

# **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. Quid    | ck reference data            |  |     |     |     |     |      |
|------------------|------------------------------|--|-----|-----|-----|-----|------|
| Symbol           | Parameter                    | Conditions                                     |     | Min | Тур | Max | Unit |
| Per transist     | or                           | -  |     | _   |     | _   |      |
| V <sub>CEO</sub> | collector-emitter<br>voltage | open base                                      |     | -   | -   | 45  | V    |
| I <sub>C</sub>   | collector current            |  |     | -   | -   | 500 | mA   |
| I <sub>CM</sub>  | peak collector current       | single pulse; t <sub>p</sub> ≤ 1 ms            |     | -   | -   | 1   | А    |
| h <sub>FE</sub>  | DC current gain              | V <sub>CE</sub> = 1 V; I <sub>C</sub> = 100 mA | [1] | 160 | -   | 400 |      |

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

# 5. Pinning information

| Table 2. F | inning info | rmation       |                       |                |
|------------|-------------|---------------|-----------------------|----------------|
| Pin        | Symbol      | Description   | Simplified outline    | Graphic symbol |
| 1          | E1          | emitter TR1   | 6 5 4                 | C1 B2 E2       |
| 2          | B1          | base TR1      |                       |                |
| 3          | C2          | collector TR2 |                       |                |
| 4          | E2          | emitter TR2   | SC-74; TSOP6 (SOT457) |                |
| 5          | B2          | base TR2      | ,,                    | E1 B1 C2       |
| 6          | C1          | collector TR1 |                       | sym020         |



# 6. Ordering information

| Table 3. Ordering information |              |  |         |  |  |  |
|-------------------------------|--------------|--|---------|--|--|--|
| Type number                   | Package      | ckage  |         |  |  |  |
|                               | 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 |
|------------------|---------------------------|-------------------------------------|-----|-----|-----|------|
| Per transist     | or                        | 1                                   |     | I   |     |      |
| V <sub>CBO</sub> | collector-base voltage    | open emitter                        |     | -   | 50  | V    |
| V <sub>CEO</sub> | collector-emitter voltage | open base                           |     | -   | 45  | V    |
| V <sub>EBO</sub> | emitter-base voltage      | open collector                      |     | -   | 5   | V    |
| I <sub>C</sub>   | collector current         |                                     |     | -   | 500 | mA   |
| I <sub>CM</sub>  | peak collector current    | single pulse; t <sub>p</sub> ≤ 1 ms |     | -   | 1   | А    |
| I <sub>BM</sub>  | peak base current         |                                     |     | -   | 200 | mA   |
| P <sub>tot</sub> | total power dissipation   | T <sub>amb</sub> ≤ 25 °C            | [1] | -   | 370 | mW   |
| Tj               | junction temperature      |                                     |     | -   | 150 | °C   |
| T <sub>amb</sub> | ambient temperature       |                                     |     | -65 | 150 | °C   |
| T <sub>stg</sub> | storage temperature       |                                     |     | -65 | 150 | °C   |
| Per device       | I                         |                                     |     |     |     |      |
| P <sub>tot</sub> | total power dissipation   | T <sub>amb</sub> ≤ 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 Unit Тур Max Per device thermal resistance from in free air 208 K/W $\mathsf{R}_{\mathsf{th}(\mathsf{j-a})}$ [1] \_ junction to ambient

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

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# **10. Characteristics**

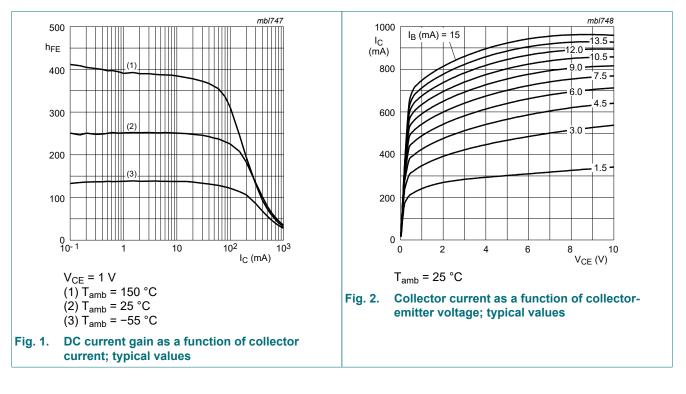
### **Table 7. Characteristics**

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

| Symbol             | Parameter                            | Conditions  |         | Min | Тур | Max | Unit |
|--------------------|--------------------------------------|---|---------|-----|-----|-----|------|
| Per transist       | tor                                  |   |         |     | _   | _   |      |
| I <sub>CBO</sub>   | collector-base cut-off               | V <sub>CB</sub> = 20 V; I <sub>E</sub> = 0 A                                  |         | -   | -   | 100 | nA   |
|                    | current                              | V <sub>CB</sub> = 20 V; I <sub>E</sub> = 0 A; T <sub>j</sub> = 150 °C         |         | -   | -   | 5   | μA   |
| I <sub>EBO</sub>   | emitter-base cut-off<br>current      | V <sub>EB</sub> = 5 V; I <sub>C</sub> = 0 A                                   |         | -   | -   | 100 | nA   |
| h <sub>FE</sub>    | DC current gain                      | V <sub>CE</sub> = 1 V; I <sub>C</sub> = 100 mA                                | [1]     | 160 | -   | 400 |      |
|                    |                                      | V <sub>CE</sub> = 1 V; I <sub>C</sub> = 500 mA                                | [1]     | 40  | -   | -   |      |
| V <sub>CEsat</sub> | collector-emitter saturation voltage | I <sub>C</sub> = 500 mA; I <sub>B</sub> = 50 mA                               | [1]     | -   | -   | 700 | mV   |
| V <sub>BE</sub>    | base-emitter voltage                 | V <sub>CE</sub> = 1 V; I <sub>C</sub> = 500 mA                                | [1] [2] | -   | -   | 1.2 | V    |
| 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 |         | -   | 5   | -   | pF   |
| f <sub>T</sub>     | transition frequency                 | V <sub>CE</sub> = 5 V; I <sub>C</sub> = 10 mA; f = 100 MHz                    |         | 100 | -   | -   | MHz  |

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

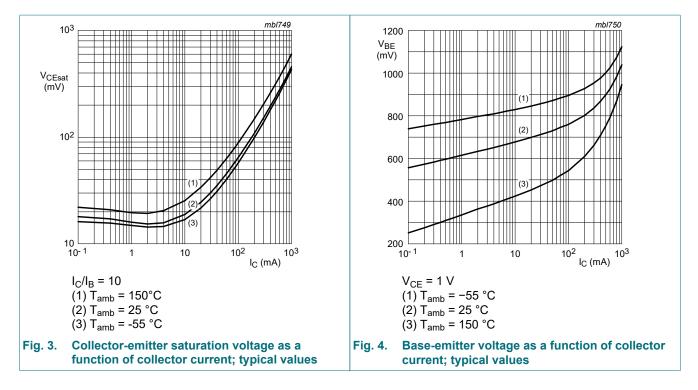
[2]  $V_{BE}$  decreases by approximately -2 mV/k with increasing temperature.



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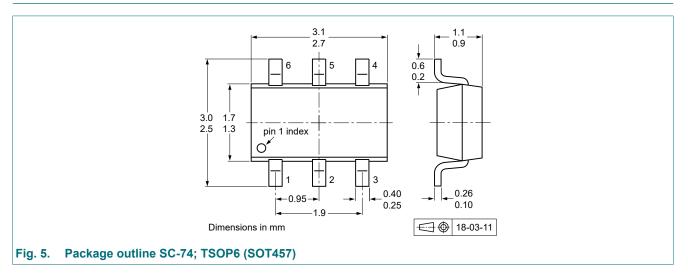


### **11. Test information**

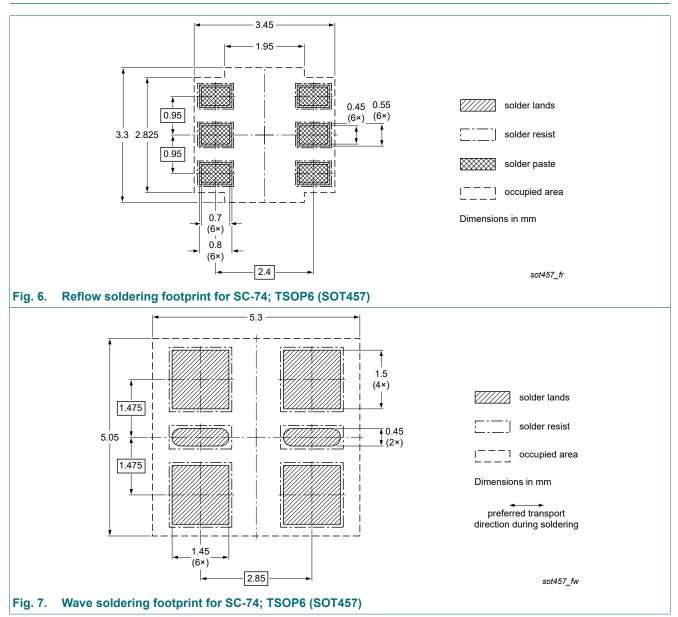
### **Quality information**

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



# 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> <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<br>[1][2]         | Product<br>status [3] | Definition  |
|-----------------------------------|-----------------------|---|
| Objective [short]<br>data sheet   | Development           | This document contains data from<br>the objective specification for<br>product development. |
| Preliminary [short]<br>data sheet | Qualification         | This document contains data from the preliminary specification.                             |
| Product [short]<br>data sheet     | Production            | This document contains the product specification.   |

 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 <u>https://www.nexperia.com</u>.

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