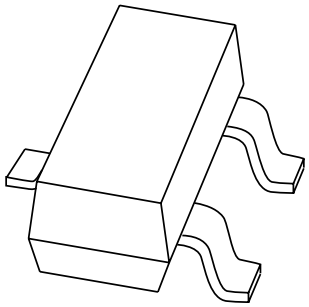
DATA SHEET



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

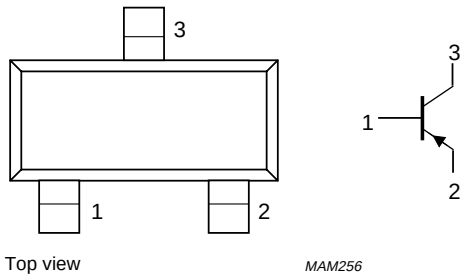


Fig.1 Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

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

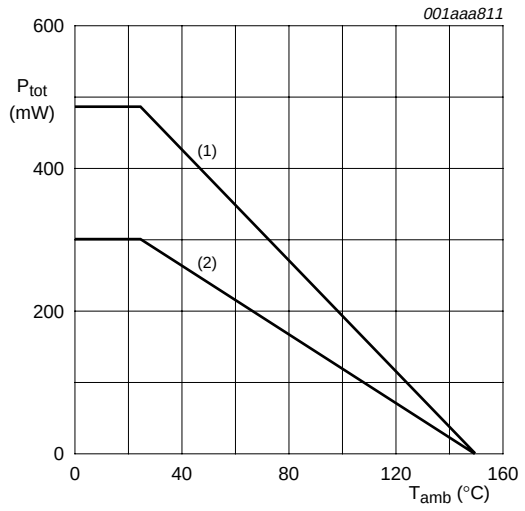
LIMITING VALUES

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.

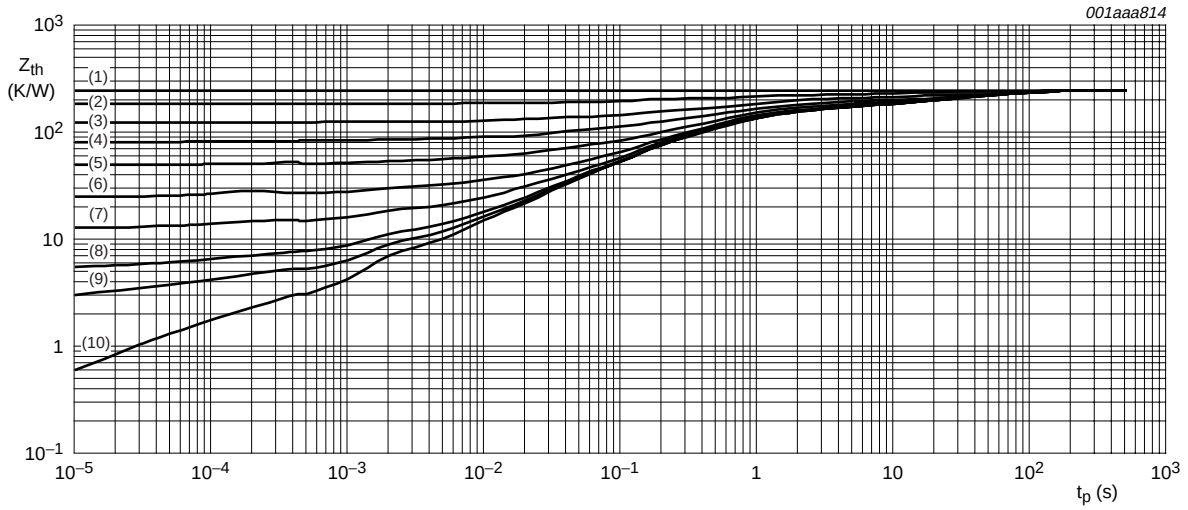
Fig.2 Power derating curves.

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

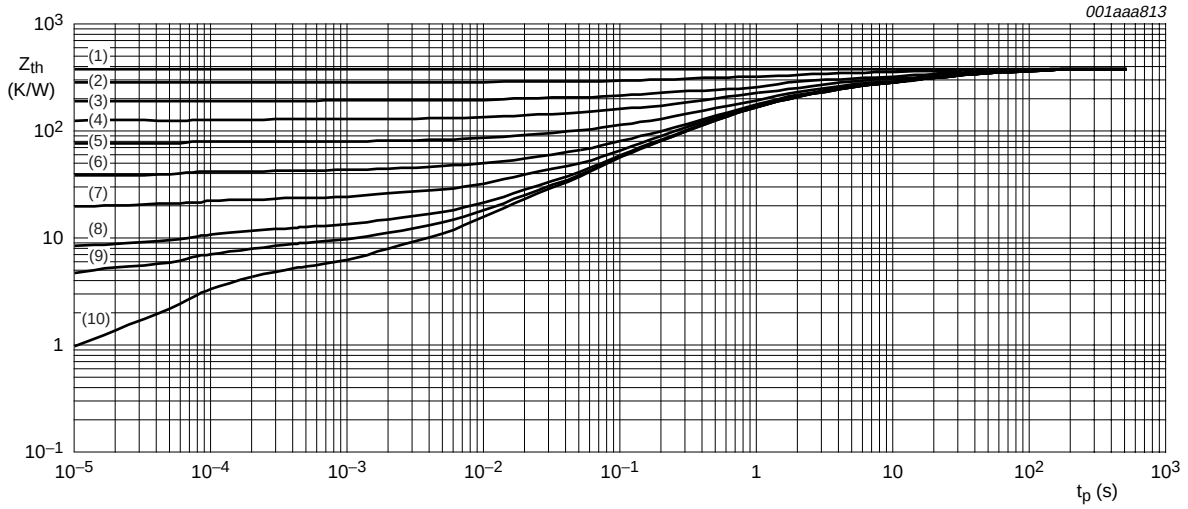
1. Device mounted on a printed-circuit board, single-sided copper, tin-plated and standard footprint.
2. Device mounted on a printed-circuit board, single-sided copper, tin-plated and 1 cm^2 collector mounting pad.



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

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

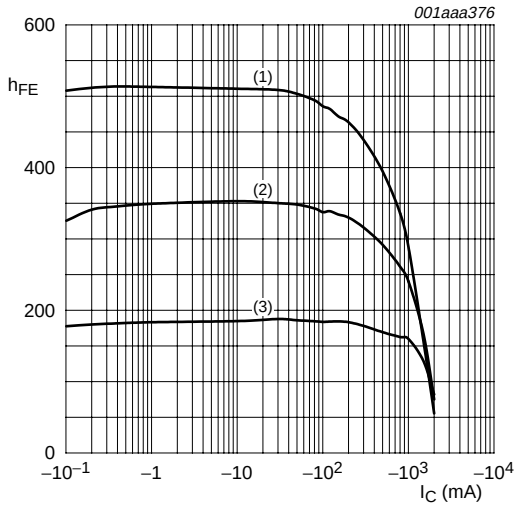
CHARACTERISTICS

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

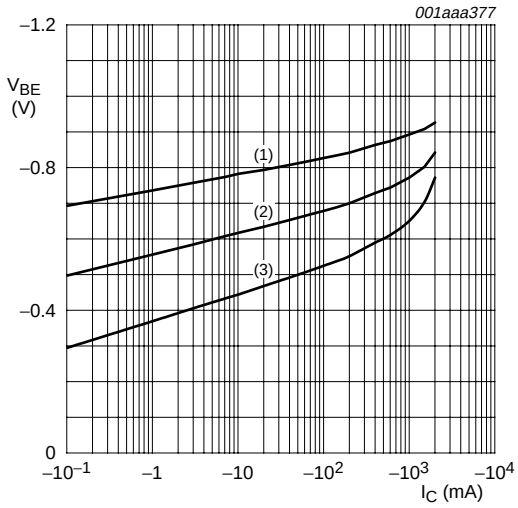
Note

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



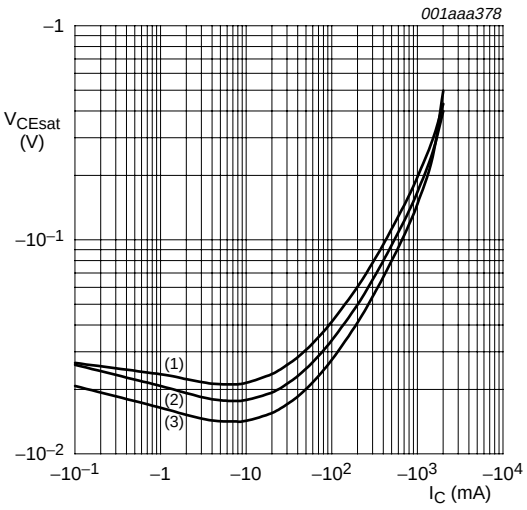
V_{CE} = −10 V.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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



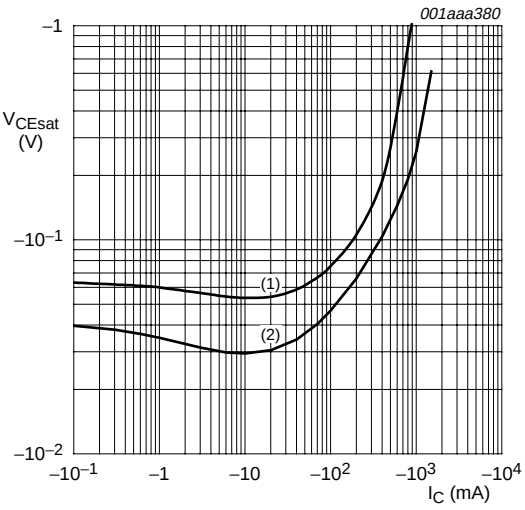
V_{CE} = −10 V.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

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



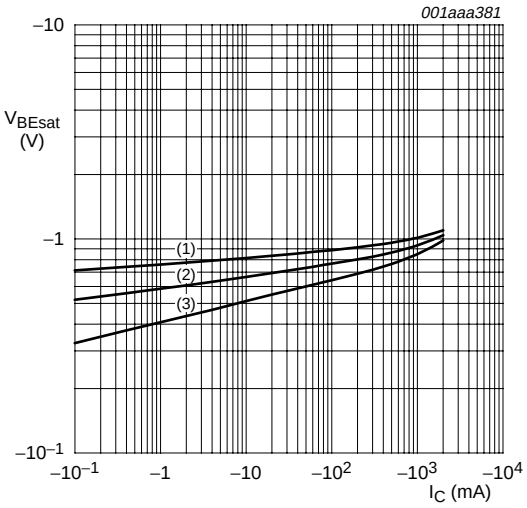
I_C/I_B = 10.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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



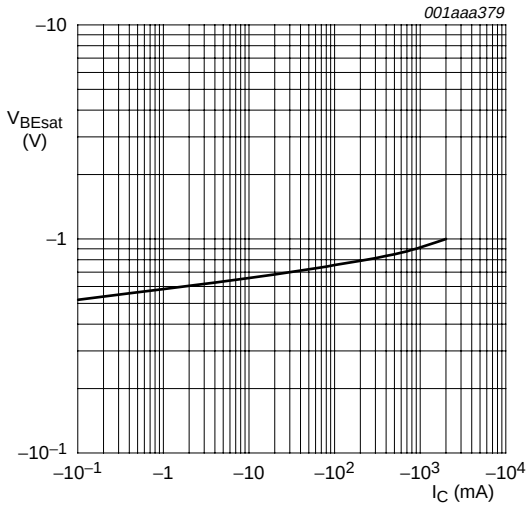
T_{amb} = 25 °C.
(1) I_C/I_B = 50.
(2) I_C/I_B = 20.

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



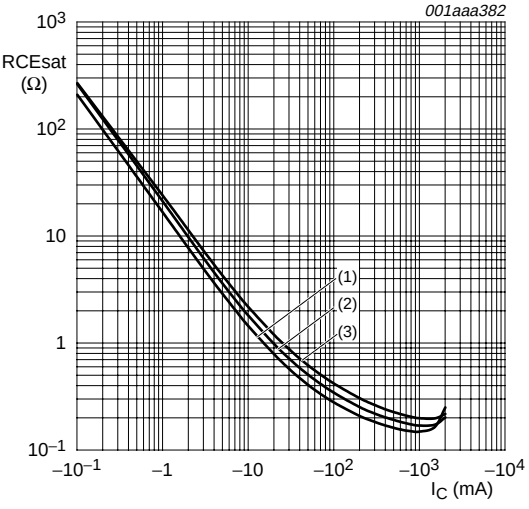
I_C/I_B = 10.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

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



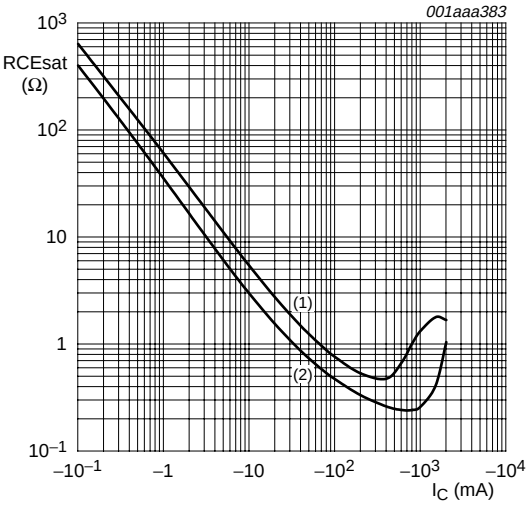
I_C/I_B = 20.
T_{amb} = 25 °C.

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



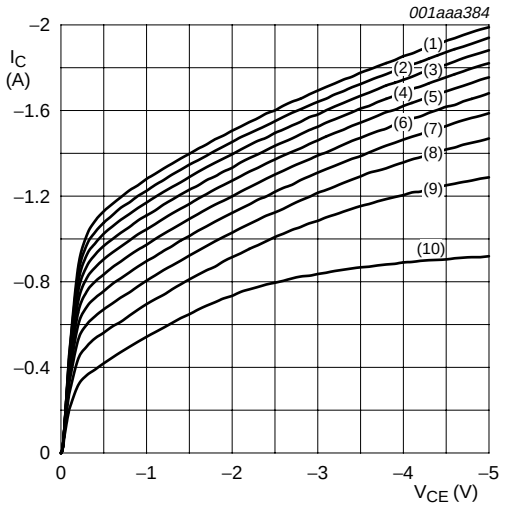
I_C/I_B = 10.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 100 °C.

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.



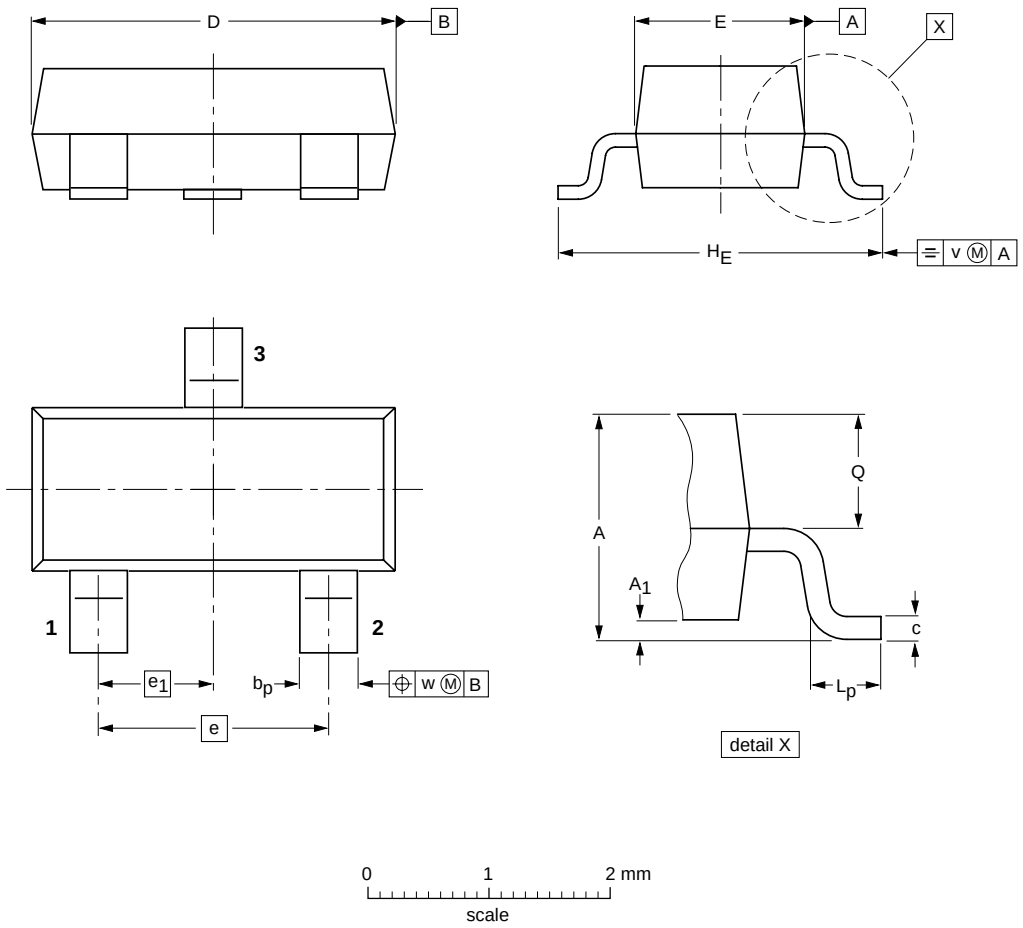
T_{amb} = 25 °C.

(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
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