

PESD5V0V1BLD

Very low capacitance bidirectional ESD protection diode

Rev. 1 — 7 December 2010 Product data sheet

1. Product profile

1.1 General description

Very low capacitance bidirectional ElectroStatic Discharge (ESD) protection diode designed to protect one signal line from the damage caused by ESD and other transients. The device is housed in a SOD882D leadless ultra small Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

1.2 Features and benefits

- Bidirectional ESD protection of one line
- Ultra small SMD plastic package
- Solderable side pads
- Package height typ. 0.37 mm
- Very low diode capacitance: C_d = 11 pF
- Max. peak pulse power: P_{PP} = 45 W
- Low clamping voltage: V_{CL} = 12.5 V
- Ultra low leakage current: I_{RM} < 1 nA
- ESD protection up to 30 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC 61000-4-5 (surge); I_{PP} = 4.8 A
- AEC-Q101 qualified

1.3 Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- Subscriber Identity Module (SIM) card protection
- Communication systems
- Portable electronics
- 10/100 Mbit/s Ethernet
- FireWire

1.4 Quick reference data

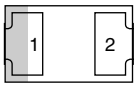
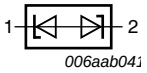
Table 1. Quick reference data

T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage		-	-	5	V
C_d	diode capacitance	f = 1 MHz; V_R = 0 V	-	11	13	pF

2. Pinning information

Table 2. Pinning

Pin	Description		Simplified outline	Graphic symbol
1	cathode 1	[1]	 Transparent top view	 006aab041
2	cathode 2			

[1] The marking bar indicates pin 1.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD5V0V1BLD	-	leadless ultra small plastic package; 2 terminals; body 1 × 0.6 × 0.4 mm	SOD882D

4. Marking

Table 4. Marking codes

Type number	Marking code[1]
PESD5V0V1BLD	0111 0000

[1] For SOD882D binary marking code description, see Figure 1.

4.1 Binary marking code description

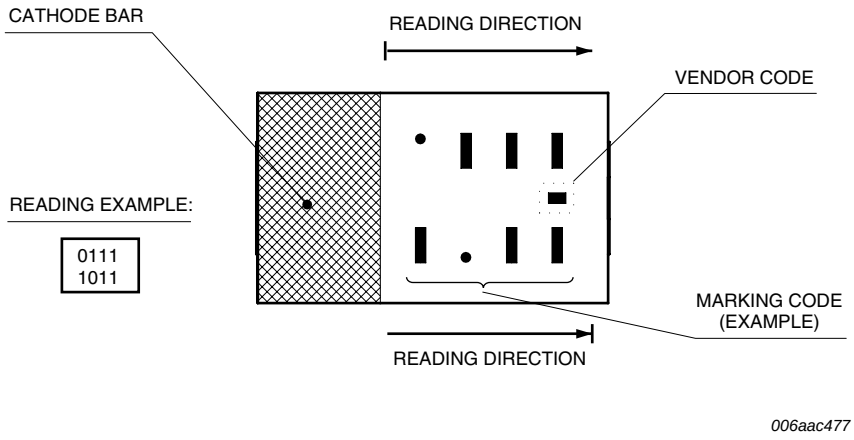


Fig 1. SOD882D binary marking code description

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5. 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_{PP}	peak pulse power	t_p = 8/20 μs	[1]	-	45	W
I_{PP}	peak pulse current	t_p = 8/20 μs	[1]	-	4.8	A
Per device						
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			−55	+150	°C
T_{stg}	storage temperature			−65	+150	°C

[1] Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.

Table 6. ESD maximum ratings

T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Max	Unit
V_{ESD}	electrostatic discharge voltage	IEC 61000-4-2 (contact discharge)	[1]	-	30	kV
		machine model		-	2	kV
		MIL-STD-883 (human body model)		-	16	kV

[1] Device stressed with ten non-repetitive ESD pulses.

Table 7. ESD standards compliance

Standard	Conditions
IEC 61000-4-2; level 4 (ESD)	> 15 kV (air); > 8 kV (contact)
MIL-STD-883; class 3B (human body model)	> 8 kV

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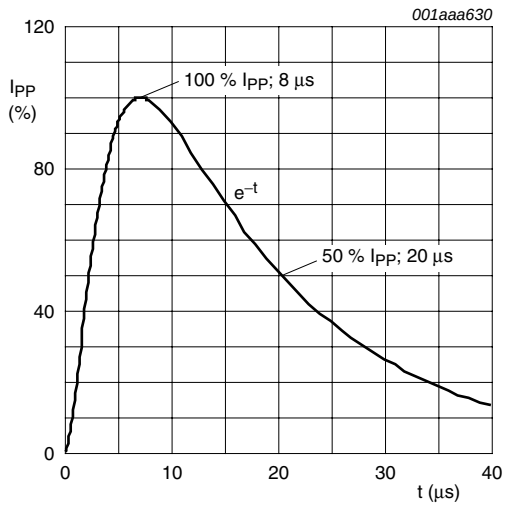


Fig 2. 8/20 µs pulse waveform according to IEC 61000-4-5

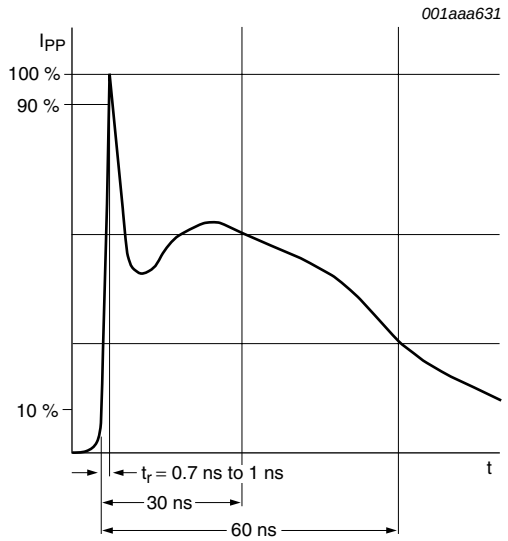


Fig 3. ESD pulse waveform according to IEC 61000-4-2

6. Characteristics

Table 8. Characteristics

T_{amb} = 25 °C unless otherwise specified.

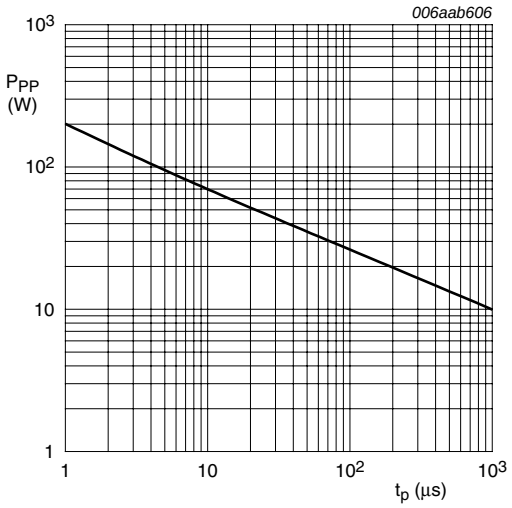
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage			-	-	5	V
I_{RM}	reverse leakage current	V_{RWM} = 5 V		-	< 1	10	nA
V_{BR}	breakdown voltage	I_R = 5 mA		5.8	6.8	7.8	V
C_d	diode capacitance	f = 1 MHz; V_R = 0 V		-	11	13	pF
V_{CL}	clamping voltage	I_{PP} = 4.8 A	[1]	-	-	12.5	V
r_{dyn}	dynamic resistance	I_R = 10 A	[2]	-	0.2	-	Ω

[1] Non-repetitive current pulse 8/20 µs exponential decay waveform according to IEC 61000-4-5.

[2] Non-repetitive current pulse, Transmission Line Pulse (TLP) t_p = 100 ns; square pulse; ANS/IESD STM5.1-2008.

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T_{amb} = 25 °C

Fig 4. Peak pulse power as a function of exponential pulse duration; typical values

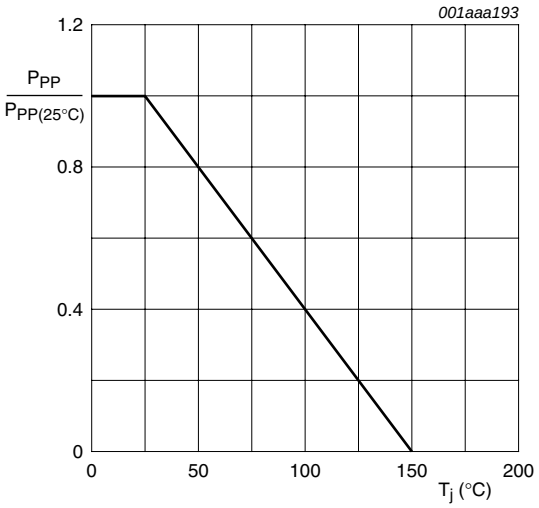
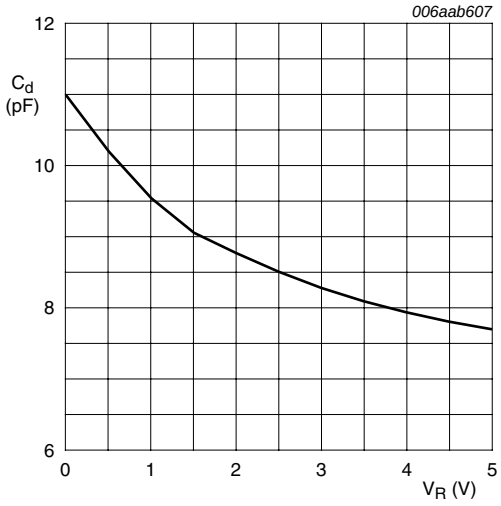


Fig 5. Relative variation of peak pulse power as a function of junction temperature; typical values



f = 1 MHz; T_{amb} = 25 °C

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

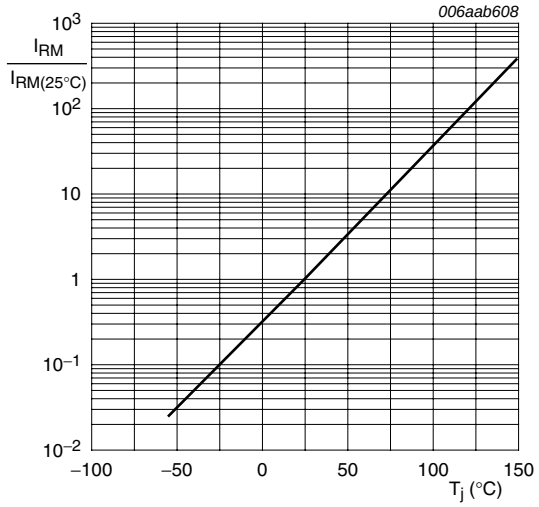


Fig 7. Relative variation of reverse leakage current as a function of junction temperature; typical values

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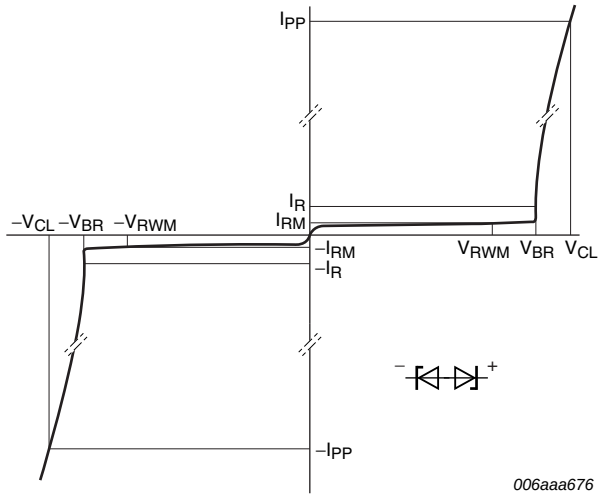


Fig 8. V-I characteristics for a bidirectional ESD protection diode

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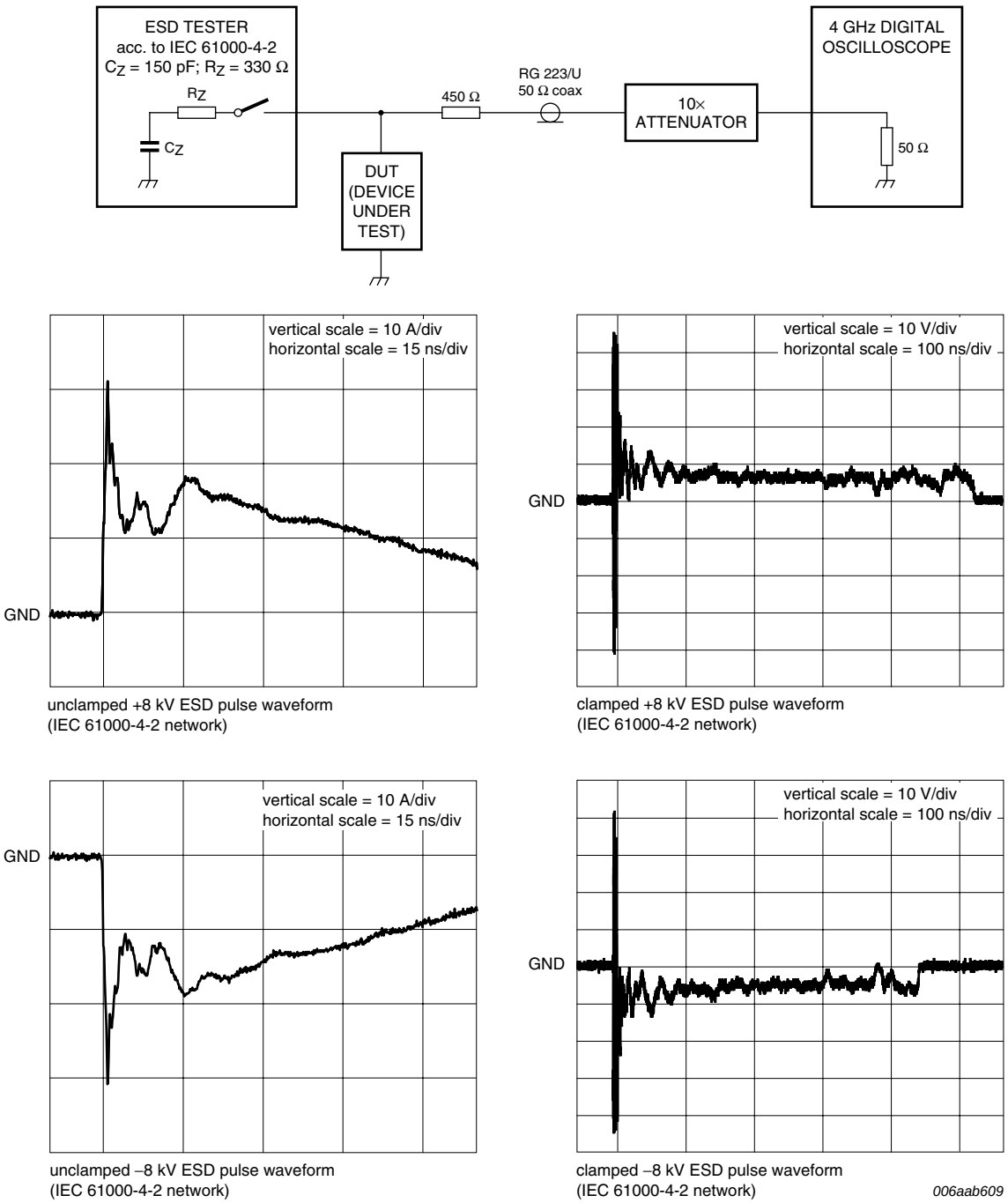


Fig 9. ESD clamping test setup and waveforms

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7. Application information

The PESD5V0V1BLD is designed for the protection of one bidirectional data or signal line from the damage caused by ESD and surge pulses. The device may be used on lines where the signal polarities are both, positive or negative with respect to ground.
The PESD5V0V1BLD provides a surge capability of 45 W per line for an 8/20 μs waveform.

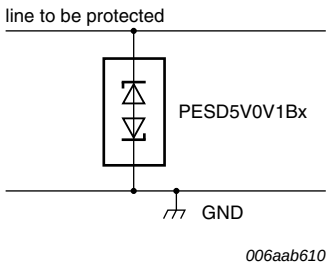


Fig 10. Application diagram

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. The path length between the device and the protected line should be minimized.
3. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
6. Minimize the length of the transient return path to ground.
7. Avoid using shared transient return paths to a common ground point.
8. Ground planes should be used whenever possible. For multilayer PCBs, use ground vias.

8. Test information

8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

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9. Package outline

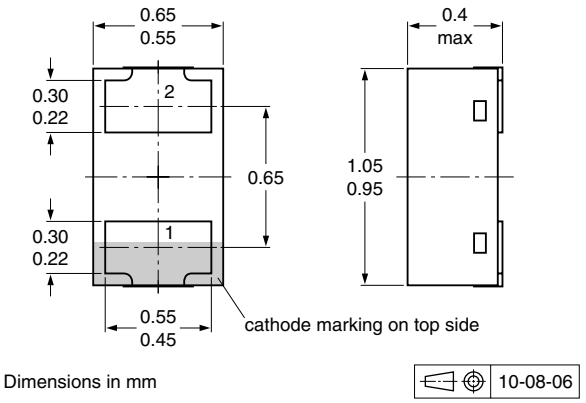


Fig 11. Package outline PESD5V0V1BLD (SOD882D)

10. Packing information

Table 9. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.[1]

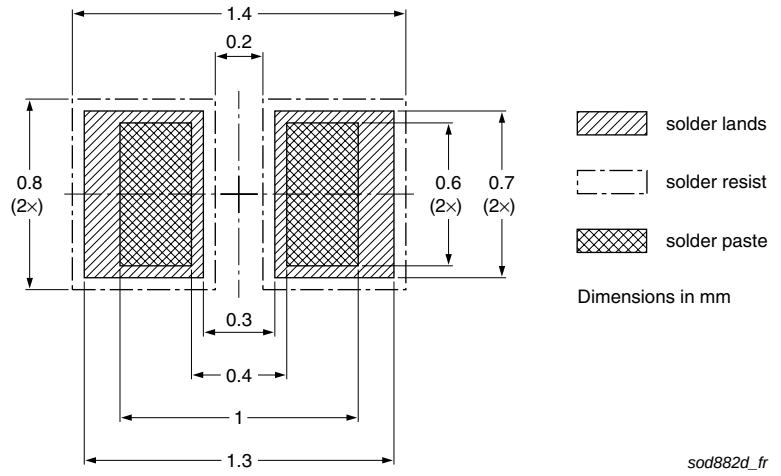
Type number	Package	Description	Packing quantity
			10000
PESD5V0V1BLD	SOD882D	2 mm pitch, 8 mm tape and reel	-315

[1] For further information and the availability of packing methods, see Section 14.

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11. Soldering



Reflow soldering is the only recommended soldering method.

Fig 12. Reflow soldering footprint PESD5V0V1BLD (SOD882D)

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12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PESD5V0V1BLD v.1	20101207	Product data sheet	-	-

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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.
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[2] The term 'short data sheet' is explained in section "Definitions".

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