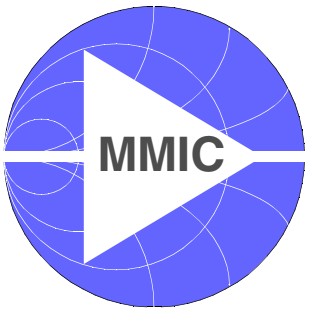
Data sheet, BGA612, Nov. 2003

BGA612

Silicon Germanium
Broadband MMIC Amplifier



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BGA612
Data sheet
Revision History: 2003-11-04

Previous Version: 2002-05-27

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

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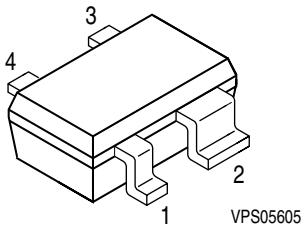
Silicon Germanium
Broadband MMIC Amplifier

BGA612

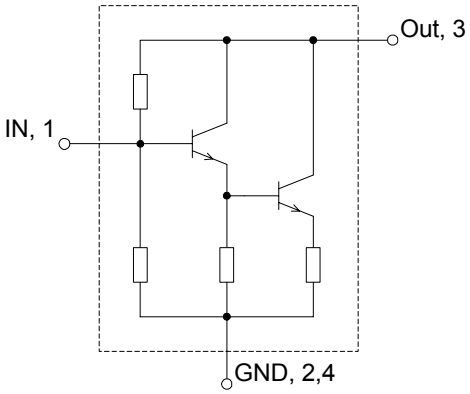
Features

- Cascadable 50Ω-gain block
- 3 dB-bandwidth: DC to 2.8 GHz with 17.0 dB typical gain at 1.0 GHz
- Compression point P_{-1dB} = 7 dBm at 2.0 GHz
- Noise figure $F_{50\Omega}$ = 2.35 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 BGA612 is a broadband matched, general purpose MMIC amplifier in a Darlington configuration. It is optimized for a typical supply current of 20mA.

The BGA612 is based on Infineon Technologies' B7HF Silicon Germanium technology.

ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Package	Marking	Chip
BGA612	SOT343	BNs	T0545

Maximum Ratings

Parameter	Symbol	Value	Unit
Device voltage	V_D	2.8	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 < 105°C [2]	P_{tot}	225	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 $Z_S=Z_L=50\Omega$, $V_{CC}=5V$, $R_{Bias}=135\Omega$
[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)
$V_{CC}=5V$, $R_{Bias}=135\Omega$, Frequency=2GHz, unless otherwise specified

Parameter	Symbol	min.	typ.	max.	Unit
Insertion power gain	$\|S_{21}\|^2$				dB
f = 0.1GHz		-	17.5	-	
f = 1.0GHz		-	17.0	-	
f = 2.0GHz		-	15.8	-	
Noise Figure ($Z_S=50\Omega$)	$F_{50\Omega}$				dB
f = 0.1GHz		-	1.95	-	
f = 1.0GHz		-	2.25	-	
f = 2.0GHz		-	2.35	-	
Output Power at 1dB Gain Compression	P_{-1dB}	-	7	-	dBm
Output Third Order Intercept Point	OIP_3	-	17	-	dBm
Input Return Loss	RL_{In}	-	18	-	dB
Output Return Loss	RL_{Out}	-	21	-	dB
Total Device Current	I_D	-	20	-	mA

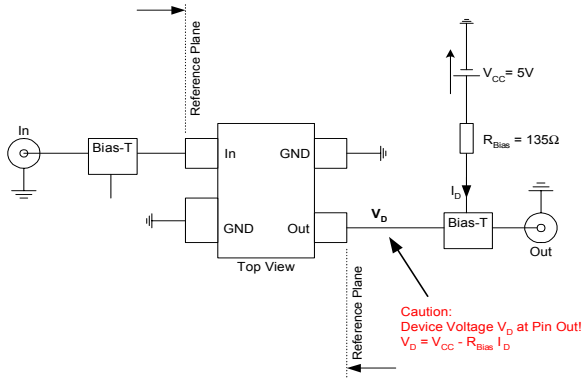
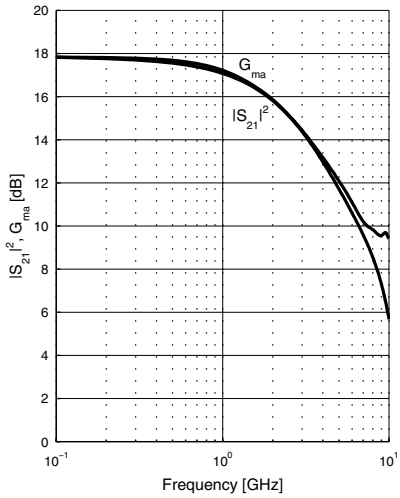


Fig.1: Test Circuit for Electrical Characteristics and S-Parameters

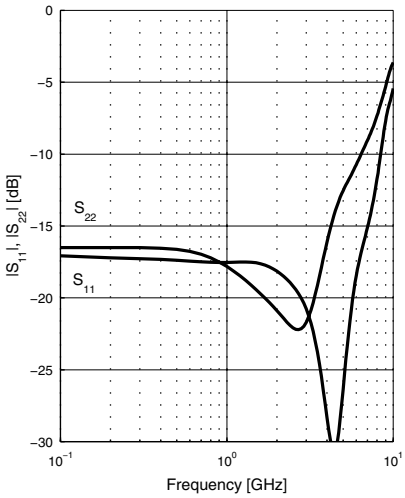
S-Parameter V_{CC}=5V, R_{Bias}=135Ω (see Electrical Characteristics for conditions)

Frequency [GHz]	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
0.1	0.1803	5.5	7.6542	177.5	0.0960	0.0	0.1497	-1.2
0.2	0.1146	7.3	7.7188	173.3	0.0964	1.2	0.1499	-4.6
0.4	0.1345	7.4	7.6068	166.6	0.0956	1.8	0.1503	-11.3
0.6	0.1307	4.4	7.5301	159.7	0.0965	2.8	0.1457	-18.2
0.8	0.1310	5.5	7.3697	153.2	0.0961	4.0	0.1384	-25.5
1.0	0.1341	3.3	7.1755	146.6	0.0969	5.1	0.1292	-33.0
1.2	0.1337	3.8	6.9799	140.8	0.0978	6.4	0.1198	-40.2
1.4	0.1311	3.8	6.7873	134.4	0.0986	6.7	0.1111	-48.5
1.6	0.1302	3.8	6.5728	129.2	0.1002	8.1	0.1033	-57.4
1.8	0.1257	-1.7	6.3555	123.6	0.1018	8.8	0.0958	-67.5
2.0	0.1258	-3.5	6.1539	118.4	0.1044	9.6	0.0891	-78.0
3.0	0.0878	-9.4	5.2390	94.7	0.1172	12.1	0.0823	-146.8
4.0	0.0409	5.2	4.4689	74.0	0.1346	11.6	0.1550	170.5
5.0	0.0517	119.1	3.8775	54.8	0.1544	8.7	0.2362	148.3
6.0	0.1209	131.0	3.3943	36.2	0.1737	3.3	0.2929	129.2
7.0	0.1796	114.7	2.9678	20.2	0.1929	-2.4	0.3527	115.2
8.0	0.2594	104.3	2.6995	2.8	0.2132	-10.7	0.4330	104.6

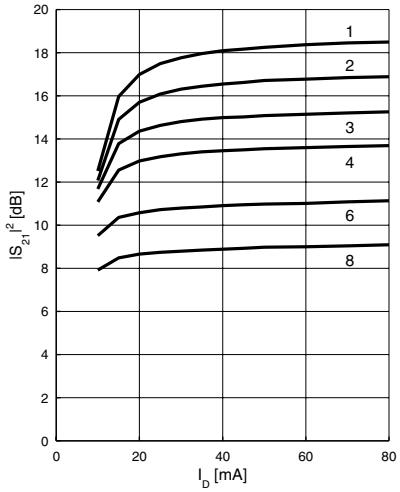
Power Gain $|S_{21}|^2$, G_{ma} = f(f)
V_{CC} = 5V, R_{Bias} = 135Ω, I_C = 20mA



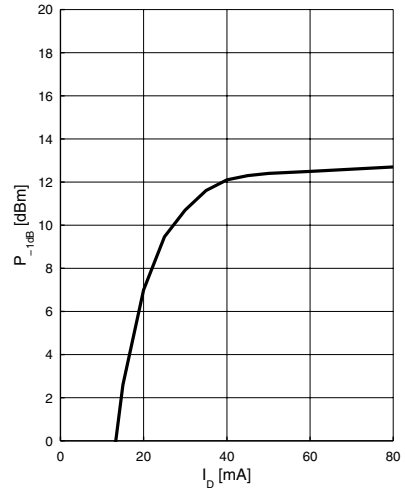
Matching $|S_{11}|$, $|S_{22}|$ = f(f)
V_{CC} = 5V, R_{Bias} = 135Ω, I_C = 20mA



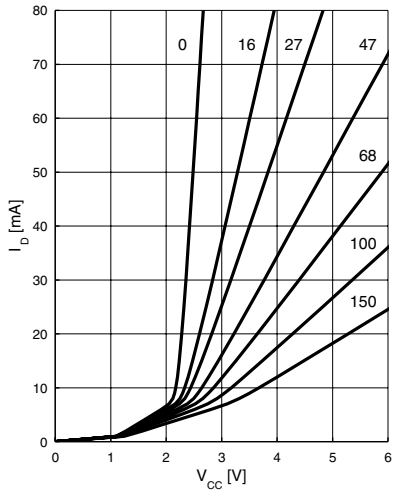
Power Gain $|S_{21}|$ = f(I_D)
f = parameter in GHz



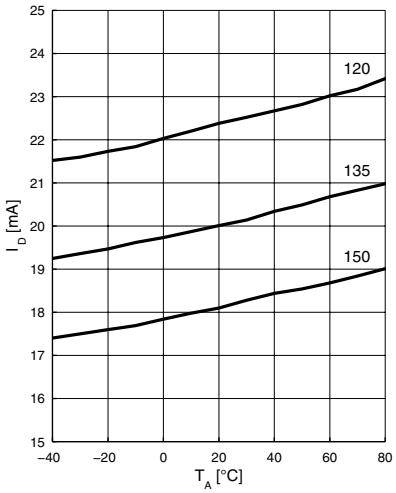
Output Compression Point
P_{-1dB} = f(I_D), f = 2GHz



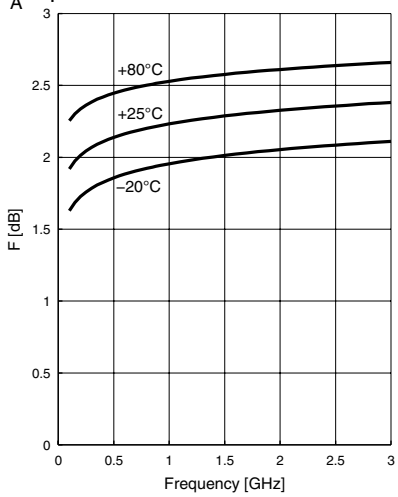
Device Current $I_D = f(V_{CC})$
R_{Bias} = parameter in Ω



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} = 135Ω, Z_S = 50Ω
T_A = parameter in °C



Package Outline