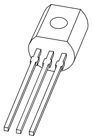


PBSS9110AS

100 V, 1 A PNP low V_{CEsat} (BISS) transistor

Rev. 03 — 21 November 2009 **Product data sheet**

1. Product profile

1.1 General description

PNP low V_{CEsat} (BISS) transistor in a SOT54 (SC-43/TO-92) plastic package.

1.2 Features

- SOT54 package
- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability I_C and I_{CM}
- High efficiency leading to less heat generation

1.3 Applications

- Major application segments:
  - Automotive 42 V power
  - Telecom infrastructure
  - Industrial
- Peripheral driver:
  - Driver in low supply voltage applications (e.g. lamps and LEDs)
  - Inductive load driver (relays, buzzers and motors)
- DC-to-DC converter

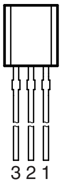
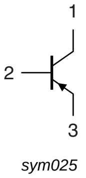
1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage		-	-	–100	V
I_C	collector current (DC)		-	-	–1	A
I_{CM}	peak collector current		-	-	–3	A
R_{CEsat}	equivalent on-resistance		-	-	320	mΩ

2. Pinning information

Table 2. Discrete pinning

Pin	Description	Simplified outline	Symbol
1	collector		
2	base		
3	emitter		

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS9110AS	-	plastic single-ended leaded (through hole) package; 3 leads	SOT54

4. Marking

Table 4. Marking

Type number	Marking code
PBSS9110AS	9110AS[1]

[1] Made in Hong Kong

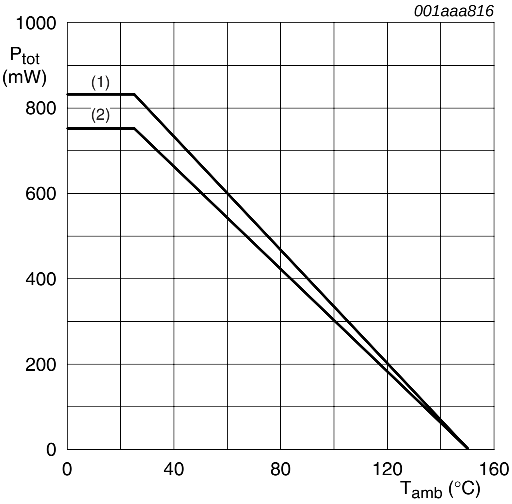
5. Limiting values

Table 5. 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		-	–120	V
V_{CEO}	collector-emitter voltage	open base		-	–100	V
V_{EBO}	emitter-base voltage	open collector		-	–5	V
I_{CM}	peak collector current	$T_{j(max)}$		-	–3	A
I_C	collector current (DC)			-	–1	A
I_B	base current (DC)			-	–0.3	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	830	mW
T_j	junction temperature			-	150	°C
T_{amb}	operating ambient temperature			–65	+150	°C
T_{stg}	storage temperature			–65	+150	°C

[1] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, standard footprint.



(1) 1cm^2 collector mounting pad

(2) Standard footprint

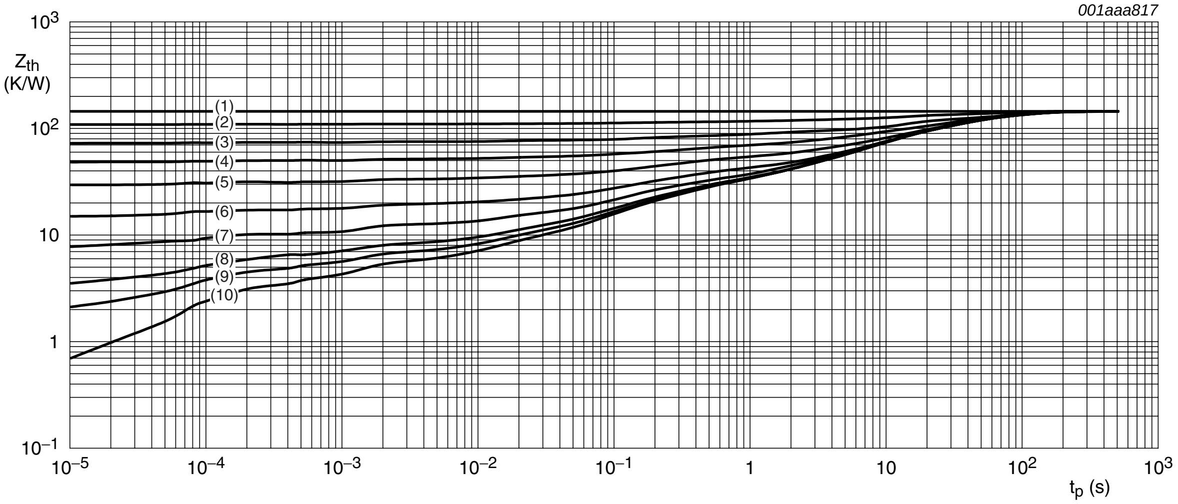
Fig 1. Power derating curves

6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Typ	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	150	K/W

[1] Device mounted on a FR4 printed-circuit board, single-sided copper, tin-plated, standard footprint.



Mounted on FR4 PCB; standard footprint

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

Fig 2. Transient thermal impedance as a function of pulse time; typical values

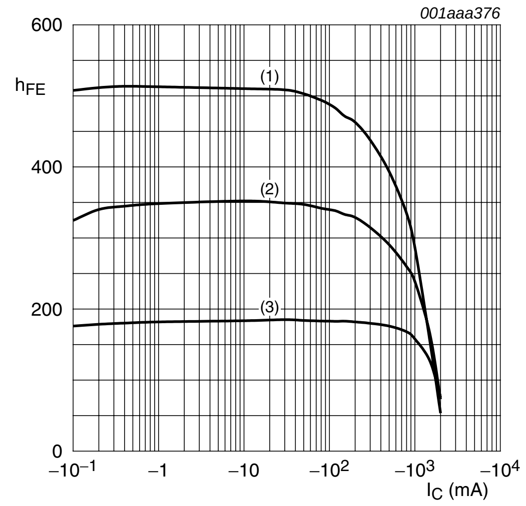
7. Characteristics

Table 7. Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = −80 V; I_E = 0 A	-	-	−100	nA
		V_{CB} = −80 V; I_E = 0 A; T_j = 150 °C	-	-	−50	μA
I_{CES}	collector-emitter cut-off current	V_{CE} = −80 V; V_{BE} = 0 V	-	-	−100	nA
I_{EBO}	emitter-base cut-off current	V_{EB} = −4 V; I_C = 0 A	-	-	−100	nA
h_{FE}	DC current gain	V_{CE} = −5 V; I_C = −1 mA	150	-	-	
		V_{CE} = −5 V; I_C = −250 mA	150		-	
		V_{CE} = −5 V; I_C = −0.5 A [1]	150	-	450	
		V_{CE} = −5 V; I_C = −1 A [1]	125	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = −250 mA; I_B = −25 mA	-	-	−120	mV
		I_C = −500 mA; I_B = −50 mA	-	-	−180	mV
		I_C = −1 A; I_B = −100 mA	-	-	−320	mV
R_{CEsat}	equivalent on-resistance	I_C = −1 A; I_B = −100 mA [1]	-	170	320	mΩ
V_{BEsat}	base-emitter saturation voltage	I_C = −1 A; I_B = −100 mA	-	-	−1.1	V
V_{BEon}	base-emitter turn-on voltage	I_C = −1 A; V_{CE} = −5 V	-	-	−1.0	V
f_T	transition frequency	I_C = −50 mA; V_{CE} = −10 V; f = 100 MHz	100	-	-	MHz
C_c	collector capacitance	I_E = I_e = 0 A; V_{CB} = −10 V; f = 1 MHz	-	-	17	pF

[1] Pulse test $t_p \leq 300$ μs; $\delta \leq 0.02$.



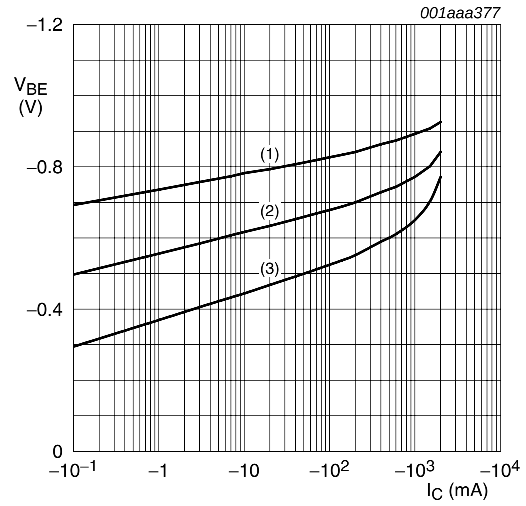
$V_{CE} = -10$ V

(1) $T_{amb} = 100$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = -55$ °C

Fig 3. DC current gain as a function of collector current; typical values



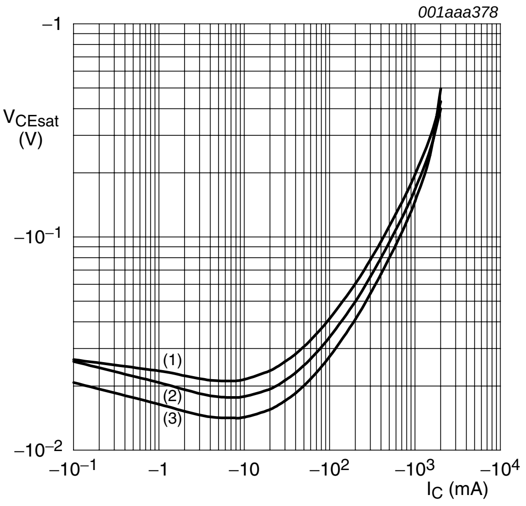
$V_{CE} = -10$ V

(1) $T_{amb} = -55$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = 100$ °C

Fig 4. Base-emitter voltage as a function of collector current; typical values



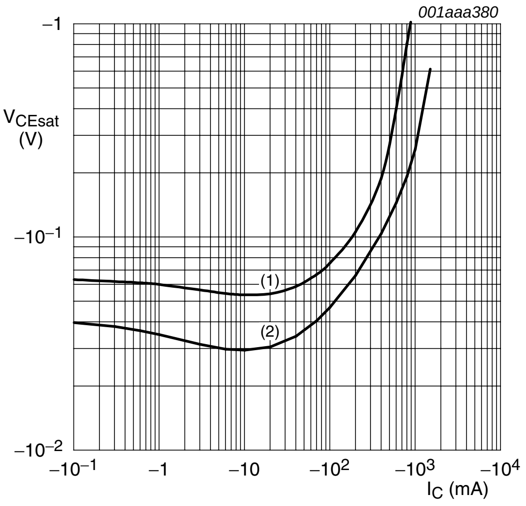
$I_C/I_B = 10$

(1) $T_{amb} = 100$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = -55$ °C

Fig 5. Collector-emitter saturation voltage as a function of collector current; typical values

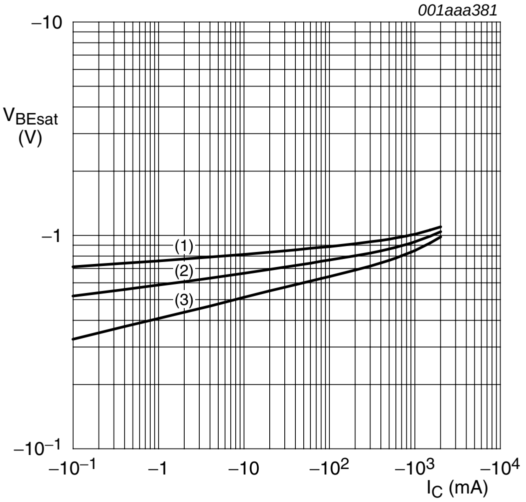


$T_{amb} = 25$ °C

(1) $I_C/I_B = 50$

(2) $I_C/I_B = 20$

Fig 6. Collector-emitter saturation voltage as a function of collector current; typical values



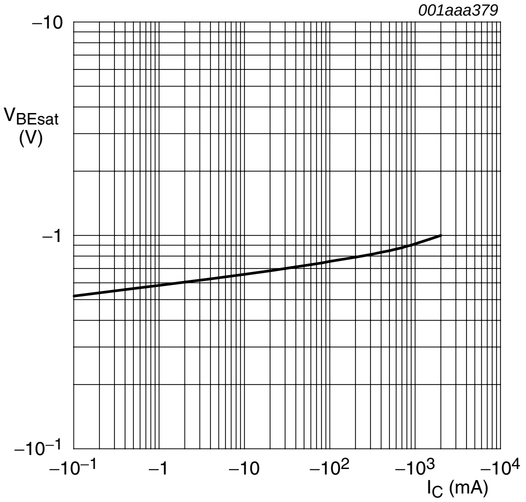
$I_C/I_B = 10$

(1) $T_{amb} = −55$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = 100$ °C

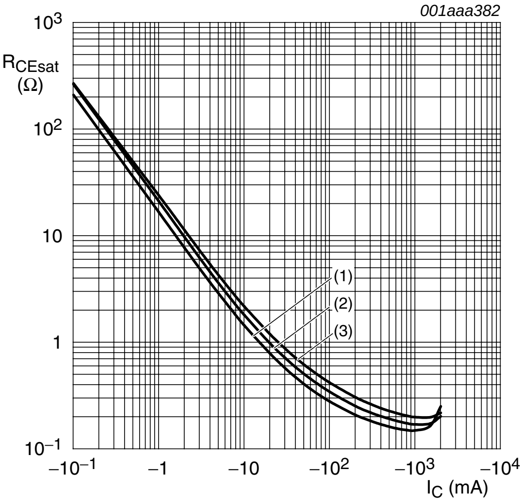
Fig 7. Base-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 20$

$T_{amb} = 25$ °C

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



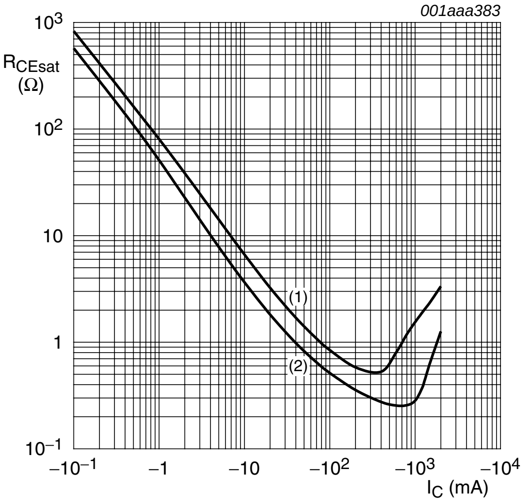
$I_C/I_B = 10$

(1) $T_{amb} = −55$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = 100$ °C

Fig 9. Equivalent on-resistance as a function of collector current; typical values



$T_{amb} = 25$ °C

(1) $I_C/I_B = 50$

(2) $I_C/I_B = 20$

Fig 10. Equivalent on-resistance as a function of collector current; typical values

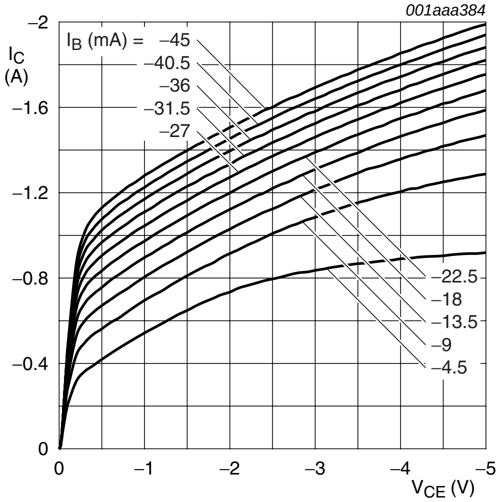
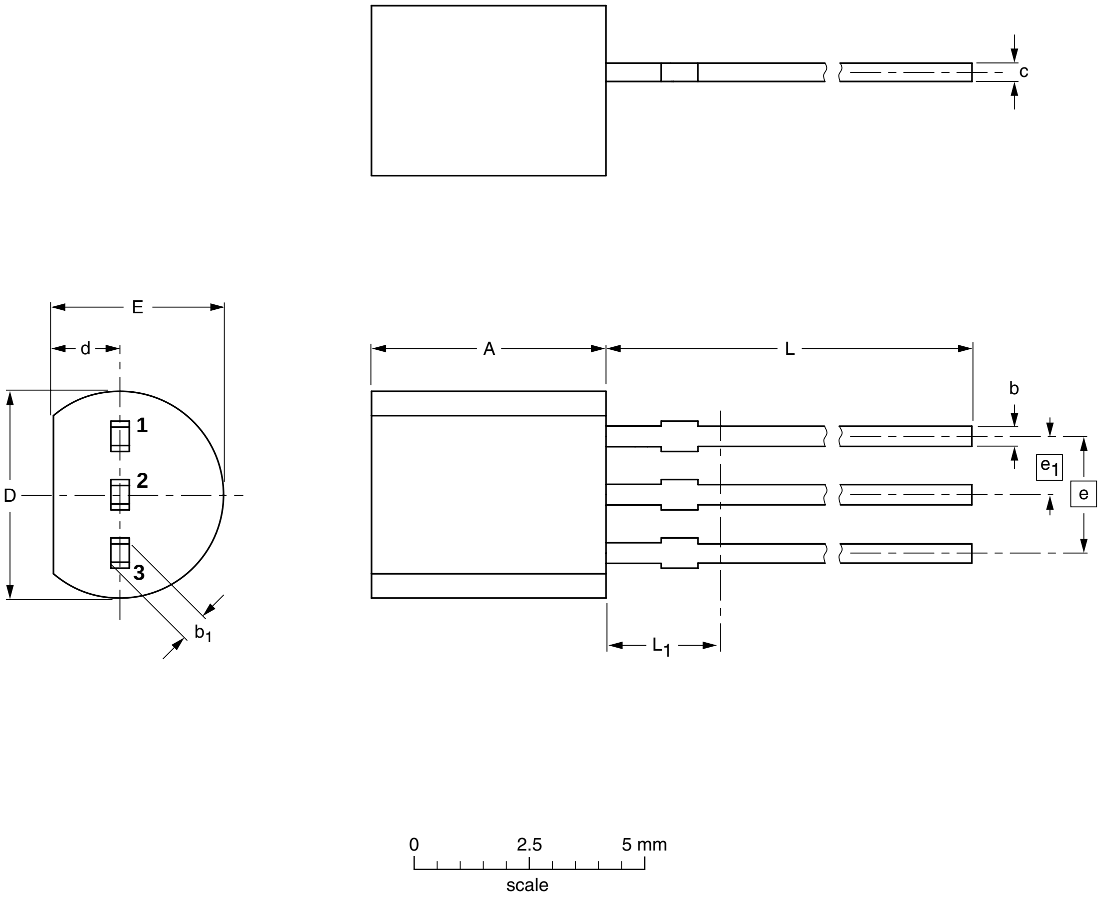


Fig 11. Collector current as a function of collector-emitter voltage; typical values

8. Package outline

Plastic single-ended leaded (through hole) package; 3 leads **SOT54**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b_1	c	D	d	E	e	e_1	L	$L_1^{(1)}$ max.
mm	5.2 5.0	0.48 0.40	0.66 0.55	0.45 0.38	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT54		TO-92	SC-43A			~~04-06-28~~ 04-11-16

Fig 12. Package outline

9. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PBSS9110S_3	20091121	Product data sheet	-	PBSS9110S_2
Modifications:	• This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content. • Figure 9 “Equivalent on-resistance as a function of collector current; typical values”: updated • Figure 10 “Equivalent on-resistance as a function of collector current; typical values”: updated • Figure 11 “Collector current as a function of collector-emitter voltage; typical values”: updated • Figure 12 “Package outline”: updated			
PBSS9110S_2	20040816	Product data sheet	-	PBSS9110AS_1
PBSS9110AS_1	20040610	Product data sheet	-	-

10. Legal information

10.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term ‘short data sheet’ is explained in section “Definitions”.

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Document identifier: PBSS9110AS_3

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