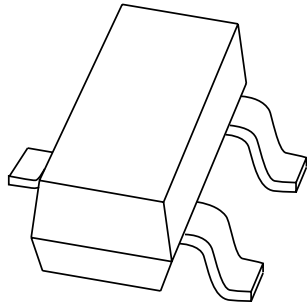


# DATA SHEET



**PBSS8110T**

100 V, 1 A

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

Product data sheet  
Supersedes data of 2003 Jul 28

2003 Dec 22

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

**PBSS8110T**

**FEATURES**

- SOT23 package
- Low collector-emitter saturation voltage  $V_{CEsat}$
- High collector current capability:  $I_C$  and  $I_{CM}$
- Higher efficiency leading to less heat generation
- Reduced printed-circuit board requirements.

**APPLICATIONS**

- Major application segments
  - Automotive 42 V power
  - Telecom infrastructure
  - Industrial
- Power management
  - DC/DC converters
  - Supply line switching
  - Battery charger
  - LCD backlighting.
- Peripheral drivers
  - Driver in low supply voltage applications (e.g. lamps and LEDs).
  - Inductive load driver (e.g. relays, buzzers and motors).

**DESCRIPTION**

NPN low  $V_{CEsat}$  transistor in a SOT23 plastic package.  
PNP complement: PBSS9110T.

**MARKING**

| TYPE NUMBER | MARKING CODE <sup>(1)</sup> |
|-------------|-----------------------------|
| PBSS8110T   | *U8                         |

**Note**

1. \* = p : Made in Hong Kong.  
\* = t : Made in Malaysia.  
\* = W : Made in China.

**ORDERING INFORMATION**

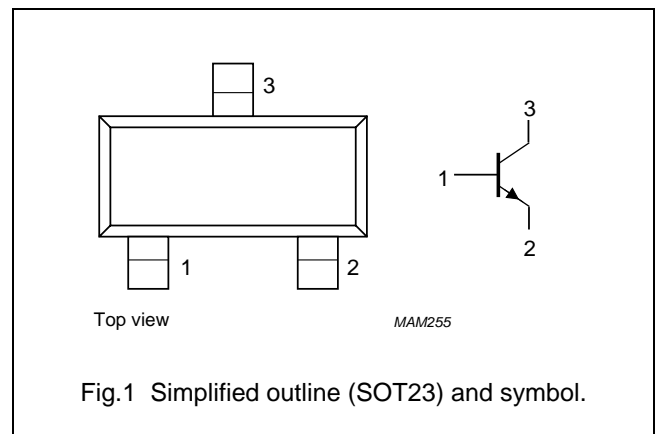
| TYPE NUMBER | PACKAGE |  |         |
|-------------|---------|--|---------|
|             | NAME    | DESCRIPTION                              | VERSION |
| PBSS8110T   | –       | plastic surface mounted package; 3 leads | SOT23   |

**QUICK REFERENCE DATA**

| SYMBOL      | PARAMETER                         | MAX. | UNIT       |
|-------------|-----------------------------------|------|------------|
| $V_{CEO}$   | collector-emitter voltage         | 100  | V          |
| $I_C$       | collector current (DC)            | 1    | A          |
| $I_{CM}$    | repetitive peak collector current | 3    | A          |
| $R_{CEsat}$ | equivalent on-resistance          | 200  | m $\Omega$ |

**PINNING**

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



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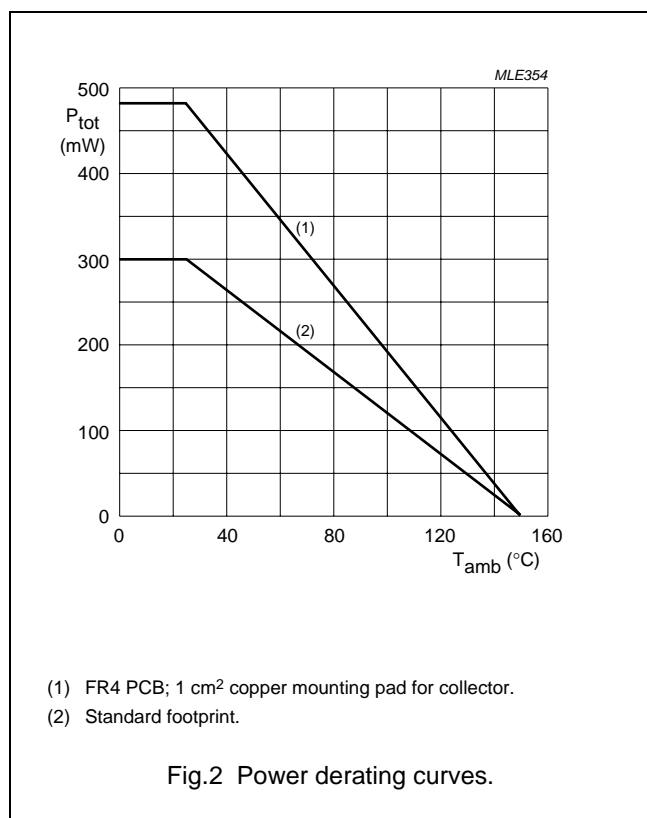
**LIMITING VALUES**

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        | limited by $T_{j\max}$                           | –    | 3    | A                |
| $I_B$     | base current (DC)             |  | –    | 300  | mA               |
| $P_{tot}$ | total power dissipation       | $T_{amb} \leq 25\text{ }^\circ\text{C}$ ; note 1 | –    | 300  | mW               |
|           |                               | $T_{amb} \leq 25\text{ }^\circ\text{C}$ ; note 2 | –    | 480  | mW               |
| $T_j$     | junction temperature          |  | –    | 150  | $^\circ\text{C}$ |
| $T_{amb}$ | operating ambient temperature |  | –65  | +150 | $^\circ\text{C}$ |
| $T_{stg}$ | storage 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<sup>2</sup>.



100 V, 1 A  
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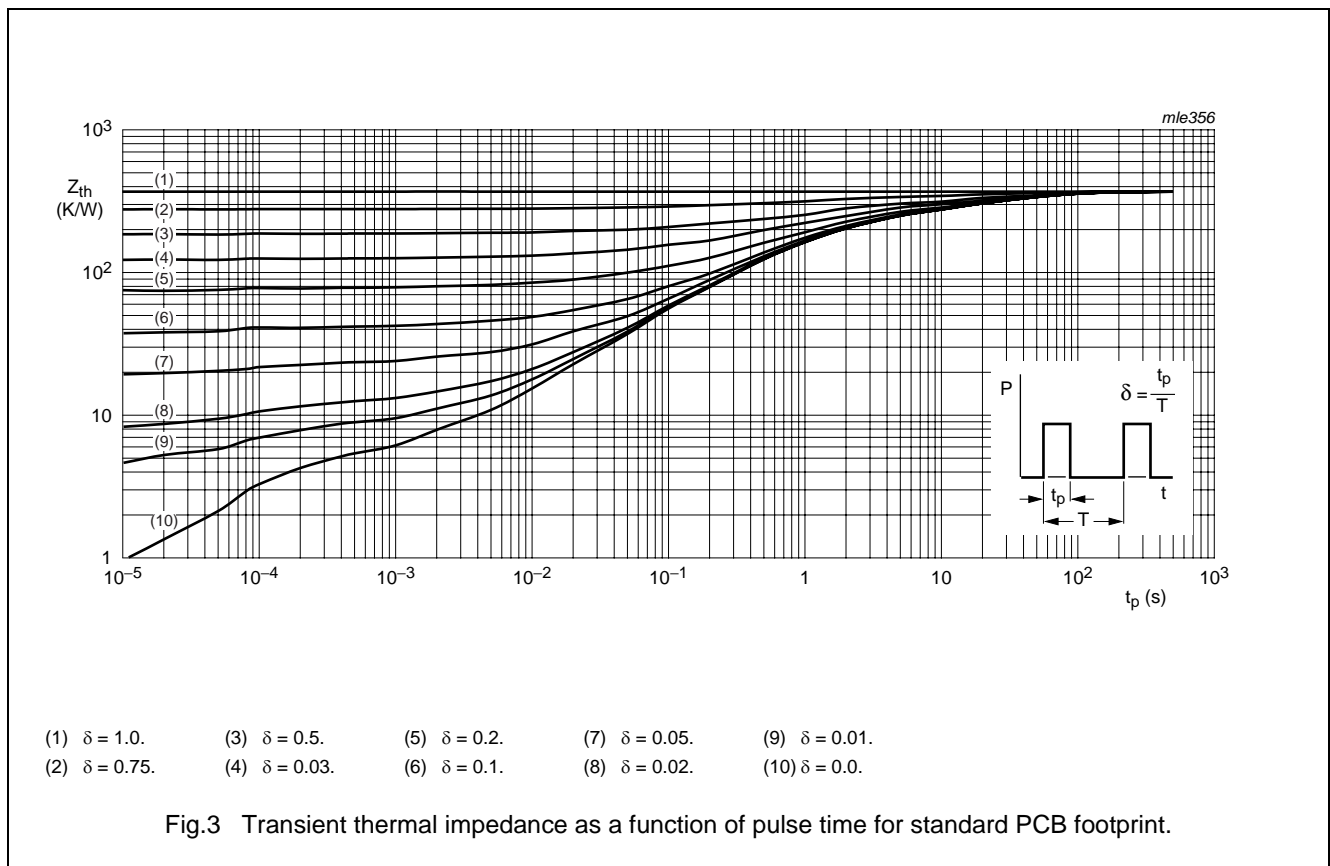
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**THERMAL CHARACTERISTICS**

| SYMBOL        | PARAMETER                                   | CONDITIONS          | VALUE | UNIT |
|---------------|---|---------------------|-------|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air; note 1 | 417   | K/W  |
|               |   | in free air; note 2 | 260   | K/W  |

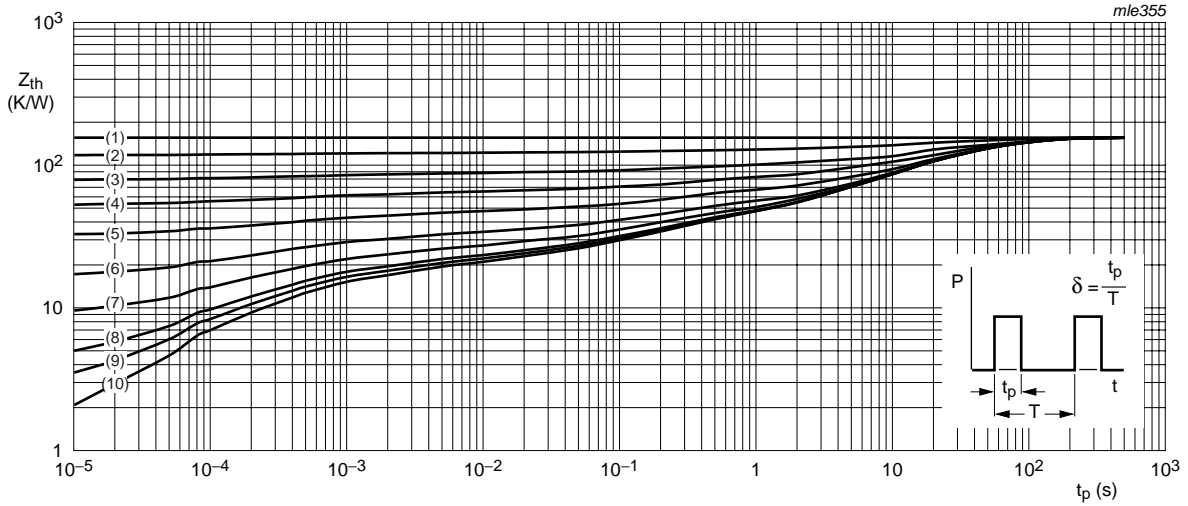
**Notes**

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 and mounting pad for collector 1 cm<sup>2</sup>.



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- (1)  $\delta = 1.0$ .
- (2)  $\delta = 0.75$ .
- (3)  $\delta = 0.5$ .
- (4)  $\delta = 0.03$ .
- (5)  $\delta = 0.2$ .
- (6)  $\delta = 0.1$ .
- (7)  $\delta = 0.05$ .
- (8)  $\delta = 0.02$ .
- (9)  $\delta = 0.01$ .
- (10)  $\delta = 0.0$ .

Fig.4 Transient thermal impedance as a function of pulse time for collector 1 cm<sup>2</sup> copper mounting pad.

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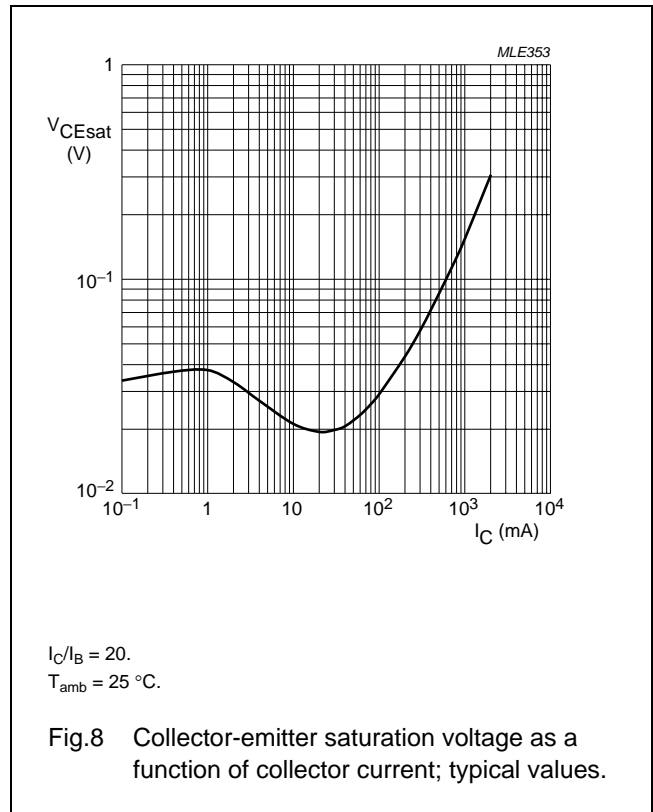
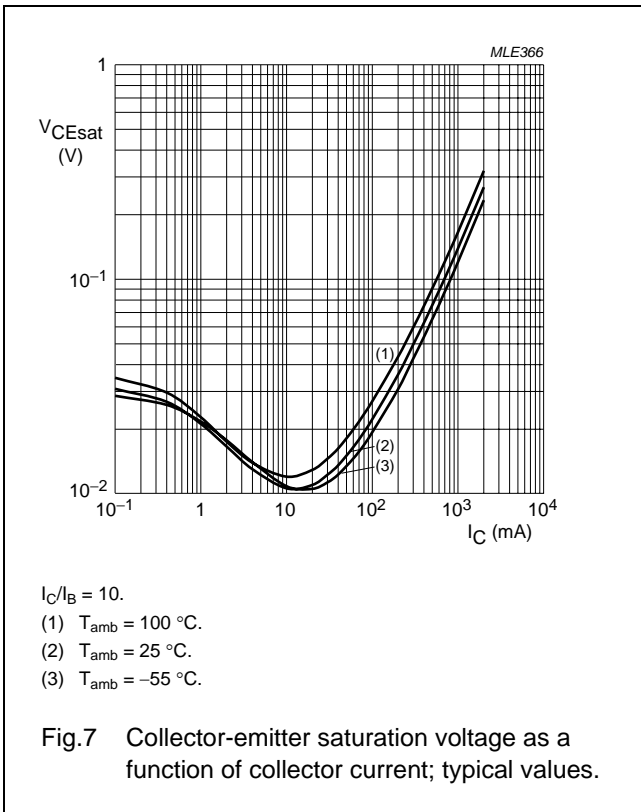
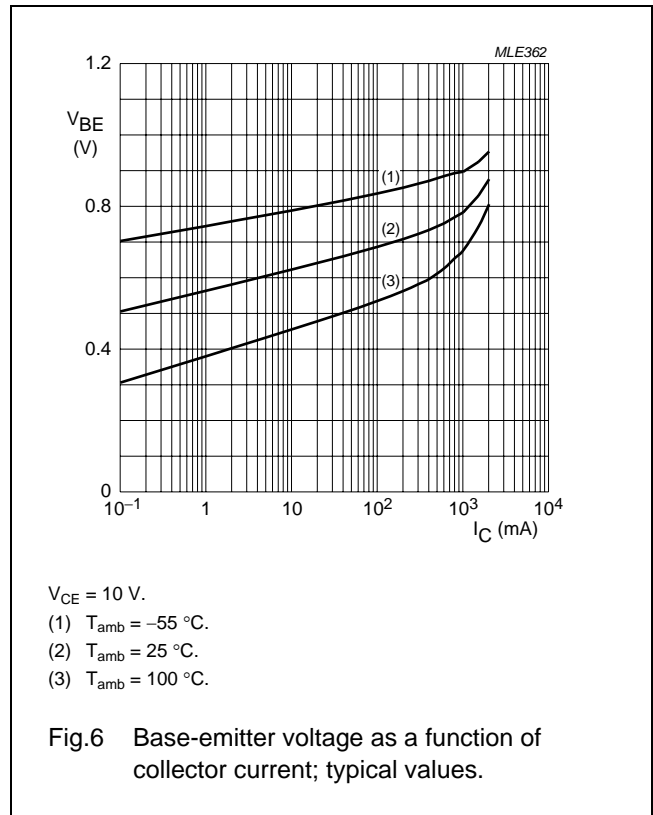
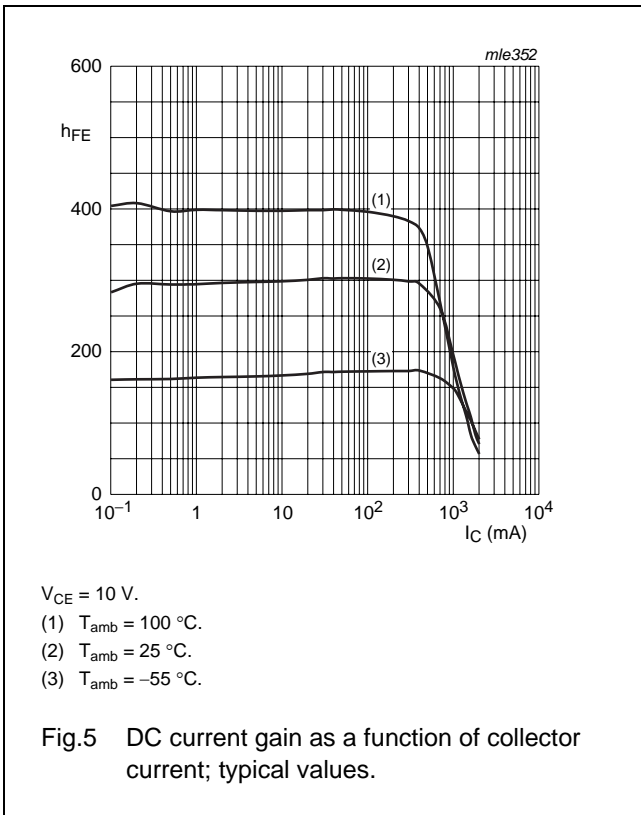
**CHARACTERISTICS** $T_j = 25\text{ °C}$  unless otherwise specified.

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

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

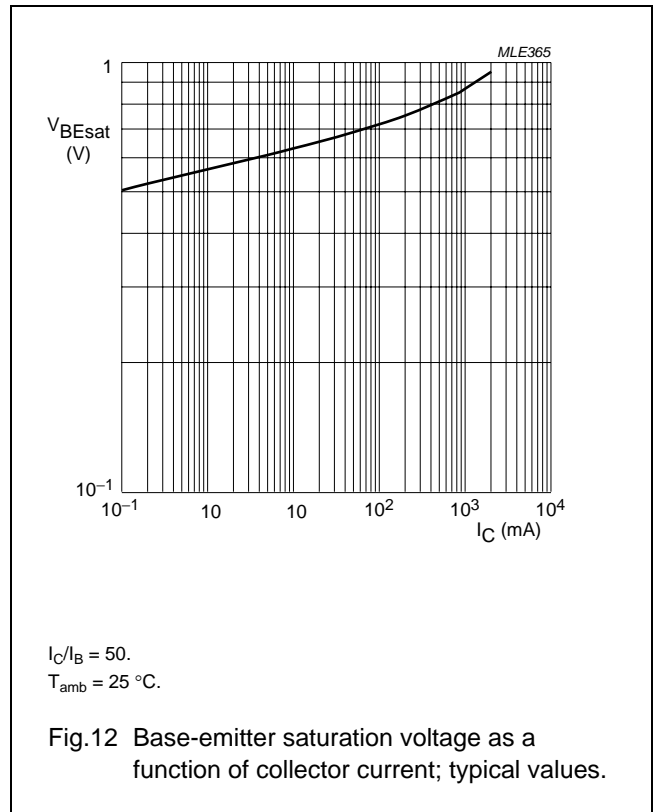
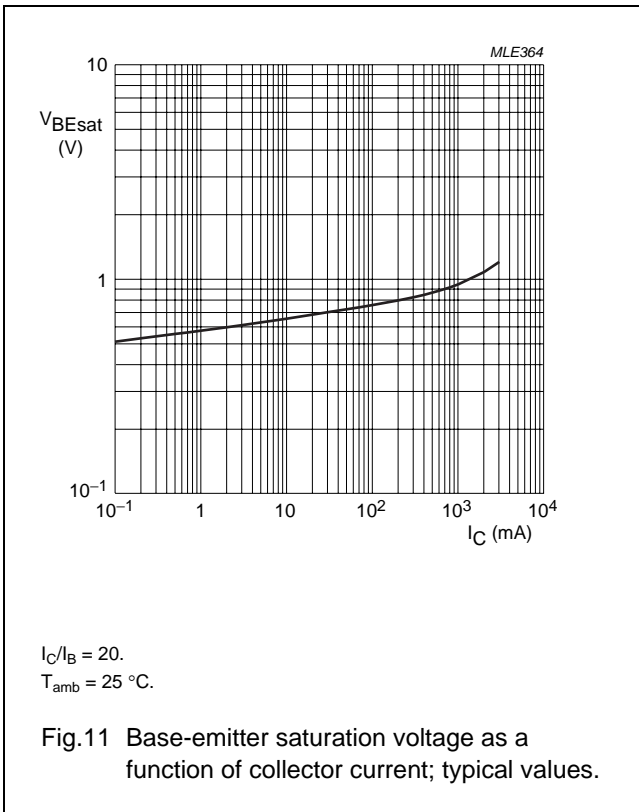
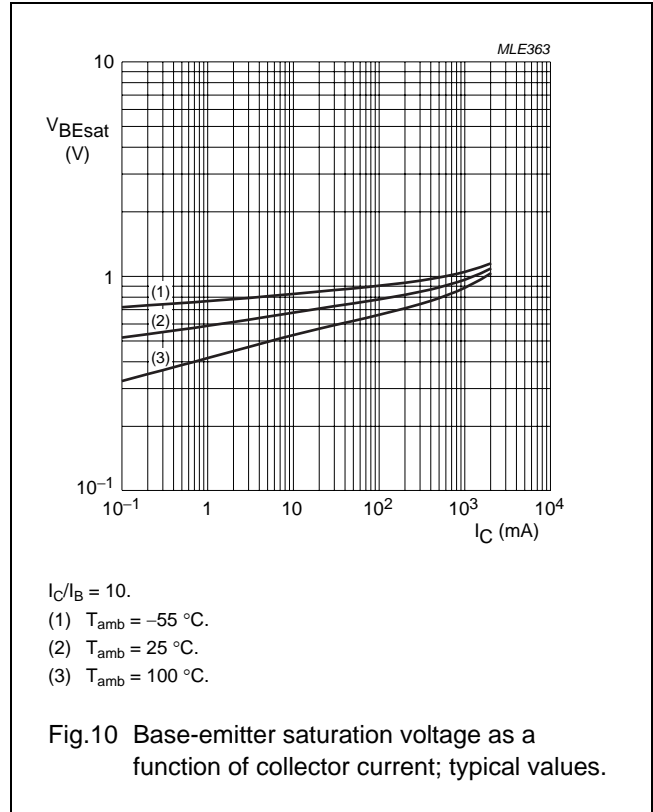
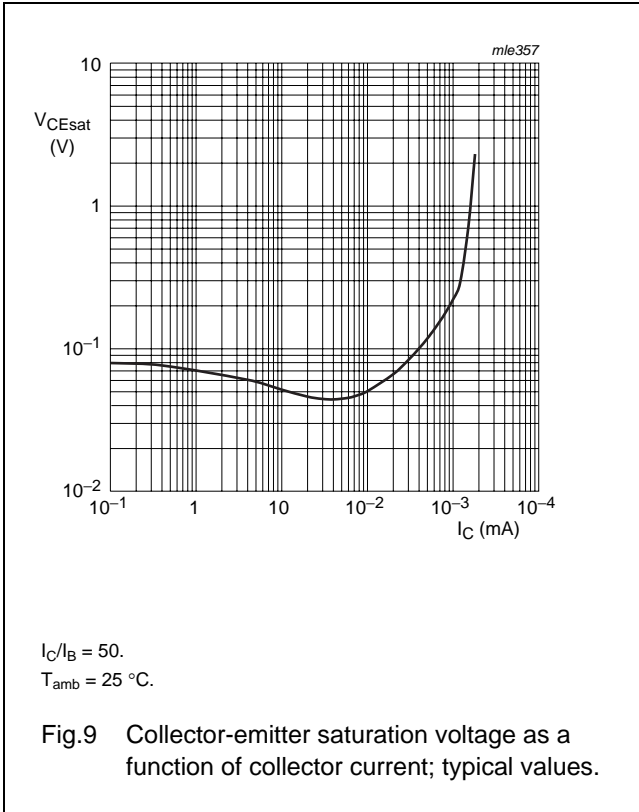
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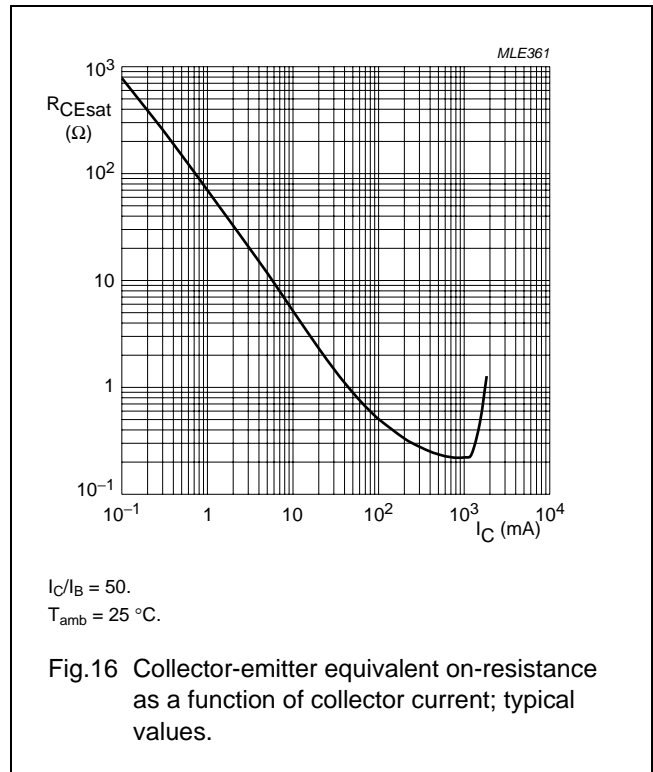
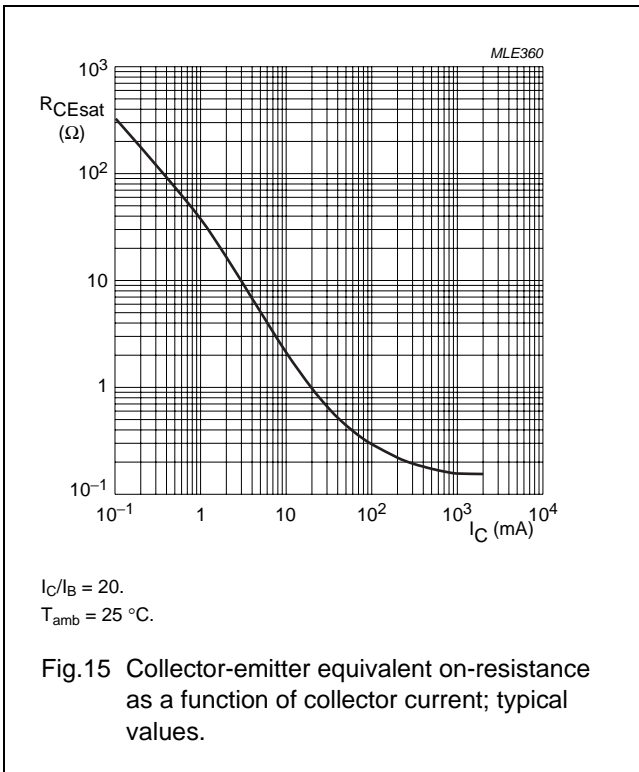
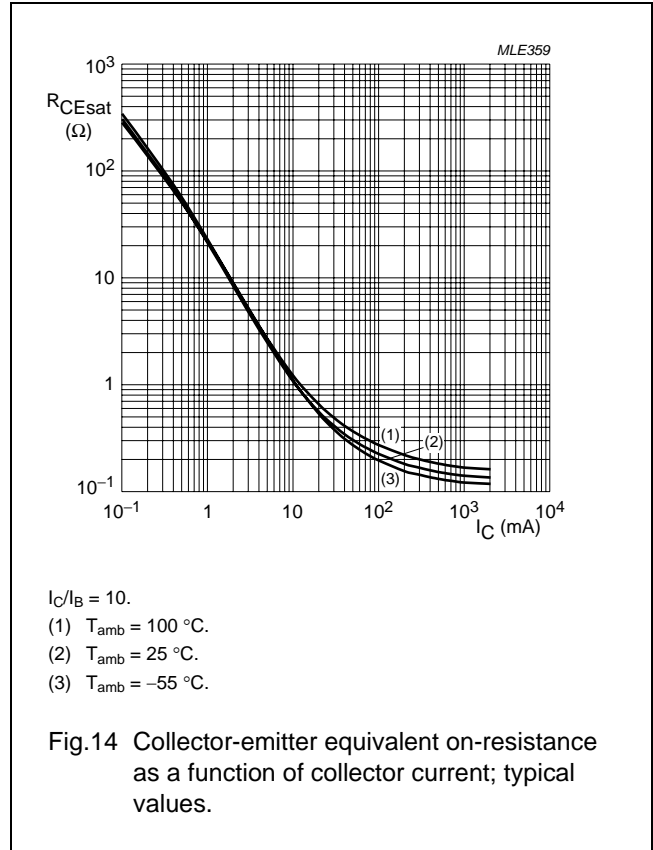
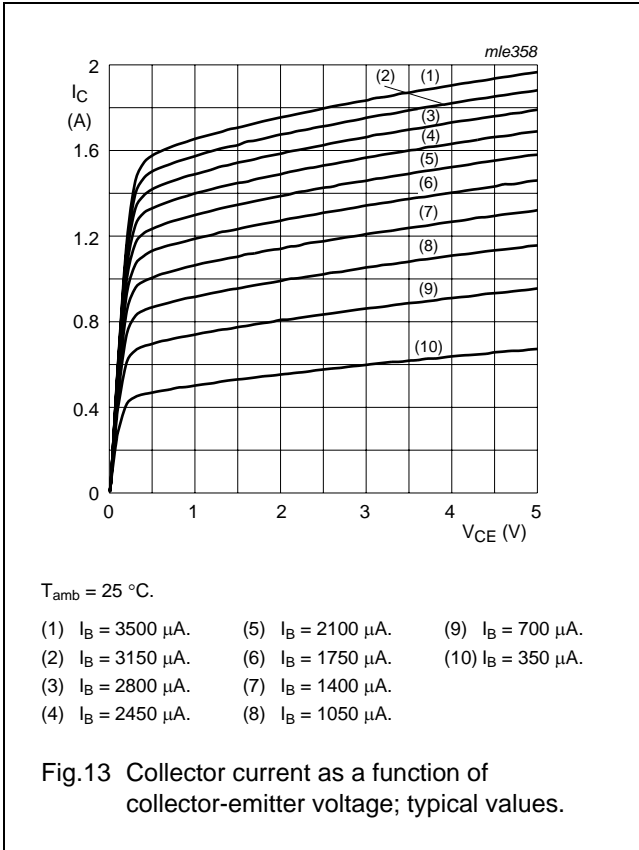
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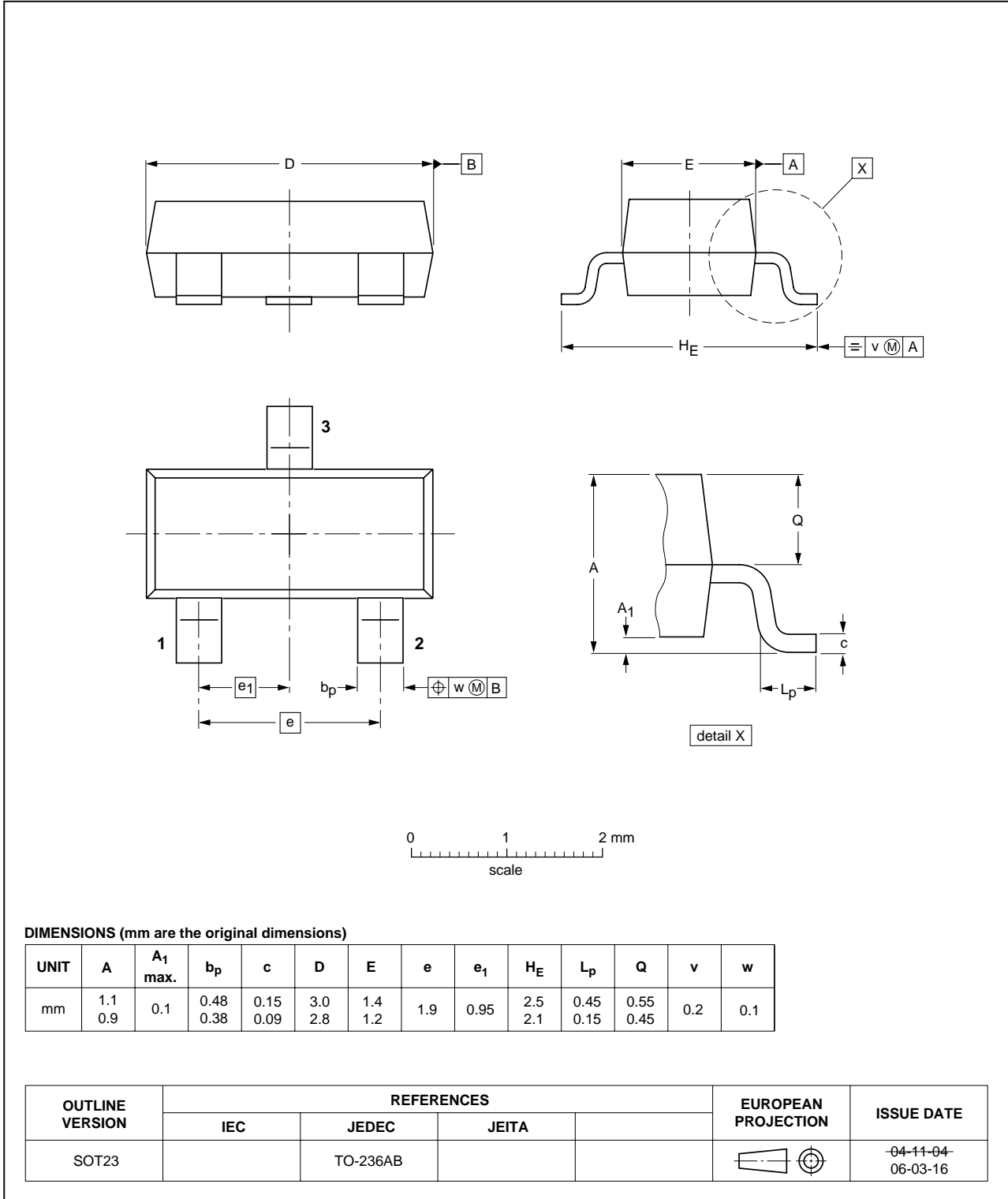
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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



100 V, 1 A  
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**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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## **Contact information**

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