



# PESD5V0U5BF

## Ultra low capacitance bidirectional fivefold ESD protection array

28 December 2022

Product data sheet

### 1. General description

Ultra low capacitance bidirectional fivefold ElectroStatic Discharge (ESD) protection array in a leadless ultra small XSON6 (SOT886) Surface-Mounted Device (SMD) plastic package, designed to protect up to five signal lines from the damage caused by ESD and other transients.

### 2. Features and benefits

- Bidirectional ESD protection of up to five 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

### 3. Applications

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

### 4. Quick reference data

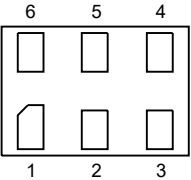
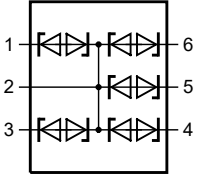
Table 1. Quick reference data

| 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 | [1] | -   | 2.9 | 3.5 | pF   |

[1] Measured from pin 1, 3, 4, 5 or 6 to pin 2.

## 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><b>XSON6 (SOT886)</b></p> |  <p>006aab346</p> |
| 2   | CC     | common cathode    |  |  |
| 3   | K2     | cathode (diode 2) |  |  |
| 4   | K3     | cathode (diode 3) |  |  |
| 5   | K4     | cathode (diode 4) |  |  |
| 6   | K5     | cathode (diode 5) |  |  |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package |   |         |
|-------------|---------|---|---------|
|             | Name    | Description   | Version |
| PESD5V0U5BF | XSON6   | plastic, leadless extremely thin small outline package; 6 terminals; 0.5 mm pitch; 1 mm x 1.45 mm x 0.5 mm body | SOT886  |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PESD5V0U5BF | B2           |

## 8. Limiting values

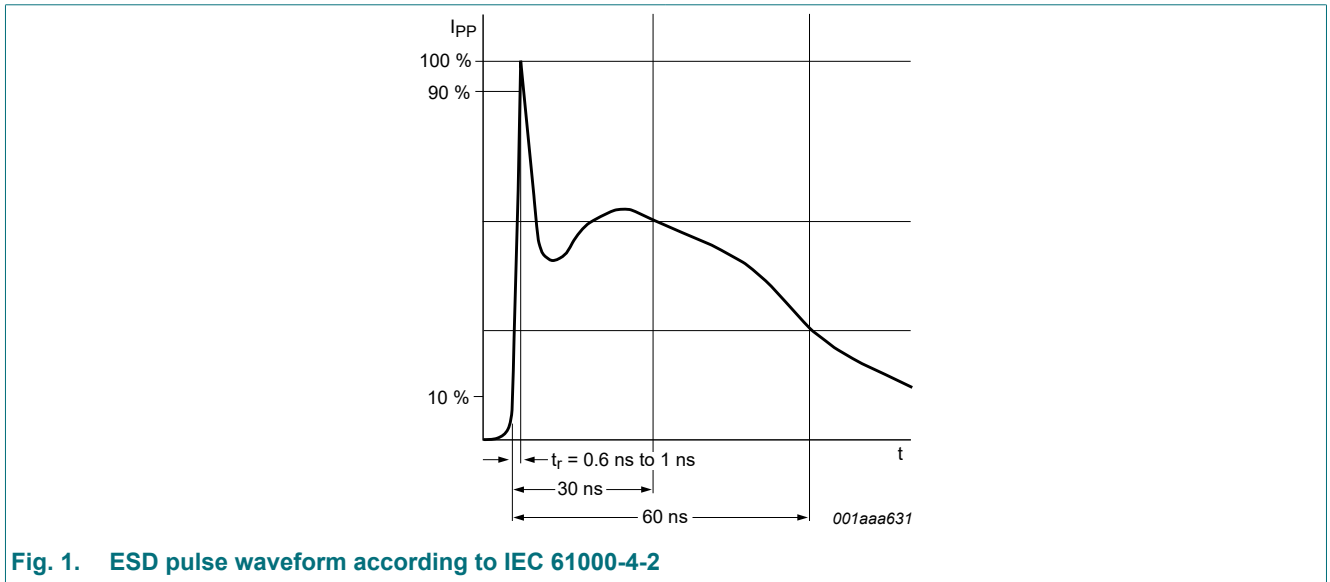
**Table 5. Limiting values**

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 (HBM) | [1] [2] | -   | 8   | V    |

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

[2] Measured from pin 1, 3, 4, 5 or 6 to pin 2.



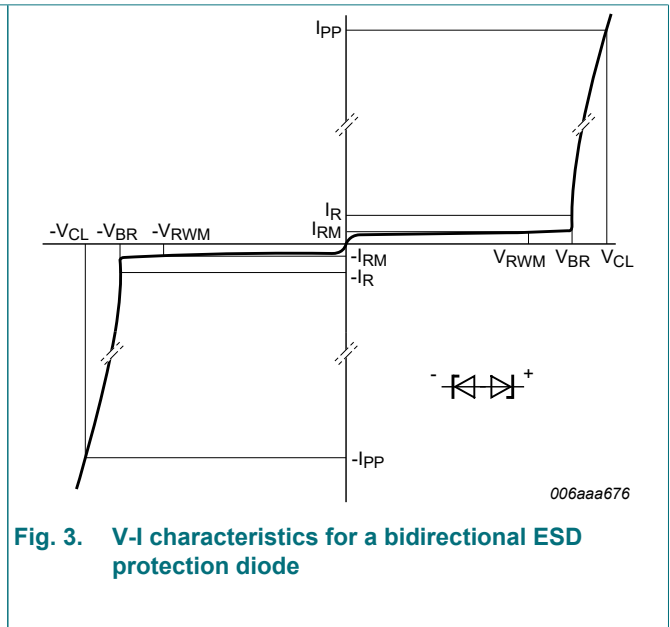
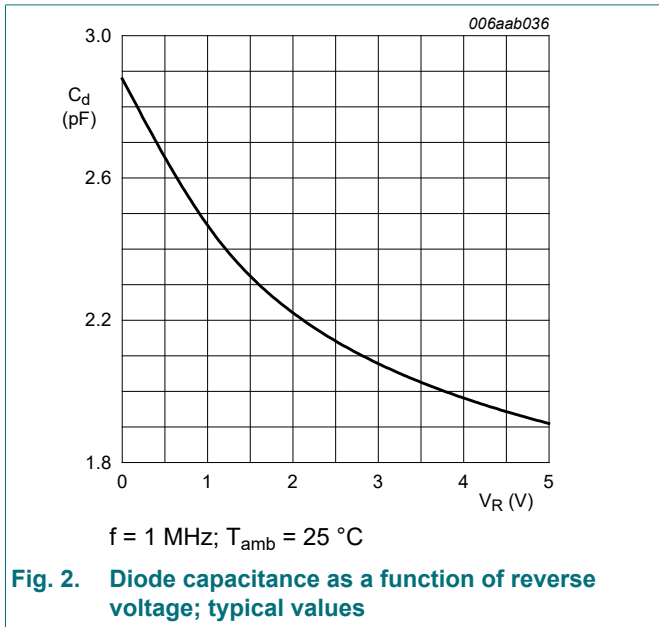
**Fig. 1. ESD pulse waveform according to IEC 61000-4-2**

## 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        | $I_R = 5\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                  | [1] | 6.5 | 9.5 | V    |          |
| $I_{RM}$   | reverse leakage current  | $V_{RWM} = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$               | [1] | 5   | 100 | nA   |          |
| $C_d$      | diode capacitance        | $f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] | -   | 2.9 | 3.5  | pF       |
|            |                          | $f = 1\text{ MHz}; V_R = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] | -   | 1.9 | -    | pF       |
| $R_{diff}$ | differential resistance  | $I_R = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$                  | [1] | -   | -   | 100  | $\Omega$ |

[1] Measured from pin 1, 3, 4, 5 or 6 to pin 2.



Ultra low capacitance bidirectional fivefold ESD protection array

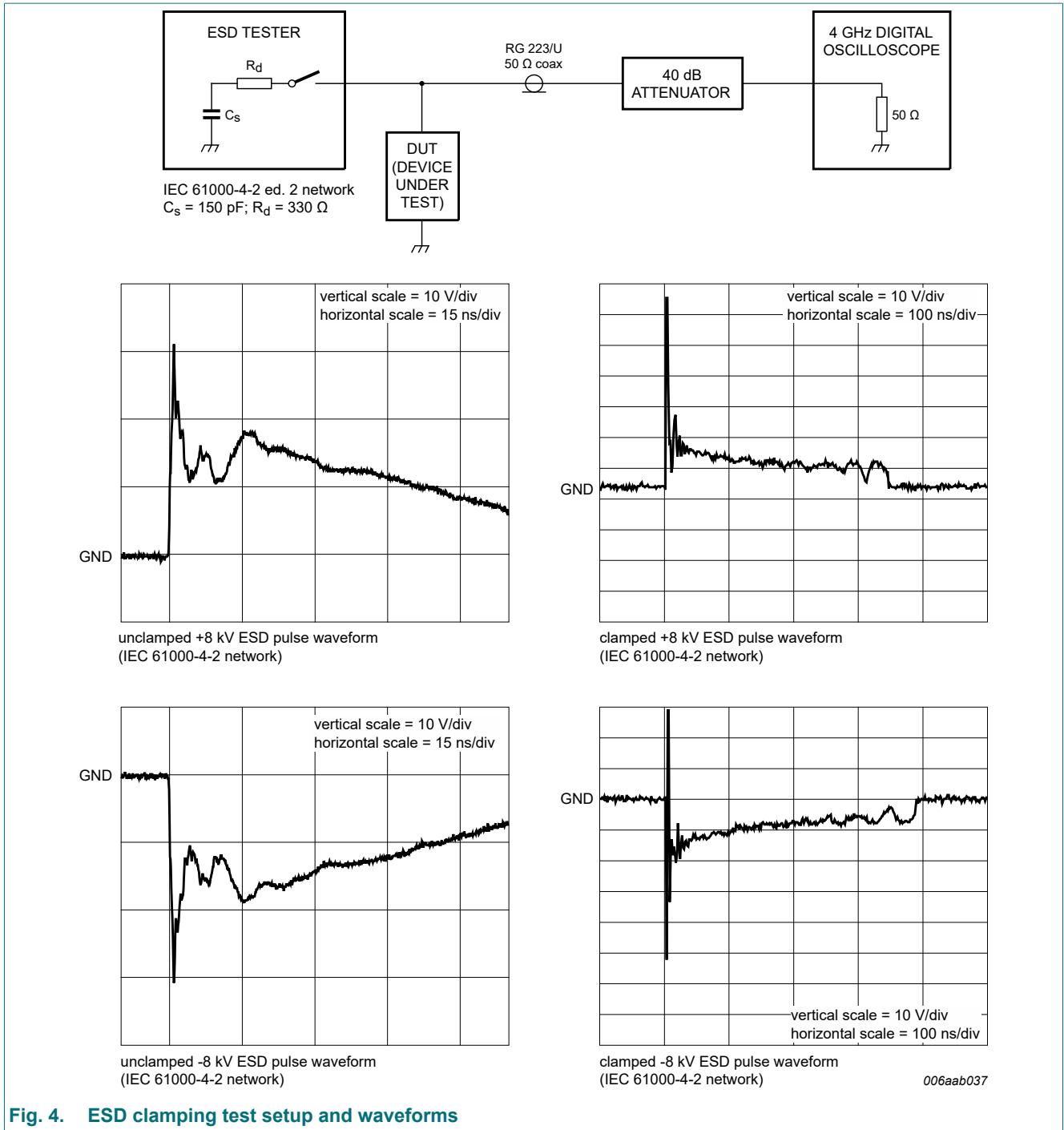
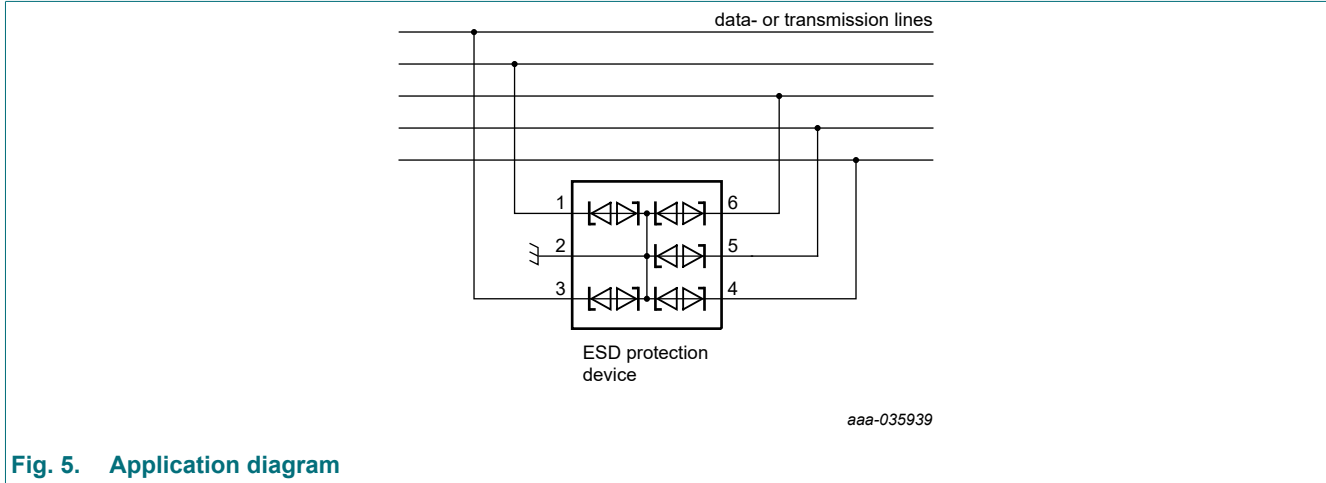


Fig. 4. ESD clamping test setup and waveforms

## 10. Application information

The device is designed for the protection of up to five 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:

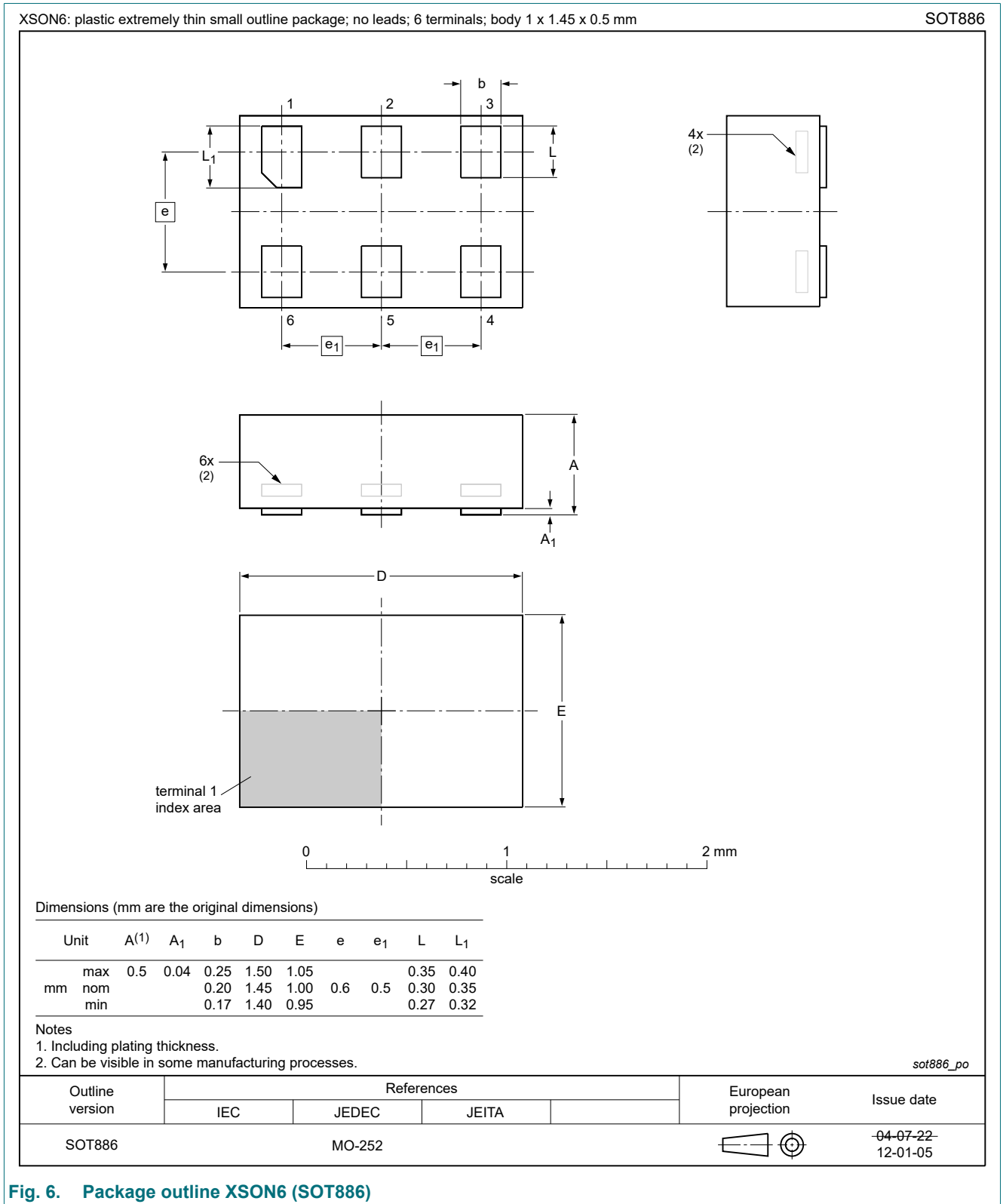
1. Place the device as close to the input terminal or connector as possible.
2. The path length between the device and the protected line should be minimized.
3. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit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

## 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 XSON6 (SOT886)**

### 13. Soldering

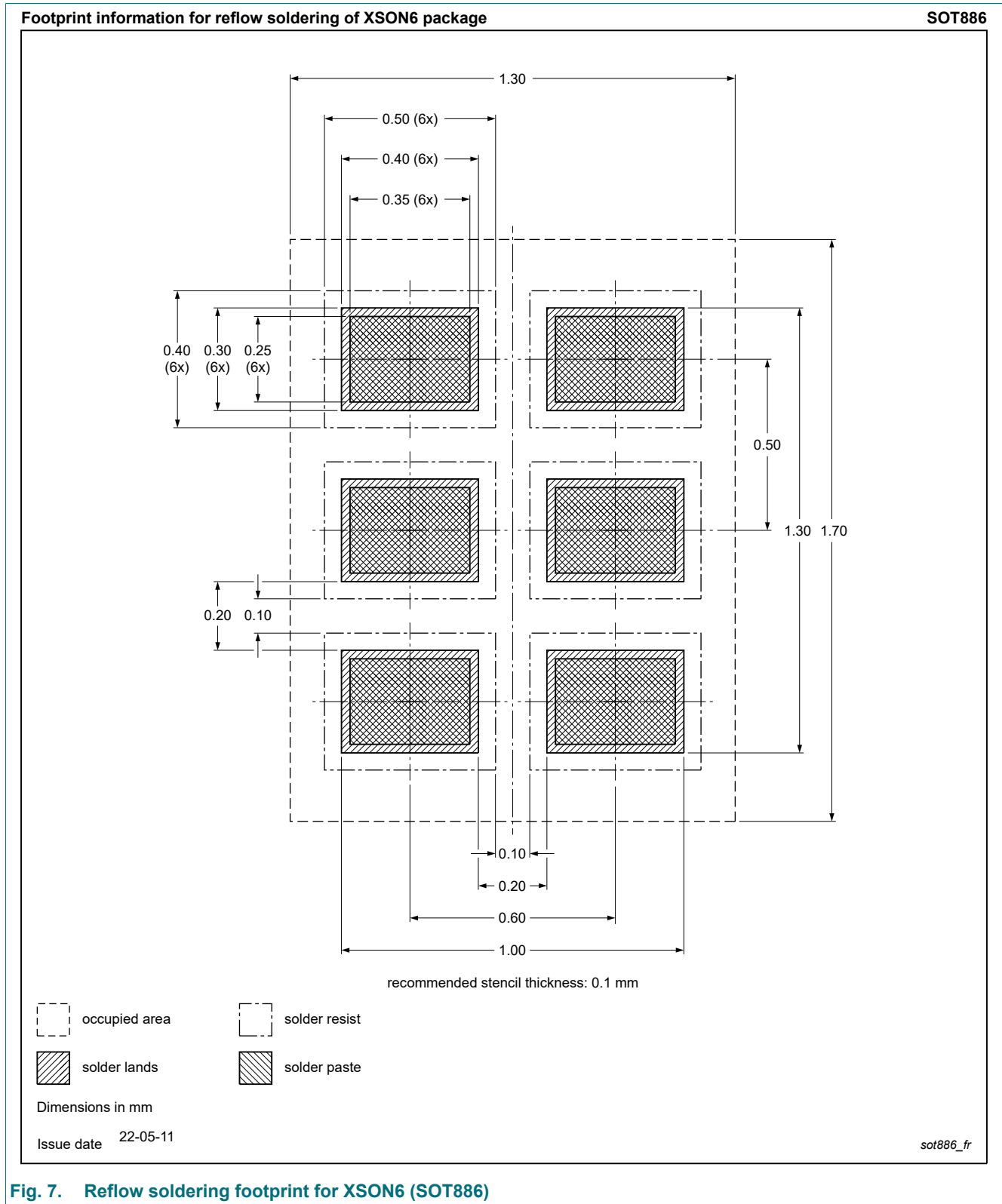


Fig. 7. Reflow soldering footprint for XSON6 (SOT886)



## 14. Revision history

Table 7. Revision history

| Data sheet ID             | Release date   | Data sheet status  | Change notice | Supersedes                |
|---------------------------|--|--------------------|---------------|---------------------------|
| PESD5V0U5BF v.2           | 20221228   | Product data sheet | -             | PESD5V0U5BF_PESD5V0U5BV_1 |
| Modifications:            | <ul style="list-style-type: none"><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><li>Family data sheet reduced to single type data sheet</li></ul> |                    |               |                           |
| PESD5V0U5BF_PESD5V0U5BV_1 | 20080815   | 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".
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