

# **DATA SHEET**

**BFS17W**  
**NPN 1 GHz wideband transistor**

Product specification  
Supersedes data of November 1992

1995 Sep 04



## NPN 1 GHz wideband transistor

BFS17W

## APPLICATIONS

Primarily intended as a mixer, oscillator and IF amplifier in UHF and VHF tuners.

## DESCRIPTION

Silicon NPN transistor in a plastic SOT323 (S-mini) package. The BFS17W uses the same crystal as the SOT23 version, BFS17.

## PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

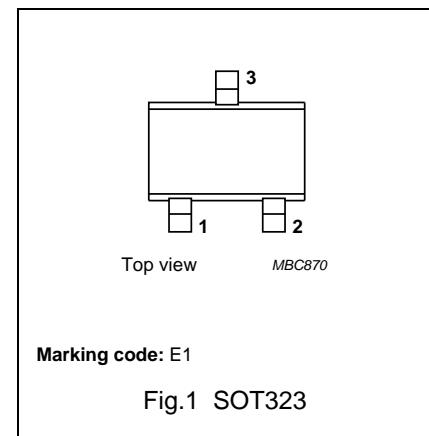


Fig.1 SOT323

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CBO}$	collector-base voltage		–	–	25	V
$V_{CEO}$	collector-emitter voltage		–	–	15	V
$I_C$	DC collector current		–	–	50	mA
$P_{tot}$	total power dissipation	up to $T_s = 118^\circ\text{C}$ ; note 1	–	–	300	mW
$h_{FE}$	DC current gain	$I_C = 2 \text{ mA}; V_{CE} = 1 \text{ V}$	25	90	–	
$f_T$	transition frequency	$I_C = 25 \text{ mA}; V_{CE} = 5 \text{ V}$	–	1.6	–	GHz
$C_c$	collector capacitance	$I_E = 0; V_{CB} = 10 \text{ V}; f = 1 \text{ MHz}$	–	0.8	1.5	pF
$C_{re}$	feedback capacitance	$I_C = 1 \text{ mA}; V_{CE} = 5 \text{ V}; f = 1 \text{ MHz}$	–	0.75	–	pF
$T_j$	junction temperature		–	–	175	°C

## Note

1.  $T_s$  is the temperature at the soldering point of the collector pin.

## 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	–	25	V
$V_{CEO}$	collector-emitter voltage	open base	–	15	V
$V_{EBO}$	emitter-base voltage	open collector	–	2.5	V
$I_C$	collector current (DC)		–	50	mA
$P_{tot}$	total power dissipation	$T_s = 118^\circ\text{C}$ ; note 1	–	300	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	175	°C

## Note

1.  $T_s$  is the temperature at the soldering point of the collector pin.

## NPN 1 GHz wideband transistor

BFS17W

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-s}$	thermal resistance from junction to soldering point	up to $T_s = 118^\circ\text{C}$ ; note 1	190	K/W

## Note

- $T_s$  is the temperature at the soldering point of the collector pin.

## CHARACTERISTICS

 $T_j = 25^\circ\text{C}$  (unless otherwise specified).

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0$ ; $V_{CB} = 10\text{ V}$	—	—	10	nA
$h_{FE}$	DC current gain	$I_C = 2\text{ mA}$ ; $V_{CE} = 1\text{ V}$	25	90	—	
$f_T$	transition frequency	$I_C = 25\text{ mA}$ ; $V_{CE} = 5\text{ V}$ ; $f = 500\text{ MHz}$	—	1.6	—	GHz
$C_c$	collector capacitance	$I_E = i_e = 0$ ; $V_{CB} = 10\text{ V}$ ; $f = 1\text{ MHz}$	—	0.8	1.5	pF
$C_e$	emitter capacitance	$I_C = i_c = 0$ ; $V_{EB} = 0.5\text{ V}$ ; $f = 1\text{ MHz}$	—	2	—	pF
$C_{re}$	feedback capacitance	$I_B = i_b = 0$ ; $V_{CE} = 5\text{ V}$ ; $f = 1\text{ MHz}$ ; $T_{amb} = 25^\circ\text{C}$	—	0.75	—	pF
$F$	noise figure	$I_C = 2\text{ mA}$ ; $V_{CE} = 5\text{ V}$ ; $f = 500\text{ MHz}$ ; $\Gamma_S = \Gamma_{opt}$	—	4.5	—	dB

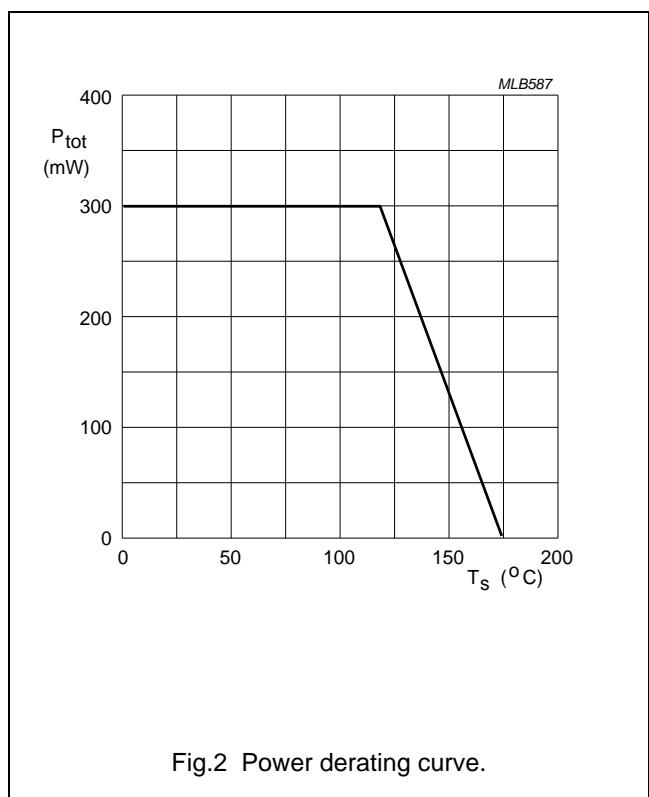


Fig.2 Power derating curve.

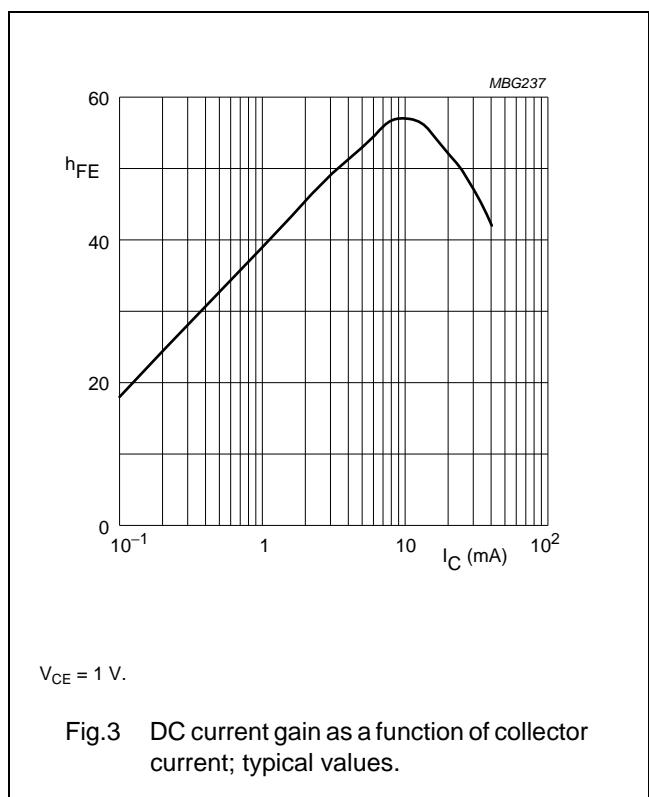


Fig.3 DC current gain as a function of collector current; typical values.

## NPN 1 GHz wideband transistor

BFS17W

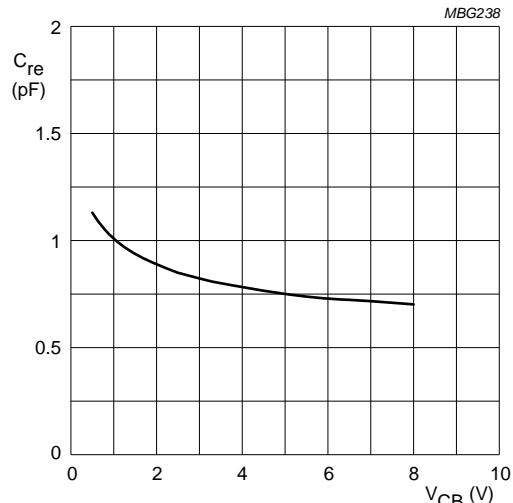
 $I_B = i_b = 0$ ;  $f = 1$  MHz.

Fig.4 Feedback capacitance as a function of collector-base voltage; typical values.

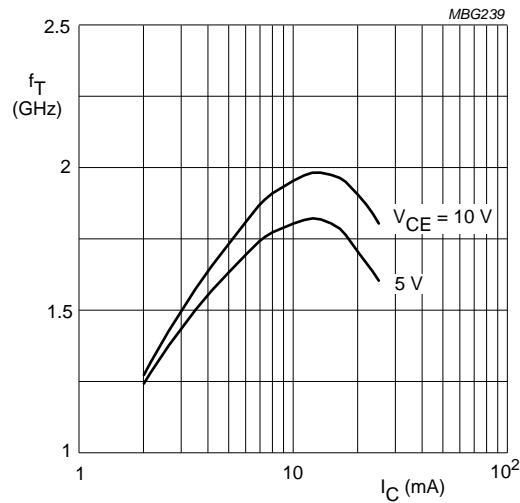
 $T_{amb} = 25$  °C;  $f = 500$  MHz.

Fig.5 Transition frequency as a function of collector current; typical values.

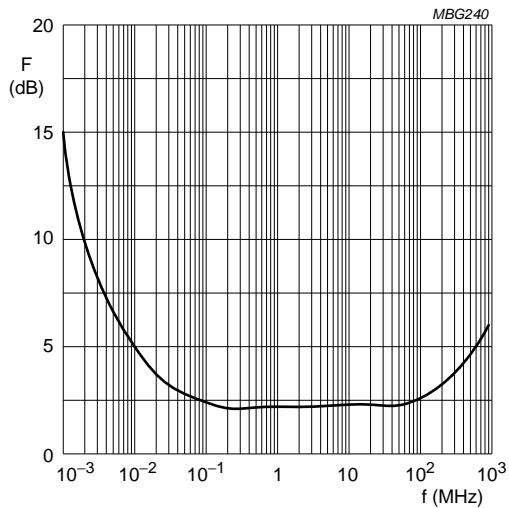
 $V_{CE} = 10$  V.

Fig.6 Minimum noise figure as function of frequency; typical values.

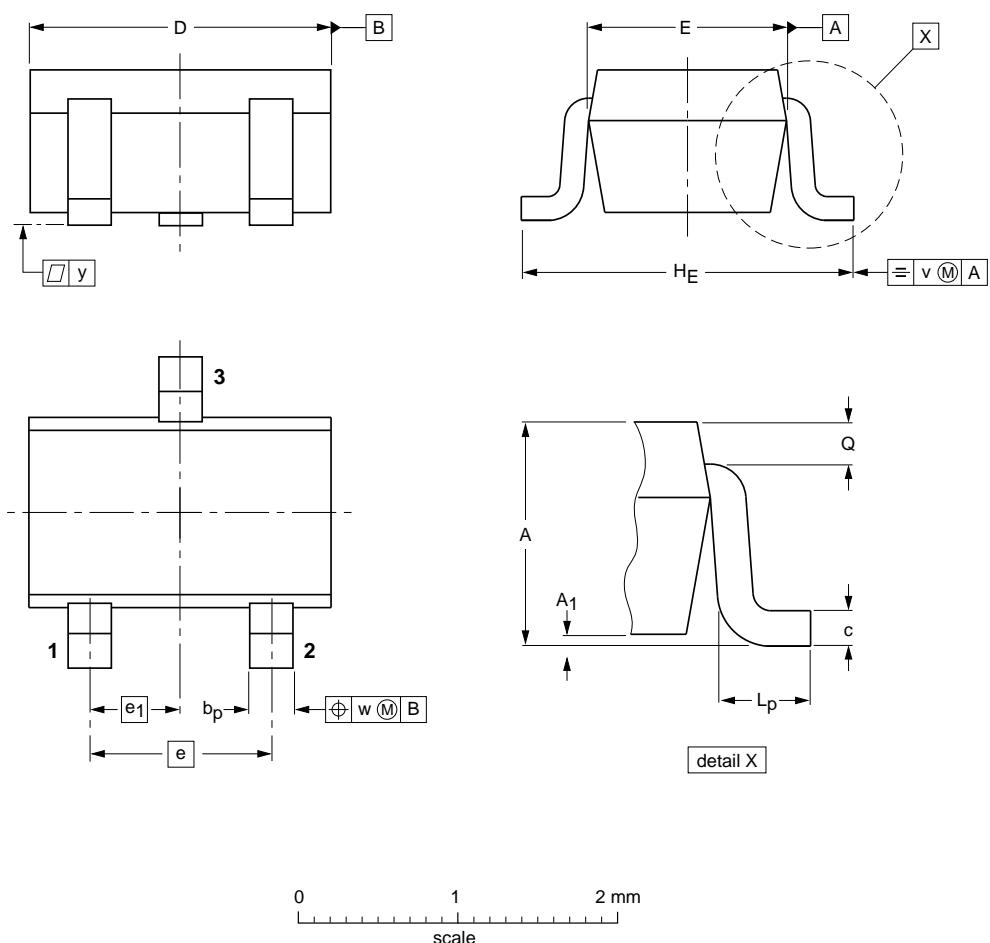
## NPN 1 GHz wideband transistor

BFS17W

## PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT323



## 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 0.8	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	JEITA	SC-70		
SOT323						-04-11-04- 06-03-16

## NPN 1 GHz wideband transistor

BFS17W

## 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.

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BFS17W

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