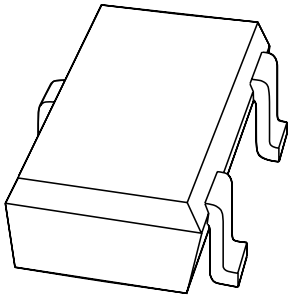
DATA SHEET



BFS20W
NPN medium frequency transistor

Product specification

1999 Apr 21

Philips
Semiconductors

PHILIPS

NPN medium frequency transistor BFS20W

FEATURES

- Low current (max. 25 mA)
- Low voltage (max. 20 V).
- Very low feedback capacitance (typ. 350 fF).

APPLICATIONS

- IF and VHF applications in thick and thin-film circuits.

DESCRIPTION

NPN medium frequency transistor in a SOT323 (SC-70) plastic package.

MARKING

TYPE NUMBER	MARKING CODE(1)
BFS20W	N1∗

Note

1. ∗ = -: Made in Hong Kong.
   ∗ = t: Made in Malaysia.

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

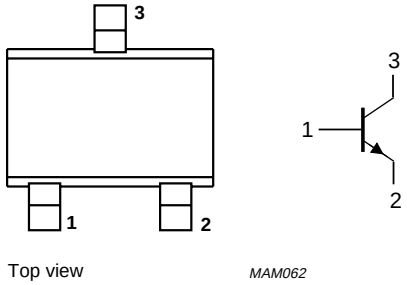


Fig.1 Simplified outline (SOT323; SC-70) and symbol.

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	–	30	V
V_{CEO}	collector-emitter voltage	open base	–	20	V
V_{EBO}	emitter-base voltage	open collector	–	4	V
I_C	collector current (DC)		–	25	mA
I_{CM}	peak collector current		–	25	mA
I_{BM}	peak base current		–	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; note 1	–	200	mW
T_{stg}	storage temperature		−65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		−65	+150	°C

Note

1. Refer to SOT323 (SC-70) standard mounting conditions.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	625	K/W

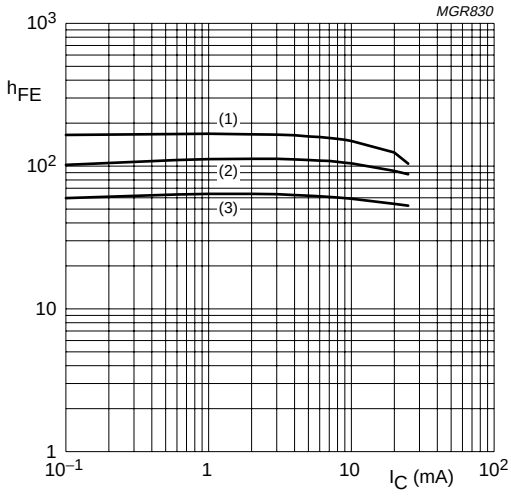
Note

1. Refer to SOT323 (SC-70) standard mounting conditions.

CHARACTERISTICS

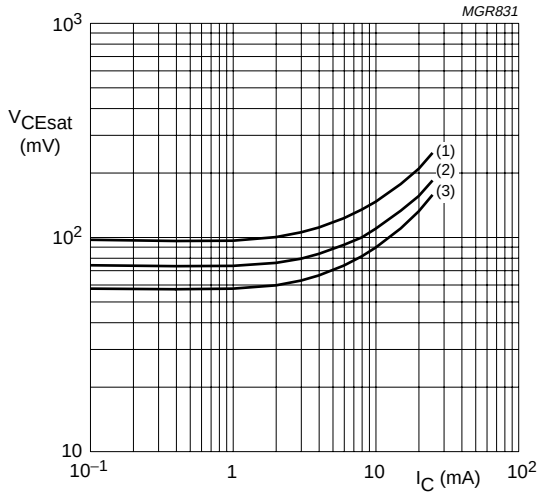
T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current	I_E = 0; V_{CB} = 20 V	–	–	100	nA
		I_E = 0; V_{CB} = 20 V; T_j = 100 °C	–	–	10	µA
I_{EBO}	emitter cut-off current	I_C = 0; V_{EB} = 4 V	–	–	100	nA
h_{FE}	DC current gain	I_C = 7 mA; V_{CE} = 10 V	40	85	–	
V_{BE}	base-emitter voltage	I_C = 7 mA; V_{CE} = 10 V	–	740	900	mV
C_c	collector capacitance	$I_E = i_e$ = 0; V_{CB} = 10 V; f = 1 MHz	–	1	–	pF
C_{re}	feedback capacitance	I_C = 0; V_{CE} = 10 V; f = 1 MHz	–	350	–	fF
f_T	transition frequency	I_C = 5 mA; V_{CE} = 10 V; f = 100 MHz	360	470	–	MHz



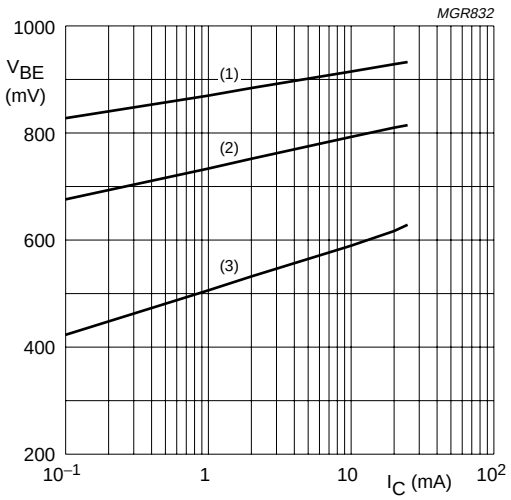
V_{CE} = 10 V.
(1) T_{amb} = 150 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

Fig.2 DC current gain as a function of collector current; typical values.



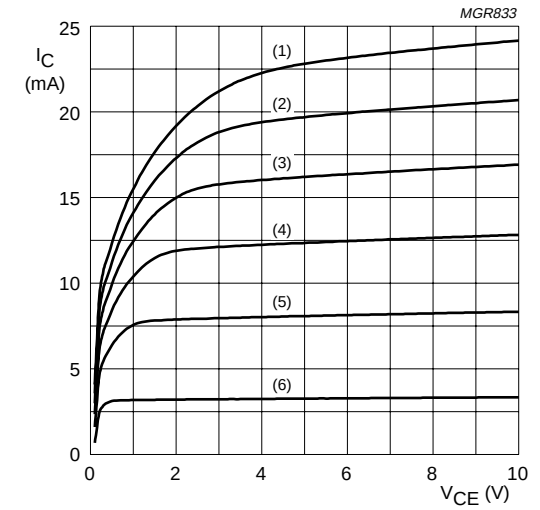
I_C/I_B = 10.
(1) T_{amb} = 100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = –55 °C.

Fig.3 Collector-emitter saturation voltage as a function of collector current; typical values.



V_{CE} = 10 V.
(1) T_{amb} = –100 °C.
(2) T_{amb} = 25 °C.
(3) T_{amb} = 150 °C.

Fig.4 Base-emitter voltage as a function of collector current; typical values.

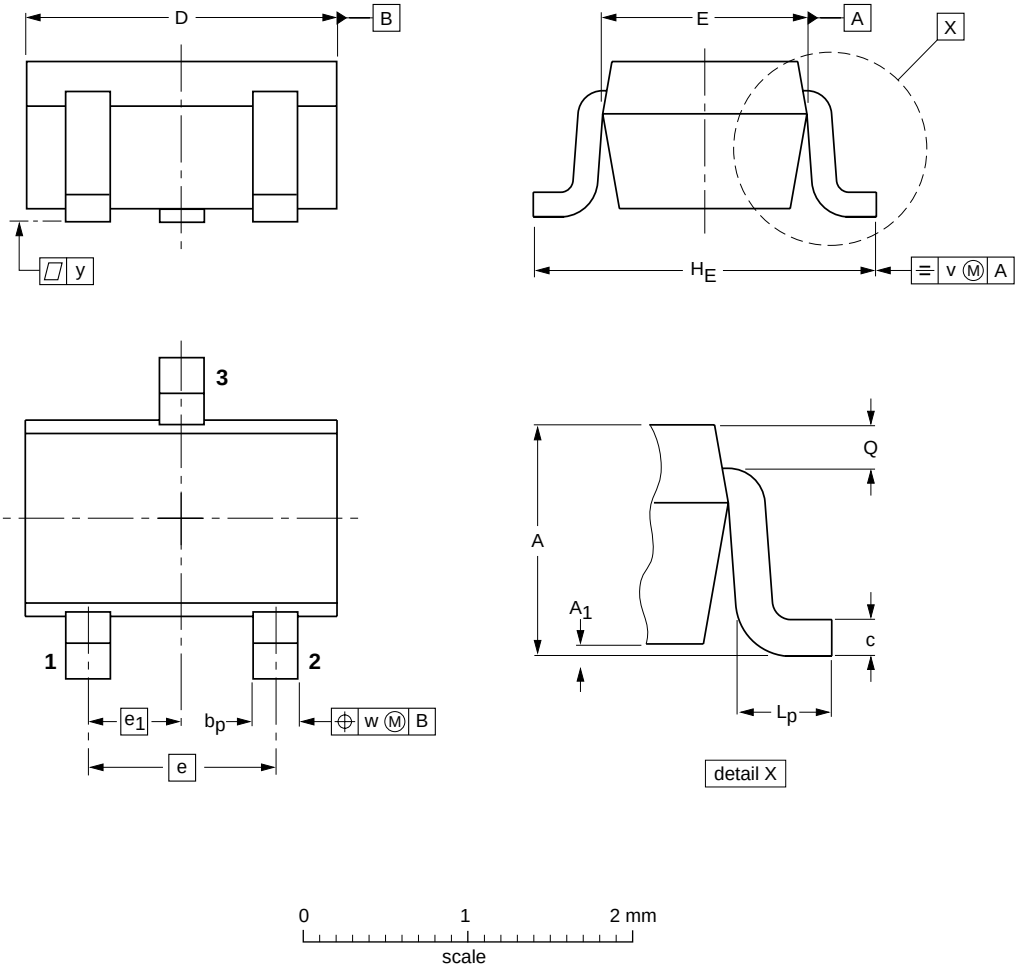


T_{amb} = 25 °C.
(1) I_B = 280 µA.
(2) I_B = 230 µA.
(3) I_B = 180 µA.
(4) I_B = 130 µA.
(5) I_B = 80 µA.
(6) I_B = 30 µA.

Fig.5 Collector current as a function of collector-emitter voltage; typical values.

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads **SOT323**



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 0.8	0.1	0.4 0.3	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.23 0.13	0.2	0.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT323			SC-70			97-02-28

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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