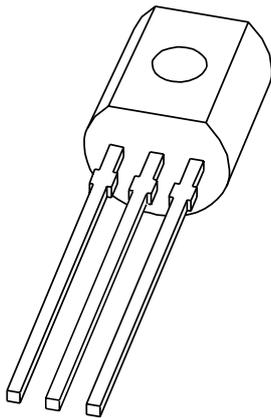# DATA SHEET



# PBSS8110S

## 100 V, 1 A

## NPN low $V_{CEsat}$ (BISS) transistor

Product specification

2004 Aug 13

Supersedes data of 2003 Nov 11

**Philips**
**Semiconductors**

**PHILIPS**

## 100 V, 1 A
## NPN low V$_{CEsat}$ (BISS) transistor

# PBSS8110S

## FEATURES

- SOT54 package
- Low collector-emitter saturation voltage V$_{CEsat}$
- High collector current capability: I$_C$ and I$_{CM}$
- Higher efficiency leading to less heat generation.

## APPLICATIONS

- Automotive 42 V power
- Telecom infrastructure
- General industrial applications
- Power management
  - DC/DC converters
  - Supply line switching
  - Battery charger
  - LCD backlighting.
- Peripheral drivers
  - Generic driver (e.g. lamps and LEDs)
  - Inductive load driver (e.g. relays, buzzers and motors).

## DESCRIPTION

NPN low V$_{CEsat}$ BISS transistor in a SOT54 plastic package.

## MARKING

| TYPE NUMBER | MARKING CODE |
|---|---|
| PBSS8110S | S8110S |

## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|---|---|---|---|
| | NAME | DESCRIPTION | VERSION |
| PBSS8110S | – | plastic single-ended leaded (through hole) package; 3 leads | SOT54 |

## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | UNIT |
|---|---|---|---|
| V$_{CEO}$ | collector-emitter voltage | 100 | V |
| I$_C$ | collector current (DC) | 1 | A |
| I$_{CM}$ | peak collector current | 3 | A |
| R$_{CEsat}$ | equivalent on-resistance | 200 | mΩ |

## PINNING

| PIN | DESCRIPTION |
|---|---|
| 1 | base |
| 2 | collector |
| 3 | emitter |
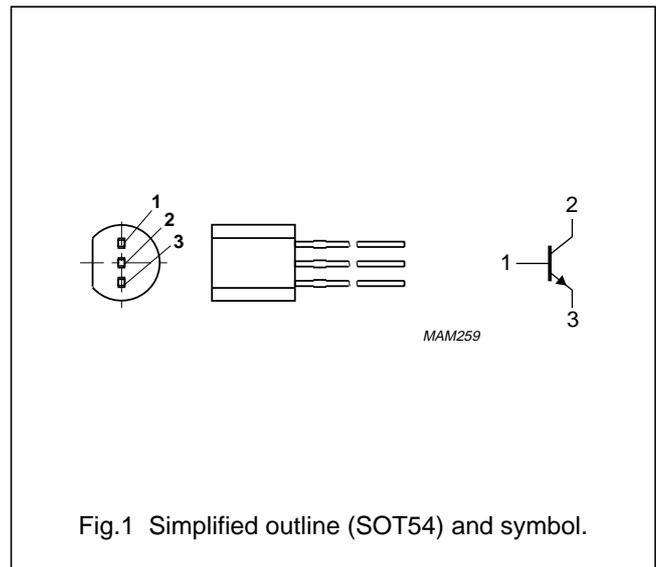


Fig.1  Simplified outline (SOT54) and symbol.

**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 | – | 120 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | – | 100 | V |
| $V_{EBO}$ | emitter-base voltage | open collector | – | 5 | V |
| $I_C$ | collector current (DC) | | – | 1 | A |
| $I_{CM}$ | peak collector current | $T_{j\,max}$ | – | 3 | A |
| $I_B$ | base current (DC) | | – | 300 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25\ ^{\circ}C$; note 1 | – | 830 | mW |
| $T_j$ | junction temperature | | – | 150 | $^{\circ}C$ |
| $T_{amb}$ | operating ambient temperature | | –65 | +150 | $^{\circ}C$ |
| $T_{stg}$ | storage temperature | | –65 | +150 | $^{\circ}C$ |

**Note**

1. Device mounted on a FR4 printed-circuit board; single-sided copper; tinplated; standard footprint.

**THERMAL CHARACTERISTICS**

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th\,j-a}$ | thermal resistance from junction to ambient | in free air; note 1 | 150 | K/W |

**Note**

1. Device mounted on a FR4 printed-circuit board; single-sided copper; tinplated; standard footprint.

**CHARACTERISTICS**

$T_j = 25 \,^\circ C$ unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--------|-----------|------------|------|------|------|------|
| $I_{CBO}$ | collector cut-off current | $V_{CB} = 80$ V; $I_E = 0$ | – | – | 100 | nA |
| | | $V_{CB} = 80$ V; $I_E = 0$; $T_j = 150\,^\circ C$ | – | – | 50 | $\mu A$ |
| $I_{CES}$ | collector cut-off current | $V_{CE} = 80$ V; $V_{BE} = 0$ | – | – | 100 | nA |
| $I_{EBO}$ | emitter cut-off current | $V_{EB} = 4$ V; $I_C = 0$ | – | – | 100 | nA |
| $h_{FE}$ | DC current gain | $V_{CE} = 10$ V; $I_C = 1$ mA | 150 | – | – | |
| | | $V_{CE} = 10$ V; $I_C = 250$ mA | 150 | – | 500 | |
| | | $V_{CE} = 10$ V; $I_C = 0.5$ A; note 1 | 100 | – | – | |
| | | $V_{CE} = 10$ V; $I_C = 1$ A; note 1 | 80 | – | – | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C = 100$ mA; $I_B = 10$ mA | – | – | 40 | mV |
| | | $I_C = 500$ mA; $I_B = 50$ mA | – | – | 120 | mV |
| | | $I_C = 1$ A; $I_B = 100$ mA | – | – | 200 | mV |
| $R_{CEsat}$ | equivalent on-resistance | $I_C = 1$ A; $I_B = 100$ mA; note 1 | – | 165 | 200 | $m\Omega$ |
| $V_{BEsat}$ | base-emitter saturation voltage | $I_C = 1$ A; $I_B = 100$ mA; note 1 | – | – | 1.05 | V |
| $V_{BEon}$ | base-emitter turn-on voltage | $V_{CE} = 10$ V; $I_C = 1$ A | – | – | 0.9 | V |
| $f_T$ | transition frequency | $V_{CE} = 10$ V; $I_C = 50$ mA; $f = 100$ MHz | 100 | – | – | MHz |
| $C_c$ | collector capacitance | $V_{CB} = 10$ V; $I_E = I_e = 0$; $f = 1$ MHz | – | – | 7.5 | pF |

**Note**

1. Pulse test: $t_p \le 300 \,\mu s$; $\delta \le 0.02$.
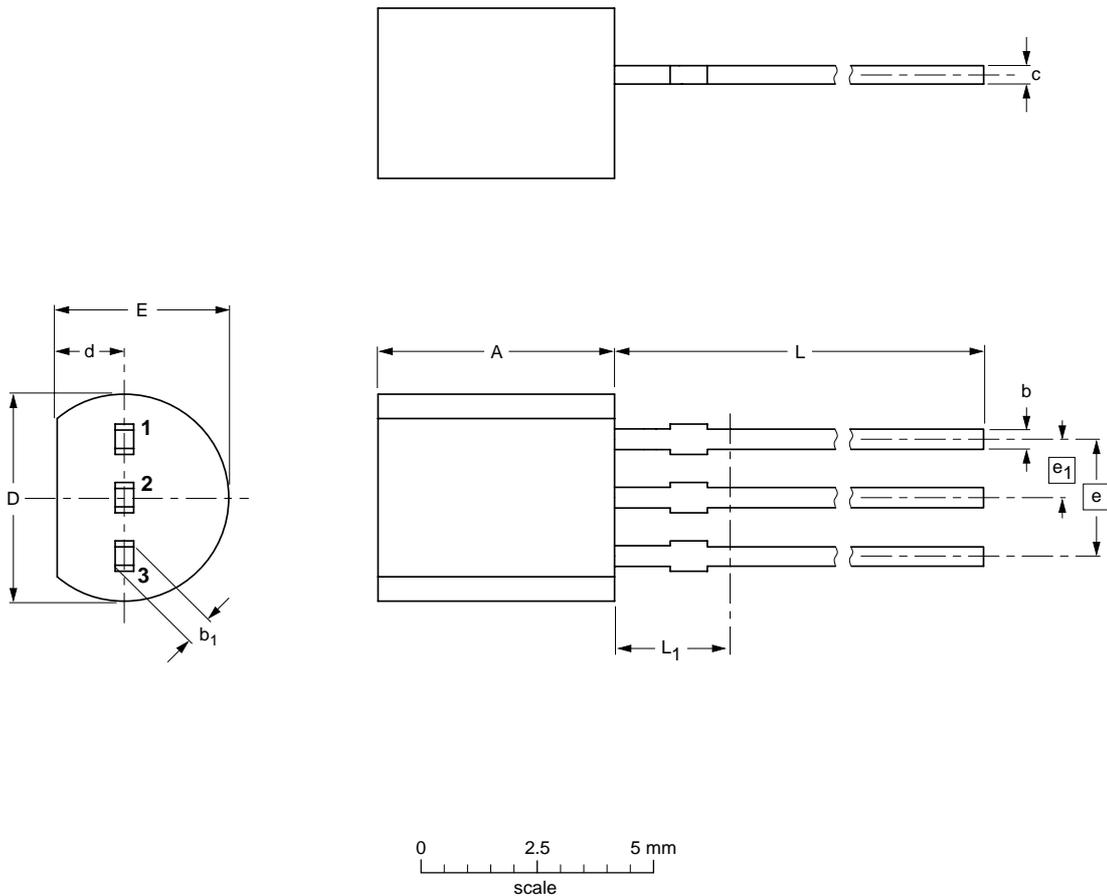
100 V, 1 A
NPN low $V_{CEsat}$ (BISS) transistor

PBSS8110S

**PACKAGE OUTLINE**

**Plastic single-ended leaded (through hole) package; 3 leads**

**SOT54**



**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | b | $b_1$ | c | D | d | E | e | $e_1$ | L | $L_1^{(1)}$ max. |
|------|-----|------|-------|------|-----|-----|-----|------|-------|------|---------|
| mm | 5.2 | 0.48 | 0.66 | 0.45 | 4.8 | 1.7 | 4.2 | 2.54 | 1.27 | 14.5 | 2.5 |
|      | 5.0 | 0.40 | 0.55 | 0.38 | 4.4 | 1.4 | 3.6 |      |      | 12.7 |         |

**Note**

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|-------|--|---------------------|------------|
|                 | IEC | JEDEC | JEITA | | | |
| SOT54 | | TO-92 | SC-43A | | | ~~97-02-28~~ 04-06-28 |

100 V, 1 A
NPN low $V_{CEsat}$ (BISS) transistor

PBSS8110S

**DATA SHEET STATUS**

| LEVEL | DATA SHEET STATUS[1] | PRODUCT STATUS[2][3] | DEFINITION |
|---|---|---|---|
| I | Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice. |
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**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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