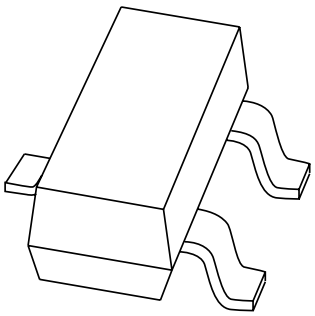
DATA SHEET



BSR19; BSR19A
NPN high voltage transistors

Product specification
Supersedes data of 2004 Jan 13

2004 Mar 15

Philips
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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

1. * = p : Made in Hong Kong.
   * = t : Made in Malaysia.
   * = W : Made in China.

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

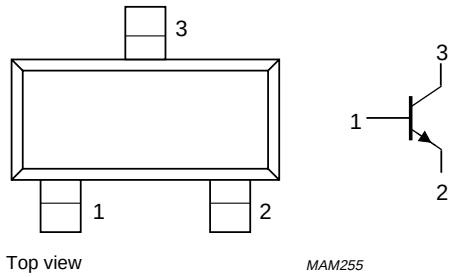


Fig.1 Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BSR19	–	plastic surface mounted package; 3 leads	SOT23
BSR19A	–	plastic surface mounted package; 3 leads	SOT23

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	$T_{amb} \leq 25$ °C	–	250	mW
h_{FE}	DC current gain	I_C = 10 mA; V_{CE} = 5 V			
	BSR19		60	–	
	BSR19A		80	–	
f_T	transition frequency	I_C = 10 mA; V_{CE} = 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_{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	$T_{amb} \leq 25$ °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.

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current				
	BSR19	I_E = 0 A; V_{CB} = 100 V	–	100	nA
		I_E = 0 A; V_{CB} = 100 V; T_{amb} = 100 °C	–	100	µA
I_{CBO}	collector cut-off current				
	BSR19A	I_E = 0 A; V_{CB} = 120 V	–	50	nA
		I_E = 0 A; V_{CB} = 120 V; T_{amb} = 100 °C	–	50	µA
I_{EBO}	emitter cut-off current	I_C = 0 A; V_{EB} = 4 V	–	50	nA
h_{FE}	DC current gain	I_C = 1 mA; V_{CE} = 5 V			
	BSR19		60	–	
	BSR19A		80	–	
	DC current gain	I_C = 10 mA; V_{CE} = 5 V			
	BSR19		60	250	
	BSR19A		80	250	
	DC current gain	I_C = 50 mA; V_{CE} = 5 V			
	BSR19		20	–	
	BSR19A		30	–	
V_{CEsat}	collector-emitter saturation voltage	I_C = 10 mA; I_B = 1 mA	–	150	mV
V_{CEsat}	collector-emitter saturation voltage	I_C = 50 mA; I_B = 5 mA			
	BSR19		–	250	mV
	BSR19A		–	200	mV
C_c	collector capacitance	I_E = 0 A; V_{CB} = 10 V; f = 1 MHz	–	6	pF
f_T	transition frequency	I_C = 10 mA; V_{CE} = 10 V; f = 100 MHz	100	300	MHz

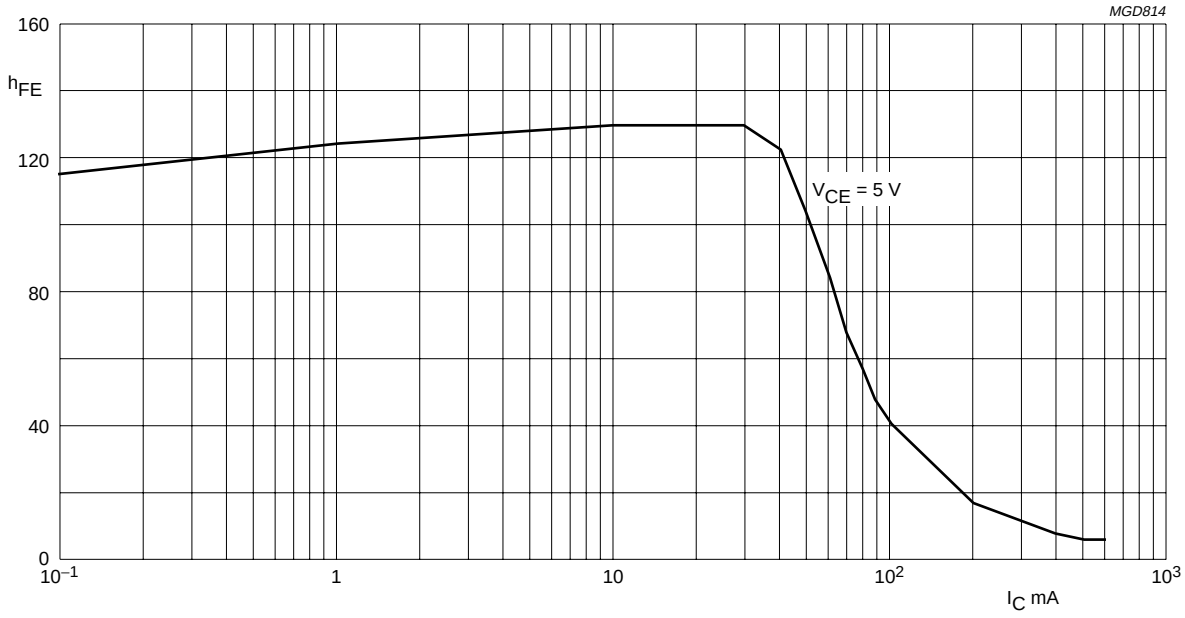
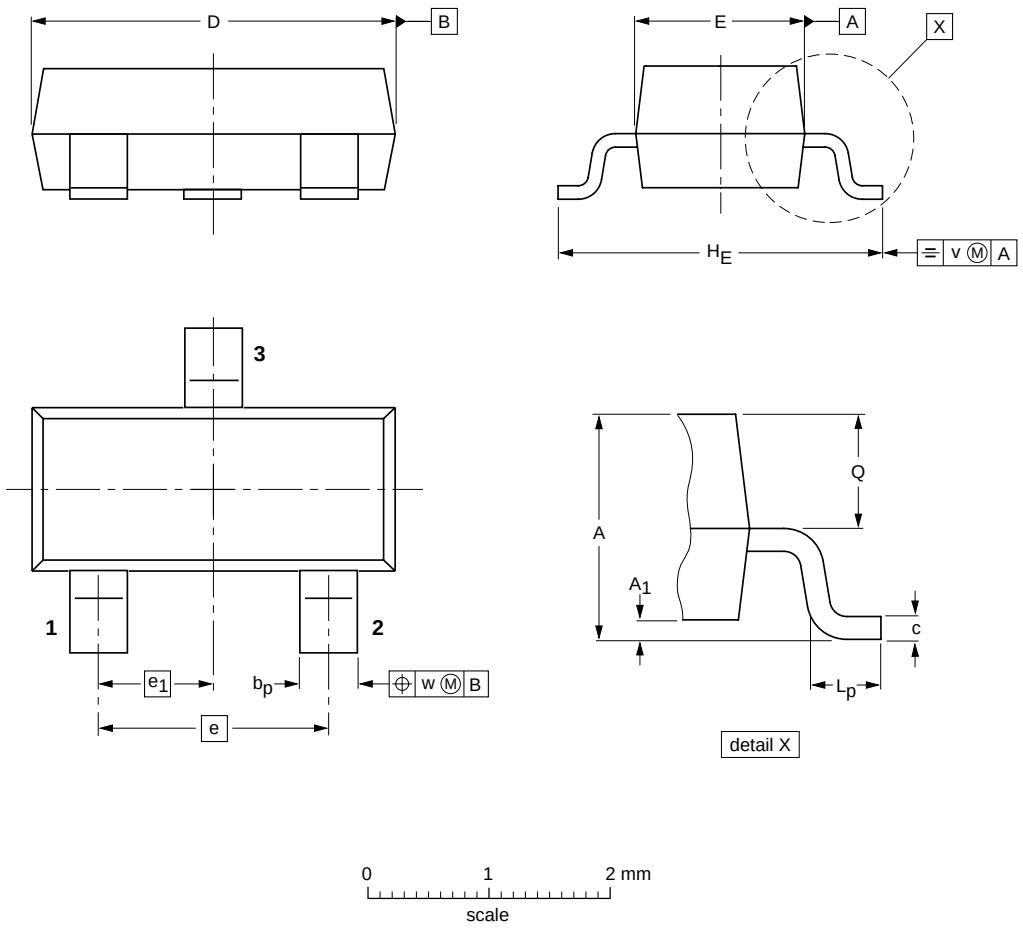


Fig.2 DC current gain; typical values.

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

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.
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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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