DATA SHEET

BFG31
PNP 5 GHz wideband transistor

Product specification
Supersedes data of November 1992

1995 Sep 12

PNP 5 GHz wideband transistor BFG31

FEATURES

- High output voltage capability
- High gain bandwidth product
- Good thermal stability
- Gold metallization ensures excellent reliability.

PINNING

PIN	DESCRIPTION
1	emitter
2	base
3	emitter
4	collector

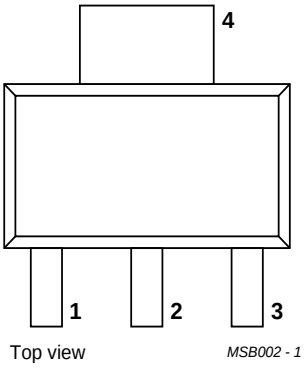


Fig.1 SOT223.

DESCRIPTION

PNP planar epitaxial transistor mounted in a plastic SOT223 envelope.

It is intended for wideband amplifier applications.

NPN complement is the BFG97.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	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 = 135 °C ; note 1	–	–	1	W
h_{FE}	DC current gain	I_C = –70 mA; V_{CE} = –10 V; T_{amb} = 25 °C	25	–	–	
f_T	transition frequency	I_C = –70 mA; V_{CE} = –10 V; f = 500 MHz; T_{amb} = 25 °C	–	5.0	–	GHz
G_{UM}	maximum unilateral power gain	I_C = –70 mA; V_{CE} = –10 V; f = 800 MHz; T_{amb} = 25 °C	–	12	–	dB
V_o	output voltage	I_C = –100 mA; V_{CE} = –10 V; R_L = 75 Ω; T_{amb} = 25 °C	–	600	–	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
I_C	DC collector current		–	–100	mA
P_{tot}	total power dissipation	up to T_s = 135 °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.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	THERMAL RESISTANCE
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	up to T_s = 135 °C; note 1	40 K/W

Note

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

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; I_C = –10 mA	–20	–	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base; I_C = –10 mA	–18	–	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; I_E = –0.1 mA	–3	–	–	V
I_{CBO}	collector cut-off current	I_E = 0; V_{CB} = –10 V	–	–	–1	μA
h_{FE}	DC current gain	I_C = –70 mA; V_{CE} = –10 V; T_{amb} = 25 °C	25	–	–	
C_{cb}	collector-base capacitance	I_C = 0; V_{CB} = –10 V; f = 1 MHz;	–	1.8	–	pF
C_{eb}	emitter-base capacitance	I_C = 0; V_{EB} = –10 V; f = 1 MHz	–	5	–	pF
C_{re}	feedback capacitance	I_C = 0; V_{CE} = –10 V; f = 1 MHz; T_{amb} = 25 °C	–	1.6	–	pF
f_T	transition frequency	I_C = –70 mA; V_{CE} = –10 V; f = 500 MHz; T_{amb} = 25 °C	–	5	–	GHz
G_{UM}	maximum unilateral power gain; note 1	I_C = –70 mA; V_{CE} = –10 V; f = 500 MHz; T_{amb} = 25 °C	–	16	–	dB
		I_C = –70 mA; V_{CE} = –10 V; f = 800 MHz; T_{amb} = 25 °C	–	12	–	dB
V_o	output voltage	note 2	–	600	–	mV
V_o	output voltage	note 3	–	550	–	mV

Notes

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.
2. d_{im} = –60 dB; I_C = –70 mA; V_{CE} = –10 V; R_L = 75 Ω; T_{amb} = 25 °C;
   $V_p = V_o$ at d_{im} = –60 dB; f_p = 850.25 MHz;
   $V_q = V_o$ –6 dB; f_q = 858.25 MHz;
   $V_r = V_o$ –6 dB; f_r = 860.25 MHz;
   measured at $f_{(p+q-r)}$ = 848.25 MHz.
3. d_{im} = –60 dB (DIN 45004B); I_C = –70 mA; V_{CE} = –10 V; R_L = 75 Ω; T_{amb} = 25 °C;
   $V_p = V_o$ = at d_{im} = –60 dB; f_p = 445.25 MHz;
   $V_q = V_o$ –6 dB; f_q = 453.25 MHz;
   $V_r = V_o$ –6 dB; f_r = 455.25 MHz;
   measured at $f_{(p+q-r)}$ = 443.25 MHz.

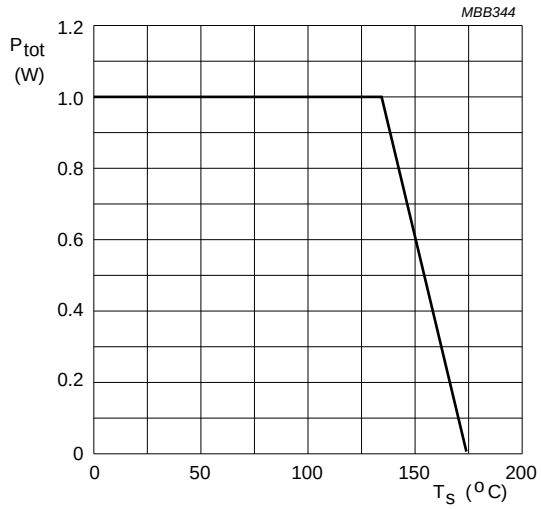
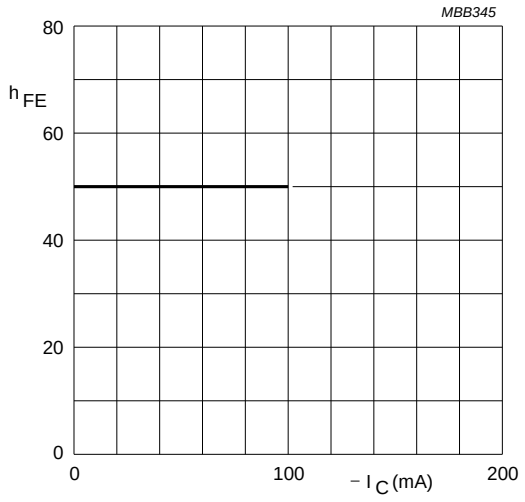
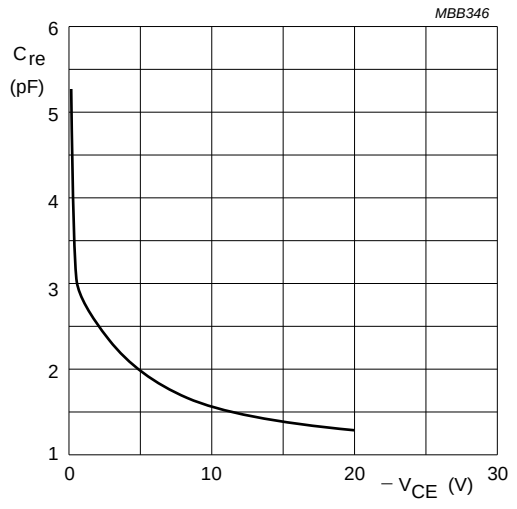


Fig.2 Power derating curve.



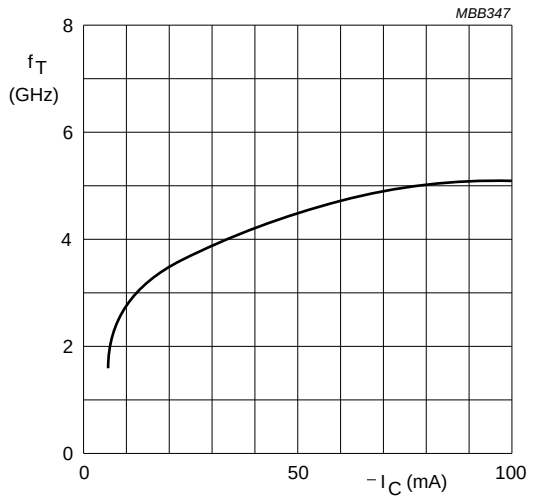
V_{CE} = –10 V; T_{amb} = 25 °C.

Fig.3 DC current gain as a function of collector current.



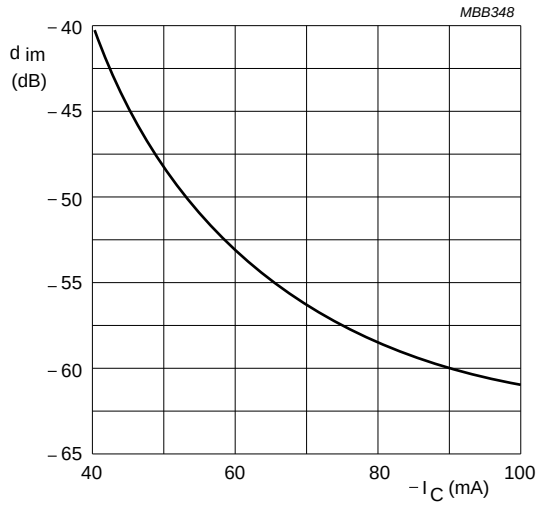
f = 1 MHz; T_{amb} = 25 °C

Fig.4 Feedback capacitance as a function of collector-emitter voltage.



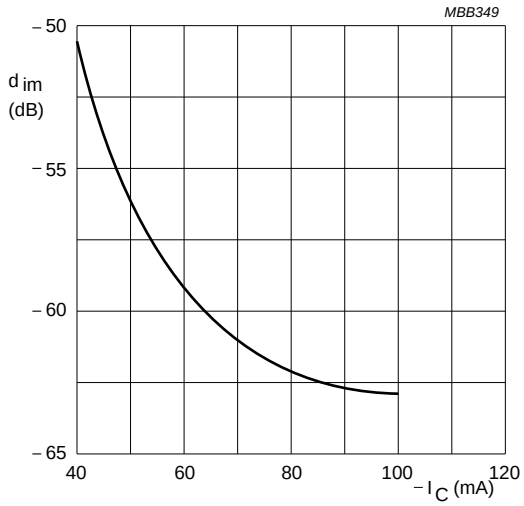
V_{CE} = –10 V; T_{amb} = 25 °C.

Fig.5 Transition frequency as a function of collector current.



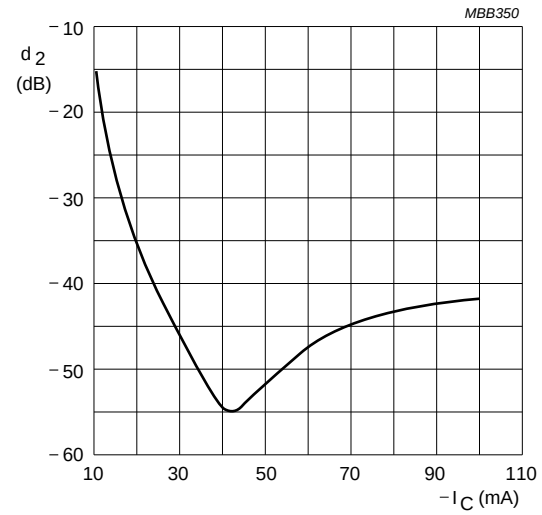
V_{CE} = −10 V; V_o = 650 mV; T_{amb} = 25 °C;
$f_{(p+q-r)}$ = 443.25 MHz.

Fig.6 Intermodulation distortion as a function of collector current.



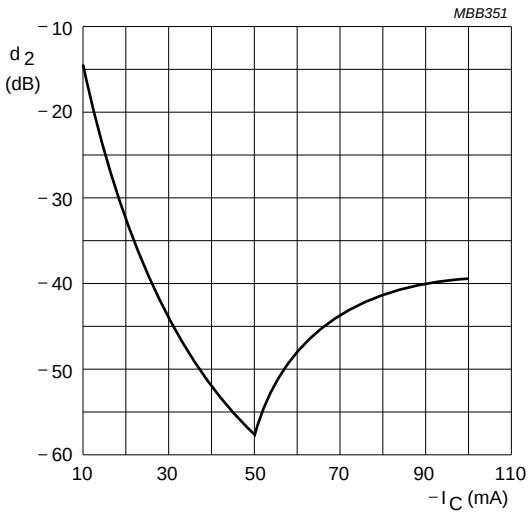
V_{CE} = −10 V; V_o = 550 mV; T_{amb} = 25 °C;
$f_{(p+q-r)}$ = 848.25 MHz.

Fig.7 Intermodulation distortion as a function of collector current.



V_{CE} = −10 V; V_o = 50 dBmV; T_{amb} = 25 °C;
$f_{(p+q)}$ = 450 MHz.

Fig.8 Second order intermodulation distortion as a function of collector current.

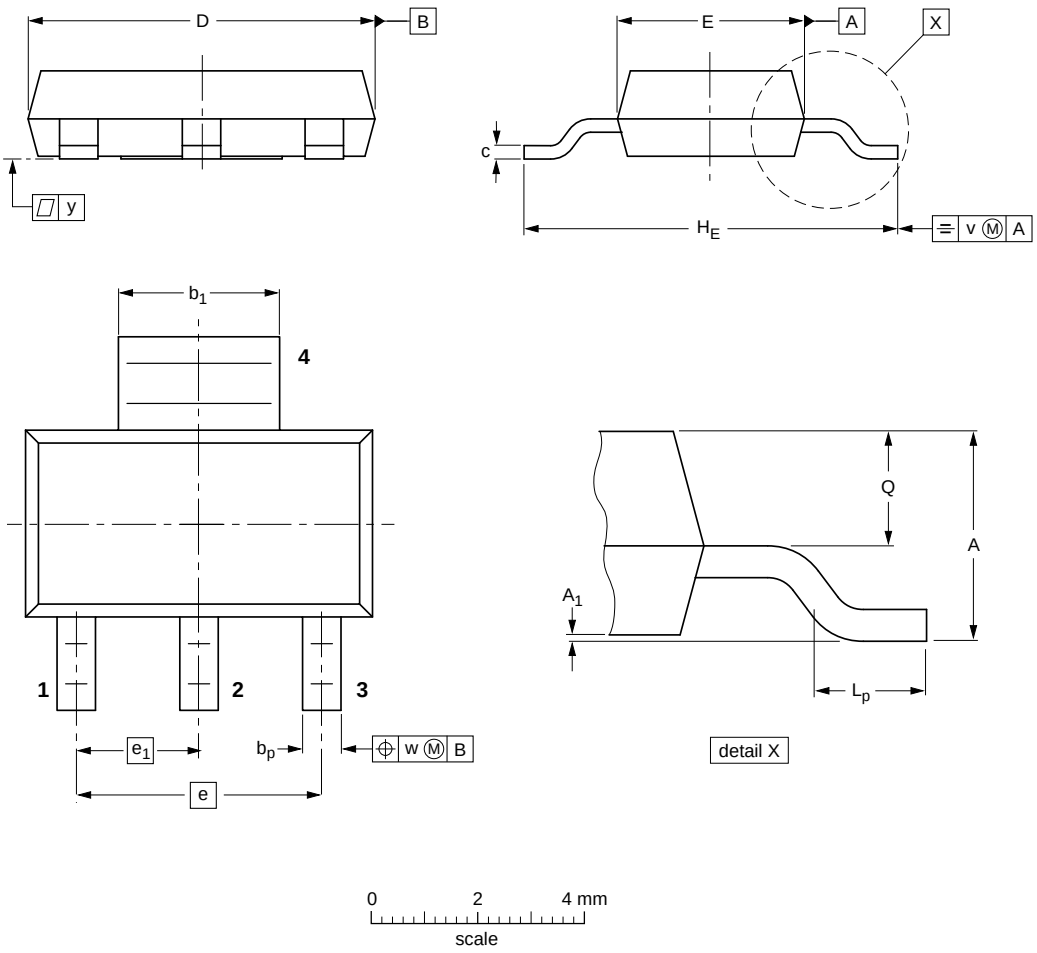


V_{CE} = −10 V; V_o = 50 dBmV; T_{amb} = 25 °C;
$f_{(p+q)}$ = 810 MHz.

Fig.9 Second order intermodulation distortion as a function of collector current.

PACKAGE OUTLINE

Plastic surface-mounted package with increased heatsink; 4 leads **SOT223**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	b_1	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.8 1.5	0.10 0.01	0.80 0.60	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	4.6	2.3	7.3 6.7	1.1 0.7	0.95 0.85	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT223			SC-73			~~04-11-10~~ 06-03-16

DATA SHEET STATUS

DOCUMENT STATUS[1]	PRODUCT STATUS[2]	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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Printed in The Netherlands R77/02/pp9 Date of release: 1995 Sep 12

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