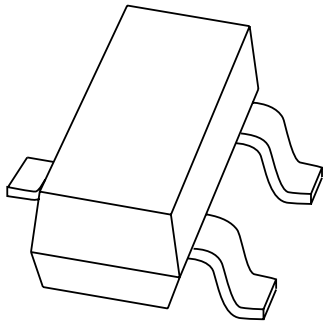
DATA SHEET



BC856; BC857; BC858
PNP general purpose transistors

Product specification
Supersedes data of 2003 Apr 09

2004 Jan 16

Philips
Semiconductors

PHILIPS

PNP general purpose transistors BC856; BC857; BC858

FEATURES

- Low current (max. 100 mA)
- Low voltage (max. 65 V).

APPLICATIONS

- General purpose switching and amplification.

DESCRIPTION

PNP transistor in a SOT23 plastic package.
NPN complements: BC846, BC847 and BC848.

MARKING

TYPE NUMBER	MARKING CODE(1)
BC856	3D*
BC856A	3A*
BC856B	3B*
BC857	3H*
BC857A	3E*
BC857B	3F*
BC857C	3G*
BC858B	3K*

Note

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

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

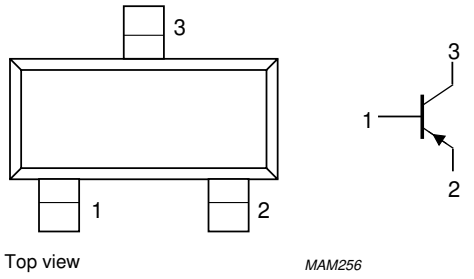


Fig.1 Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BC856	–	plastic surface mounted package; 3 leads	SOT23
BC857	–	plastic surface mounted package; 3 leads	SOT23
BC858	–	plastic surface mounted package; 3 leads	SOT23

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter			
	BC856		–	–80	V
	BC857		–	–50	V
	BC858		–	–30	V
V_{CEO}	collector-emitter voltage	open base			
	BC856		–	–65	V
	BC857		–	–45	V
	BC858		–	–30	V
V_{EBO}	emitter-base voltage	open collector	–	–5	V
I_C	collector current (DC)		–	–100	mA
I_{CM}	peak collector current		–	–200	mA
I_{BM}	peak base current		–	–200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; note 1	–	250	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

Note

1. Transistor mounted on an FR4 printed-circuit board, standard footprint.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	TYPICAL	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; note 1	500	K/W

Note

1. Transistor mounted on an FR4 printed-circuit board, standard footprint.

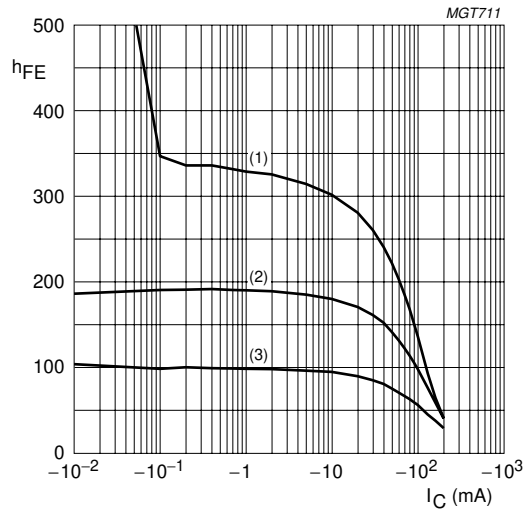
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	V_{CB} = –30 V; I_E = 0	–	–1	–15	nA
		V_{CB} = –30 V; I_E = 0; T_j = 150 °C	–	–	–4	μA
I_{EBO}	emitter-base cut-off current	V_{EB} = –5 V; I_C = 0	–	–	–100	nA
h_{FE}	DC current gain	I_C = –2 mA; V_{CE} = –5 V				
	BC856		125	–	475	
	BC857		125	–	800	
	BC856A; BC857A		125	–	250	
	BC856B; BC857B; BC858B		220	–	475	
	BC857C		420	–	800	
V_{CEsat}	collector-emitter saturation voltage	I_C = –10 mA; I_B = –0.5 mA	–	–75	–300	mV
		I_C = –100 mA; I_B = –5 mA; note 1	–	–250	–650	mV
V_{BEsat}	base-emitter saturation voltage	I_C = –10 mA; I_B = –0.5 mA	–	–700	–	mV
		I_C = –100 mA; I_B = –5 mA; note 1	–	–850	–	mV
V_{BE}	base-emitter voltage	I_C = –2 mA; V_{CE} = –5 V	–600	–650	–750	mV
		I_C = –10 mA; V_{CE} = –5 V	–	–	–820	mV
C_c	collector capacitance	V_{CB} = –10 V; I_E = I_e = 0; f = 1 MHz	–	4.5	–	pF
f_T	transition frequency	V_{CE} = –5 V; I_C = –10 mA; f = 100 MHz	100	–	–	MHz
F	noise figure	I_C = –200 μA; V_{CE} = –5 V; R_S = 2 kΩ; f = 1 kHz; B = 200 Hz	–	2	10	dB

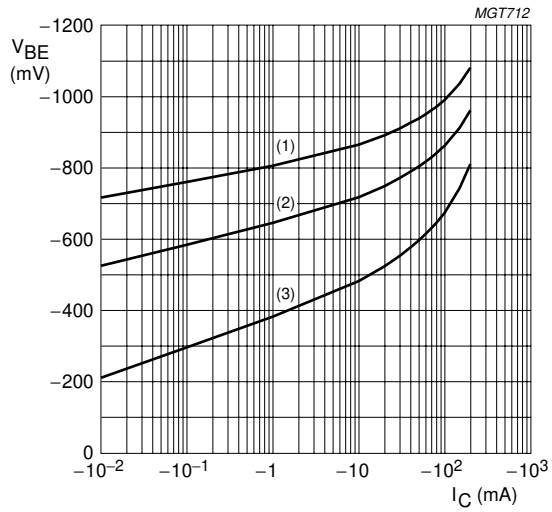
Note

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



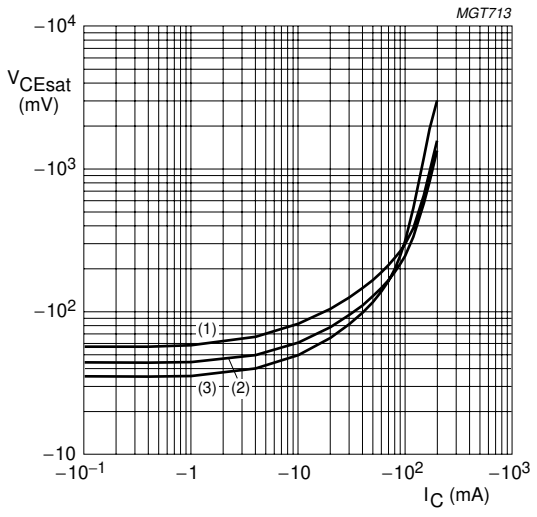
BC857A; V_{CE} = −5 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

Fig.2 DC current gain as a function of collector current; typical values.



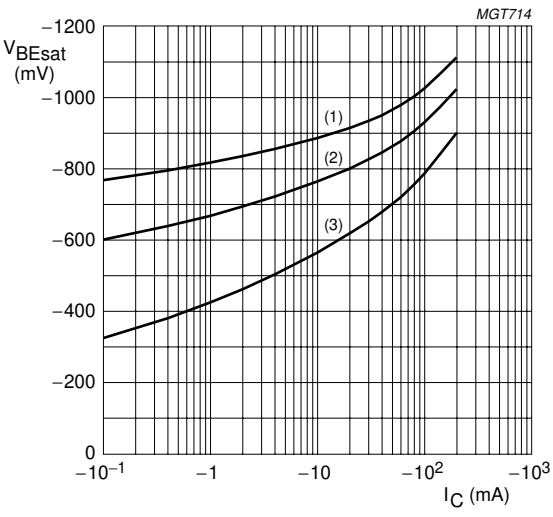
BC857A; V_{CE} = −5 V.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

Fig.3 Base-emitter voltage as a function of collector current; typical values.



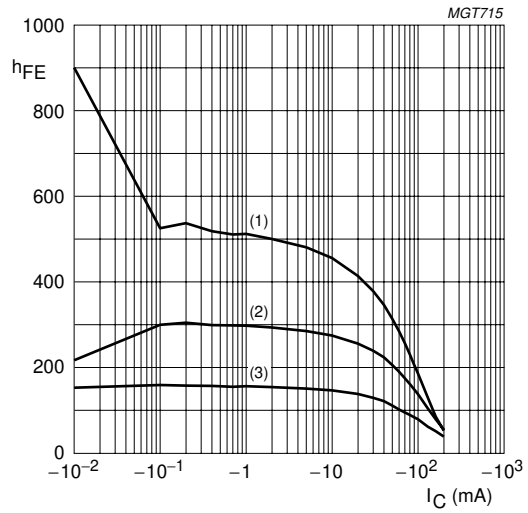
BC857A; I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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



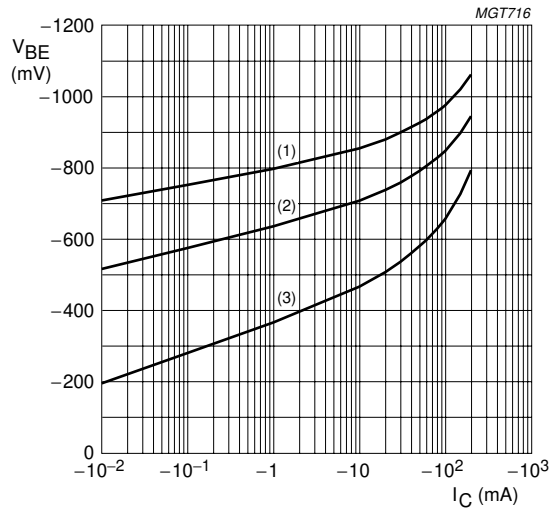
BC857A; I_C/I_B = 20.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

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



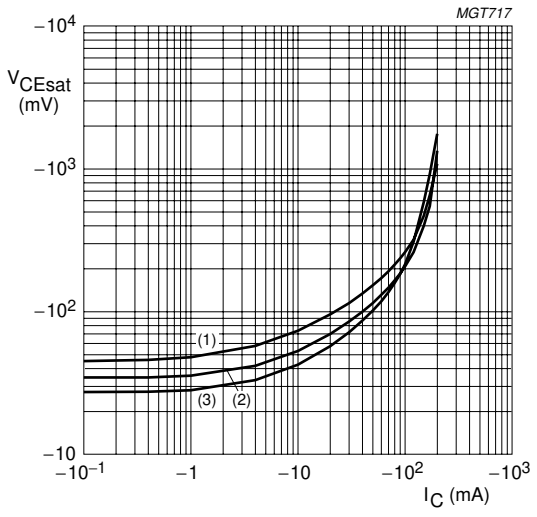
BC857B; V_{CE} = −5 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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



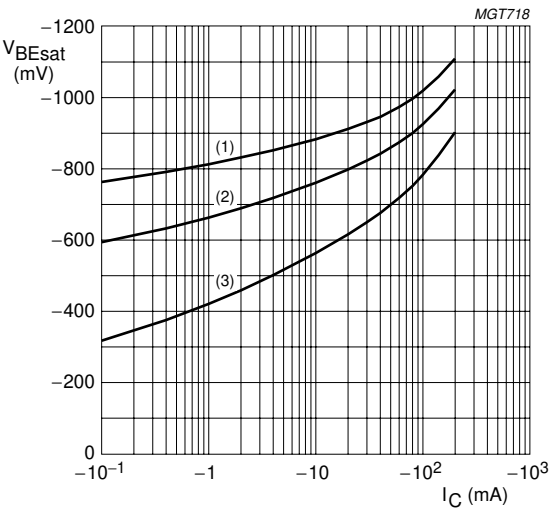
BC857B; V_{CE} = −5 V.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

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



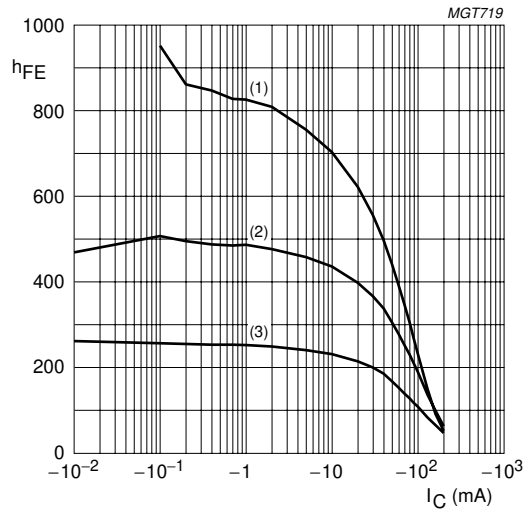
BC857B; I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

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



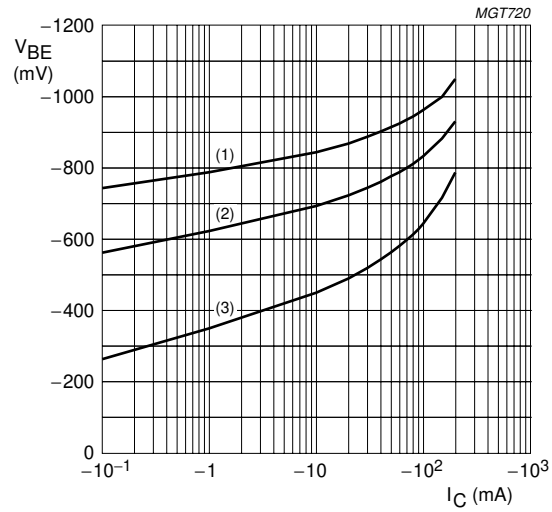
BC857B; I_C/I_B = 20.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

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



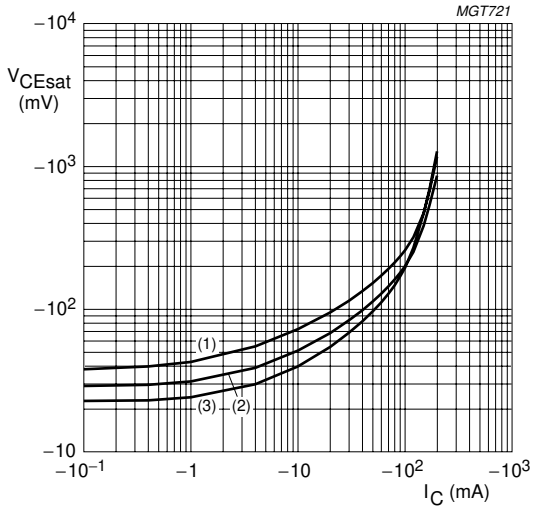
BC857C; V_{CE} = −5 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

Fig.10 DC current gain as a function of collector current; typical values.



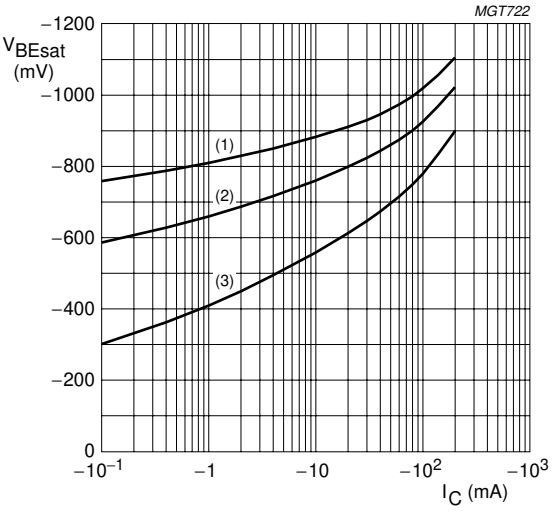
BC857C; V_{CE} = −5 V.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

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



BC857C; I_C/I_B = 20.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = −55 °C.

Fig.12 Collector-emitter saturation voltage as a function of collector current; typical values.

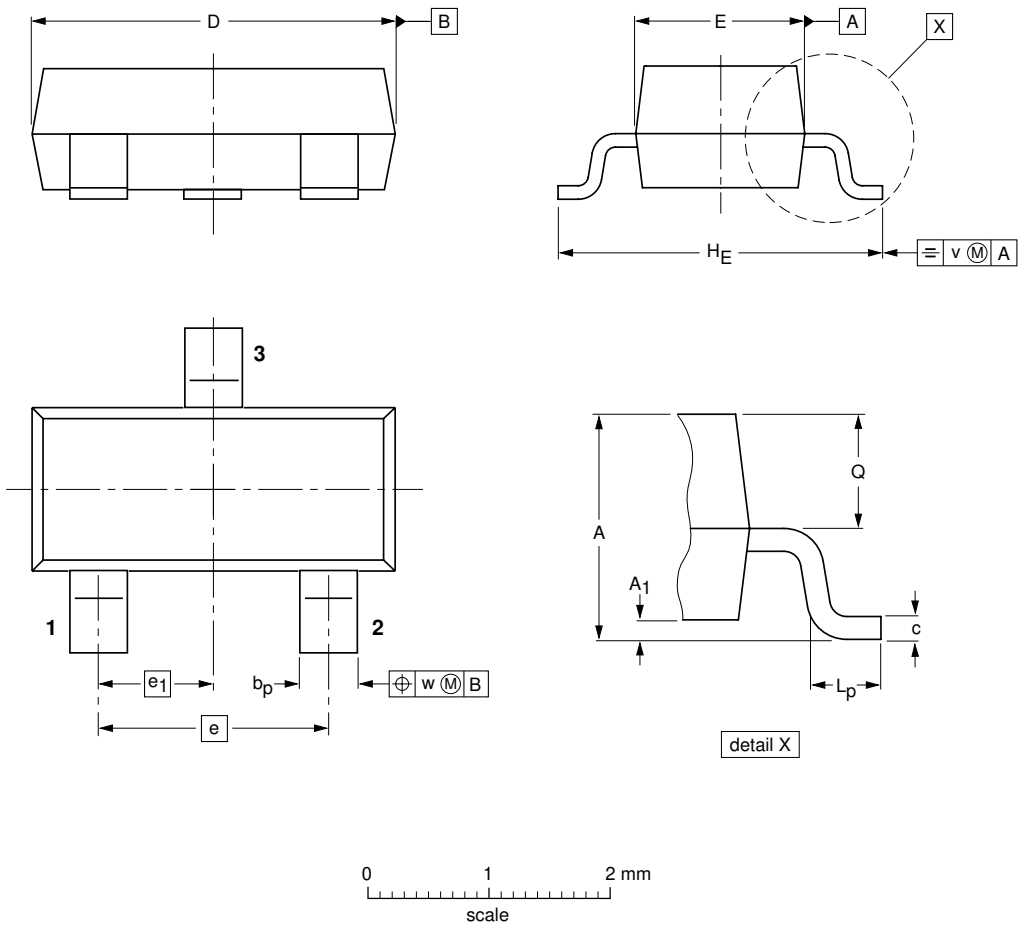


BC857C; I_C/I_B = 20.
(1) T_{amb} = −55 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

Fig.13 Base-emitter saturation voltage as a function of collector current; 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.
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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3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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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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For additional information please visit **http://www.semiconductors.philips.com**. Fax: **+31 40 27 24825**
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Printed in The Netherlands R75/06/pp10 Date of release: 2004 Jan 16 Document order number: 9397 750 12397

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