

DATA SHEET

BFQ19

NPN 5 GHz wideband transistor

Product specification
File under Discrete Semiconductors, SC14

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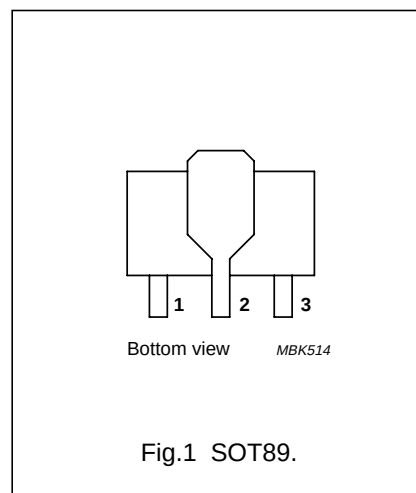
DESCRIPTION

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 analyzers 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



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

1. T_s is the temperature at the soldering point of the collector tab.

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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

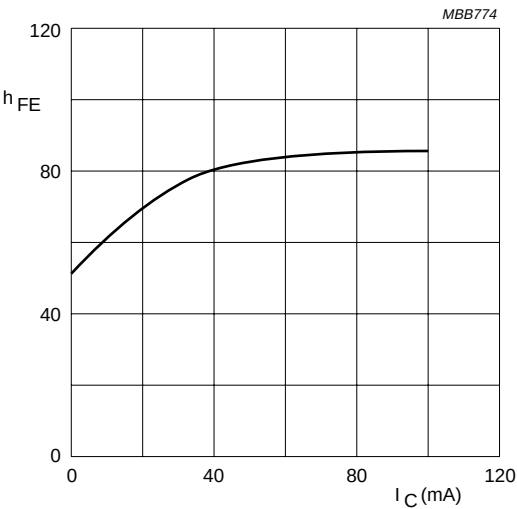
Note

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

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

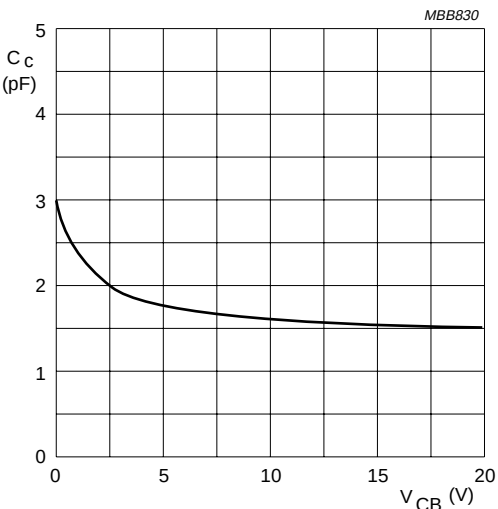
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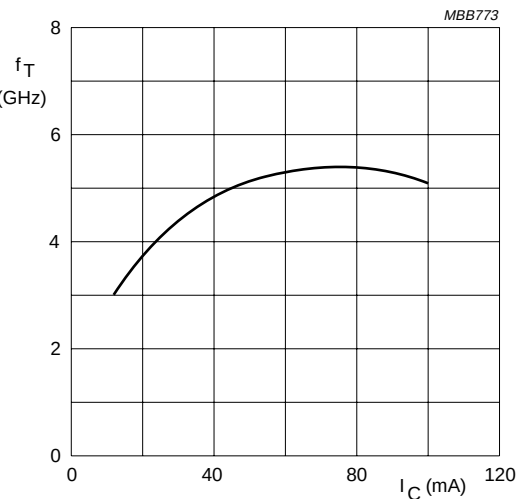
$V_{CE} = 10\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$.

Fig.2 DC current gain as a function of collector current.



$I_E = I_B = 0$; $f = 1\text{ MHz}$; $T_j = 25\text{ }^{\circ}\text{C}$.

Fig.3 Collector capacitance as a function of collector-base voltage.



$V_{CE} = 10\text{ V}$; $f = 500\text{ MHz}$; $T_j = 25\text{ }^{\circ}\text{C}$.

Fig.4 Transition frequency as a function of collector current.

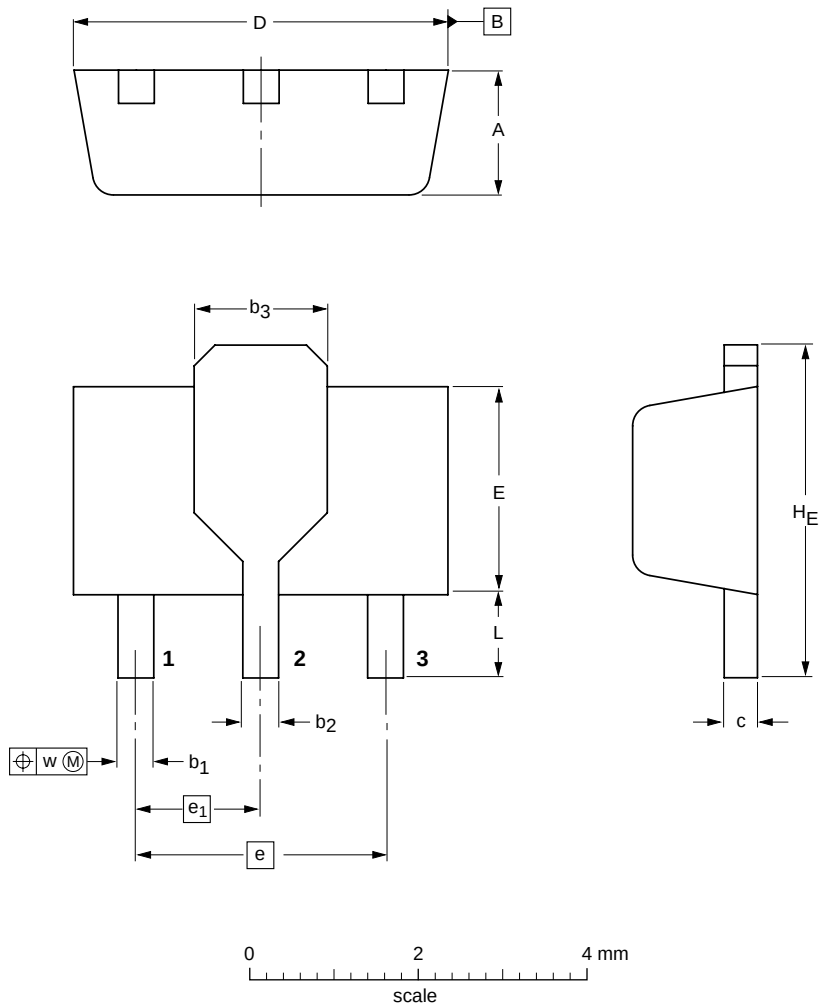
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PACKAGE OUTLINE

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

SOT89



DIMENSIONS (mm are the original dimensions)

UNIT	A	b ₁	b ₂	b ₃	c	D	E	e	e ₁	H _E	L min.	w
mm	1.6 1.4	0.48 0.35	0.53 0.40	1.8 1.4	0.44 0.37	4.6 4.4	2.6 2.4	3.0	1.5	4.25 3.75	0.8	0.13

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT89						97-02-28

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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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