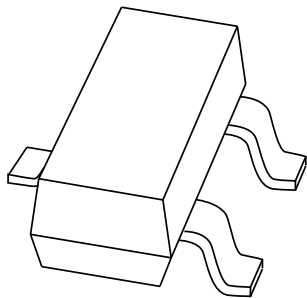


# DATA SHEET



## **BSR20; BSR20A** PNP high-voltage transistors

Product specification  
Supersedes data of September 1994  
File under Discrete Semiconductors, SC04

1997 Apr 21

# 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

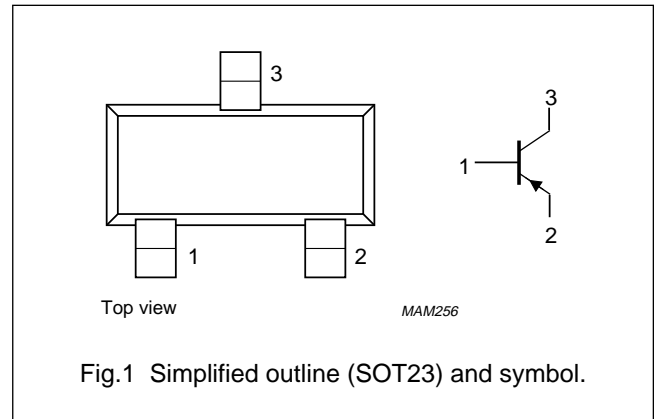
PNP high-voltage transistor in a SOT23 plastic package.  
NPN complements: BSR19 and BSR19A.

### MARKING

TYPE NUMBER	MARKING CODE
BSR20	T35
BSR20A	T36

### PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



### 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	$T_{amb} \leq 25\text{ }^\circ\text{C}$	–	250	mW
$h_{FE}$	DC current gain	$I_C = -10\text{ mA}; V_{CE} = -5\text{ V}$			
	BSR20		40	180	
	BSR20A		60	240	
$f_T$	transition frequency	$I_C = -10\text{ mA}; V_{CE} = -10\text{ V}; f = 100\text{ MHz}$	100	–	MHz

## PNP high-voltage transistors

## BSR20; BSR20A

**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage	open emitter			
	BSR20		–	–130	V
	BSR20A		–	–160	V
V <sub>CEO</sub>	collector-emitter voltage	open base			
	BSR20		–	–120	V
	BSR20A		–	–150	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	–5	V
I <sub>C</sub>	collector current (DC)		–	–300	mA
I <sub>CM</sub>	peak collector current		–	–600	mA
I <sub>B</sub>	base current		–	–100	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	–	250	mW
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C
T <sub>amb</sub>	operating ambient temperature		–65	+150	°C

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th j-a</sub>	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	$I_E = 0; V_{CB} = -100\text{ V}$	–	–100	nA
		$I_E = 0; V_{CB} = -100\text{ V}; T_{amb} = 100\text{ °C}$	–	–100	$\mu\text{A}$
$I_{CBO}$	collector cut-off current BSR20A	$I_E = 0; V_{CB} = -120\text{ V}$	–	–50	nA
		$I_E = 0; V_{CB} = -120\text{ V}; T_{amb} = 100\text{ °C}$	–	–50	$\mu\text{A}$
$I_{EBO}$	emitter cut-off current	$I_C = 0; V_{EB} = -4\text{ V}$	–	–50	nA
$h_{FE}$	DC current gain BSR20 BSR20A	$I_C = -1\text{ mA}; V_{CE} = -5\text{ V}$	30	–	
			50	–	
$h_{FE}$	DC current gain BSR20 BSR20A	$I_C = -10\text{ mA}; V_{CE} = -5\text{ V}$	40	180	
			60	240	
$h_{FE}$	DC current gain BSR20 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	$I_E = 0; V_{CB} = -10\text{ V}; f = 1\text{ MHz}$	–	6	pF
$f_T$	transition frequency BSR20 BSR20A	$I_C = -10\text{ mA}; V_{CE} = -10\text{ V};$ $f = 100\text{ MHz}$	100	400	MHz
			100	300	MHz

PNP high-voltage transistors

BSR20; BSR20A

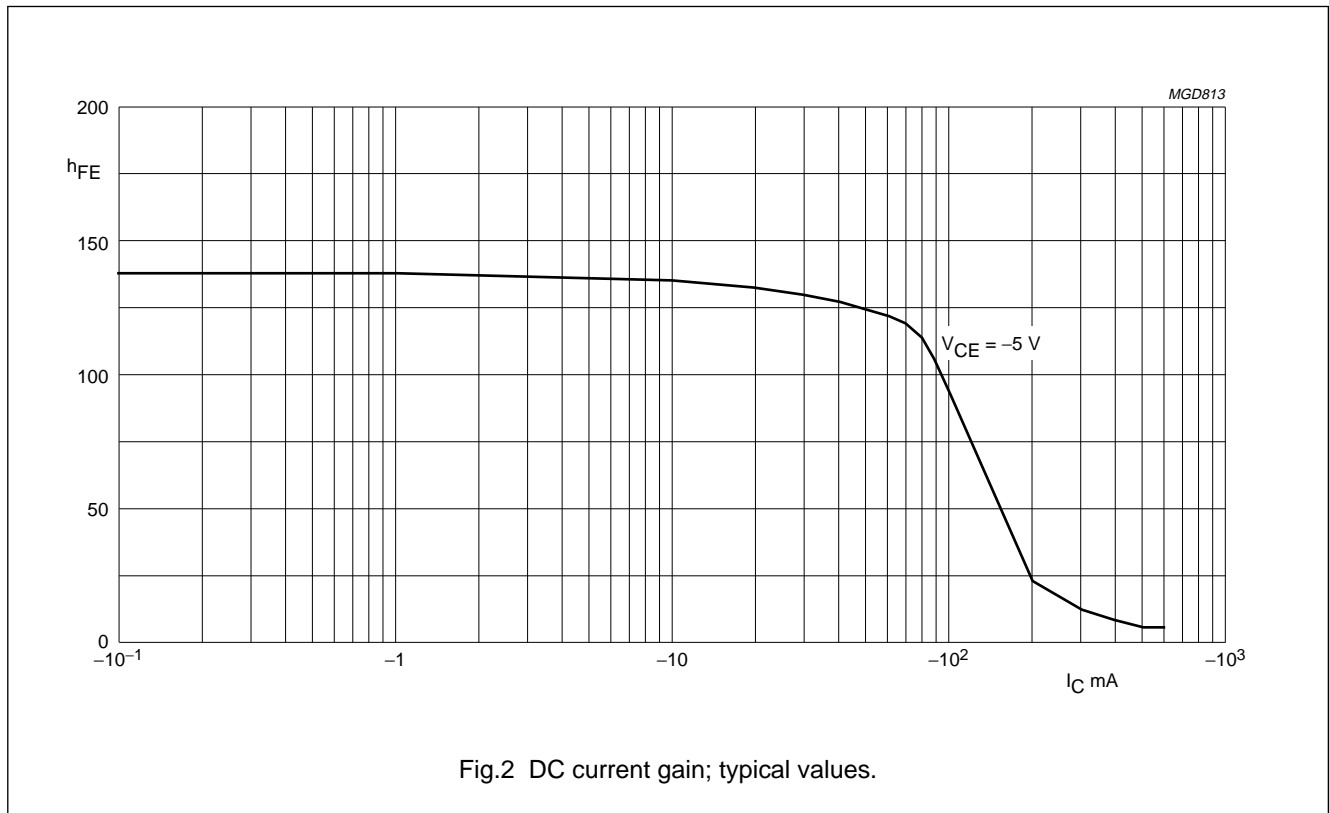


Fig.2 DC current gain; typical values.

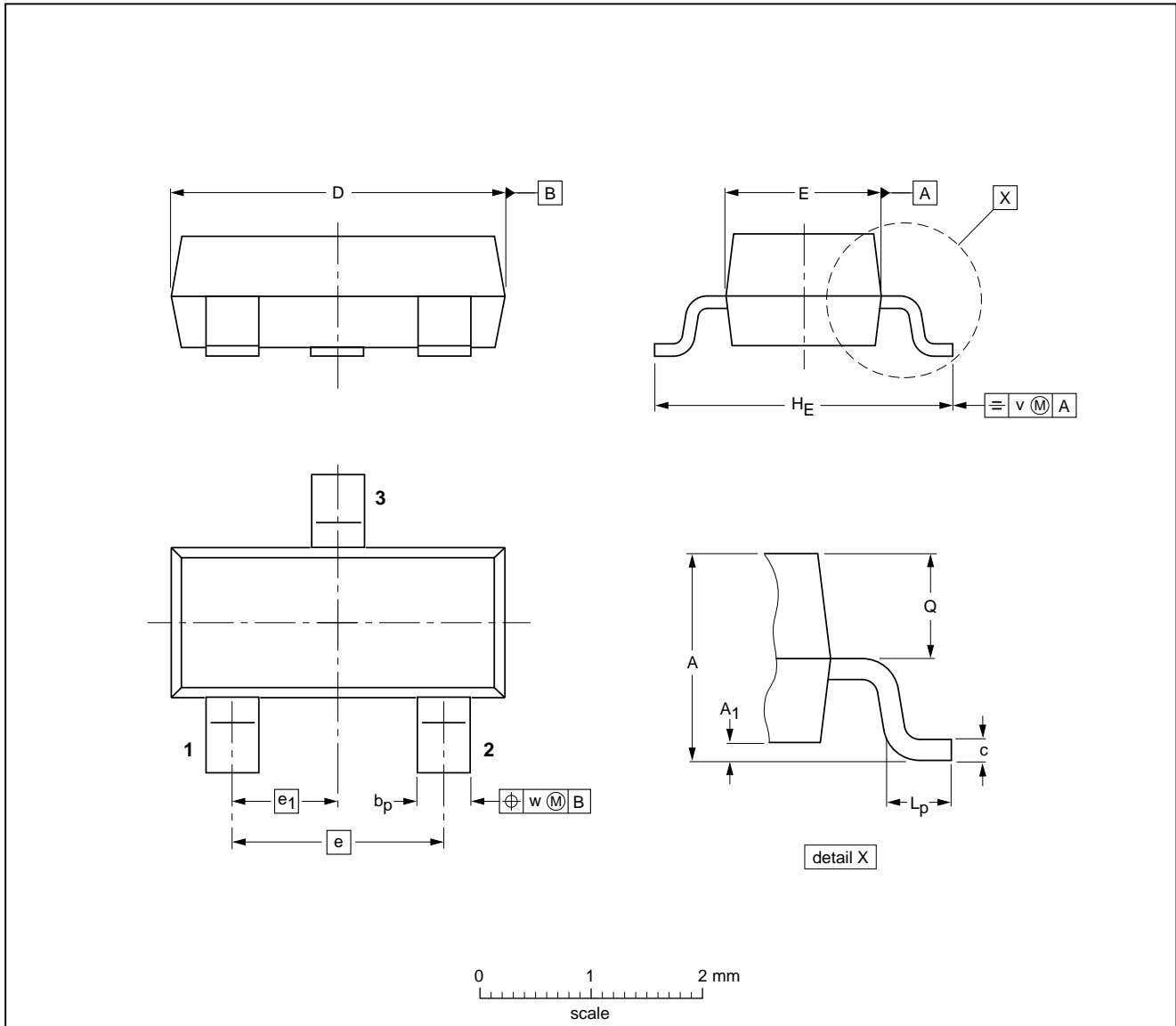
PNP high-voltage transistors

BSR20; BSR20A

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max.	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	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						97-02-28

## PNP high-voltage transistors

## BSR20; BSR20A

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<b>Data sheet status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). 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.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

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Printed in The Netherlands

117041/00/02/pp8

Date of release: 1997 Apr 21

Document order number: 9397 750 01403

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