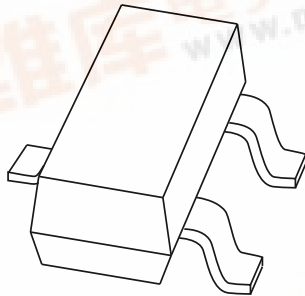


DISCRETE SEMICONDUCTORS

DATA SHEET



BSR20; BSR20A PNP high-voltage transistors

Product specification

1997 Apr 21

Supersedes data of September 1994

File under Discrete Semiconductors, SC04

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

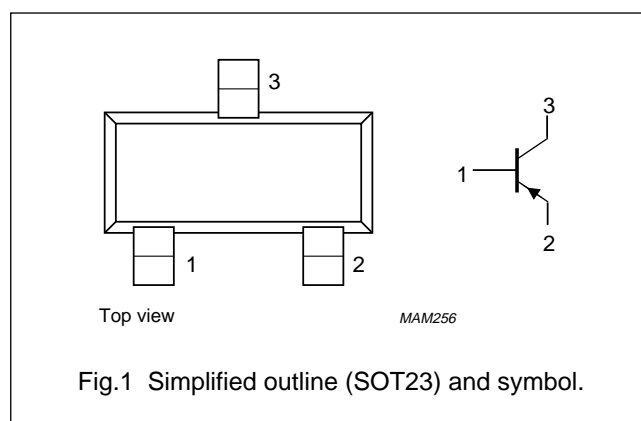
PNP high-voltage transistor in a SOT23 plastic package.
NPN complements: BSR19 and BSR19A.

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_{CB0}	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 _{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

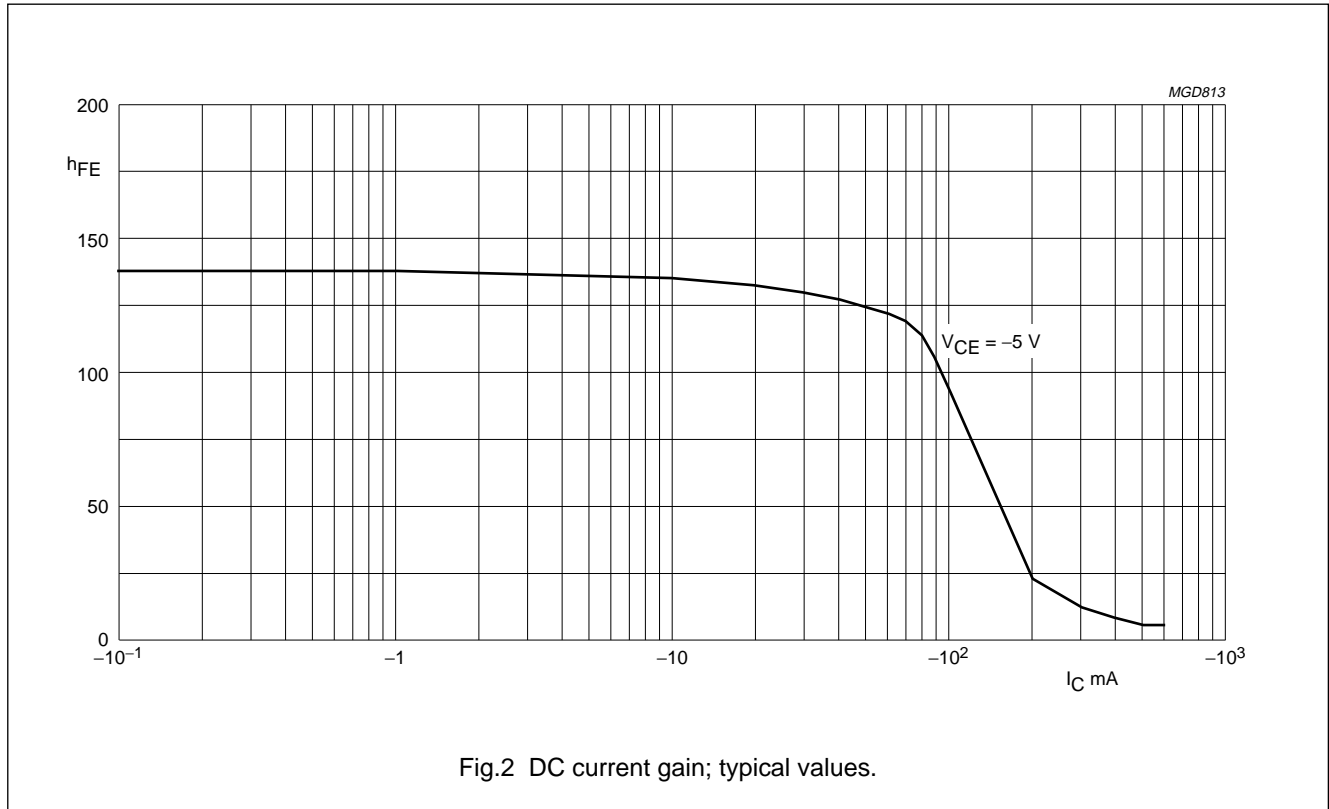
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current BSR20	$I_E = 0; V_{CB} = -100\text{ V}$	–	–100	nA
		$I_E = 0; V_{CB} = -100\text{ V}; T_{amb} = 100\text{ °C}$	–	–100	μA
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	μA
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



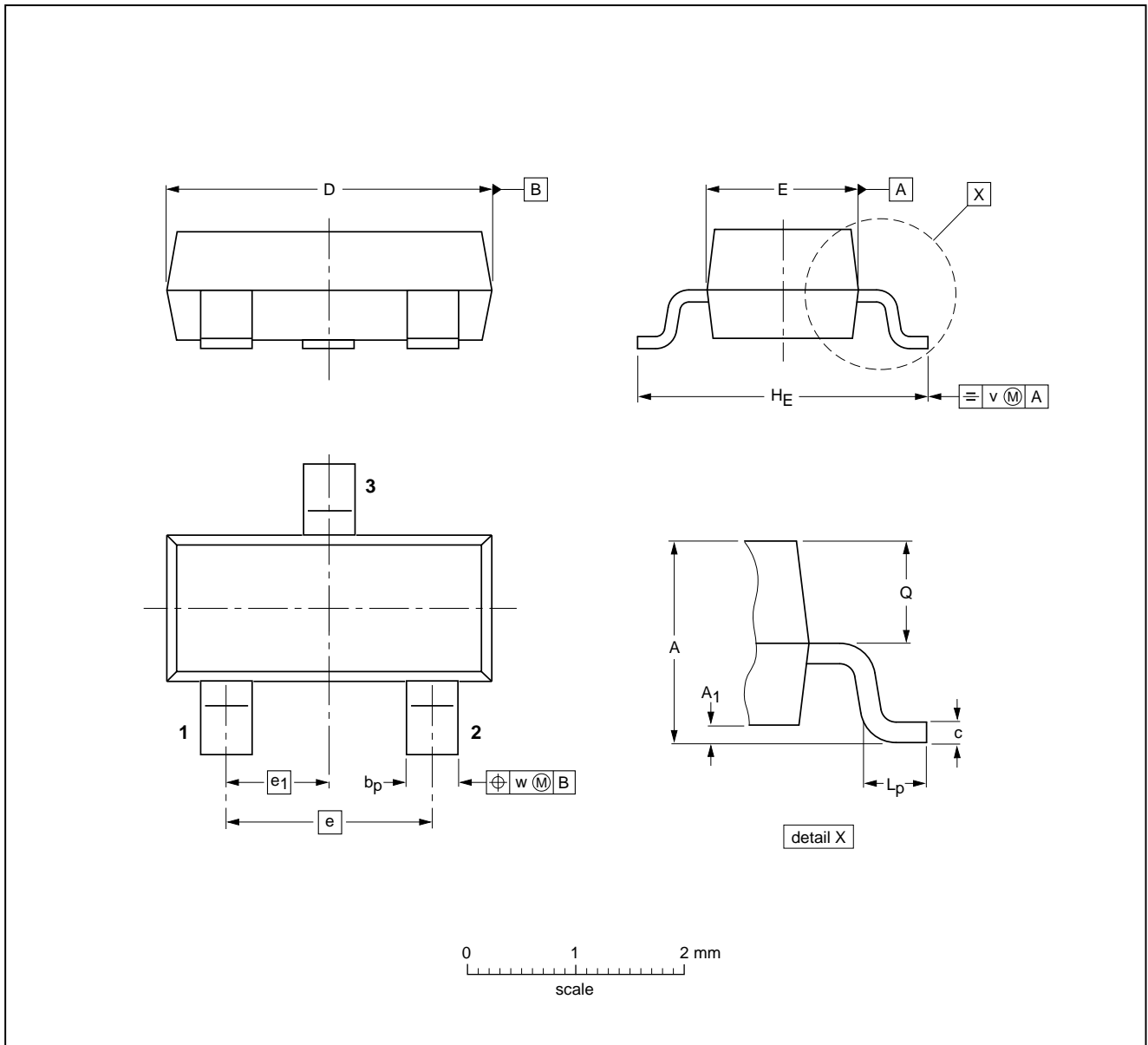
PNP high-voltage transistors

BSR20; BSR20A

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						97-02-28

PNP high-voltage transistors

BSR20; BSR20A

DEFINITIONS

Data sheet status	
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.
Limiting values	
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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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SCA54

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