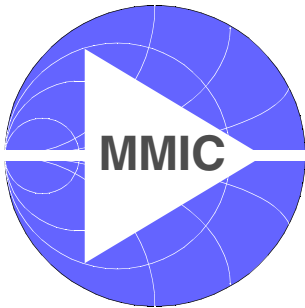


# BGA614

Silicon Germanium  
Broadband MMIC Amplifier



Secure Mobile Solutions  
Silicon Discretes



Never stop thinking.

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**BGA614****Data sheet****Revision History:        2003-11-04**Previous Version:        2002-05-27

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Page	Subjects (major changes since last revision)
	Preliminary status removed

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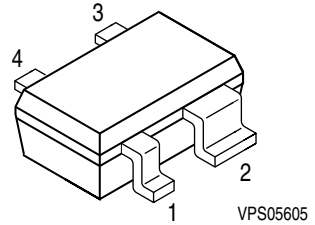
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# Silicon Germanium Broadband MMIC Amplifier

**BGA614**

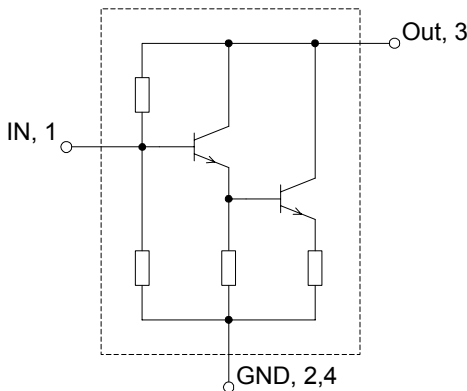
## Features

- 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

**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 <sup>1)</sup>	$P_{IN}$	10	dBm
Total power dissipation, $T_S < 102^\circ\text{C}$ <sup>2)</sup>	$P_{tot}$	240	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Ambient temperature range	$T_A$	-65 ... +150	$^\circ\text{C}$
Storage temperature range	$T_{STG}$	-65 ... +150	$^\circ\text{C}$
Thermal resistance: junction-soldering point	$R_{th_{JS}}$	200	K/W

Notes:

All Voltages refer to GND-Node

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

<sup>2)</sup>  $T_S$  is measured on the ground lead at the soldering point

**Electrical Characteristics** at  $T_A=25^\circ\text{C}$  (measured in test circuit specified in fig. 1)

$V_{CC}=5\text{V}$ ,  $R_{Bias}=62\Omega$ , Frequency=2GHz, unless otherwise specified

Parameter	Symbol	min.	typ.	max.	Unit
Insertion power gain	$ S_{21} ^2$				dB
$f = 0.1\text{GHz}$		-	19.5	-	
$f = 1.0\text{GHz}$		-	18.5	-	
$f = 2.0\text{GHz}$		-	17.0	-	
Noise Figure ( $Z_S=50\Omega$ )	$F_{50\Omega}$				dB
$f = 0.1\text{GHz}$		-	1.95	-	
$f = 1.0\text{GHz}$		-	2.20	-	
$f = 2.0\text{GHz}$		-	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

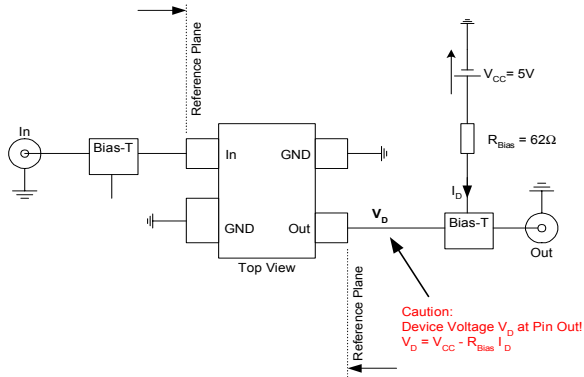
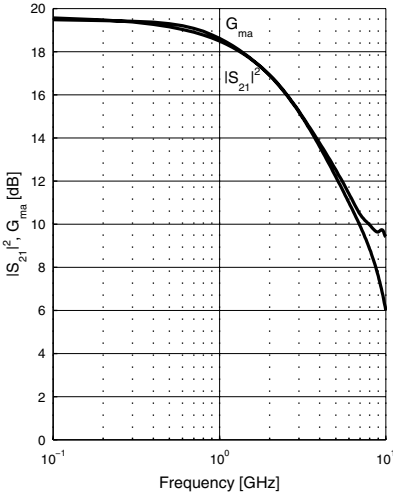


Fig.1: Test Circuit for Electrical Characteristics and S-Parameters

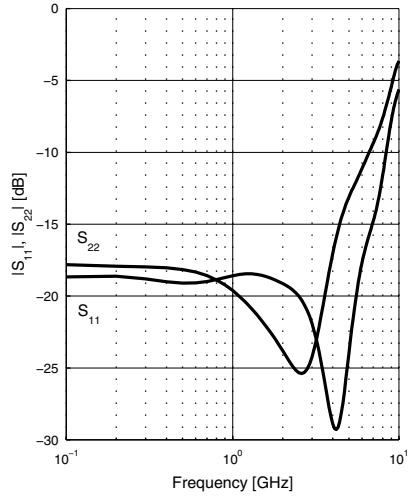
**S-Parameter**  $V_{CC}=5V$ ,  $R_{Bias}=62\Omega$  (see Electrical Characteristics for conditions)

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

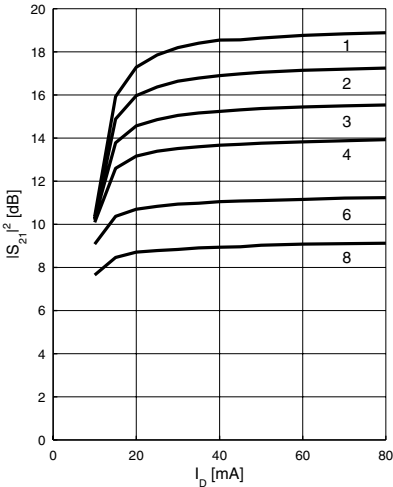
**Power Gain**  $|S_{21}|^2, G_{ma} = f(f)$   
 $V_{CC} = 5V, R_{Bias} = 62\Omega, I_C = 40mA$



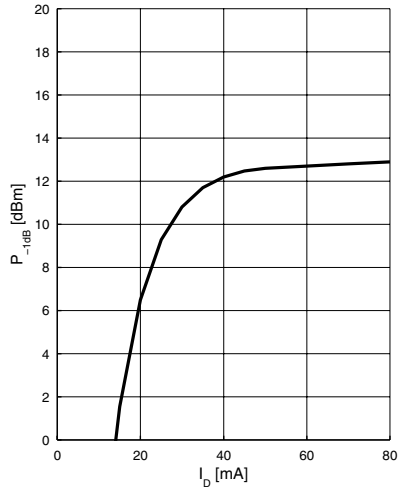
**Matching**  $|S_{11}|, |S_{22}| = f(f)$   
 $V_{CC} = 5V, R_{Bias} = 62\Omega, I_C = 40mA$



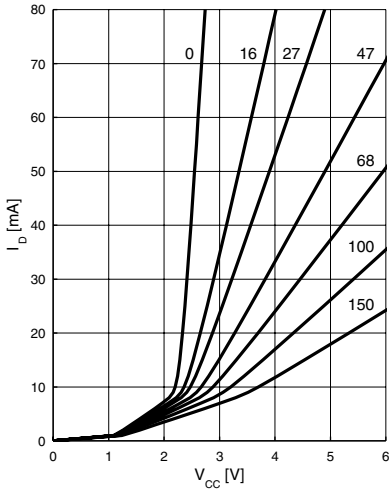
**Power Gain**  $|S_{21}| = f(I_D)$   
 $f = \text{parameter in GHz}$



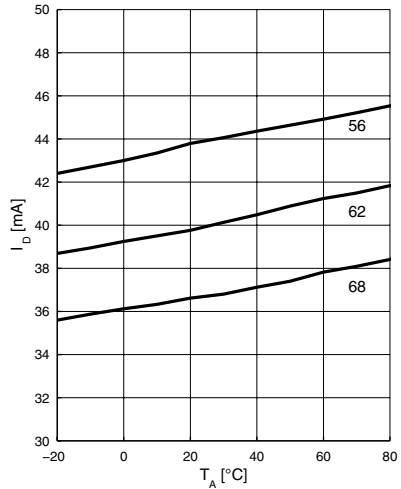
**Output Compression Point**  
 $P_{-1dB} = f(I_D), f = 2GHz$



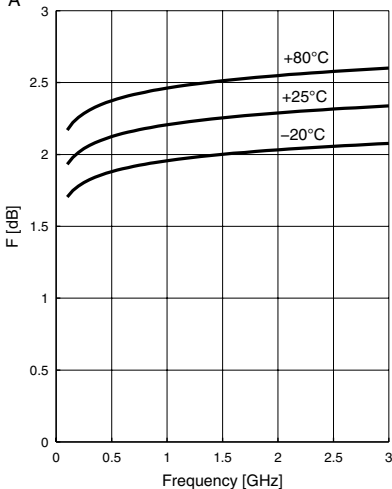
**Device Current  $I_D = f(V_{CC})$**   
 $R_{Bias} = \text{parameter in } \Omega$



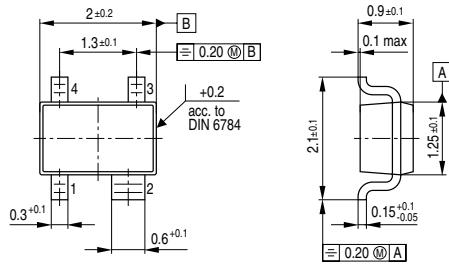
**Device Current  $I_D = f(T_A)$**   
 $V_{CC} = 5V, R_{Bias} = \text{parameter in } \Omega$



**Noise figure  $F = f(f)$**   
 $V_{CC} = 5V, R_{Bias} = 62\Omega, Z_S = 50\Omega$   
 $T_A = \text{parameter in } ^{\circ}C$



**Package Outline**



GPS06605