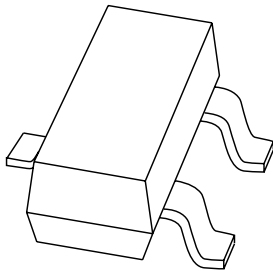


DATA SHEET



BSR20; BSR20A PNP high voltage transistors

Product specification
Supersedes data of 2004 Jan 16

2004 Mar 15

PNP high voltage transistors

BSR20; BSR20A

FEATURES

- Low current (max. 300 mA)
- High voltage (max. 150 V).

APPLICATIONS

- General purpose switching and amplification
- Telephony applications.

DESCRIPTION

PNP high-voltage transistor in a SOT23 plastic package.
NPN complements: BSR19 and BSR19A.

MARKING

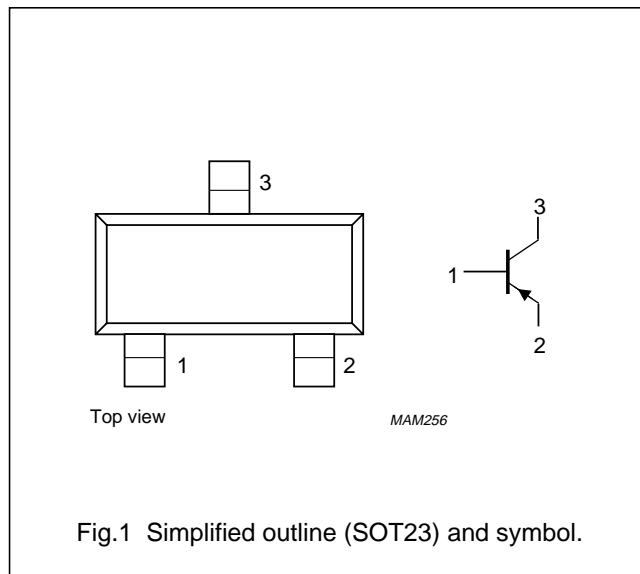
TYPE NUMBER	MARKING CODE ⁽¹⁾
BSR20	58* or T35
BSR20A	59* or T36

Note

- * = 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 NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BSR20	–	plastic surface mounted package; 3 leads	SOT23
BSR20A	–	plastic surface mounted package; 3 leads	SOT23

PNP high voltage transistors

BSR20; BSR20A

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{CBO}	collector-base voltage	open emitter			
	BSR20		–	–130	V
	BSR20A		–	–160	V
V _{CEO}	collector-emitter voltage	open base			
	BSR20		–	–120	V
	BSR20A		–	–150	V
I _{CM}	peak collector current		–	–600	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	–	250	mW
h _{FE}	DC current gain	I _C = –10 mA; V _{CE} = –5 V			
	BSR20		40	180	
	BSR20A		60	240	
f _T	transition frequency	I _C = –10 mA; V _{CE} = –10 V; f = 100 MHz	100	–	MHz

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			
	BSR20		–	–130	V
	BSR20A		–	–160	V
V _{CEO}	collector-emitter voltage	open base			
	BSR20		–	–120	V
	BSR20A		–	–150	V
V _{EBO}	emitter-base voltage	open collector	–	–5	V
I _C	collector current (DC)		–	–300	mA
I _{CM}	peak collector current		–	–600	mA
I _B	base current		–	–100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	–	250	mW
T _{stg}	storage temperature		–65	+150	°C
T _j	junction temperature		–	150	°C
T _{amb}	operating ambient temperature		–65	+150	°C

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.

PNP high voltage transistors

BSR20; BSR20A

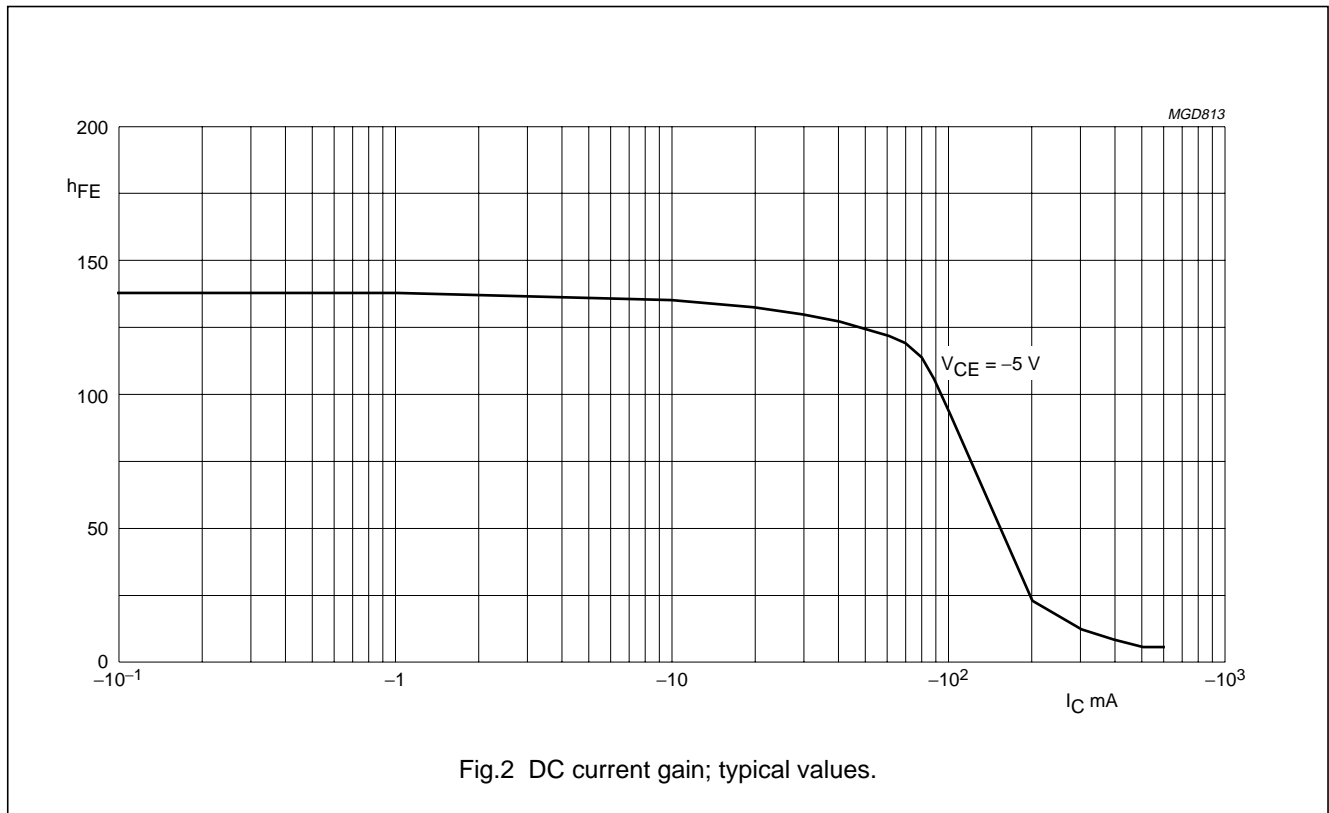
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current BSR20	$I_E = 0\text{ A}; V_{CB} = -100\text{ V}$	–	–100	nA
		$I_E = 0\text{ A}; V_{CB} = -100\text{ V}; T_{amb} = 100\text{ °C}$	–	–100	μA
I_{CBO}	collector cut-off current BSR20A	$I_E = 0\text{ A}; V_{CB} = -120\text{ V}$	–	–50	nA
		$I_E = 0\text{ A}; V_{CB} = -120\text{ V}; T_{amb} = 100\text{ °C}$	–	–50	μA
I_{EBO}	emitter cut-off current	$I_C = 0\text{ A}; V_{EB} = -4\text{ V}$	–	–50	nA
h_{FE}	DC current gain BSR20	$I_C = -1\text{ mA}; V_{CE} = -5\text{ V}$	30	–	
			50	–	
	DC current gain BSR20	$I_C = -10\text{ mA}; V_{CE} = -5\text{ V}$	40	180	
			60	240	
	DC current gain BSR20A	$I_C = -50\text{ mA}; V_{CE} = -5\text{ V}$	40	–	
			50	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -10\text{ mA}; I_B = -1\text{ mA}$	–	–200	mV
		$I_C = -50\text{ mA}; I_B = -5\text{ mA}$	–	–500	mV
C_c	collector capacitance	$I_E = 0\text{ A}; V_{CB} = -10\text{ V}; f = 1\text{ MHz}$	–	6	pF
f_T	transition frequency BSR20	$I_C = -10\text{ mA}; V_{CE} = -10\text{ V};$ $f = 100\text{ MHz}$	100	400	MHz
			100	300	MHz

PNP high voltage transistors

BSR20; BSR20A



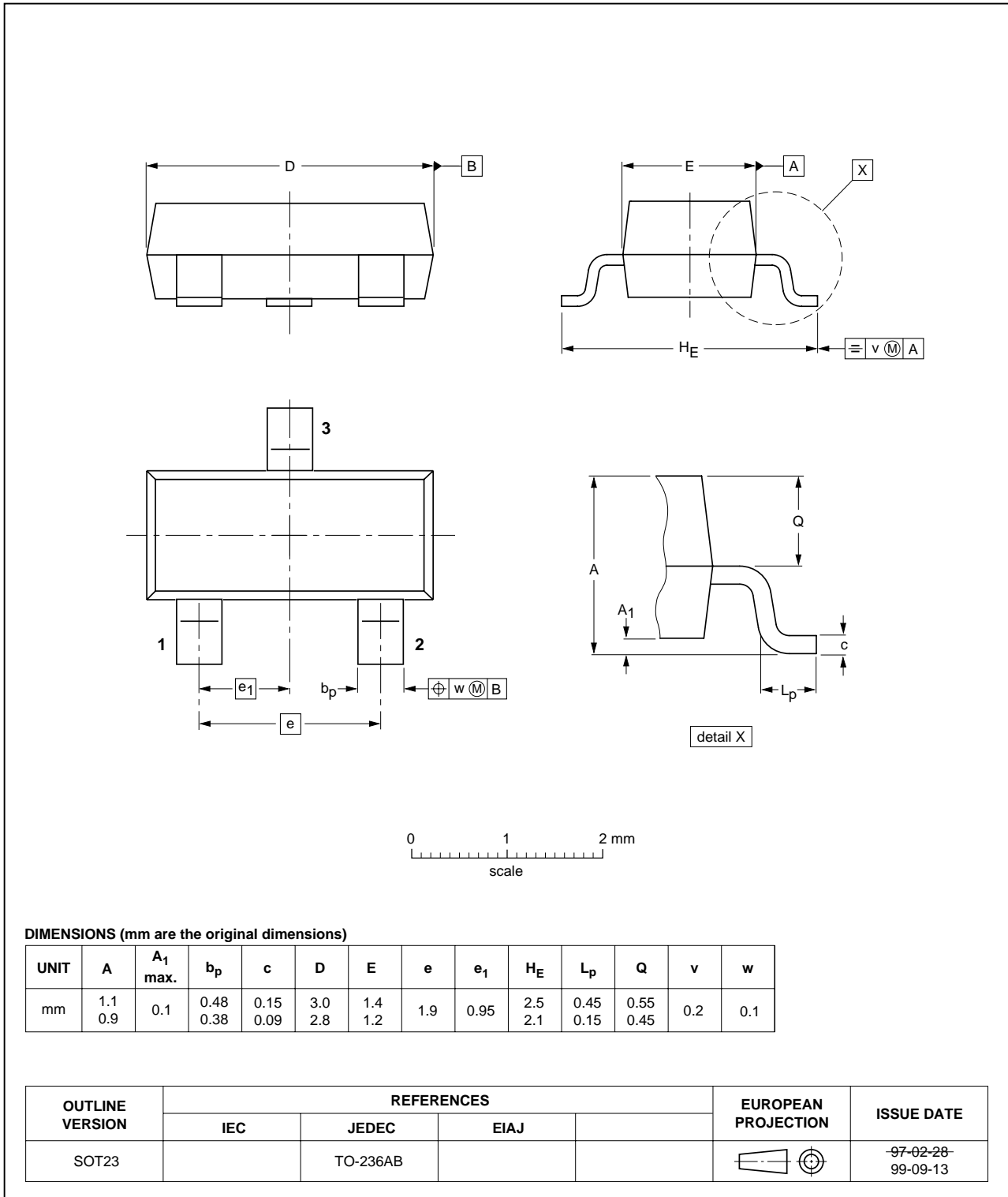
PNP high voltage transistors

BSR20; BSR20A

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



PNP high voltage transistors

BSR20; BSR20A

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.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

Notes

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2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.
3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

DEFINITIONS

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

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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Printed in The Netherlands

R75/04/pp8

Date of release: 2004 Mar 15

Document order number: 9397 750 12909

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