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## Product Reference Information

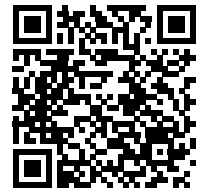
**Part Number:** PBSS4420D,115  
**Manufacturer:** Nexperia USA Inc.  
**Package:** SC-74, SOT-457  
**Availability:** Please confirm with sales

### Product Page:

<https://antrexco.com/product/details/nexperia-usa-inc/pbss4420d-115.html>

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### Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

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# PBSS4420D

20 V, 4 A NPN low V<sub>CEsat</sub> transistor

30 September 2025

Product data sheet

## 1. General description

NPN low V<sub>CEsat</sub> transistor in a small SOT457 (SC-74) Surface-Mounted Device (SMD) plastic package.

PNP complement: PBSS5420D

## 2. Features and benefits

- Very low collector-emitter saturation resistance
- Ultra low collector-emitter saturation voltage
- 4 A continuous collector current
- Up to 15 A peak current
- High efficiency due to less heat generation

## 3. Applications

- Power management functions
- Charging circuits
- DC-to-DC conversion
- MOSFET gate driving
- Power switches (e.g. motors, fans)
- Thin Film Transistor (TFT) backlight inverter

## 4. Quick reference data

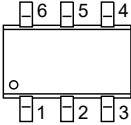
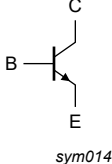
Table 1. Quick reference data

| Symbol             | Parameter                               | Conditions                                                                                                         |     | Min | Typ | Max | Unit |
|--------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------|
| V <sub>CEO</sub>   | collector-emitter voltage               | open base                                                                                                          |     | -   | -   | 20  | V    |
| I <sub>C</sub>     | collector current                       |                                                                                                                    | [1] | -   | -   | 4   | A    |
| I <sub>CM</sub>    | peak collector current                  | single pulse; t <sub>p</sub> ≤ 1 ms                                                                                |     | -   | -   | 15  | A    |
| R <sub>CEsat</sub> | collector-emitter saturation resistance | I <sub>C</sub> = 4 A; I <sub>B</sub> = 400 mA; pulsed; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C |     | -   | 50  | 70  | mΩ   |

[1] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline                                                                                  | Graphic symbol                                                                                |
|-----|--------|-------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 1   | C      | collector   | <br>TSOP6 (SOT457) | <br>sym014 |
| 2   | C      | collector   |                                                                                                     |                                                                                               |
| 3   | B      | base        |                                                                                                     |                                                                                               |
| 4   | E      | emitter     |                                                                                                     |                                                                                               |
| 5   | C      | collector   |                                                                                                     |                                                                                               |
| 6   | C      | collector   |                                                                                                     |                                                                                               |

6. Ordering information

Table 3. Ordering information

| Type number               | Package |                                                          |                        |
|---------------------------|---------|----------------------------------------------------------|------------------------|
|                           | Name    | Description                                              | Version                |
| <a href="#">PBSS4420D</a> | TSOP6   | plastic, surface-mounted package (SC-74; TSOP6); 6 leads | <a href="#">SOT457</a> |

7. Marking

Table 4. Marking codes

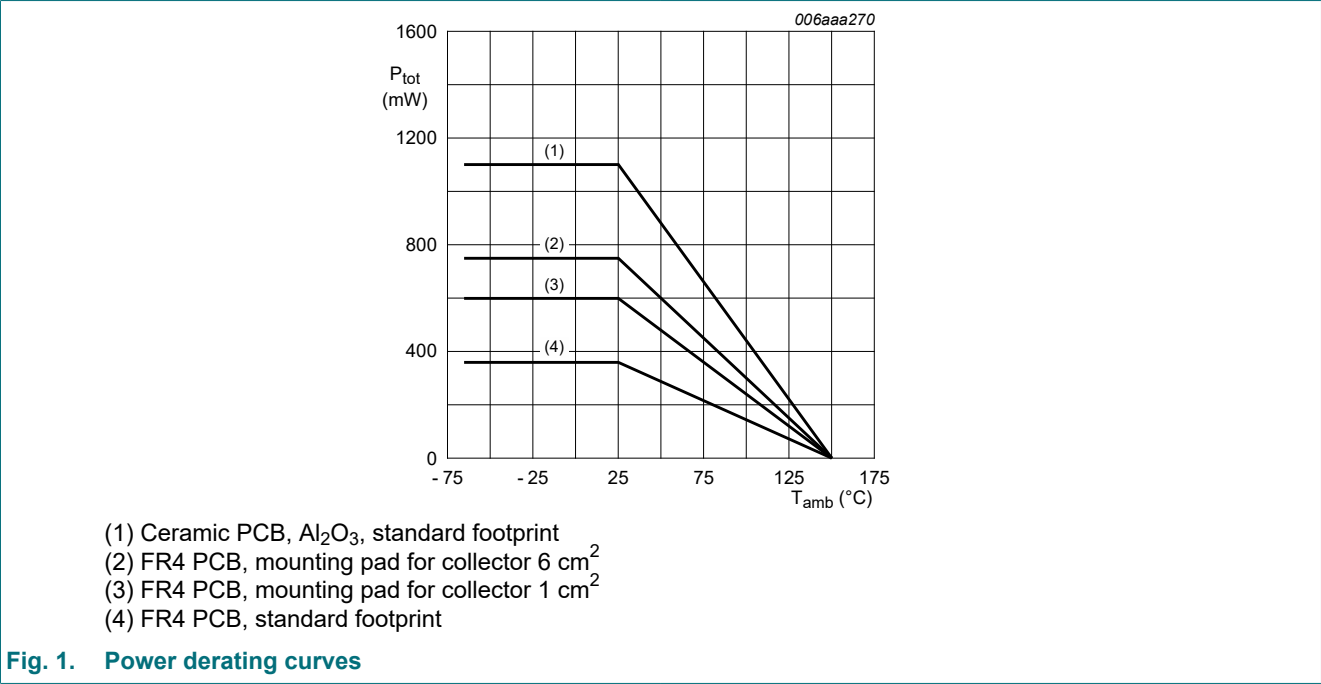
| Type number | Marking code |
|-------------|--------------|
| PBSS4420D   | D4           |

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                        |         | -   | 20  | V    |
| V <sub>CEO</sub> | collector-emitter voltage | open base                           |         | -   | 20  | V    |
| V <sub>EBO</sub> | emitter-base voltage      | open collector                      |         | -   | 5   | V    |
| I <sub>C</sub>   | collector current         |                                     | [1]     | -   | 4   | A    |
| I <sub>CM</sub>  | peak collector current    | single pulse; t <sub>p</sub> ≤ 1 ms |         | -   | 15  | A    |
| I <sub>B</sub>   | base current              |                                     |         | -   | 0.8 | A    |
| I <sub>BM</sub>  | peak base current         | single pulse; t <sub>p</sub> ≤ 1 ms |         | -   | 2   | A    |
| P <sub>tot</sub> | total power dissipation   | T <sub>amb</sub> ≤ 25 °C            | [2]     | -   | 360 | mW   |
|                  |                           |                                     | [3]     | -   | 600 | mW   |
|                  |                           |                                     | [4]     | -   | 750 | mW   |
|                  |                           |                                     | [1]     | -   | 1.1 | W    |
|                  |                           |                                     | [2] [5] | -   | 2.5 | W    |
| T <sub>j</sub>   | junction temperature      |                                     |         | -   | 150 | °C   |
| T <sub>amb</sub> | ambient temperature       |                                     |         | -65 | 150 | °C   |
| T <sub>stg</sub> | storage temperature       |                                     |         | -65 | 150 | °C   |

- [1] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.
- [4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.
- [5] Operated under pulsed conditions: δ ≤ 10 %; t<sub>p</sub> ≤ 10 ms.



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]     | -   | -   | 350 | K/W  |
|                |                                                  |             | [2]     | -   | -   | 208 | K/W  |
|                |                                                  |             | [3]     | -   | -   | 160 | K/W  |
|                |                                                  |             | [4]     | -   | -   | 113 | K/W  |
|                |                                                  |             | [1] [5] | -   | -   | 50  | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             |         | -   | -   | 45  | 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 a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.
- [5] Operated under pulsed conditions:  $\delta \leq 10\%$ ;  $t_p \leq 10$  ms.

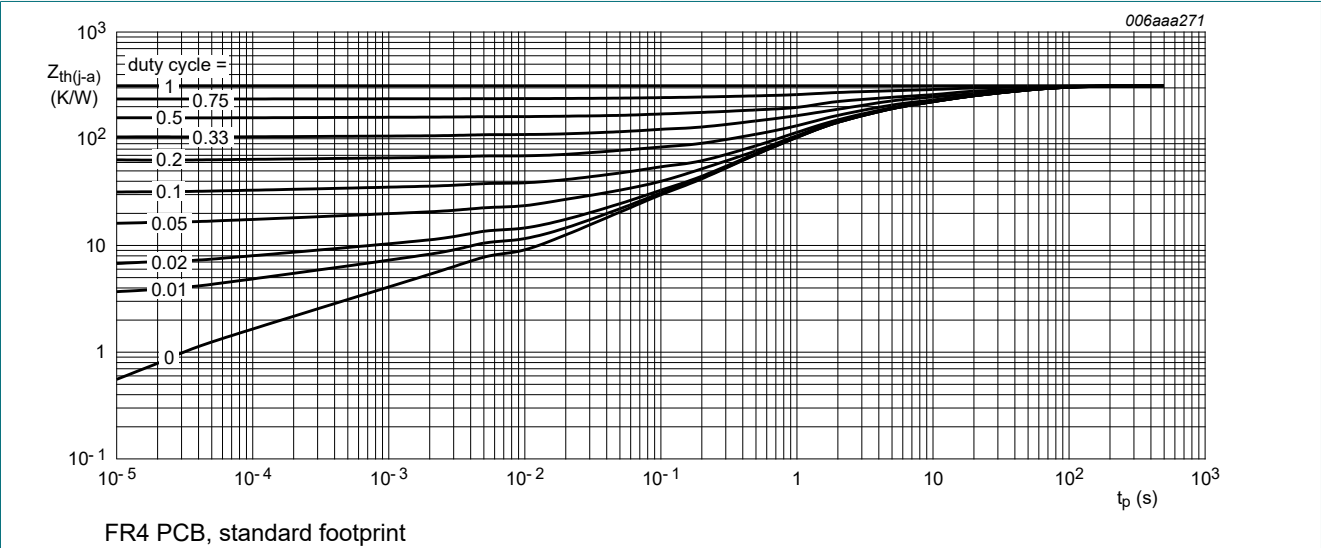


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

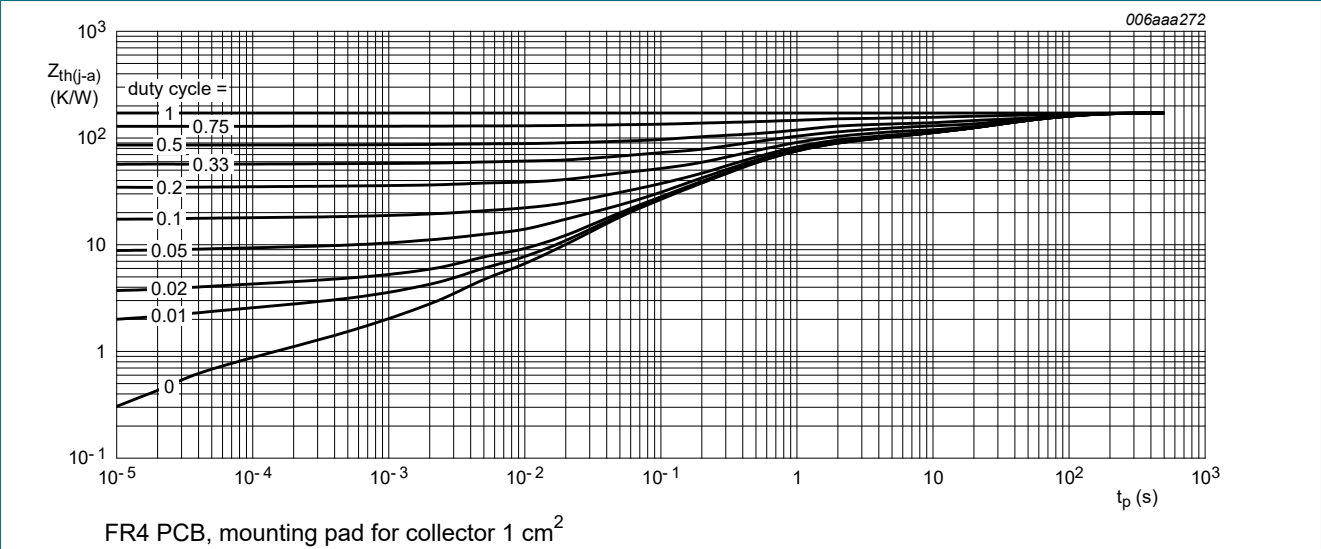
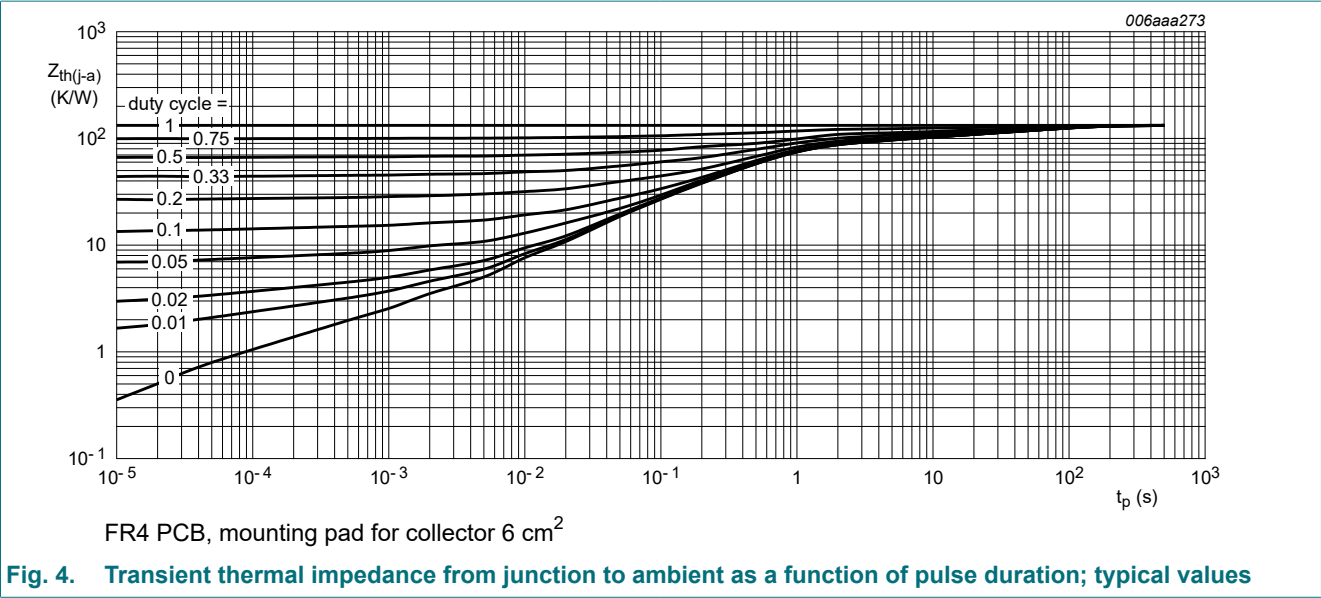


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



## 10. Characteristics

Table 7. Characteristics

| Symbol      | Parameter                               | Conditions                                                                                                                                           | Min | Typ  | Max  | Unit          |
|-------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|------|---------------|
| $I_{CBO}$   | collector-base cut-off current          | $V_{CB} = 20 \text{ V}; I_E = 0 \text{ A}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                                                                    | -   | -    | 100  | nA            |
|             |                                         | $V_{CB} = 20 \text{ V}; I_E = 0 \text{ A}; T_j = 150 \text{ }^{\circ}\text{C}$                                                                       | -   | -    | 50   | $\mu\text{A}$ |
| $I_{CES}$   | collector-emitter cut-off current       | $V_{CE} = 20 \text{ V}; V_{BE} = 0 \text{ V}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                                                                 | -   | -    | 100  | nA            |
| $I_{EBO}$   | emitter-base cut-off current            | $V_{EB} = 5 \text{ V}; I_C = 0 \text{ A}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                                                                     | -   | -    | 100  | nA            |
| $h_{FE}$    | DC current gain                         | $V_{CE} = 2 \text{ V}; I_C = 0.5 \text{ A}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                                                                   | 300 | 450  | -    |               |
|             |                                         | $V_{CE} = 2 \text{ V}; I_C = 1 \text{ A}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^{\circ}\text{C}$ | 300 | 430  | -    |               |
|             |                                         | $V_{CE} = 2 \text{ V}; I_C = 2 \text{ A}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^{\circ}\text{C}$ | 250 | 400  | -    |               |
|             |                                         | $V_{CE} = 2 \text{ V}; I_C = 4 \text{ A}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^{\circ}\text{C}$ | 200 | 310  | -    |               |
|             |                                         | $V_{CE} = 2 \text{ V}; I_C = 6 \text{ A}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^{\circ}\text{C}$ | 100 | 230  | -    |               |
| $V_{CEsat}$ | collector-emitter saturation voltage    | $I_C = 0.5 \text{ A}; I_B = 50 \text{ mA}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                                                                    | -   | 30   | 50   | mV            |
|             |                                         | $I_C = 1 \text{ A}; I_B = 50 \text{ mA}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                                                                      | -   | 60   | 90   | mV            |
|             |                                         | $I_C = 2 \text{ A}; I_B = 200 \text{ mA}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                                                                     | -   | 110  | 150  | mV            |
|             |                                         | $I_C = 4 \text{ A}; I_B = 400 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^{\circ}\text{C}$ | -   | 200  | 280  | mV            |
|             |                                         | $I_C = 6 \text{ A}; I_B = 600 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^{\circ}\text{C}$ | -   | 300  | 420  | mV            |
| $R_{CEsat}$ | collector-emitter saturation resistance | $I_C = 4 \text{ A}; I_B = 400 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^{\circ}\text{C}$ | -   | 50   | 70   | m $\Omega$    |
| $V_{BEsat}$ | base-emitter saturation voltage         | $I_C = 0.5 \text{ A}; I_B = 50 \text{ mA}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                                                                    | -   | 0.79 | 0.85 | V             |
|             |                                         | $I_C = 1 \text{ A}; I_B = 50 \text{ mA}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                                                                      | -   | 0.81 | 0.9  | V             |
|             |                                         | $I_C = 1 \text{ A}; I_B = 100 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^{\circ}\text{C}$ | -   | 0.83 | 1    | V             |
|             |                                         | $I_C = 4 \text{ A}; I_B = 400 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^{\circ}\text{C}$ | -   | 1    | 1.1  | V             |
| $V_{BEon}$  | base-emitter turn-on voltage            | $V_{CE} = 2 \text{ V}; I_C = 2 \text{ A}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                                                                     | -   | 0.79 | 1    | V             |
| $t_d$       | delay time                              | $V_{CC} = 12.5 \text{ V}; I_C = 3 \text{ A}; I_{Bon} = 0.15 \text{ A}; I_{Boff} = -0.15 \text{ A}; T_{amb} = 25 \text{ }^{\circ}\text{C}$            | -   | 12   | -    | ns            |
| $t_r$       | rise time                               |                                                                                                                                                      | -   | 36   | -    | ns            |
| $t_{on}$    | turn-on time                            |                                                                                                                                                      | -   | 48   | -    | ns            |
| $t_s$       | storage time                            |                                                                                                                                                      | -   | 230  | -    | ns            |
| $t_f$       | fall time                               |                                                                                                                                                      | -   | 50   | -    | ns            |
| $t_{off}$   | turn-off time                           |                                                                                                                                                      | -   | 280  | -    | ns            |
| $f_T$       | transition frequency                    | $V_{CE} = 10 \text{ V}; I_C = 0.1 \text{ A}; f = 100 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                                             | -   | 100  | -    | MHz           |
| $C_c$       | collector capacitance                   | $V_{CB} = 10 \text{ V}; I_E = 0 \text{ A}; i_e = 0 \text{ A}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$                              | -   | 60   | -    | pF            |

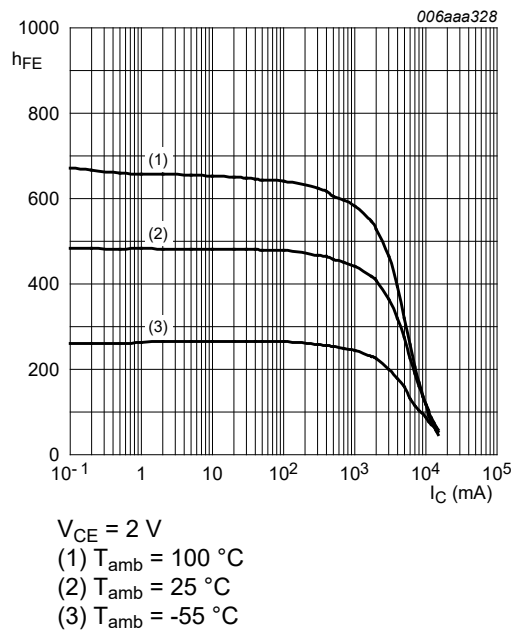


Fig. 5. DC current gain as a function of collector current; typical values

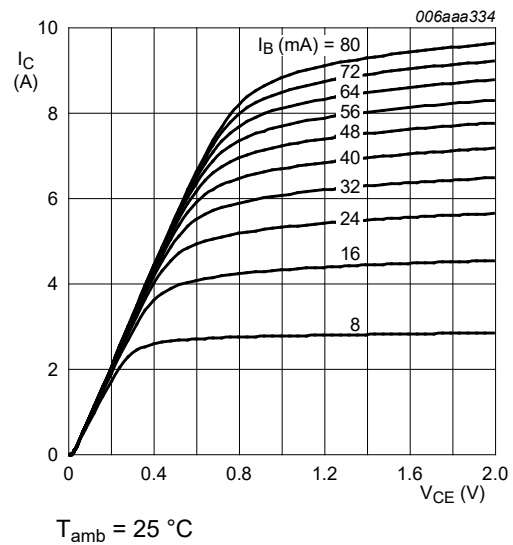


Fig. 6. Collector current as a function of collector-emitter voltage; typical values

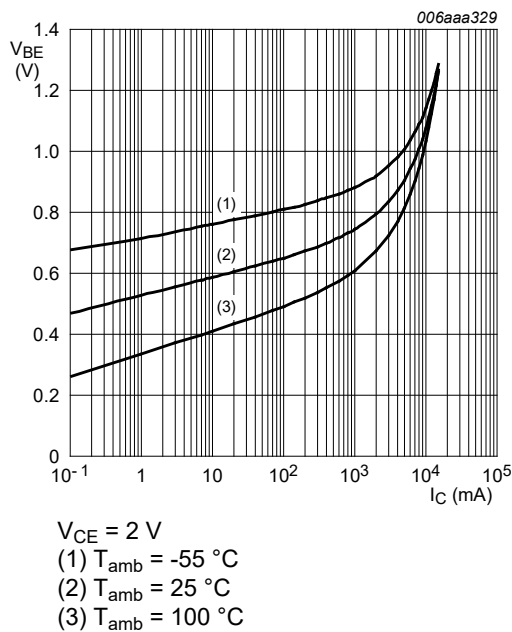


Fig. 7. Base-emitter voltage as a function of collector current; typical values

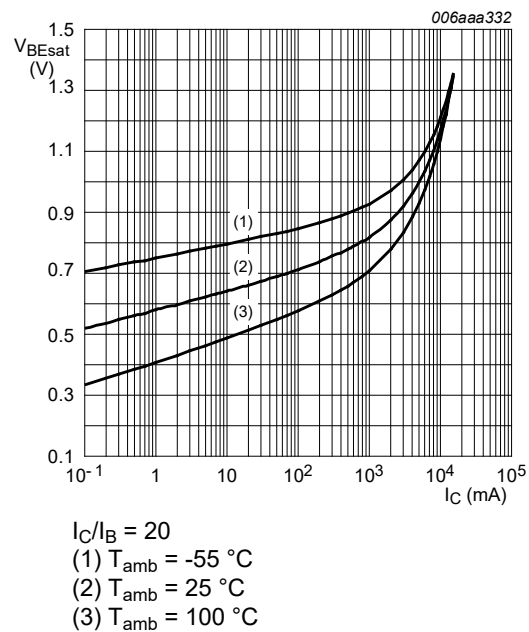


Fig. 8. Base-emitter saturation voltage as a function of collector current; typical values

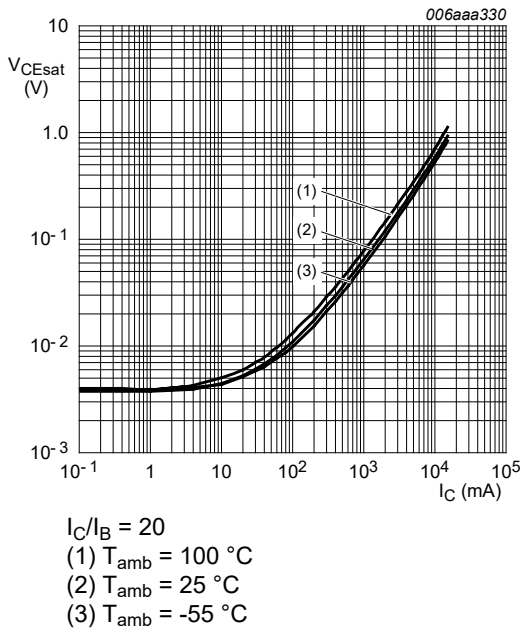


Fig. 9. Collector-emitter saturation voltage as a function of collector current; typical values

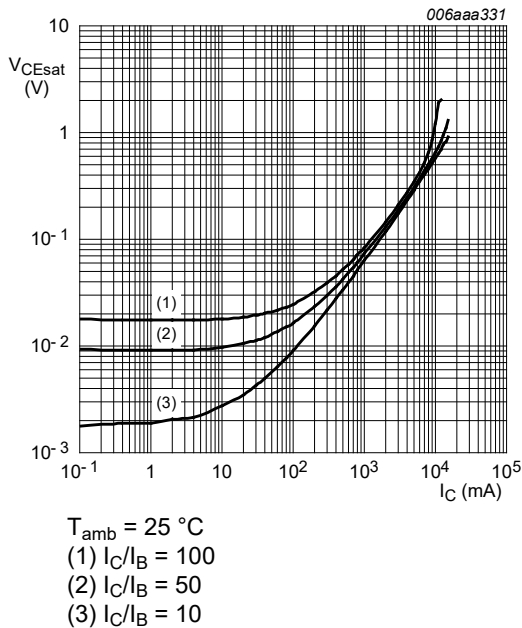


Fig. 10. Collector-emitter saturation voltage as a function of collector current; typical values

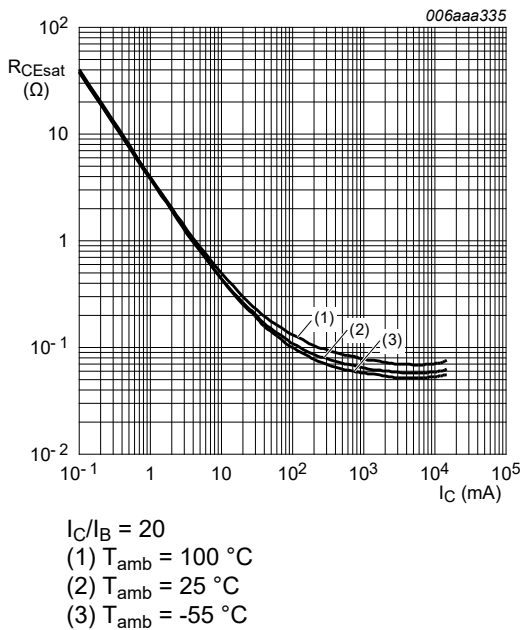


Fig. 11. Collector-emitter saturation resistance as a function of collector current; typical values

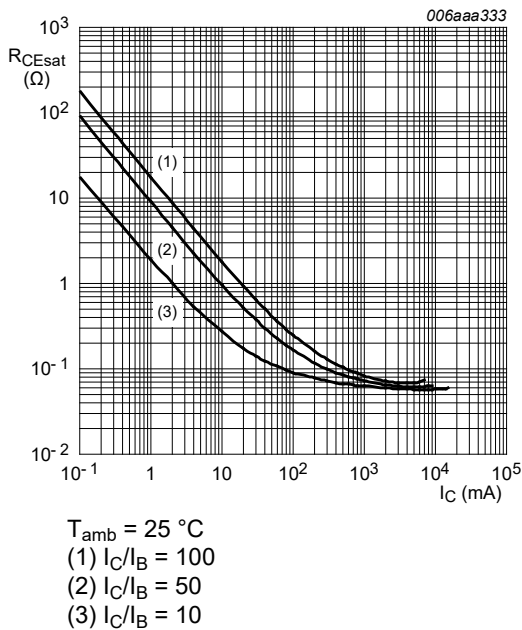


Fig. 12. Collector-emitter saturation resistance as a function of collector current; typical values

11. Test information

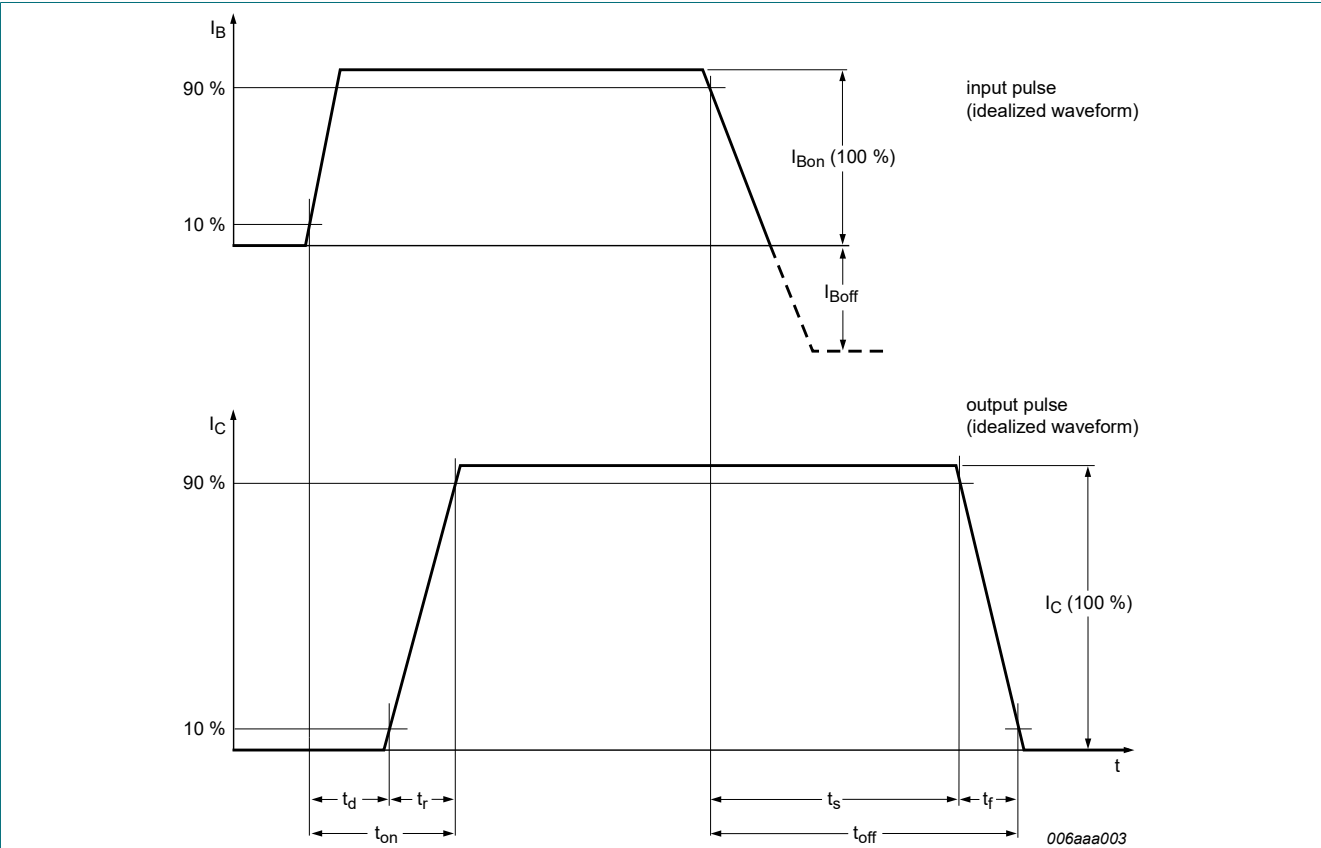


Fig. 13. Switching time definition

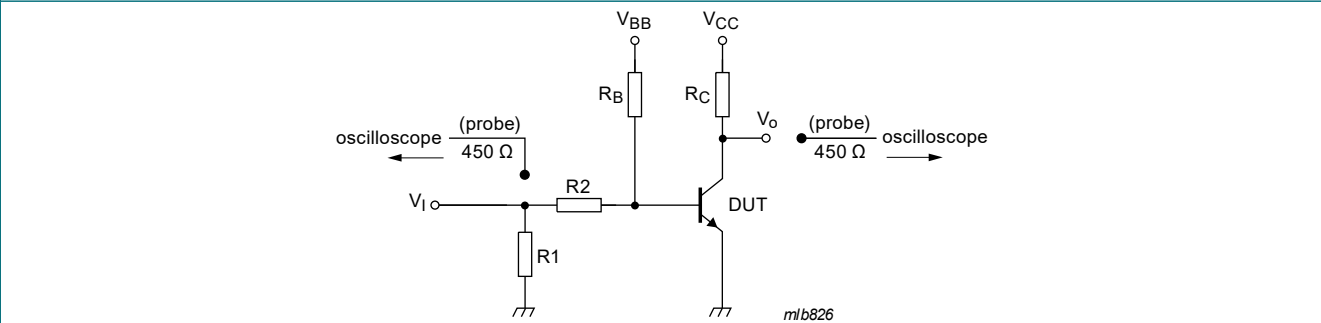
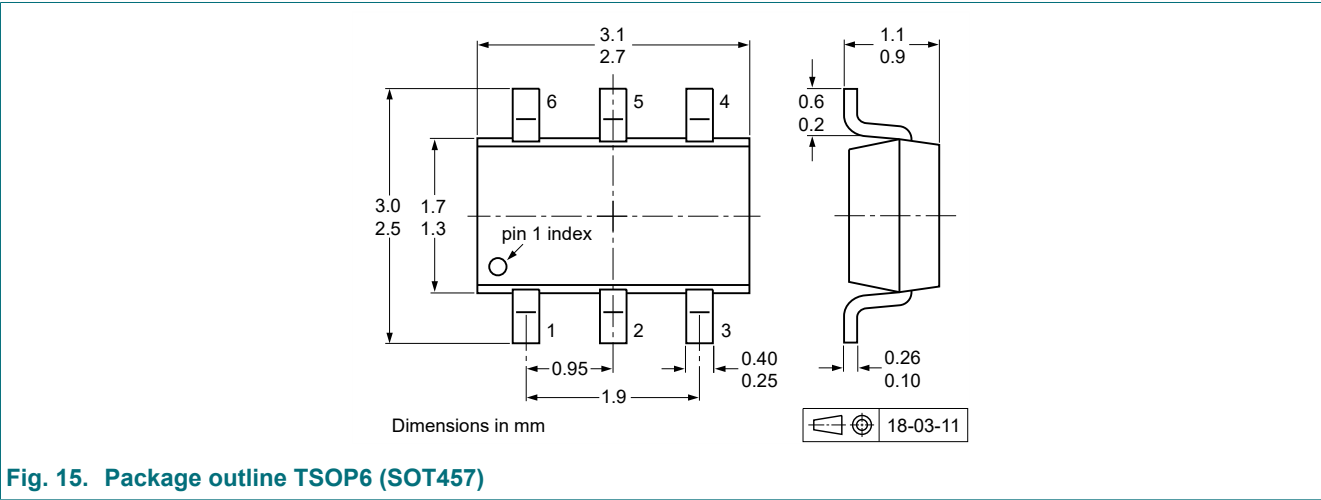


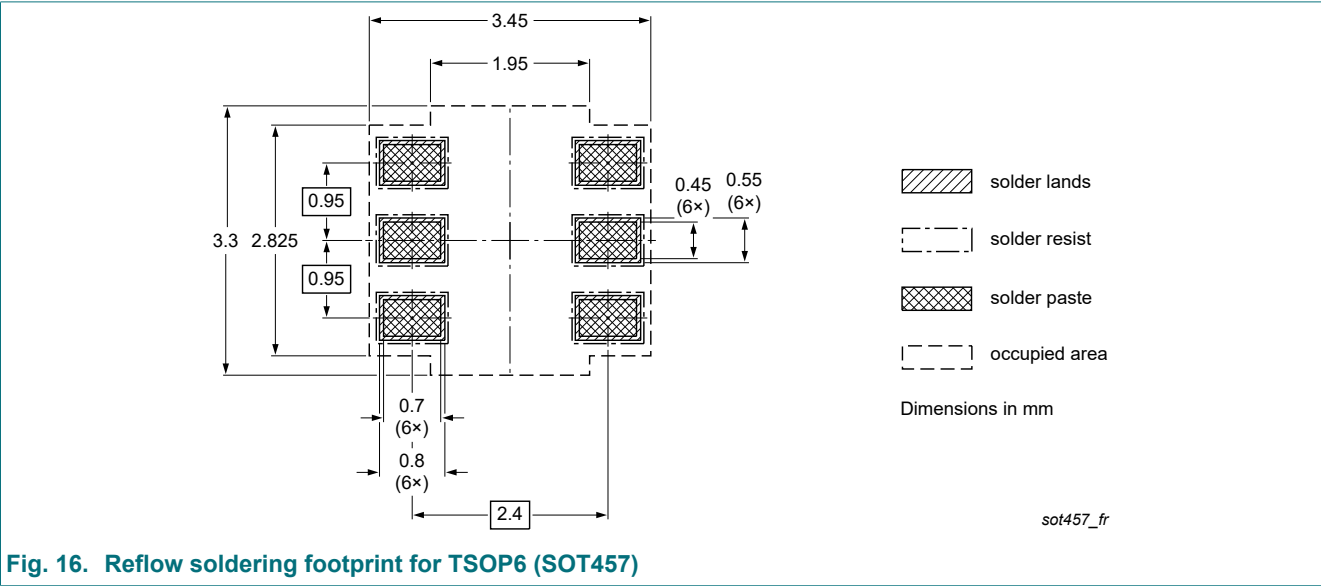
Fig. 14. Test circuit for switching times

$V_{CC} = 12.5\text{ V}$ ;  $I_C = 3\text{ A}$ ;  $I_{B\text{on}} = 0.15\text{ A}$ ;  $I_{B\text{off}} = -0.15\text{ A}$

12. Package outline



13. Soldering



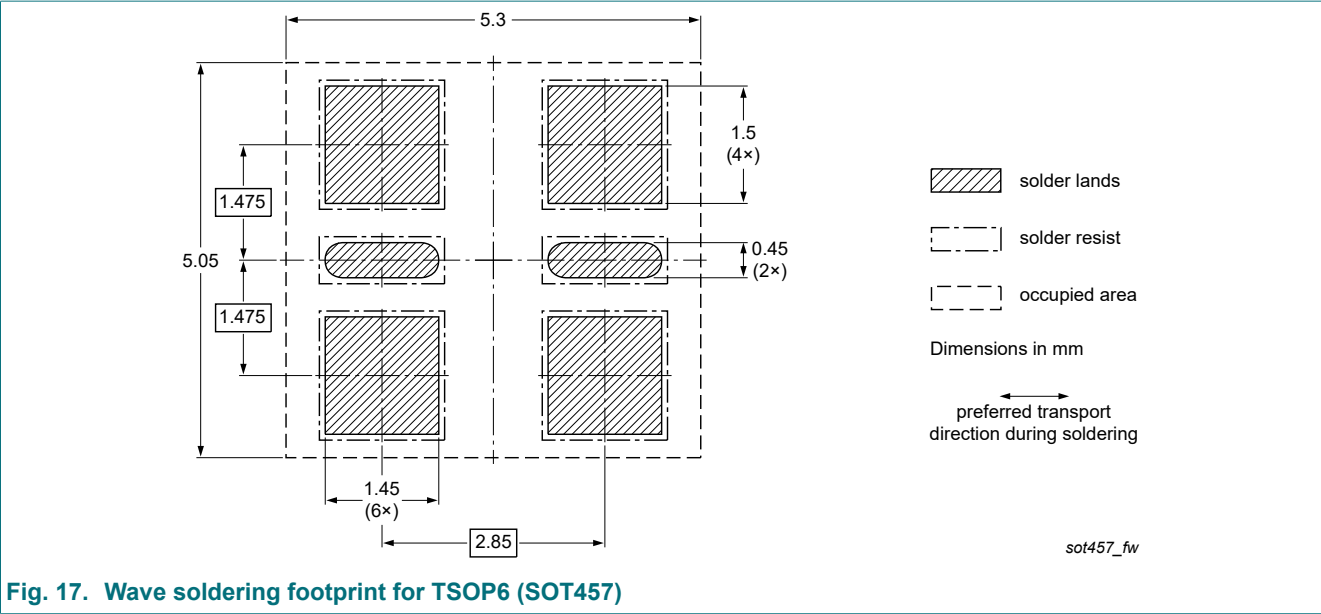


Fig. 17. Wave soldering footprint for TSOP6 (SOT457)

14. Revision history

Table 8. Revision history

| Data sheet ID  | Release date                                                                                                                                                                 | Data sheet status  | Change notice | Supersedes  |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|-------------|
| PBSS4420D v.3  | 20250930                                                                                                                                                                     | Product data sheet | -             | PBSS4420D_2 |
| Modifications: | <ul style="list-style-type: none"><li>Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).</li></ul> |                    |               |             |
| PBSS4420D_2    | 20080924                                                                                                                                                                     | Product data sheet | -             | PBSS4420D_1 |
| PBSS4420D_1    | 20050421                                                                                                                                                                     | 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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