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Should be replaced with:

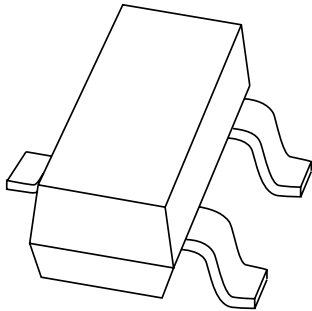
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If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)). Thank you for your cooperation and understanding,

Kind regards,

Team Nexperia

# DATA SHEET



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

Product data sheet  
Supersedes data of 2004 Jan 13

2004 Mar 15

# 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

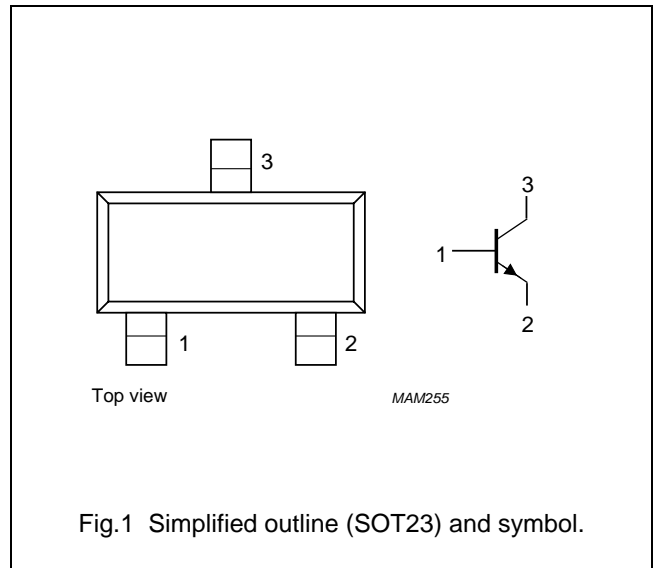
TYPE NUMBER	MARKING CODE <sup>(1)</sup>
BSR19	56* or U35
BSR19A	57* or U36

### 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
BSR19	–	plastic surface mounted package; 3 leads	SOT23
BSR19A	–	plastic surface mounted package; 3 leads	SOT23

## NPN high voltage transistors

## BSR19; BSR19A

## 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

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

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

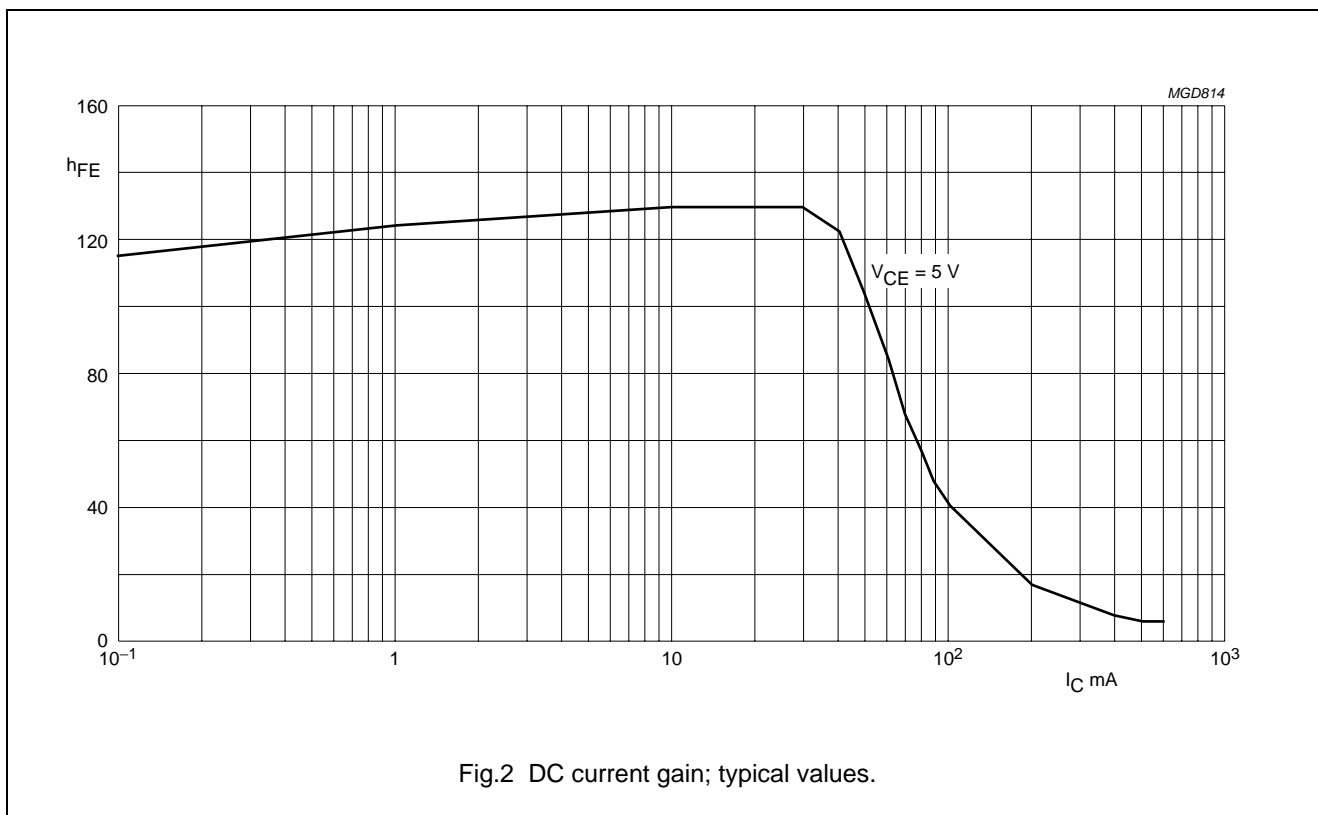
**CHARACTERISTICS**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{CBO}$	collector cut-off current BSR19	$I_E = 0\text{ A}; V_{CB} = 100\text{ V}$	–	100	nA
		$I_E = 0\text{ A}; V_{CB} = 100\text{ V}; T_{amb} = 100\text{ °C}$	–	100	$\mu\text{A}$
$I_{CBO}$	collector cut-off current BSR19A	$I_E = 0\text{ A}; V_{CB} = 120\text{ V}$	–	50	nA
		$I_E = 0\text{ A}; V_{CB} = 120\text{ V}; T_{amb} = 100\text{ °C}$	–	50	$\mu\text{A}$
$I_{EBO}$	emitter cut-off current	$I_C = 0\text{ A}; V_{EB} = 4\text{ V}$	–	50	nA
$h_{FE}$	DC current gain BSR19 BSR19A	$I_C = 1\text{ mA}; V_{CE} = 5\text{ V}$	60	–	
			80	–	
	DC current gain BSR19 BSR19A	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$	60	250	
			80	250	
	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	$I_E = 0\text{ A}; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	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



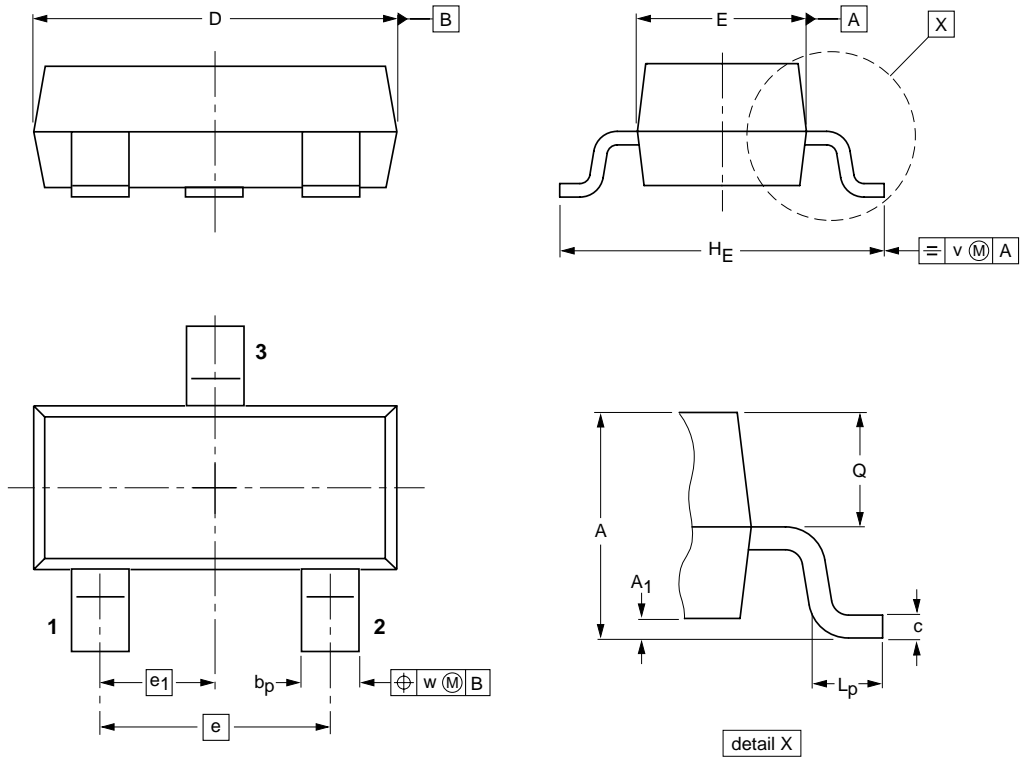
NPN high voltage transistors

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	JEITA			
SOT23		TO-236AB				04-11-04 06-03-16

## NPN high voltage transistors

## BSR19; BSR19A

## DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	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>.

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# ***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](mailto:salesaddresses@nxp.com)

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