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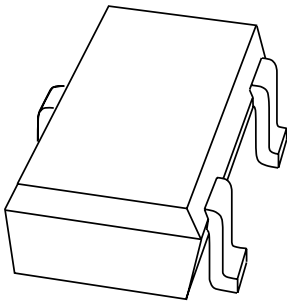
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Kind regards,

Team Nexperia

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

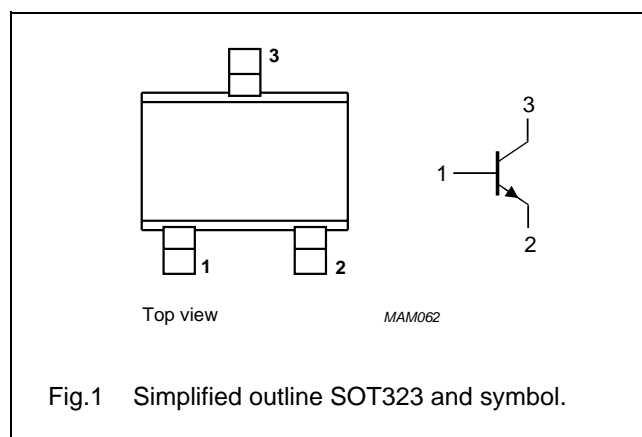
| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| PBSS4140U | 41t |

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 Ω |

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 cm².

CHARACTERISTICS

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

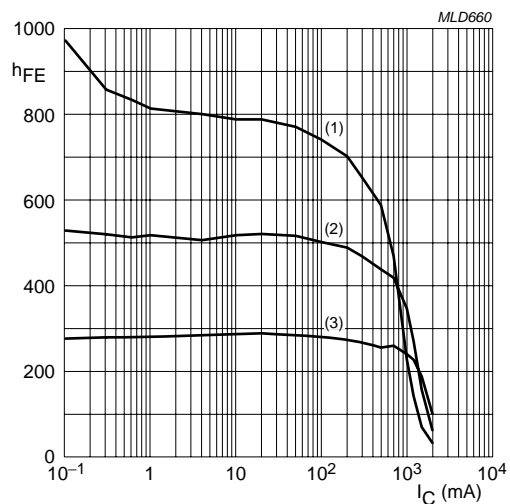
| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------|--------------------------------------|--|------|------|------|------------------|
| I_{CBO} | collector-base cut-off current | $V_{CB} = 40\text{ V}; I_C = 0$ | — | — | 100 | nA |
| | | $V_{CB} = 40\text{ V}; I_C = 0; T_{amb} = 150\text{ }^{\circ}\text{C}$ | — | — | 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 | — | — | |
| | | $V_{CE} = 5\text{ V}; I_C = 500\text{ mA}$ | 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: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.

40 V low V_{CEsat} NPN transistor

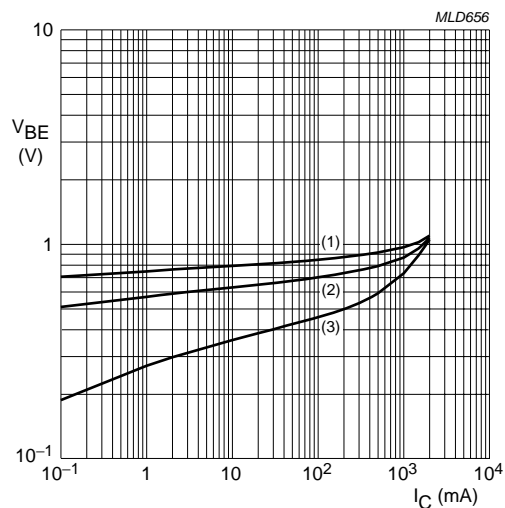
PBSS4140U



$V_{CE} = 5 \text{ V}$.

- (1) $T_{amb} = 150 \text{ }^{\circ}\text{C}$.
- (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$.
- (3) $T_{amb} = -55 \text{ }^{\circ}\text{C}$.

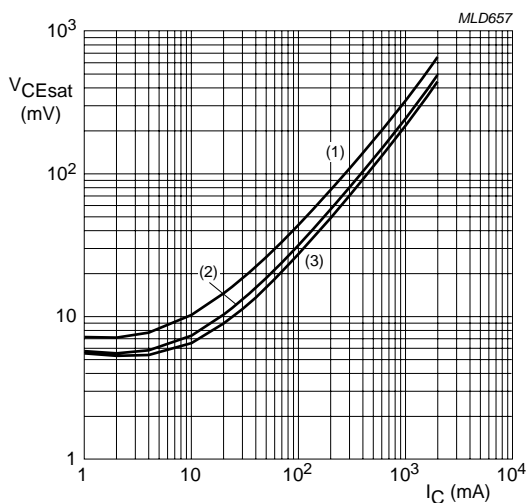
Fig.2 DC current gain as a function of collector current; typical values.



$V_{CE} = 5 \text{ V}$.

- (1) $T_{amb} = -55 \text{ }^{\circ}\text{C}$.
- (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$.
- (3) $T_{amb} = 150 \text{ }^{\circ}\text{C}$.

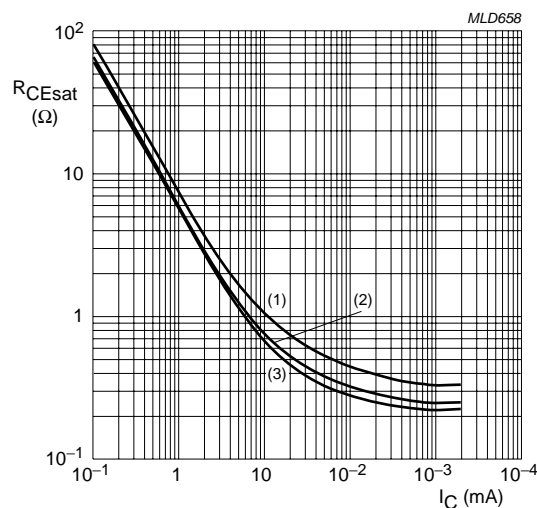
Fig.3 Base-emitter voltage as a function of collector current; typical values.



$I_C/I_B = 10$.

- (1) $T_{amb} = 150 \text{ }^{\circ}\text{C}$.
- (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$.
- (3) $T_{amb} = -55 \text{ }^{\circ}\text{C}$.

Fig.4 Collector-emitter saturation voltage as a function of collector current; typical values.



$I_C/I_B = 10$.

- (1) $T_{amb} = 150 \text{ }^{\circ}\text{C}$.
- (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$.
- (3) $T_{amb} = -55 \text{ }^{\circ}\text{C}$.

Fig.5 Equivalent on-resistance as a function of collector current; typical values.

40 V low V_{CEsat} NPN transistor

PBSS4140U

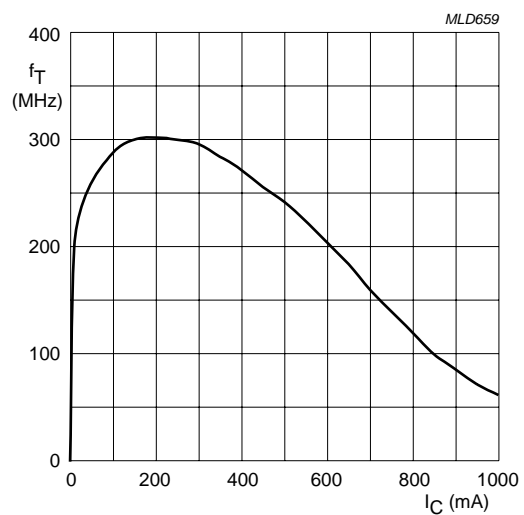
 $V_{CE} = 10$ V.

Fig.6 Transition frequency as a function of collector current; typical values.

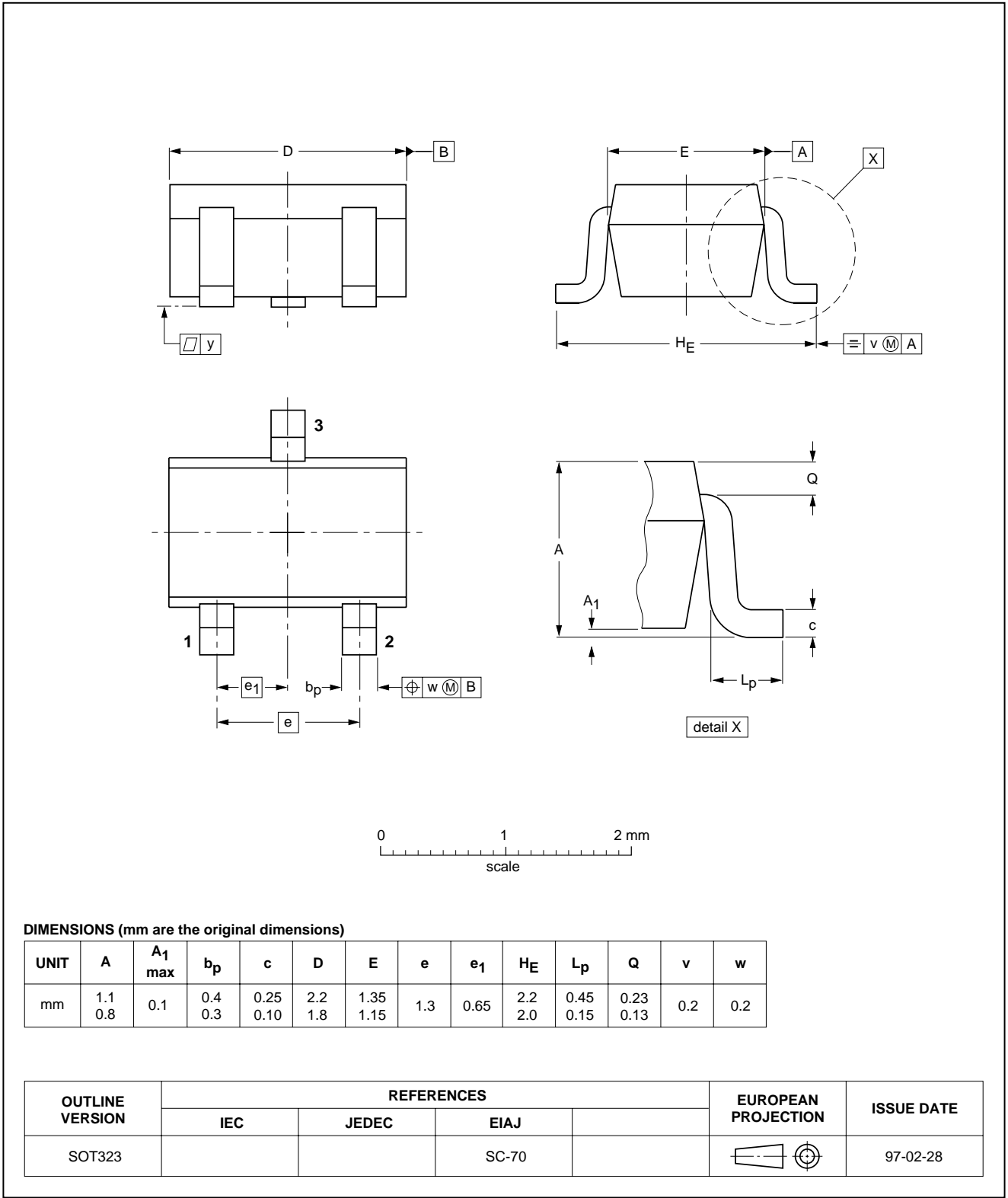
40 V low V_{CEsat} NPN transistor

PBSS4140U

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT323



40 V low V_{CEsat} NPN transistor

PBSS4140U

DATA SHEET STATUS

| DOCUMENT STATUS ⁽¹⁾ | PRODUCT STATUS ⁽²⁾ | 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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NXP Semiconductors

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