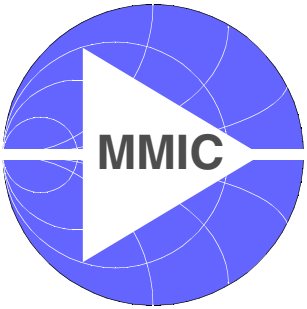
BGA614

Silicon Germanium Broadband MMIC Amplifier



Wireless
Silicon Discretes

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Never stop thinking.

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BGA614
Preliminary data sheet
Revision History: **2002-05-27** Preliminary

Previous Version: 2001-11-14

Page	Subjects (major changes since last revision)
5	Maximum input power specified

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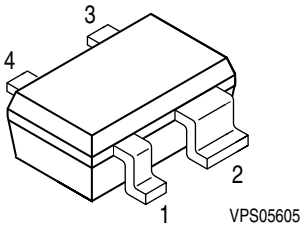
Preliminary

Silicon Germanium Broadband MMIC Amplifier

BGA614

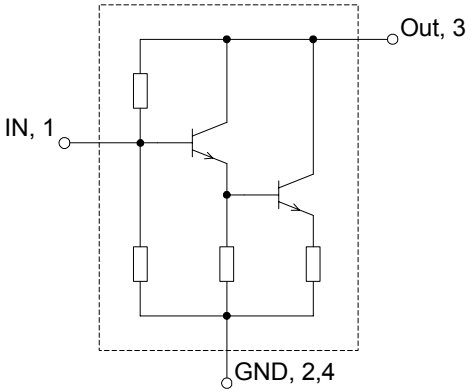
Features

- Cascadable 50Ω-gain block
- 3 dB-bandwidth: DC to 2.4 GHz with 18.5 dB typical gain at 1.0 GHz
- Compression point P_{-1dB} = 12 dBm at 2.0 GHz
- Noise figure $F_{50\Omega}$ = 2.30 dB at 2.0 GHz
- Absolute stable
- 70 GHz f_T - Silicon Germanium technology



Applications

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



Description

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

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

ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Package	Marking	Chip
BGA614	SOT343	BOs	T0565

Preliminary

Maximum Ratings

Parameter	Symbol	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
Thermal resistance: junction-soldering point	$R_{th\ JS}$	200	K/W

Notes:
All Voltages refer to GND-Node
[1] Valid for $Z_S=Z_L=50\Omega$, $V_{CC}=5V$, $R_{Bias}=62\Omega$
[2] T_S is measured on the ground lead at the soldering point

Electrical Characteristics at T_A=25°C (measured in test circuit specified in fig. 1)
V_{CC}=5V, R_{Bias}=62Ω, Frequency=2GHz, unless otherwise specified

Parameter	Symbol	min.	typ.	max.	Unit
Insertion power gain	$\|S_{21}\|^2$				dB
f = 0.1GHz		-	19.5	-	
f = 1.0GHz		-	18.5	-	
f = 2.0GHz		-	17.0	-	
Noise Figure (Z_S=50Ω)	$F_{50\Omega}$				dB
f = 0.1GHz		-	1.95	-	
f = 1.0GHz		-	2.20	-	
f = 2.0GHz		-	2.30	-	
Output Power at 1dB Gain Compression	P_{-1dB}	-	12	-	dBm
Output Third Order Intercept Point	OIP_3	-	25	-	dBm
Input Return Loss	RL_{In}	-	19	-	dB
Output Return Loss	RL_{Out}	-	24	-	dB
Total Device Current	I_D	-	40	-	mA

Preliminary

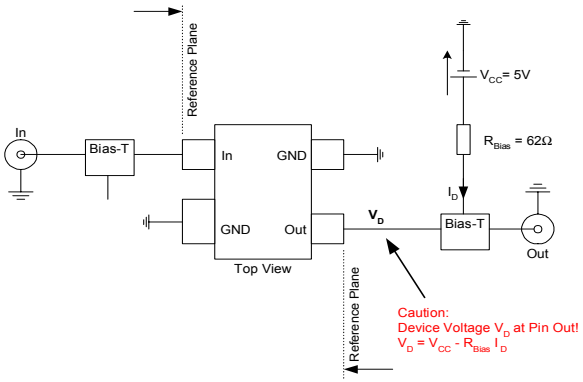


Fig.1: Test Circuit for Electrical Characteristics and S-Parameters

S-Parameter V_{CC}=5V, R_{Bias}=62Ω (see Electrical Characteristics for conditions)

Frequency [GHz]	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
0.1	0.1245	5.9	9.3122	177.5	0.0840	0.0	0.1288	-0.9
0.2	0.0854	4.6	9.3767	172.8	0.0825	1.5	0.1266	-4.8
0.4	0.1133	11.1	9.1886	165.1	0.0832	2.7	0.1268	-10.0
0.6	0.1115	7.8	9.0552	157.9	0.0837	4.7	0.1220	-16.9
0.8	0.1114	8.5	8.7953	150.8	0.0834	6.6	0.1146	-23.1
1.0	0.1205	9.8	8.5065	144.1	0.0848	8.4	0.1049	-30.4
1.2	0.1165	8.9	8.0863	137.8	0.0857	9.9	0.0948	-37.5
1.4	0.1163	8.4	7.8100	131.1	0.0883	11.4	0.0869	-45.4
1.6	0.1159	6.7	7.4972	125.6	0.0899	13.0	0.0779	-54.7
1.8	0.1164	5.7	7.2744	120.0	0.0923	13.7	0.0706	-65.1
2.0	0.1099	1.0	6.9831	114.8	0.0944	15.1	0.0642	-75.7
3.0	0.0775	-5.3	5.7650	91.5	0.1114	17.9	0.0623	-159.0
4.0	0.0358	31.2	4.7962	71.7	0.1316	17.2	0.1391	163.7
5.0	0.0719	116.9	4.0808	53.3	0.1541	13.3	0.2209	144.4
6.0	0.1365	123.3	3.5461	36.1	0.1759	7.6	0.2793	126.3
7.0	0.1807	111.4	3.0857	20.8	0.1971	1.0	0.3398	113.0
8.0	0.2628	101.8	2.7951	4.4	0.2197	-7.7	0.4199	103.4

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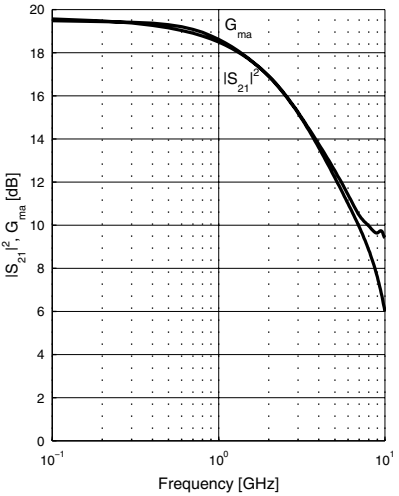
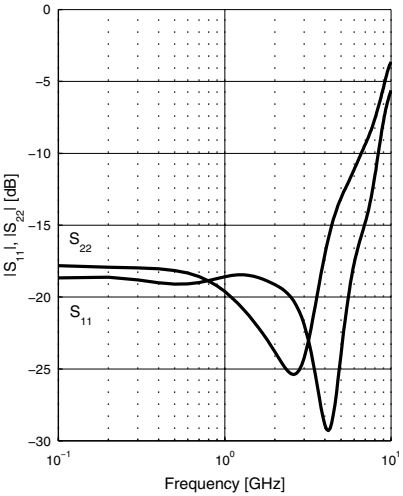
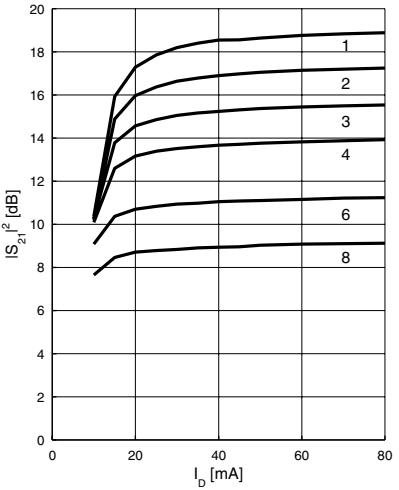
Power Gain $|S_{21}|^2$, G_{ma} = f(f)
V_{CC} = 5V, R_{Bias} = 62Ω, I_C = 40mA



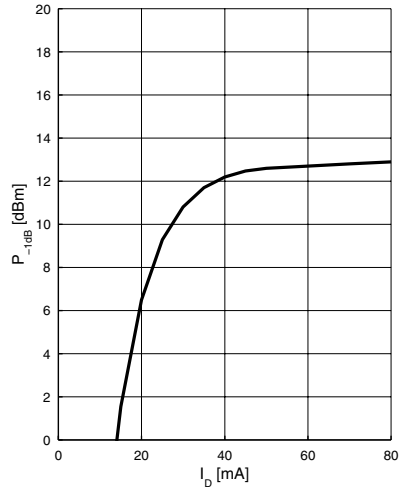
Matching $|S_{11}|$, $|S_{22}|$ = f(f)
V_{CC} = 5V, R_{Bias} = 62Ω, I_C = 40mA



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



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



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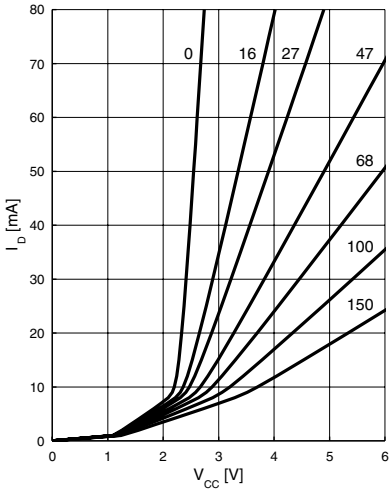
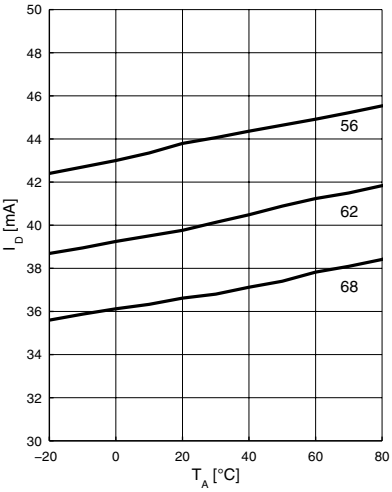
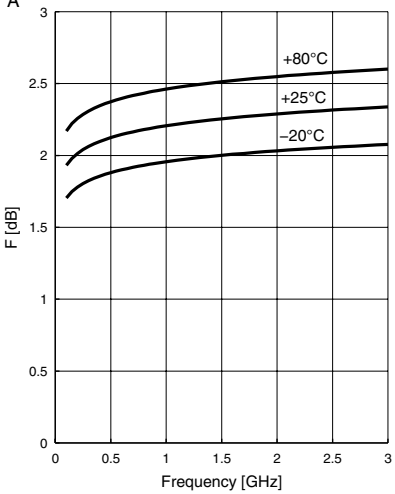
Device Current $I_D = f(V_{CC})$
R_{Bias} = parameter in Ω



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



Package Outline