BGA614

Silicon Germanium Broadband MMIC Amplifier

Small Signal Discretes

Never stop thinking

Edition 2008-03-28

Published by Infineon Technologies AG,
81726 München, Germany

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BGA614, Silicon Germanium Broadband MMIC Amplifier

Revision History: 2008-03-28, Rev. 2.1

Previous Version: 2003-11-04

Page	Subjects (major changes since last revision)
All	New Chip Version with integrated ESD protection
5	Electrical Characteristics slightly changed
7-8	Figures updated
All	Document layout change

Trademarks

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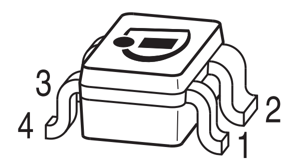
1 Silicon Germanium Broadband MMIC Amplifier

Feature
- Cascadable 50 Ω-gain block
- 3 dB-bandwidth: DC to 2.4 GHz with 19 dB typical gain at 1.0 GHz
- Compression point P_{-1dB} = 12 dBm at 2.0 GHz
- Noise figure $F_{50\Omega}$ = 2.1 dB at 2.0 GHz
- Absolute stable
- 70 GHz f_T - Silicon Germanium technology
- 1 kV HBM ESD protection (Pin-to-Pin)
- Pb-free (RoHS compliant) package[1)]

RoHS



SOT343

Applications
- Driver amplifier for GSM/PCS/CDMA/UMTS
- Broadband amplifier for SAT-TV & LNBs
- Broadband amplifier for CATV

1) Pb-containing package may be available upon special request

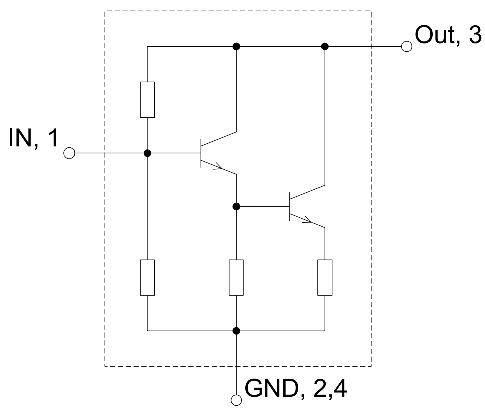


Figure 1 Pin connection

Description

BGA614 is a broadband matched, general purpose MMIC amplifier in a Darlington configuration. It is optimized for a typical supply current of 40 mA

The BGA614 is based on Infineon Technologies' B7HF Silicon Germanium technology.

Type	Package	Marking
BGA614	SOT343	BOs

Note: ***ESD:*** *Electrostatic discharge sensitive device, observe handling precaution*

Maximum Ratings

Table 1 Maximum ratings

Parameter	Symbol	Limit Value	Unit
Device voltage	V_D	3	V
Device current	I_D	80	mA
Current into pin In	I_{in}	0.7	mA
Input power[1)]	P_{in}	10	dBm
Total power dissipation, T_S < 102 °C[2)]	P_{tot}	240	mW
Junction temperature	T_J	150	°C
Ambient temperature range	T_A	-65... 150	°C
Storage temperature range	T_{STG}	-65... 150	°C
ESD capability all pins (HBM: JESD22-A114)	V_{ESD}	1000	V

1)Valid for $Z_S = Z_L = 50\ \Omega$, $V_{CC} = 5$ V, $R_{Bias} = 62\ \Omega$

2) T_S is measured on the ground lead at the soldering point

Note: All Voltages refer to GND-Node

Thermal resistance

Table 2 Thermal resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[1)]	R_{thJS}	200	K/W

1) For calculation of R_{thJA} please refer to Application Note Thermal Resistance

2 Electrical Characteristics

Electrical characteristics at T_A = 25 °C (measured in test circuit specified in **Figure 2**)

V_{CC} = 5 V, R_{Bias} = 62 Ω, Frequency = 2 GHz, unless otherwise specified

Table 3 Electrical Characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Insertion power gain	$\lvert S_{21}\rvert^2$		19.8		dB	f = 0.1 GHz
			19.0		dB	f = 1.0 GHz
			17.5		dB	f = 2.0 GHz
Noise figure (Z_S = 50 Ω)	$F_{50\Omega}$		1.8		dB	f = 0.1 GHz
			2.0		dB	f = 1.0 GHz
			2.1		dB	f = 2.0 GHz
Output power at 1 dB gain compression	P_{-1dB}		12		dBm	
Output third order intercept point	OIP_3		25		dBm	
Input return loss	RL_{in}		18		dB	
Output return loss	RL_{out}		20		dB	
Total device current	I_D		40		mA	

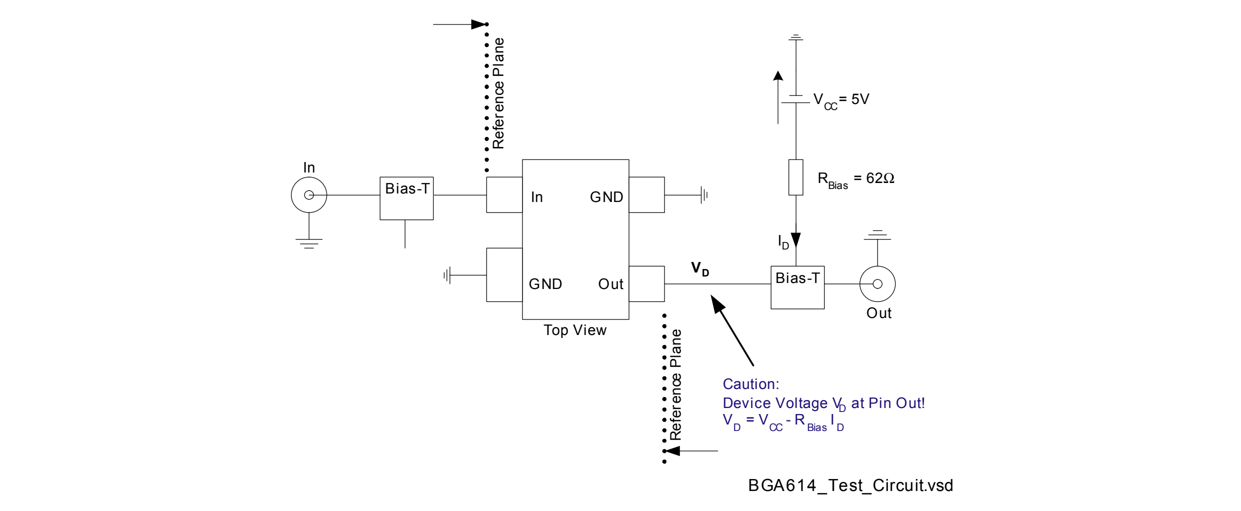
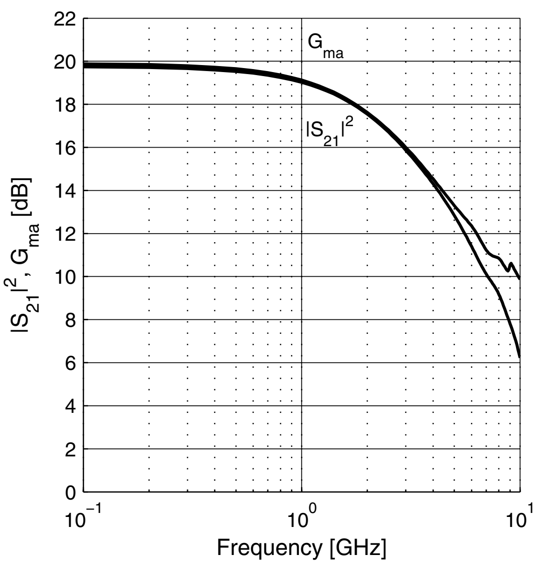


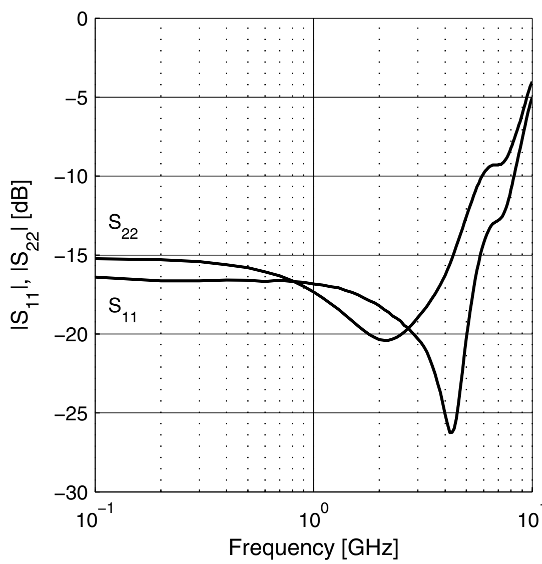
Figure 2 Test Circuit for Electrical Characteristics and S-Parameter

3 Measured Parameters

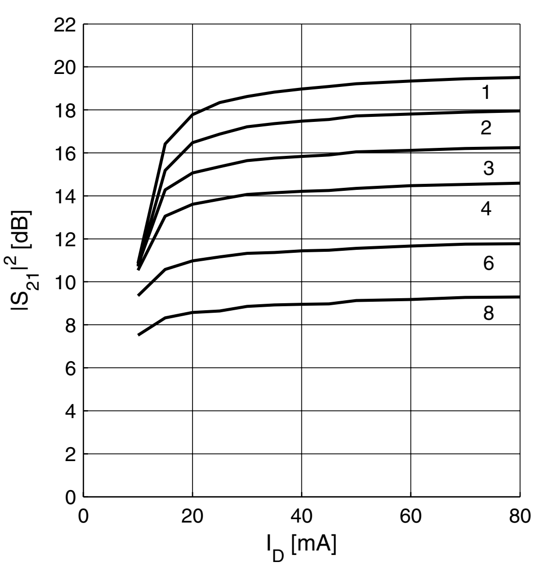
Power Gain $|S_{21}|^2$, $G_{ma} = f(f)$
$V_{CC} = 5V$, $R_{Bias} = 62\Omega$, $I_C = 40mA$



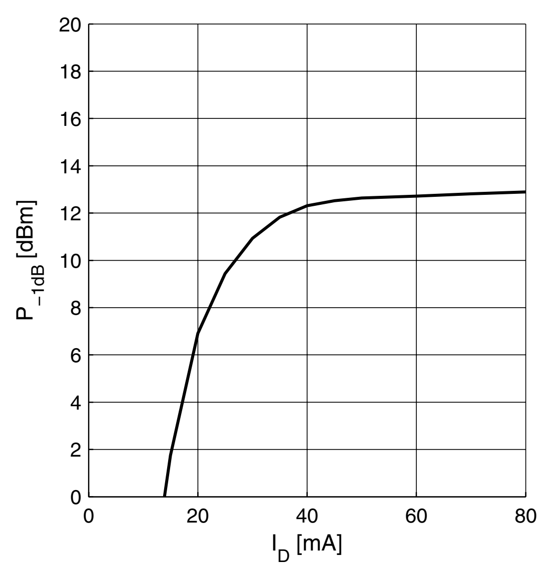
Matching $|S_{11}|$, $|S_{22}| = f(f)$
$V_{CC} = 5V$, $R_{Bias} = 62\Omega$, $I_C = 40mA$



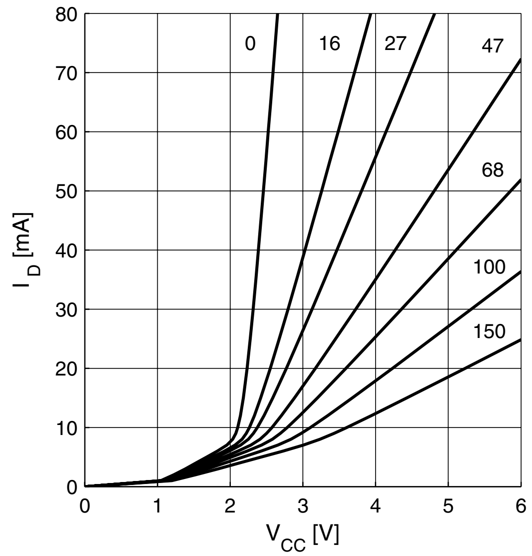
Power Gain $|S_{21}| = f(I_D)$
f = parameter in GHz



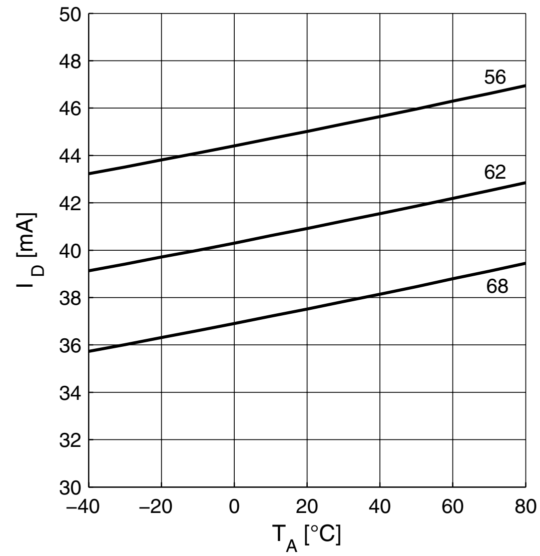
Output Compression Point
$P_{-1dB} = f(I_D)$, f = 2GHz



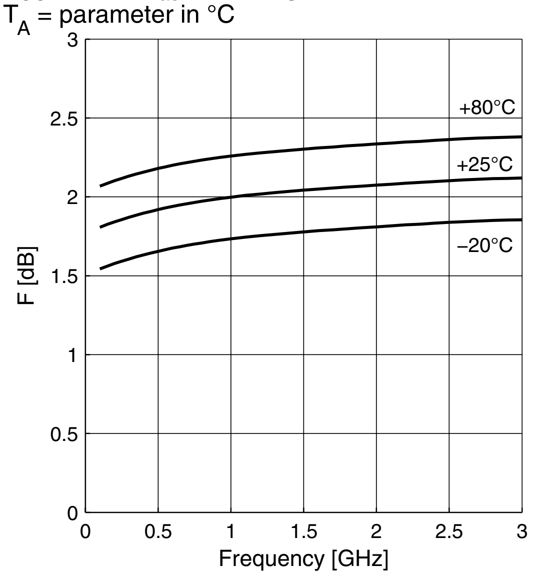
Device Current $I_D = f(V_{CC})$
R_{Bias} = parameter in Ω



Device Current $I_D = f(T_A)$
V_{CC} = 5V, R_{Bias} = parameter in Ω



Noise figure F = f(f)
V_{CC} = 5V, R_{Bias} = 62Ω, Z_S = 50Ω
T_A = parameter in °C



4 Package Information

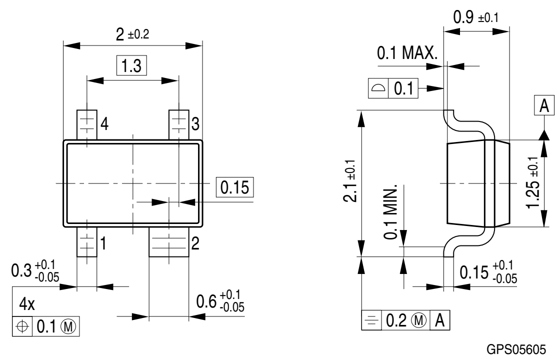


Figure 3 Package Outline SOT343

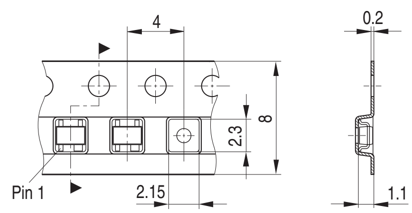


Figure 4 Tape for SOT343