

BOTTOM VIEW

PESD5V0U2BM

Ultra low capacitance bidirectional double ESD protection array

Rev. 01 — 14 August 2008

Product data sheet

1. Product profile

1.1 General description

Ultra low capacitance bidirectional double ElectroStatic Discharge (ESD) protection diode array in a SOT883 (SC-101) leadless ultra small Surface-Mounted Device (SMD) plastic package designed to protect up to two signal lines from the damage caused by ESD and other transients.

1.2 Features

- Bidirectional ESD protection of up to two lines
- ESD protection up to 10 kV
- Ultra low diode capacitance: $C_d = 2.9$ pF
- IEC 61000-4-2; level 4 (ESD)
- Ultra low leakage current: $I_{RM} = 5$ nA
- AEC-Q101 qualified

1.3 Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- 10/100/1000 Mbit/s Ethernet
- Communication systems
- Portable electronics
- Subscriber Identity Module (SIM) card protection
- FireWire
- High-speed data lines

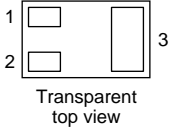
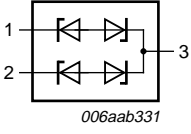
1.4 Quick reference data

Table 1. Quick reference data
 $T_{amb} = 25^\circ\text{C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|--------------------------|--------------------------|-----|-----|-----|------|
| Per diode | | | | | | |
| V_{RWM} | reverse standoff voltage | | - | - | 5 | V |
| C_d | diode capacitance | $f = 1$ MHz; $V_R = 0$ V | - | 2.9 | 3.5 | pF |

2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|-------------------|--|---|
| 1 | cathode (diode 1) |  |  |
| 2 | cathode (diode 2) | | |
| 3 | common cathode | | |

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|---|---------|
| | Name | Description | Version |
| PESD5V0U2BM | SC-101 | leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm | SOT883 |

4. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PESD5V0U2BM | GA |

5. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-------------------|----------------------|------------|-----|------|------|
| Per device | | | | | |
| T_j | junction temperature | | - | 150 | °C |
| T_{amb} | ambient temperature | | -55 | +150 | °C |
| T_{stg} | storage temperature | | -65 | +150 | °C |

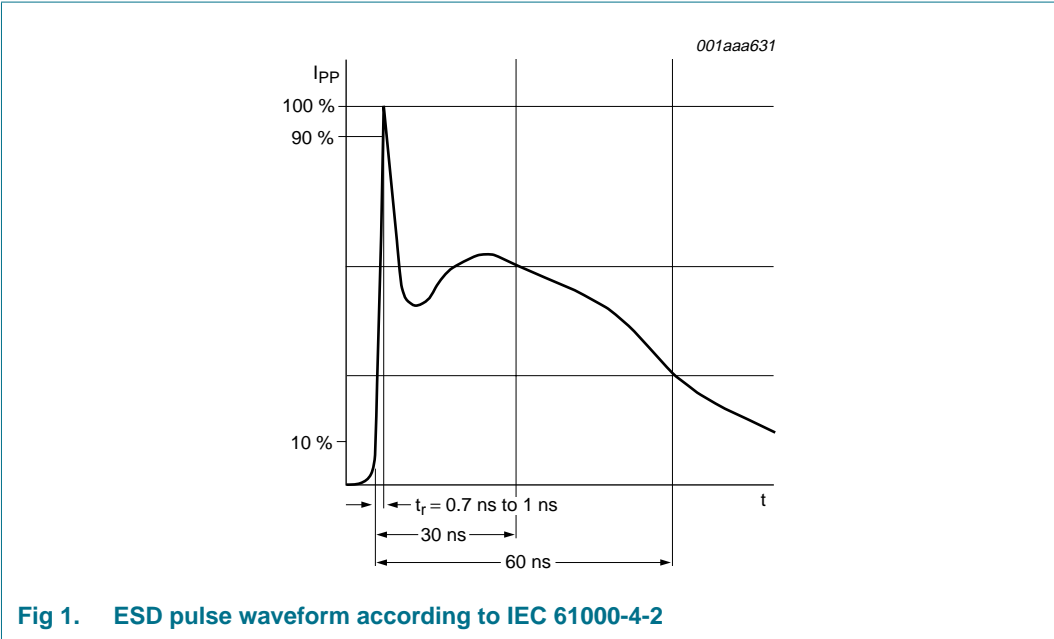
Table 6. ESD maximum ratings
T_{amb} = 25 °C unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Max | Unit |
|------------------|---------------------------------|-----------------------------------|-----|-----|--------|
| Per diode | | | | | |
| V _{ESD} | electrostatic discharge voltage | | | | [1][2] |
| | | IEC 61000-4-2 (contact discharge) | - | 10 | kV |
| | | MIL-STD-883 (human body model) | - | 8 | kV |

- [1] Device stressed with ten non-repetitive ESD pulses.
[2] Measured from pin 1 or 3 to pin 2 or 3.

Table 7. ESD standards compliance

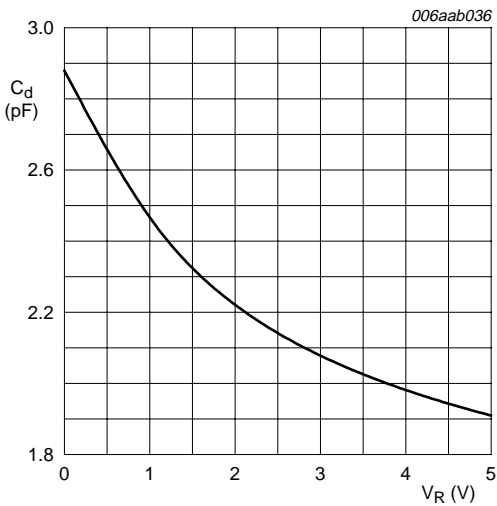
| Standard | Conditions |
|---|---------------------------------|
| Per diode | |
| IEC 61000-4-2; level 4 (ESD) | > 15 kV (air); > 8 kV (contact) |
| MIL-STD-883; class 3 (human body model) | > 4 kV |



6. Characteristics

Table 8. Characteristics
T_{amb} = 25 °C unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|--------------------------|------------------------|-----|-----|-----|------|
| Per diode | | | | | | |
| V _{RWM} | reverse standoff voltage | | - | - | 5 | V |
| I _{RM} | reverse leakage current | V _{RWM} = 5 V | - | 5 | 100 | nA |
| V _{BR} | breakdown voltage | I _R = 5 mA | 5.5 | 6.5 | 9.5 | V |
| C _d | diode capacitance | f = 1 MHz | | | | |
| | | V _R = 0 V | - | 2.9 | 3.5 | pF |
| | | V _R = 5 V | - | 1.9 | - | pF |
| r _{dif} | differential resistance | I _R = 1 mA | - | - | 100 | Ω |



f = 1 MHz; T_{amb} = 25 °C

Fig 2. Diode capacitance as a function of reverse voltage; typical values

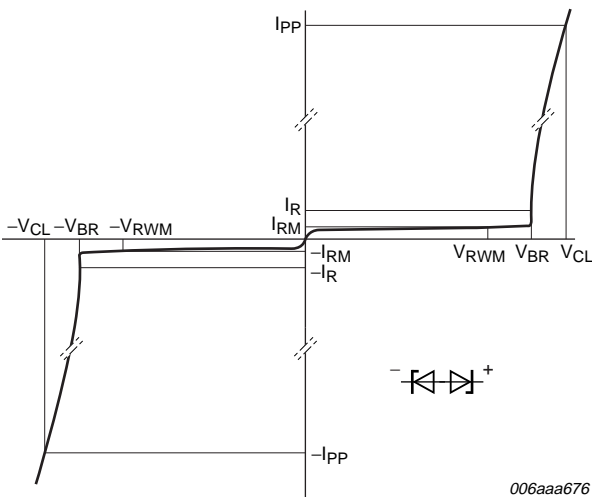


Fig 3. V-I characteristics for a bidirectional ESD protection diode

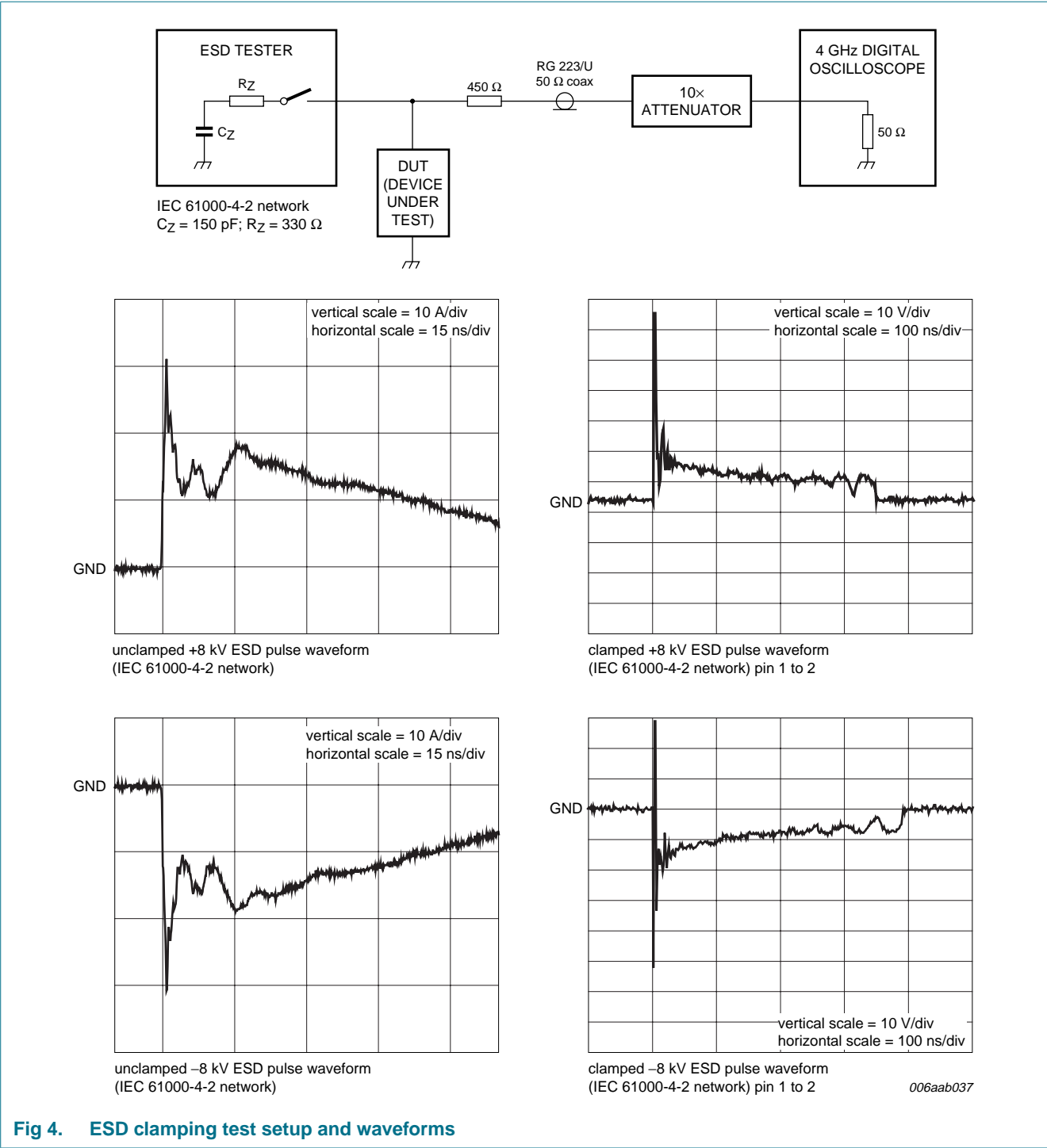


Fig 4. ESD clamping test setup and waveforms

7. Application information

The PESD5V0U2BM is designed for the protection of up to two bidirectional data or signal lines from the damage caused by ESD and surge pulses. The device may be used on lines where the signal polarities are both, positive and negative with respect to ground.

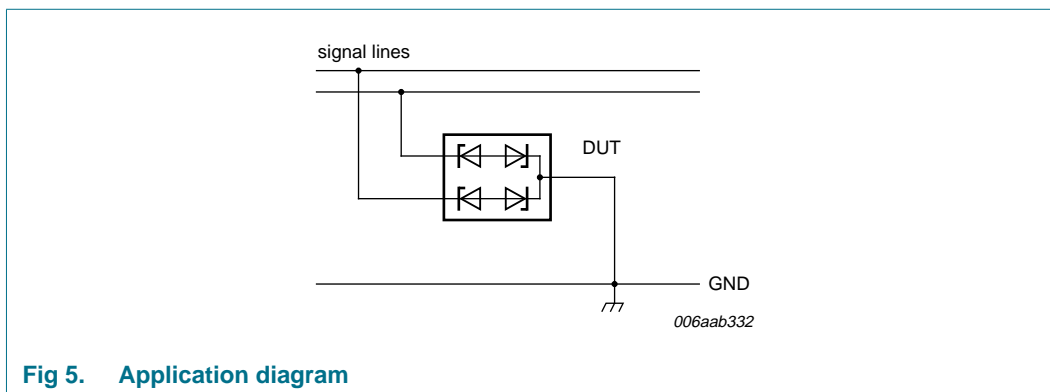


Fig 5. Application diagram

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:

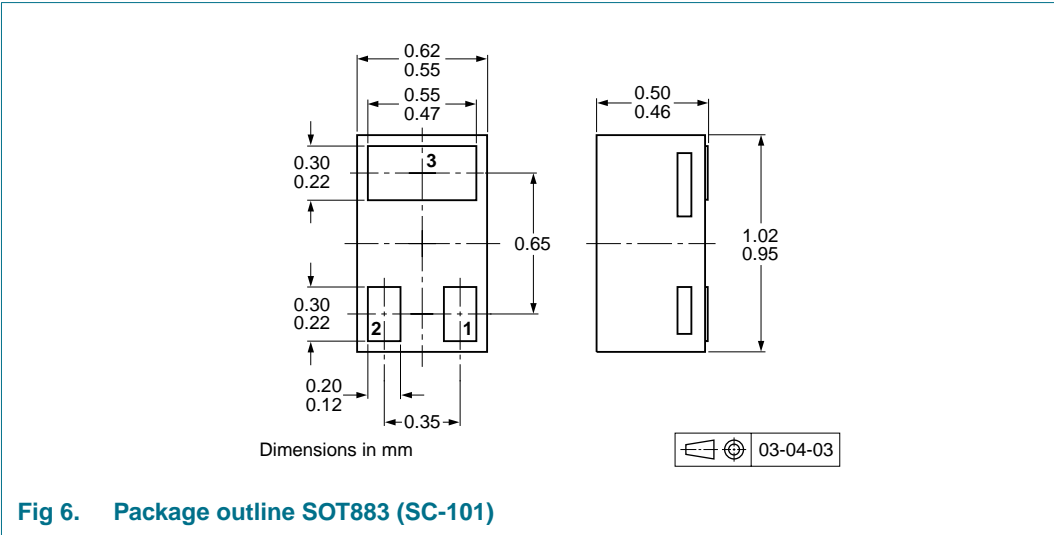
1. Place the PESD5V0U2BM as close to the input terminal or connector as possible.
2. The path length between the PESD5V0U2BM and the protected line should be minimized.
3. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize 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.

9. Package outline



10. Packing information

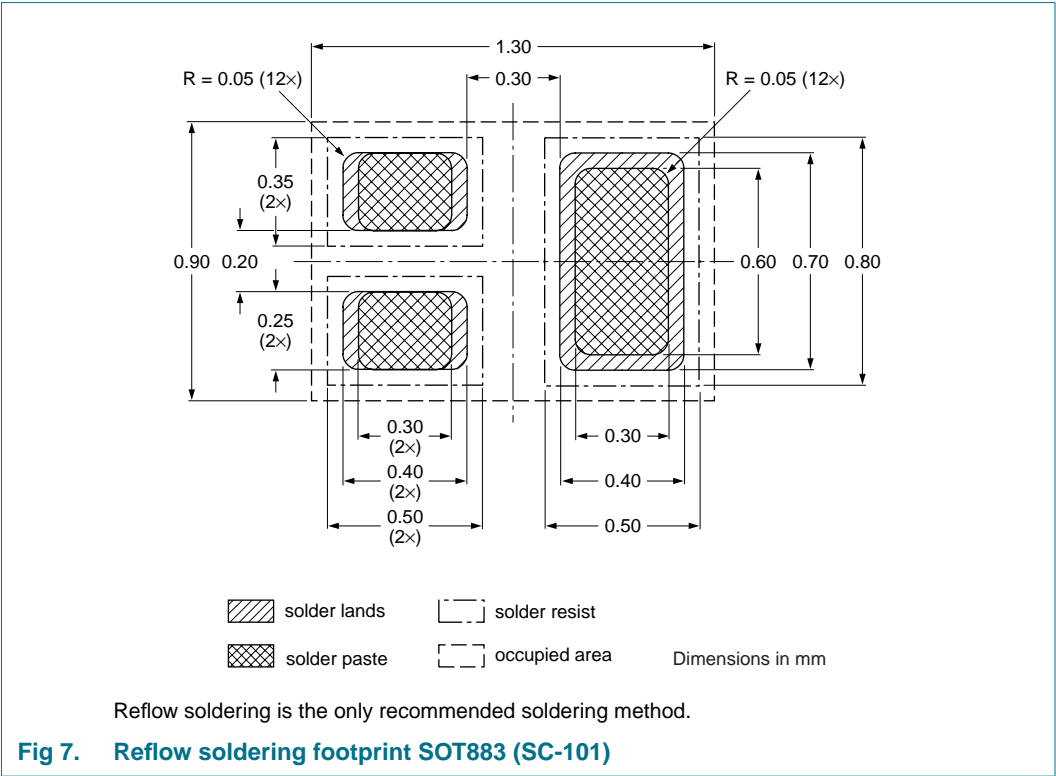
Table 9. Packing methods

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

| Type number | Package | Description | Packing quantity |
|-------------|---------|--------------------------------|------------------|
| | | | 10000 |
| PESD5V0U2BM | SOT883 | 2 mm pitch, 8 mm tape and reel | -315 |

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

11. Soldering



12. Revision history

Table 10. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| PESD5V0U2BM_1 | 20080814 | Product data sheet | - | - |

13. Legal information

13.1 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. |
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[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 URL <http://www.nxp.com>.

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