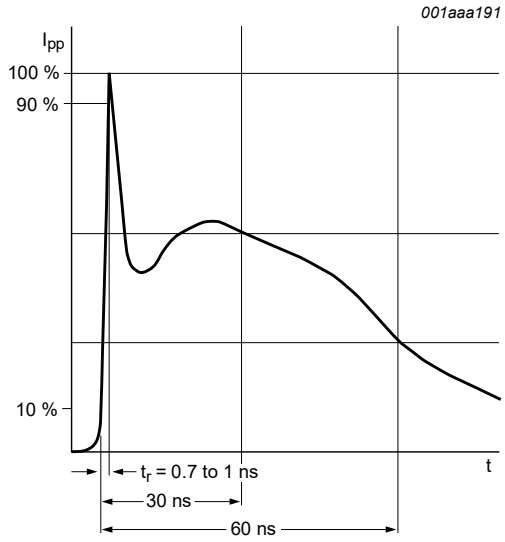


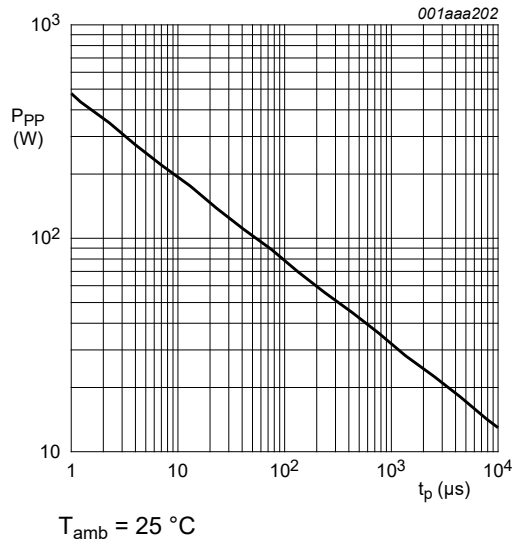
Fig. 2. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	T_{amb} = 25 °C		-	-	5	V
V_{BR}	breakdown voltage	I_R = 1 mA; T_{amb} = 25 °C		5.5	-	9.5	V
I_{RM}	reverse leakage current	V_{RWM} = 5 V; T_{amb} = 25 °C		-	5	100	nA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_{amb} = 25 °C		-	35	45	pF
V_{CL}	clamping voltage	I_{PP} = 1 A; T_{amb} = 25 °C	[1] [2]	-	-	10	V
		I_{PPM} = 12 A; T_{amb} = 25 °C	[1] [2]	-	-	14	V
R_{diff}	differential resistance	I_R = 1 mA; T_{amb} = 25 °C		-	-	50	Ω

[1] Non-repetitive current pulse 8/20 µs exponentially decaying waveform according to IEC61000-4-5.
[2] Measures from pin 1 to pin 2.



T_{amb} = 25 °C

Fig. 3. Peak pulse power as a function of exponential pulse duration; typical values

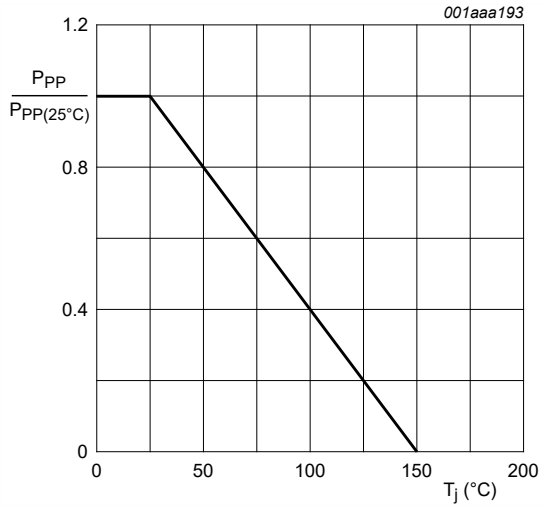
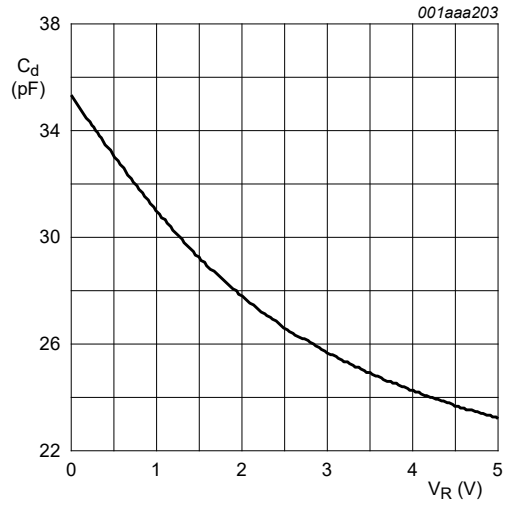


Fig. 4. Relative variation of peak pulse power as a function of junction temperature; typical values



f = 1 MHz; T_{amb} = 25 °C

Fig. 5. Diode capacitance as a function of reverse voltage; typcial values

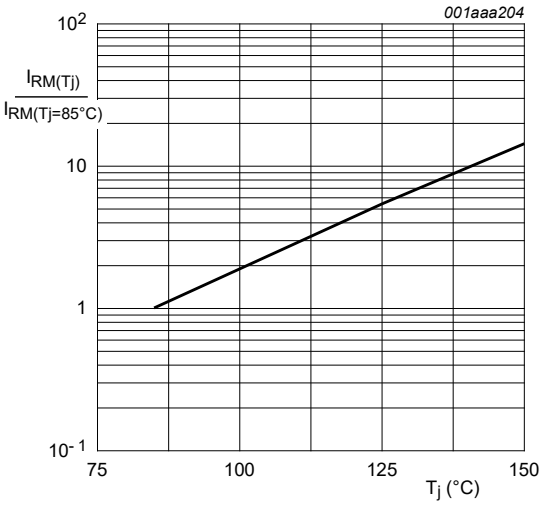


Fig. 6. Relative variation of reverse leakage current as a function of junction temperature; typical values

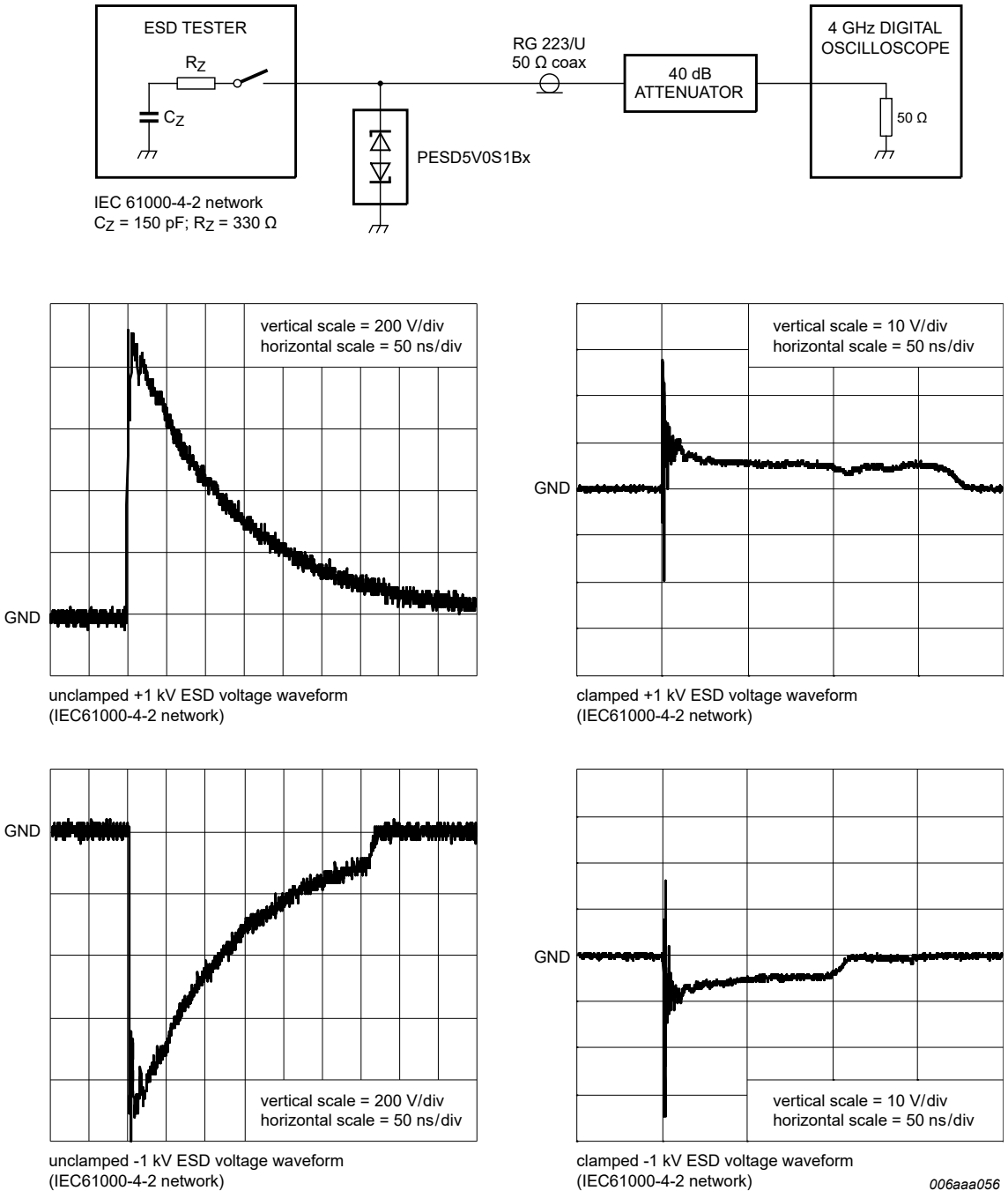


Fig. 7. ESD clamping test setup and waveforms

10. Application information

The device is designed for the protection of one bidirectional data or signal line from the damage caused by ESD and/or other surge pulses. The device may be used on lines where the signal polarities are both, positive and negative with respect to ground. It provides a surge capability of 130 W per line for an 8/20 µs waveform.

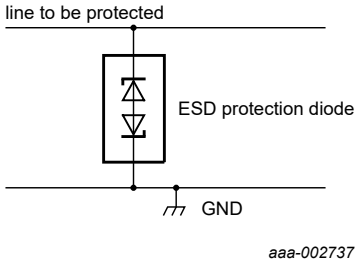


Fig. 8. Bidirectional protection of one signal line

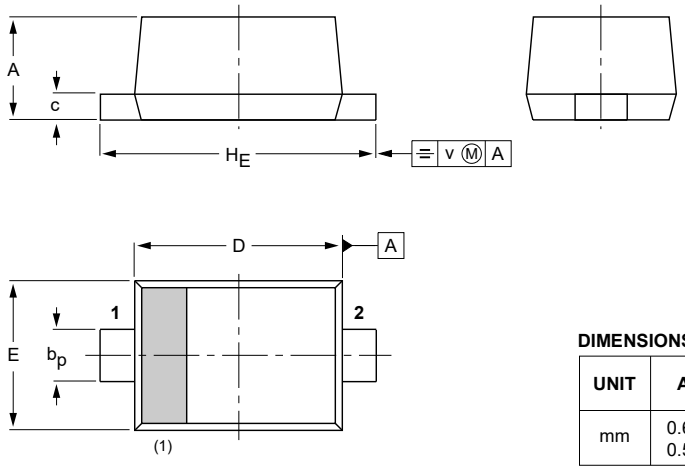
Circuit board layout and protection device placement

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

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

11. 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			~~02-12-13~~ 06-03-16

Fig. 9. Package outline SC-79 (SOD523)

12. Soldering

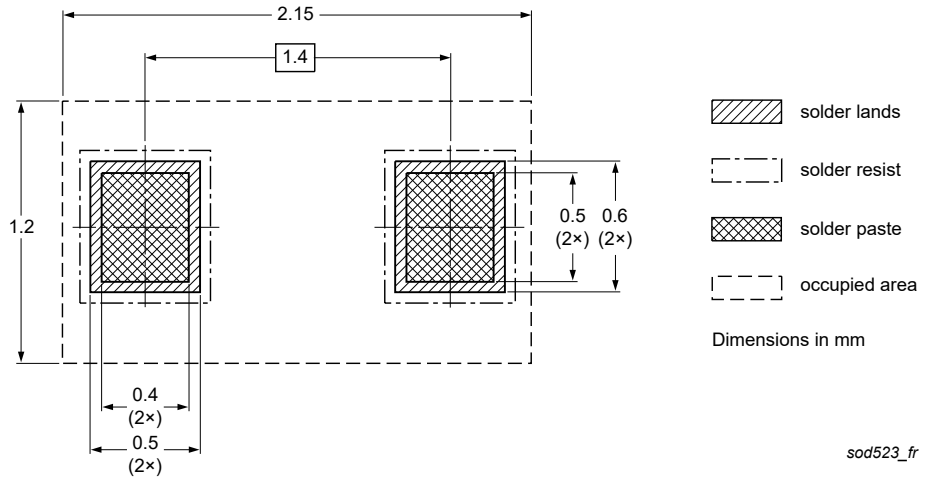


Fig. 10. Reflow soldering footprint for SC-79 (SOD523)

13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD5V0S1BB v.6	20230414	Product data sheet	-	PESD5V0S1BB v.5
Modifications:	• Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
PESD5V0S1BB v.5	20180823	Product data sheet	-	PESD5V0S1BA _BB_BL_4
PESD5V0S1BA _BB_BL_4	20090820	Product data sheet	-	PESD5V0S1BA _BB_BL_3
PESD5V0S1BA _BB_BL_3	20041217	Product data sheet	-	PESD5V0S1BA _BB_BL_2
PESD5V0S1BA _BB_BL_2	20040322	Product specification	-	PESD5V0S1BA _BB_BL_1
PESD5V0S1BA _BB_BL_1	20040304	Product specification	-	-

14. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
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