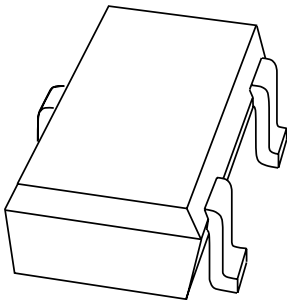


# DATA SHEET



**PBSS4140U**

40 V low  $V_{CEsat}$  NPN transistor

Product data sheet  
Supersedes data of 2001 Mar 27

2001 Jul 13

# 40 V low $V_{CEsat}$ NPN transistor

# PBSS4140U

### FEATURES

- Low collector-emitter saturation voltage
- High current capabilities.
- Improved device reliability due to reduced heat generation.
- Enhanced performance over SOT231A general purpose packaged transistors.

### 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 low  $V_{CEsat}$  transistor in a SOT323 plastic package. PNP complement: PBSS5140U.

### MARKING

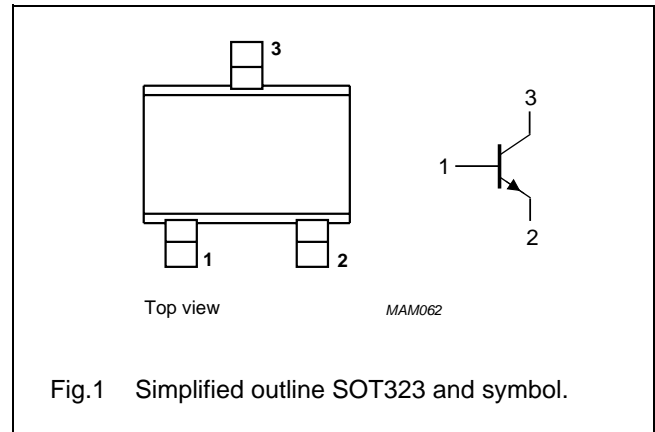
| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| PBSS4140U   | 41t          |

### QUICK REFERENCE DATA

| SYMBOL      | PARAMETER                 | MAX. | UNIT      |
|-------------|---------------------------|------|-----------|
| $V_{CEO}$   | collector-emitter voltage | 40   | V         |
| $I_{CM}$    | peak collector current    | 2    | A         |
| $R_{CEsat}$ | equivalent on-resistance  | <500 | $m\Omega$ |

### PINNING

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



### 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                                     | –    | 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       | $T_{amb} \leq 25\text{ }^\circ\text{C}$ ; note 1 | –    | 250  | mW               |
|           |                               | $T_{amb} \leq 25\text{ }^\circ\text{C}$ ; note 2 | –    | 350  | mW               |
| $T_{stg}$ | storage temperature           |  | –65  | +150 | $^\circ\text{C}$ |
| $T_j$     | junction temperature          |  | –    | 150  | $^\circ\text{C}$ |
| $T_{amb}$ | operating ambient temperature |  | –65  | +150 | $^\circ\text{C}$ |

### Notes

1. Device mounted on a printed-circuit board; single sided copper; tinplated; standard footprint.
2. Device mounted on a printed-circuit board; single sided copper; tinplated; mounting pad for collector 1 cm.

40 V low  $V_{CEsat}$  NPN transistor

PBSS4140U

## THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER                                   | CONDITIONS          | VALUE | UNIT |
|---------------|---|---------------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | in free air; note 1 | 500   | K/W  |
|               |   | in free air; note 2 | 357   | K/W  |

## Notes

1. Device mounted on a printed-circuit board, single sided copper, tinplated and standard footprint.
2. Device mounted on a printed-circuit board, single sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>.

## CHARACTERISTICS

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

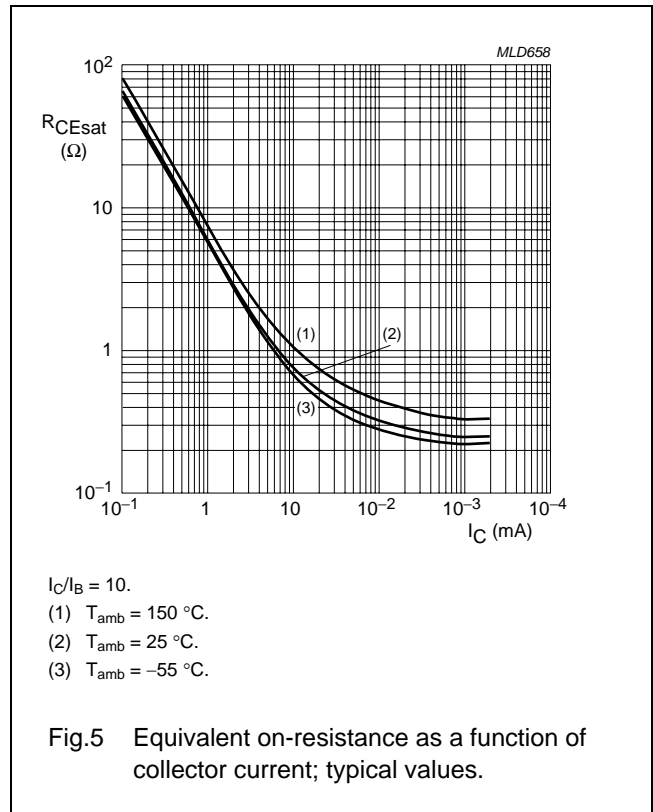
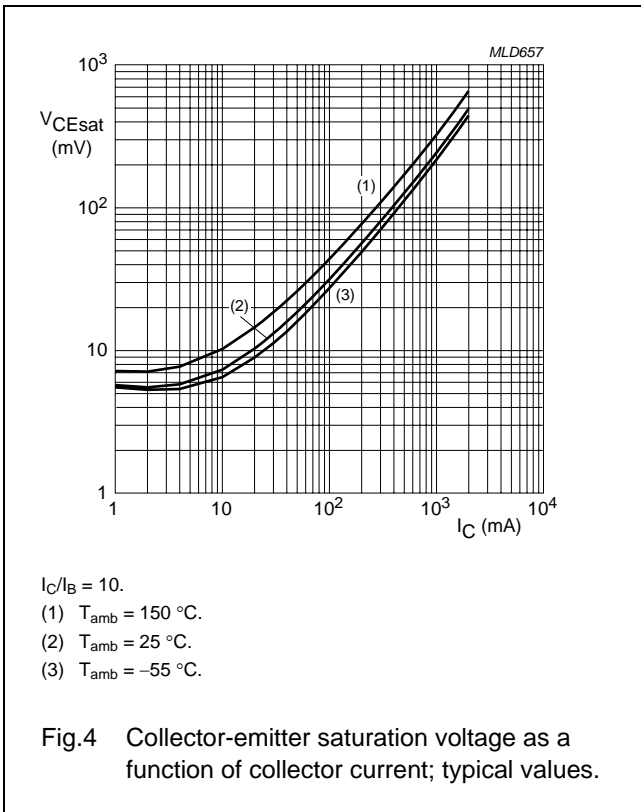
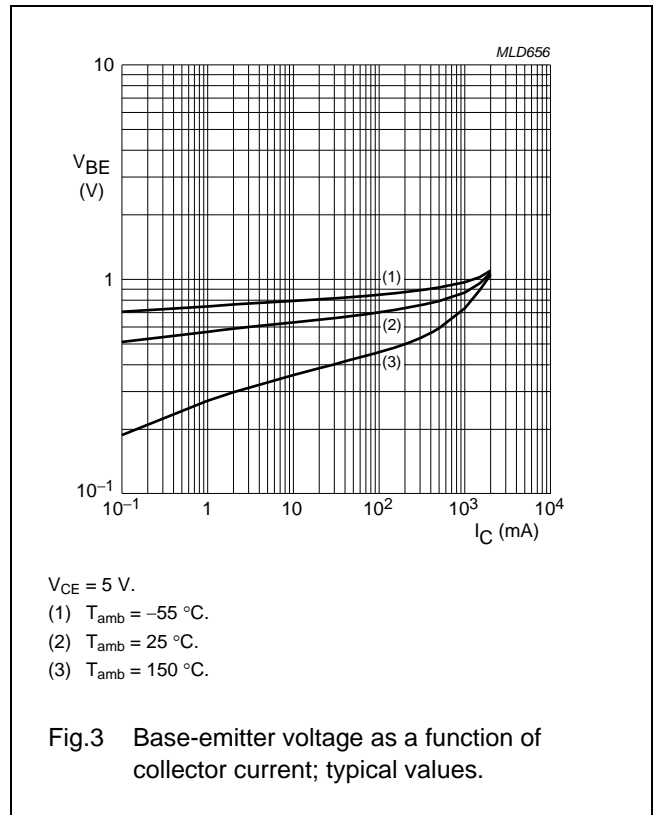
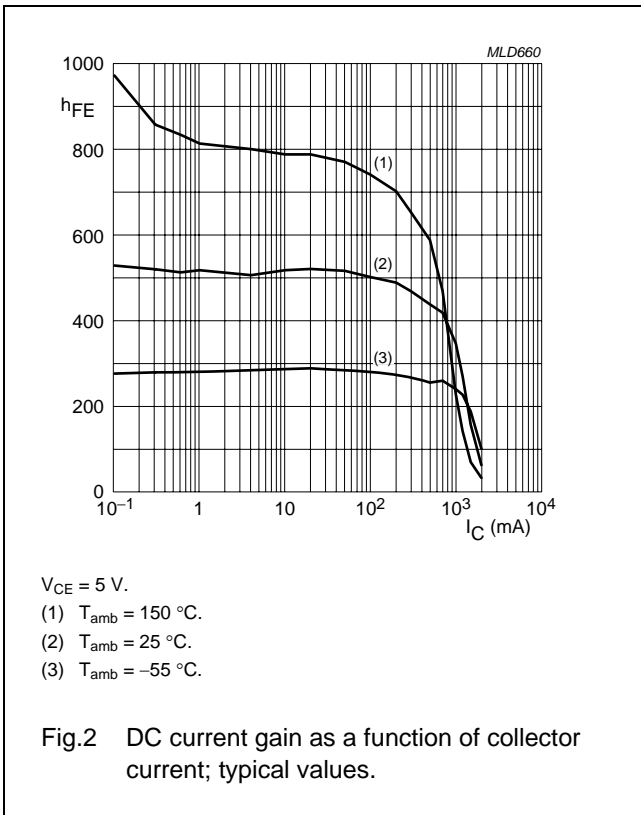
| SYMBOL      | PARAMETER                            | CONDITIONS   | MIN. | TYP. | MAX. | UNIT             |
|-------------|--------------------------------------|--|------|------|------|------------------|
| $I_{CBO}$   | collector-base cut-off current       | $V_{CB} = 40\text{ V}; I_C = 0$                                | –    | –    | 100  | nA               |
|             |                                      | $V_{CB} = 40\text{ V}; I_C = 0; T_{amb} = 150\text{ °C}$       | –    | –    | 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  | –    | –    |                  |
|             |                                      | $V_{CE} = 5\text{ V}; I_C = 500\text{ mA}$                     | 300  | –    | 900  |                  |
|             |                                      | $V_{CE} = 5\text{ V}; I_C = 1\text{ A}$                        | 200  | –    | –    |                  |
| $V_{CEsat}$ | 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               |
| $R_{CEsat}$ | equivalent on-resistance             | $I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$       | –    | 260  | <500 | $\text{m}\Omega$ |
| $V_{BEsat}$ | 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                |
| $f_T$       | transition frequency                 | $I_C = 50\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$ | 150  | –    | –    | MHz              |
| $C_c$       | collector capacitance                | $V_{CB} = 10\text{ V}; I_E = I_C = 0; f = 1\text{ MHz}$        | –    | –    | 10   | pF               |

## Note

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

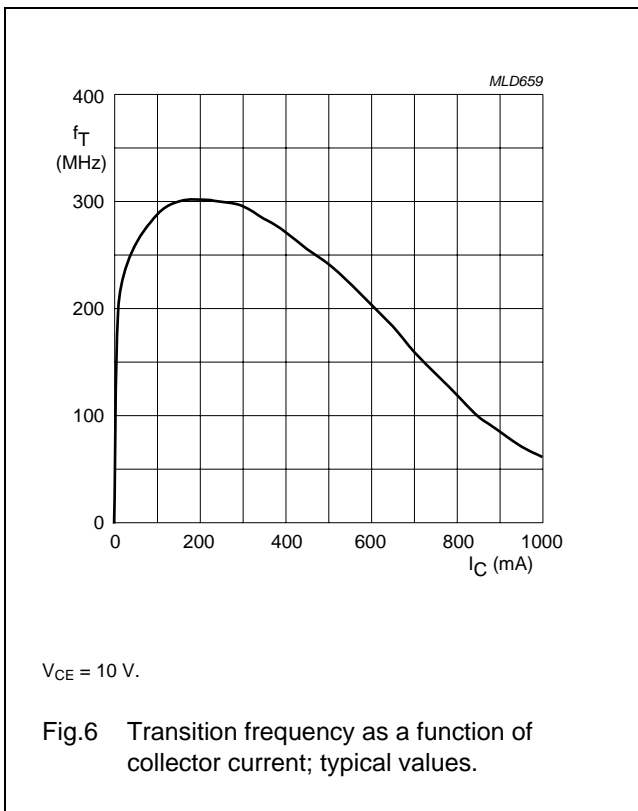
40 V low  $V_{CEsat}$  NPN transistor

PBSS4140U



40 V low  $V_{CEsat}$  NPN transistor

PBSS4140U



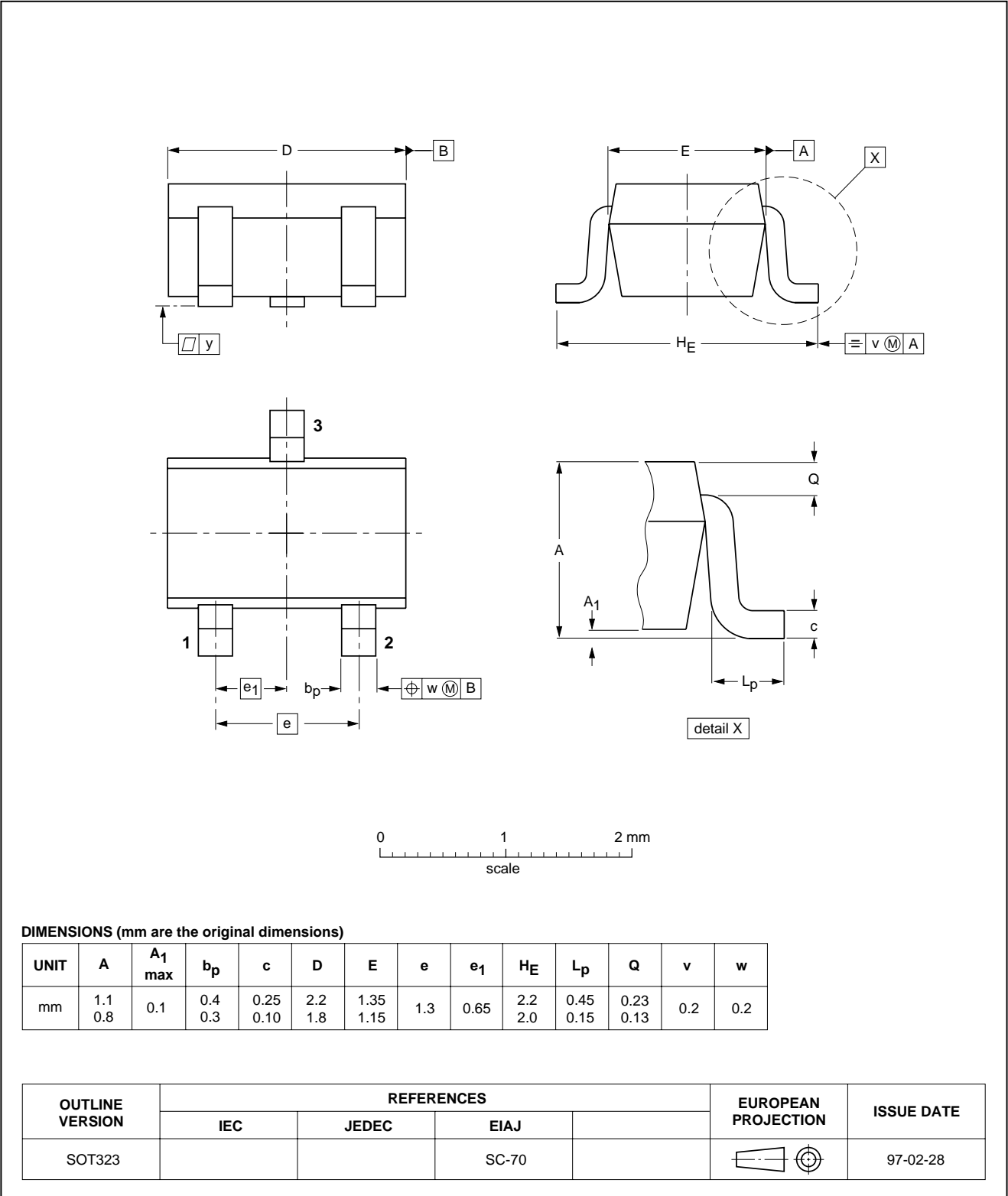
40 V low  $V_{CEsat}$  NPN transistor

PBSS4140U

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT323



40 V low  $V_{CEsat}$  NPN transistor

PBSS4140U

**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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