



# PESD3V3X1BL

Ultra low capacitance bidirectional ESD protection diode

22 August 2018

Product data sheet

## 1. General description

Ultra low capacitance bidirectional ElectroStatic Discharge (ESD) protection diode in a leadless ultra small Surface-Mounted Device (SMD) 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
- ESD protection up to 9 kV
- Ultra low diode capacitance:  $C_d = 1.3 \text{ pF}$
- Very low leakage current:  $I_{RM} = 1 \text{ nA}$
- IEC 61000-4-2; level 4 (ESD)
- AEC-Q101 qualified

## 3. Application information

- USB interfaces
- Cellular handsets and accessories
- Antenna protection
- Portable electronics
- 10/100/1000 Mbit/s Ethernet
- Communication systems
- Computers and peripherals
- High-speed data lines
- Audio and video equipment
- SIM card protection

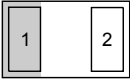
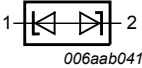
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RWM}$	reverse standoff voltage	$T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	-	3.3	V
$C_d$	diode capacitance	$f = 1 \text{ MHz}$ ; $V_R = 0 \text{ V}$ ; $T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	1.3	1.6	pF

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)	 <p>Transparent top view</p> <p>DFN1006-2 (SOD882)</p>	 <p>006aab041</p>
2	K2	cathode (diode 2)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD3V3X1BL	DFN1006-2	plastic, leadless ultra small package; 2 terminals; 0.65 mm pitch; 1 mm x 0.6 mm x 0.48 mm body	SOD882

7. Marking

Table 4. Marking codes

Type number	Marking code
PESD3V3X1BL	SS

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
T <sub>j</sub>	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-55	150	°C
T <sub>stg</sub>	storage temperature			-65	150	°C
ESD maximum ratings						
V <sub>ESD</sub>	electrostatic discharge voltage	IEC 61000-4-2; contact discharge	[1]	-	9	kV
		MIL-STD-883 (human body model)		-	10	kV

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

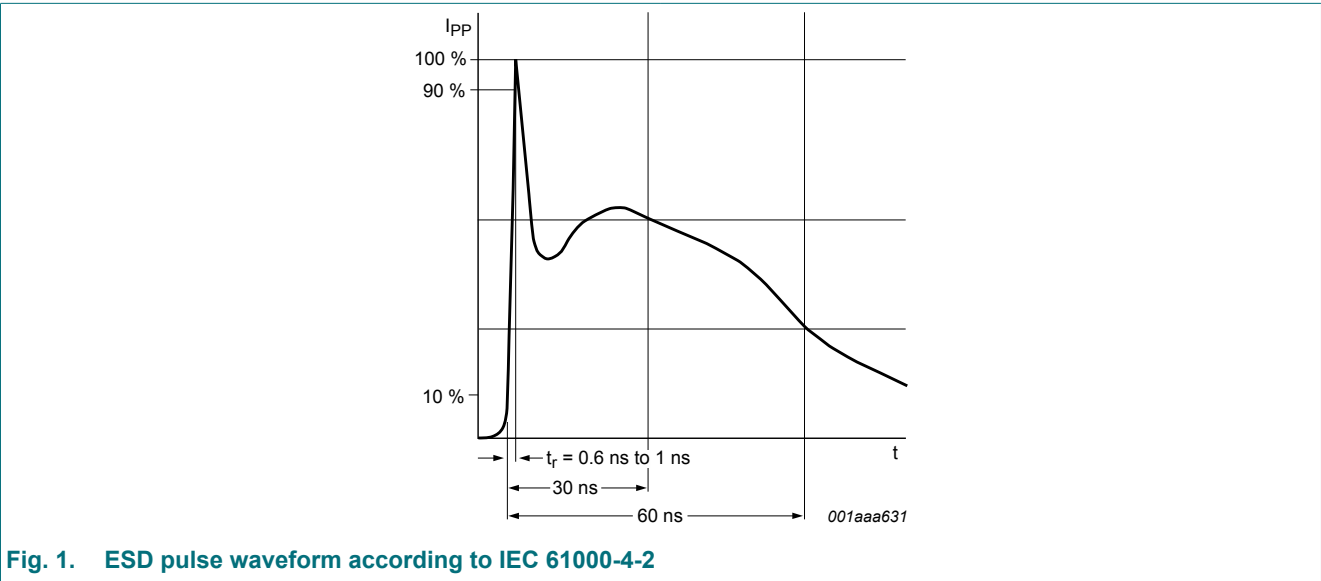
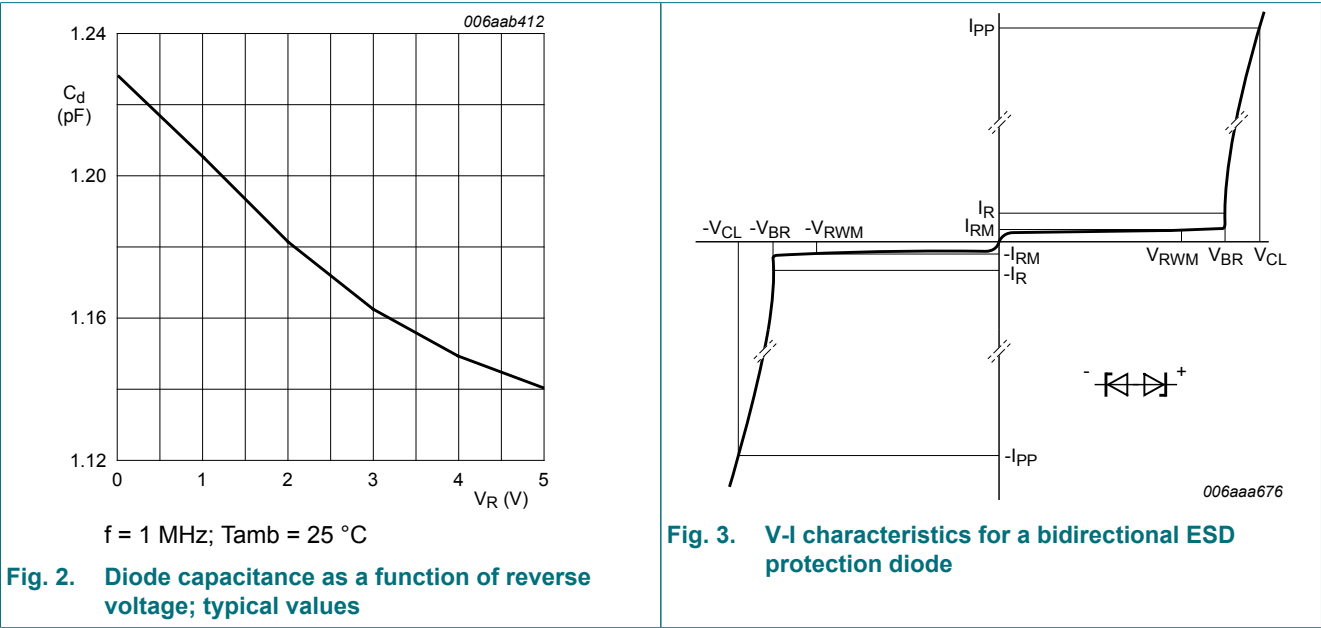


Fig. 1. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RWM}$	reverse standoff voltage	$T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	3.3	V
$V_{BR}$	breakdown voltage	$I_R = 5\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	5	6.3	7.8	V
$I_{RM}$	reverse leakage current	$V_{RWM} = 3\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	1	100	nA
$C_d$	diode capacitance	$f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	1.3	1.6	pF
$r_{dif}$	differential resistance	$I_R = 5\text{ mA}$	-	-	100	$\Omega$



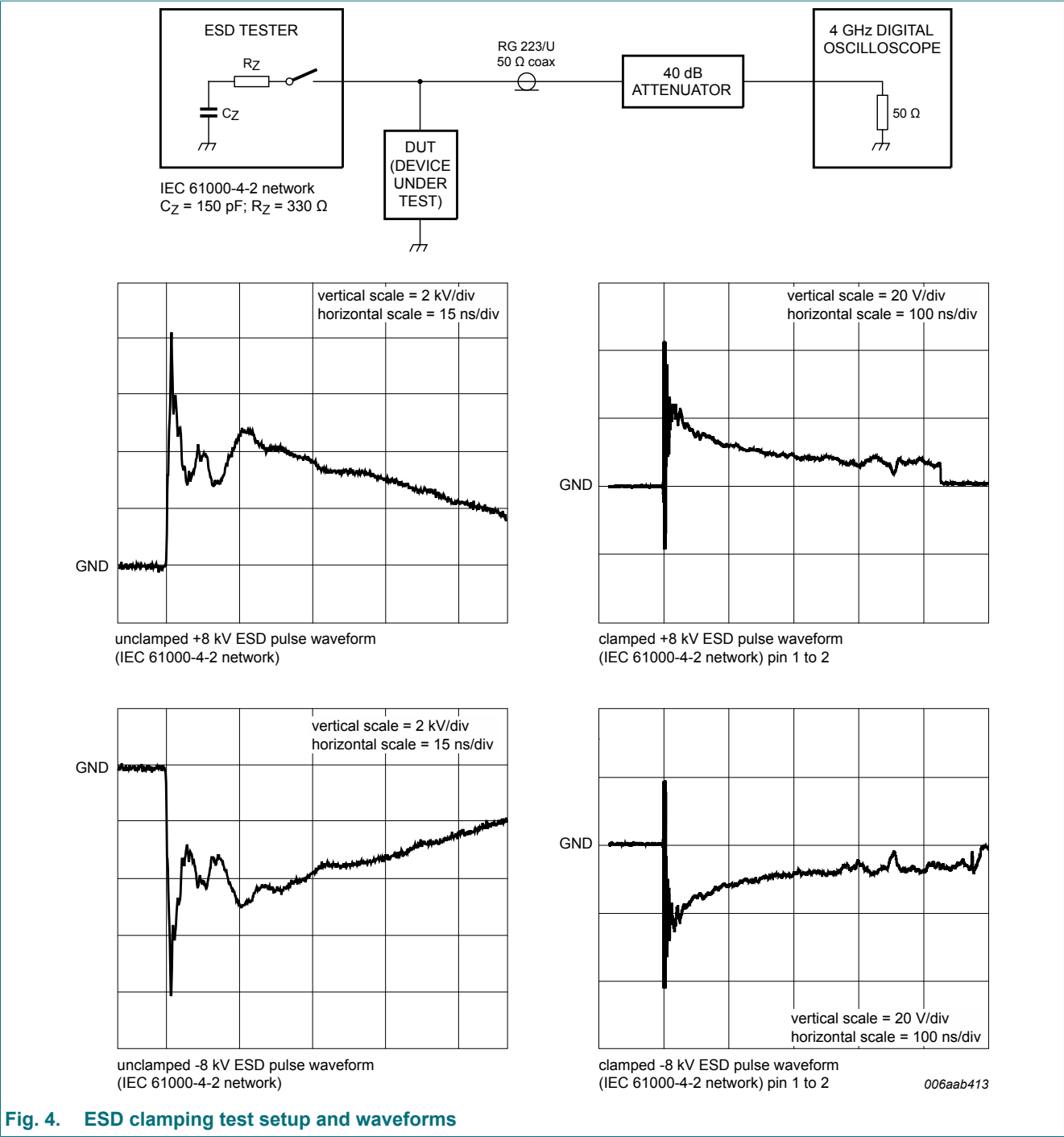


Fig. 4. ESD clamping test setup and waveforms

## 10. Application information

The device is designed for the protection of one bidirectional data or signal line from the damage caused by ESD. The device may be used on line where the signal polarities are both, positive and negative with respect to ground.

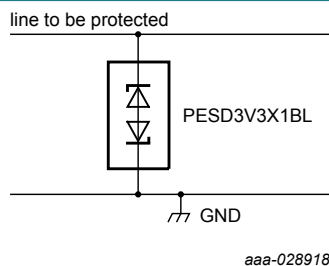


Fig. 5. Application diagram

### 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:

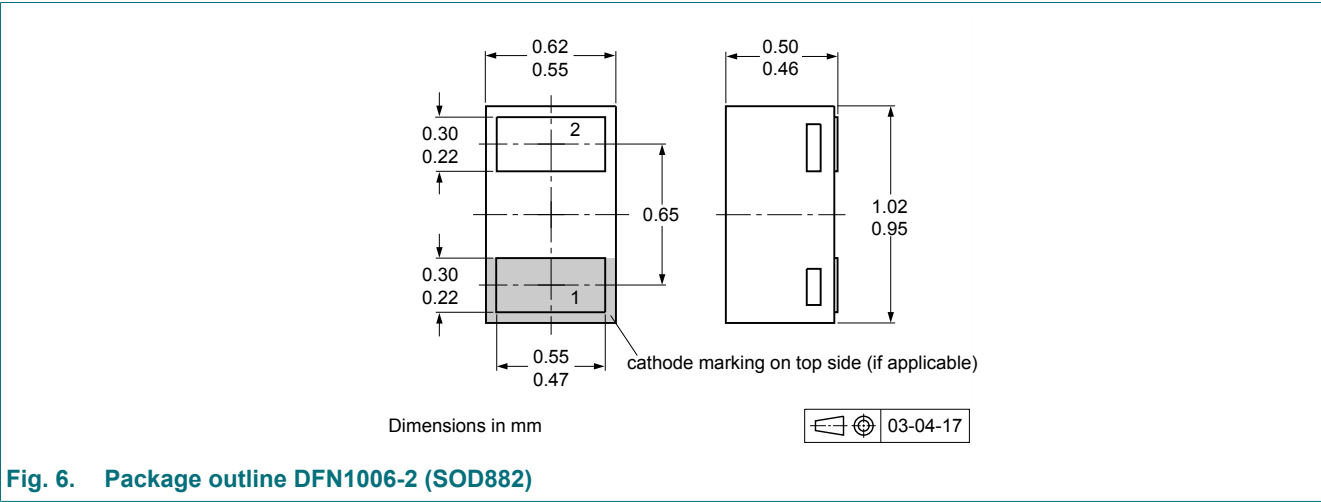
1. Place the device as close to the input terminal or connector as possible.
2. Minimize the path length between the device and the protected line.
3. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit 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. Use ground planes whenever possible. For multilayer PCBs, use ground vias.

## 11. Test information

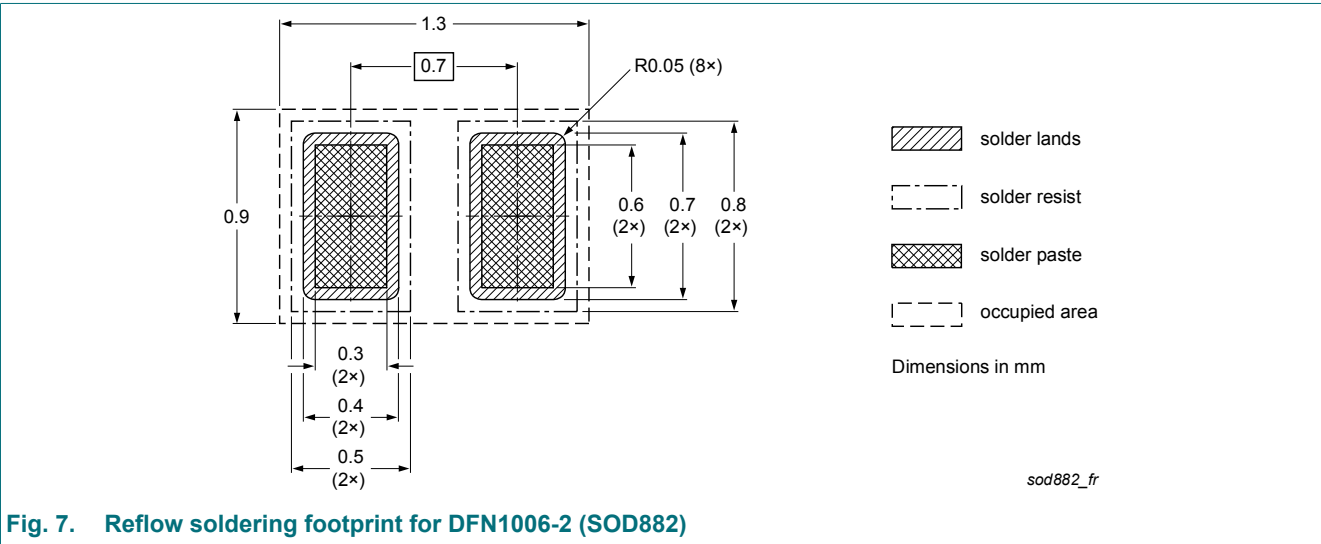
### Quality information

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.

12. Package outline



13. Soldering



## 14. Revision history

**Table 7. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD3V3X1BL v.2	20180822	Product data sheet	-	PESD3V3X1BL v.1
Modifications:	<ul style="list-style-type: none"><li>• Application information: updated.</li><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li></ul>			
PESD3V3X1BL v.1	20090106	Product data sheet	-	-

## 15. 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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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Date of release: 22 August 2018