DISCRETE SEMICONDUCTORS

DATA SHEET

BFR106 NPN 5 GHz wideband transistor

Product specification
File under Discrete Semiconductors, SC14

September 1995





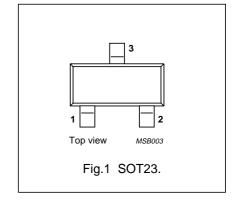
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DESCRIPTION

NPN silicon planar epitaxial transistor in a plastic SOT23 envelope. It is primarily intended for low noise, general RF applications.

PINNING

PIN	PIN DESCRIPTION	
	Code: R7p	
1	base	
2	emitter	
3	collector	



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V _{CBO}	collector-base voltage	open emitter	_	-	20	V
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 = 70 °C; note 1	_	_	500	mW
h _{FE}	DC current gain	$I_C = 50 \text{ mA}; V_{CE} = 9 \text{ V}; T_{amb} = 25 ^{\circ}\text{C}$	25	80	_	
f _T	transition frequency	$I_C = 50 \text{ mA}; V_{CE} = 9 \text{ V}; f = 500 \text{ MHz};$ $T_{amb} = 25 \text{ °C}$	-	5	_	GHz
G _{UM}	maximum unilateral power gain	$I_C = 30 \text{ mA}; V_{CE} = 6 \text{ V}; f = 800 \text{ MHz};$ $T_{amb} = 25 \text{ °C}$	_	11.5	_	dB
Vo	output voltage	I_C = 50 mA; V_{CE} = 9 V; R_L = 75 Ω; T_{amb} = 25 °C; d_{im} = -60 dB; $f_{(p+q-r)}$ = 793.25 MHz	_	350	_	mV

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	V
Ic	DC collector current		_	100	mA
P _{tot}	total power dissipation	up to T _s = 70 °C; note 1	_	500	mW
T _{stg}	storage temperature		-65	150	°C
T _i	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 = 70 °C; note 1	210 K/W

Note

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

CHARACTERISTICS

 $T_i = 25$ °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I _{CBO}	collector cut-off current	I _E = 0; V _{CB} = 10 V	_	_	100	nA
h _{FE}	DC current gain	I _C = 50 mA; V _{CE} = 9 V	25	80	_	
f _T	transition frequency	I_{C} = 50 mA; V_{CE} = 9 V; f = 500 MHz; T_{amb} = 25 °C	_	5	_	GHz
C _c	collector capacitance	$I_E = i_e = 0$; $V_{CB} = 10 \text{ V}$; $f = 1 \text{ MHz}$	_	1.5	_	рF
C _e	emitter capacitance	$I_C = I_C = 0$; $V_{EB} = 0.5 \text{ V}$; $f = 1 \text{ MHz}$	_	4.5	_	рF
C _{re}	feedback capacitance	I _C = 0; V _{CE} = 10 V; f = 1 MHz	_	1.2	_	рF
G _{UM}	maximum unilateral power gain (note 1)	$I_C = 30 \text{ mA}; V_{CE} = 6 \text{ V}; f = 800 \text{ MHz}; $ $T_{amb} = 25 ^{\circ}\text{C}$	_	11.5	_	dB
F	noise figure	$I_C = 30 \text{ mA}; V_{CE} = 6 \text{ V}; f = 800 \text{ MHz}; $ $T_{amb} = 25 ^{\circ}\text{C}$	_	3.5	_	dB
d ₂	second order intermodulation distortion	note 2	_	-50	_	dB
Vo	output voltage	note 3	_	350	_	mV

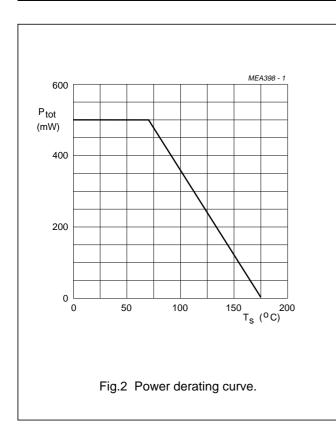
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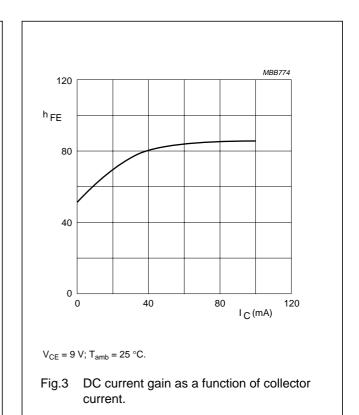
1. $\,\,G_{UM}$ is the maximum unilateral power gain, assuming S_{12} is zero and

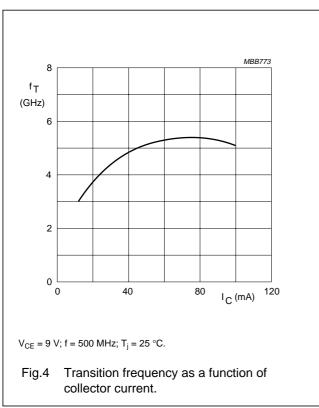
$$G_{UM} = 10 \log \frac{|S_{21}|^2}{(1 - |S_{11}|^2)(1 - |S_{22}|^2)} dB.$$

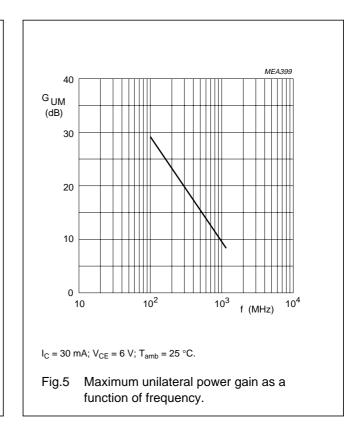
- 3. $d_{im} = -60$ dB (DIN 45004B); $I_C = 50$ mA; $V_{CE} = 9$ V; $R_L = 75$ Ω ; $T_{amb} = 25$ °C; $f_{(p+q-r)} = 793.25$ MHz.

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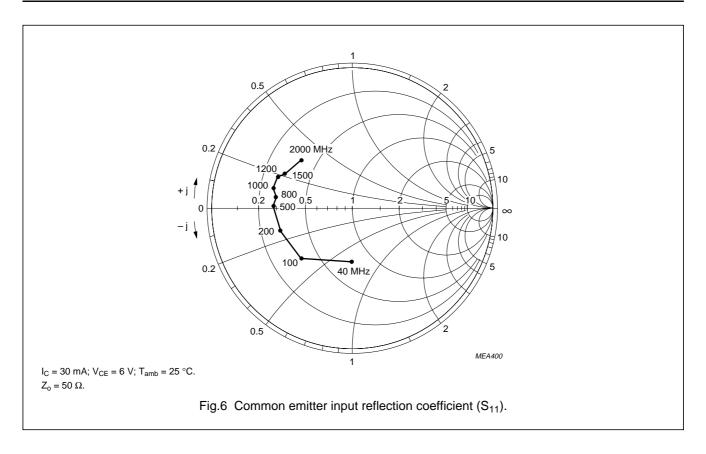


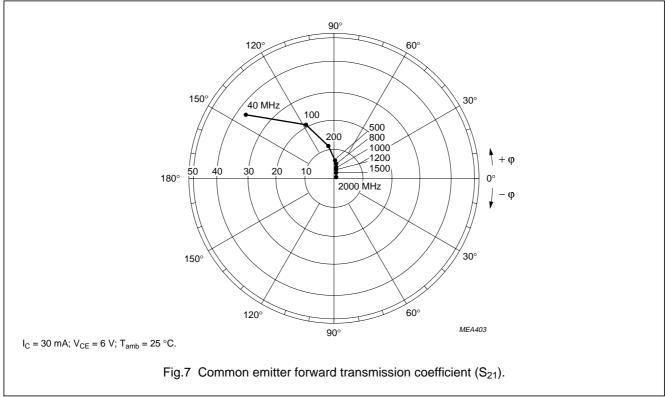


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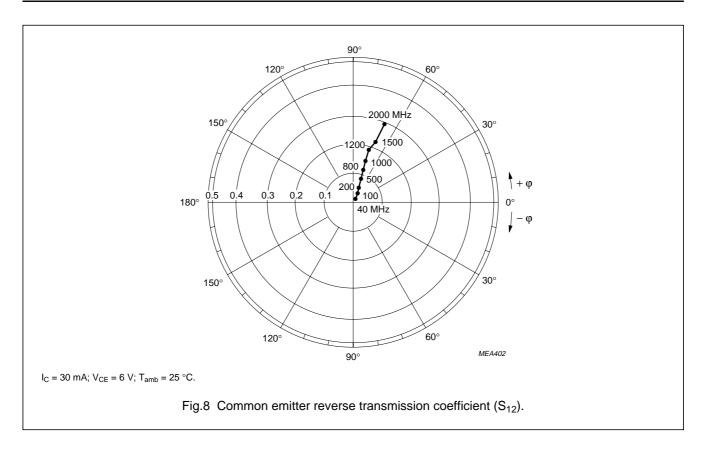
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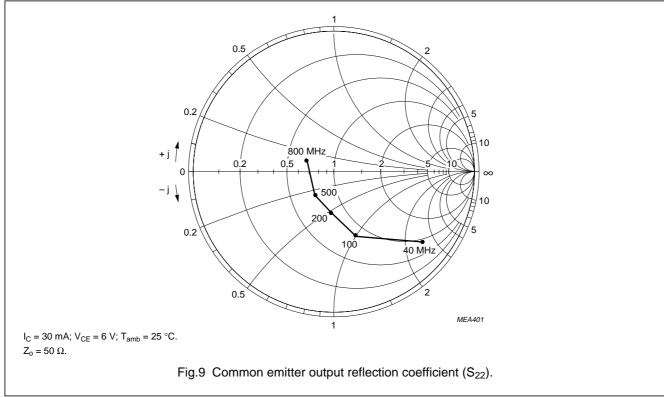
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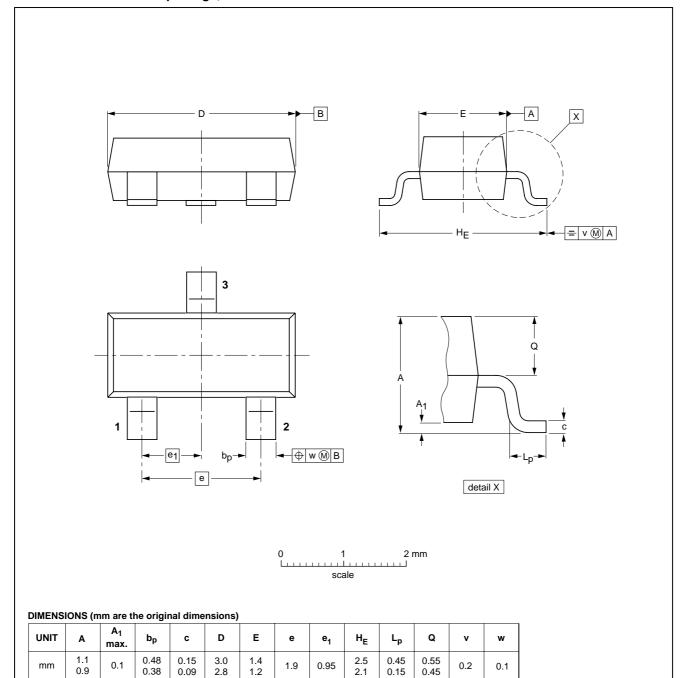


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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



OUTLINE		REFER	RENCES	EUROPEAN	ISSUE DATE	
VERSION	IEC	JEDEC	EIAJ	PROJECTION	ISSUE DATE	
SOT23					97-02-28	

0.95

2.5

0.45

0.15

0.55

0.2

0.1

mm

0.48

0.1

0.15

1.4 1.2

1.9

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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

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.

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.