



# PESD5V0U1BL

## Low capacitance bidirectional ESD protection diode

11 October 2018

Product data sheet

## 1. General description

Low capacitance bidirectional ElectroStatic Discharge (ESD) protection diode in an SOD882 leadless ultra-small 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
- Low diode capacitance:  $C_d = 2.9$  pF
- Ultra low leakage current:  $I_{RM} = 5$  nA
- ESD protection of up to 10 kV
- IEC 61000-4-2, level 4 (ESD)
- AEC-Q101 qualified

## 3. Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- 10/100/1000 Ethernet
- Local Area Network (LAN) equipment
- Communication systems
- Portable electronics
- SIM card protection
- High-speed data lines


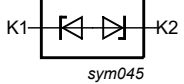
## 4. Quick reference data

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 | -   | 2.9 | 3.5 | pF   |
|           |                          | $f = 1$ MHz; $V_R = 5$ V; $T_{amb} = 25$ °C | -   | 1.9 | -   | pF   |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description       | Simplified outline  | Graphic symbol   |
|-----|--------|-------------------|---|--|
| 1   | K1     | cathode (diode 1) |  <p>Transparent<br/>top view</p> <p>DFN1006-2<br/>(SOD882)</p> |  <p><i>sym045</i></p> |
| 2   | K2     | cathode (diode 2) |   |  |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package   |             |         |
|-------------|-----------|-------------|---------|
|             | Name      | Description | Version |
| PESD5V0U1BL | DFN1006-2 |             | SOD882  |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PESD5V0U1BL | AN           |

## 8. Limiting values

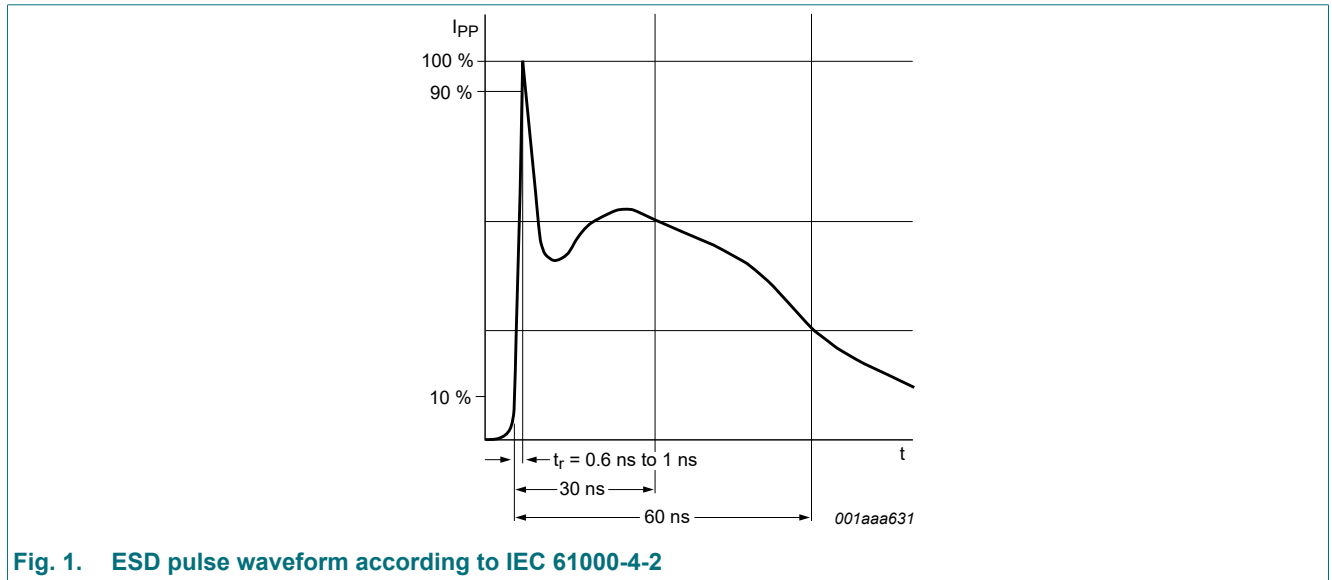
**Table 5. Limiting values**

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

| Symbol                     | Parameter                       | Conditions                        |         | Min | Max | Unit |
|----------------------------|---------------------------------|-----------------------------------|---------|-----|-----|------|
| $T_j$                      | junction temperature            |                                   |         | -   | 150 | °C   |
| $T_{amb}$                  | ambient temperature             |                                   |         | -55 | 150 | °C   |
| $T_{stg}$                  | storage temperature             |                                   |         | -65 | 150 | °C   |
| <b>ESD maximum ratings</b> |                                 |                                   |         |     |     |      |
| $V_{ESD}$                  | electrostatic discharge voltage | IEC 61000-4-2 (contact discharge) | [1] [2] | -   | 10  | kV   |
|                            |                                 | MIL-STD-883 (human body model)    |         | -   | 8   | kV   |

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

[2] Measured from pin 1 to pin 2.

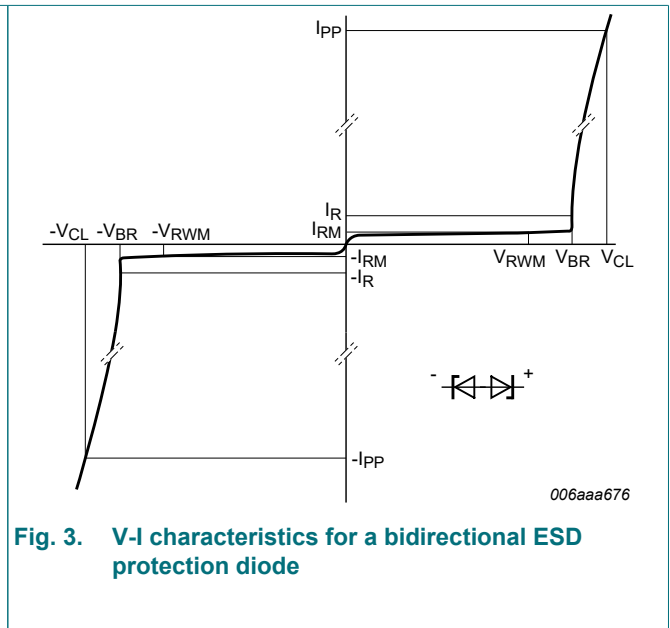
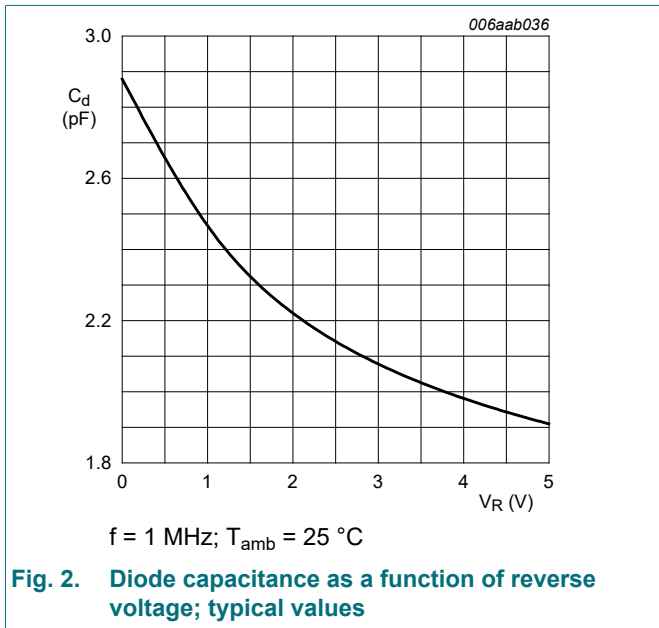


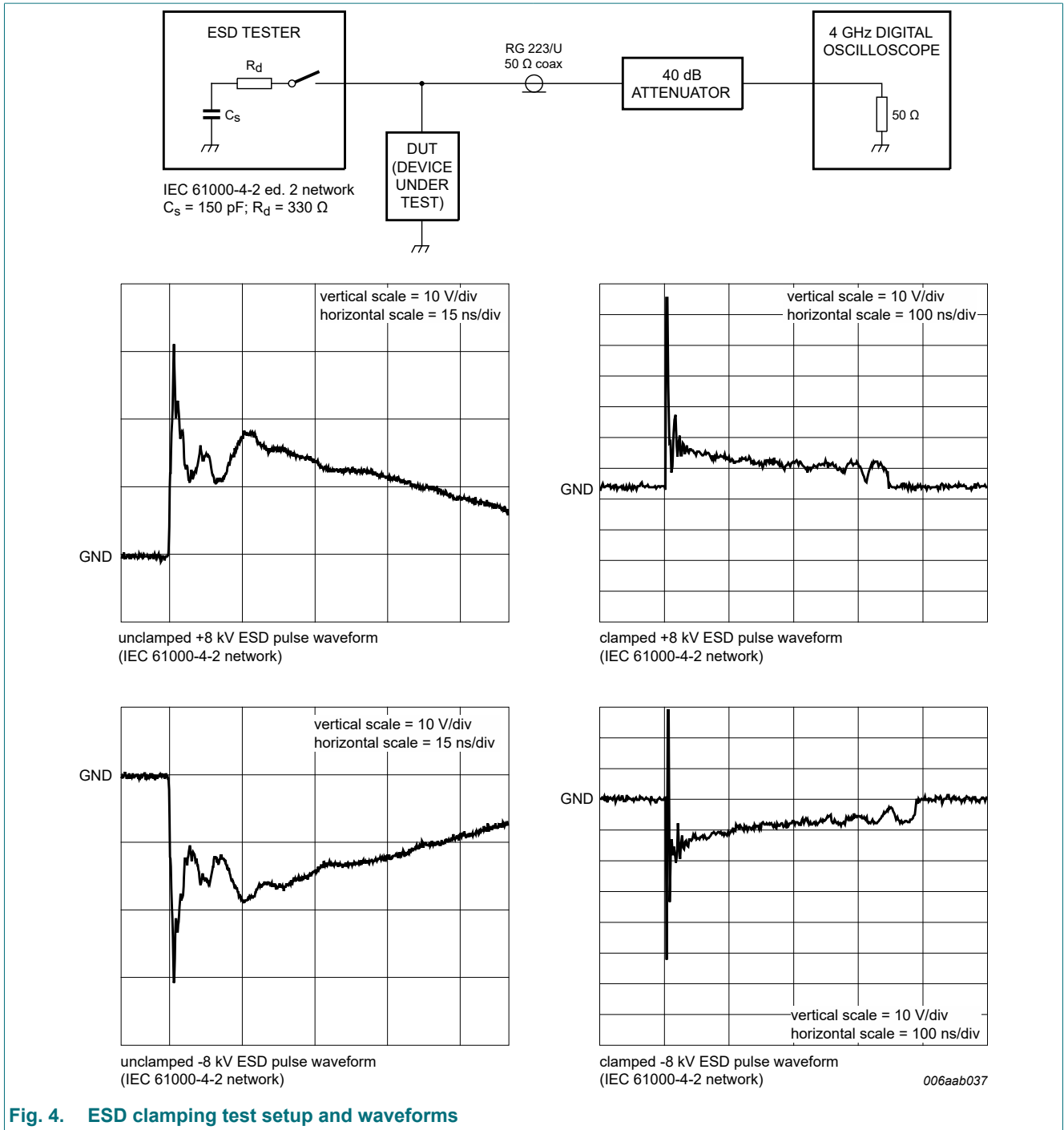
**Fig. 1. ESD pulse waveform according to IEC 61000-4-2**

### 9. Characteristics

Table 6. Characteristics

| Symbol    | Parameter                | Conditions   | Min | Typ | Max | Unit     |
|-----------|--------------------------|--|-----|-----|-----|----------|
| $V_{RWM}$ | reverse standoff voltage | $T_{amb} = 25\text{ }^{\circ}\text{C}$                                     | -   | -   | 5   | V        |
| $V_{BR}$  | breakdown voltage        | $I_R = 5\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                  | 5.5 | 7   | 9.5 | V        |
| $I_{RM}$  | reverse leakage current  | $V_{RWM} = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$               | -   | 5   | 100 | nA       |
| $C_d$     | diode capacitance        | $f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | -   | 2.9 | 3.5 | pF       |
|           |                          | $f = 1\text{ MHz}; V_R = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | -   | 1.9 | -   | pF       |
| $r_{dif}$ | differential resistance  | $I_R = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                  | -   | -   | 100 | $\Omega$ |





**Fig. 4. ESD clamping test setup and waveforms**

## 10. Application information

The device is designed for the protection of one bidirectional data line from surge pulses and ESD damage. The device is suitable on lines where the signal polarities are both positive and negative with respect to ground.

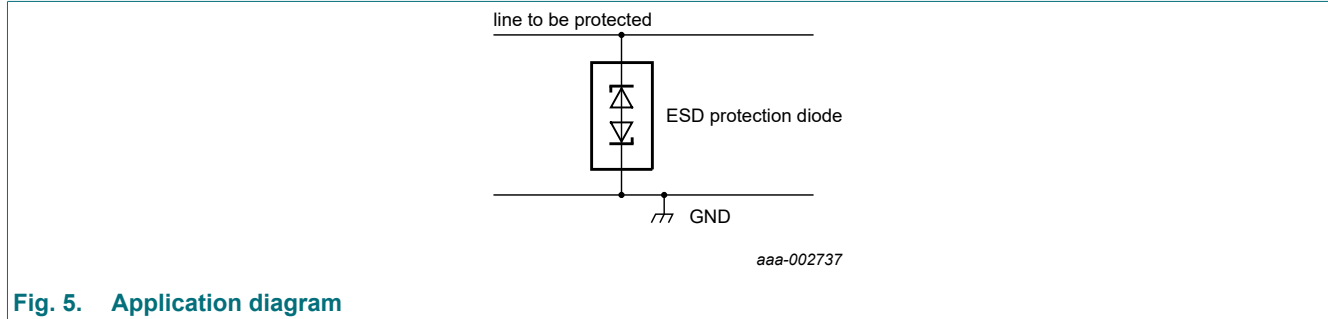


Fig. 5. Application diagram

### 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

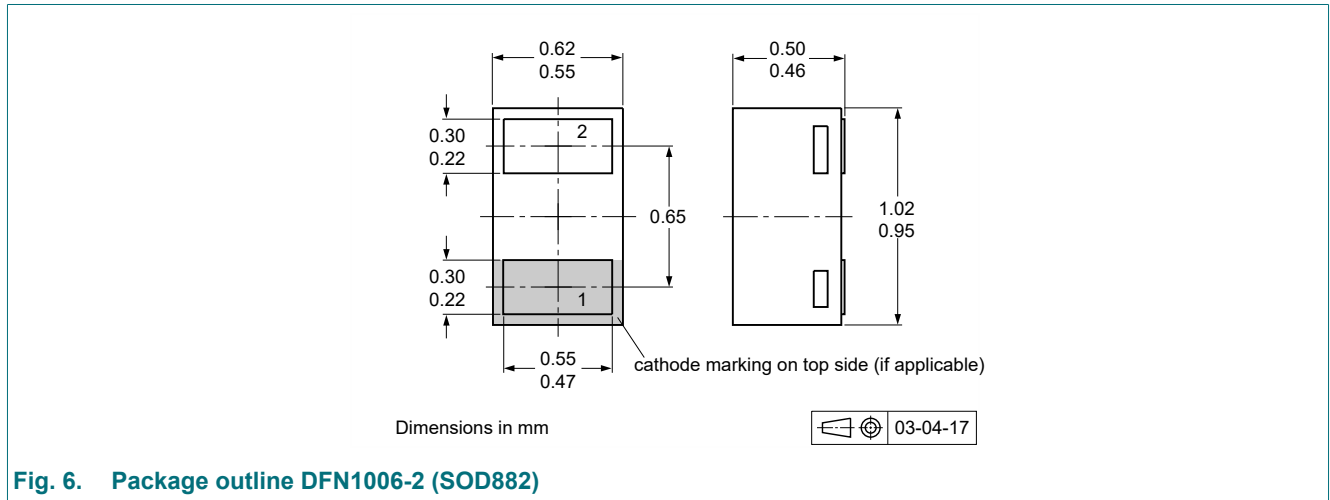


Fig. 6. Package outline DFN1006-2 (SOD882)

## 13. Soldering

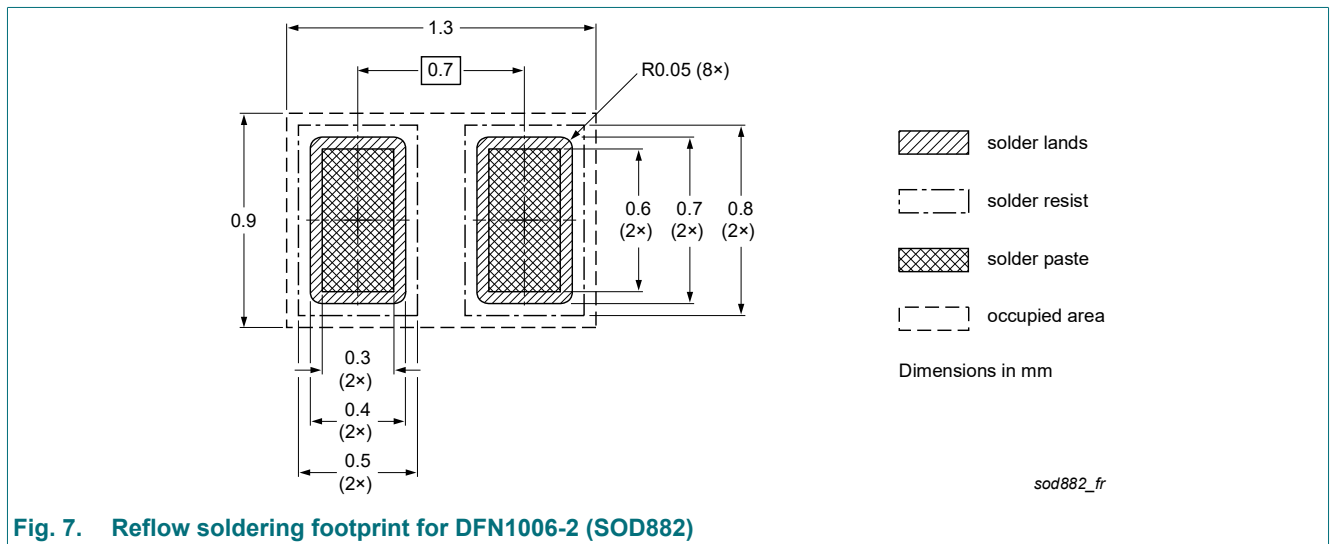


Fig. 7. Reflow soldering footprint for DFN1006-2 (SOD882)

## 14. Revision history

Table 7. Revision history

| Data sheet ID           | Release date   | Data sheet status  | Change notice | Supersedes              |
|-------------------------|--|--------------------|---------------|-------------------------|
| PESD5V0U1BL v.1         | 20181011   | Product data sheet | -             | PESD5V0U1BA<br>_BB_BL_1 |
| Modifications:          | <ul style="list-style-type: none"> <li>• Features and benefit AEC-Q101 qualified added</li> <li>• AEC-Q101 quality information added</li> <li>• Limiting values; T<sub>amb</sub> updated to -55°C.</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> |                    |               |                         |
| PESD5V0U1BA<br>_BB_BL_1 | 20070425   | 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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