Important notice

Dear Customer,

On 7 February 2017 the former NXP Standard Product business became a new company with the tradename **Nexperia**. Nexperia is an industry leading supplier of Discrete, Logic and PowerMOS semiconductors with its focus on the automotive, industrial, computing, consumer and wearable application markets

In data sheets and application notes which still contain NXP or Philips Semiconductors references, use the references to Nexperia, as shown below.

Instead of http://www.nxp.com, http://www.philips.com/ or http://www.semiconductors.philips.com/, use **http://www.nexperia.com**

Instead of sales.addresses@www.nxp.com or sales.addresses@www.semiconductors.philips.com, use **salesaddresses@nexperia.com** (email)

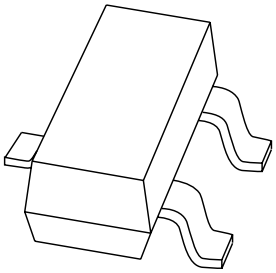
Replace the copyright notice at the bottom of each page or elsewhere in the document, depending on the version, as shown below:
- © NXP N.V. (year). All rights reserved or © Koninklijke Philips Electronics N.V. (year). All rights reserved
Should be replaced with:
- **© Nexperia B.V. (year). All rights reserved**.

If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via **salesaddresses@nexperia.com**). Thank you for your cooperation and understanding,

Kind regards,

Team Nexperia

DATA SHEET



BC859; BC860
PNP general purpose transistors

Product data sheet
Supersedes data of 1999 May 28

2004 Jan 16

PNP general purpose transistors BC859; BC860

FEATURES

- Low current (max. 100 mA)
- Low voltage (max. 45 V).

APPLICATIONS

- Low noise input stages of audio frequency equipment.

DESCRIPTION

PNP transistor in a SOT23 plastic package.
NPN complements: BC849 and BC850.

MARKING

TYPE NUMBER	MARKING CODE(1)	TYPE NUMBER	MARKING CODE(1)
BC859B	4B*	BC860B	4F*
BC859C	4C*	BC860C	4G*

Note

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

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

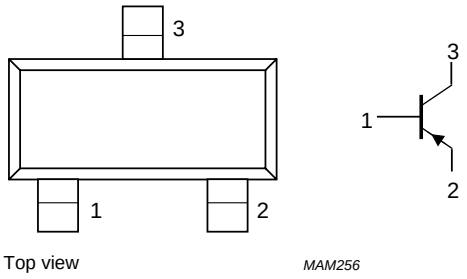


Fig.1 Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BC859B	–	plastic surface mounted package; 3 leads	SOT23
BC859C			
BC860B			
BC860C			

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			
	BC859		−	−30	V
	BC860		−	−50	V
V_{CEO}	collector-emitter voltage	open base			
	BC859		−	−30	V
	BC860		−	−45	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.

THERMAL CHARACTERISTICS

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

Note

1. Transistor mounted on an FR4 printed-circuit board.

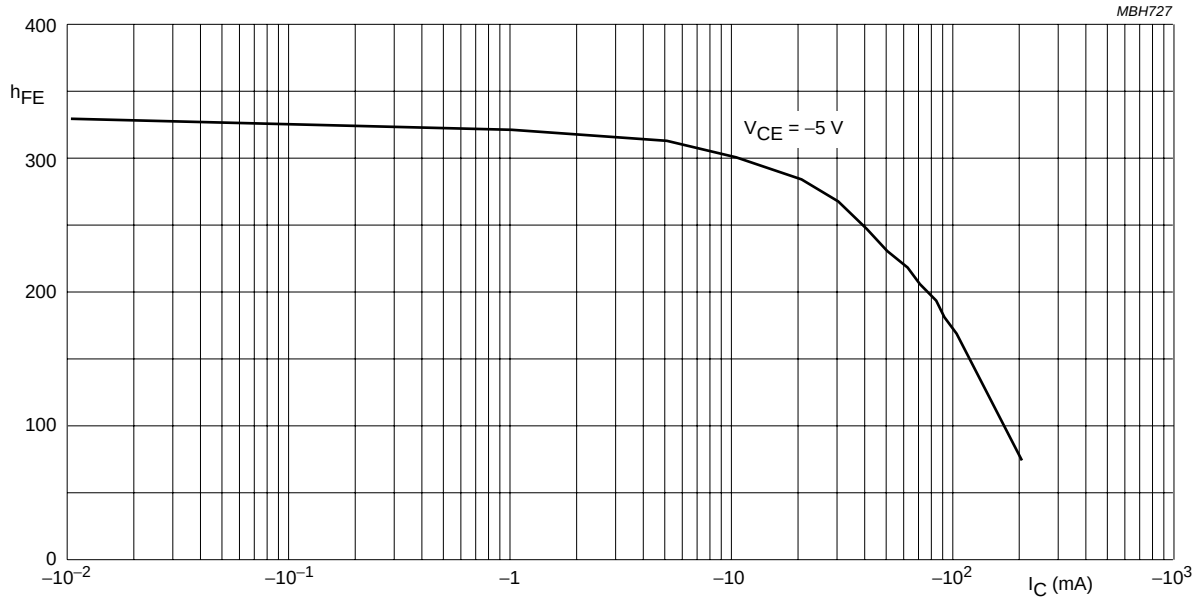
CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current	I_E = 0; V_{CB} = −30 V	−	−1	−15	nA
		I_E = 0; V_{CB} = −30 V; T_j = 150 °C	−	−	−4	μA
I_{EBO}	emitter cut-off current	I_C = 0; V_{EB} = −5 V	−	−	−100	nA
h_{FE}	DC current gain BC859B; BC860B BC859C; BC860C	I_C = −2 mA; V_{CE} = −5 V; see Figs 2 and 3	 220 420	 − −	 475 800	
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	−	−250	−650	mV
V_{BEsat}	base-emitter saturation voltage	I_C = −10 mA; I_B = −0.5 mA; note 1	−	−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; note 2	−600	−650	−750	mV
		I_C = −10 mA; V_{CE} = −5 V; note 2	−	−	−820	mV
C_c	collector capacitance	I_E = I_e = 0; V_{CB} = −10 V; f = 1 MHz	−	4.5	−	pF
C_e	emitter capacitance	I_C = I_c = 0; V_{EB} = −500 mV; f = 1 MHz	−	10	−	pF
f_T	transition frequency	I_C = −10 mA; V_{CE} = −5 V; f = 100 MHz	100	−	−	MHz
F	noise figure BC859B; BC860B; BC859C; BC860C	I_C = −200 μA; V_{CE} = −5 V; R_S = 2 kΩ; f = 30 Hz to 15 kHz	−	−	4	dB
	noise figure BC859B; BC860B; BC859C; BC860C	I_C = −200 μA; V_{CE} = −5 V; R_S = 2 kΩ; f = 1 kHz; B = 200 Hz	−	−	4	dB

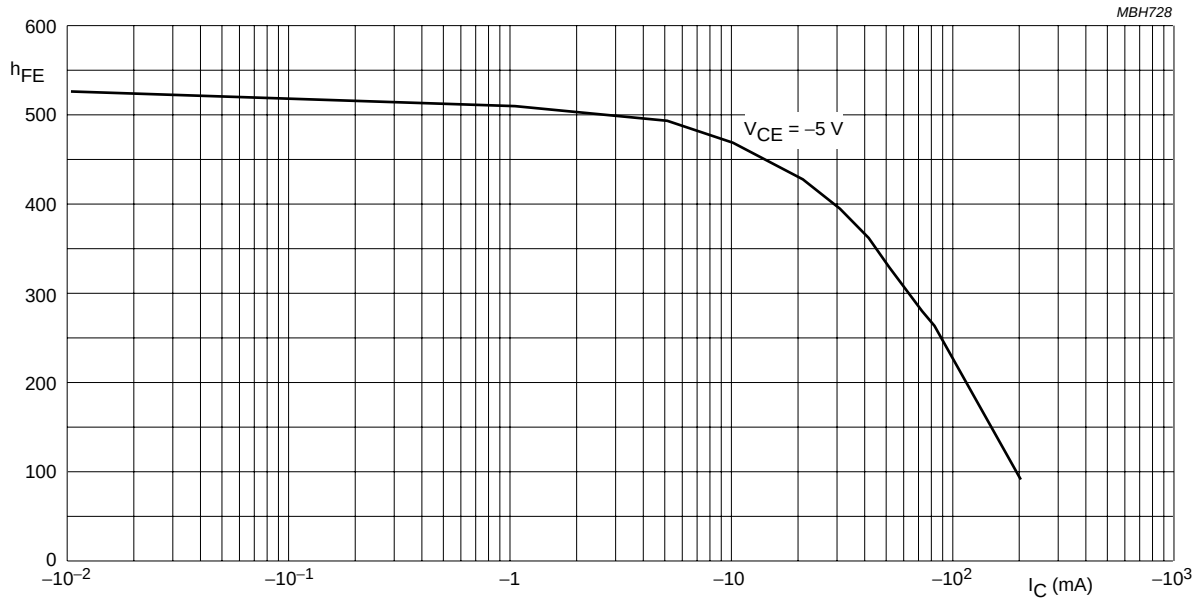
Notes

1. V_{BEsat} decreases by about −1.7 mV/K with increasing temperature.
2. V_{BE} decreases by about −2 mV/K with increasing temperature.



BC859B; BC860B.

Fig.2 DC current gain; typical values.

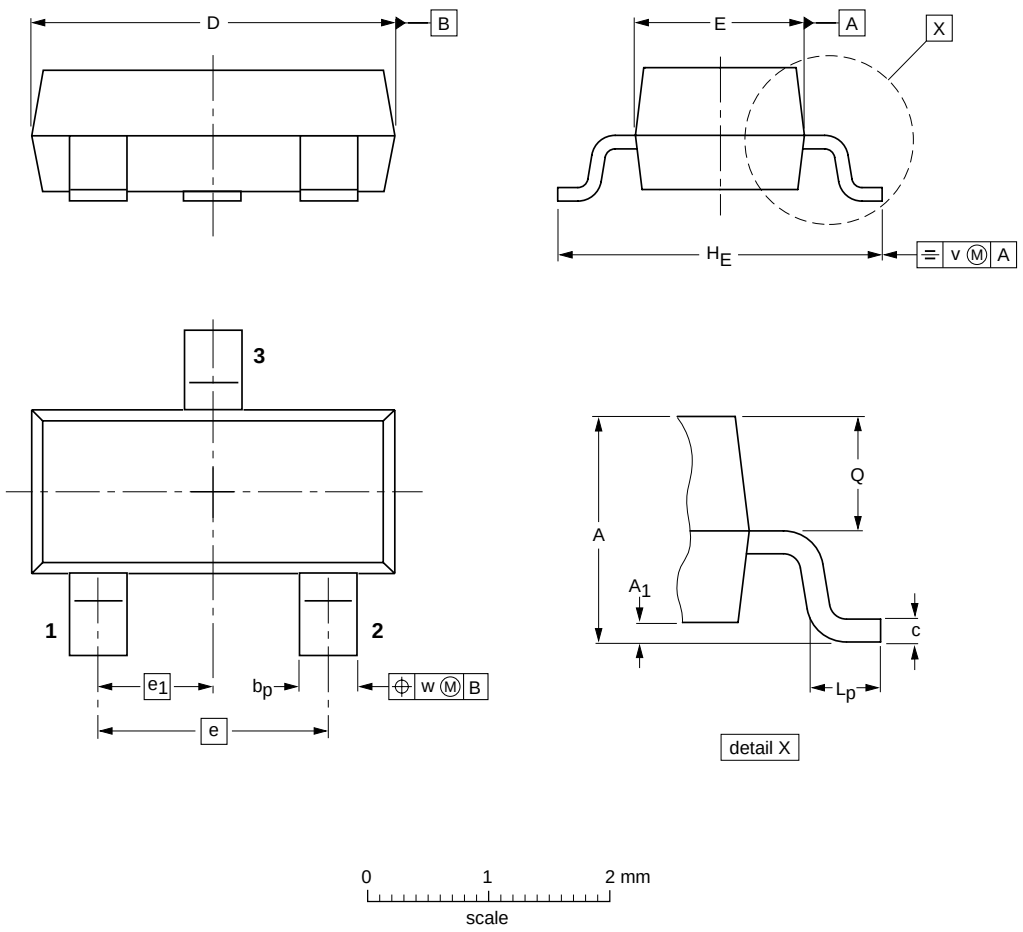


BC859C; BC860C.

Fig.3 DC current gain; 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	JEITA			
SOT23		TO-236AB				~~04-11-04~~ 06-03-16

DATA SHEET STATUS

DOCUMENT STATUS[1]	PRODUCT STATUS[2]	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.

Notes

1. Please consult the most recently issued document before initiating or completing a design.
2. The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

DISCLAIMERS

General — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

Terms and conditions of sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at http://www.nxp.com/profile/terms, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by NXP Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from national authorities.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

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**

Printed in The Netherlands R75/05/pp8 Date of release: 2004 Jan 16 Document order number: 9397 750 12398

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Nexperia:

BC859B,215 BC859C,235 BC859C,215 BC860B,235 BC860B,215 BC860C,235 BC860C,215