

# PBSS4130QA-Q

30 V, 1 A NPN low V<sub>CEsat</sub> transistor

8 July 2025

Product data sheet

## 1. General description

NPN low V<sub>CEsat</sub> transistor in a leadless ultra small DFN1010D-3 (SOT1215) Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

PNP complement: PBSS5130QA-Q.

## 2. Features and benefits

- Very Low collector-emitter saturation voltage V<sub>CEsat</sub>
- High collector current capability I<sub>C</sub> and I<sub>CM</sub>
- High collector current gain h<sub>FE</sub> at high I<sub>C</sub>
- High energy efficiency due to less heat generation
- Reduced Printed-Circuit Board (PCB) area requirements
- Solderable side pads
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- Loadswitch
- Battery-driven devices
- Power management
- Charging circuits
- Power switches (e.g. motors, fans)

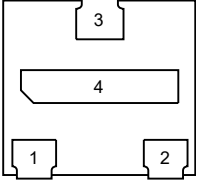
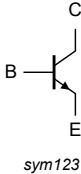
## 4. Quick reference data

Table 1. Quick reference data

| Symbol             | Parameter                               | Conditions                                                                                                        | Min | Typ | Max | Unit |
|--------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|
| V <sub>CEO</sub>   | collector-emitter voltage               | open base                                                                                                         | -   | -   | 30  | V    |
| I <sub>C</sub>     | collector current                       |                                                                                                                   | -   | -   | 1   | A    |
| I <sub>CM</sub>    | peak collector current                  | single pulse; t <sub>p</sub> ≤ 1 ms                                                                               | -   | -   | 1.5 | A    |
| R <sub>CEsat</sub> | collector-emitter saturation resistance | I <sub>C</sub> = 1 A; I <sub>B</sub> = 0.1 A; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C | -   | 175 | 235 | mΩ   |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline                                                                                                                     | Graphic symbol                                                                                    |
|-----|--------|-------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 1   | B      | base        |  <p>Transparent top view<br/>DFN1010D-3 (SOT1215)</p> |  <p>sym123</p> |
| 2   | E      | emitter     |                                                                                                                                        |                                                                                                   |
| 3   | C      | collector   |                                                                                                                                        |                                                                                                   |
| 4   | C      | collector   |                                                                                                                                        |                                                                                                   |

6. Ordering information

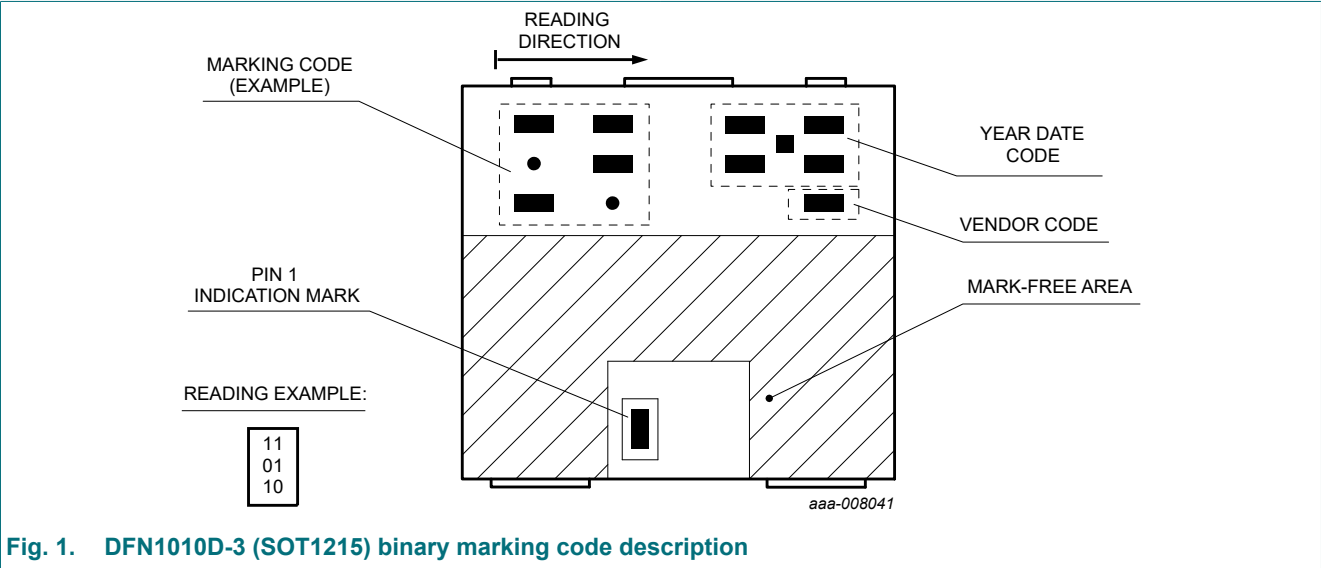
Table 3. Ordering information

| Type number                  | Package    |                                                                                                                                                               |                         |
|------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
|                              | Name       | Description                                                                                                                                                   | Version                 |
| <a href="#">PBSS4130QA-Q</a> | DFN1010D-3 | plastic, leadless thermal enhanced ultra thin small outline package with side-wettable flanks (SWF); 3 terminals; 0.75 mm pitch; 1.1 mm x 1 mm x 0.37 mm body | <a href="#">SOT1215</a> |

7. Marking

Table 4. Marking codes

| Type number  | Marking code   |
|--------------|----------------|
| PBSS4130QA-Q | 01<br>00<br>10 |

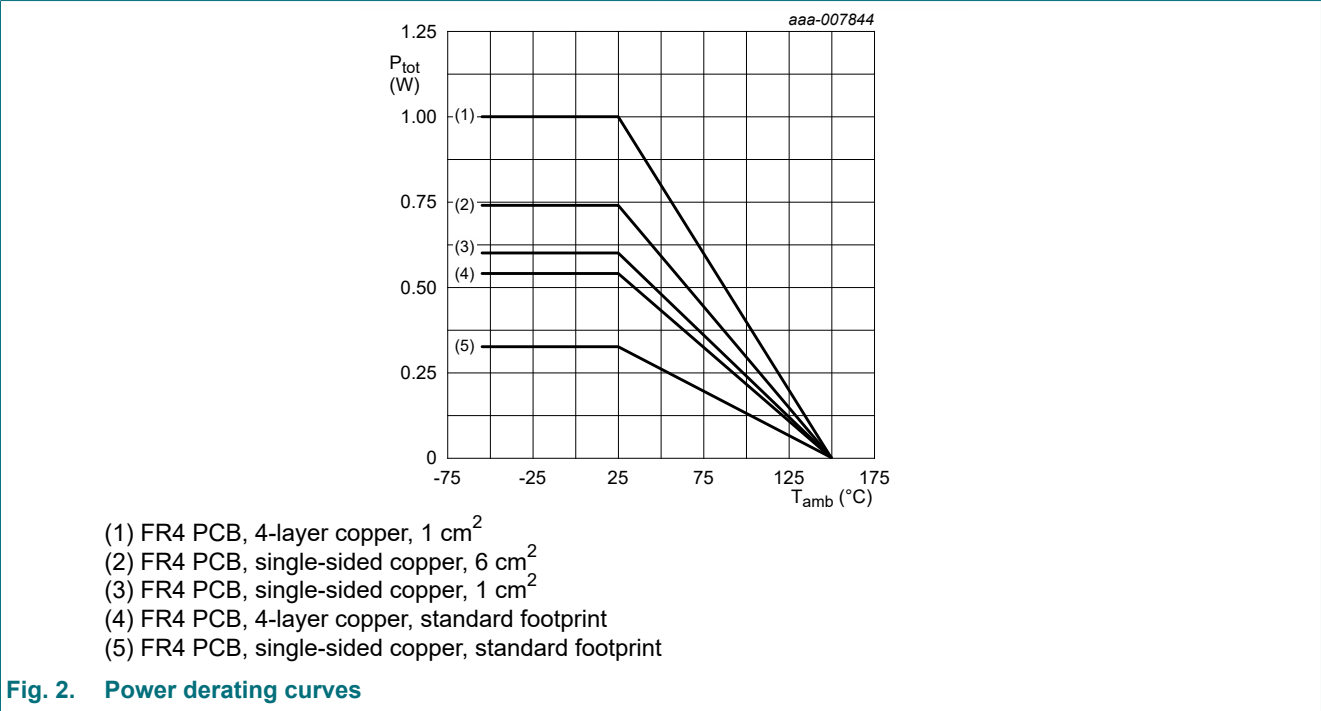


8. Limiting values

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

| Symbol           | Parameter                 | Conditions                          |     | Min | Max  | Unit |
|------------------|---------------------------|-------------------------------------|-----|-----|------|------|
| V <sub>CBO</sub> | collector-base voltage    | open emitter                        |     | -   | 30   | V    |
| V <sub>CEO</sub> | collector-emitter voltage | open base                           |     | -   | 30   | V    |
| V <sub>EBO</sub> | emitter-base voltage      | open collector                      |     | -   | 7    | V    |
| I <sub>C</sub>   | collector current         |                                     |     | -   | 1    | A    |
| I <sub>CM</sub>  | peak collector current    | single pulse; t <sub>p</sub> ≤ 1 ms |     | -   | 1.5  | A    |
| I <sub>B</sub>   | base current              |                                     |     | -   | 0.3  | A    |
| I <sub>BM</sub>  | peak base current         | single pulse; t <sub>p</sub> ≤ 1 ms |     | -   | 1    | A    |
| P <sub>tot</sub> | total power dissipation   | T <sub>amb</sub> ≤ 25 °C            | [1] | -   | 325  | mW   |
|                  |                           |                                     | [2] | -   | 600  | mW   |
|                  |                           |                                     | [3] | -   | 740  | mW   |
|                  |                           |                                     | [4] | -   | 540  | mW   |
|                  |                           |                                     | [5] | -   | 1000 | mW   |
| 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   |

- [1] Device mounted on an FR4 PCB single-sided copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated mounting pad for collector 1 cm<sup>2</sup>.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated mounting pad for collector 6 cm<sup>2</sup>.
- [4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.
- [5] Device mounted on an FR4 PCB, 4-layer copper, tin-plated mounting pad for collector 1 cm<sup>2</sup>.



9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol        | Parameter                                   | Conditions  |     | Min | Typ | Max | Unit |
|---------------|---------------------------------------------|-------------|-----|-----|-----|-----|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | -   | -   | 385 | K/W  |
|               |                                             |             | [2] | -   | -   | 209 | K/W  |
|               |                                             |             | [3] | -   | -   | 169 | K/W  |
|               |                                             |             | [4] | -   | -   | 232 | K/W  |
|               |                                             |             | [5] | -   | -   | 125 | K/W  |

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated mounting pad for collector 1 cm<sup>2</sup>.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated mounting pad for collector 6 cm<sup>2</sup>.
- [4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.
- [5] Device mounted on an FR4 PCB, 4-layer copper, tin-plated mounting pad for collector 1 cm<sup>2</sup>.

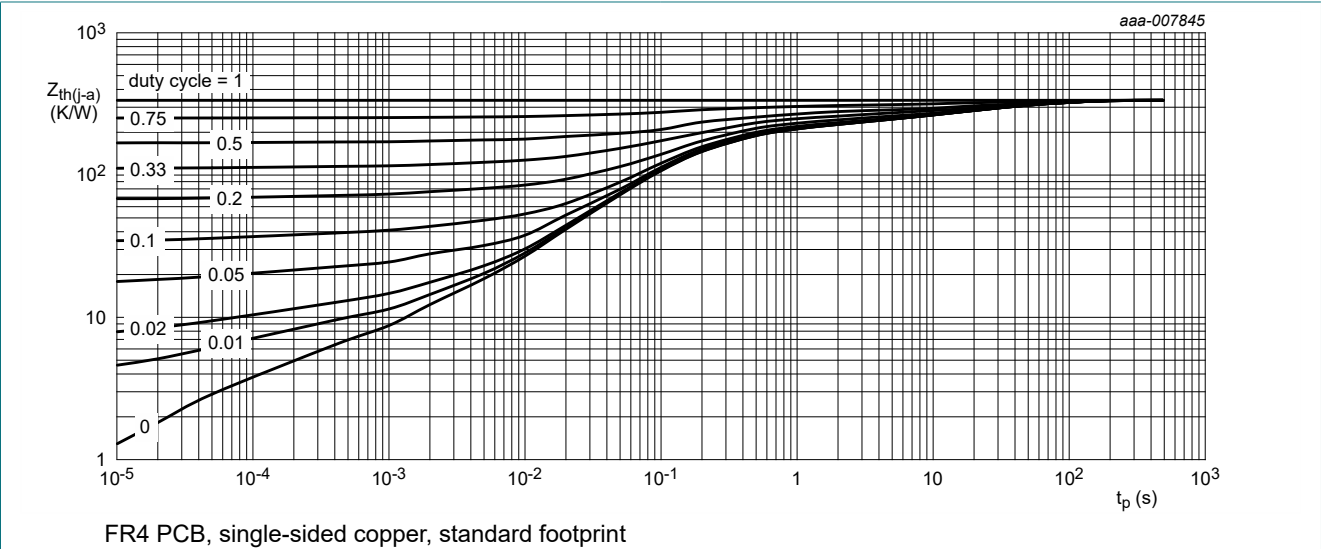


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

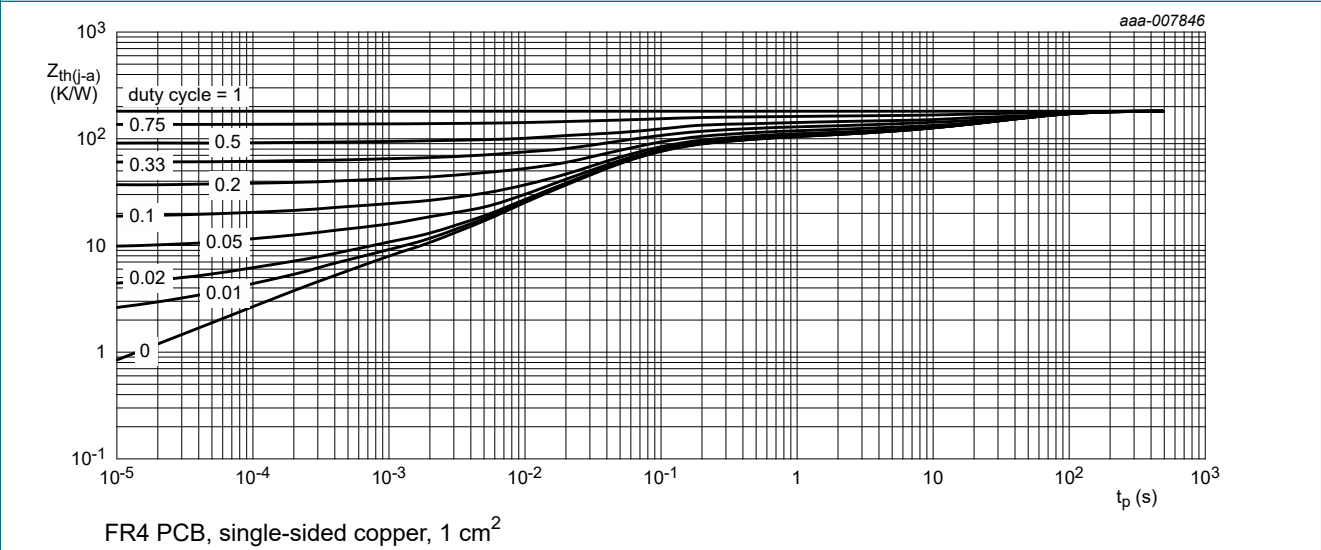


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

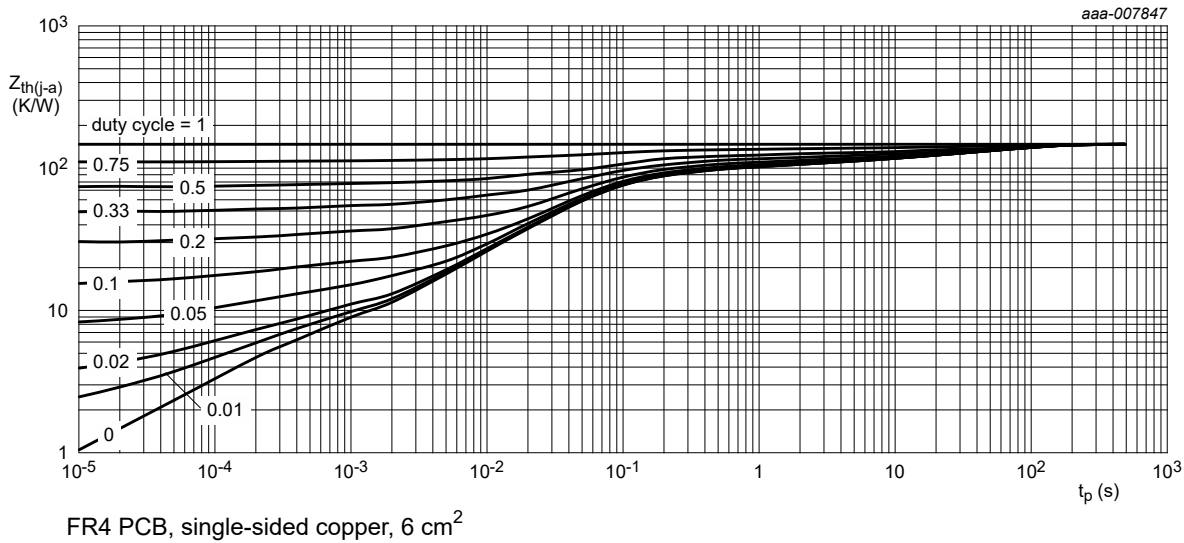


Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

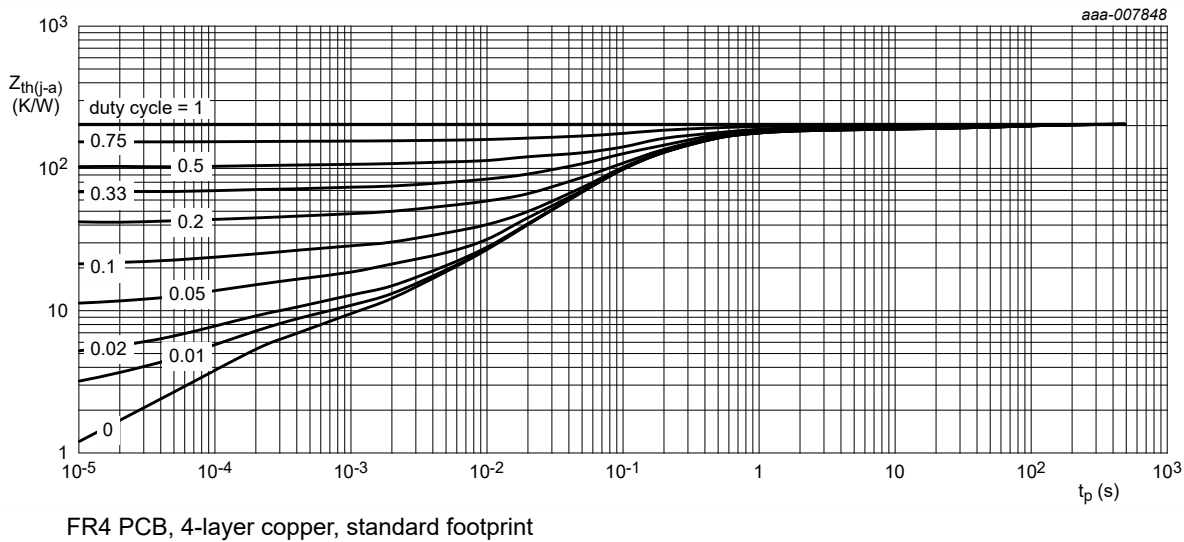


Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

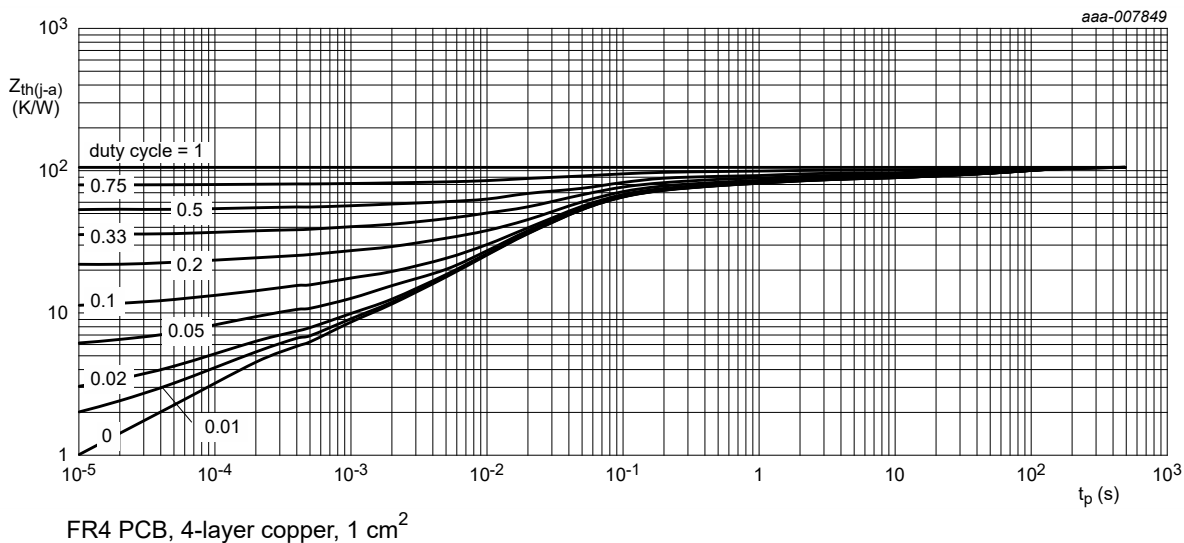


Fig. 7. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

| Symbol             | Parameter                               | Conditions                                                                                                                     |  | Min | Typ  | Max  | Unit |
|--------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--|-----|------|------|------|
| I <sub>CBO</sub>   | collector-base cut-off current          | V <sub>CB</sub> = 24 V; I <sub>E</sub> = 0 A; T <sub>amb</sub> = 25 °C                                                         |  | -   | -    | 100  | nA   |
|                    |                                         | V <sub>CB</sub> = 24 V; I <sub>E</sub> = 0 A; T <sub>j</sub> = 150 °C                                                          |  | -   | -    | 50   | μA   |
| I <sub>CES</sub>   | collector-emitter cut-off current       | V <sub>CE</sub> = 24 V; V <sub>BE</sub> = 0 V; T <sub>amb</sub> = 25 °C                                                        |  | -   | -    | 100  | nA   |
| I <sub>EBO</sub>   | emitter-base cut-off current            | V <sub>EB</sub> = 5 V; I <sub>C</sub> = 0 A; T <sub>amb</sub> = 25 °C                                                          |  | -   | -    | 100  | nA   |
| h <sub>FE</sub>    | DC current gain                         | V <sub>CE</sub> = 2 V; I <sub>C</sub> = 100 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C            |  | 250 | 430  | -    |      |
|                    |                                         | V <sub>CE</sub> = 2 V; I <sub>C</sub> = 500 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C            |  | 230 | 380  | -    |      |
|                    |                                         | V <sub>CE</sub> = 2 V; I <sub>C</sub> = 1 A; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C               |  | 180 | 290  | -    |      |
| V <sub>CEsat</sub> | collector-emitter saturation voltage    | I <sub>C</sub> = 500 mA; I <sub>B</sub> = 50 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C           |  | -   | 90   | 125  | mV   |
|                    |                                         | I <sub>C</sub> = 1 A; I <sub>B</sub> = 50 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C              |  | -   | 180  | 245  | mV   |
|                    |                                         | I <sub>C</sub> = 1 A; I <sub>B</sub> = 100 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C             |  | -   | 175  | 235  | mV   |
| R <sub>CEsat</sub> | collector-emitter saturation resistance | I <sub>C</sub> = 1 A; I <sub>B</sub> = 0.1 A; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C              |  | -   | 175  | 235  | mΩ   |
| V <sub>BEsat</sub> | base-emitter saturation voltage         | I <sub>C</sub> = 500 mA; I <sub>B</sub> = 50 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C           |  | -   | 0.89 | 1    | V    |
|                    |                                         | I <sub>C</sub> = 1 A; I <sub>B</sub> = 50 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C              |  | -   | 0.94 | 1.05 | V    |
|                    |                                         | I <sub>C</sub> = 1 A; I <sub>B</sub> = 100 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C             |  | -   | 0.97 | 1.1  | V    |
| V <sub>BEon</sub>  | base-emitter turn-on voltage            | V <sub>CE</sub> = 2 V; I <sub>C</sub> = 0.5 A; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C             |  | -   | 0.78 | 0.9  | V    |
| t <sub>d</sub>     | delay time                              | V <sub>CC</sub> = 10 V; I <sub>C</sub> = 0.5 A; I <sub>Bon</sub> = 25 mA; I <sub>Boff</sub> = -25 mA; T <sub>amb</sub> = 25 °C |  | -   | 15   | -    | ns   |
| t <sub>r</sub>     | rise time                               |                                                                                                                                |  | -   | 30   | -    | ns   |
| t <sub>on</sub>    | turn-on time                            |                                                                                                                                |  | -   | 45   | -    | ns   |
| t <sub>s</sub>     | storage time                            |                                                                                                                                |  | -   | 425  | -    | ns   |
| t <sub>f</sub>     | fall time                               |                                                                                                                                |  | -   | 65   | -    | ns   |
| t <sub>off</sub>   | turn-off time                           |                                                                                                                                |  | -   | 490  | -    | ns   |
| f <sub>T</sub>     | transition frequency                    | V <sub>CE</sub> = 10 V; I <sub>C</sub> = 50 mA; f = 100 MHz; T <sub>amb</sub> = 25 °C                                          |  | 130 | 190  | -    | MHz  |
| C <sub>c</sub>     | collector capacitance                   | V <sub>CB</sub> = 10 V; I <sub>E</sub> = 0 A; i <sub>e</sub> = 0 A; f = 1 MHz; T <sub>amb</sub> = 25 °C                        |  | -   | 8    | 10   | pF   |

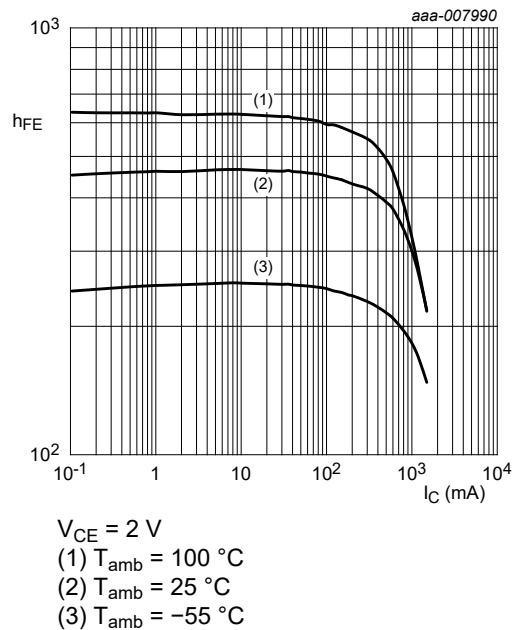


Fig. 8. DC current gain as a function of collector current; typical values

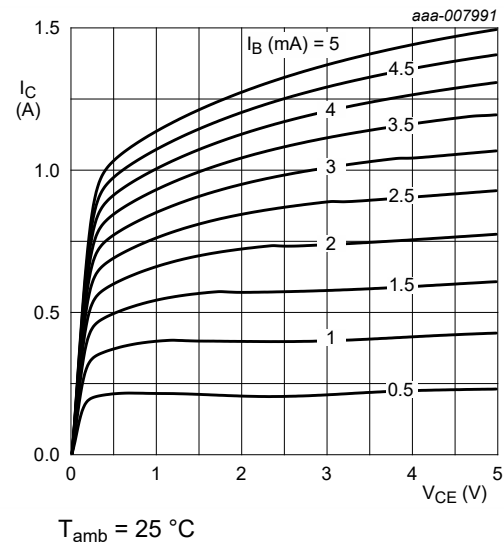


Fig. 9. Collector current as a function of collector-emitter voltage; typical values

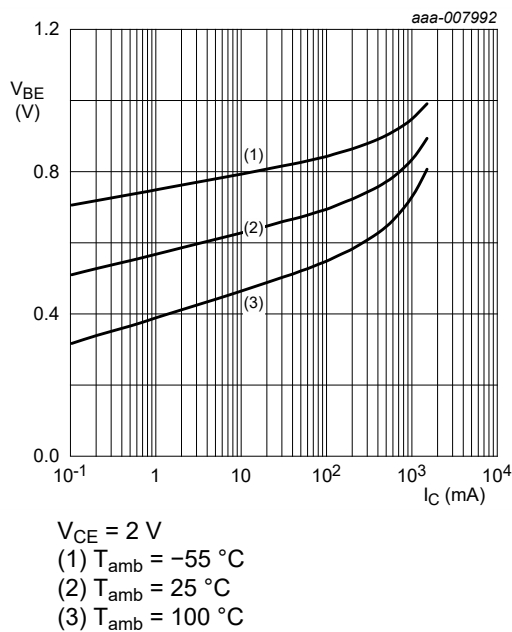


Fig. 10. Base-emitter voltage as a function of collector current; typical values

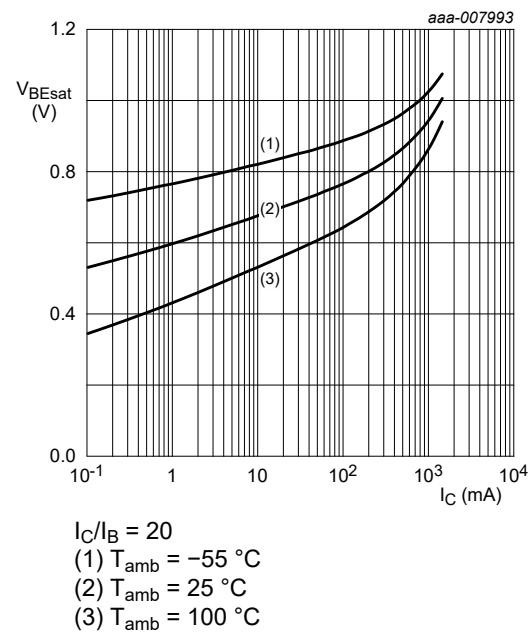


Fig. 11. Base-emitter saturation voltage as a function of collector current; typical values

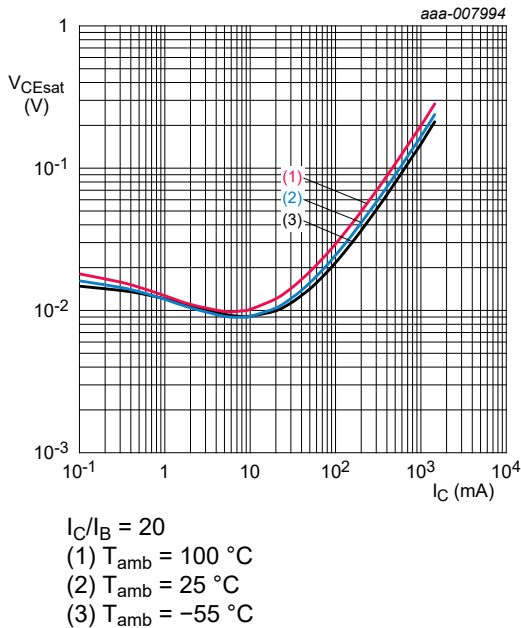


Fig. 12. Collector-emitter saturation voltage as a function of collector current; typical values

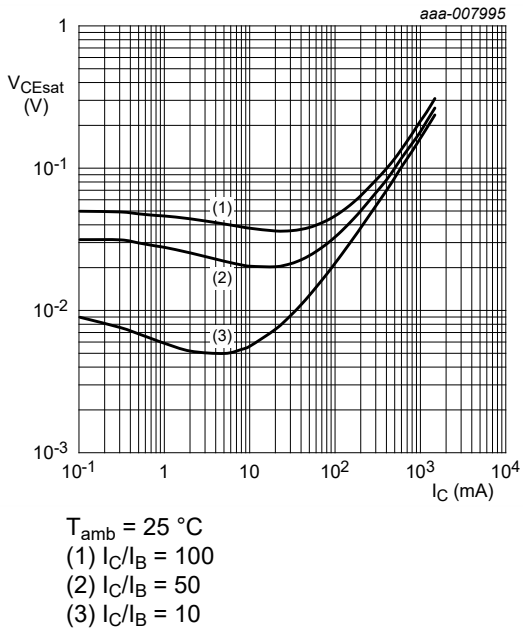


Fig. 13. Collector-emitter saturation voltage as a function of collector current; typical values

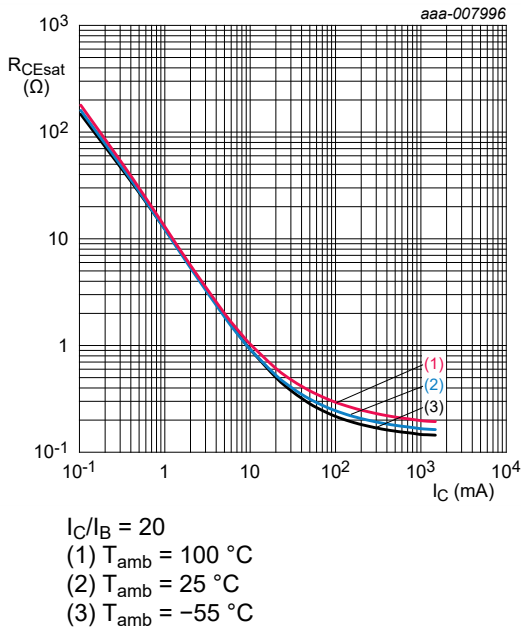


Fig. 14. Collector-emitter saturation resistance as a function of collector current; typical values

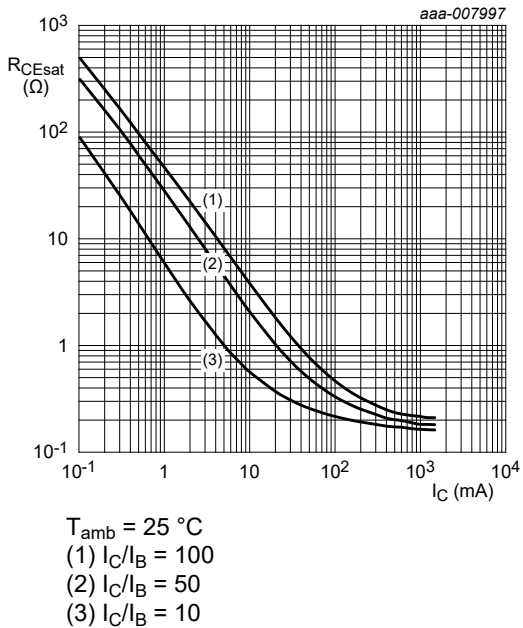


Fig. 15. Collector-emitter saturation resistance as a function of collector current; typical values

11. Test information

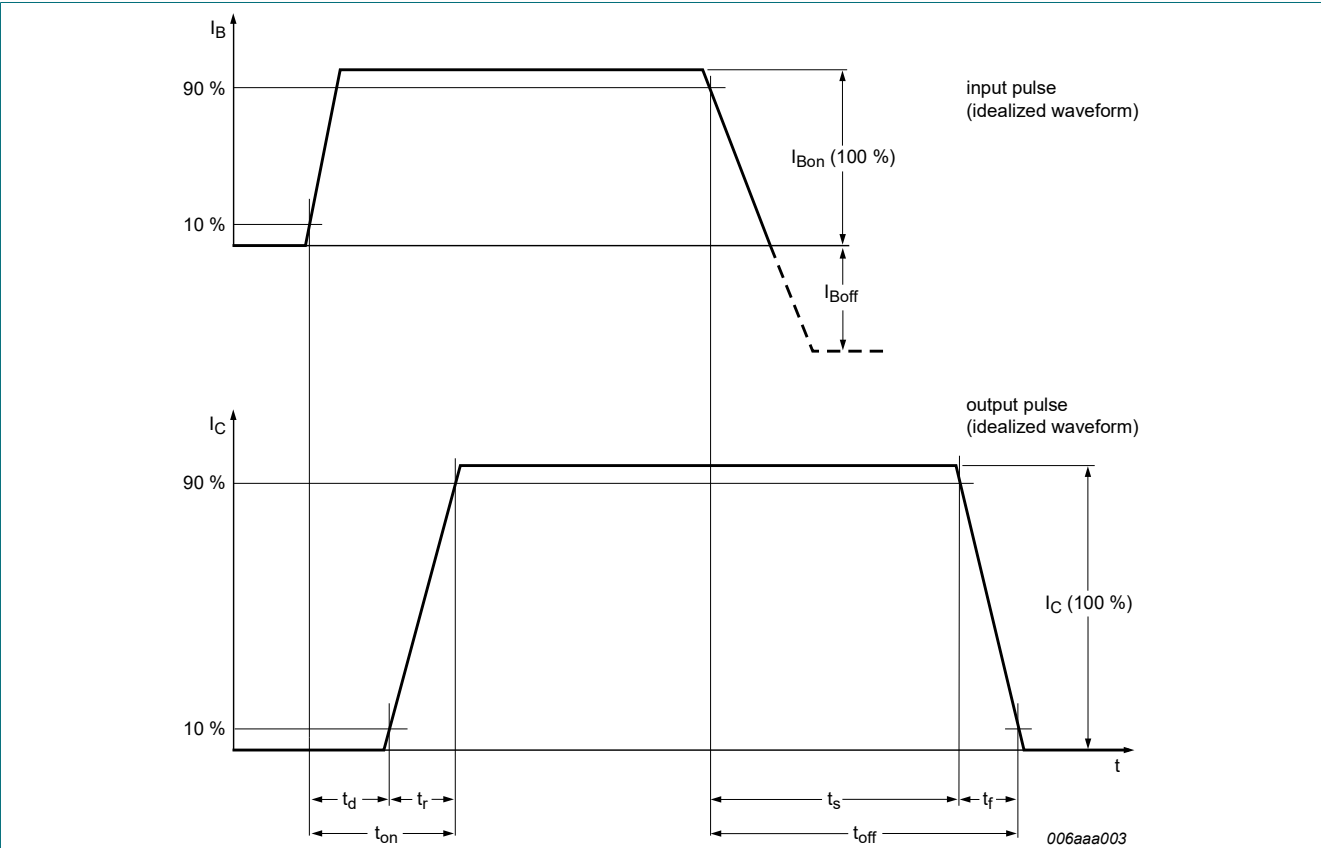


Fig. 16. Transistor switching time definition

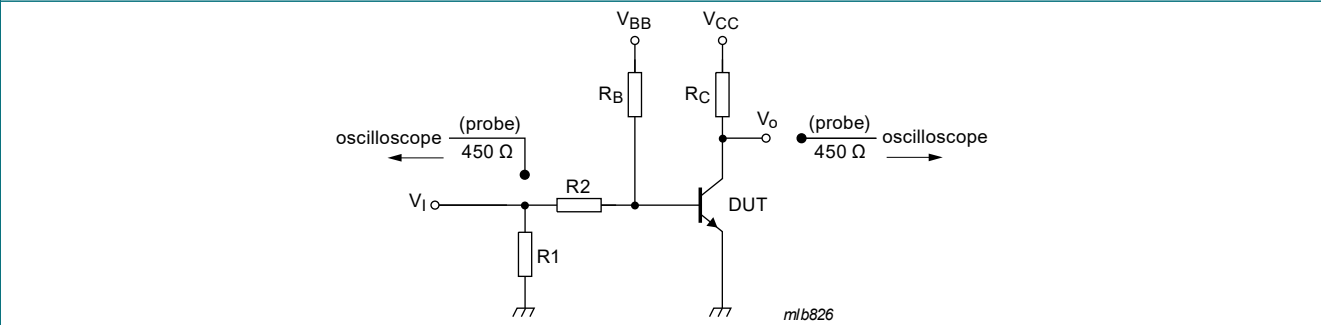


Fig. 17. Test circuit for switching times

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

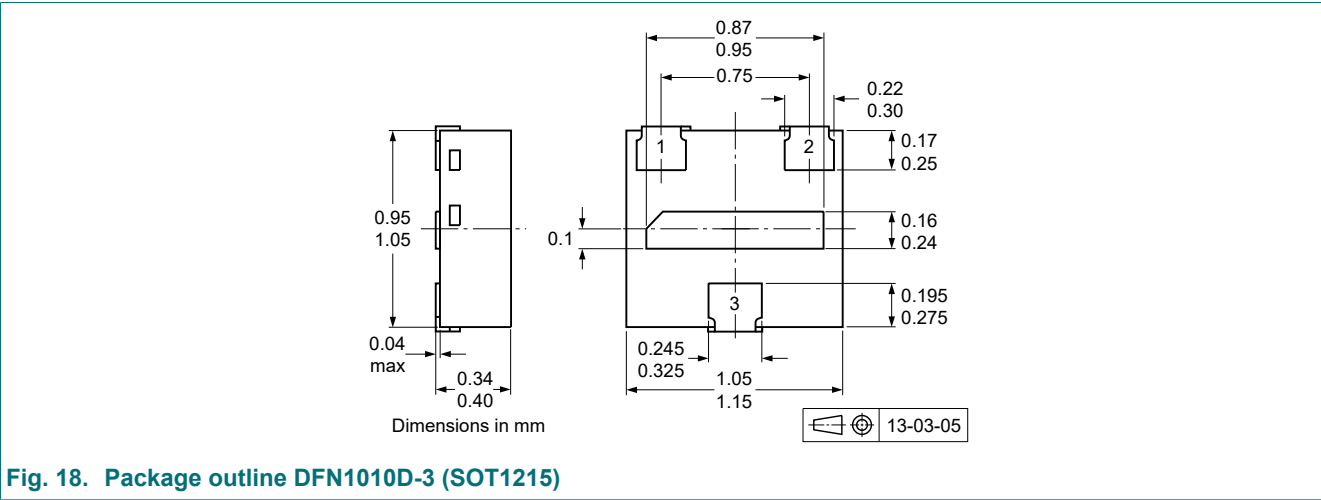
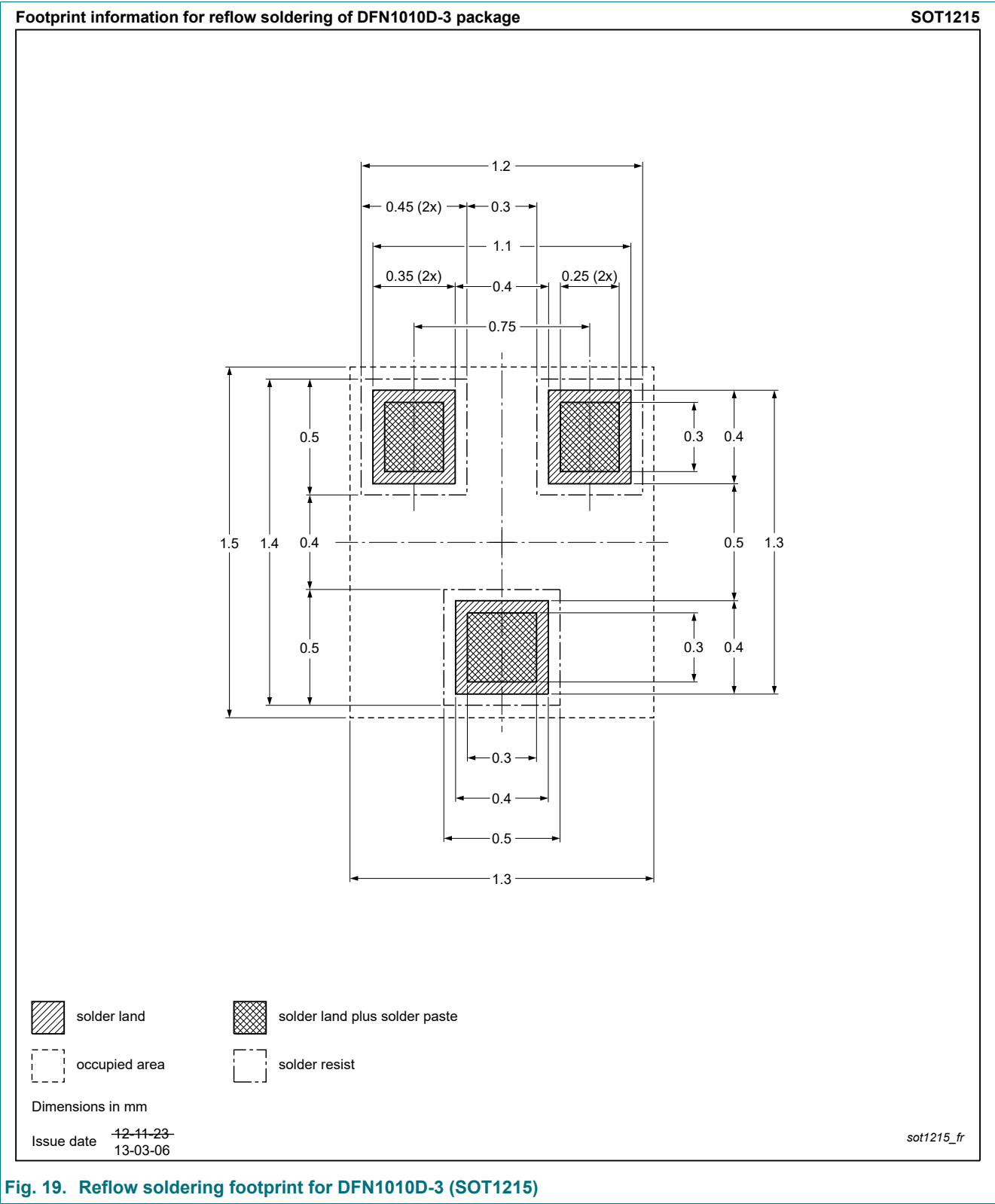


Fig. 18. Package outline DFN1010D-3 (SOT1215)

13. Soldering



14. Revision history

Table 8. Revision history

| Data sheet ID    | Release date | Data sheet status  | Change notice | Supersedes |
|------------------|--------------|--------------------|---------------|------------|
| PBSS4130QA-Q v.1 | 20250708     | 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.                       |
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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 8 July 2025