



# BSP52

## NPN Darlington transistor

30 September 2025

Product data sheet

## 1. General description

NPN Darlington transistor in an SOT223 Surface-Mounted Device (SMD) plastic package.

PNP complement: BSP62

## 2. Features and benefits

- High current of 1 A
- Low voltage of 80 V
- Integrated diode and resistor

## 3. Applications

- Industrial high gain amplification

## 4. Quick reference data

Table 1. Quick reference data

| Symbol    | Parameter                 | Conditions                                  | Min | Typ  | Max | Unit |
|-----------|---------------------------|---------------------------------------------|-----|------|-----|------|
| $V_{CBO}$ | collector-base voltage    | open emitter                                | -   | -    | 90  | V    |
| $V_{CES}$ | collector-emitter voltage | base short-circuited to emitter             | -   | -    | 80  | V    |
| $I_C$     | collector current         |                                             | -   | -    | 1   | A    |
| $I_{CM}$  | peak collector current    |                                             | -   | -    | 2   | A    |
| $h_{FE}$  | DC current gain           | $V_{CE} = 10\text{ V}; I_C = 150\text{ mA}$ | [1] | 1000 | -   | -    |

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

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--------------------|----------------|
| 1   | B      | base        | <br>SC-73 (SOT223) | <br>aaa-027580 |
| 2   | C      | collector   |                    |                |
| 3   | E      | emitter     |                    |                |
| 4   | C      | collector   |                    |                |

## 6. Ordering information

Table 3. Ordering information

| Type number           | Package |                                                                                                                 |                        |
|-----------------------|---------|-----------------------------------------------------------------------------------------------------------------|------------------------|
|                       | Name    | Description                                                                                                     | Version                |
| <a href="#">BSP52</a> | SC-73   | plastic, surface-mounted package with increased heatsink; 4 leads; 2.3 mm pitch; 6.5 mm x 3.5 mm x 1.65 mm body | <a href="#">SOT223</a> |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BSP52       | BSP52        |

## 8. Limiting values

Table 5. Limiting values

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

| Symbol    | Parameter                 | Conditions                      |                     | Min | Max  | Unit |
|-----------|---------------------------|---------------------------------|---------------------|-----|------|------|
| $V_{CBO}$ | collector-base voltage    | open emitter                    |                     | -   | 90   | V    |
| $V_{CES}$ | collector-emitter voltage | base short-circuited to emitter |                     | -   | 80   | V    |
| $V_{EBO}$ | emitter-base voltage      | open collector                  |                     | -   | 5    | V    |
| $I_C$     | collector current         |                                 |                     | -   | 1    | A    |
| $I_{CM}$  | peak collector current    |                                 |                     | -   | 2    | A    |
| $I_B$     | base current              |                                 |                     | -   | 100  | mA   |
| $P_{tot}$ | total power dissipation   | $T_{amb} \leq 25\text{ °C}$     | <a href="#">[1]</a> | -   | 1.25 | W    |
| $T_j$     | junction temperature      |                                 |                     | -   | 150  | °C   |
| $T_{amb}$ | ambient temperature       |                                 |                     | -65 | 150  | °C   |
| $T_{stg}$ | storage temperature       |                                 |                     | -65 | 150  | °C   |

[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 |
|----------------|--------------------------------------------------|------------|---------------------|-----|-----|-----|------|
| $R_{th(j-a)}$  | thermal resistance from junction to ambient      |            | <a href="#">[1]</a> | -   | -   | 96  | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |            |                     | -   | -   | 17  | K/W  |

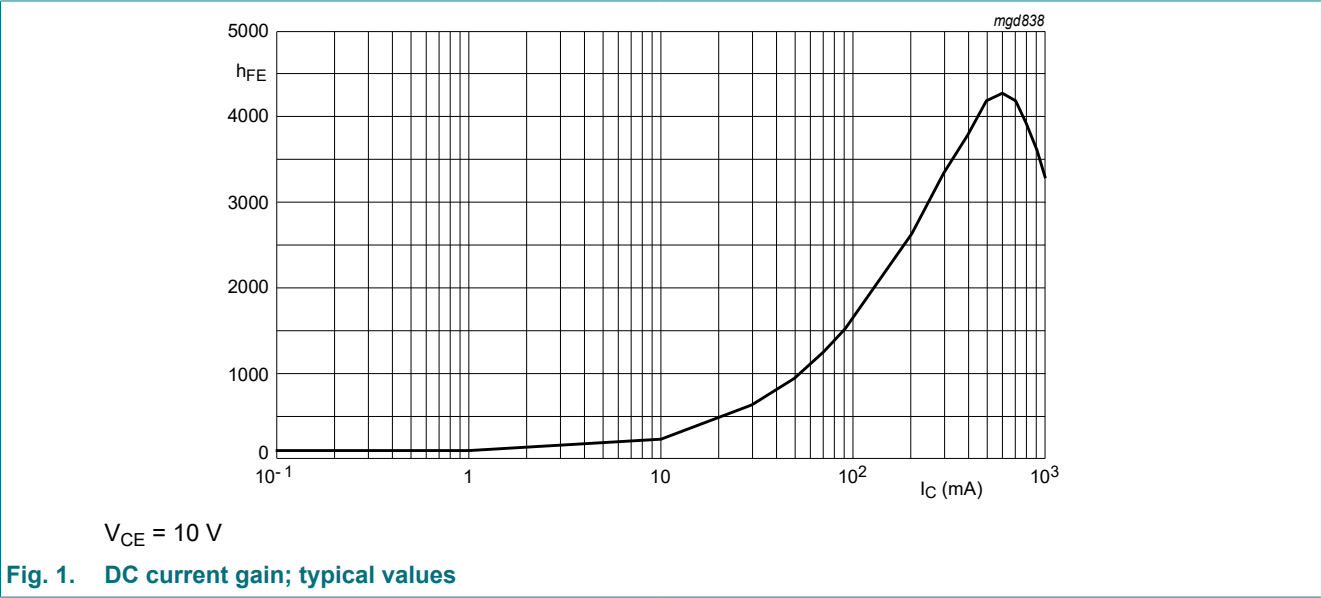
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.

10. Characteristics

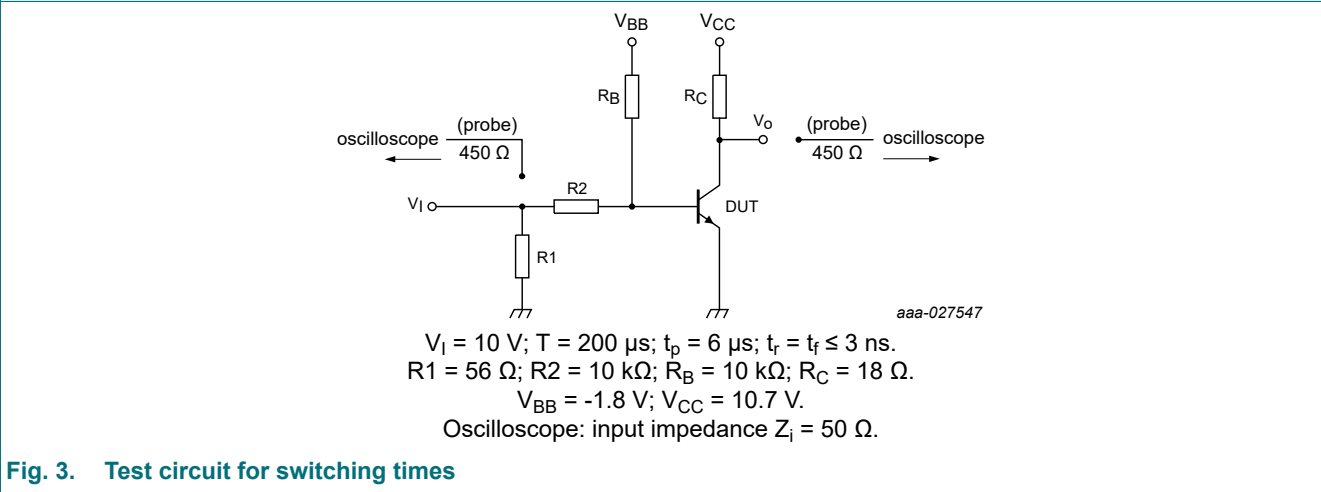
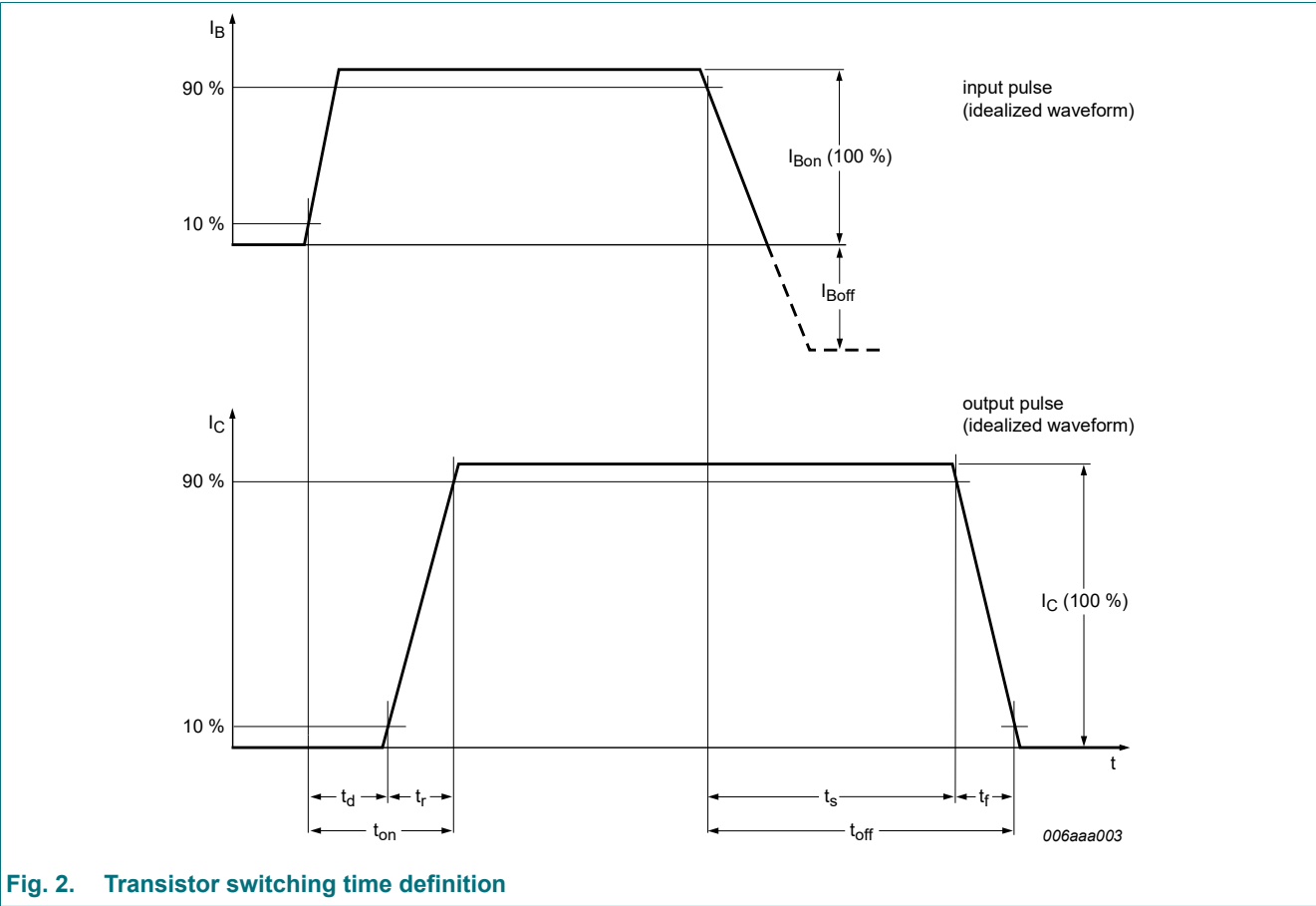
Table 7. Characteristics  
*T<sub>j</sub> = 25 °C unless otherwise specified*

| Symbol               | Parameter                            | Conditions                                                                      |     | Min  | Typ  | Max | Unit |
|----------------------|--------------------------------------|---------------------------------------------------------------------------------|-----|------|------|-----|------|
| V <sub>(BR)CBO</sub> | collector-base breakdown voltage     | I <sub>C</sub> = 100 µA; I <sub>E</sub> = 0 A                                   |     | 90   | -    | -   | V    |
| V <sub>(BR)CES</sub> | collector-emitter breakdown voltage  | I <sub>C</sub> = 2 mA; V <sub>BE</sub> = 0 V                                    |     | 80   | -    | -   | V    |
| V <sub>(BR)EBO</sub> | emitter-base breakdown voltage       | I <sub>C</sub> = 0 A; I <sub>E</sub> = 100 µA                                   |     | 5    | -    | -   | V    |
| I <sub>CES</sub>     | collector-emitter cut-off current    | V <sub>CE</sub> = 80 V; V <sub>BE</sub> = 0 V                                   |     | -    | -    | 50  | nA   |
| I <sub>EBO</sub>     | emitter-base cut-off current         | V <sub>EB</sub> = 4 V; I <sub>C</sub> = 0 A                                     |     | -    | -    | 50  | nA   |
| h <sub>FE</sub>      | DC current gain                      | V <sub>CE</sub> = 10 V; I <sub>C</sub> = 150 mA                                 | [1] | 1000 | -    | -   |      |
|                      |                                      | V <sub>CE</sub> = 10 V; I <sub>C</sub> = 500 mA                                 | [1] | 2000 | -    | -   |      |
| V <sub>CEsat</sub>   | collector-emitter saturation voltage | I <sub>C</sub> = 500 mA; I <sub>B</sub> = 0.5 mA; T <sub>j</sub> = 150 °C       |     | -    | -    | 1.3 | V    |
|                      |                                      |                                                                                 |     | -    | -    | 1.3 | V    |
| V <sub>BEsat</sub>   | base-emitter saturation voltage      | I <sub>C</sub> = 500 mA; I <sub>B</sub> = 0.5 mA                                |     | -    | -    | 1.9 | V    |
| t <sub>on</sub>      | turn-on time                         | I <sub>C</sub> = 500 mA; I <sub>Bon</sub> = 0.5 mA; I <sub>Boff</sub> = -0.5 mA |     | -    | 500  | -   | ns   |
| t <sub>off</sub>     | turn-off time                        |                                                                                 |     | -    | 1300 | -   | ns   |
| f <sub>T</sub>       | transition frequency                 | V <sub>CE</sub> = 5 V; I <sub>C</sub> = 500 mA; f = 100 MHz                     |     | -    | 200  | -   | MHz  |

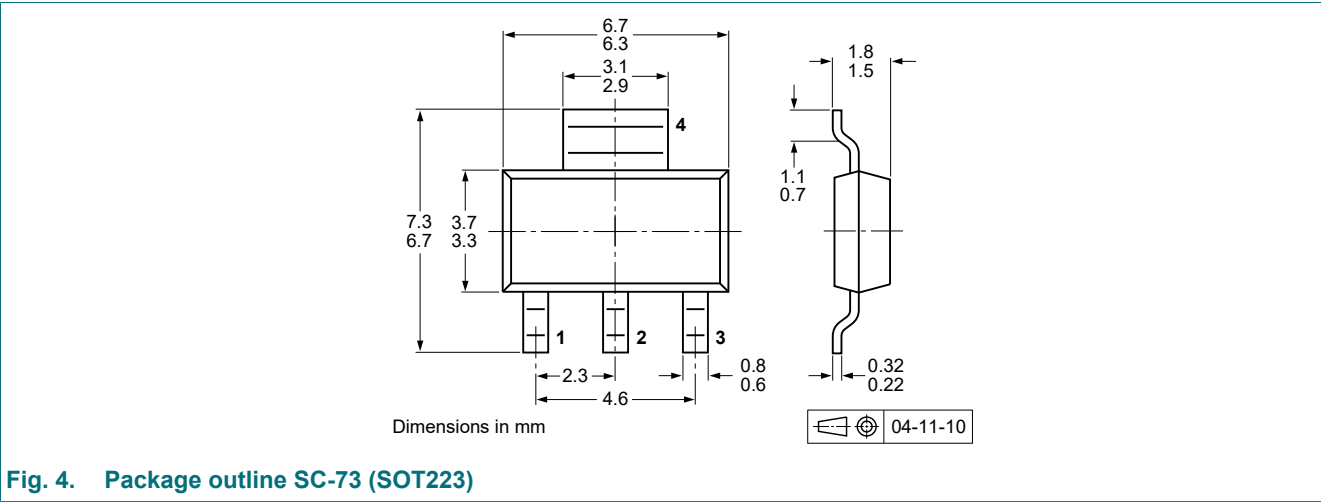
[1] Pulse test: t<sub>p</sub> ≤ 300 µs; δ ≤ 0.02.



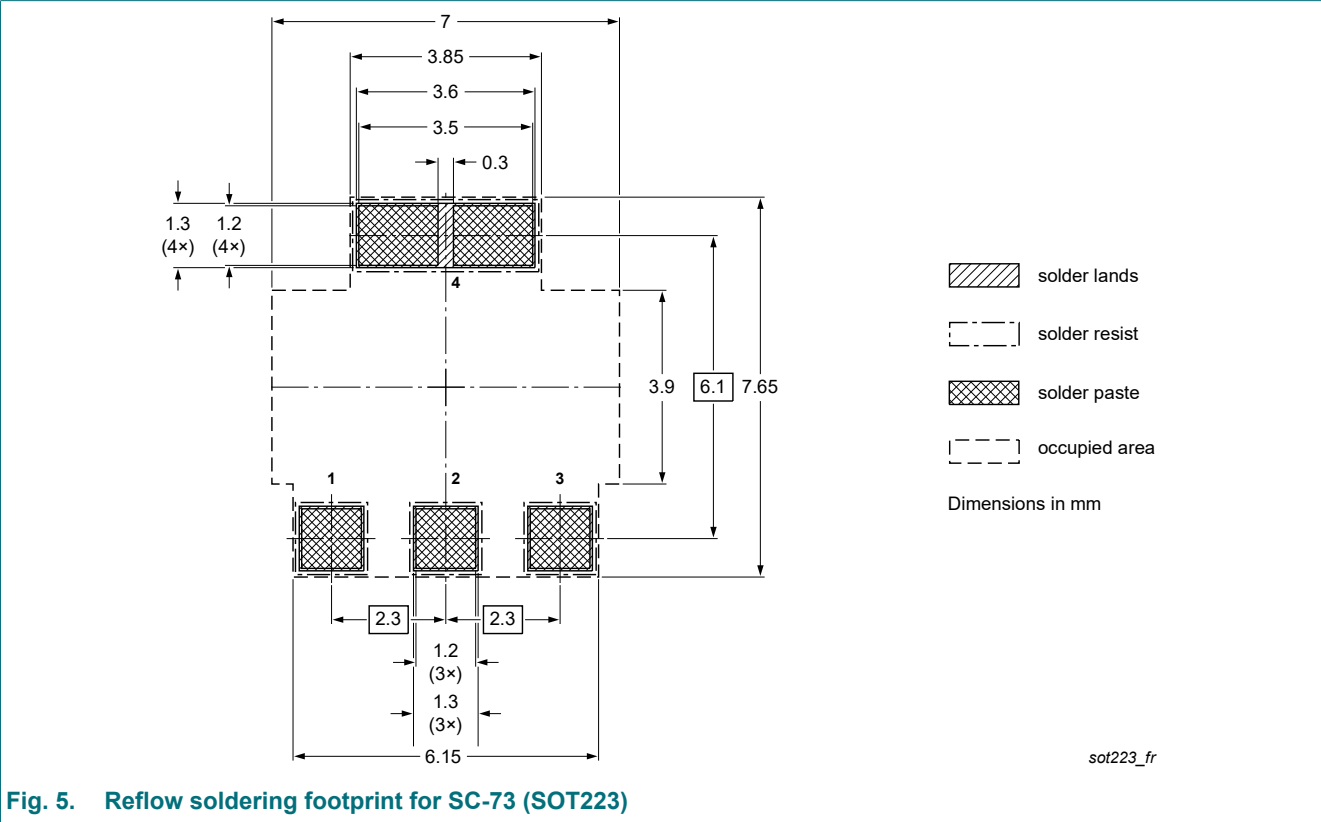
# 11. Test information



12. Package outline



13. Soldering



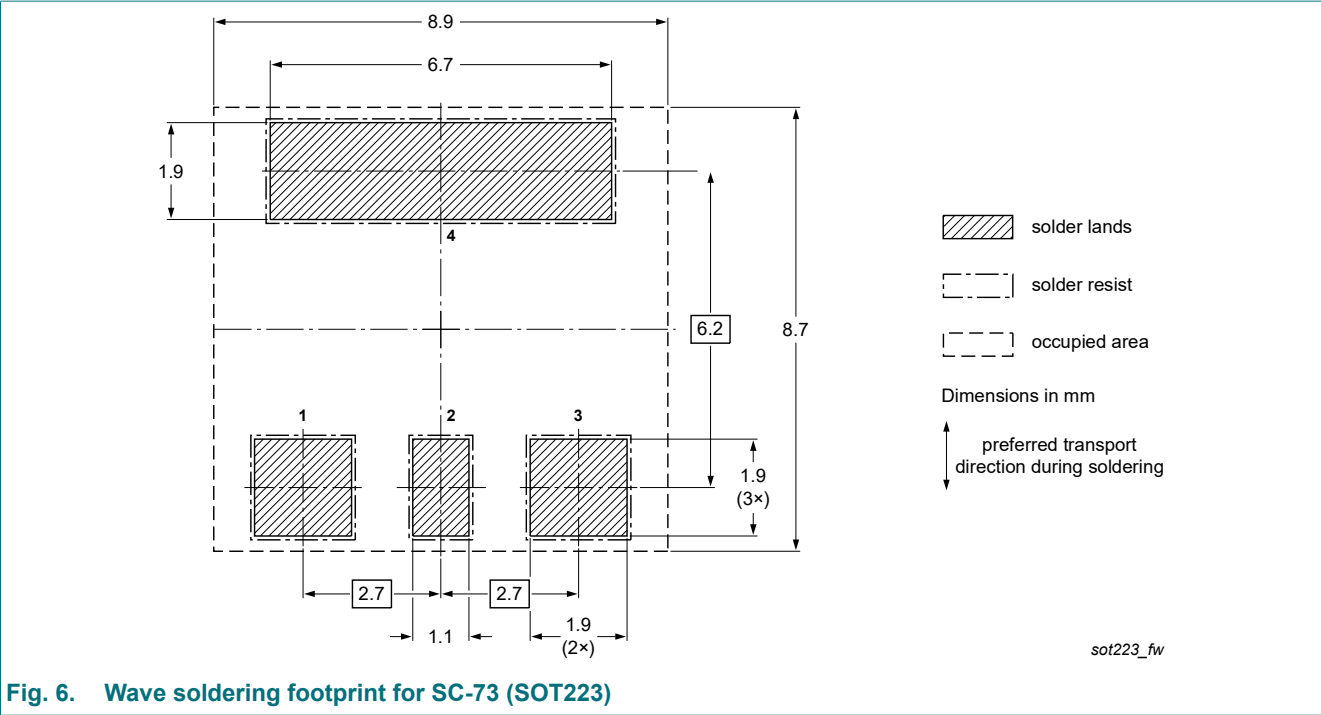


Fig. 6. Wave soldering footprint for SC-73 (SOT223)

14. Revision history

Table 8. Revision history

| Data sheet ID   | Release date                                                                            | Data sheet status  | Change notice | Supersedes      |
|-----------------|-----------------------------------------------------------------------------------------|--------------------|---------------|-----------------|
| BSP52 v.4       | 20250930                                                                                | Product data sheet | -             | BSP52 v.3       |
| Modifications:  | • Product changed to non automotive. Please refer to the automotive product(s) with -Q. |                    |               |                 |
| BSP52 v.3       | 20180223                                                                                | Product data sheet | -             | BSP50_51_52 v.2 |
| BSP50_51_52 v.2 | 19990423                                                                                | 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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