

DATA SHEET



PBSS4320X

20 V, 3 A

NPN low V_{CEsat} (BISS) transistor

Product data sheet
Supersedes data of 2003 Dec 15

2004 Nov 03

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FEATURES

- SOT89 (SC-62) 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

- 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 SOT89 plastic package.
 PNP complement: PBSS5320X.

MARKING

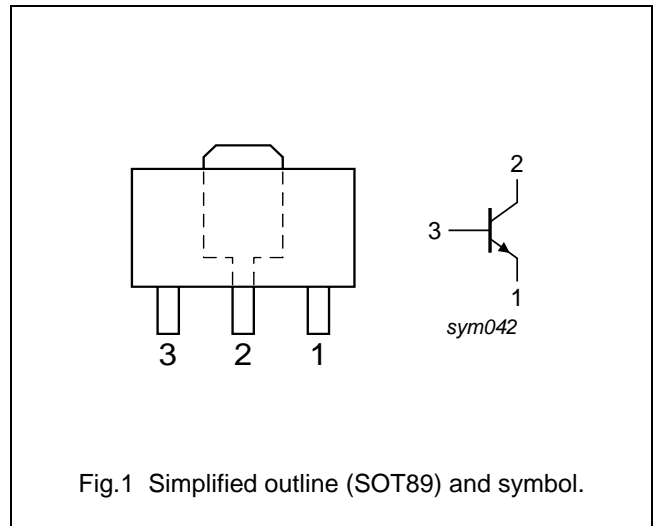
| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| PBSS4320X | S44 |

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | UNIT |
|-------------|---------------------------|------|-----------|
| V_{CEO} | collector-emitter voltage | 20 | V |
| I_C | collector current (DC) | 3 | A |
| I_{CM} | peak collector current | 5 | A |
| R_{CEsat} | equivalent on-resistance | 105 | $m\Omega$ |

PINNING

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



ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|-------------|---------|--|---------|
| | NAME | DESCRIPTION | VERSION |
| PBSS4320X | SC-62 | plastic surface mounted package; collector pad for good heat transfer; 3 leads | SOT89 |

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LIMITING VALUES

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

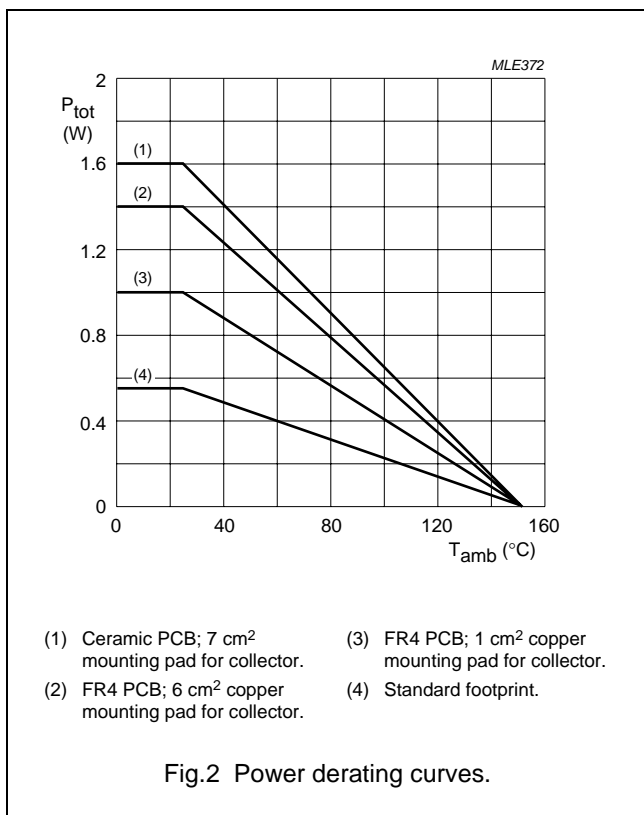
| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|---------------------------|---|------|------------------------|-------------------|
| V_{CBO} | collector-base voltage | open emitter | – | 20 | V |
| V_{CEO} | collector-emitter voltage | open base | – | 20 | V |
| V_{EBO} | emitter-base voltage | open collector | – | 5 | V |
| I_C | collector current (DC) | note 4 | – | 3 | A |
| I_{CM} | peak collector current | limited by $T_{j(max)}$ | – | 5 | A |
| I_B | base current (DC) | | – | 0.5 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ note 1 note 2 note 3 note 4 | – | 550 1 1.4 1.6 | mW W W W |
| T_{stg} | storage temperature | | –65 | +150 | °C |
| T_j | junction temperature | | – | 150 | °C |
| T_{amb} | ambient temperature | | –65 | +150 | °C |

Notes

1. Device mounted on a FR4 printed-circuit board; single-sided copper; tin-plated; standard footprint.
2. Device mounted on a FR4 printed-circuit board; single-sided copper; tin-plated; mounting pad for collector 1 cm².
3. Device mounted on a FR4 printed-circuit board; single-sided copper; tin-plated; mounting pad for collector 6 cm².
4. Device mounted on a ceramic printed-circuit board 7 cm², single-sided copper, tin-plated.

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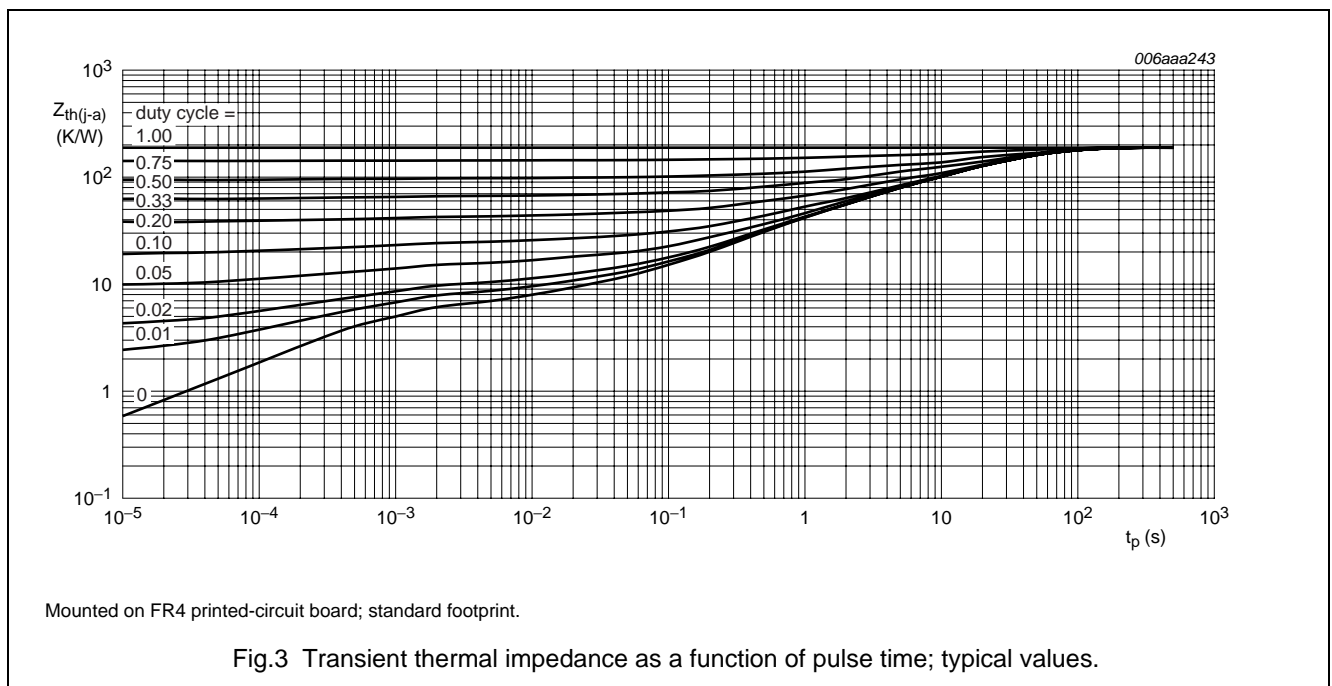
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THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---------------|---|-------------|-------|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | | |
| | | note 1 | 225 | K/W |
| | | note 2 | 125 | K/W |
| | | note 3 | 90 | K/W |
| | | note 4 | 80 | K/W |
| $R_{th(j-s)}$ | thermal resistance from junction to soldering point | | 16 | K/W |

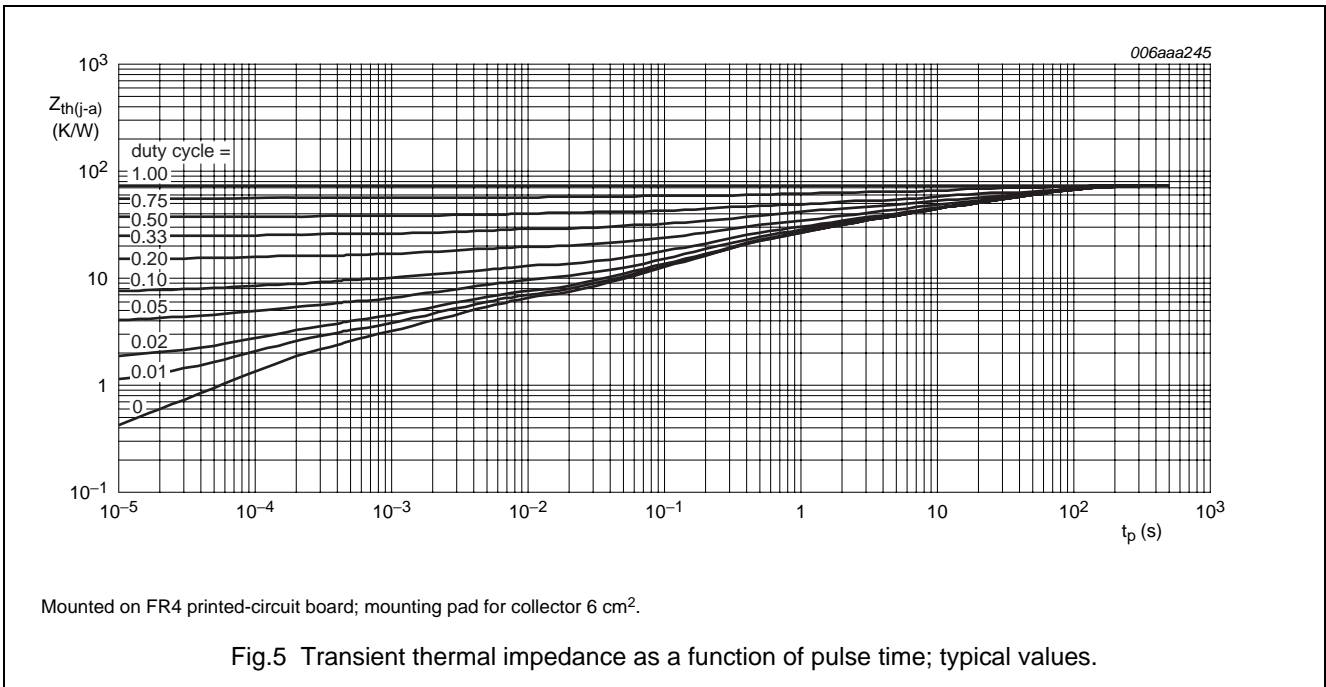
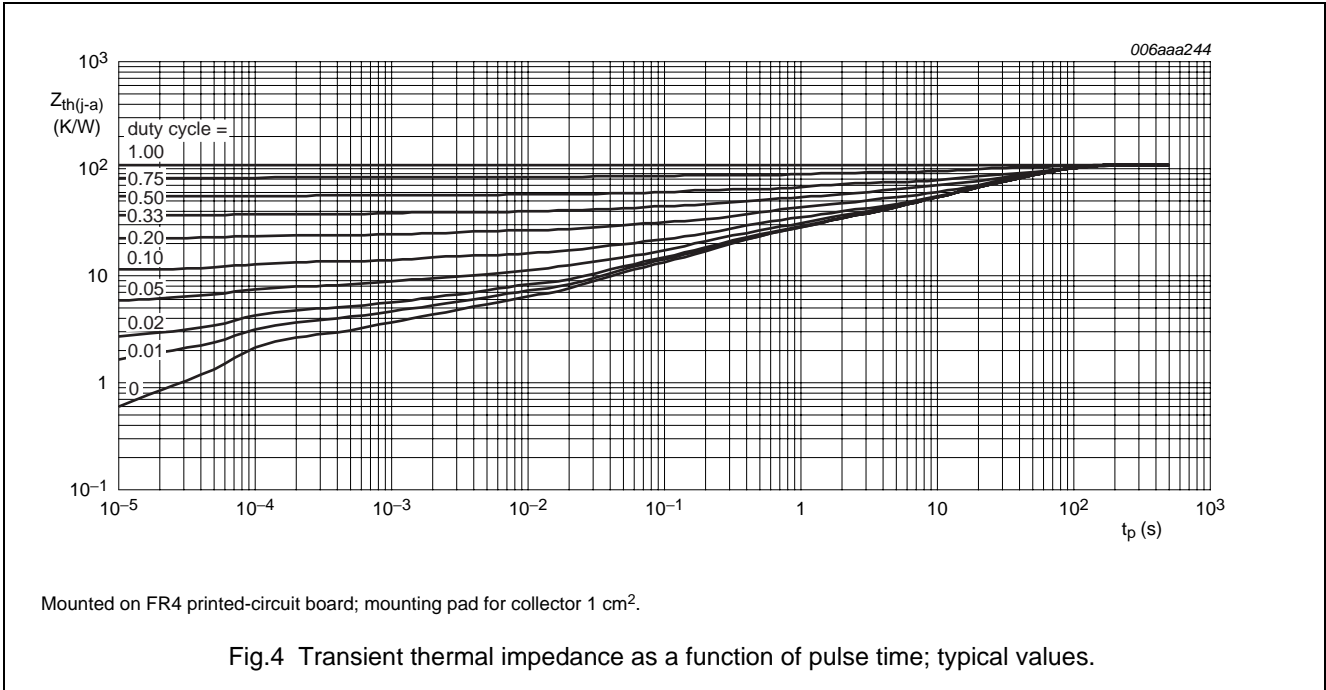
Notes

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

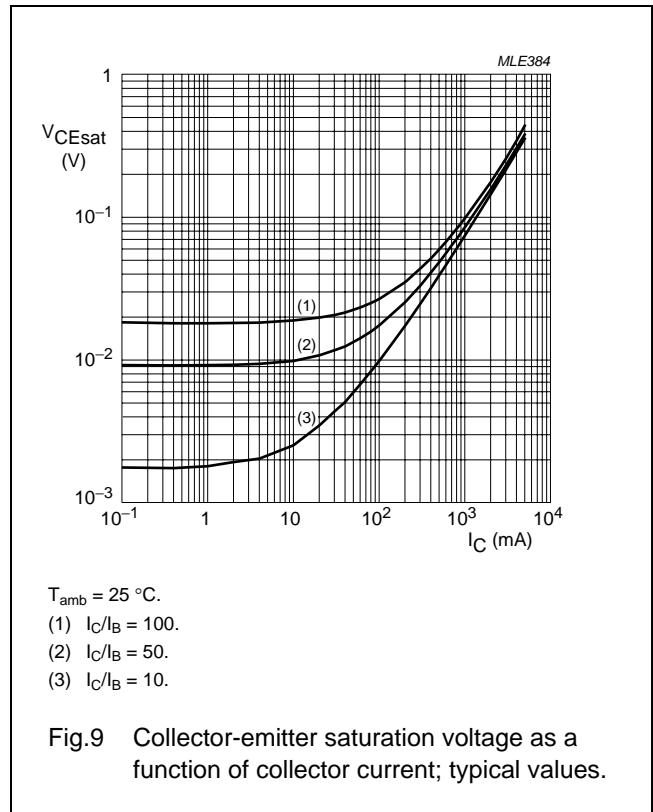
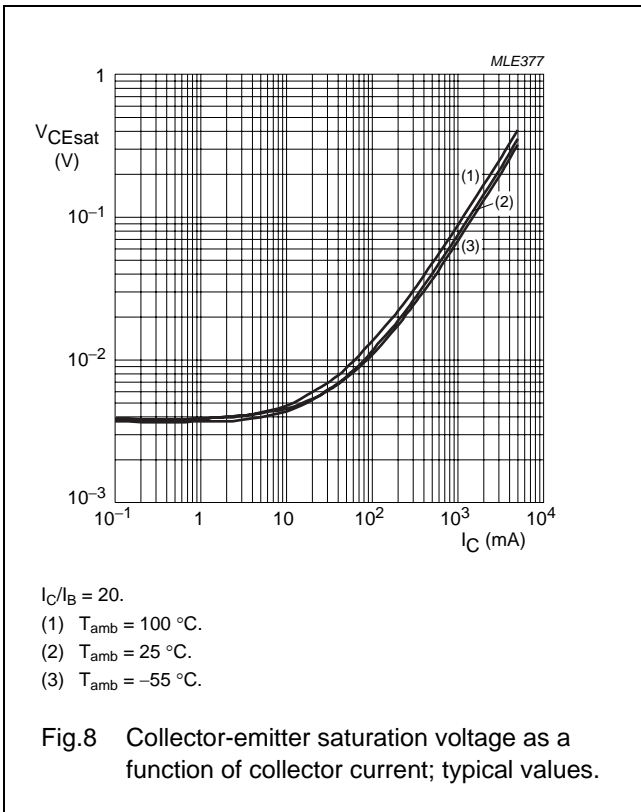
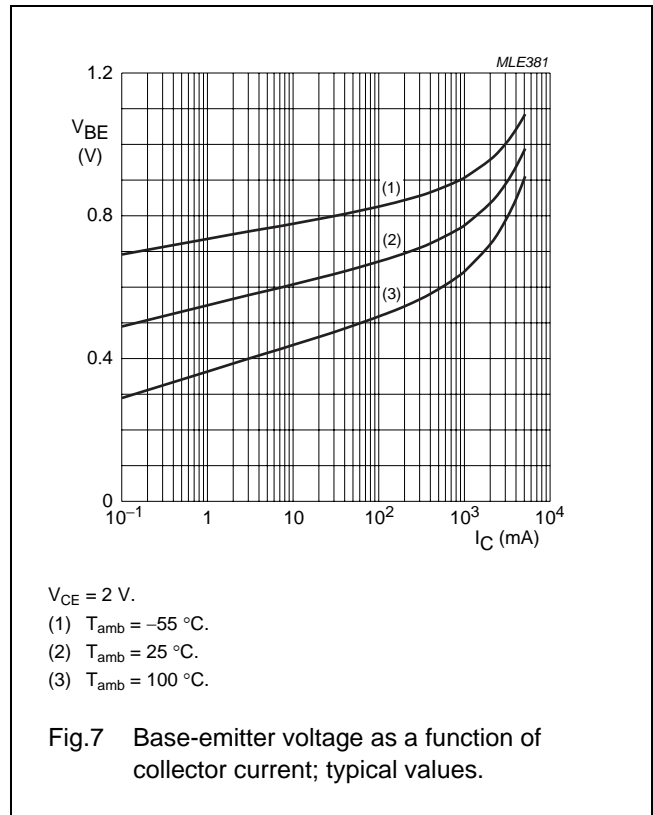
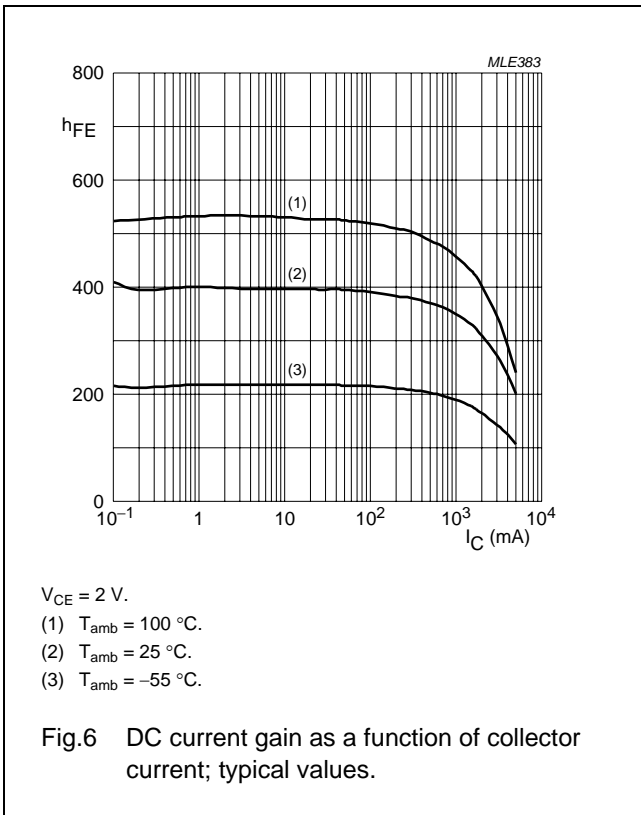
| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------|--------------------------------------|--|------|------|------|------------------|
| I_{CBO} | collector-base cut-off current | $V_{CB} = 20\text{ V}; I_E = 0\text{ A}$ | – | – | 100 | nA |
| | | $V_{CB} = 20\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$ | – | – | 50 | μA |
| I_{CES} | collector-emitter cut-off current | $V_{CE} = 20\text{ V}; V_{BE} = 0\text{ V}$ | – | – | 100 | nA |
| I_{EBO} | emitter-base cut-off current | $V_{EB} = 5\text{ V}; I_C = 0\text{ A}$ | – | – | 100 | nA |
| h_{FE} | DC current gain | $V_{CE} = 2\text{ V}$ | | | | |
| | | $I_C = 0.1\text{ A}$ | 220 | – | – | |
| | | $I_C = 0.5\text{ A}$ | 220 | – | – | |
| | | $I_C = 1\text{ A}; \text{note 1}$ | 220 | – | – | |
| | | $I_C = 2\text{ A}; \text{note 1}$ | 200 | – | – | |
| | | $I_C = 3\text{ A}; \text{note 1}$ | 150 | – | – | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = 0.5\text{ A}; I_B = 50\text{ mA}$ | – | – | 70 | mV |
| | | $I_C = 1\text{ A}; I_B = 50\text{ mA}$ | – | – | 120 | mV |
| | | $I_C = 2\text{ A}; I_B = 100\text{ mA}$ | – | – | 240 | mV |
| | | $I_C = 3\text{ A}; I_B = 300\text{ mA}; \text{note 1}$ | – | – | 310 | mV |
| R_{CEsat} | equivalent on-resistance | $I_C = 3\text{ A}; I_B = 300\text{ mA}; \text{note 1}$ | – | 85 | 105 | $\text{m}\Omega$ |
| V_{BEsat} | base-emitter saturation voltage | $I_C = 2\text{ A}; I_B = 100\text{ mA}$ | – | 1.1 | – | V |
| | | $I_C = 3\text{ A}; I_B = 300\text{ mA}; \text{note 1}$ | – | – | 1.2 | V |
| V_{BEon} | base-emitter turn-on voltage | $V_{CE} = 2\text{ V}; I_C = 1\text{ A}$ | 1.1 | – | – | V |
| f_T | transition frequency | $I_C = 100\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$ | 100 | – | – | MHz |
| C_c | collector capacitance | $V_{CB} = 10\text{ V}; I_E = I_e = 0\text{ A}; f = 1\text{ MHz}$ | – | – | 35 | pF |

Note

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

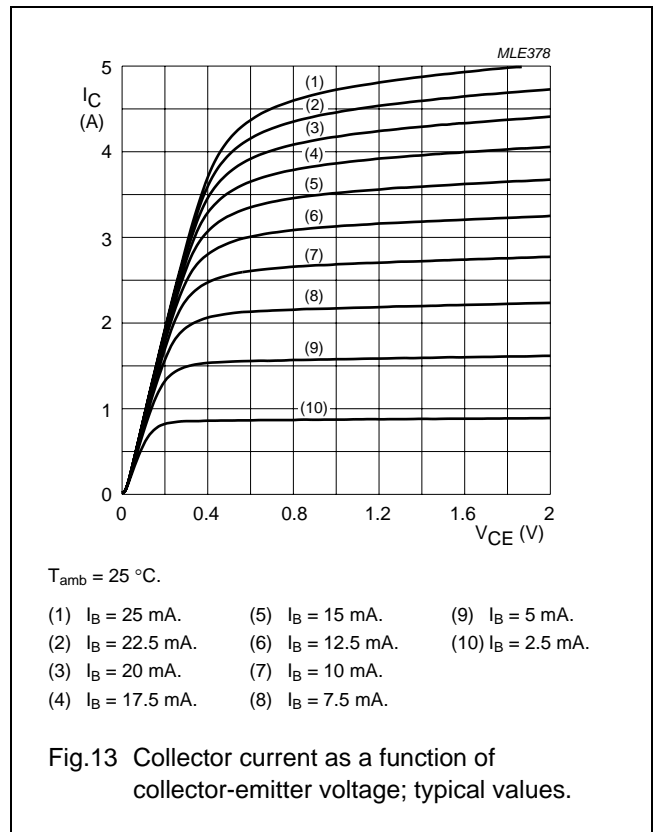
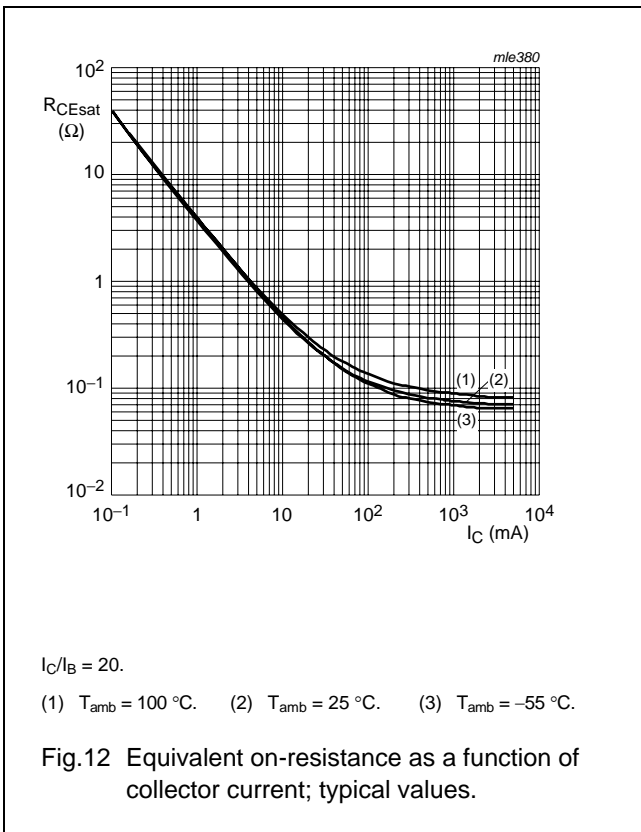
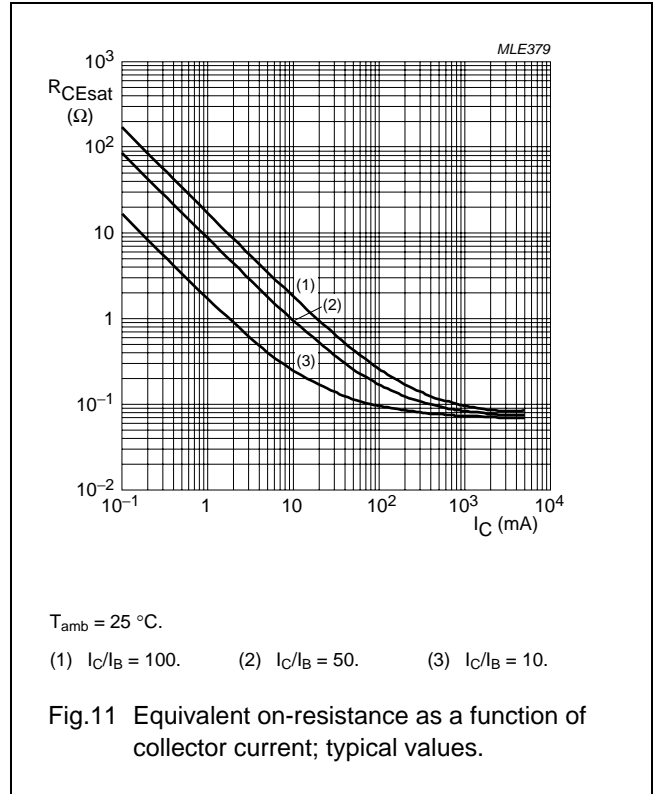
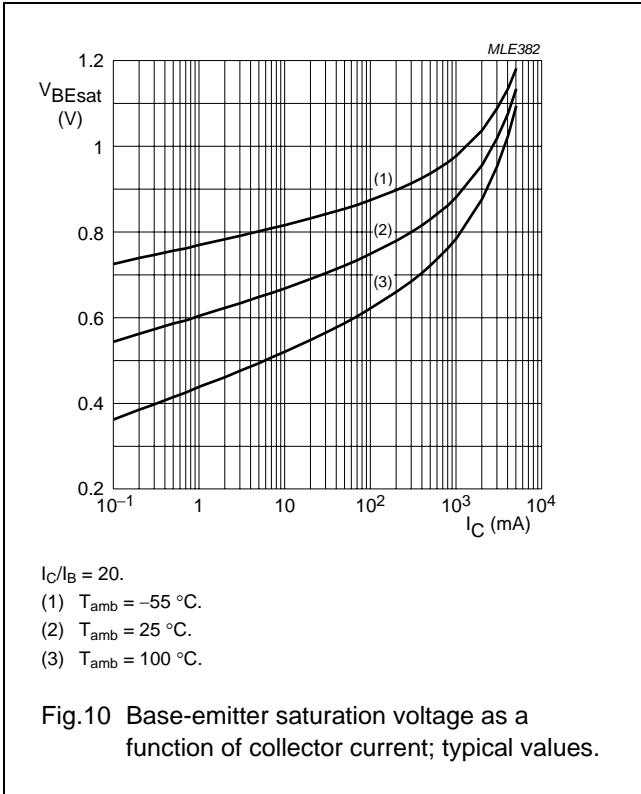
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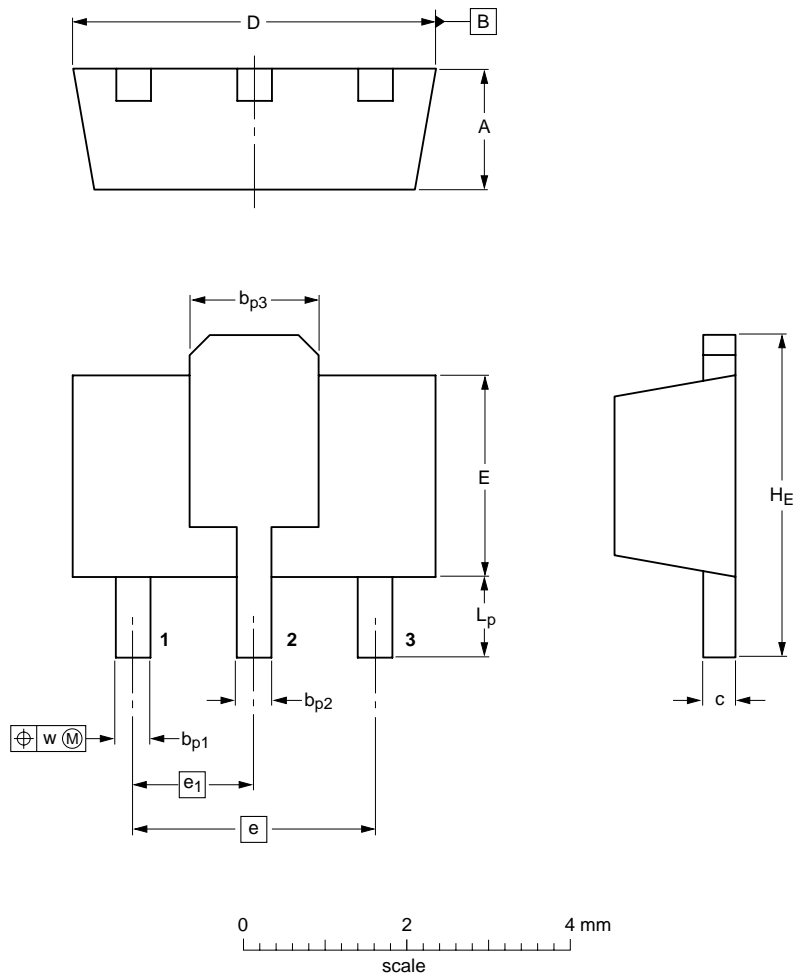
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PACKAGE OUTLINE

Plastic surface-mounted package; collector pad for good heat transfer; 3 leads

SOT89



DIMENSIONS (mm are the original dimensions)

| UNIT | A | b _{p1} | b _{p2} | b _{p3} | c | D | E | e | e ₁ | H _E | L _p | w |
|------|------------|-----------------|-----------------|-----------------|--------------|------------|------------|-----|----------------|----------------|----------------|------|
| mm | 1.6 1.4 | 0.48 0.35 | 0.53 0.40 | 1.8 1.4 | 0.44 0.23 | 4.6 4.4 | 2.6 2.4 | 3.0 | 1.5 | 4.25 3.75 | 1.2 0.8 | 0.13 |

| OUTLINE VERSION | REFERENCES | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|--------|-------|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | |
| SOT89 | | TO-243 | SC-62 | | 04-08-03 06-03-16 |

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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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Contact information

For additional information please visit: <http://www.nxp.com>

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