



PTVS20VZ1UPC

Transient Voltage Suppressor

28 March 2025

Product data sheet

1. General description

Transient voltage suppressor in a DFN1610-2 (SOD1610-1) ultra small and leadless Surface-Mounted Device (SMD) package designed to protect one line against high surge currents and other transients.

2. Features and benefits

- Unidirectional protection of one line
- Reverse standoff voltage: $V_{RWM} = 20\text{ V}$
- Surge robustness: $I_{PPM} = 38\text{ A}$ (8/20 μs)
- Ultra low clamping voltage $V_{CL} = 25.5\text{ V typ. at } 10\text{ A}$; $V_{CL} = 32.5\text{ V typ. at } 38\text{ A}$

3. Applications

- Portable electronics
- Power supply protection
- Power management

4. Quick reference data

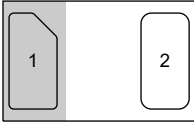

Table 1. Quick reference data

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|-----------|--------------------------|--|-----|-----|------|-----|------|
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25\text{ °C}$ | | - | - | 20 | V |
| I_{PPM} | rated peak pulse current | $t_p = 8/20\text{ }\mu\text{s}$ | [1] | - | - | 38 | A |
| V_{CL} | clamping voltage | $I_{PPM} = 38\text{ A}$; $t_p = 8/20\text{ }\mu\text{s}$; $T_{amb} = 25\text{ °C}$ | [1] | - | 32.5 | - | V |
| | | $I_{PPM} = 10\text{ A}$; $t_p = 8/20\text{ }\mu\text{s}$; $T_{amb} = 25\text{ °C}$ | [1] | - | 25.5 | - | V |

[1] Device stressed with 8/20 μs exponential decay waveform according to IEC 61000-4-5.

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--|--|
| 1 | K | cathode |  <p>Transparent top view</p> <p>DFN1610-2 (SOD1610-1)</p> |  <p><i>sym035</i></p> |
| 2 | A | anode | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|--------------|-----------|--|-----------|
| | Name | Description | Version |
| PTVS20VZ1UPC | DFN1610-2 | plastic, leadless ultra small package; 2 terminals; body 1.6 x 1 x 0.55 mm | SOD1610-1 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|--------------|--------------|
| PTVS20VZ1UPC | 20Z |

8. Limiting values

Table 5. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---------------------|---------------------------------|----------------------------------|-----|-----|-----|------|
| I _{PPM} | rated peak pulse current | t _p = 8/20 μs | [1] | - | 38 | A |
| T _j | junction temperature | | | - | 150 | °C |
| T _{amb} | ambient temperature | | | -40 | 125 | °C |
| T _{stg} | storage temperature | | | -55 | 150 | °C |
| ESD maximum ratings | | | | | | |
| V _{ESD} | electrostatic discharge voltage | IEC 61000-4-2; contact discharge | [2] | - | 30 | kV |
| | | IEC 61000-4-2; air discharge | [2] | - | 30 | kV |

- [1] Device stressed with 8/20 μs exponential decay waveform according to IEC 61000-4-5.
 [2] Device stressed with ten non-repetitive ESD pulses.

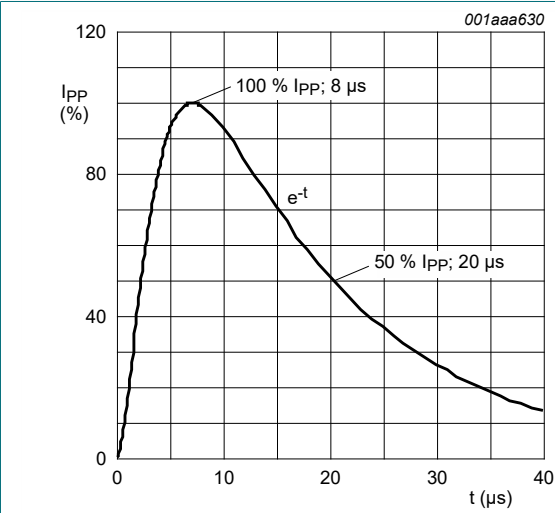


Fig. 1. 8/20 μs pulse waveform according to IEC 61000-4-5

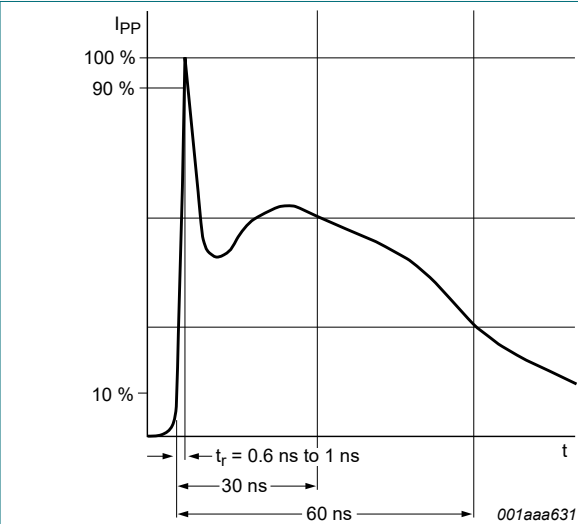


Fig. 2. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|-----------|--------------------------|--|-----|-----|------|------|---------------|
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25\text{ }^{\circ}\text{C}$ | | - | - | 20 | V |
| V_{BR} | breakdown voltage | $I_R = 1\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$ | | 22 | - | 24.5 | V |
| I_{RM} | reverse leakage current | $V_R = 20\text{ V}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$ | | - | - | 0.5 | μA |
| C_d | diode capacitance | $f = 1\text{ MHz}$; $V_R = 0\text{ V}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$ | | - | 270 | - | pF |
| V_{CL} | clamping voltage | $I_{PPM} = 38\text{ A}$; $t_p = 8/20\text{ }\mu\text{s}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] | - | 32.5 | - | V |
| | | $I_{PPM} = 10\text{ A}$; $t_p = 8/20\text{ }\mu\text{s}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] | - | 25.5 | - | V |

[1] Device stressed with 8/20 μs exponential decay waveform according to IEC 61000-4-5.

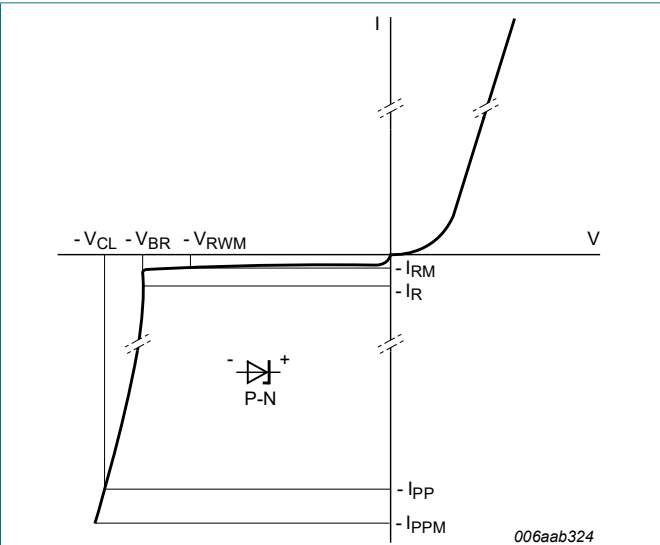


Fig. 3. V-I characteristics for a unidirectional TVS protection diode

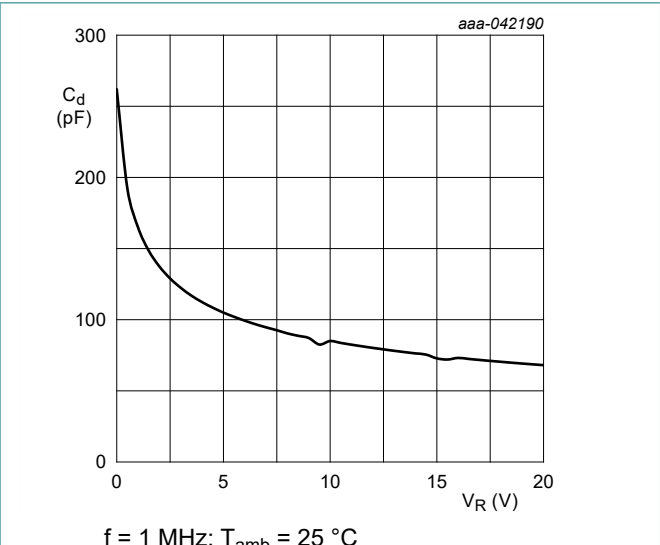


Fig. 4. Capacitance as a function of reverse voltage; typical values

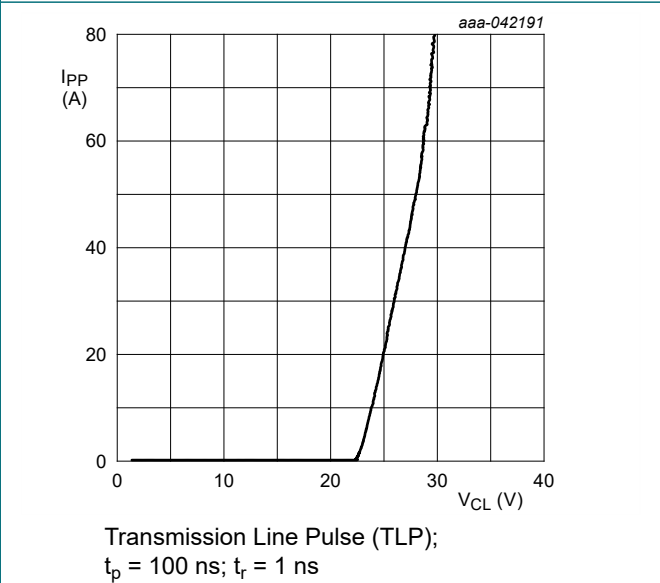


Fig. 5. Positive clamping voltage (TLP); typical values

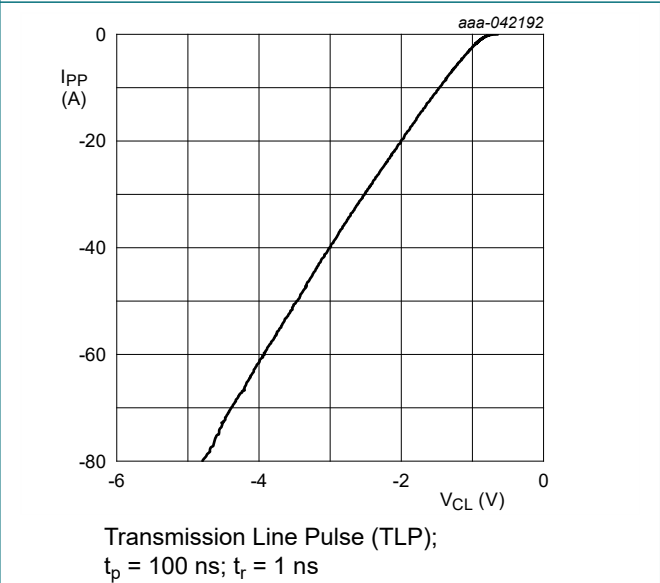
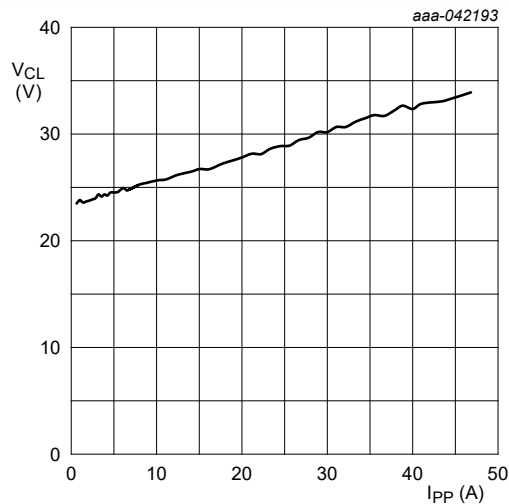
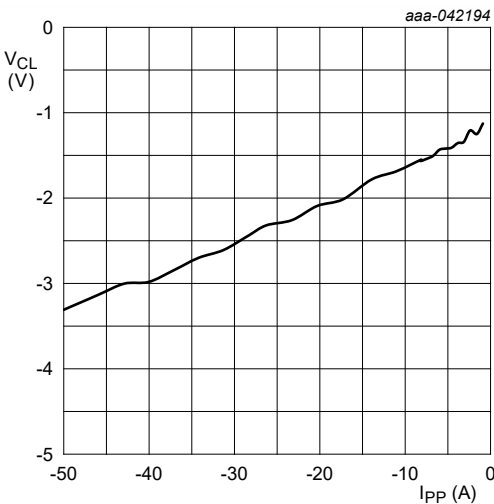


Fig. 6. Negative clamping voltage (TLP); typical values



IEC 61000-4-5; $t_p = 8/20 \mu s$; positive pulse

Fig. 7. Positive clamping voltage (8/20 μs pulse); typical values



IEC 61000-4-5; $t_p = 8/20 \mu s$; negative pulse

Fig. 8. Negative clamping voltage (8/20 μs pulse); typical values

10. Application information

The device is designed for the protection of one unidirectional power 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.

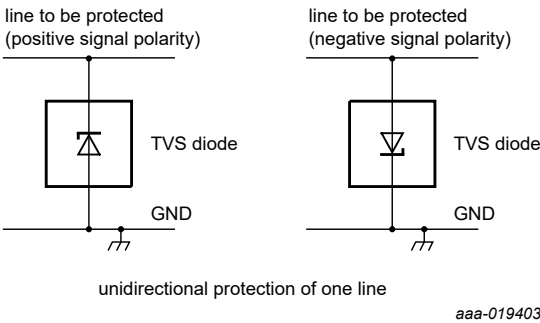


Fig. 9. Application diagram

11. Package outline

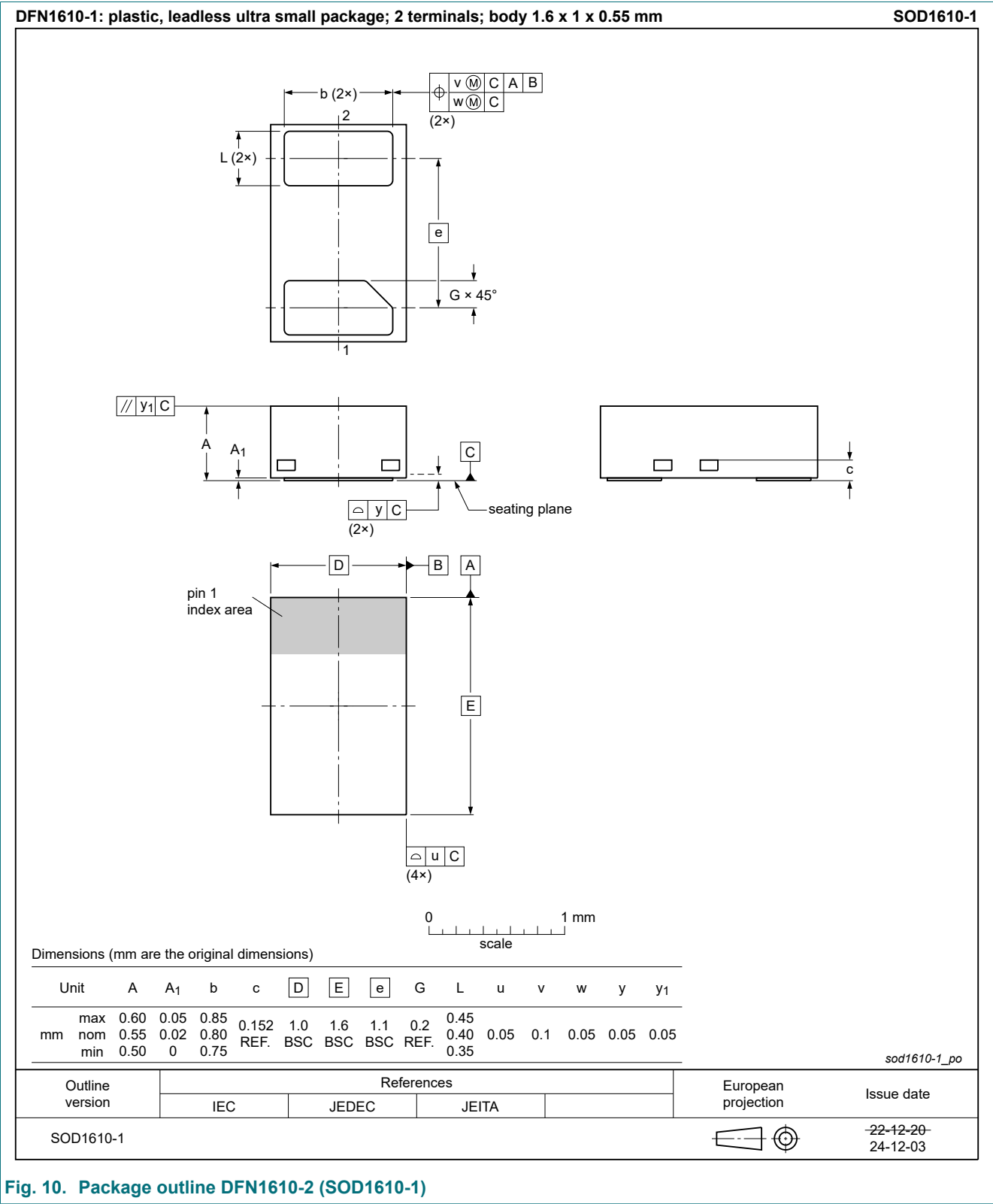
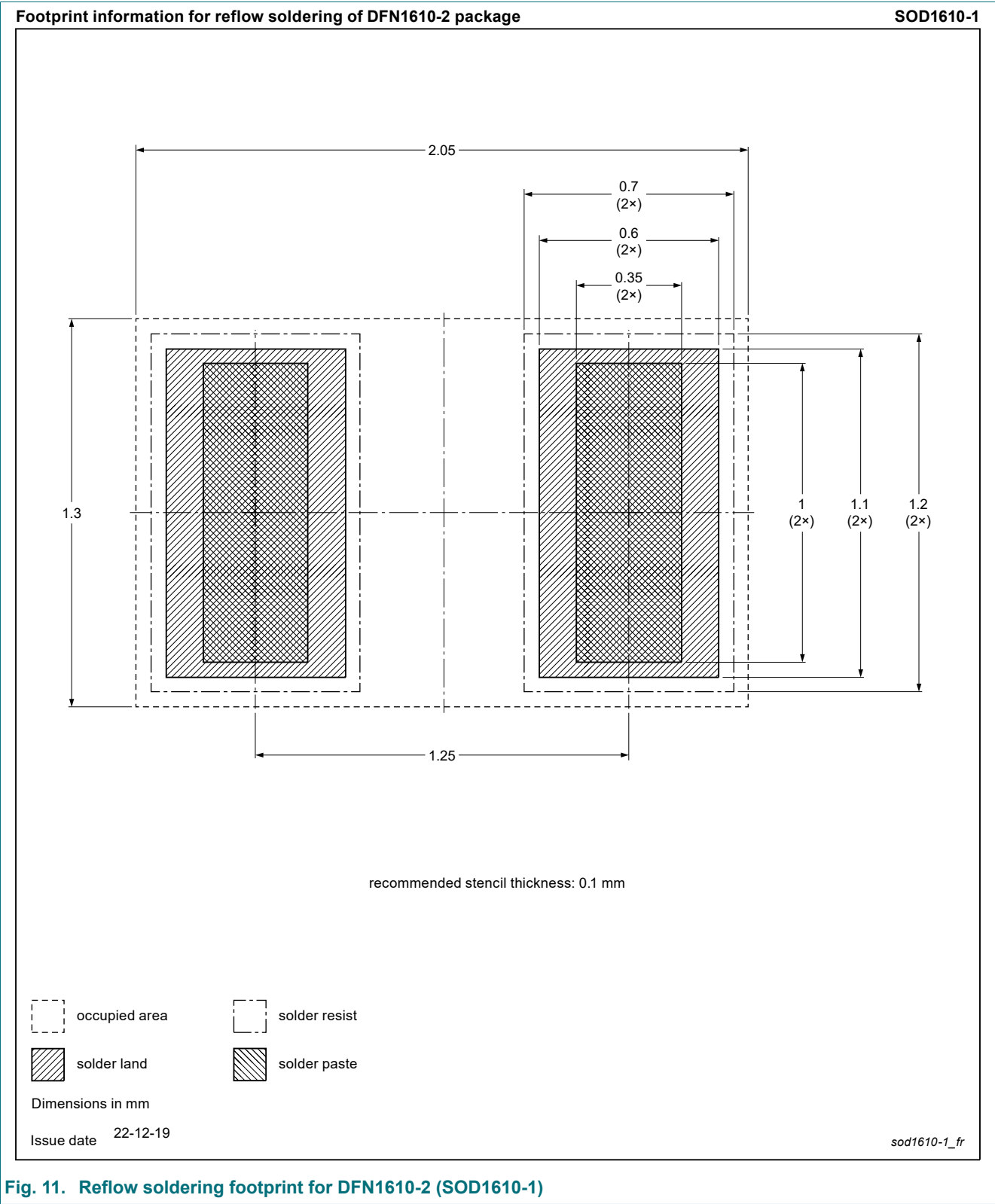


Fig. 10. Package outline DFN1610-2 (SOD1610-1)

12. Soldering



13. Revision history

Table 7. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|------------------|---|------------------------|---------------|------------------|
| PTVS20VZ1UPC v.2 | 20250328 | Product data sheet | - | PTVS20VZ1UPC v.1 |
| Modifications: | • Changed document status to "Product data sheet" | | | |
| PTVS20VZ1UPC v.1 | 20250218 | Preliminary data sheet | - | - |

14. 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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