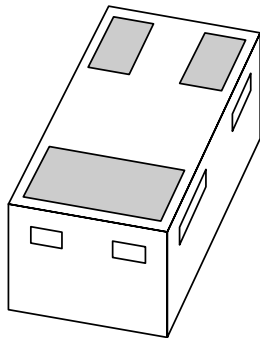


# DATA SHEET



**PBSS2540M**

40 V, 0.5 A

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

Product specification

2003 Jul 22

**40 V, 0.5 A  
NPN low  $V_{CEsat}$  (BISS) transistor**

**PBSS2540M**

**FEATURES**

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

**APPLICATIONS**

- Power management:
  - DC-DC converter
  - Supply line switching
  - Battery charger
  - LCD backlighting.
- Peripheral driver:
  - Driver in low supply voltage applications (e.g. lamps and LEDs).
  - Inductive load drivers (e.g. relays, buzzers and motors).

**DESCRIPTION**

Low  $V_{CEsat}$  NPN transistor in a SOT883 leadless ultra small plastic package.  
PNP complement: PBSS3540M.

**MARKING**

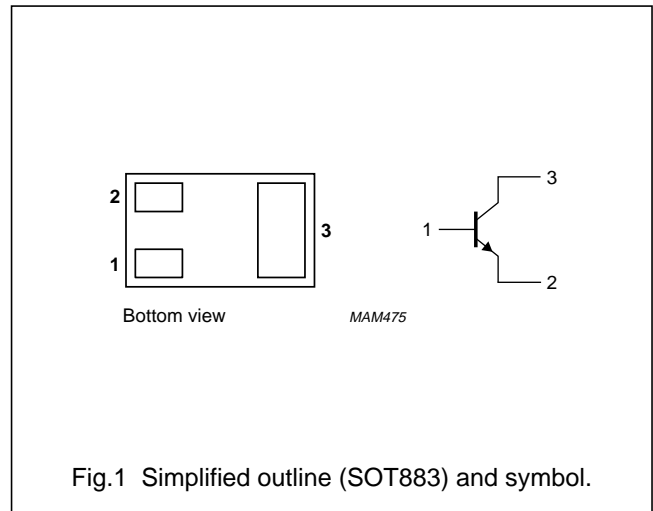
TYPE NUMBER	MARKING CODE
PBSS2540M	DC

**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	MAX.	UNIT
$V_{CEO}$	collector-emitter voltage	40	V
$I_C$	collector current (DC)	500	mA
$I_{CM}$	peak collector current	1	A
$R_{CEsat}$	equivalent on-resistance	<500	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	–	40	V
$V_{CEO}$	collector-emitter voltage	open base	–	40	V
$V_{EBO}$	emitter-base voltage	open collector	–	6	V
$I_C$	collector current (DC)	notes 1 and 2	–	500	mA
$I_{CM}$	peak collector current		–	1	A
$I_{BM}$	peak base current		–	100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$ ; notes 1 and 2	–	250	mW
		$T_{amb} \leq 25\text{ °C}$ ; note 1 and 3	–	430	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C
$T_{amb}$	operating ambient temperature		–65	+150	°C

**Notes**

1. Refer to SOT883 standard mounting conditions.
2. Device mounted on an FR4 printed-circuit board, single-sided copper, tinplated, standard footprint, with 60  $\mu\text{m}$  copper strip line.
3. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1  $\text{cm}^2$ .

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	in free air; notes 1 and 2	500	K/W
		in free air; notes 1, 3 and 4	290	K/W

**Notes**

1. Refer to SOT883 standard mounting conditions.
2. Device mounted on an FR4 printed-circuit board, single-sided copper, tinplated, standard footprint, with 60  $\mu\text{m}$  copper strip line.
3. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1  $\text{cm}^2$ .
4. Operated under pulsed conditions: duty cycle  $\delta \leq 20\%$ , pulse width  $t_p \leq 30\text{ ms}$ .

**Soldering**

Reflow soldering is the only recommended soldering method.

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

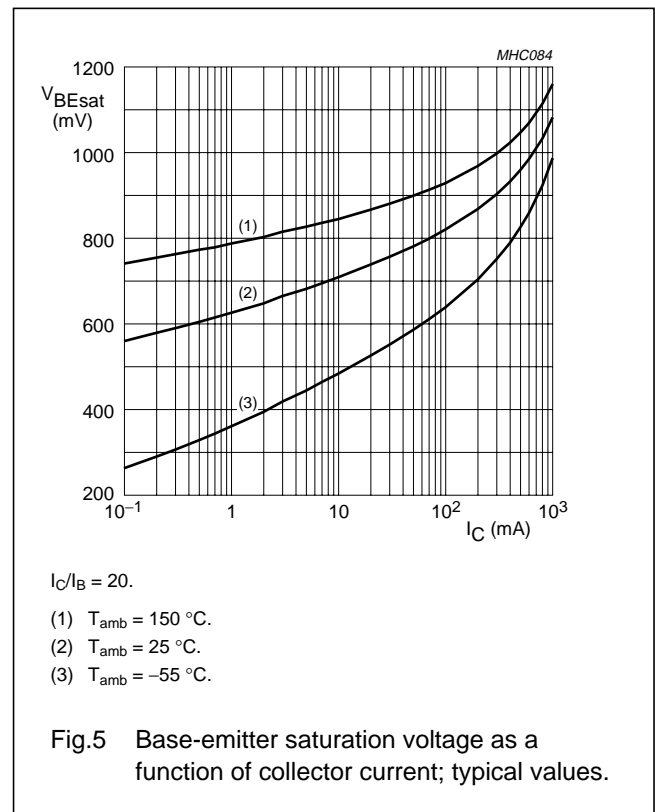
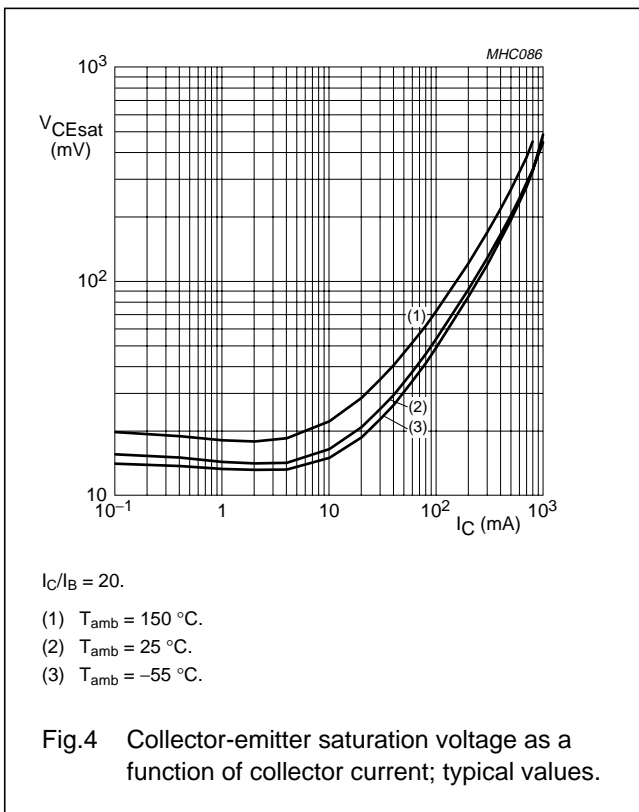
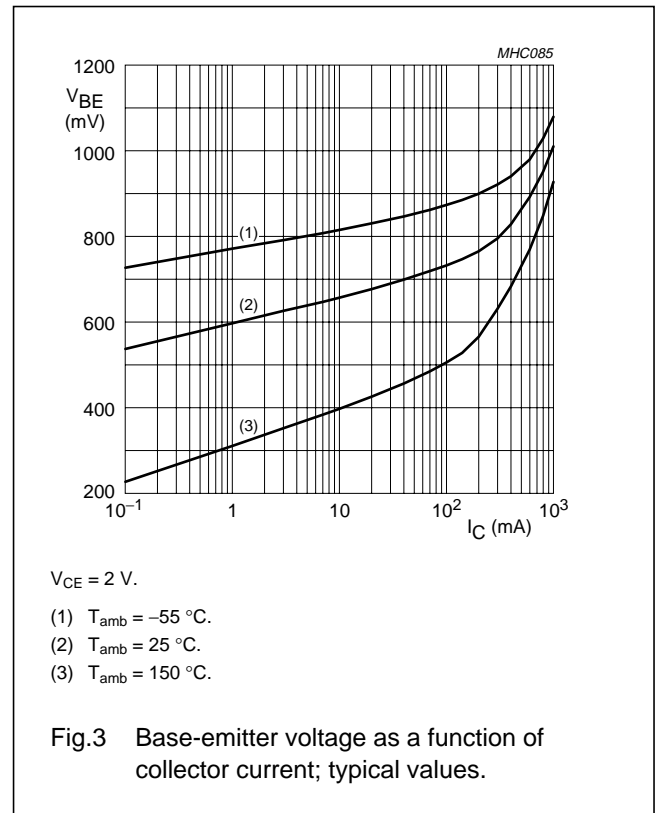
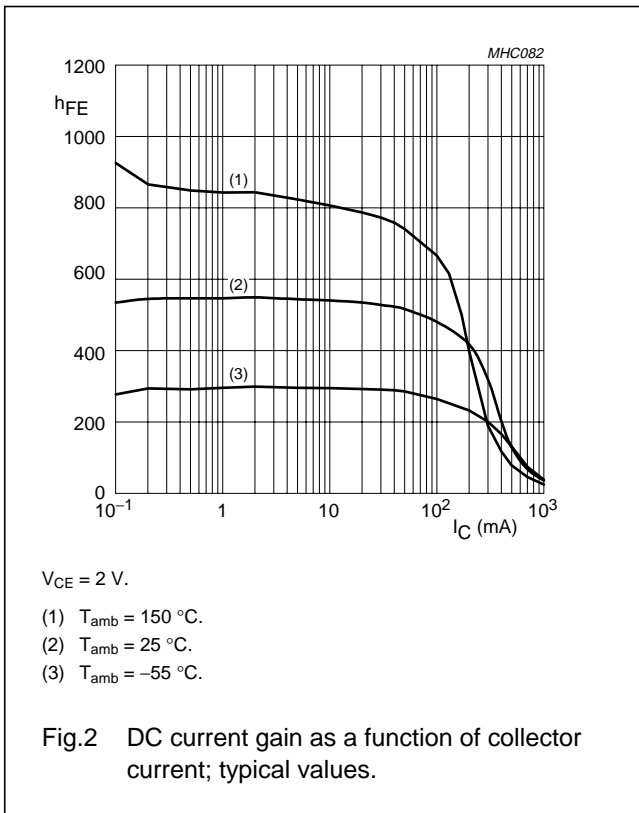
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0$	–	–	100	nA
		$V_{CB} = 30\text{ V}; I_E = 0; T_j = 150\text{ °C}$	–	–	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0$	–	–	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 2\text{ V}; I_C = 10\text{ mA}$	200	–	–	
		$V_{CE} = 2\text{ V}; I_C = 100\text{ mA};$ note 1	150	–	–	
		$V_{CE} = 2\text{ V}; I_C = 500\text{ mA};$ note 1	50	–	–	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	–	–	50	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA}$	–	–	100	mV
		$I_C = 200\text{ mA}; I_B = 10\text{ mA};$ note 1	–	–	200	mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA};$ note 1	–	–	250	mV
$R_{CEsat}$	equivalent on-resistance	$I_C = 500\text{ mA}; I_B = 50\text{ mA};$ note 1	–	380	<500	$\text{m}\Omega$
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 500\text{ mA}; I_B = 50\text{ mA};$ note 1	–	–	1.2	V
$V_{BEon}$	base-emitter turn-on voltage	$V_{CE} = 2\text{ V}; I_C = 100\text{ mA};$ note 1	–	–	1.1	V
$f_T$	transition frequency	$I_C = 100\text{ mA}; V_{CE} = 5\text{ V};$ $f = 100\text{ MHz}$	250	450	–	MHz
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = I_e = 0; f = 1\text{ MHz}$	–	–	6	pF

**Note**

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

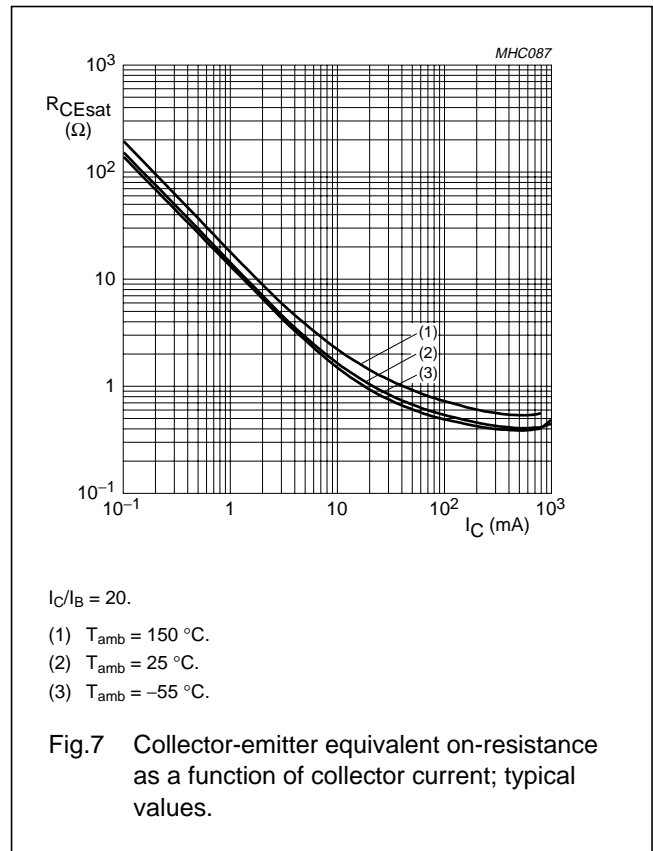
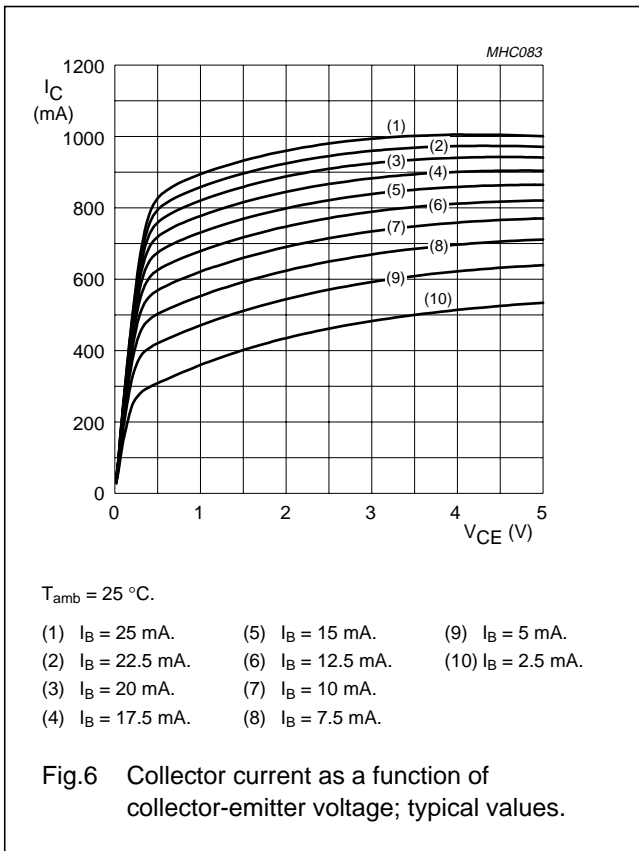
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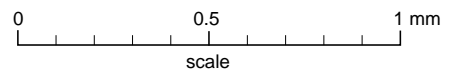
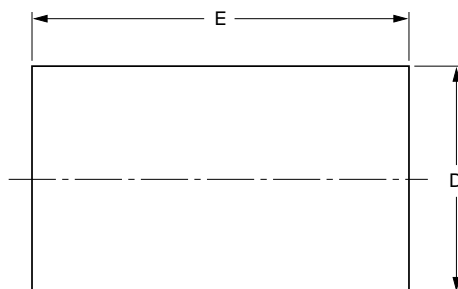
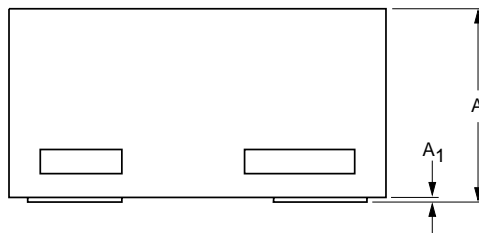
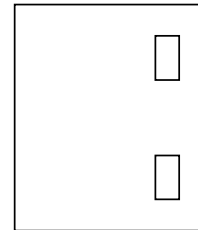
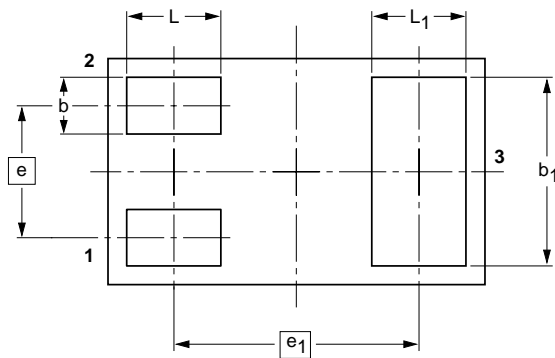
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PACKAGE OUTLINE

Leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.5 mm

SOT883



DIMENSIONS (mm are the original dimensions)

UNIT	A <sup>(1)</sup>	A <sub>1</sub> max.	b	b <sub>1</sub>	D	E	e	e <sub>1</sub>	L	L <sub>1</sub>
mm	0.50 0.46	0.03	0.20 0.12	0.55 0.47	0.62 0.55	1.02 0.95	0.35	0.65	0.30 0.22	0.30 0.22

Note

1. Including plating thickness

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT883			SC-101			03-02-05 03-04-03

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**DATA SHEET STATUS**

LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(3)</sup>	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.
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