

DATA SHEET



PBSS4140V 40 V low V_{CEsat} NPN transistor

Product specification
Supersedes data of 2001 Nov 05

2002 Jun 20

40 V low V_{CEsat} NPN transistor

PBSS4140V

FEATURES

- 300 mW total power dissipation
- Very small 1.6 mm x 1.2 mm x 0.55 mm ultra thin package
- Improved thermal behaviour due to flat leads
- Excellent coplanarity due to straight leads
- Low collector-emitter saturation voltage
- High current capabilities
- Reduced required PCB area.

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 with high current capability in a SOT666 plastic package. PNP complement: PBSS5140V.

MARKING

| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| PBSS4140V | 22 |

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | UNIT |
|-------------|---------------------------|------|------------|
| V_{CEO} | collector-emitter voltage | 40 | V |
| I_C | collector current (DC) | 1 | A |
| I_{CRP} | peak collector current | 2 | A |
| R_{CEsat} | equivalent on-resistance | <190 | m Ω |

PINNING

| PIN | DESCRIPTION |
|-----|-------------|
| 1 | collector |
| 2 | collector |
| 3 | base |
| 4 | emitter |
| 5 | collector |
| 6 | collector |

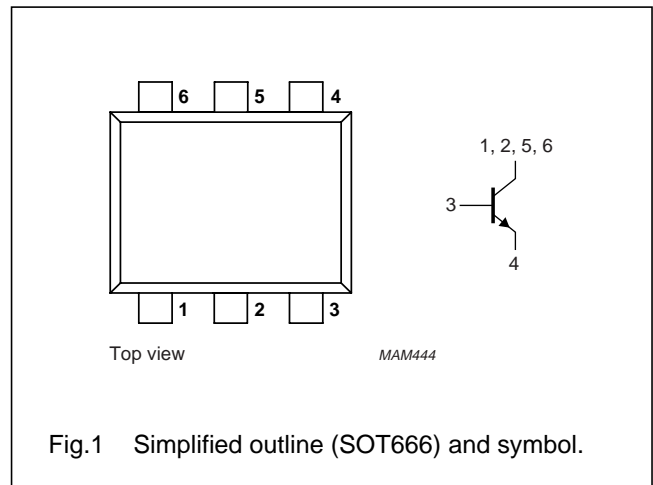


Fig.1 Simplified outline (SOT666) and symbol.

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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 | – | 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 | | – | 3 | A |
| I_{CRP} | repetitive peak collector current | note 1 | – | 2 | A |
| I_B | base current (DC) | | – | 300 | mA |
| I_{BM} | peak base current | | – | 1 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$; note 2 | – | 300 | mW |
| | | $T_{amb} \leq 25\text{ °C}$; note 3 | – | 500 | mW |
| | | $T_{amb} \leq 25\text{ °C}$; notes 1 and 2 | – | 1.2 | W |
| T_{stg} | storage temperature | | –65 | +150 | °C |
| T_j | junction temperature | | – | 150 | °C |
| T_{amb} | operating ambient temperature | | –65 | +150 | °C |

Notes

1. Operated under pulsed conditions: $t_p \leq 30\text{ ms}$; $\delta \leq 0.2$.
2. Device mounted on a printed-circuit board; single sided copper; tinplated; standard footprint.
3. Device mounted on a printed-circuit board; single sided copper; tinplated; mounting pad for collector 1 cm^2 .

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---------------|---|---------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | note 1 | 410 | K/W |
| | | note 2 | 215 | K/W |
| | | notes 1 and 3 | 110 | K/W |

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^2 .
3. Operated under pulsed conditions: $t_p \leq 30\text{ ms}$; $\delta \leq 0.2$.

Soldering

The only recommended soldering method is reflow soldering.

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CHARACTERISTICS

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

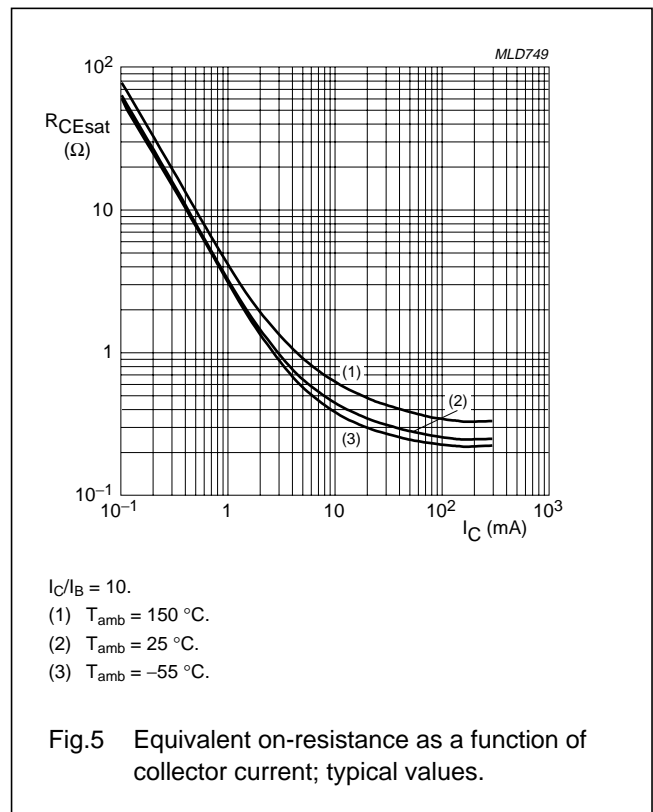
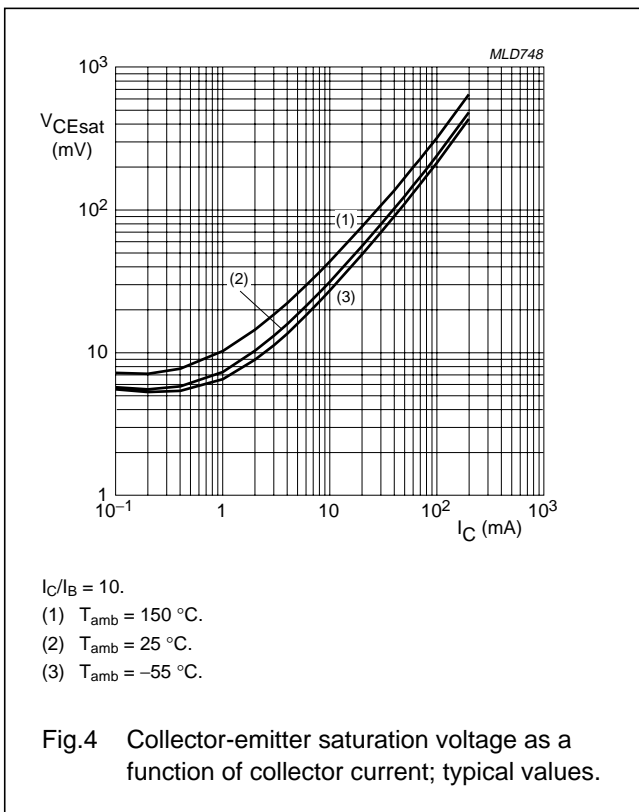
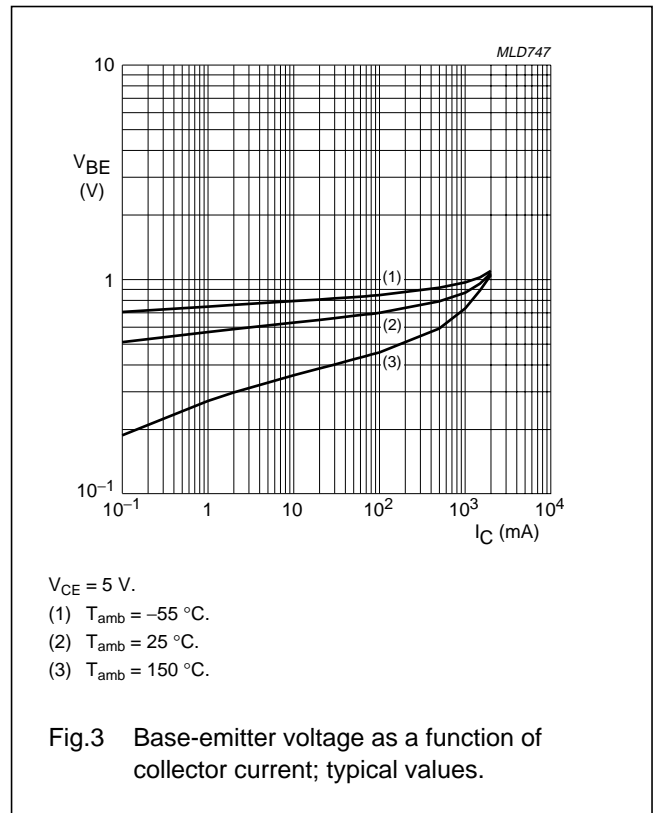
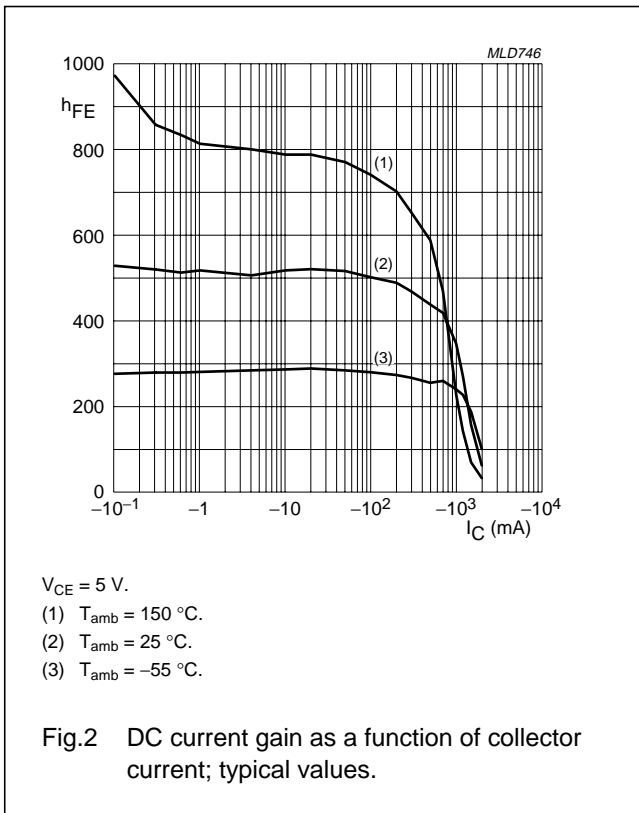
| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------|--------------------------------------|--|------|------|------|------------------|
| I_{CBO} | collector-base cut-off current | $V_{CB} = 40\text{ V}; I_E = 0$ | – | – | 100 | nA |
| | | $V_{CB} = 40\text{ V}; I_E = 0; T_{amb} = 150\text{ °C}$ | – | – | 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 | – | – | |
| | | $V_{CE} = 5\text{ V}; I_C = 2\text{ A}; \text{note 1}$ | 75 | – | – | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = 100\text{ mA}; I_B = 1\text{ mA}$ | – | 50 | 80 | mV |
| | | $I_C = 500\text{ mA}; I_B = 50\text{ mA}$ | – | 70 | 110 | mV |
| | | $I_C = 1\text{ A}; I_B = 100\text{ mA}; \text{note 1}$ | – | 150 | 190 | mV |
| | | $I_C = 2\text{ A}; I_B = 200\text{ mA}; \text{note 1}$ | – | 320 | 440 | mV |
| R_{CEsat} | equivalent on-resistance | $I_C = 1\text{ A}; I_B = 100\text{ mA}; \text{note 1}$ | – | 150 | <190 | $\text{m}\Omega$ |
| 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 | $V_{CB} = 10\text{ V}; I_E = I_e = 0; f = 1\text{ MHz}$ | – | – | 10 | pF |

Note

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

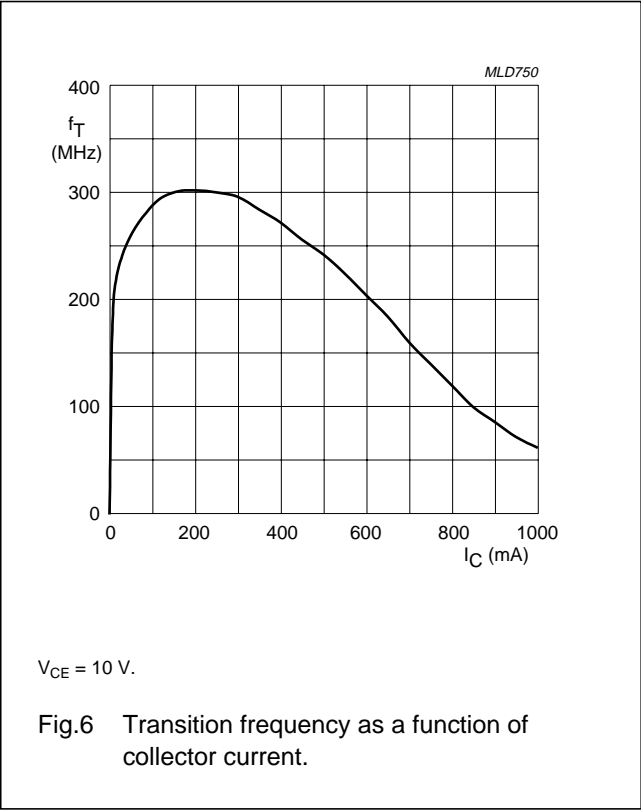
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$V_{CE} = 10$ V.

Fig.6 Transition frequency as a function of collector current.

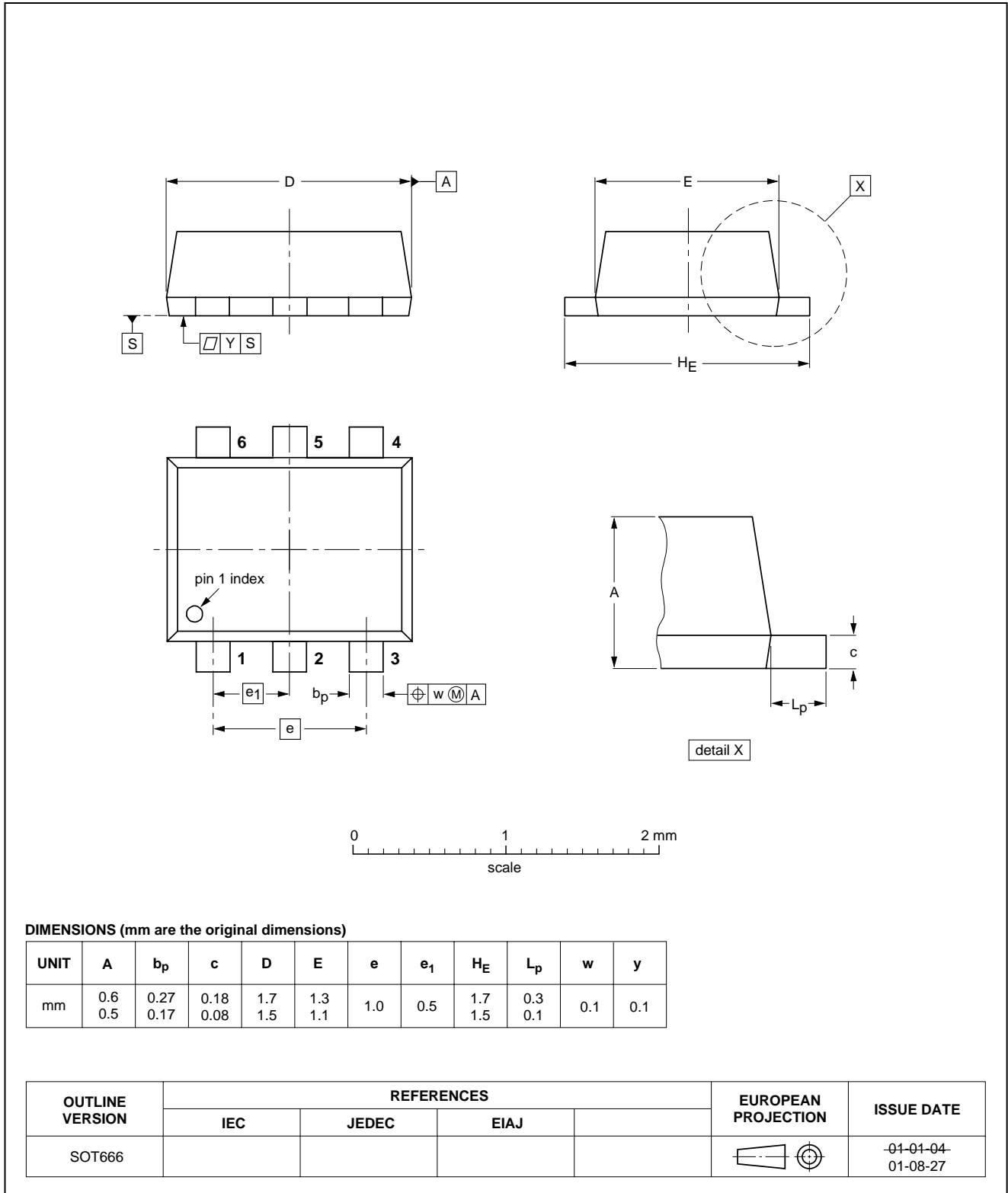
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PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT666



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DATA SHEET STATUS

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|----------------------------------|-------------------------------|--|
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NOTES

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NOTES

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