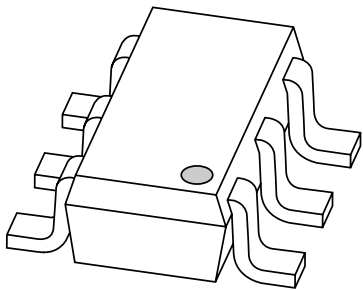


DATA SHEET



PBSS4140DPN 40 V low V_{CEsat} NPN/PNP transistor

Product specification

2001 Dec 13

40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN

FEATURES

- 600 mW total power dissipation
- Low collector-emitter saturation voltage
- High current capability
- Improved device reliability due to reduced heat generation
- Replaces two SOT23 packaged low V_{CEsat} transistors on same PCB area
- Reduces required PCB area
- Reduced pick and place costs.

APPLICATIONS

- General purpose switching and muting
- LCD backlighting
- Supply line switching circuits
- Battery driven equipment (mobile phones, video cameras and hand-held devices).

DESCRIPTION

NPN/PNP low V_{CEsat} transistor pair in an SC-74 (SOT457) plastic package.

MARKING

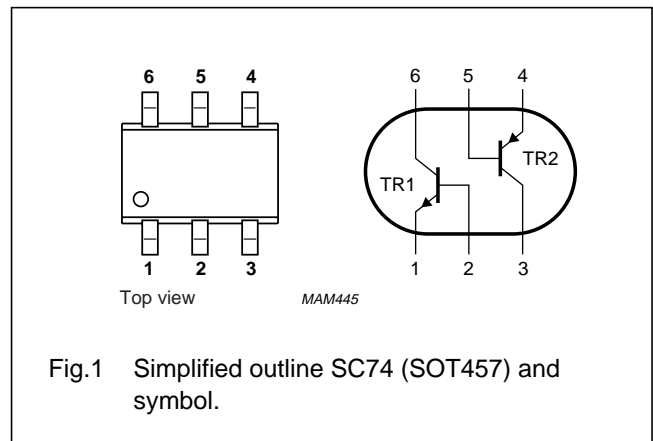
| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| PBSS4140DPN | M2 |

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | UNIT |
|-------------|---------------------------|------|------------|
| V_{CEO} | collector-emitter voltage | 40 | V |
| I_C | peak collector current | 1 | A |
| I_{CM} | peak collector current | 2 | A |
| TR1 | NPN | – | – |
| TR2 | PNP | – | – |
| R_{CEsat} | equivalent on-resistance | <500 | m Ω |

PINNING

| PIN | DESCRIPTION | |
|------|-------------|----------|
| 1, 4 | emitter | TR1; TR2 |
| 2, 5 | base | TR1; TR2 |
| 6, 3 | collector | TR1; TR2 |



40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN

LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|--|-------------------------------|--------------------------------------|------|------|------|
| Per transistor; for the PNP transistor with negative polarity | | | | | |
| V_{CBO} | collector-base voltage | open emitter | – | 40 | V |
| V_{CEO} | collector-emitter voltage | open base | – | 40 | V |
| V_{EBO} | emitter-base voltage | open collector | – | 5 | V |
| I_C | collector current (DC) | | – | 1 | A |
| I_{CM} | peak collector current | | – | 2 | A |
| I_{BM} | peak base current | | – | 1 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$; note 1 | – | 370 | mW |
| T_{stg} | storage temperature | | –65 | +150 | °C |
| T_j | junction temperature | | – | 150 | °C |
| T_{amb} | operating ambient temperature | | –65 | +150 | °C |
| Per device | | | | | |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$; note 1 | – | 600 | mW |

Note

1. Device mounted on a printed-circuit board, single side copper, tinplated, mounting pad for collector 1 cm².

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---------------|---|---------------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | in free air; note 1 | 208 | K/W |

Note

1. Device mounted on a printed-circuit board, single side copper, tinplated, mounting pad for collector 1 cm².

40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN

CHARACTERISTICS

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

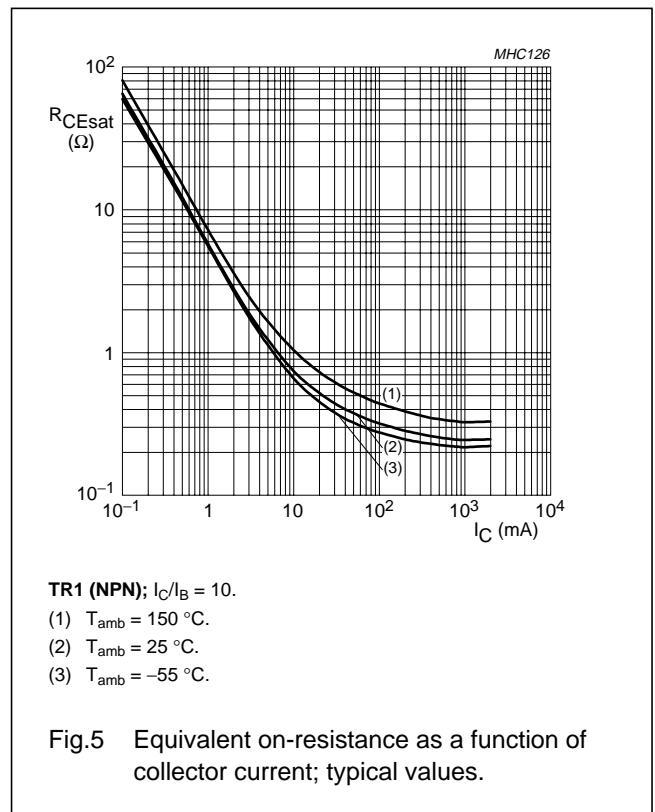
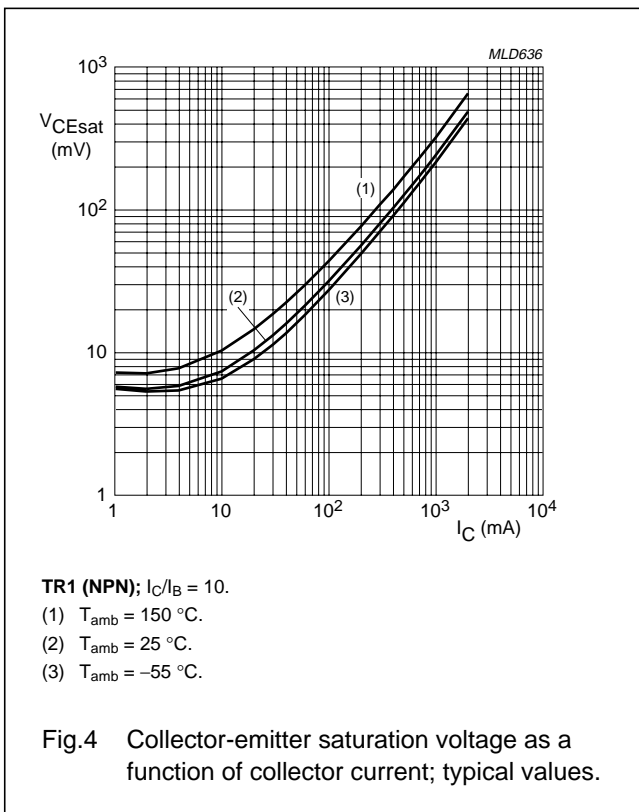
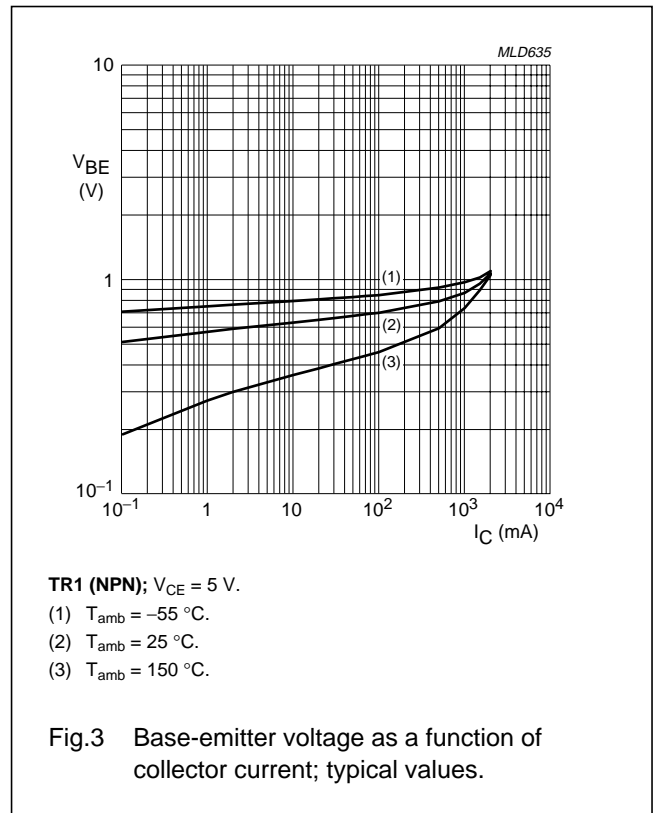
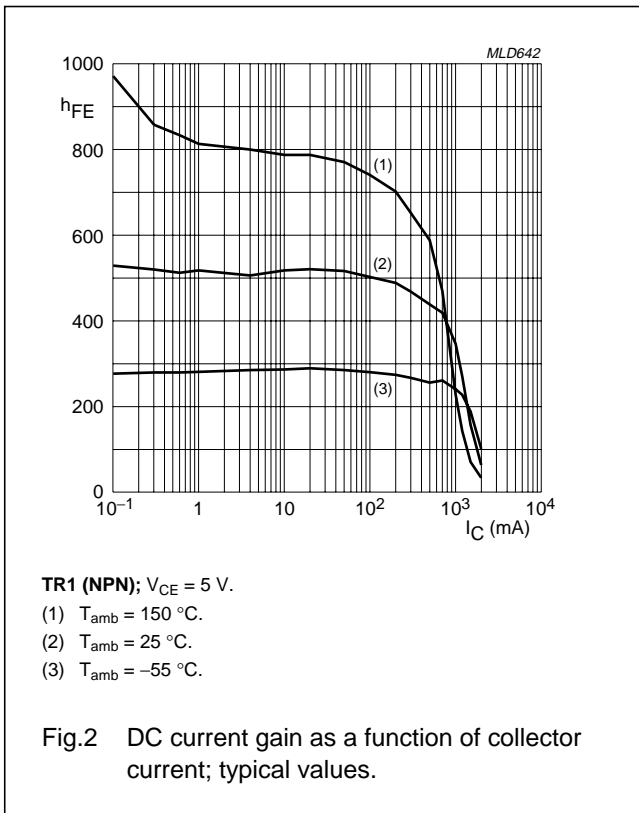
| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|--------------------------------------|--|------|------|------|------------------|
| Per transistor unless otherwise specified; for the PNP transistor with negative polarity | | | | | | |
| I_{CBO} | collector-base cut-off current | $V_{CB} = 40\text{ V}; I_E = 0$ | – | – | 100 | nA |
| | | $V_{CB} = 40\text{ V}; I_E = 0; T_j = 150\text{ °C}$ | – | – | 50 | μA |
| I_{CEO} | collector-emitter cut-off current | $V_{CE} = 30\text{ V}; I_B = 0$ | – | – | 100 | nA |
| I_{EBO} | emitter-base cut-off current | $V_{EB} = 5\text{ V}; I_C = 0$ | – | – | 100 | nA |
| h_{FE} | DC current gain | $V_{CE} = 5\text{ V}; I_C = 1\text{ mA}$ | 300 | – | – | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = 100\text{ mA}; I_B = 1\text{ mA}$ | – | – | 200 | mV |
| | | $I_C = 500\text{ mA}; I_B = 50\text{ mA}$ | – | – | 250 | mV |
| | | $I_C = 1\text{ A}; I_B = 100\text{ mA}$ | – | – | 500 | mV |
| NPN transistor | | | | | | |
| h_{FE} | DC current gain | $V_{CE} = 5\text{ V}; I_C = 500\text{ mA}$ | 300 | – | 900 | |
| | | $V_{CE} = 5\text{ V}; I_C = 1\text{ A}$ | 200 | – | – | |
| V_{BEsat} | base-emitter saturation voltage | $I_C = 1\text{ A}; I_B = 100\text{ mA}$ | – | – | 1.2 | V |
| V_{BEon} | base-emitter turn-on voltage | $V_{CE} = 5\text{ V}; I_C = 1\text{ A}$ | – | – | 1.1 | V |
| R_{CEsat} | equivalent on-resistance | $I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note } 1$ | – | 260 | <500 | $\text{m}\Omega$ |
| f_T | transition frequency | $V_{CE} = 10\text{ V}; I_C = 50\text{ mA}; f = 100\text{ MHz}$ | 150 | – | – | MHz |
| C_c | collector capacitance | $V_{CB} = 10\text{ V}; I_E = I_e = 0; f = 1\text{ MHz}$ | – | – | 10 | pF |
| PNP transistor | | | | | | |
| h_{FE} | DC current gain | $V_{CE} = -5\text{ V}; I_C = -100\text{ mA}$ | 300 | – | 800 | |
| | | $V_{CE} = -5\text{ V}; I_C = -500\text{ mA}$ | 250 | – | – | |
| | | $V_{CE} = -5\text{ V}; I_C = -1\text{ A}$ | 160 | – | – | |
| V_{BEsat} | base-emitter saturation voltage | $I_C = -1\text{ A}; I_B = -50\text{ mA}$ | – | – | -1.1 | V |
| V_{BEon} | base-emitter turn-on voltage | $V_{CE} = -5\text{ V}; I_C = -1\text{ A}$ | – | – | -1.0 | V |
| R_{CEsat} | equivalent on-resistance | $I_C = -500\text{ mA}; I_B = -50\text{ mA}; \text{note } 1$ | – | 300 | <500 | $\text{m}\Omega$ |
| f_T | transition frequency | $V_{CE} = -10\text{ V}; I_C = -50\text{ mA}; f = 100\text{ MHz}$ | 150 | – | – | MHz |
| C_c | collector capacitance | $V_{CB} = -10\text{ V}; I_E = I_e = 0; f = 1\text{ MHz}$ | – | – | 12 | pF |

Note

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

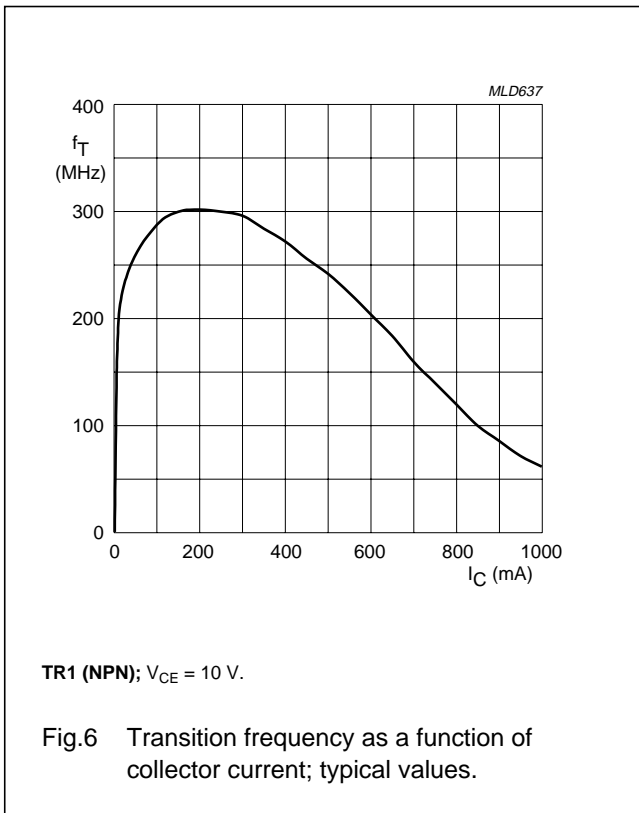
40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN



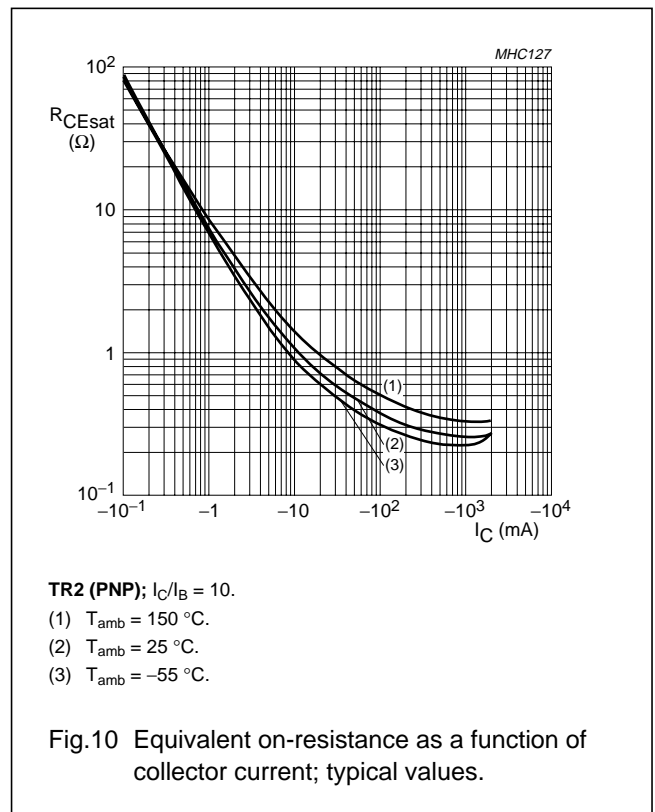
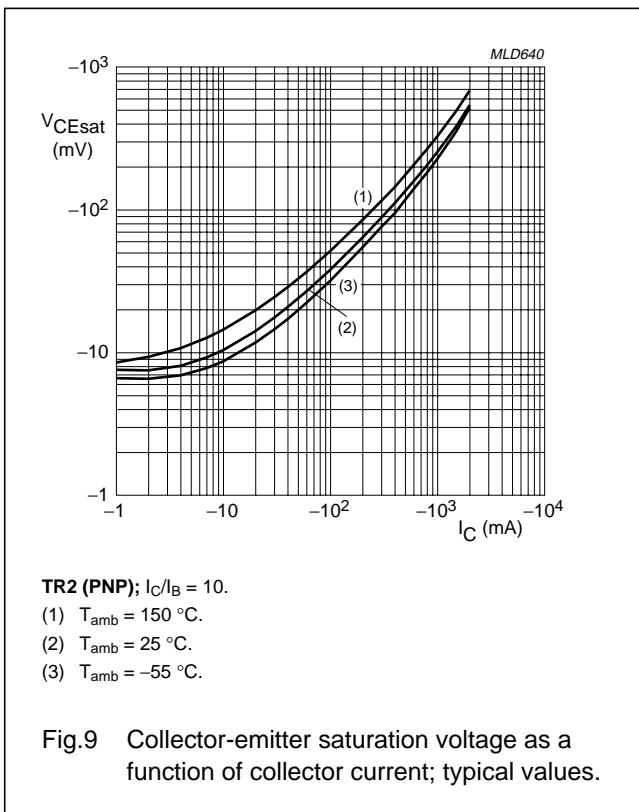
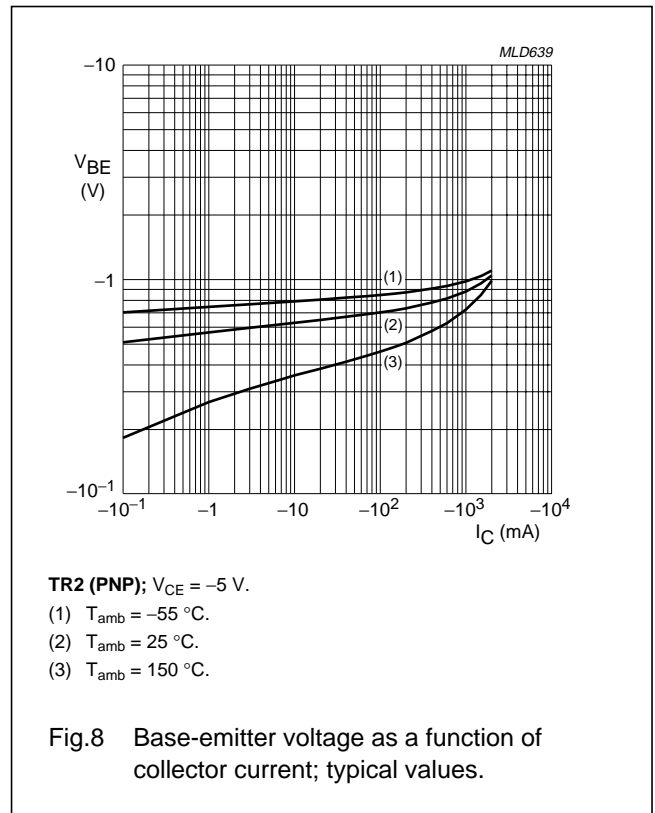
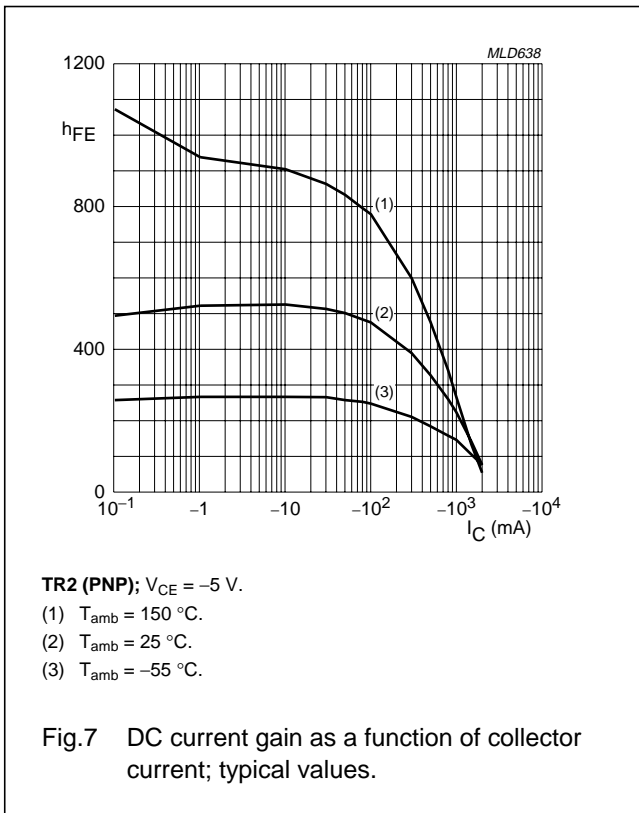
40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN



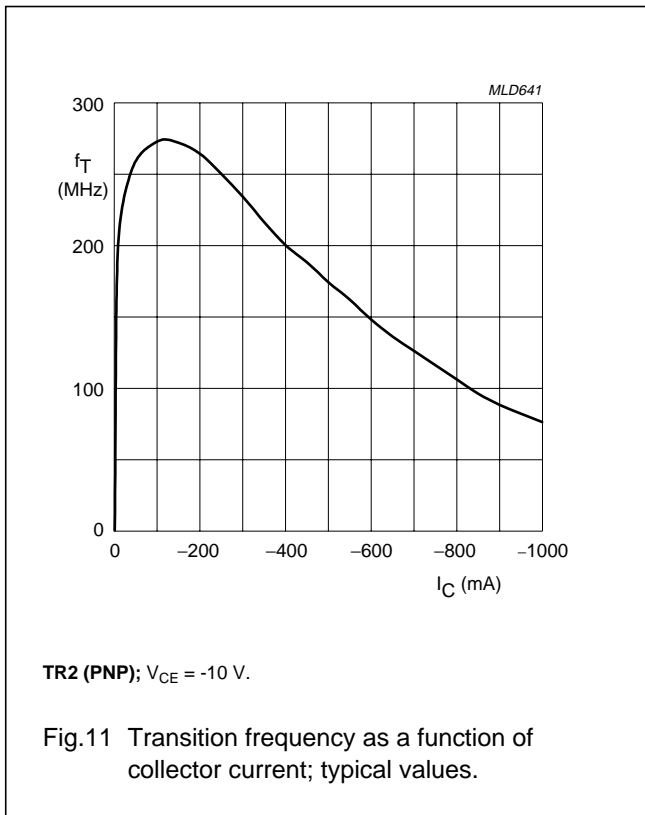
40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN



40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN



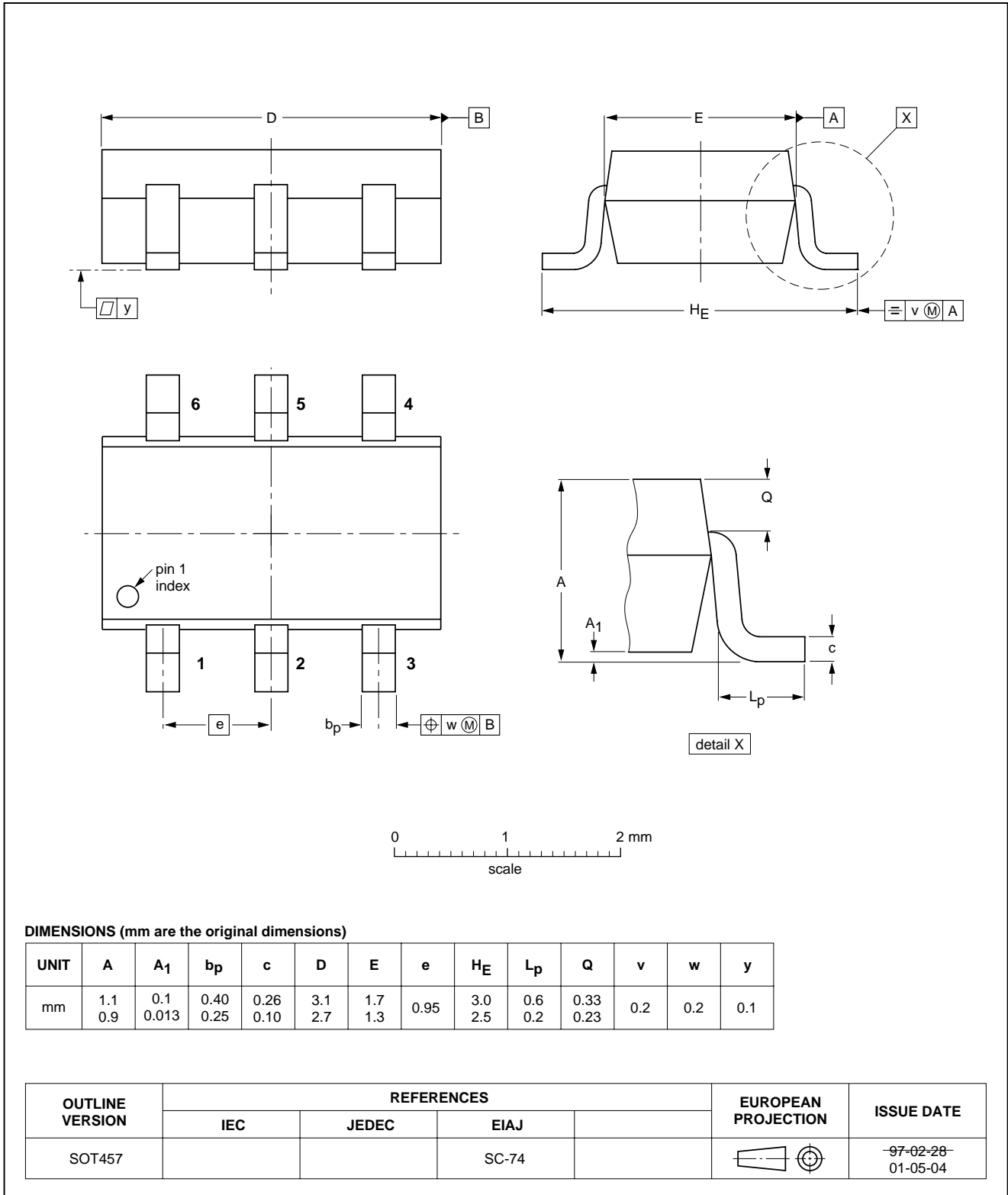
40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN

PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT457



40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN

DATA SHEET STATUS

| DATA SHEET STATUS ⁽¹⁾ | PRODUCT STATUS ⁽²⁾ | DEFINITIONS |
|----------------------------------|-------------------------------|--|
| 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. |
| Preliminary data | Qualification | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product. |
| Product data | Production | This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A. |

Notes

1. Please consult the most recently issued data sheet before initiating or completing a design.
2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

DEFINITIONS

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

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.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

DISCLAIMERS

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance. Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no licence or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN

NOTES

Philips Semiconductors – a worldwide company

Contact information

For additional information please visit <http://www.semiconductors.philips.com>. Fax: +31 40 27 24825

For sales offices addresses send e-mail to: sales.addresses@www.semiconductors.philips.com.

© Koninklijke Philips Electronics N.V. 2001

SCA73

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.

The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Printed in The Netherlands

613514/01/pp12

Date of release: 2001 Dec 13

Document order number: 9397 750 09062

Let's make things better.

**Philips
Semiconductors**



PHILIPS