



# BC817DS

NPN/NPN general purpose double transistors

25 June 2019

Product data sheet

## 1. General description

NPN/NPN general-purpose double transistors in an SOT457 (SC-74) plastic package.

PNP/PNP complement: BC807DS

NPN/PNP complement: BC817DPN

## 2. Features and benefits

- Reduces component count
- Reduces pick and place costs
- AEC-Q101 qualified

## 3. Applications

- General purpose switching and amplification

## 4. Quick reference data

Table 1. Quick reference data

| Symbol                | Parameter                 | Conditions                     | Min | Typ | Max | Unit |
|-----------------------|---------------------------|--------------------------------|-----|-----|-----|------|
| <b>Per transistor</b> |                           |                                |     |     |     |      |
| $V_{CEO}$             | collector-emitter voltage | open base                      | -   | -   | 45  | V    |
| $I_C$                 | collector current         |                                | -   | -   | 500 | mA   |
| $I_{CM}$              | peak collector current    | single pulse; $t_p \leq 1$ ms  | -   | -   | 1   | A    |
| $h_{FE}$              | DC current gain           | $V_{CE} = 1$ V; $I_C = 100$ mA | [1] | 160 | 400 |      |

[1] Pulsed test:  $t_p \leq 300$   $\mu$ s;  $\delta \leq 0.02$

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description   | Simplified outline           | Graphic symbol |
|-----|--------|---------------|------------------------------|----------------|
| 1   | E1     | emitter TR1   | <p>SC-74; TSOP6 (SOT457)</p> | <p>sym020</p>  |
| 2   | B1     | base TR1      |                              |                |
| 3   | C2     | collector TR2 |                              |                |
| 4   | E2     | emitter TR2   |                              |                |
| 5   | B2     | base TR2      |                              |                |
| 6   | C1     | collector TR1 |                              |                |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package      |  |         |
|-------------|--------------|--|---------|
|             | Name         | Description  | Version |
| BC817DS     | SC-74; TSOP6 | plastic, surface-mounted package (SC-74; TSOP6); 6 leads | SOT457  |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BC817DS     | N3           |

## 8. Limiting values

Table 5. Limiting values

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

| Symbol                | Parameter                 | Conditions                    | Min | Max | Unit |
|-----------------------|---------------------------|-------------------------------|-----|-----|------|
| <b>Per transistor</b> |                           |                               |     |     |      |
| $V_{CBO}$             | collector-base voltage    | open emitter                  | -   | 50  | V    |
| $V_{CEO}$             | collector-emitter voltage | open base                     | -   | 45  | V    |
| $V_{EBO}$             | emitter-base voltage      | open collector                | -   | 5   | V    |
| $I_C$                 | collector current         |                               | -   | 500 | mA   |
| $I_{CM}$              | peak collector current    | single pulse; $t_p \leq 1$ ms | -   | 1   | A    |
| $I_{BM}$              | peak base current         |                               | -   | 200 | mA   |
| $P_{tot}$             | total power dissipation   | $T_{amb} \leq 25$ °C          | [1] | 370 | mW   |
| $T_j$                 | junction temperature      |                               | -   | 150 | °C   |
| $T_{amb}$             | ambient temperature       |                               | -65 | 150 | °C   |
| $T_{stg}$             | storage temperature       |                               | -65 | 150 | °C   |
| <b>Per device</b>     |                           |                               |     |     |      |
| $P_{tot}$             | total power dissipation   | $T_{amb} \leq 25$ °C          | [1] | 600 | mW   |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB); single-sided 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 |
|-------------------|---|-------------|-----|-----|-----|------|
| <b>Per device</b> |   |             |     |     |     |      |
| $R_{th(j-a)}$     | thermal resistance from junction to ambient | in free air | [1] | -   | 208 | K/W  |

[1] Device mounted on an FR4 PCB; single-sided copper; tin-plated; mounting pad for collector 1 cm<sup>2</sup>.

## 10. Characteristics

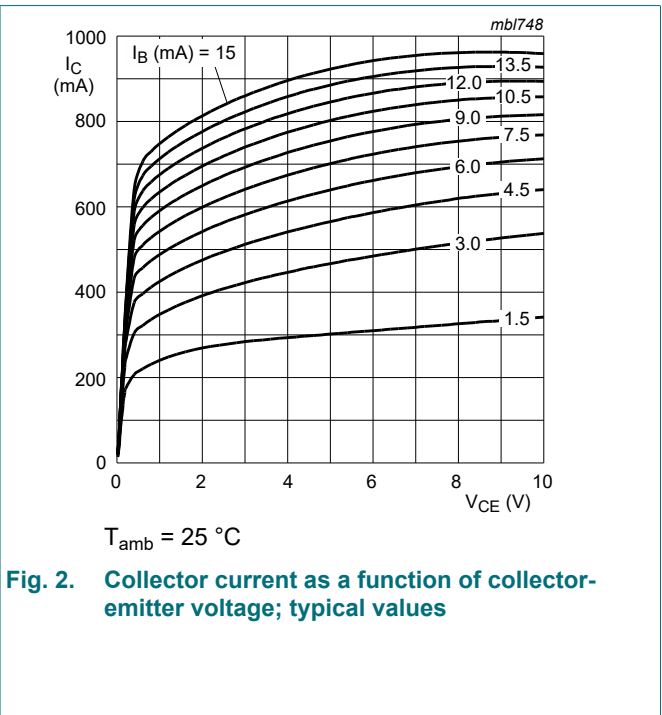
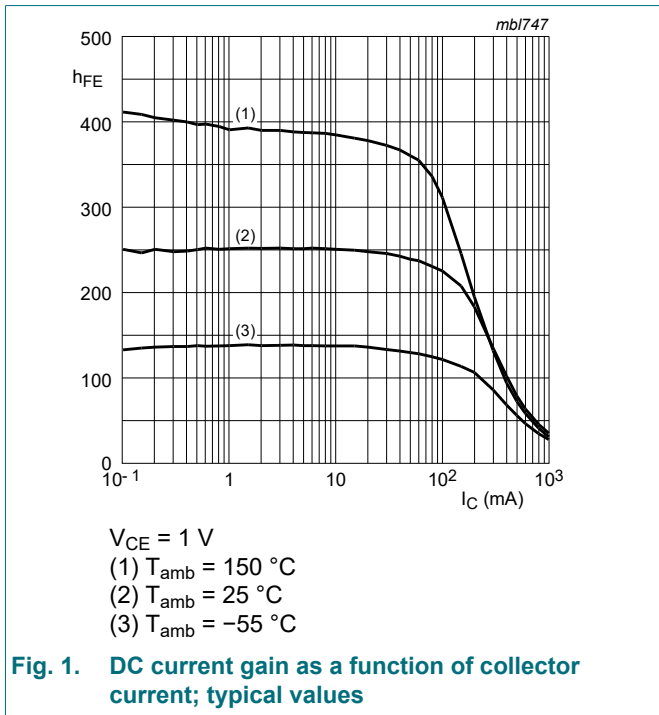
**Table 7. Characteristics**

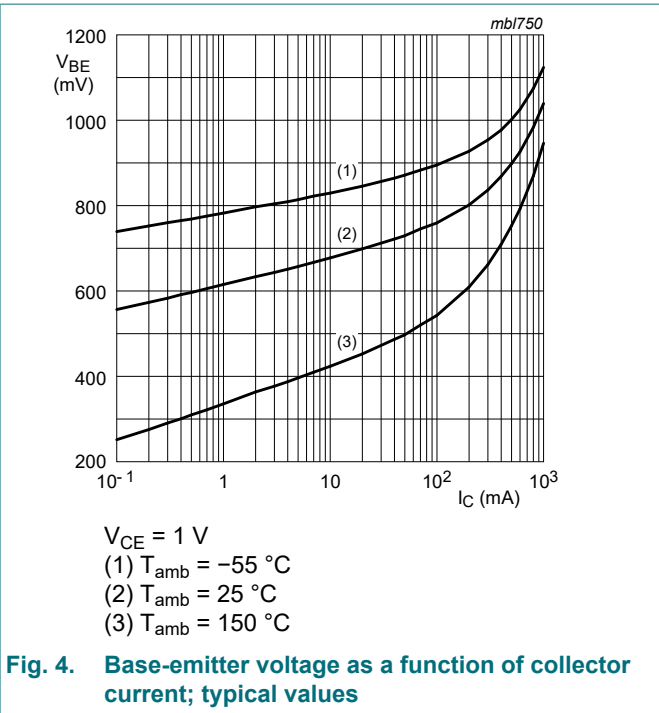
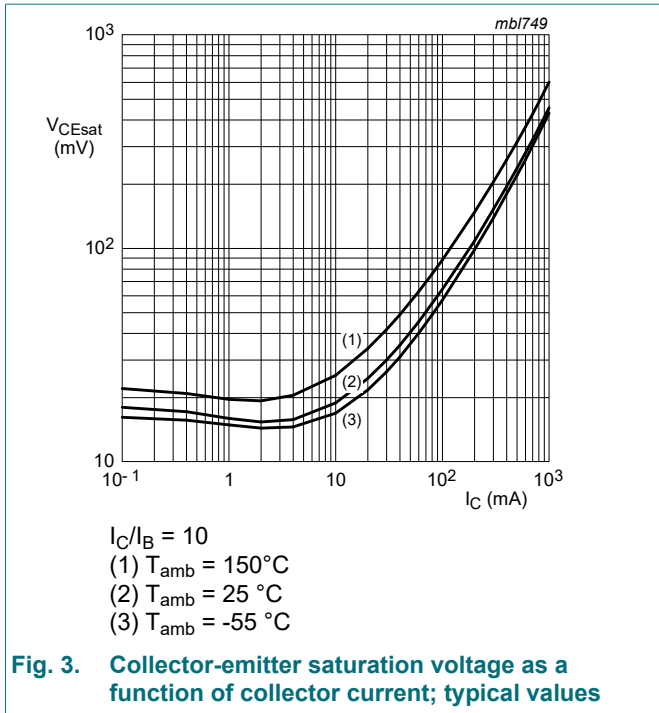
$T_{amb} = 25\text{ °C}$  unless otherwise specified.

| Symbol                | Parameter                            | Conditions   | Min     | Typ | Max | Unit          |   |
|-----------------------|--------------------------------------|--|---------|-----|-----|---------------|---|
| <b>Per transistor</b> |                                      |  |         |     |     |               |   |
| $I_{CBO}$             | collector-base cut-off current       | $V_{CB} = 20\text{ V}; I_E = 0\text{ A}$                                     | -       | -   | 100 | nA            |   |
|                       |                                      | $V_{CB} = 20\text{ V}; I_E = 0\text{ A}; T_J = 150\text{ °C}$                | -       | -   | 5   | $\mu\text{A}$ |   |
| $I_{EBO}$             | emitter-base cut-off current         | $V_{EB} = 5\text{ V}; I_C = 0\text{ A}$                                      | -       | -   | 100 | nA            |   |
| $h_{FE}$              | DC current gain                      | $V_{CE} = 1\text{ V}; I_C = 100\text{ mA}$                                   | [1]     | 160 | -   | 400           |   |
|                       |                                      | $V_{CE} = 1\text{ V}; I_C = 500\text{ mA}$                                   | [1]     | 40  | -   | -             |   |
| $V_{CEsat}$           | collector-emitter saturation voltage | $I_C = 500\text{ mA}; I_B = 50\text{ mA}$                                    | [1]     | -   | 700 | mV            |   |
| $V_{BE}$              | base-emitter voltage                 | $V_{CE} = 1\text{ V}; I_C = 500\text{ mA}$                                   | [1] [2] | -   | -   | 1.2           | V |
| $C_c$                 | collector capacitance                | $V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}$ | -       | 5   | -   | $\mu\text{F}$ |   |
| $f_T$                 | transition frequency                 | $V_{CE} = 5\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}$                | 100     | -   | -   | MHz           |   |

[1] Pulsed test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$

[2]  $V_{BE}$  decreases by approximately  $-2\text{ mV/k}$  with increasing temperature.



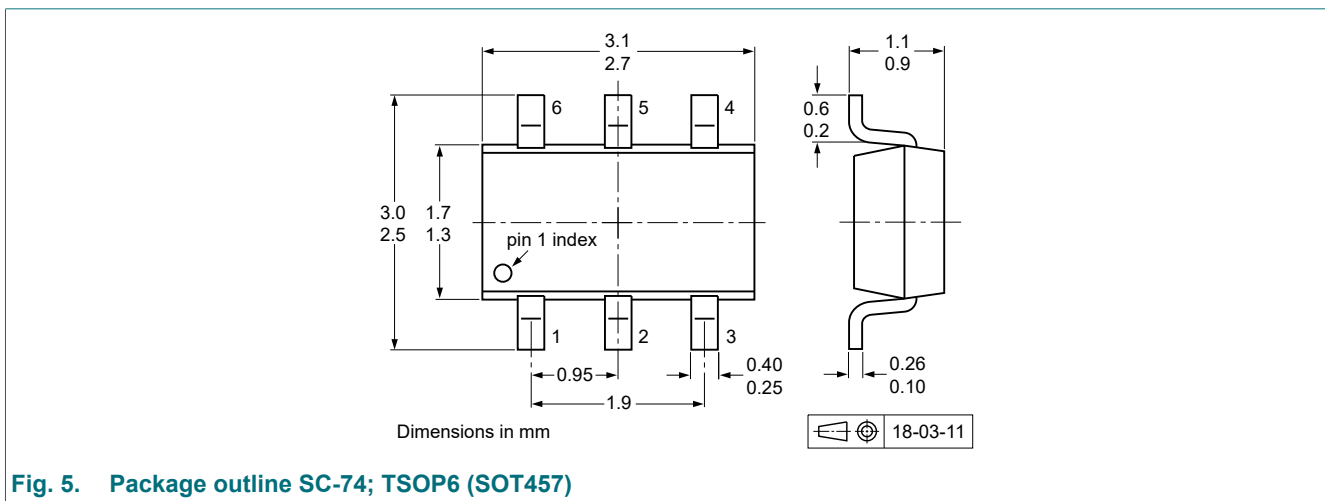


## 11. Test information

### 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



### 13. Soldering

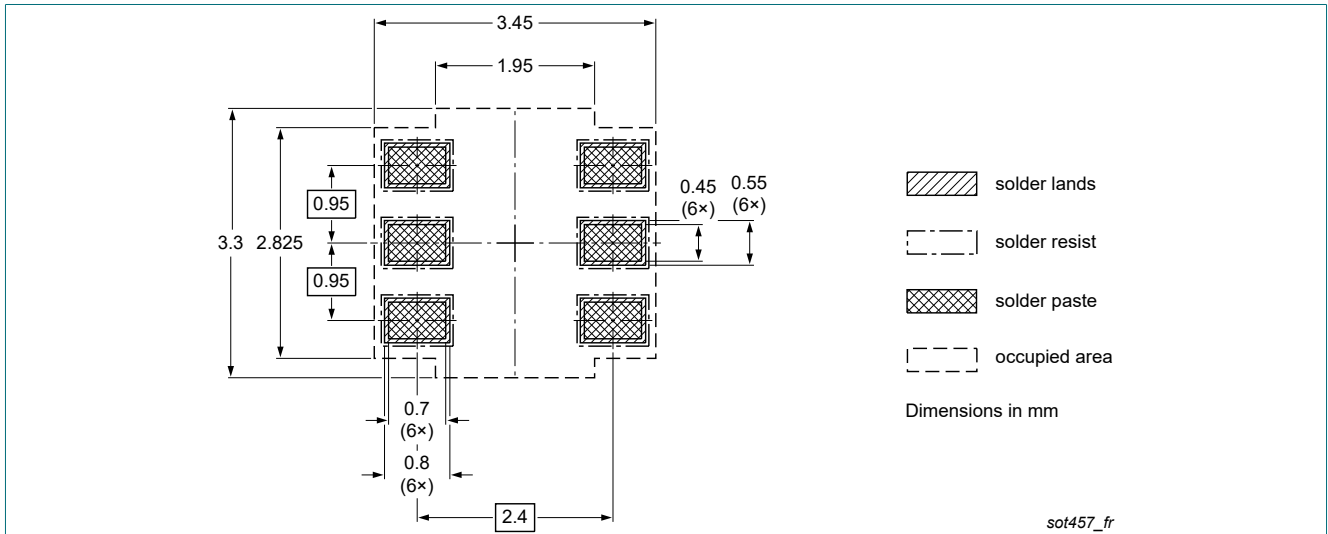


Fig. 6. Reflow soldering footprint for SC-74; TSOP6 (SOT457)

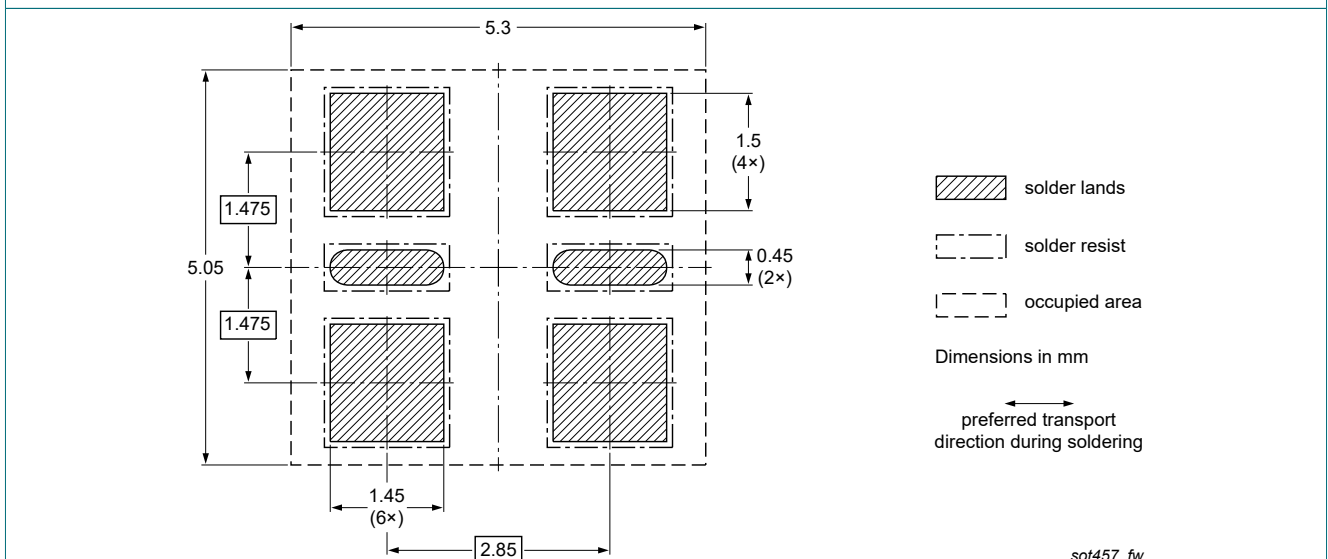


Fig. 7. Wave soldering footprint for SC-74; TSOP6 (SOT457)

### 14. Revision history

Table 8. Revision history

| Data sheet ID  | Release date  | Data sheet status  | Change notice | Supersedes  |
|----------------|---|--------------------|---------------|-------------|
| BC817DS v.3    | 20190625  | Product data sheet | -             | BC817DS v.2 |
| 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> </ul> |                    |               |             |
| BC817DS v.2    | 20021122  | Product data sheet | -             | BC817DS v.1 |
| BC817DS v.1    | 20020809  | 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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