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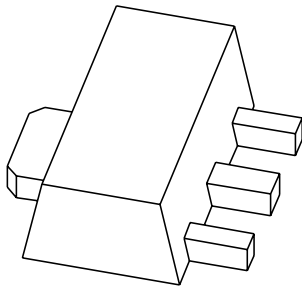
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Team Nexperia

# DATA SHEET



**PBSS5330X**

**30 V, 3 A**

**PNP low  $V_{CEsat}$  (BISS) transistor**

Product data sheet  
Supersedes data of 2003 Nov 28

2004 Nov 03

# 30 V, 3 A PNP low $V_{CEsat}$ (BISS) transistor

PBSS5330X

## 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

PNP low  $V_{CEsat}$  transistor in a SOT89 plastic package.

## MARKING

TYPE NUMBER	MARKING CODE <sup>(1)</sup>
PBSS5330X	*1S

## Note

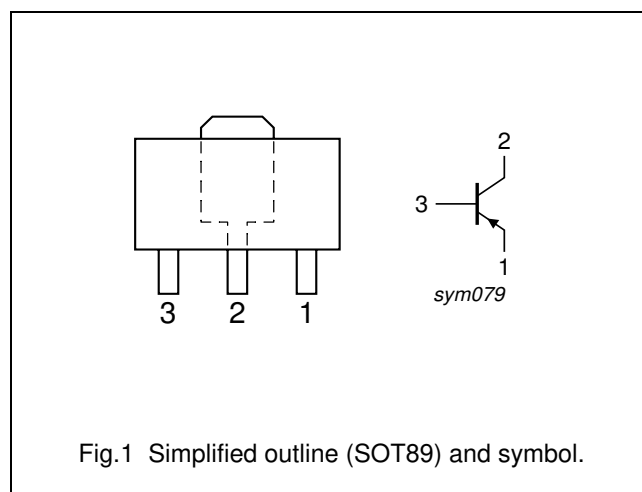
1. \* = p: Made in Hong Kong.  
\* = t: Made in Malaysia.  
\* = W: Made in China.

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
$V_{CEO}$	collector-emitter voltage	−30	V
$I_C$	collector current (DC)	−3	A
$I_{CM}$	peak collector current	−5	A
$R_{CEsat}$	equivalent on-resistance	107	mΩ

## PINNING

PIN	DESCRIPTION
1	emitter
2	collector
3	base



## ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PBSS5330X	SC-62	plastic surface mounted package; collector pad for good heat transfer; 3 leads	SOT89

# 30 V, 3 A

## PNP low $V_{CEsat}$ (BISS) transistor

PBSS5330X

### LIMITING VALUES

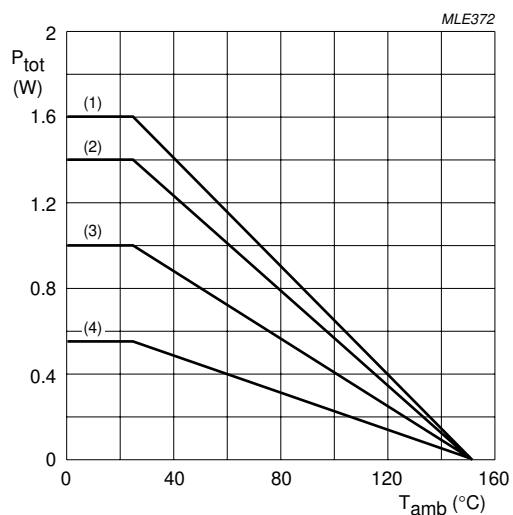
In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	–30	V
$V_{CEO}$	collector-emitter voltage	open base	–	–30	V
$V_{EBO}$	emitter-base voltage	open collector	–	–6	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	–	550	mW
		note 2	–	1	W
		note 3	–	1.4	W
		note 4	–	1.6	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 cm<sup>2</sup>.
3. Device mounted on a FR4 printed-circuit board; single-sided copper; tin-plated; mounting pad for collector 6 cm<sup>2</sup>.
4. Device mounted on a ceramic printed-circuit board 7 cm<sup>2</sup>, single-sided copper, tin-plated.

# 30 V, 3 A PNP low $V_{CEsat}$ (BISS) transistor

**PBSS5330X**

- (1) Ceramic PCB; 7 cm<sup>2</sup> mounting pad for collector.
- (2) FR4 PCB; 6 cm<sup>2</sup> copper mounting pad for collector.
- (3) FR4 PCB; 1 cm<sup>2</sup> copper mounting pad for collector.
- (4) Standard footprint.

Fig.2 Power derating curves.

30 V, 3 A  
PNP low  $V_{CEsat}$  (BISS) transistor

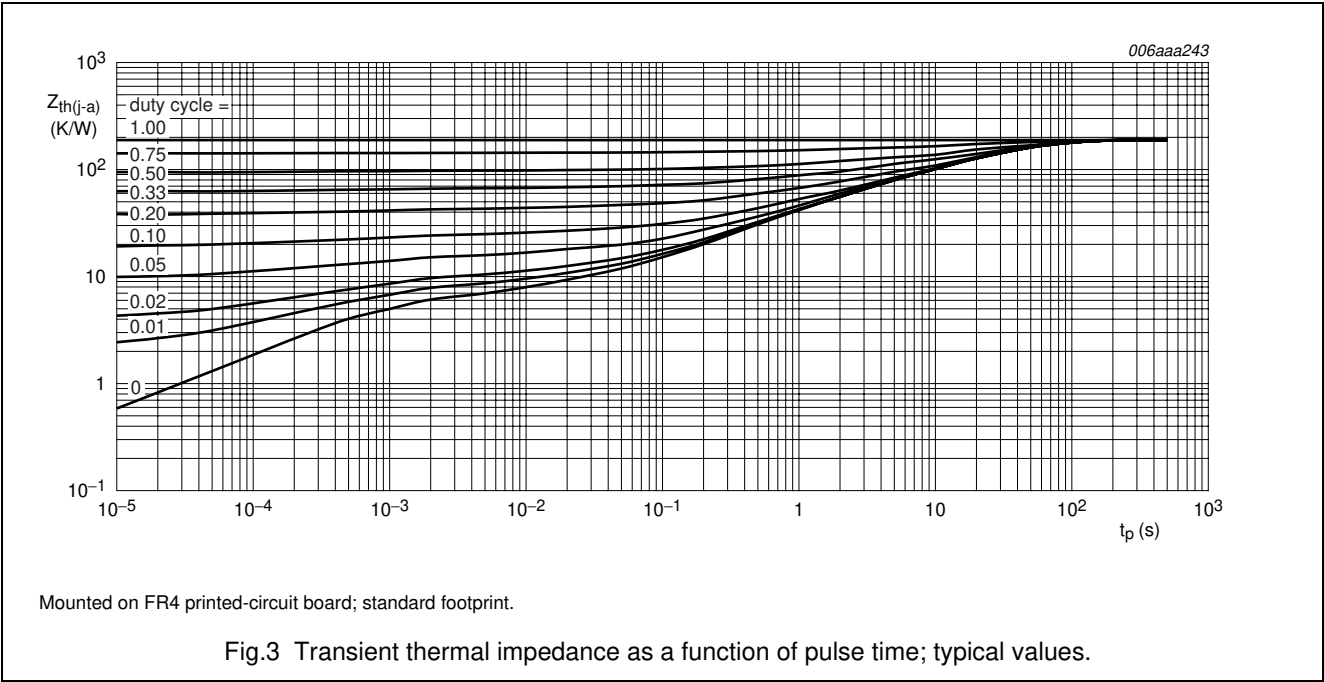
PBSS5330X

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

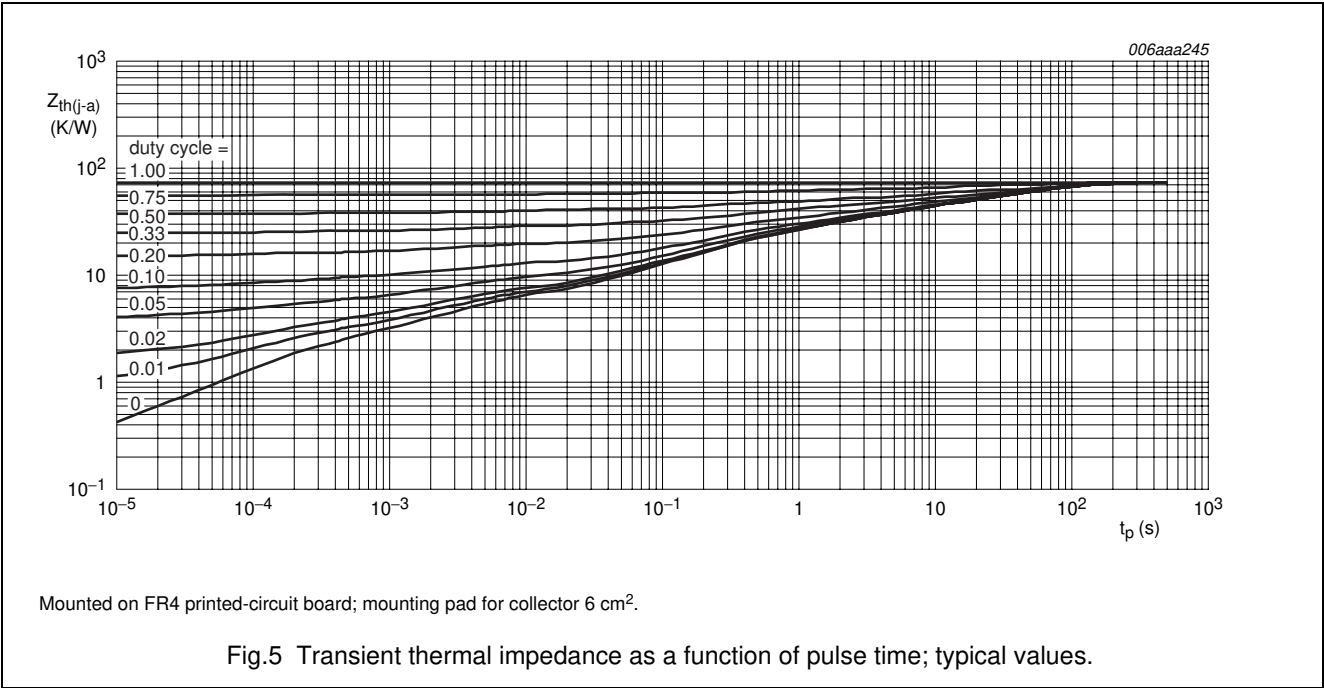
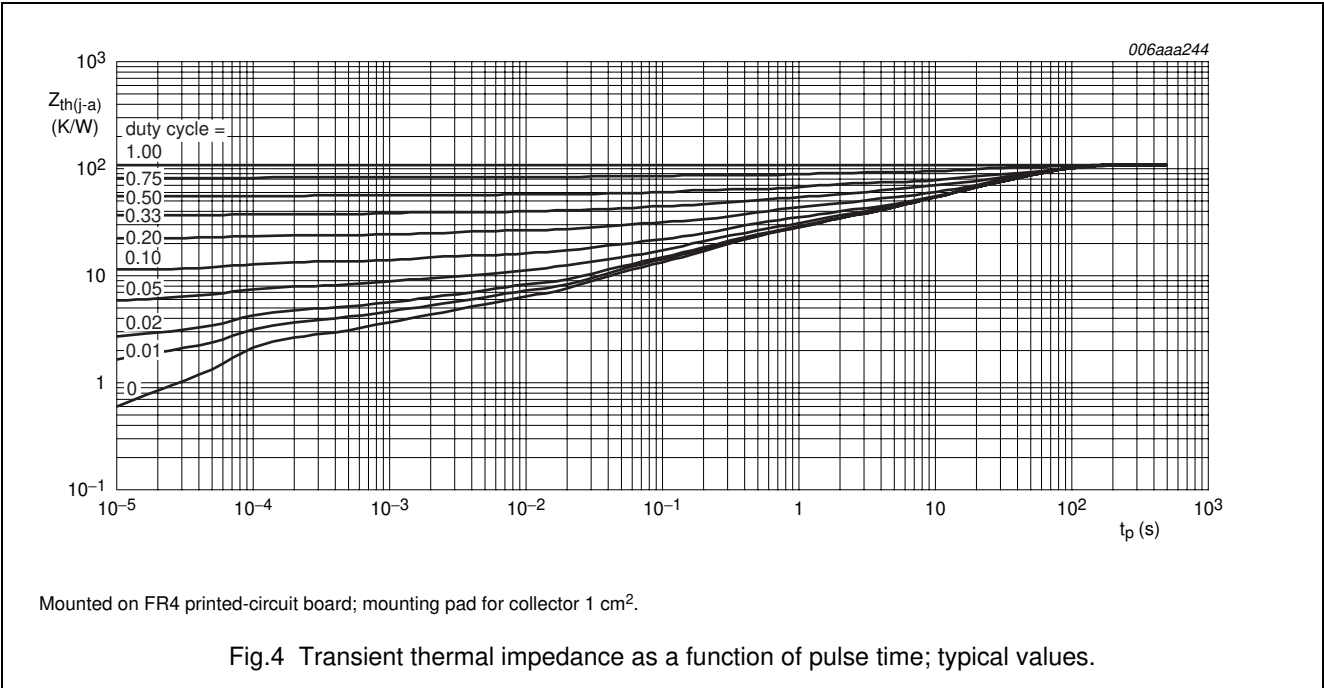
1. Device mounted on a FR4 printed-circuit board; single-sided copper; tin-plated; standard footprint.
2. Device mounted on a FR4 printed-circuit board; single-sided copper; tin-plated; mounting pad for collector 1 cm<sup>2</sup>.
3. Device mounted on a FR4 printed-circuit board; single-sided copper;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





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# 30 V, 3 A

## PNP low $V_{CEsat}$ (BISS) transistor

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### CHARACTERISTICS

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

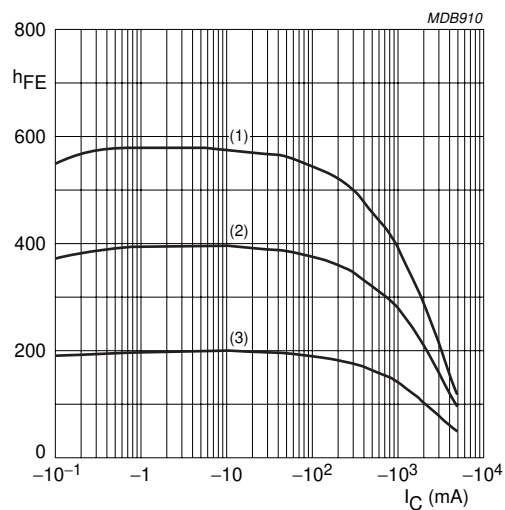
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector-base cut-off current	$V_{CB} = -30\text{ V}; I_E = 0\text{ A}$	–	–	–100	nA
		$V_{CB} = -30\text{ V}; I_E = 0\text{ A}; T_J = 150\text{ °C}$	–	–	–50	$\mu\text{A}$
$I_{CES}$	collector-emitter cut-off current	$V_{CE} = -30\text{ V}; V_{BE} = 0\text{ V}$	–	–	–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	$V_{CE} = -2\text{ V}$				
		$I_C = -0.1\text{ A}$	200	–	–	
		$I_C = -0.5\text{ A}$	200	–	–	
		$I_C = -1\text{ A}; \text{note 1}$	175	–	450	
		$I_C = -2\text{ A}; \text{note 1}$	140	–	–	
		$I_C = -3\text{ A}; \text{note 1}$	100	–	–	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -0.5\text{ A}; I_B = -50\text{ mA}$	–	–	–70	mV
		$I_C = -1\text{ A}; I_B = -50\text{ mA}$	–	–	–130	mV
		$I_C = -2\text{ A}; I_B = -100\text{ mA}$	–	–	–240	mV
		$I_C = -3\text{ A}; I_B = -300\text{ mA}; \text{note 1}$	–	–	–320	mV
$R_{CEsat}$	equivalent on-resistance	$I_C = -3\text{ A}; I_B = -300\text{ mA}; \text{note 1}$	–	80	107	$\text{m}\Omega$
$V_{BEsat}$	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	$V_{CE} = -2\text{ V}; I_C = -1\text{ A}$	–1.0	–	–	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	$V_{CB} = -10\text{ V}; I_E = I_E = 0\text{ A}; f = 1\text{ MHz}$	–	–	45	pF

### Note

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

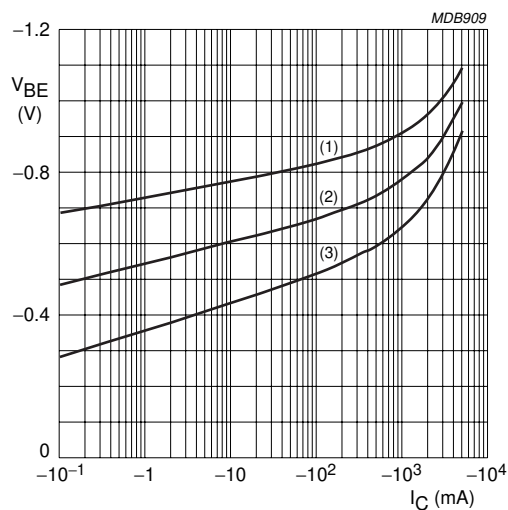
# 30 V, 3 A PNP low $V_{CEsat}$ (BISS) transistor

PBSS5330X

 $V_{CE} = -2$  V.

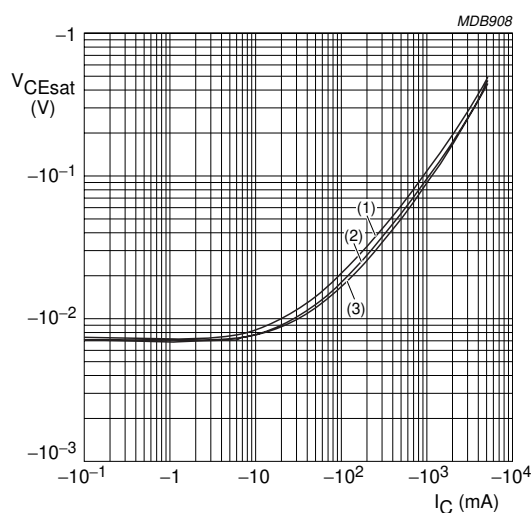
- (1)  $T_{amb} = 100$  °C.
- (2)  $T_{amb} = 25$  °C.
- (3)  $T_{amb} = -55$  °C.

Fig.6 DC current gain as a function of collector current; typical values.

 $V_{CE} = -2$  V.

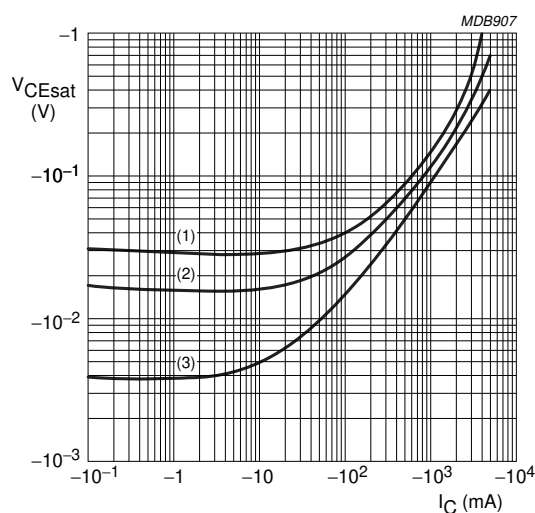
- (1)  $T_{amb} = -55$  °C.
- (2)  $T_{amb} = 25$  °C.
- (3)  $T_{amb} = 100$  °C.

Fig.7 Base-emitter voltage as a function of collector current; typical values.

 $I_C/I_B = 20$ .

- (1)  $T_{amb} = 100$  °C.
- (2)  $T_{amb} = 25$  °C.
- (3)  $T_{amb} = -55$  °C.

Fig.8 Collector-emitter saturation voltage as a function of collector current; typical values.

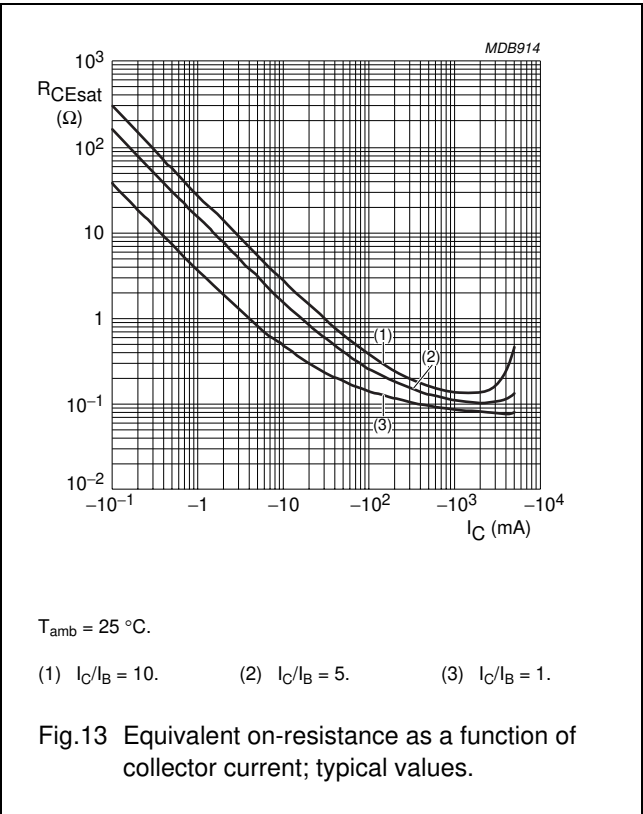
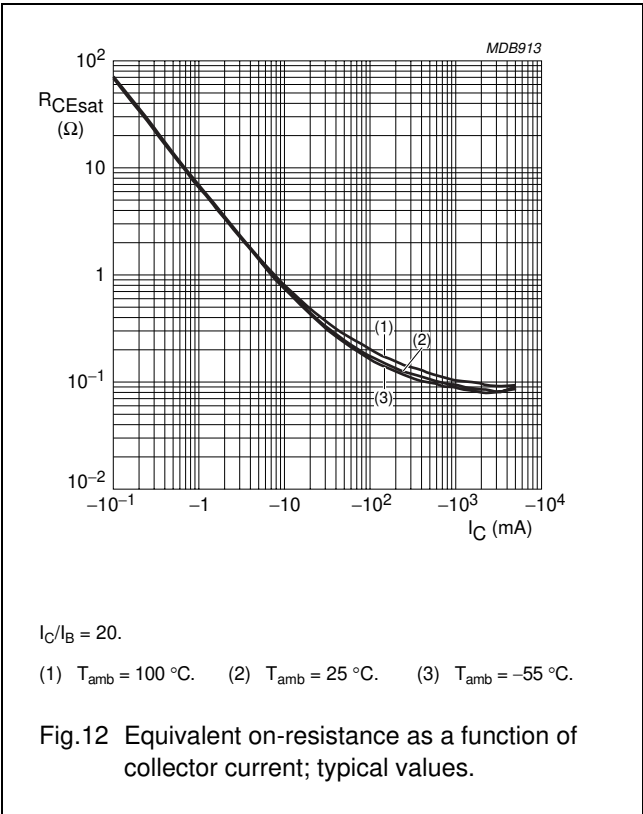
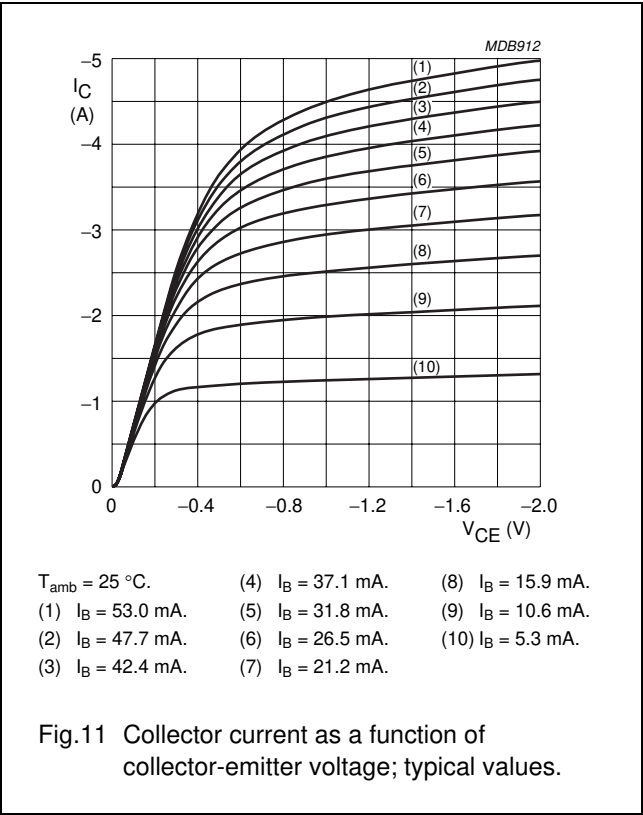
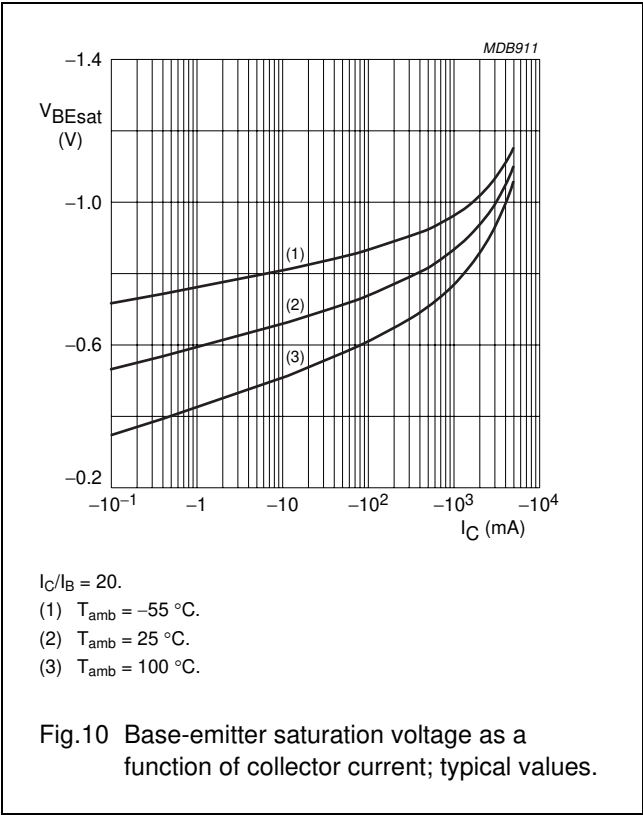
 $T_{amb} = 25$  °C.

- (1)  $I_C/I_B = 100$ .
- (2)  $I_C/I_B = 50$ .
- (3)  $I_C/I_B = 10$ .

Fig.9 Collector-emitter saturation voltage as a function of collector current; typical values.

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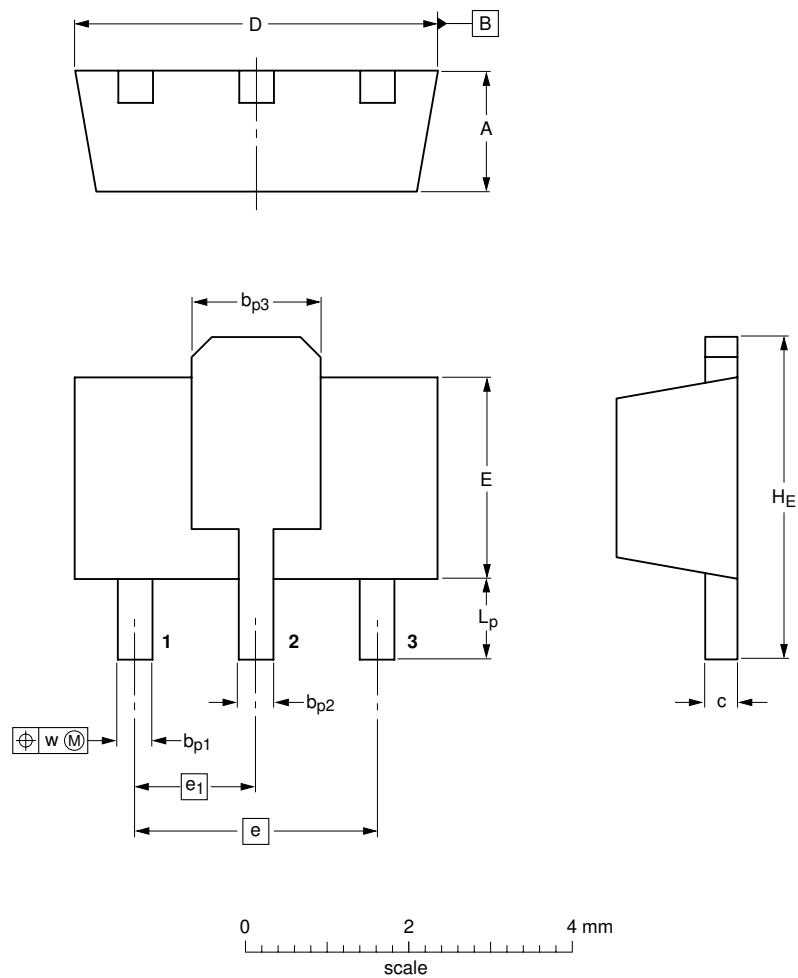
30 V, 3 A  
PNP low  $V_{CEsat}$  (BISS) transistor

PBSS5330X

PACKAGE OUTLINE


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

SOT89



DIMENSIONS (mm are the original dimensions)

UNIT	A	b <sub>p1</sub>	b <sub>p2</sub>	b <sub>p3</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	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

# 30 V, 3 A PNP low $V_{CEsat}$ (BISS) transistor

PBSS5330X

## 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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