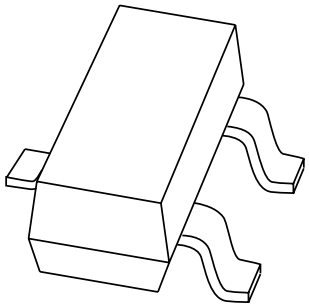
DATA SHEET



PBSS9110T

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

Product specification
Supersedes data of 2004 May 06

2004 May 13

Philips
Semiconductors

PHILIPS

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

PBSS9110T

FEATURES

- SOT23 package
- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability: I_C and I_{CM}
- Higher efficiency leading to less heat generation

APPLICATIONS

- Major application segments
  - Automotive 42 V power
  - Telecom infrastructure
  - Industrial
- DC-to-DC conversion
- 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 SOT23 plastic package.
NPN complement: PBSS8110T.

MARKING

TYPE NUMBER	MARKING CODE(1)
PBSS9110T	*U7

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	–100	V
I_C	collector current (DC)	–1	A
I_{CM}	repetitive peak collector current	–3	A
R_{CEsat}	equivalent on-resistance	320	mΩ

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

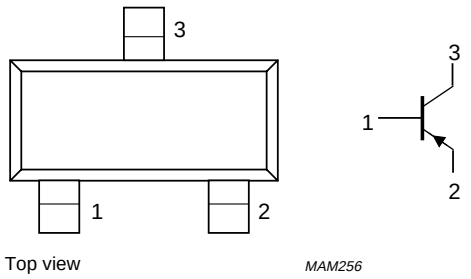


Fig.1 Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PBSS9110T	–	plastic surface mounted package; 3 leads	SOT23

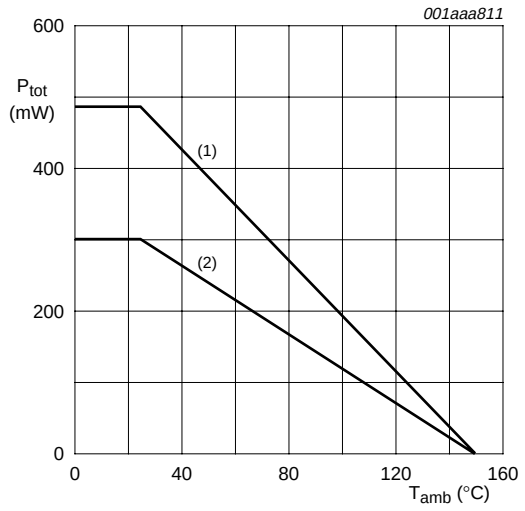
LIMITING VALUES

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_C	collector current (DC)		–	–1	A
I_{CM}	peak collector current	limited by $T_{j(max)}$	–	–3	A
I_B	base current (DC)		–	–300	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; note 1	–	300	mW
		$T_{amb} \leq 25$ °C; note 2	–	480	mW
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C
T_{stg}	storage temperature		–65	+150	°C

Notes

1. Device mounted on a printed-circuit board, single-sided copper, tin-plated, standard footprint.
2. Device mounted on a printed-circuit board, single-sided copper, tin-plated and 1 cm^2 collector mounting pad.



(1) 1 cm^2 collector mounting pad.
(2) Standard footprint.

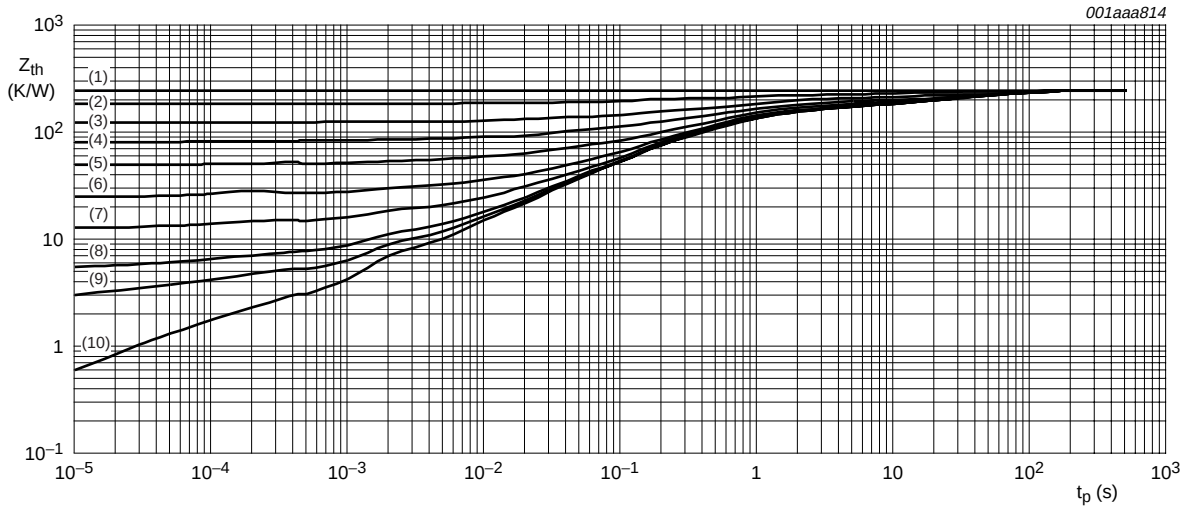
Fig.2 Power derating curves.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; note 1	417	K/W
		in free air; note 2	260	K/W

Notes

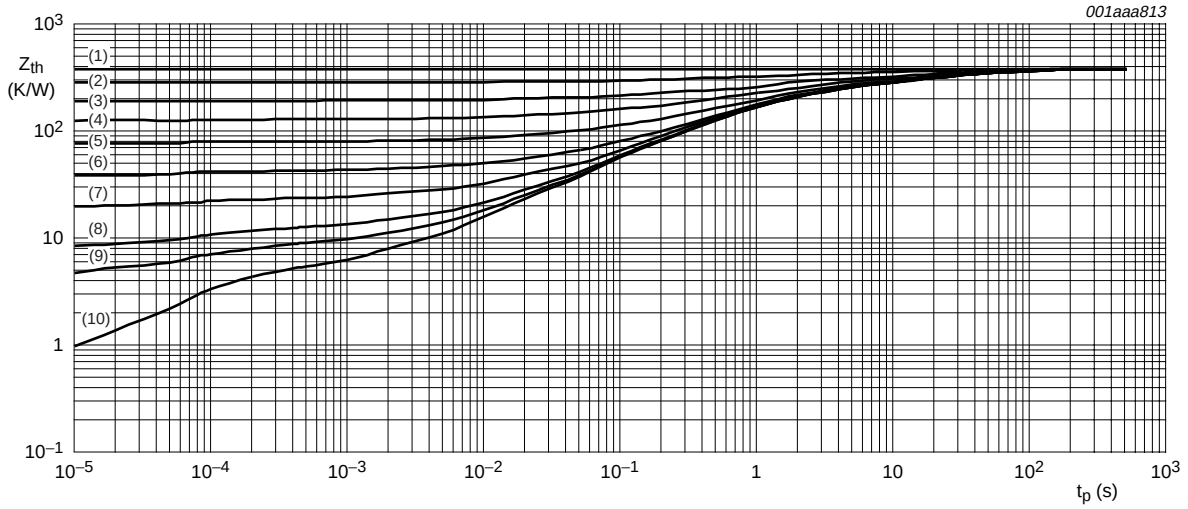
1. Device mounted on a printed-circuit board, single-sided copper, tin-plated and standard footprint.
2. Device mounted on a printed-circuit board, single-sided copper, tin-plated and 1 cm^2 collector mounting pad.



Mounted on printed-circuit board; 1 cm^2 collector mounting pad.

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

Fig.3 Transient thermal impedance as a function of pulse time; typical values.



Mounted on printed-circuit board; standard footprint.

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

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

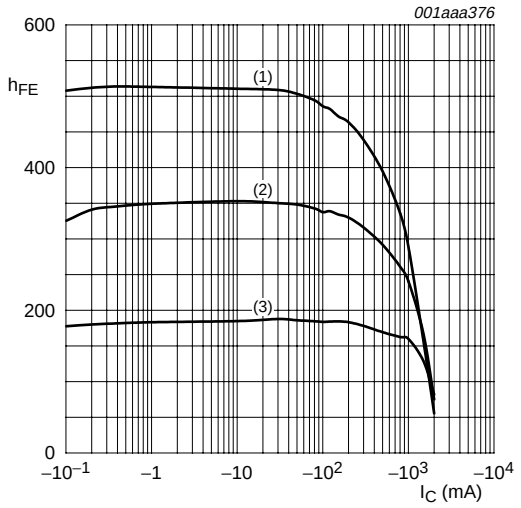
CHARACTERISTICS

T_j = 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 A	–	–	–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 = –500 mA; note 1	150	–	450	
		V_{CE} = –5 V; I_C = –1 A; note 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; note 1	–	–	–320	mV
R_{CEsat}	equivalent on-resistance	I_C = –1 A; I_B = –100 mA; note 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	V_{CE} = –5 V; I_C = –1 A	–	–	–1	V
f_T	transition frequency	V_{CE} = –10 V; I_C = –50 mA; f = 100 MHz	100	–	–	MHz
C_c	collector capacitance	V_{CB} = –10 V; I_E = I_e = 0 A; f = 1 MHz	–	–	17	pF

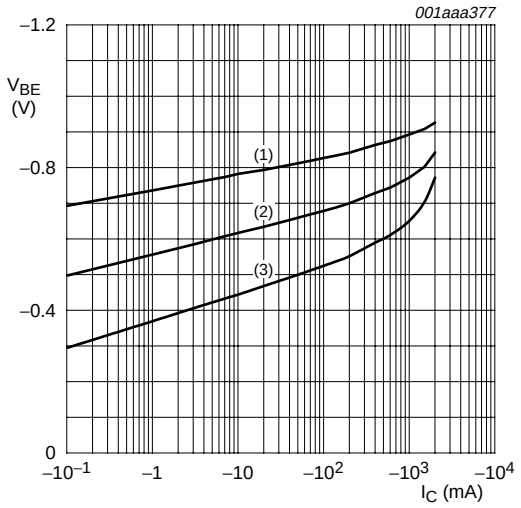
Note

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



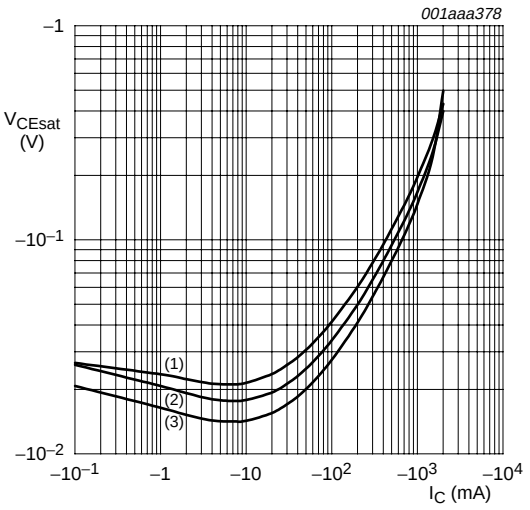
V_{CE} = −10 V.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

Fig.5 DC current gain as a function of collector current; typical values.



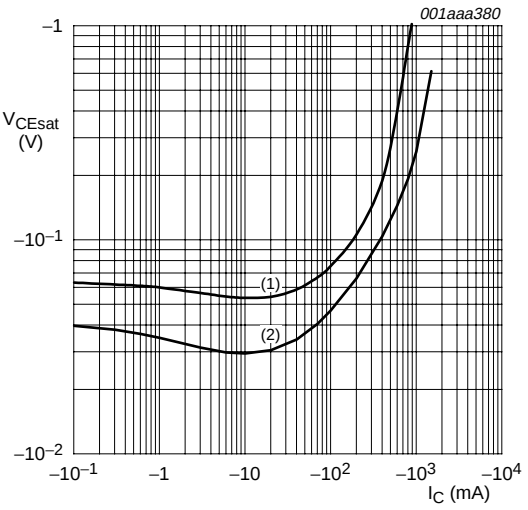
V_{CE} = −10 V.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

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



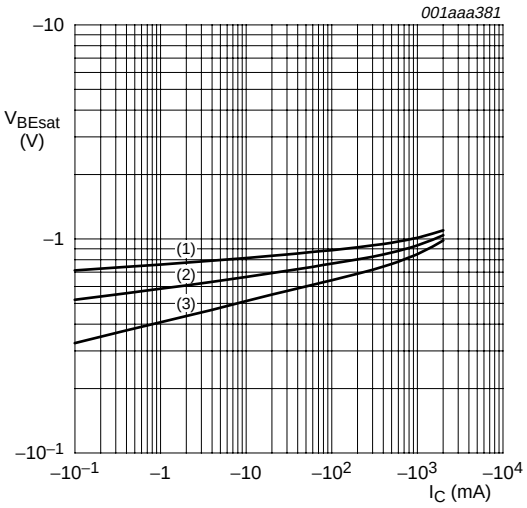
I_C/I_B = 10.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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



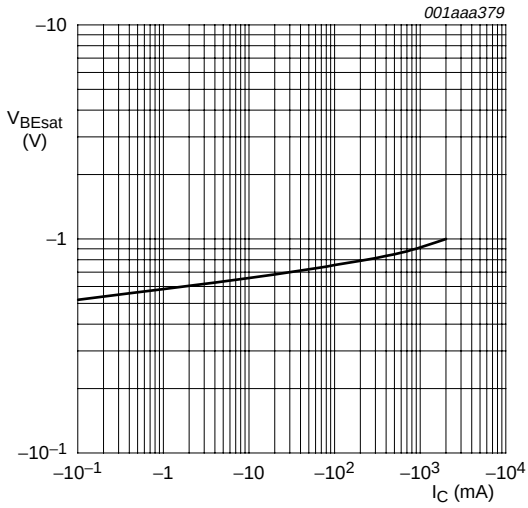
T_{amb} = 25 °C.
(1) I_C/I_B = 50.
(2) I_C/I_B = 20.

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



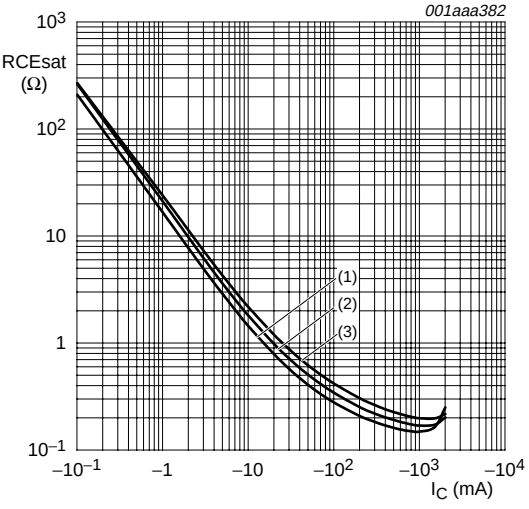
I_C/I_B = 10.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

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



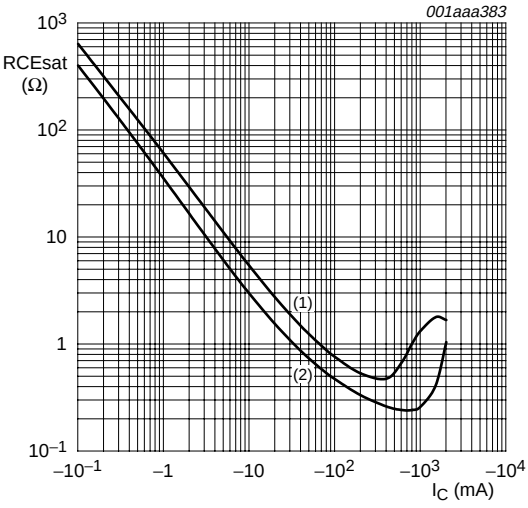
I_C/I_B = 20.
T_{amb} = 25 °C.

Fig.10 Base-emitter saturation voltage as a function of collector current; typical values.



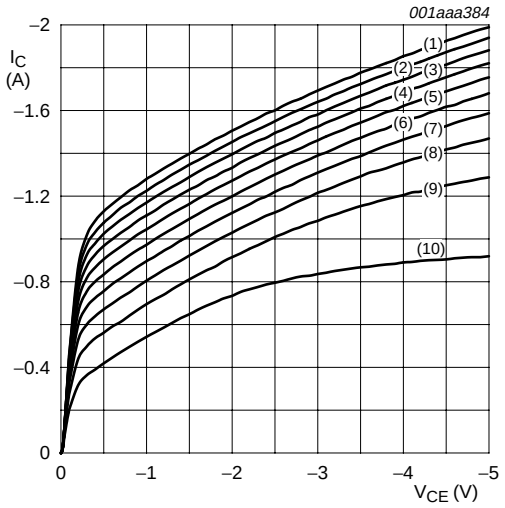
I_C/I_B = 10.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

Fig.11 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.12 Equivalent on-resistance as a function of collector current; typical values.



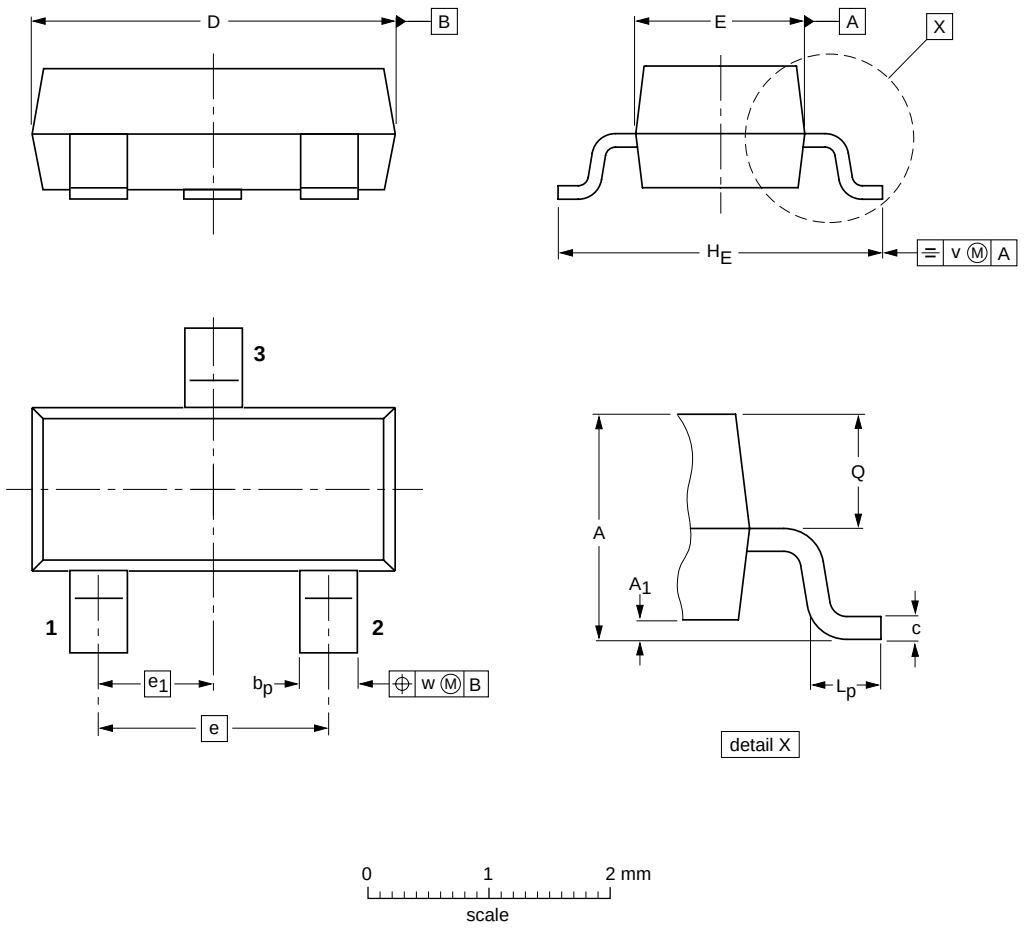
T_{amb} = 25 °C.

(1) I_B = 45 mA.
(2) I_B = 40.5 mA.
(3) I_B = 36 mA.
(4) I_B = 31.5 mA.
(5) I_B = 27 mA.
(6) I_B = 22.5 mA.
(7) I_B = 18 mA.
(8) I_B = 13.5 mA.
(9) I_B = 9 mA.
(10) I_B = 4.5 mA.

Fig.13 Collector current as a function of collector-emitter voltage; typical values.

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads **SOT23**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max.	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT23		TO-236AB				~~97-02-28~~ 99-09-13

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS[1]	PRODUCT STATUS[2][3]	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.
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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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