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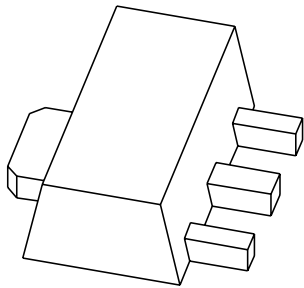
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Kind regards,

Team Nexperia

DATA SHEET



PBSS4350X

50 V, 3 A

NPN low V_{CEsat} (BISS) transistor

Product specification
Supersedes data of 2003 Nov 21

2004 Nov 04

50 V, 3 A
NPN low V_{CEsat} (BISS) transistor

PBSS4350X

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: PBSS5350X.

MARKING

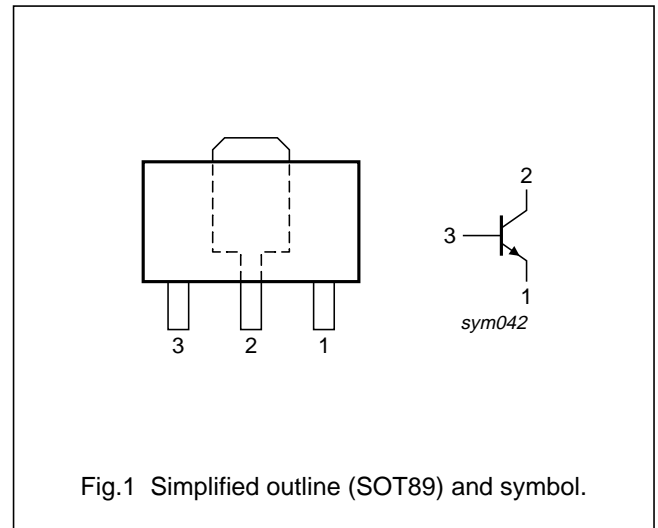
| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| PBSS4350X | S43 |

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | UNIT |
|-------------|---------------------------|------|------------|
| V_{CEO} | collector-emitter voltage | 50 | V |
| I_C | collector current (DC) | 3 | A |
| I_{CM} | peak collector current | 5 | A |
| R_{CEsat} | equivalent on-resistance | 130 | m Ω |

PINNING

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



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PBSS4350X

ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|-------------|---------|--------------------------------------------------------------------------------|---------|
| | NAME | DESCRIPTION | VERSION |
| PBSS4350X | SC-62 | plastic surface mounted package; collector pad for good heat transfer; 3 leads | SOT89 |

LIMITING VALUES

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

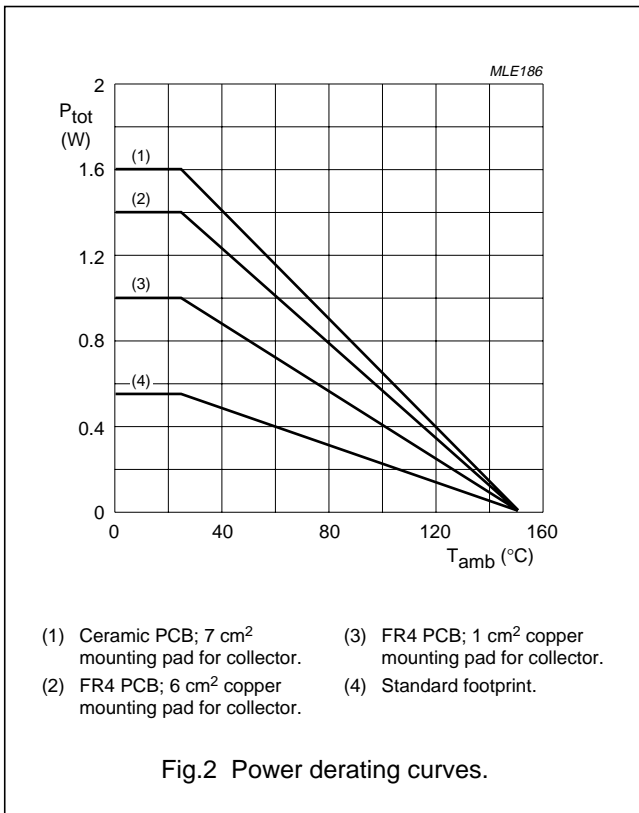
| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|---------------------------|---------------------------------------------------------------------|------|------------------------|-------------------|
| V_{CBO} | collector-base voltage | open emitter | – | 50 | V |
| V_{CEO} | collector-emitter voltage | open base | – | 50 | 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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PBSS4350X



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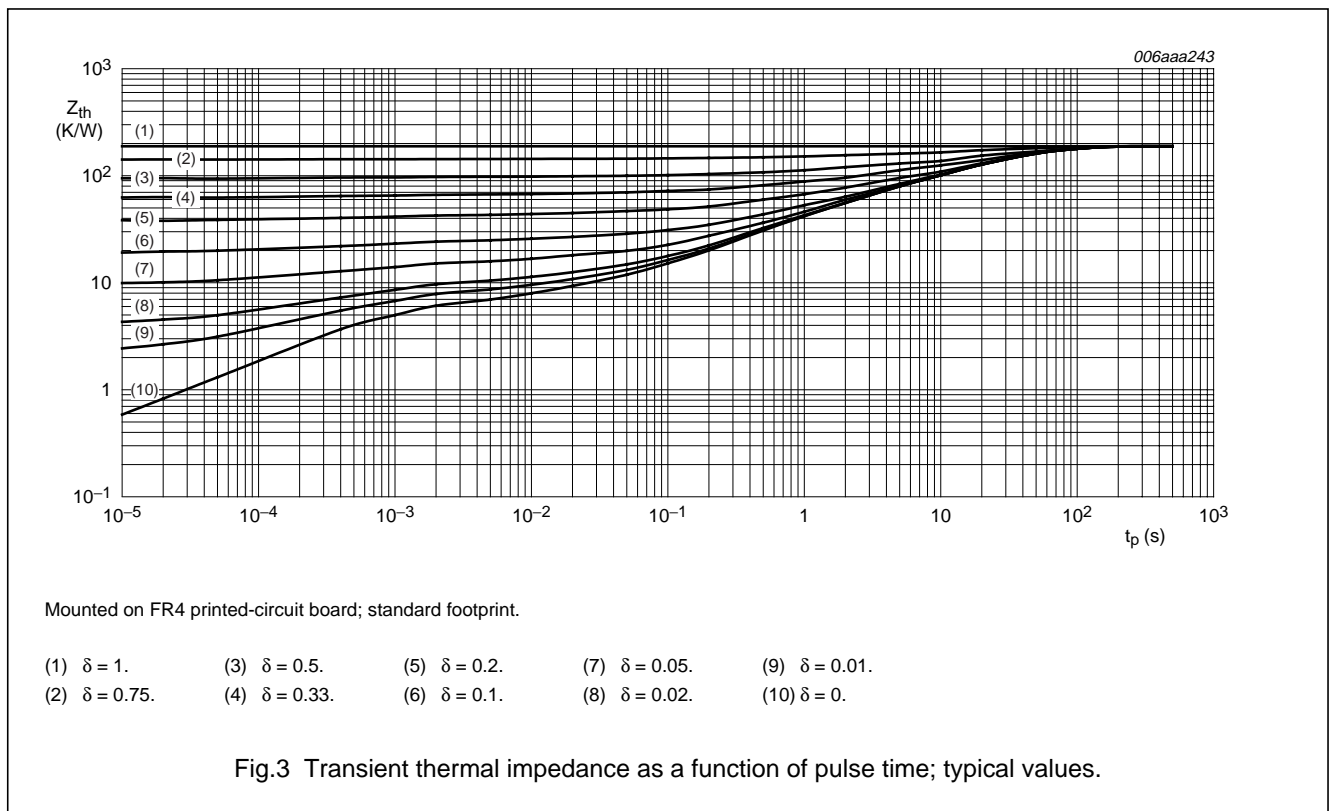
PBSS4350X

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 |

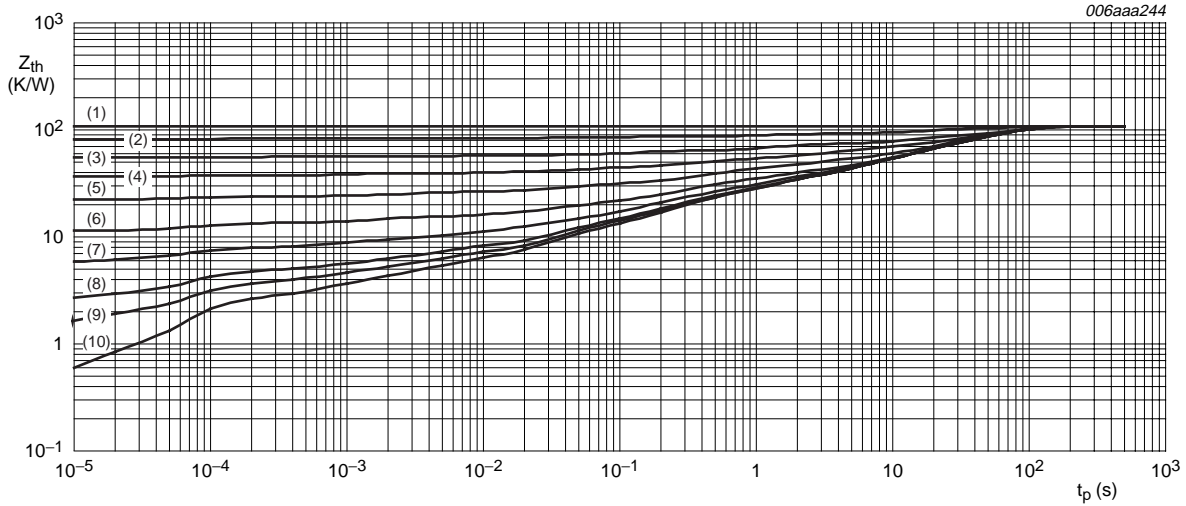
Notes

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.
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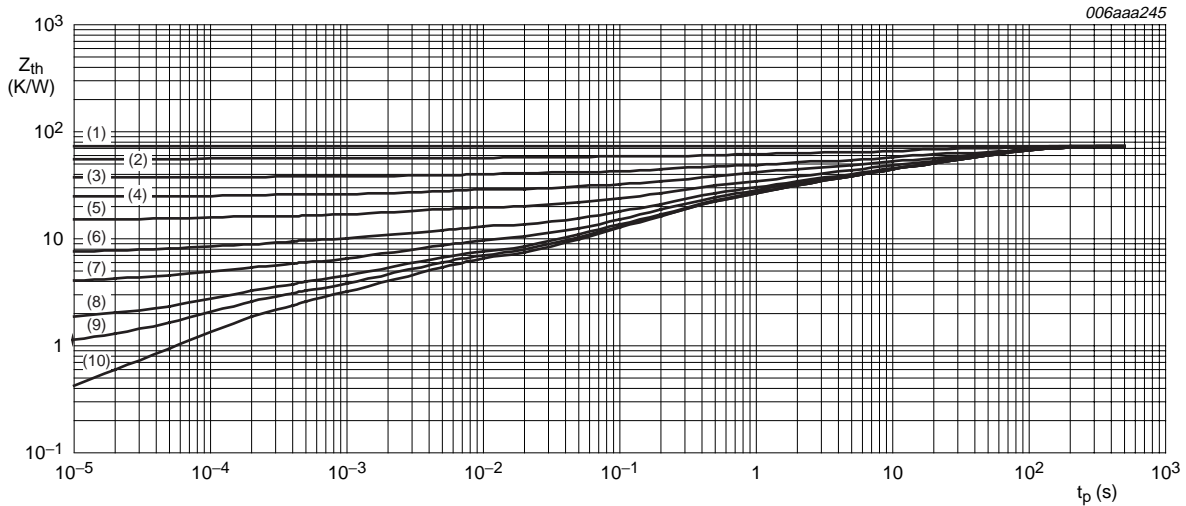
PBSS4350X



Mounted on FR4 printed-circuit board; mounting pad for collector 1 cm².

- | | | | | |
|----------------------|----------------------|---------------------|----------------------|----------------------|
| (1) $\delta = 1.$ | (3) $\delta = 0.5.$ | (5) $\delta = 0.2.$ | (7) $\delta = 0.05.$ | (9) $\delta = 0.01.$ |
| (2) $\delta = 0.75.$ | (4) $\delta = 0.33.$ | (6) $\delta = 0.1.$ | (8) $\delta = 0.02.$ | (10) $\delta = 0.$ |

Fig.4 Transient thermal impedance as a function of pulse time; typical values.



Mounted on FR4 printed-circuit board; mounting pad for collector 6 cm².

- | | | | | |
|----------------------|----------------------|---------------------|----------------------|----------------------|
| (1) $\delta = 1.$ | (3) $\delta = 0.5.$ | (5) $\delta = 0.2.$ | (7) $\delta = 0.05.$ | (9) $\delta = 0.01.$ |
| (2) $\delta = 0.75.$ | (4) $\delta = 0.33.$ | (6) $\delta = 0.1.$ | (8) $\delta = 0.02.$ | (10) $\delta = 0.$ |

Fig.5 Transient thermal impedance as a function of pulse time; typical values.

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

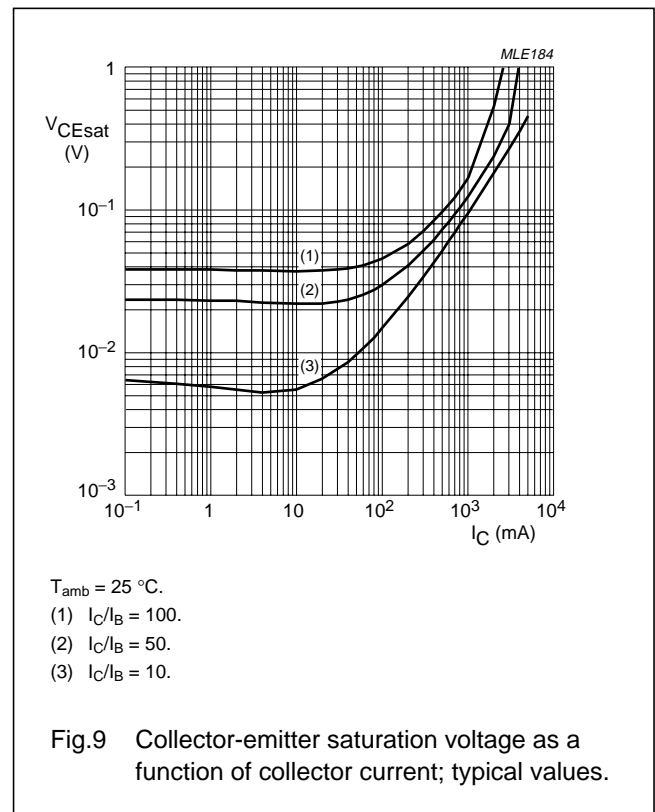
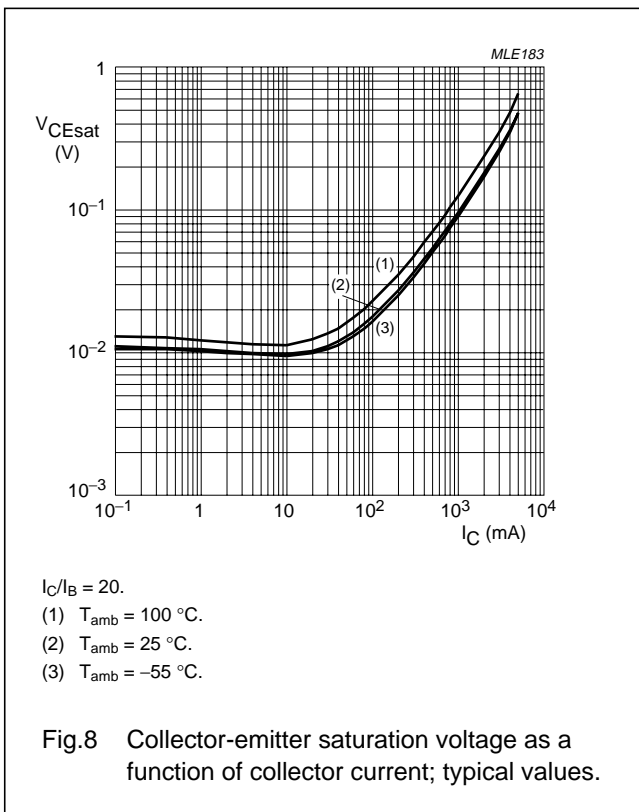
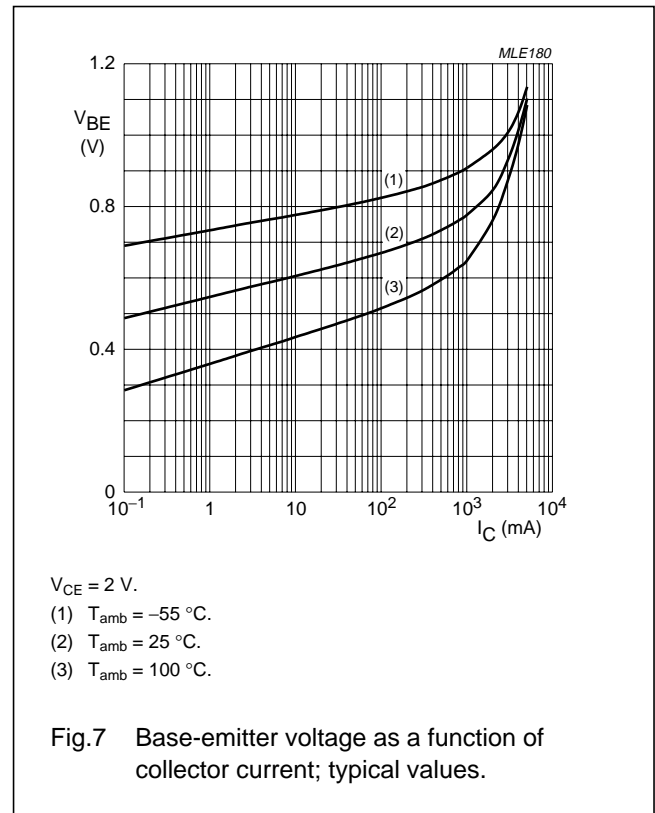
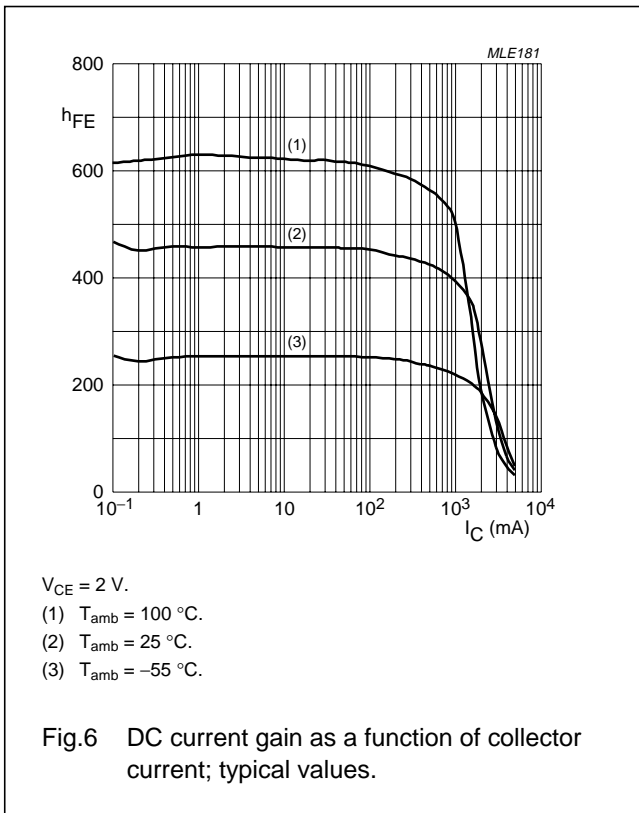
| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------|--------------------------------------|------------------------------------------------------------------|------|------|------|------------------|
| I_{CBO} | collector-base cut-off current | $V_{CB} = 50\text{ V}; I_E = 0\text{ A}$ | – | – | 100 | nA |
| | | $V_{CB} = 50\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$ | – | – | 50 | μA |
| I_{CES} | collector-emitter cut-off current | $V_{CE} = 50\text{ V}; V_{BE} = 0\text{ V}$ | – | – | 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 | $V_{CE} = 2\text{ V}$ | | | | |
| | | $I_C = 0.1\text{ A}$ | 300 | – | – | |
| | | $I_C = 0.5\text{ A}$ | 300 | – | – | |
| | | $I_C = 1\text{ A}; \text{note 1}$ | 300 | – | 700 | |
| | | $I_C = 2\text{ A}; \text{note 1}$ | 200 | – | – | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = 0.5\text{ A}; I_B = 50\text{ mA}$ | – | – | 80 | mV |
| | | $I_C = 1\text{ A}; I_B = 50\text{ mA}$ | – | – | 160 | mV |
| | | $I_C = 2\text{ A}; I_B = 100\text{ mA}$ | – | – | 280 | mV |
| | | $I_C = 2\text{ A}; I_B = 200\text{ mA}; \text{note 1}$ | – | – | 260 | mV |
| | | $I_C = 3\text{ A}; I_B = 300\text{ mA}; \text{note 1}$ | – | – | 370 | mV |
| R_{CEsat} | equivalent on-resistance | $I_C = 2\text{ A}; I_B = 200\text{ mA}; \text{note 1}$ | – | 100 | 130 | $\text{m}\Omega$ |
| 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 | $V_{CB} = 10\text{ V}; I_E = I_e = 0\text{ A}; f = 1\text{ MHz}$ | – | – | 25 | pF |

Note

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

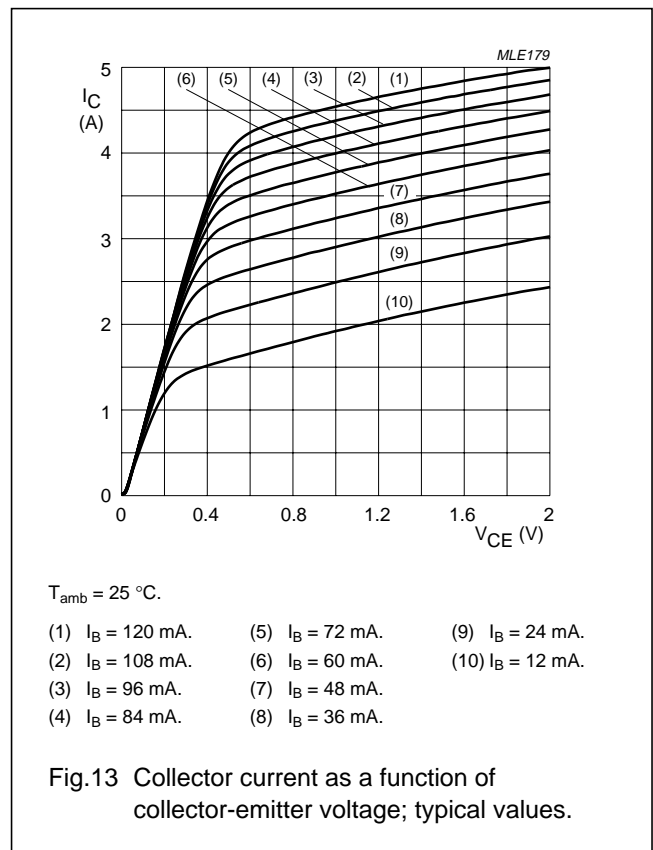
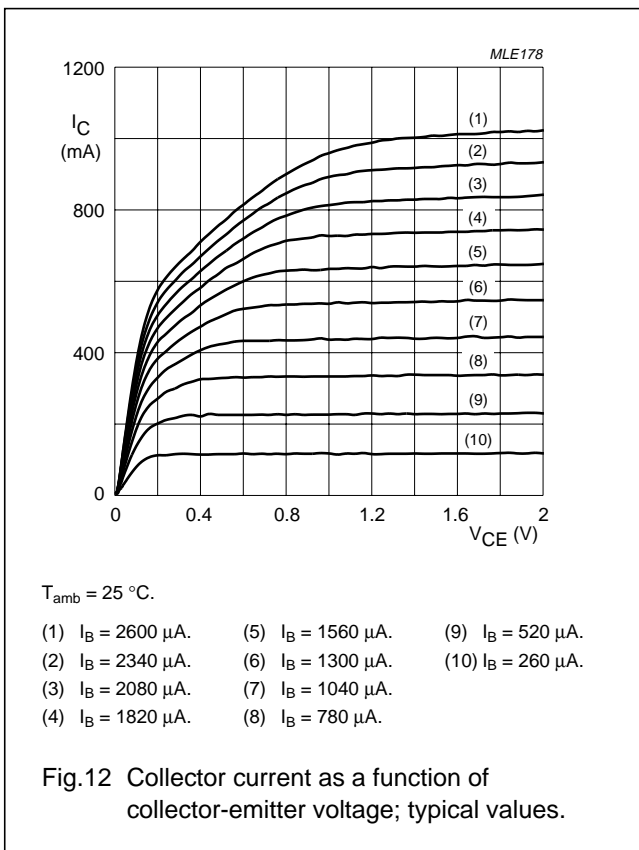
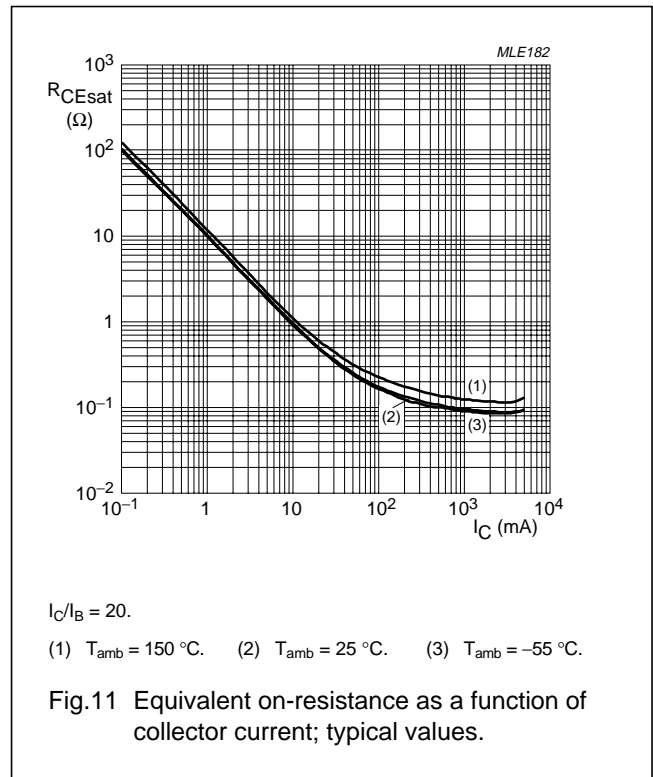
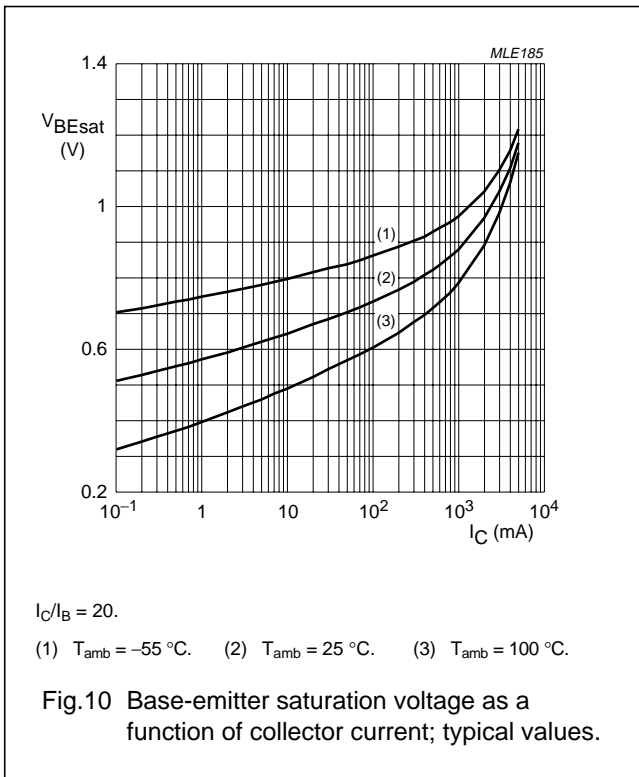
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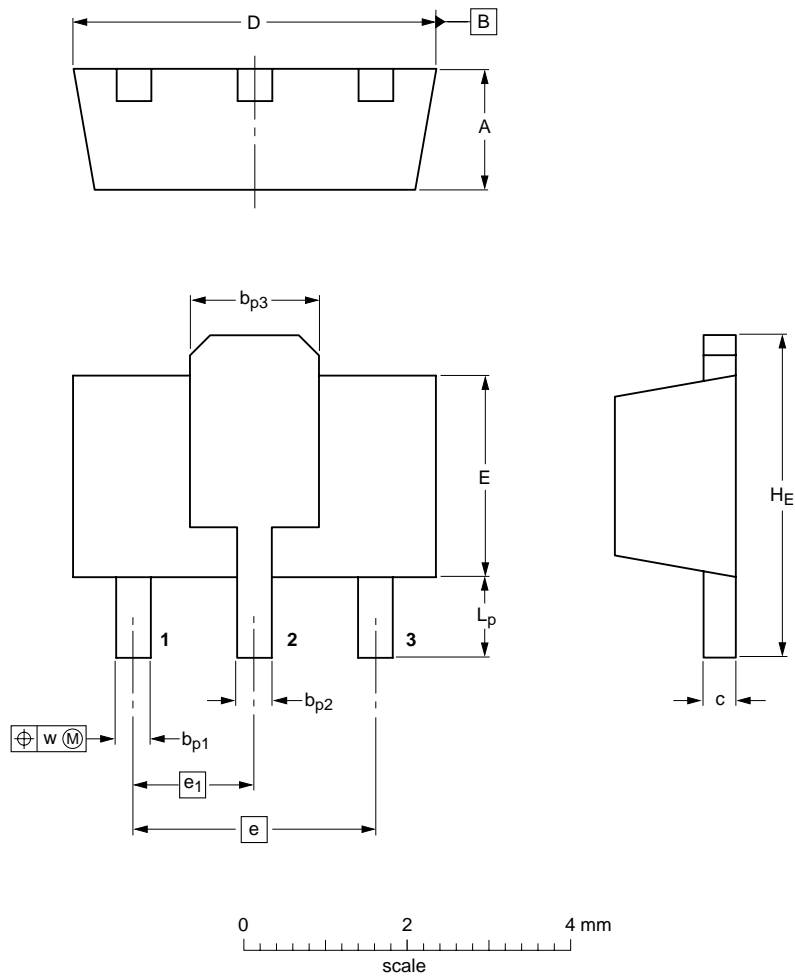
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PACKAGE OUTLINE

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

SOT89



DIMENSIONS (mm are the original dimensions)

| UNIT | A | bp1 | bp2 | bp3 | c | D | E | e | e1 | HE | Lp | 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 | | 99-09-13 04-08-03 |

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PBSS4350X

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|-------|----------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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