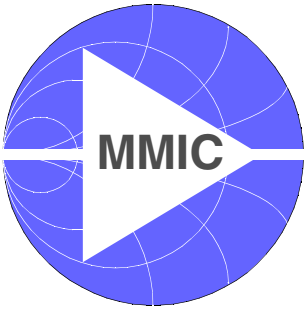
BGA616

Silicon Germanium Broadband MMIC Amplifier



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Silicon Discretes

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BGA616
Preliminary data sheet

Revision History:	**2002-05-29**	Preliminary
Previous Version:	2001-11-14	

Page	Subjects (major changes since last revision)
5	Maximum input power specified
6	Typical bias condition at test circuit for electrical characteristics and s-parameters changed from V_{CC}=5V and R_{Bias}=15Ω to V_{CC}=6V and R_{Bias}=33Ω

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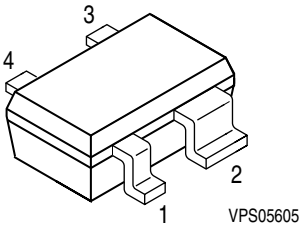
Preliminary

Silicon Germanium Broadband MMIC Amplifier

BGA616

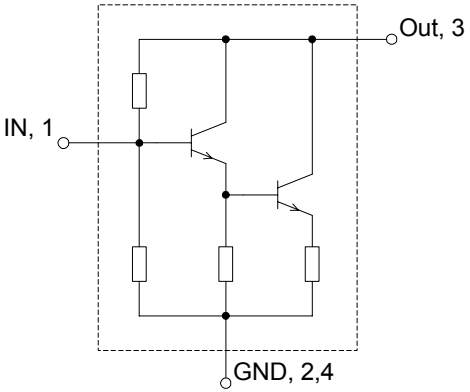
Features

- Cascadable 50Ω-gain block
- 3 dB-bandwidth: DC to 2.7 GHz with 18.5 dB typical gain at 1.0 GHz
- Compression point P_{-1dB} = 18 dBm at 2.0 GHz
- Noise figure $F_{50\Omega}$ = 2.90 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 BGA616 is a broadband matched, general purpose MMIC amplifier in a Darlington configuration. It is optimized for a typical supply current of 60mA.

The BGA616 is based on Infineon Technologies' B7HF Silicon Germanium technology.

ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Package	Marking	Chip
BGA616	SOT343	BPs	T0566

Preliminary

Maximum Ratings

Parameter	Symbol	Value	Unit
Device voltage	V_D	4.5	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 < 78°C [2]	P_{tot}	360	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 $Z_S=Z_L=50\Omega$, $V_{CC}=6V$, $R_{Bias}=32\Omega$
[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}=6V, R_{Bias}=33Ω, 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		-	17.5	-	
Noise Figure (Z_S=50Ω)	$F_{50\Omega}$				dB
f = 0.1GHz		-	2.50	-	
f = 1.0GHz		-	2.80	-	
f = 2.0GHz		-	2.90	-	
Output Power at 1dB Gain Compression	P_{-1dB}	-	18	-	dBm
Output Third Order Intercept Point	OIP_3	-	29	-	dBm
Input Return Loss	RL_{In}	-	19	-	dB
Output Return Loss	RL_{Out}	-	25	-	dB
Total Device Current	I_D	-	60	-	mA

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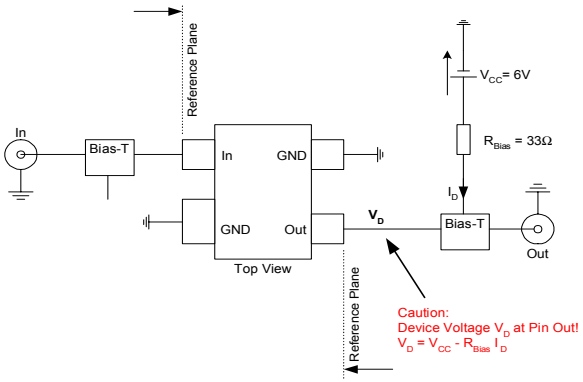

Fig.1: Test Circuit for Electrical Characteristics and S-Parameters

S-Parameter V_{CC}=6V, R_{Bias}=33Ω (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	0.0788	36.2	9.3218	177.9	0.0758	-0.1	0.1072	1.0
0.2	0.0822	10.5	9.3036	173.8	0.0756	1.0	0.1071	-1.2
0.4	0.0824	15.1	9.1939	166.6	0.0749	2.5	0.1082	-3.8
0.6	0.0888	17.9	9.0876	160.2	0.0748	4.4	0.1052	-7.0
0.8	0.0981	15.7	8.8024	153.5	0.0752	6.1	0.0999	-10.4
1.0	0.1033	20.0	8.5448	147.6	0.0762	8.0	0.0937	-14.0
1.2	0.1103	22.4	8.3023	141.8	0.0772	9.3	0.0860	-16.7
1.4	0.1134	20.4	8.0733	135.4	0.0782	10.6	0.0800	-20.7
1.6	0.1159	18.6	7.8136	130.5	0.0801	12.2	0.0735	-24.8
1.8	0.1113	13.6	7.5448	125.1	0.0820	13.1	0.0666	-29.8
2.0	0.1201	15.4	7.3943	120.1	0.0831	14.5	0.0578	-35.8
3.0	0.0875	7.4	6.2842	97.2	0.0969	18.2	0.0165	-116.2
4.0	0.0512	20.9	5.3567	77.5	0.1136	18.3	0.0831	164.4
5.0	0.0422	107.8	4.6655	59.3	0.1333	15.8	0.1644	147.1
6.0	0.0960	137.4	4.1016	41.5	0.1538	10.6	0.2237	129.0
7.0	0.1586	122.7	3.6045	26.0	0.1734	4.8	0.2858	116.3
8.0	0.2356	113.5	3.2953	9.3	0.1950	-3.0	0.3679	108.2

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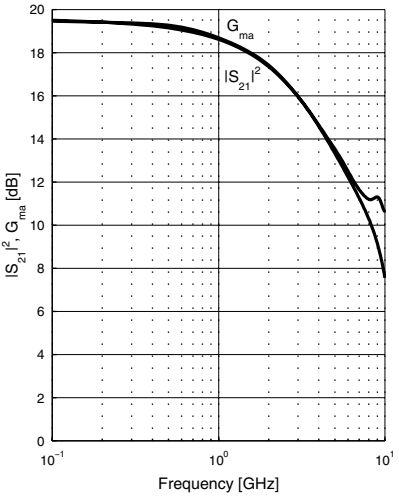
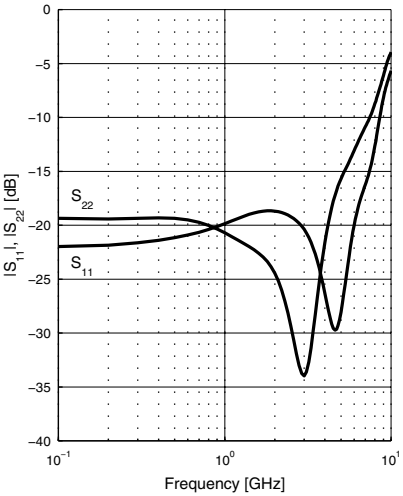
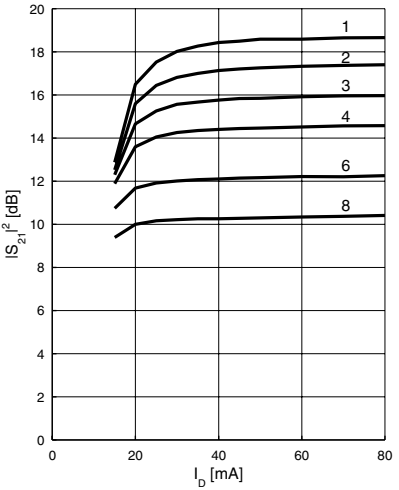
Power Gain $|S_{21}|^2$, G_{ma} = f(f)
V_{CC} = 6V, R_{Bias} = 33Ω, I_C = 60mA



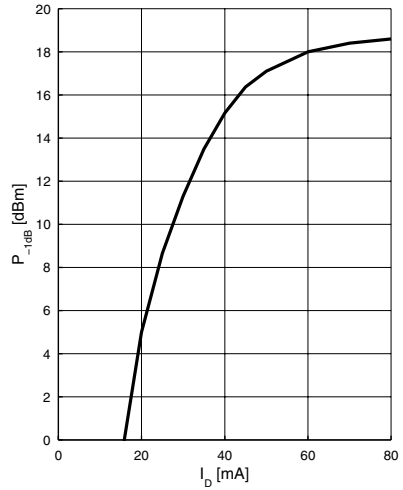
Matching $|S_{11}|$, $|S_{22}|$ = f(f)
V_{CC} = 6V, R_{Bias} = 33Ω, I_C = 60mA



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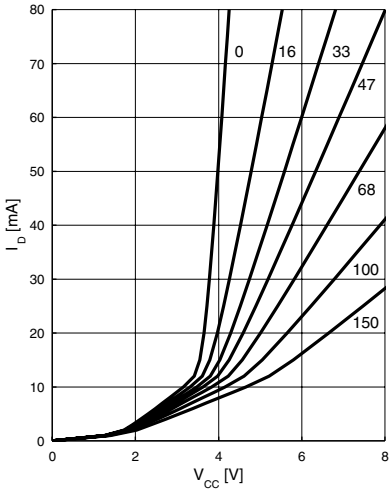
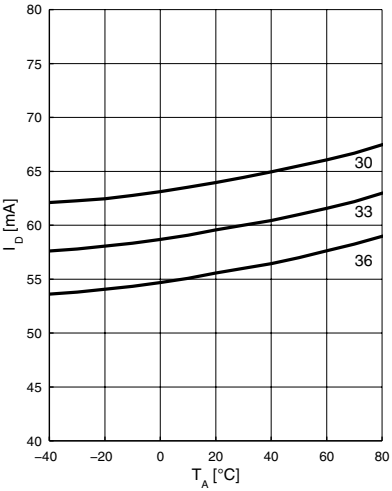
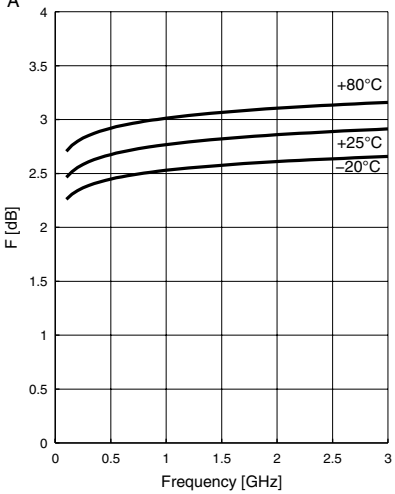
Device Current $I_D = f(V_{CC})$
R_{Bias} = parameter in Ω



Device Current $I_D = f(T_A)$
V_{CC} = 6V, R_{Bias} = parameter in Ω



Noise figure F = f(f)
V_{CC} = 6V, R_{Bias} = 33Ω, Z_S = 50Ω
T_A = parameter in °C



Package Outline