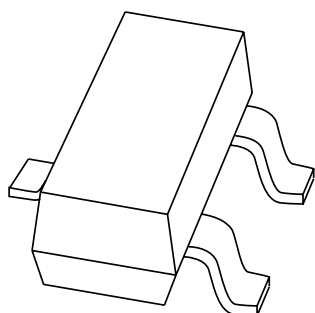


DATA SHEET



BSR19; BSR19A NPN high voltage transistors

Product specification
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

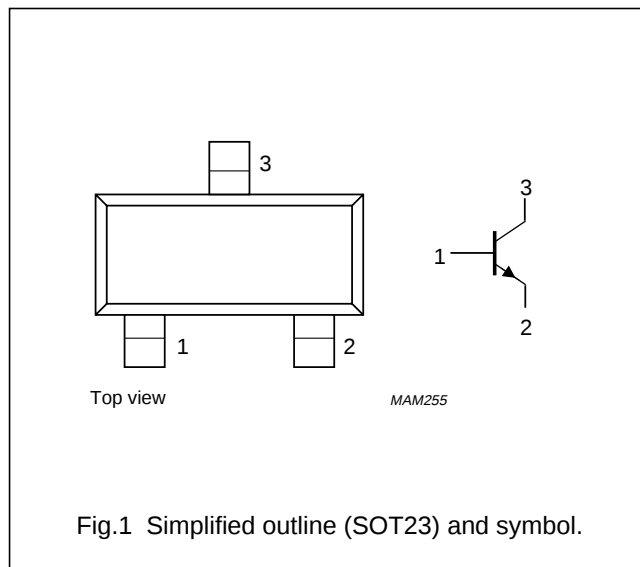
TYPE NUMBER	MARKING CODE ⁽¹⁾
BSR19	56* or U35
BSR19A	57* or U36

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_{CBO}	collector-base voltage	open emitter			
	BSR19		–	160	V
	BSR19A		–	180	V
V_{CEO}	collector-emitter voltage	open base			
	BSR19		–	140	V
	BSR19A		–	160	V
I_{CM}	peak collector current		–	600	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	–	250	mW
h_{FE}	DC current gain	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$			
	BSR19		60	–	
	BSR19A		80	–	
f_T	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$	100	300	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			
	BSR19		–	160	V
	BSR19A		–	180	V
V_{CEO}	collector-emitter voltage	open base			
	BSR19		–	140	V
	BSR19A		–	160	V
V_{EBO}	emitter-base voltage	open collector	–	6	V
I_C	collector current (DC)		–	300	mA
I_{CM}	peak collector current		–	600	mA
I_B	base current (DC)		–	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	–	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.

NPN high voltage transistors

BSR19; BSR19A

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current BSR19	$I_{\text{E}} = 0\text{ A}; V_{\text{CB}} = 100\text{ V}$	–	100	nA
		$I_{\text{E}} = 0\text{ A}; V_{\text{CB}} = 100\text{ V}; T_{\text{amb}} = 100\text{ }^{\circ}\text{C}$	–	100	μA
I_{CBO}	collector cut-off current BSR19A	$I_{\text{E}} = 0\text{ A}; V_{\text{CB}} = 120\text{ V}$	–	50	nA
		$I_{\text{E}} = 0\text{ A}; V_{\text{CB}} = 120\text{ V}; T_{\text{amb}} = 100\text{ }^{\circ}\text{C}$	–	50	μA
I_{EBO}	emitter cut-off current	$I_{\text{C}} = 0\text{ A}; V_{\text{EB}} = 4\text{ V}$	–	50	nA
h_{FE}	DC current gain BSR19	$I_{\text{C}} = 1\text{ mA}; V_{\text{CE}} = 5\text{ V}$	60	–	
	BSR19A		80	–	
	DC current gain BSR19	$I_{\text{C}} = 10\text{ mA}; V_{\text{CE}} = 5\text{ V}$	60	250	
	BSR19A		80	250	
	DC current gain BSR19	$I_{\text{C}} = 50\text{ mA}; V_{\text{CE}} = 5\text{ V}$	20	–	
	BSR19A		30	–	
V_{CEsat}	collector-emitter saturation voltage	$I_{\text{C}} = 10\text{ mA}; I_{\text{B}} = 1\text{ mA}$	–	150	mV
V_{CEsat}	collector-emitter saturation voltage BSR19	$I_{\text{C}} = 50\text{ mA}; I_{\text{B}} = 5\text{ mA}$	–	250	mV
			–	200	mV
C_{c}	collector capacitance	$I_{\text{E}} = 0\text{ A}; V_{\text{CB}} = 10\text{ V}; f = 1\text{ MHz}$	–	6	pF
f_{T}	transition frequency	$I_{\text{C}} = 10\text{ mA}; V_{\text{CE}} = 10\text{ V}; f = 100\text{ MHz}$	100	300	MHz

NPN high voltage transistors

BSR19; BSR19A

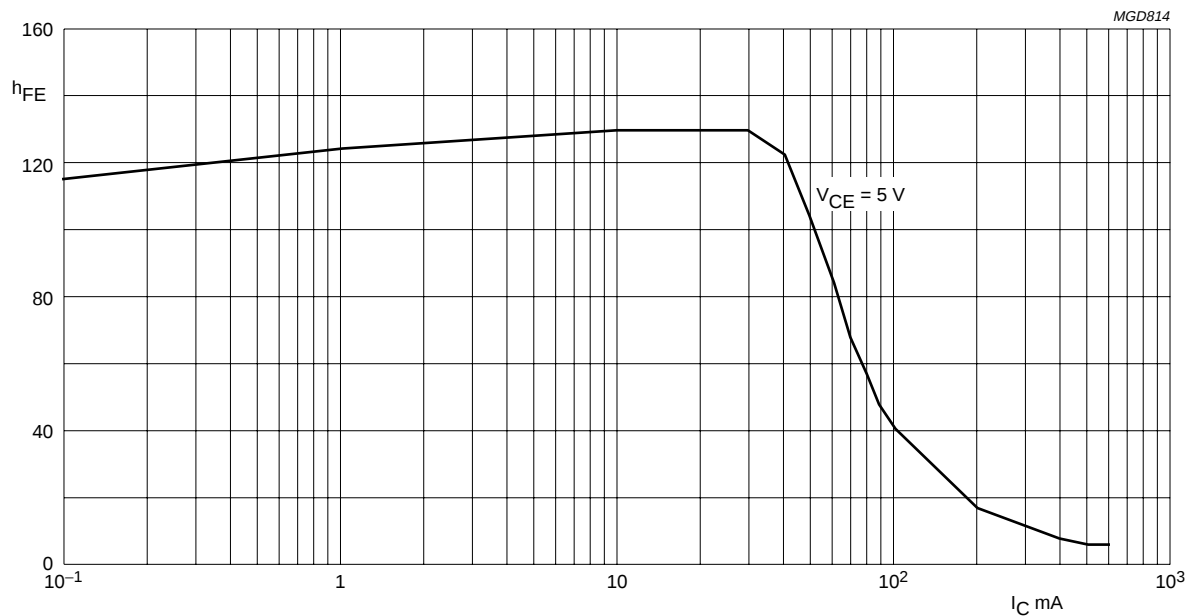


Fig.2 DC current gain; typical values.

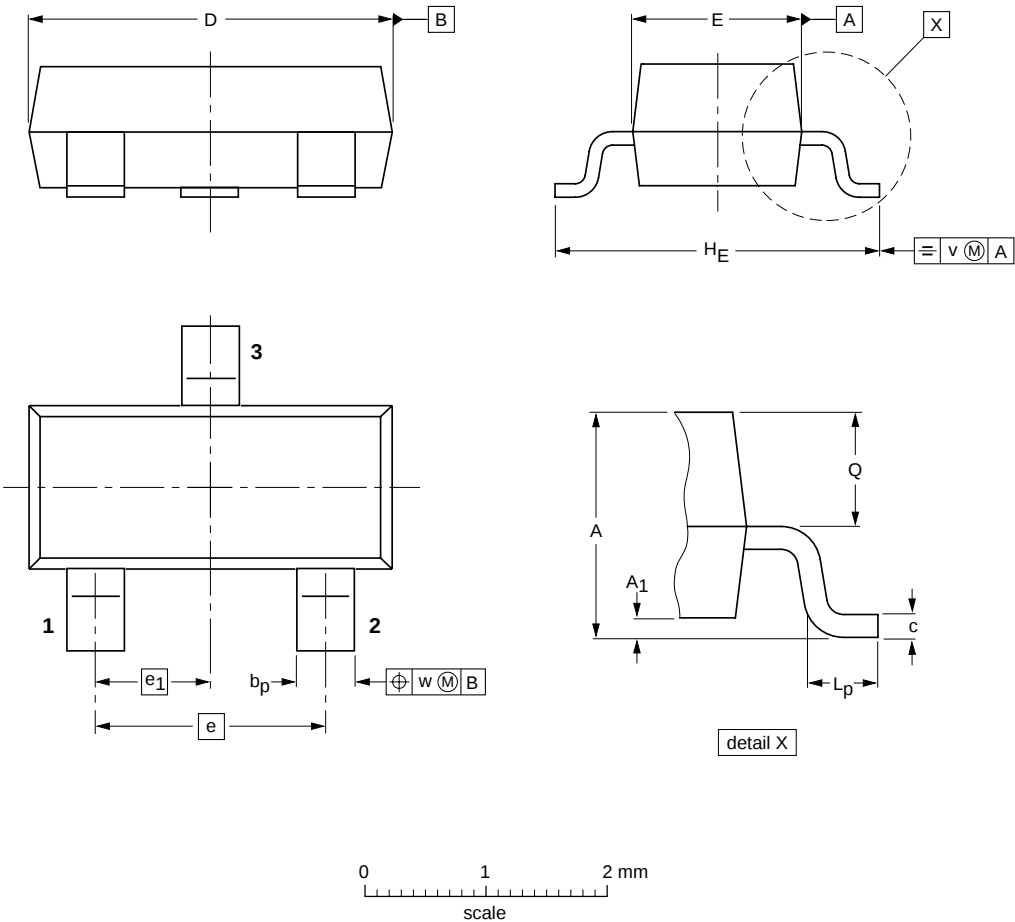
NPN high voltage transistors

BSR19; BSR19A

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		TO-236AB				97-02-28 99-09-13

NPN high voltage transistors

BSR19; BSR19A

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.

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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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