



# BFQ19

NPN 5 GHz wideband transistor

Rev. 03 — 28 September 2007

Product data sheet

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NXP Semiconductors

# NPN 5 GHz wideband transistor

# BFQ19

## DESCRIPTION

NPN transistor in a SOT89 plastic envelope intended for application in thick and thin-film circuits. It is primarily intended for use in UHF and microwave amplifiers such as in aerial amplifiers, radar systems, oscilloscopes, spectrum analysers etc.

The transistor features very low intermodulation distortion and high power gain. Due to its very high transition frequency, it also has excellent wideband properties and low noise up to high frequencies.

## PINNING

PIN	DESCRIPTION
Code: FB	
1	emitter
2	collector
3	base

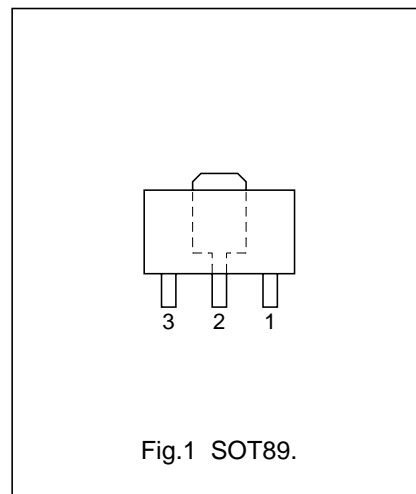


Fig.1 SOT89.

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$V_{CEO}$	collector-emitter voltage	open base	–	15	V
$I_C$	DC collector current		–	100	mA
$P_{tot}$	total power dissipation	up to $T_s = 145\text{ °C}$ (note 1)	–	1	W
$f_T$	transition frequency	$I_C = 50\text{ mA}$ ; $V_{CE} = 10\text{ V}$ ; $f = 500\text{ MHz}$ ; $T_j = 25\text{ °C}$	5.5	–	GHz
$C_{re}$	feedback capacitance	$I_C = 10\text{ mA}$ ; $V_{CE} = 10\text{ V}$ ; $f = 1\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	1.3	–	pF
F	noise figure	$I_C = 50\text{ mA}$ ; $V_{CE} = 10\text{ V}$ ; $Z_s = \text{opt.}$ ; $f = 500\text{ MHz}$ ; $T_{amb} = 25\text{ °C}$	3.3	–	dB

## LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	20	V
$V_{CEO}$	collector-emitter voltage	open base	–	15	V
$V_{EBO}$	emitter-base voltage	open collector	–	3.3	V
$I_C$	DC collector current		–	100	mA
$I_{CM}$	peak collector current	$f > 1\text{ MHz}$	–	150	mA
$P_{tot}$	total power dissipation	up to $T_s = 145\text{ °C}$ (note 1)	–	1	W
$T_{stg}$	storage temperature		–65	150	°C
$T_j$	junction temperature		–	175	°C

## Note

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

## NPN 5 GHz wideband transistor

BFQ19

## THERMAL RESISTANCE

SYMBOL	PARAMETER	CONDITIONS	THERMAL RESISTANCE
$R_{th\ j-s}$	thermal resistance from junction to soldering point	up to $T_s = 145\text{ °C}$ (note 1)	30 K/W

## Note

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

## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0; V_{CB} = 10\text{ V}$	–	–	100	nA
$h_{FE}$	DC current gain	$I_C = 70\text{ mA}; V_{CE} = 10\text{ V}$	25	80	–	
$C_c$	collector capacitance	$I_E = i_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	1.6	–	pF
$C_e$	emitter capacitance	$I_C = i_c = 0; V_{EB} = 0.5\text{ V}; f = 1\text{ MHz}$	–	5	–	pF
$C_{re}$	feedback capacitance	$I_C = 10\text{ mA}; V_{CE} = 10\text{ V}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$	–	1.3	–	pF
$f_T$	transition frequency	$I_C = 70\text{ mA}; V_{CE} = 10\text{ V}; f = 500\text{ MHz}$	4.4	5.5	–	GHz
$G_{UM}$	maximum unilateral power gain (note 1)	$I_C = 50\text{ mA}; V_{CE} = 10\text{ V}; f = 500\text{ MHz}; T_{amb} = 25\text{ °C}$	–	11.5	–	dB
		$I_C = 50\text{ mA}; V_{CE} = 10\text{ V}; f = 800\text{ MHz}; T_{amb} = 25\text{ °C}$	–	7.5	–	dB
F	noise figure	$I_C = 50\text{ mA}; V_{CE} = 10\text{ V}; Z_s = \text{opt.}; f = 500\text{ MHz}; T_{amb} = 25\text{ °C}$	–	3.3	–	dB

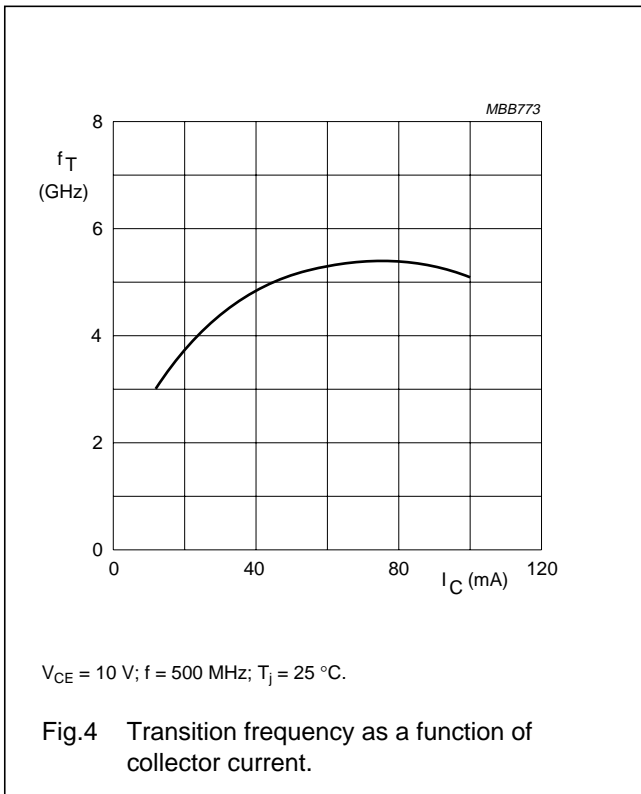
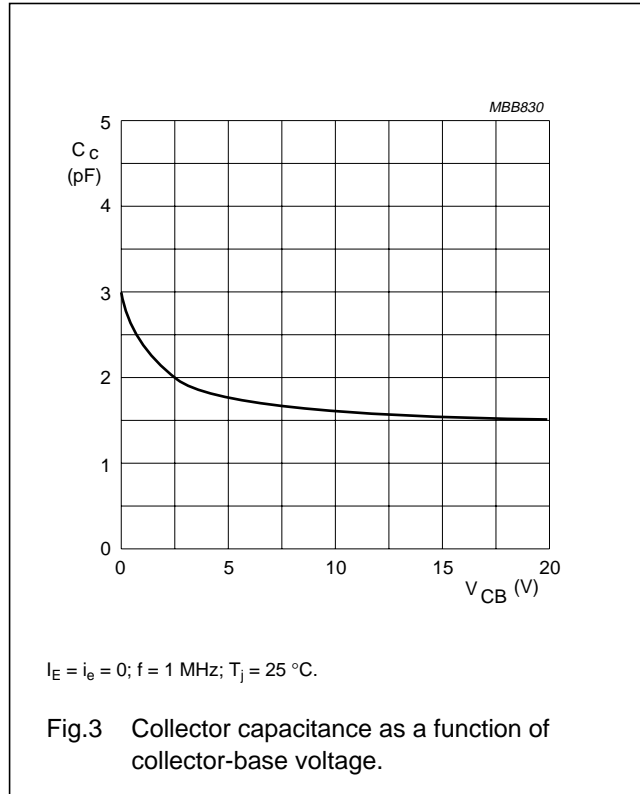
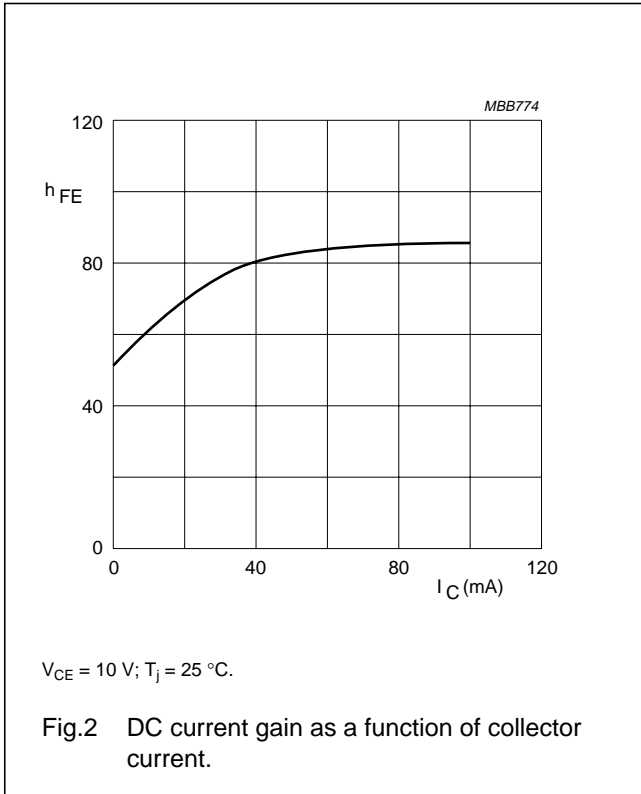
## Note

- $G_{UM}$  is the maximum unilateral power gain, assuming  $S_{12}$  is zero and

$$G_{UM} = 10 \log \left( \frac{|S_{21}|^2}{(1 - |S_{11}|^2)(1 - |S_{22}|^2)} \right) \text{ dB.}$$

# NPN 5 GHz wideband transistor

# BFQ19



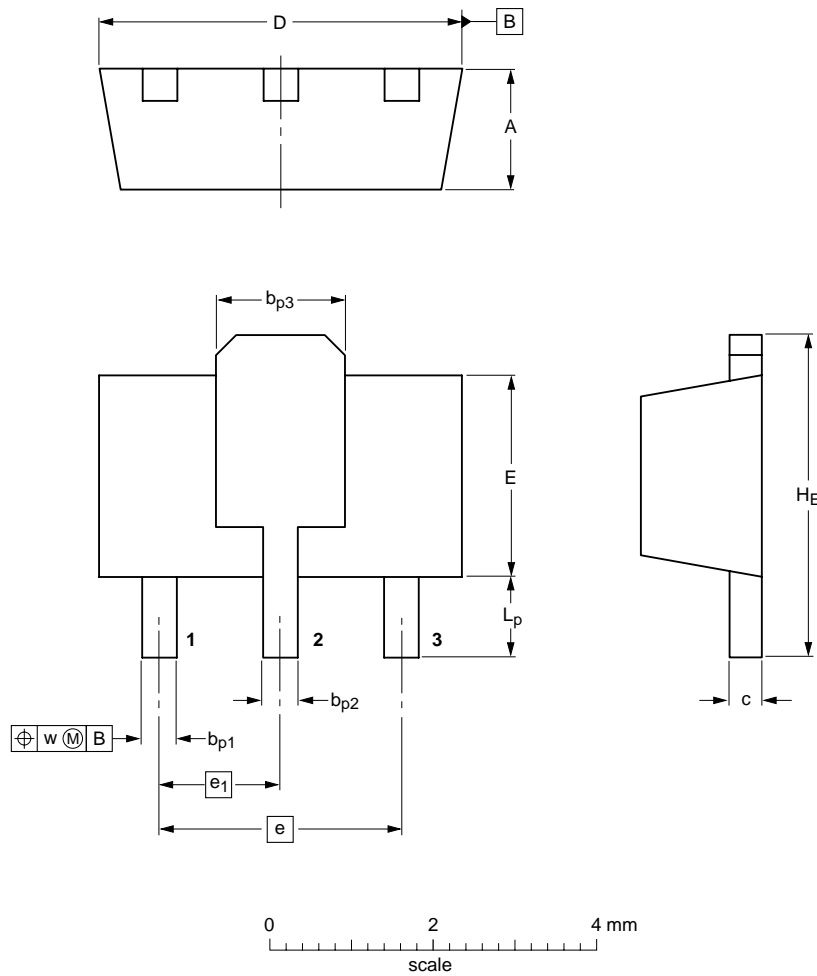
NPN 5 GHz wideband transistor

BFQ19

PACKAGE OUTLINE

Plastic surface-mounted package; collector pad for good heat transfer; 3 leads

SOT89



DIMENSIONS (mm are the original dimensions)

UNIT	A	b <sub>p1</sub>	b <sub>p2</sub>	b <sub>p3</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	w
mm	1.6	0.48	0.53	1.8	0.44	4.6	2.6	3.0	1.5	4.25	1.2	0.13
	1.4	0.35	0.40	1.4	0.23	4.4	2.4					

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT89		TO-243	SC-62		06-03-16 06-08-29

## Legal information

### Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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## Revision history

### Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BFQ19_N_3	20070928	Product data sheet	-	BFQ19_CNV_2
Modifications:	• Fig. 1 and package outline updated			
BFQ19_CNV_2	19950901	Product specification	-	-

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