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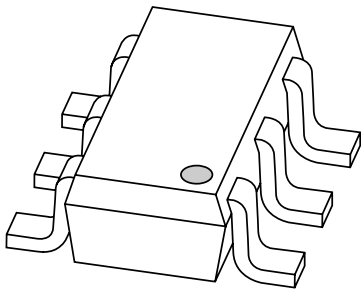
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Team Nexperia

# DATA SHEET



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

Product data sheet

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

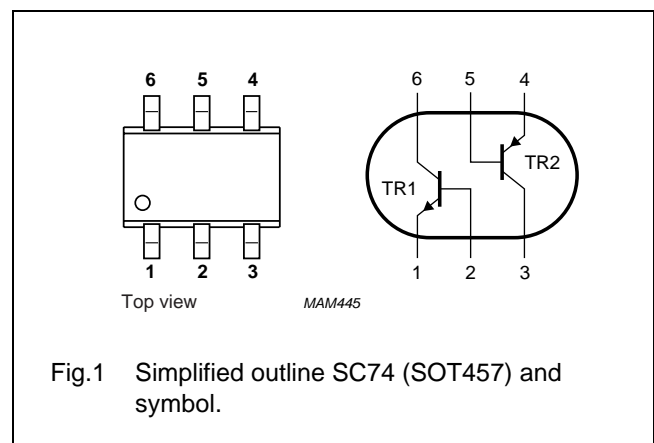
| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| PBSS4140DPN | M2           |

### 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 $\Omega$ |

### 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 |
|--|-------------------------------|--------------------------------------|------|------|------|
| <b>Per transistor; for the PNP transistor with negative polarity</b> |                               |                                      |      |      |      |
| $V_{CBO}$  | 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   |
| <b>Per device</b>  |                               |                                      |      |      |      |
| $P_{tot}$  | 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 cm<sup>2</sup>.

**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 cm<sup>2</sup>.

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

## PBSS4140DPN

## CHARACTERISTICS

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

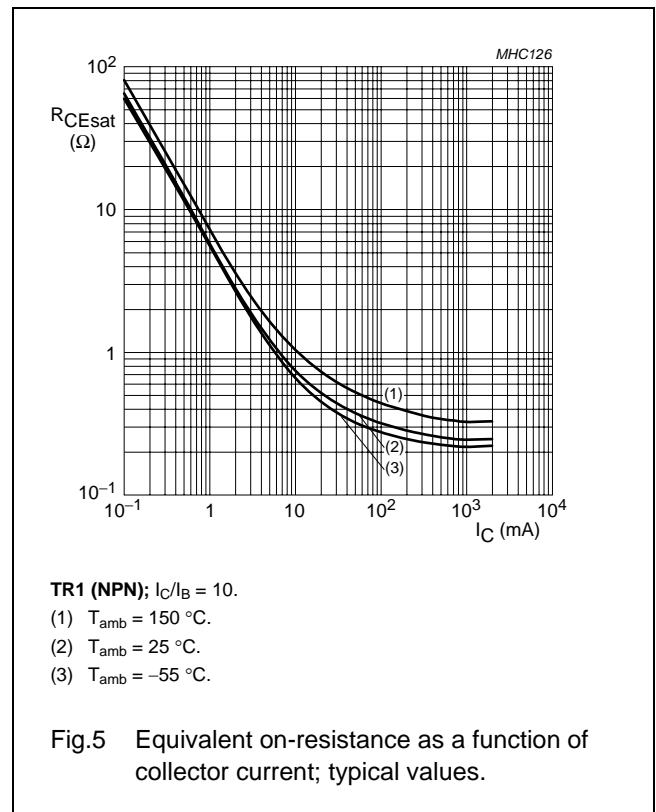
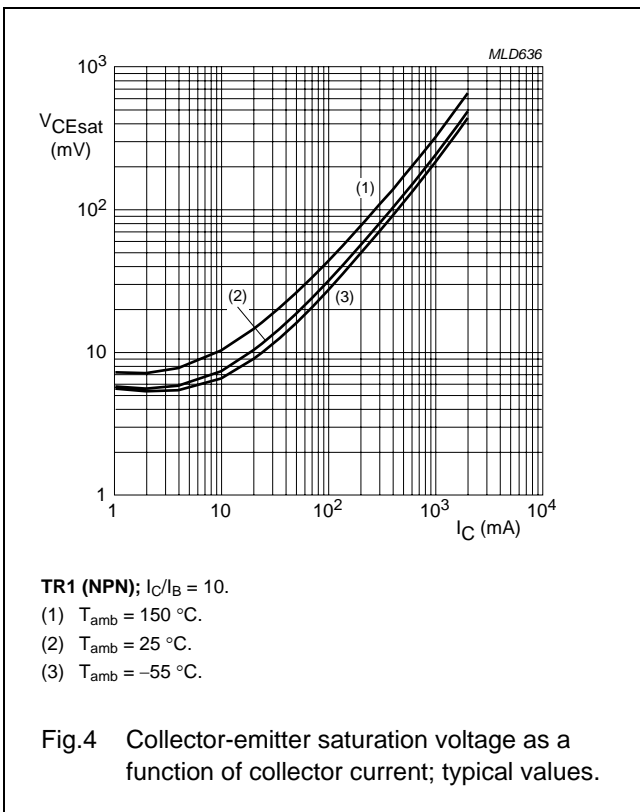
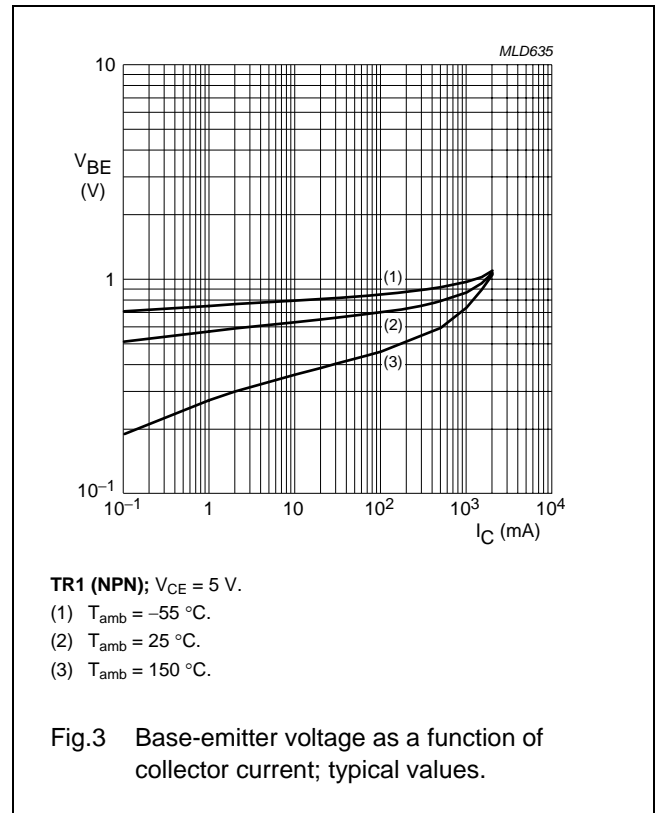
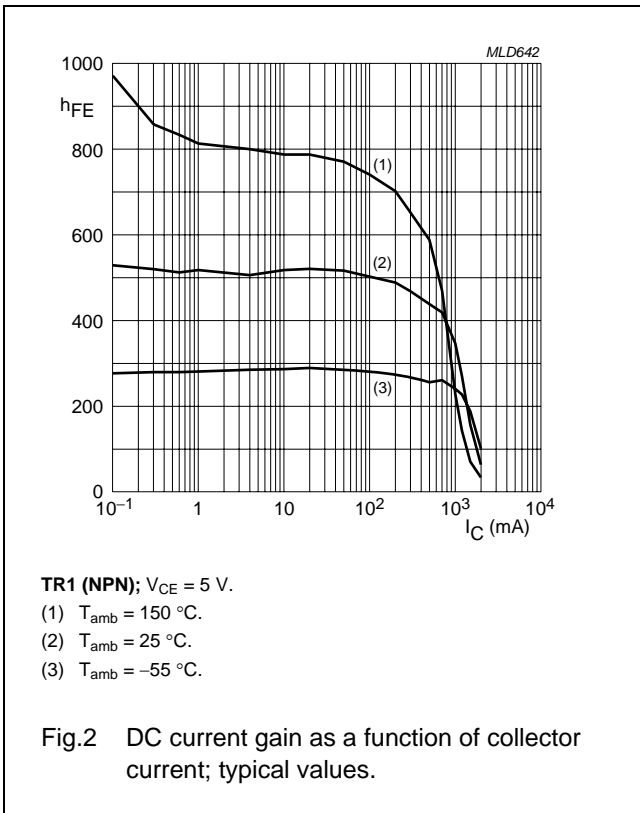
| SYMBOL  | PARAMETER                            | CONDITIONS   | MIN. | TYP. | MAX. | UNIT             |
|---|--------------------------------------|--|------|------|------|------------------|
| <b>Per transistor unless otherwise specified; for the PNP transistor with negative polarity</b> |                                      |  |      |      |      |                  |
| $I_{CBO}$   | 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   | $\mu\text{A}$    |
| $I_{CEO}$   | 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               |
| <b>NPN transistor</b>   |                                      |  |      |      |      |                  |
| $h_{FE}$  | 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               |
| <b>PNP transistor</b>   |                                      |  |      |      |      |                  |
| $h_{FE}$  | 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:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

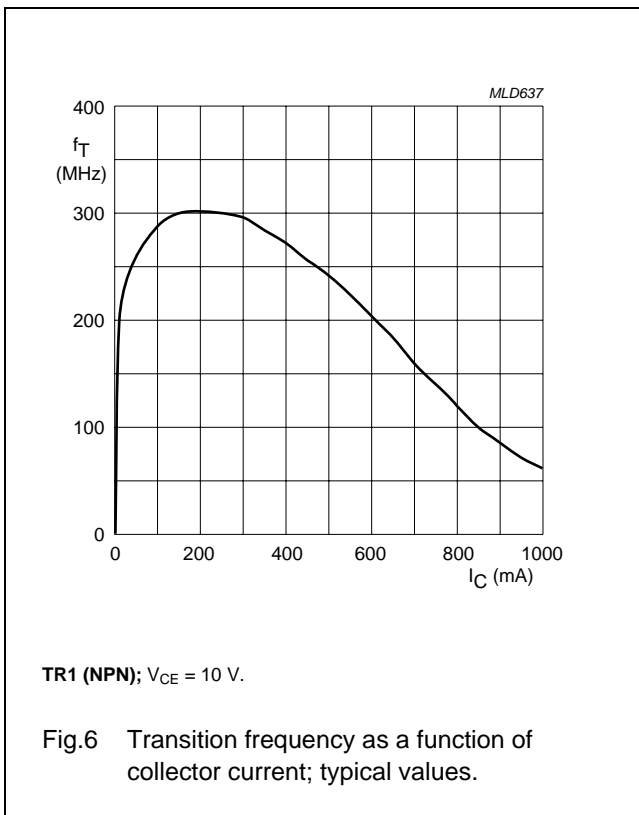
40 V low  $V_{CEsat}$  NPN/PNP transistor

PBSS4140DPN



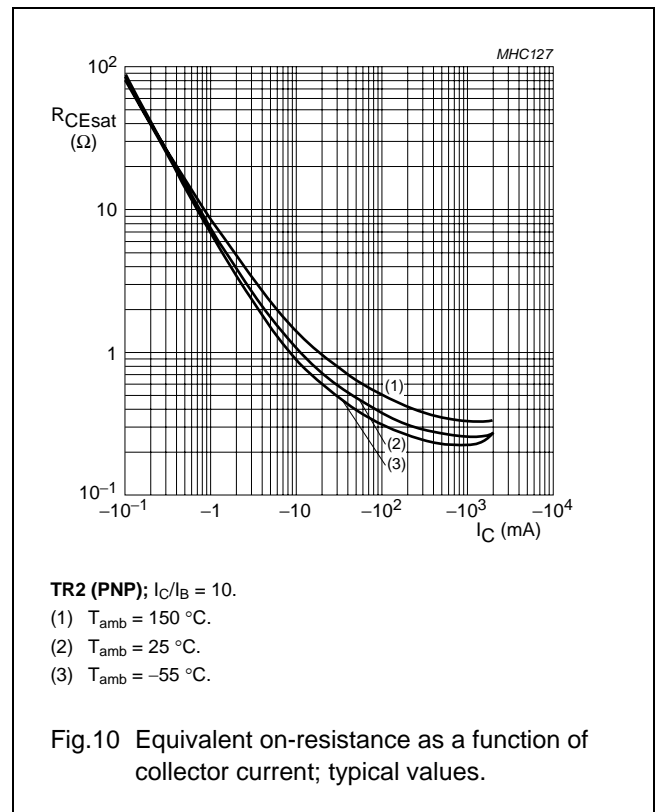
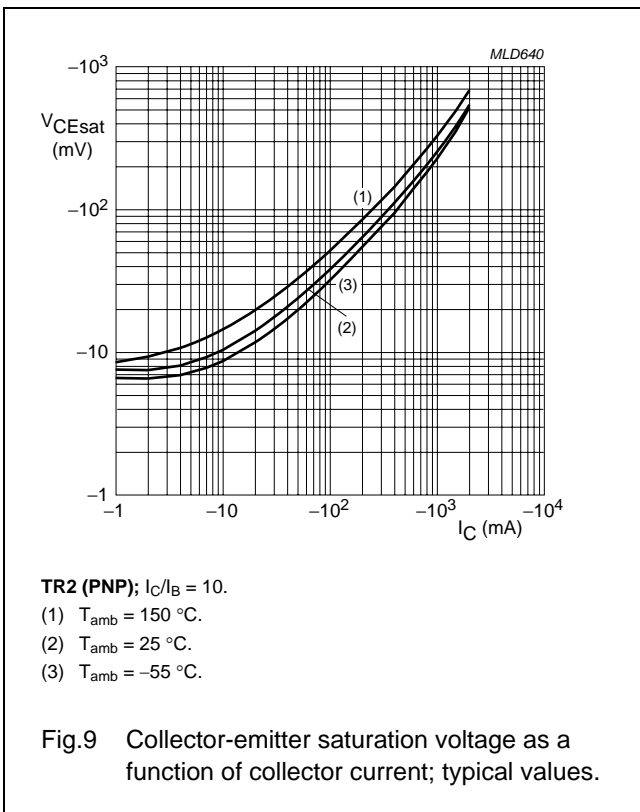
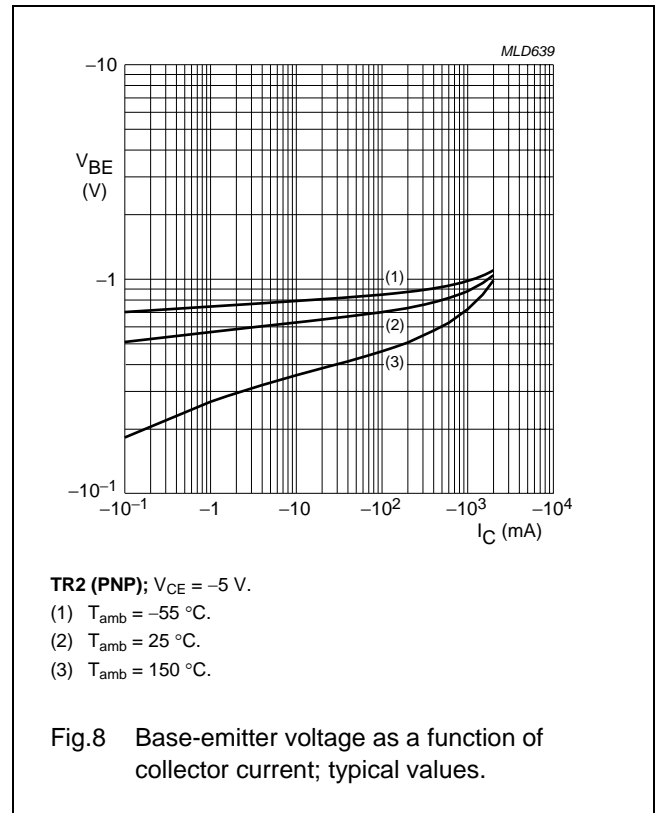
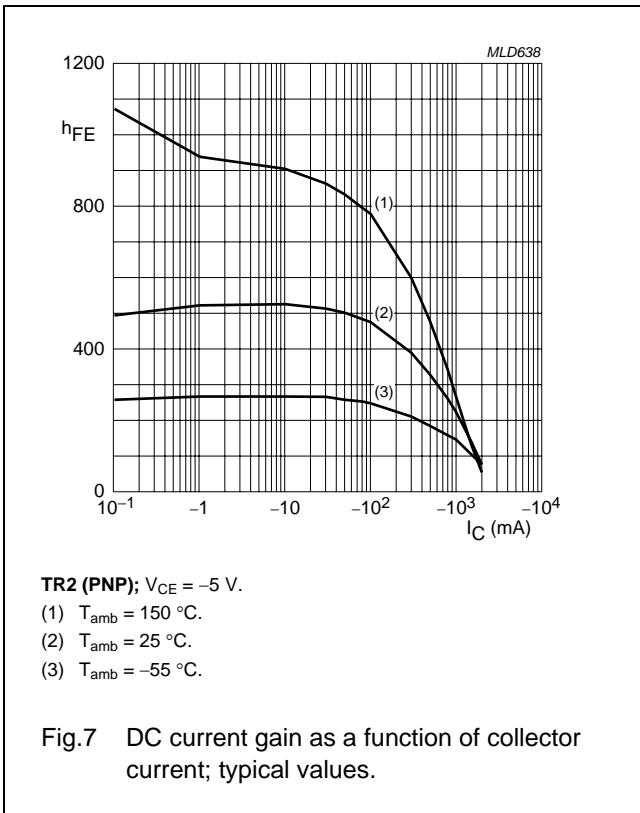
40 V low  $V_{CEsat}$  NPN/PNP transistor

PBSS4140DPN



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

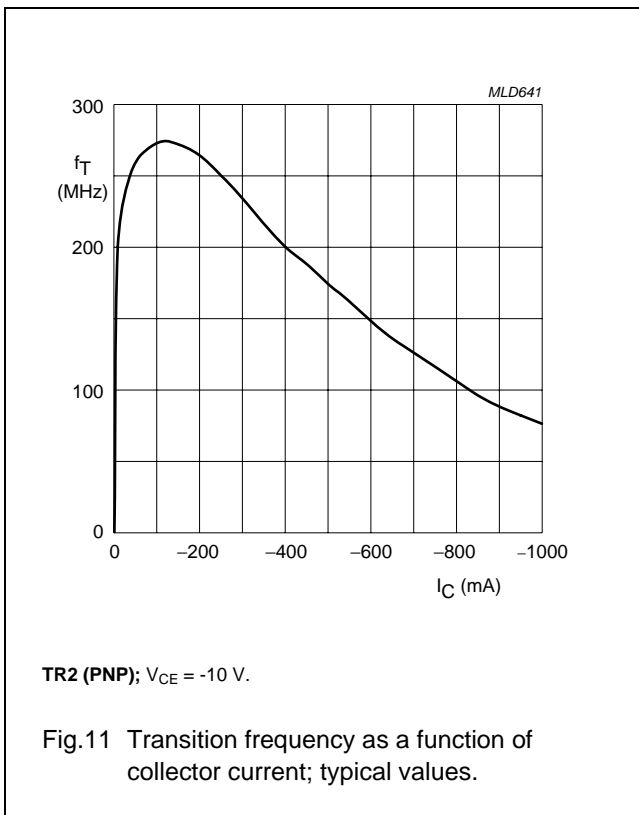
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40 V low  $V_{CEsat}$  NPN/PNP transistor

PBSS4140DPN



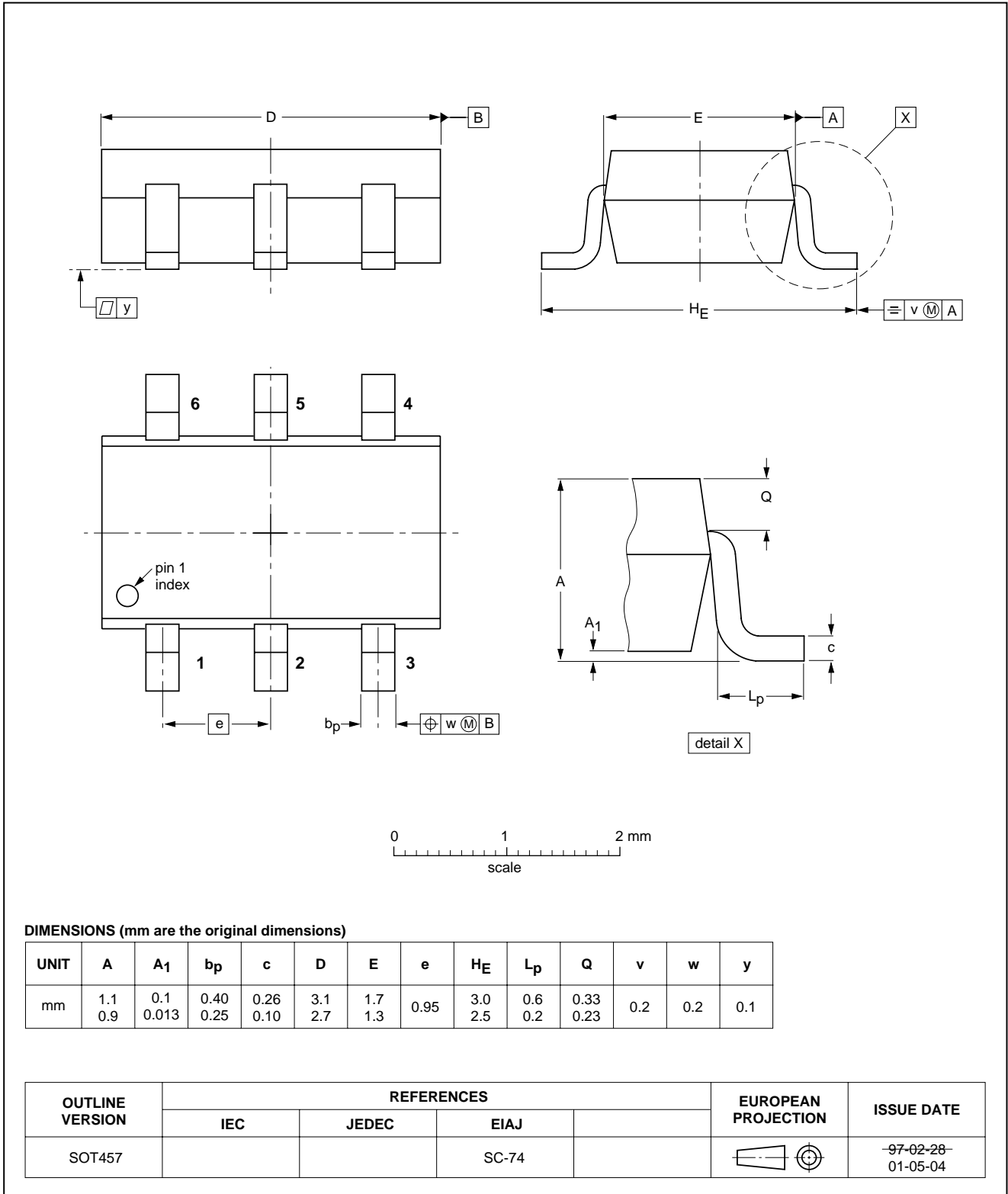
40 V low  $V_{CEsat}$  NPN/PNP transistor

PBSS4140DPN

PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT457



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

PBSS4140DPN

## DATA SHEET STATUS

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | DEFINITION  |
|--------------------------------|-------------------------------|---|
| Objective data sheet           | Development                   | This document contains data from the objective specification for product development. |
| Preliminary data sheet         | Qualification                 | This document contains data from the preliminary specification.                       |
| Product data sheet             | Production                    | This document contains the product specification.                                     |

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