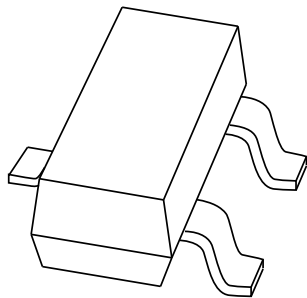


# DATA SHEET



## **BSR19; BSR19A** NPN high-voltage transistors

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

1997 Apr 21

# NPN high-voltage transistors

# BSR19; BSR19A

### FEATURES

- Low current (max. 300 mA)
- High voltage (max. 160 V).

### APPLICATIONS

- General purpose switching and amplification
- Especially used for telephony applications.

### DESCRIPTION

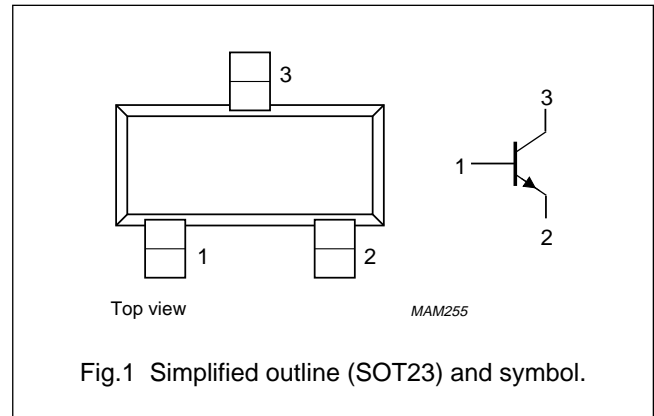
NPN high-voltage transistor in a SOT23 plastic package.  
PNP complements: BSR20 and BSR20A.

### MARKING

TYPE NUMBER	MARKING CODE
BSR19	U35
BSR19A	U36

### PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



### QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage	open emitter			
	BSR19		–	160	V
	BSR19A		–	180	V
V <sub>CEO</sub>	collector-emitter voltage	open base			
	BSR19		–	140	V
	BSR19A		–	160	V
I <sub>CM</sub>	peak collector current		–	600	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	–	250	mW
h <sub>FE</sub>	DC current gain	I <sub>C</sub> = 10 mA; V <sub>CE</sub> = 5 V			
	BSR19		60	–	
	BSR19A		80	–	
f <sub>T</sub>	transition frequency	I <sub>C</sub> = 10 mA; V <sub>CE</sub> = 10 V; f = 100 MHz	100	300	MHz

## NPN high-voltage transistors

## BSR19; BSR19A

**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			
	BSR19		–	160	V
	BSR19A		–	180	V
V <sub>CEO</sub>	collector-emitter voltage	open base			
	BSR19		–	140	V
	BSR19A		–	160	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	6	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 (DC)		–	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.

## NPN high-voltage transistors

## BSR19; BSR19A

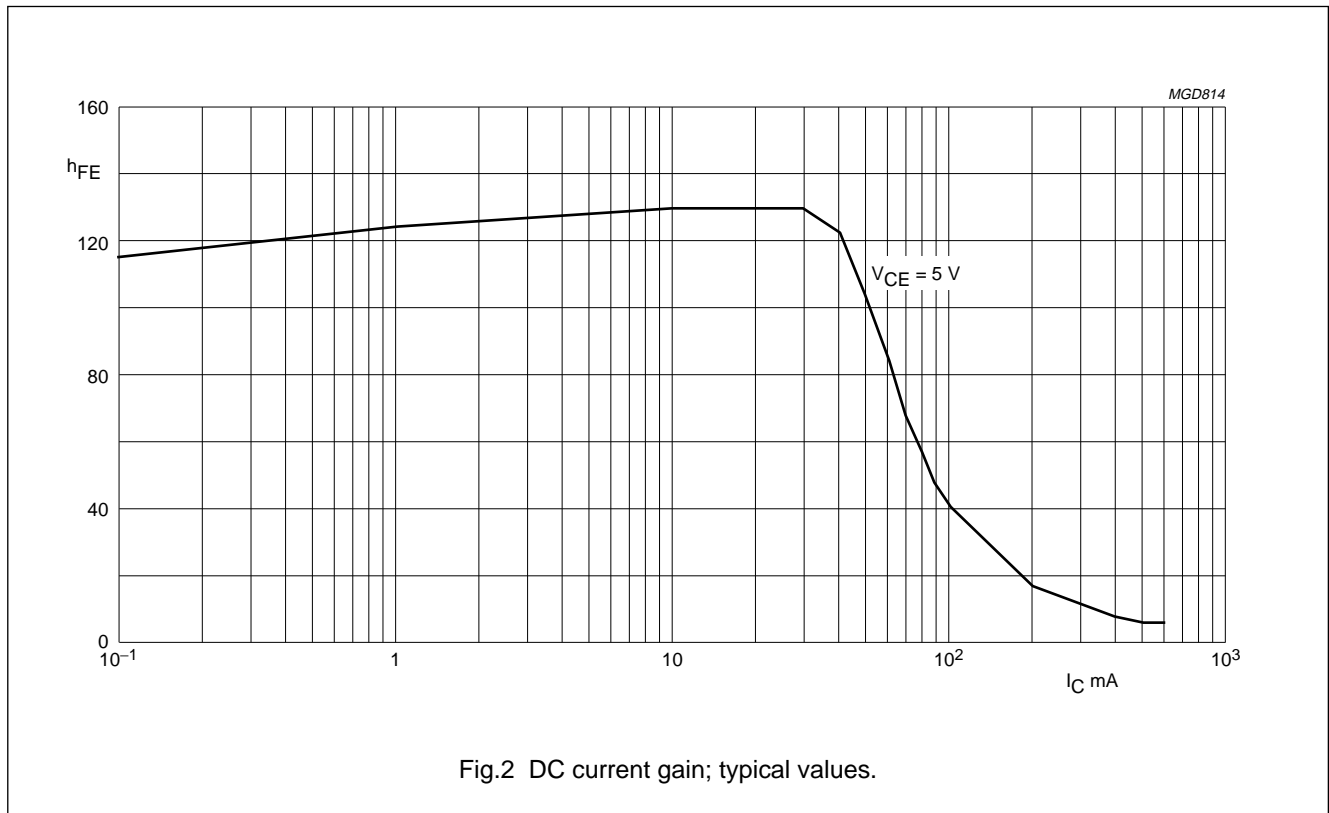
**CHARACTERISTICS**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{CBO}$	collector cut-off current BSR19	$I_E = 0; V_{CB} = 100\text{ V}$	–	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 BSR19A	$I_E = 0; V_{CB} = 120\text{ V}$	–	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 BSR19 BSR19A	$I_C = 1\text{ mA}; V_{CE} = 5\text{ V}$	60	–	
			80	–	
$h_{FE}$	DC current gain BSR19 BSR19A	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$	60	250	
			80	250	
$h_{FE}$	DC current gain BSR19 BSR19A	$I_C = 50\text{ mA}; V_{CE} = 5\text{ V}$	20	–	
			30	–	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 1\text{ mA}$	–	150	mV
$V_{CEsat}$	collector-emitter saturation voltage BSR19 BSR19A	$I_C = 50\text{ mA}; I_B = 5\text{ mA}$	–	250	mV
			–	200	mV
$C_c$	collector capacitance	$I_E = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	6	pF
$f_T$	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$	100	300	MHz

NPN high-voltage transistors

BSR19; BSR19A



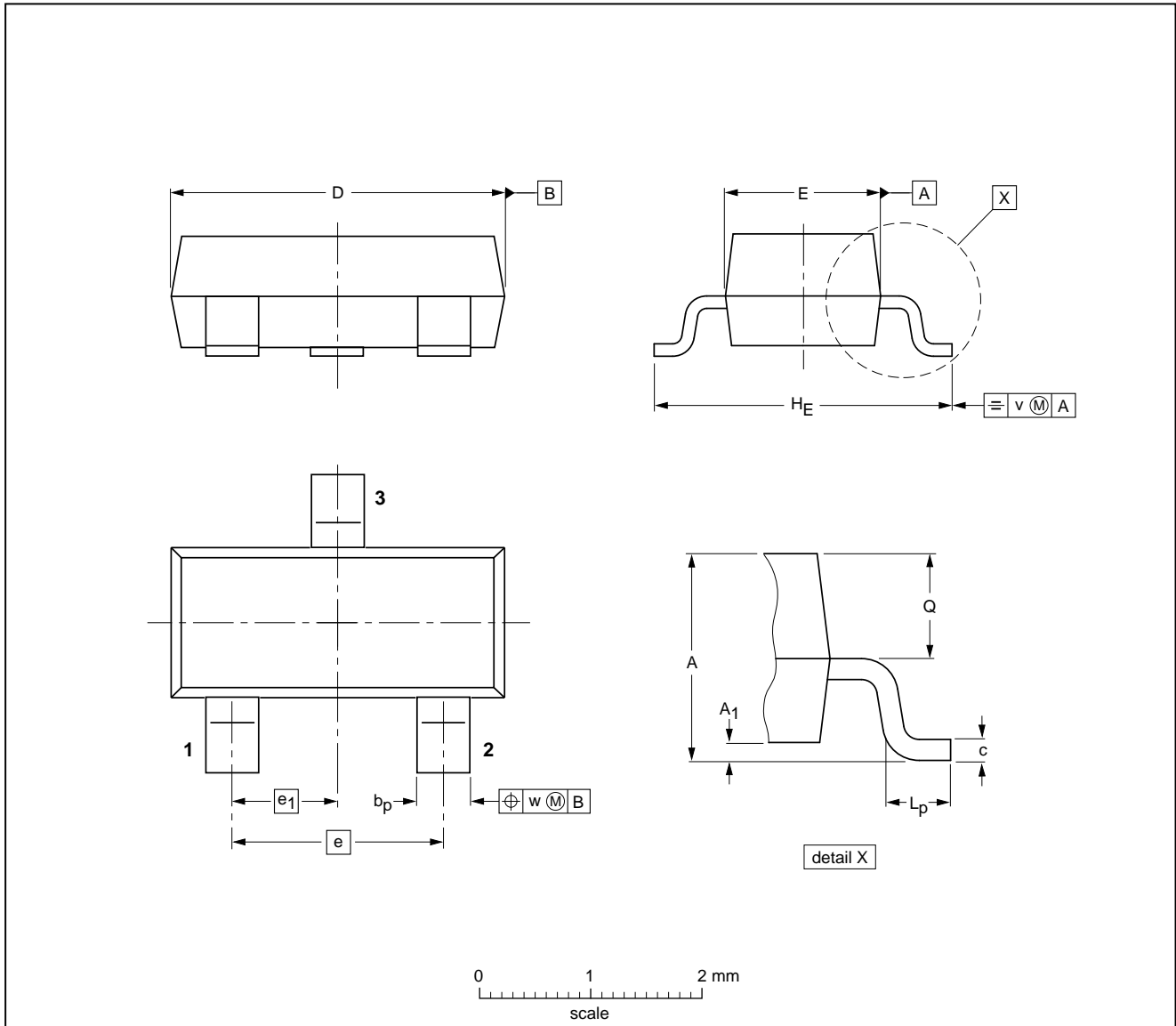
NPN high-voltage transistors

BSR19; BSR19A

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

## NPN high-voltage transistors

## BSR19; BSR19A

**DEFINITIONS**

<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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