

DATA SHEET

BFG31

PNP 5 GHz wideband transistor

Product specification
Supersedes data of November 1992
File under Discrete Semiconductors, SC14

1995 Sep 12

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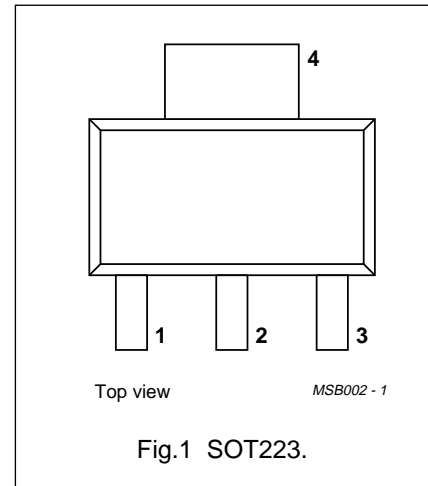
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FEATURES

- 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



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 $T_s = 135\text{ °C}$; note 1	–	–	1	W
h_{FE}	DC current gain	$I_C = -70\text{ mA}$; $V_{CE} = -10\text{ V}$; $T_{amb} = 25\text{ °C}$	25	–	–	
f_T	transition frequency	$I_C = -70\text{ mA}$; $V_{CE} = -10\text{ V}$; $f = 500\text{ MHz}$; $T_{amb} = 25\text{ °C}$	–	5.0	–	GHz
G_{UM}	maximum unilateral power gain	$I_C = -70\text{ mA}$; $V_{CE} = -10\text{ V}$; $f = 800\text{ MHz}$; $T_{amb} = 25\text{ °C}$	–	12	–	dB
V_o	output voltage	$I_C = -100\text{ mA}$; $V_{CE} = -10\text{ V}$; $R_L = 75\text{ }\Omega$; $T_{amb} = 25\text{ °C}$	–	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 $T_s = 135\text{ °C}$; 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 CHARACTERISTICS

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

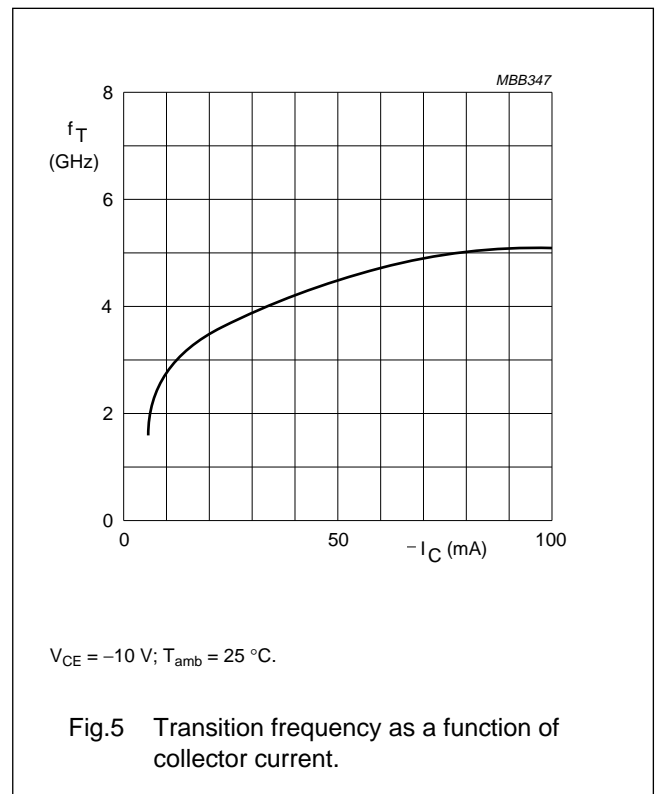
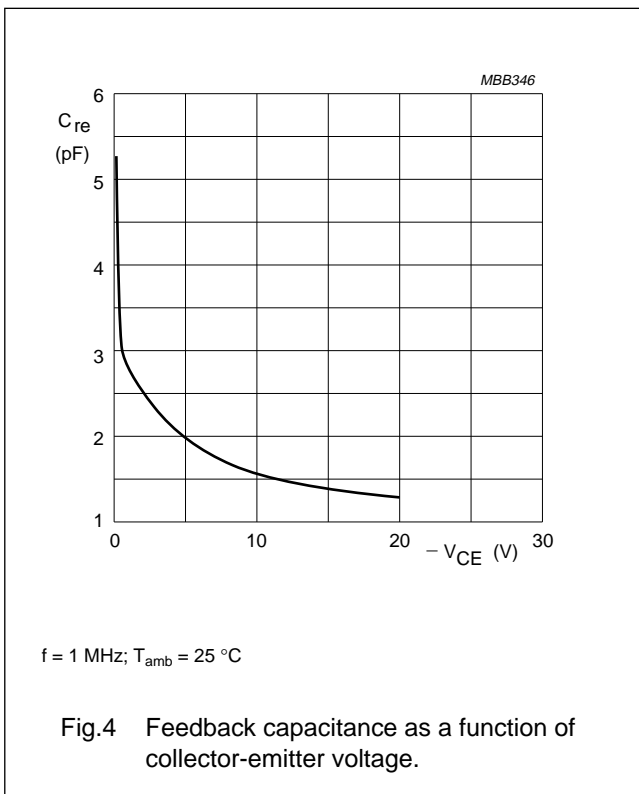
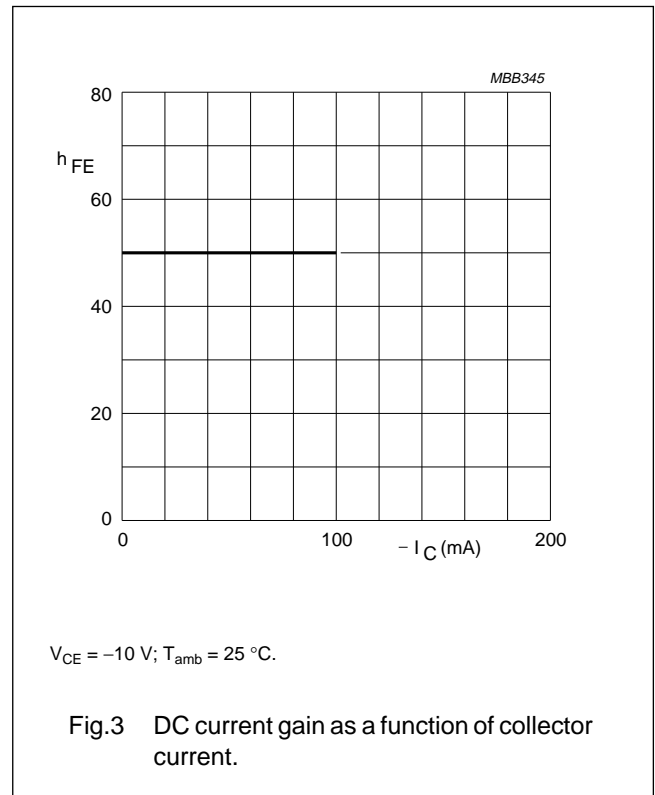
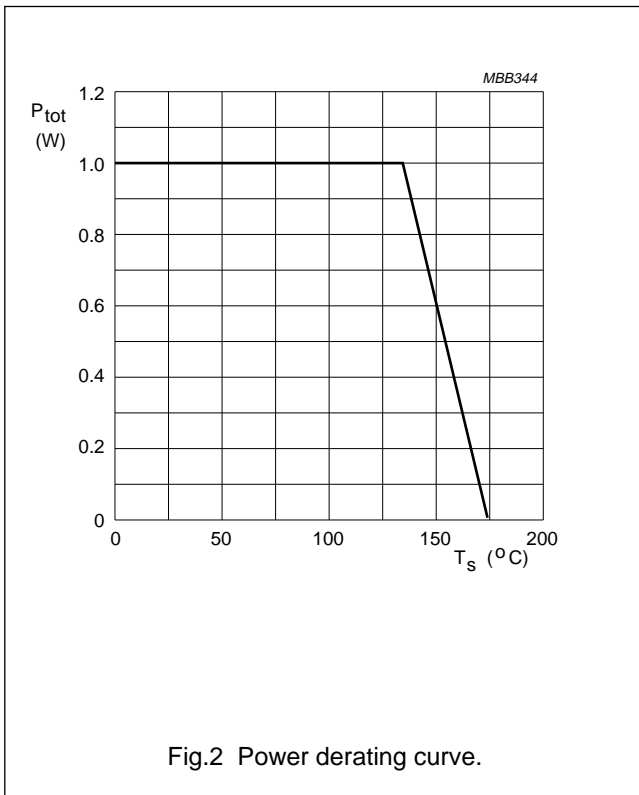
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; $I_C = -10\text{ mA}$	-20	–	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base; $I_C = -10\text{ mA}$	-18	–	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; $I_E =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

Notes

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

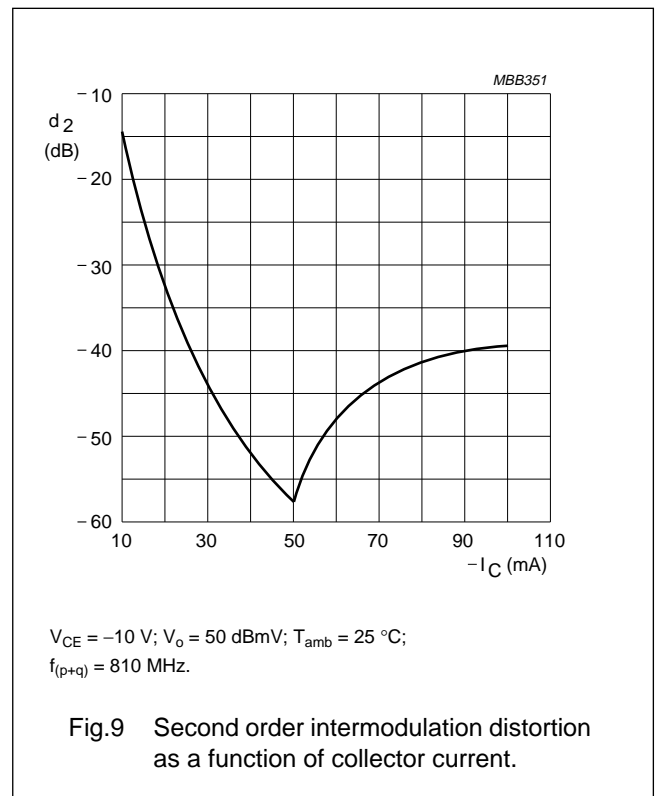
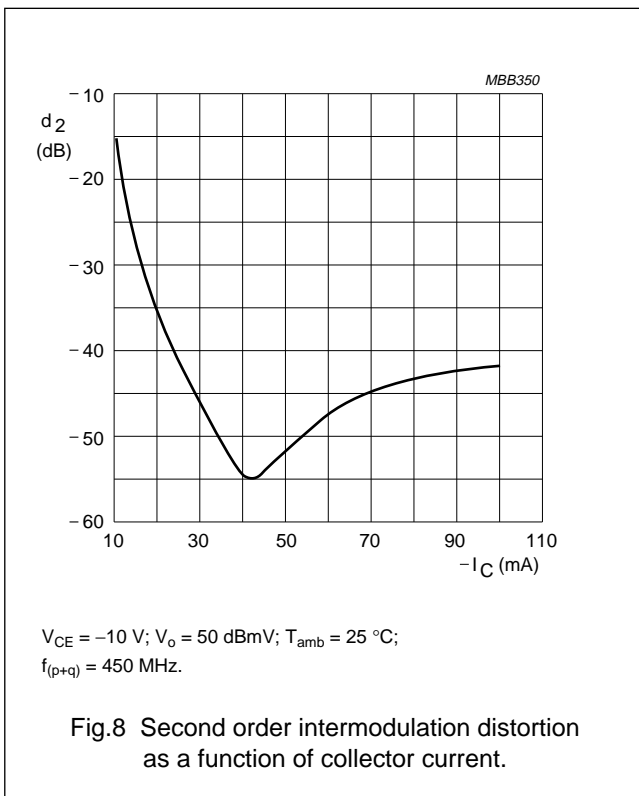
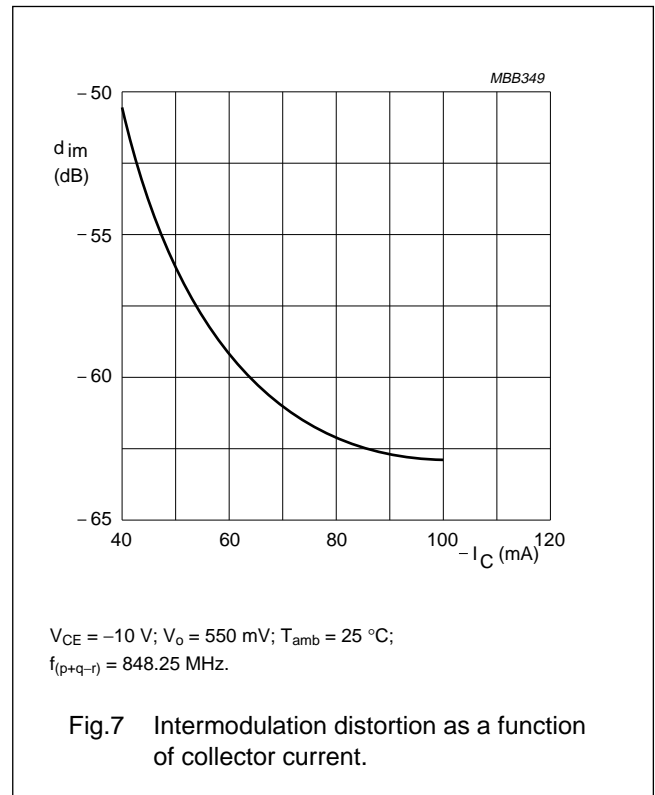
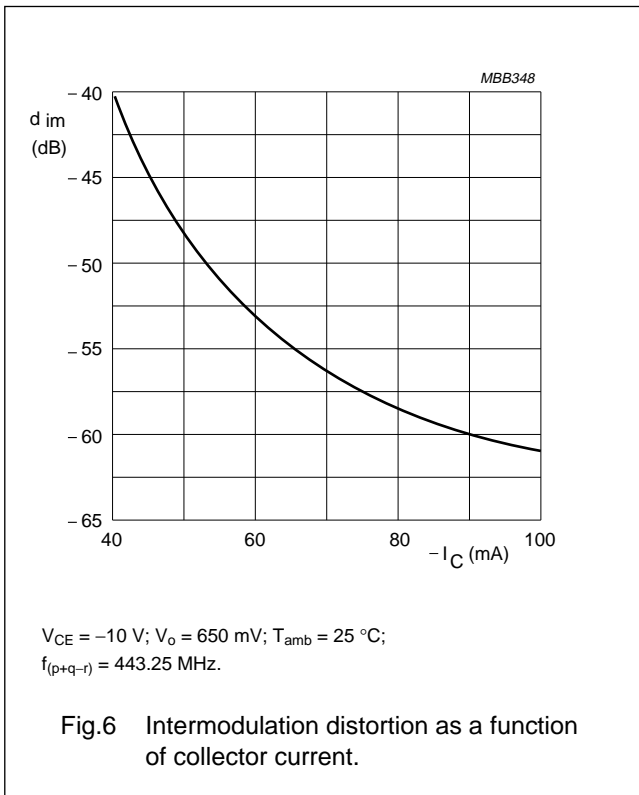
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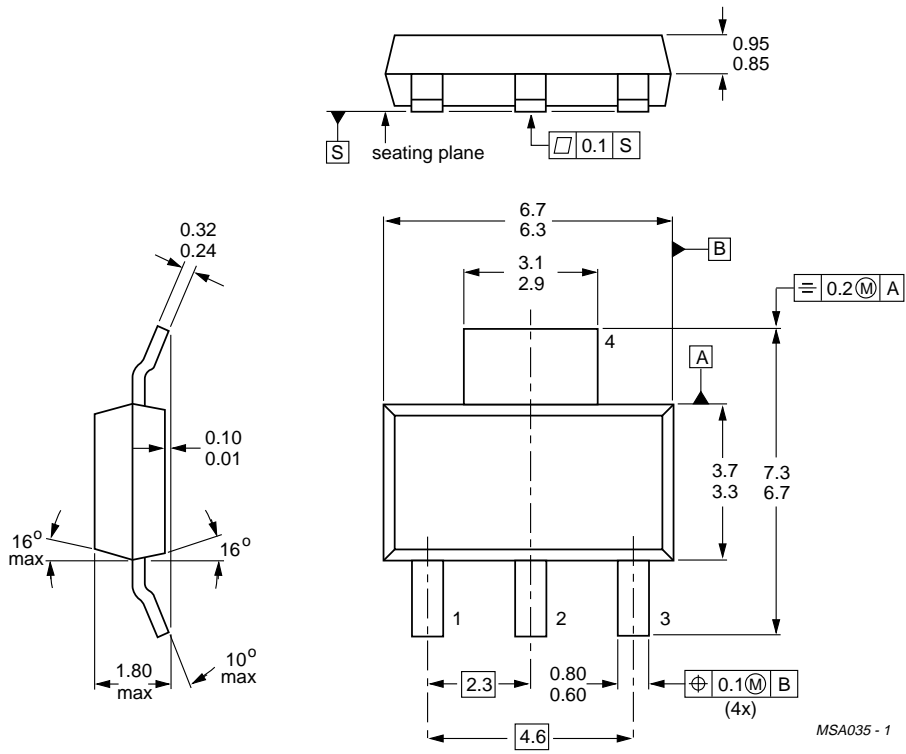
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PACKAGE OUTLINE



Dimensions in mm.

Fig.10 SOT223.

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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.	

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.