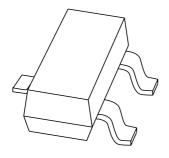
### **DISCRETE SEMICONDUCTORS**

# DATA SHEET



BC856; BC857; BC858 PNP general purpose transistors

Product data sheet Supersedes data of 2003 Apr 09 2004 Jan 16



# 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

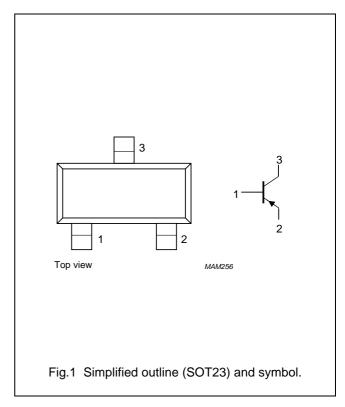
1. \* = p: made in Hong Kong.

\* = t: made in Malaysia.

\* = W: made in China.

#### **PINNING**

PIN	DESCRIPTION
1	base
2	emitter
3	collector



#### **ORDERING INFORMATION**

TYPE	PACKAGE		
NUMBER	NAME	DESCRIPTION	VERSION
BC856	_	plastic surface mounted package; 3 leads	SOT23
BC857	_	<ul> <li>plastic surface mounted package; 3 leads</li> <li>SOT:</li> </ul>	
BC858	_	plastic surface mounted package; 3 leads	SOT23

# PNP general purpose transistors

BC856; BC857; BC858

#### **LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage	open emitter			
	BC856		_	-80	V
	BC857		_	-50	V
	BC858		_	-30	V
V <sub>CEO</sub>	collector-emitter voltage	open base			
	BC856		_	-65	V
	BC857		_	-45	V
	BC858		_	-30	V
V <sub>EBO</sub>	emitter-base voltage	open collector	-	-5	V
I <sub>C</sub>	collector current (DC)		-	-100	mA
I <sub>CM</sub>	peak collector current		-	-200	mA
I <sub>BM</sub>	peak base current		-	-200	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C; note 1	-	250	mW
T <sub>stg</sub>	storage temperature		-65	+150	°C
Tj	junction temperature		_	150	°C
T <sub>amb</sub>	operating ambient temperature		-65	+150	°C

#### Note

#### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	TYPICAL	UNIT
R <sub>th(j-a)</sub>	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.

<sup>1.</sup> Transistor mounted on an FR4 printed-circuit board, standard footprint.

# PNP general purpose transistors

BC856; BC857; BC858

#### **CHARACTERISTICS**

 $T_{amb}$  = 25  $^{\circ}C$  unless otherwise specified.

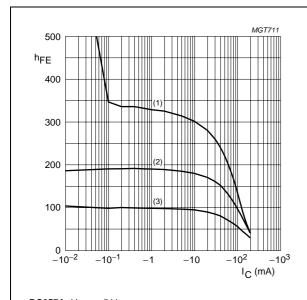
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I <sub>CBO</sub>	collector-base cut-off current	$V_{CB} = -30 \text{ V}; I_E = 0$	_	-1	-15	nA
		$V_{CB} = -30 \text{ V}; I_E = 0;$ $T_j = 150 \text{ °C}$	_	_	-4	μΑ
I <sub>EBO</sub>	emitter-base cut-off current	$V_{EB} = -5 \text{ V}; I_C = 0$	_	_	-100	nA
h <sub>FE</sub>	DC current gain	$I_C = -2 \text{ mA}; V_{CE} = -5 \text{ V}$				
	BC856		125	_	475	
	BC857		125	_	800	
	BC856A; BC857A		125	_	250	
	BC856B; BC857B; BC858B		220	_	475	
	BC857C		420	_	800	
V <sub>CEsat</sub>	collector-emitter saturation voltage	$I_C = -10 \text{ mA}; I_B = -0.5 \text{ mA}$	_	-75	-300	mV
		$I_C = -100 \text{ mA}; I_B = -5 \text{ mA};$ note 1	_	-250	-650	mV
V <sub>BEsat</sub>	base-emitter saturation voltage	$I_C = -10 \text{ mA}; I_B = -0.5 \text{ mA}$	_	-700	_	mV
		$I_C = -100 \text{ mA}$ ; $I_B = -5 \text{ mA}$ ; note 1	_	-850	_	mV
V <sub>BE</sub>	base-emitter voltage	$I_C = -2 \text{ mA}; V_{CE} = -5 \text{ V}$	-600	-650	-750	mV
		$I_C = -10 \text{ mA}; V_{CE} = -5 \text{ V}$	_	_	-820	mV
C <sub>c</sub>	collector capacitance	$V_{CB} = -10 \text{ V}; I_E = I_e = 0;$ f = 1 MHz	_	4.5	_	pF
f <sub>T</sub>	transition frequency $V_{CE} = -5 \text{ V}; I_C = -10 \text{ mA};$ $f = 100 \text{ MHz}$		100	_	_	MHz
F	noise figure	$I_{C} = -200 \mu A; V_{CE} = -5 V;$ $R_{S} = 2 k\Omega; f = 1 kHz;$ B = 200 Hz	_	2	10	dB

#### Note

<sup>1.</sup> Pulse test:  $t_p \leq 300~\mu s;~\delta \leq 0.02.$ 

# PNP general purpose transistors

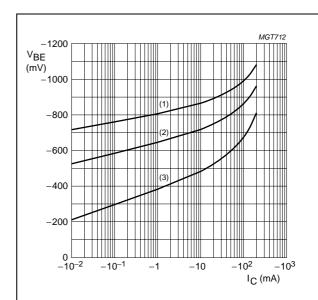
BC856; BC857; BC858



**BC857A;**  $V_{CE} = -5 V$ .

- (1)  $T_{amb} = 150 \, ^{\circ}C$
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (3)  $T_{amb} = -55 \, ^{\circ}C$ .

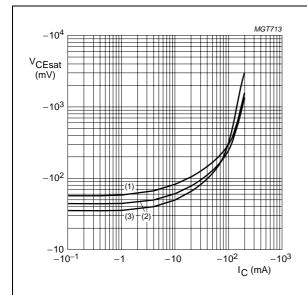
Fig.2 DC current gain as a function of collector current; typical values.



**BC857A;**  $V_{CE} = -5 \text{ V}.$ 

- (1)  $T_{amb} = -55 \, ^{\circ}C$
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (3)  $T_{amb} = 150 \, ^{\circ}C$ .

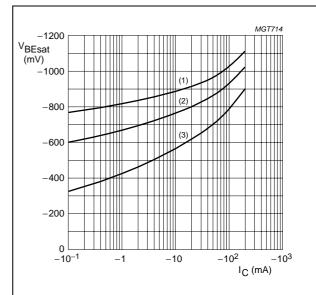
Fig.3 Base-emitter voltage as a function of collector current; typical values.



**BC857A**;  $I_C/I_B = 20$ .

- (1) T<sub>amb</sub> = 150 °C.
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (3)  $T_{amb} = -55 \,^{\circ}\text{C}$ .

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



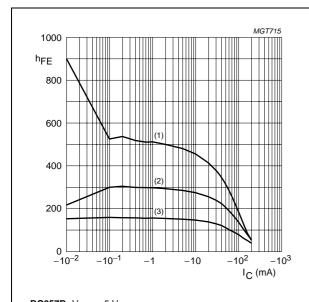
**BC857A**;  $I_{\text{C}}/I_{\text{B}} = 20$ .

- (1)  $T_{amb} = -55 \, ^{\circ}C$ .
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (3)  $T_{amb} = 150 \, ^{\circ}C$ .

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

# PNP general purpose transistors

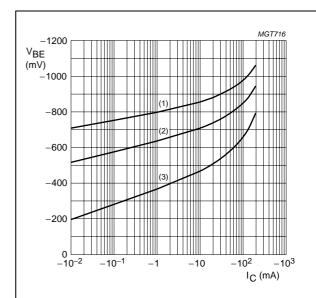
BC856; BC857; BC858



BC857B;  $V_{CE} = -5 \text{ V}.$ 

- (1)  $T_{amb} = 150 \, ^{\circ}C$ .
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (3)  $T_{amb} = -55 \, ^{\circ}C$ .

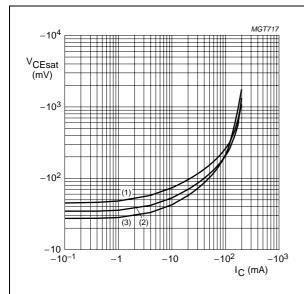
Fig.6 DC current gain as a function of collector current; typical values.



**BC857B**;  $V_{CE} = -5 \text{ V}.$ 

- (1)  $T_{amb} = -55 \, ^{\circ}C$
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (3)  $T_{amb} = 150 \, ^{\circ}C$ .

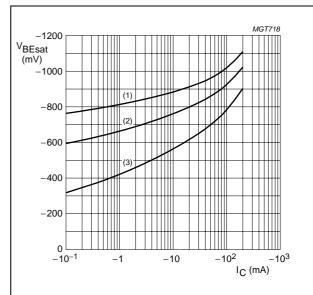
Fig.7 Base-emitter voltage as a function of collector current; typical values.



**BC857B**;  $I_C/I_B = 20$ .

- (1) T<sub>amb</sub> = 150 °C.
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (3)  $T_{amb} = -55 \,^{\circ}\text{C}$ .

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



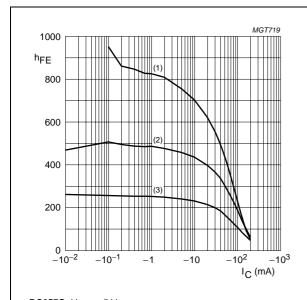
**BC857B**;  $I_C/I_B = 20$ .

- (1)  $T_{amb} = -55 \, ^{\circ}C$ .
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (3)  $T_{amb} = 150 \, ^{\circ}C$ .

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

# PNP general purpose transistors

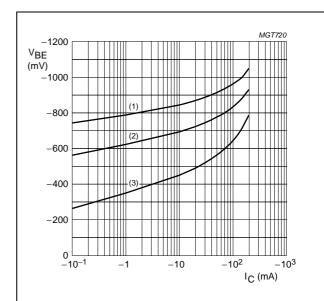
BC856; BC857; BC858



**BC857C;**  $V_{CE} = -5 \text{ V}.$ 

- (1)  $T_{amb} = 150 \, ^{\circ}C$
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (3)  $T_{amb} = -55 \, ^{\circ}C$ .

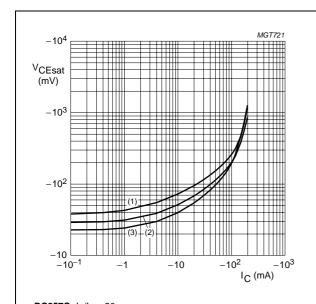
Fig.10 DC current gain as a function of collector current; typical values.



**BC857C**;  $V_{CE} = -5 \text{ V}.$ 

- (1)  $T_{amb} = -55 \, ^{\circ}C$ .
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (3)  $T_{amb} = 150 \, ^{\circ}C$ .

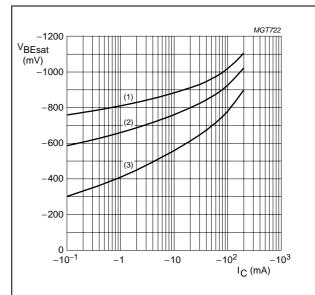
Fig.11 Base-emitter voltage as a function of collector current; typical values.



**BC857C**;  $I_C/I_B = 20$ .

- (1) T<sub>amb</sub> = 150 °C.
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (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)  $T_{amb} = -55 \, ^{\circ}C$ .
- (2)  $T_{amb} = 25 \, ^{\circ}C$ .
- (3)  $T_{amb} = 150 \, ^{\circ}C$ .

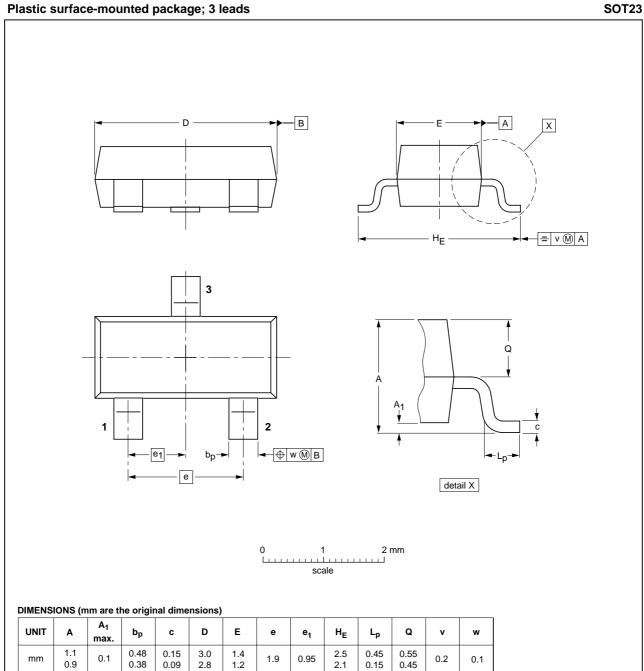
Fig.13 Base-emitter saturation voltage as a function of collector current; typical values.

# PNP general purpose transistors

BC856; BC857; BC858

#### **PACKAGE OUTLINE**

Plastic surface-mounted package; 3 leads



OUTLINE	REFERENCES		EUROPEAN	ICCUE DATE		
VERSION	IEC	JEDEC	JEITA		PROJECTION ISSUE DAT	
SOT23		TO-236AB				<del>-04-11-04-</del> 06-03-16

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### PNP general purpose transistors

BC856; BC857; BC858

#### **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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2004 Jan 16

### **NXP Semiconductors**

#### **Customer notification**

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, except for package outline drawings which were updated to the latest version.

#### **Contact information**

For additional information please visit: http://www.nxp.com
For sales offices addresses send e-mail to: salesaddresses@nxp.com

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