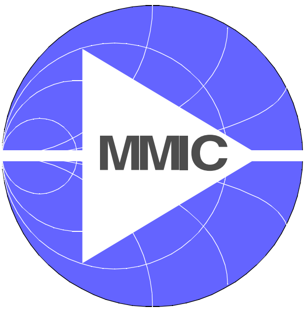
BGA622

Silicon Germanium
Wide Band Low Noise Amplifier



Wireless
Silicon Discretes

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Never stop thinking.

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BGA622
Preliminary data sheet
Revision History: **2001-11-09** Preliminary

Previous Version: 2001-09-25

Page	Subjects (major changes since last revision)
5 - 8	Electrical characteristics adjusted

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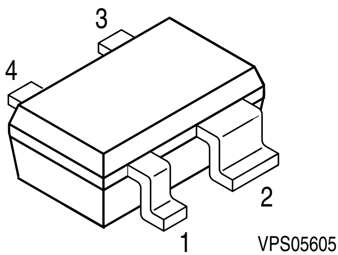
Preliminary

Silicon Germanium
Wide Band Low Noise Amplifier

BGA622

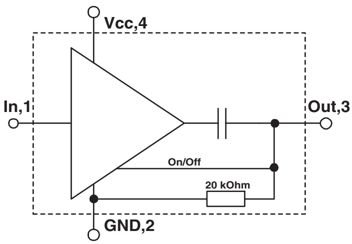
Features

- High gain, $|S_{21}|^2$=16 dB at 1.9 GHz
  $|S_{21}|^2$=15 dB at 2.14 GHz
  $|S_{21}|^2$=14 dB at 2.4 GHz
- Low noise figure, NF=1.1 dB at 2.14 GHz
- Operating frequency range 0.5 - 6 GHz
- Typical supply voltage: 2.75 V
- On/Off - Switch
- Output-match on chip, input pre-matched
- Low part count
- 70 GHz f_T - Silicon Germanium technology



Applications

- LNA for GSM, GPS, DCS, PCS, UMTS, Bluetooth, ISM and WLAN



Description

The BGA622 is a wide band low noise amplifier, based on Infineon Technologies' Silicon Germanium Technology B7HF. In order to provide the LNA in a small package the out-pin is simultaneously used for RF out and On/Off switch. This functionality can be accessed using a RF-Choke at the Out pin, where a DC level of 0 V or an open switches the device on and a DC level of Vcc switches the device off. While the device is switched off, it provides an insertion loss of 20 dB together with a high IIP3 up to 15 dBm.

ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Package	Marking	Chip
BGA622	SOT343	BRs	T535

Preliminary

Maximum Ratings

Parameter	Symbol	Value	Unit
Voltage at pin Vcc	V_{cc}	3.5	V
Voltage at pin Out	V_{OUT}	4	V
Current into pin In	I_{IN}	0.1	mA
Current into pin Out	I_{OUT}	1	mA
Current into pin Vcc	I_{Vcc}	10	mA
Total power dissipation, T_S < 139 °C [1)]	P_{tot}	35	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	$R_{th\ JS}$	300	K/W

Notes:
All Voltages refer to GND-Node
[1)] T_S is measured on the ground lead at the soldering point

Electrical Characteristics at T_A=25°C (measured according to fig. 1)
Vcc=2.75V, Frequency=2.14GHz, unless otherwise specified

Parameter	Symbol	min.	typ.	max.	Unit
Insertion power gain	$\|S_{21}\|^2$		15		dB
Insertion power gain (Off-State)	$\|S_{21}\|^2$		-20		dB
Input Return Loss (On-State)	RL_{IN}		8		dB
Output Return Loss (On-State)	RL_{OUT}		13		dB
Noise Figure (Z_S=50Ω)	$F_{50\Omega}$		1.1		dB
Input Third Order Intercept Point[1)] (On-State) Δf=1MHz, P_{IN}=-28dBm	IIP_3		2		dBm
Input Third Order Intercept Point[1)] (Off-State) Δf=1MHz, P_{IN}=-8dBm	IIP_3		15		dBm
Input Power at 1dB Gain Compression	P_{-1dB}		-15.8		dBm
Total Device Off Current, V_{CC}=2.75V, V_{out}=V_{CC}	$I_{tot\text{-}off}$		260		µA
Total Device On Current, V_{CC}=2.75V	$I_{tot\text{-}on}$		5.8		mA

[1)] IP3 value depends on termination of all intermodulation frequency components. Termination used for this measurement is 50Ω from 0.1MHz to 6GHz.

Preliminary

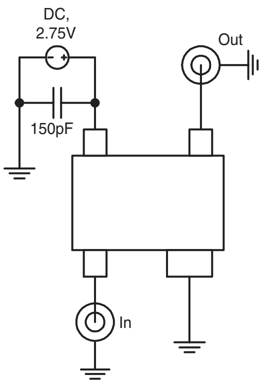
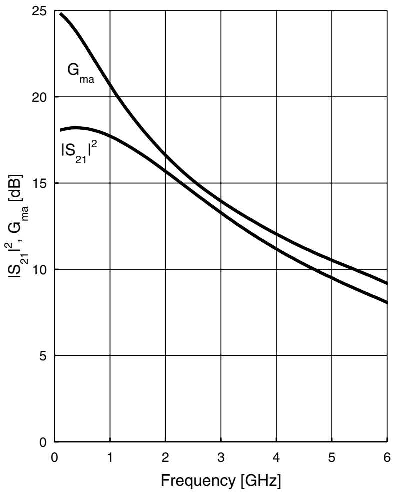
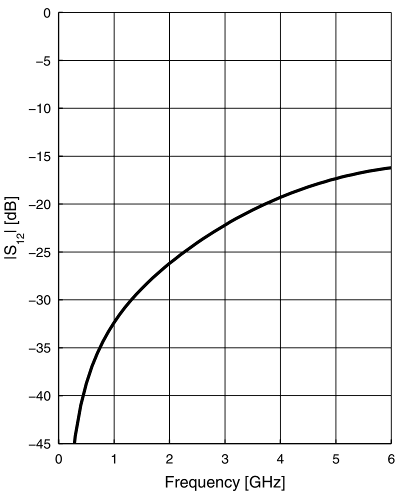


Fig. 1: S-Parameter Test Circuit

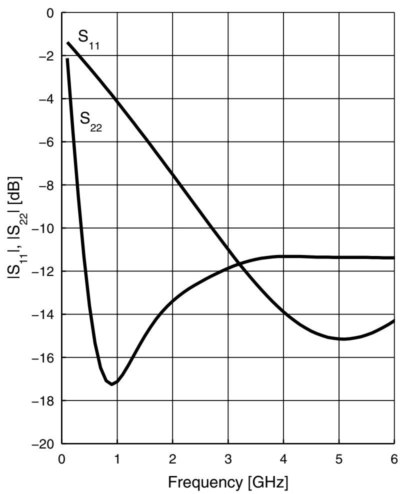
Power Gain $|S_{21}|^2$, G_{ma} = f(f)
V_{CC} = 2.75V, I_{tot-on} = 5.8mA



Reverse Isolation $|S_{12}|$ = f(f)
V_{CC} = 2.75V, I_{tot-on} = 5.8mA

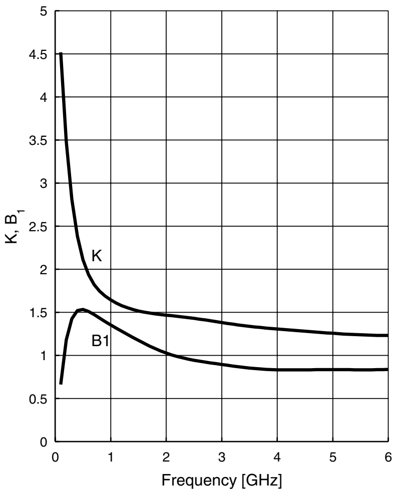


Matching $|S_{11}|$, $|S_{22}|$ = f(f)
V_{CC} = 2.75V, I_{tot-on} = 5.8mA

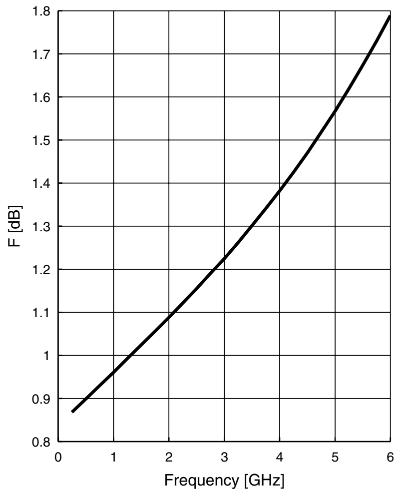


Preliminary

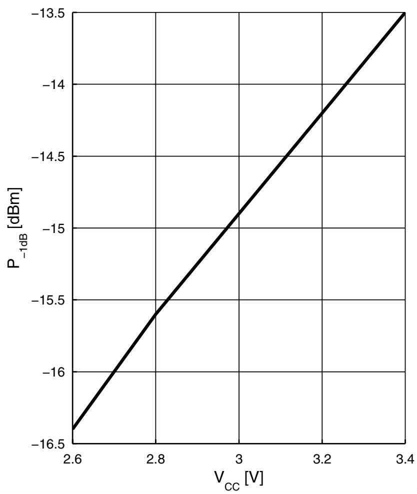
Stability K, B_1 = f(f)
V_{CC} = 2.75V, I_{tot-on} = 5.8mA



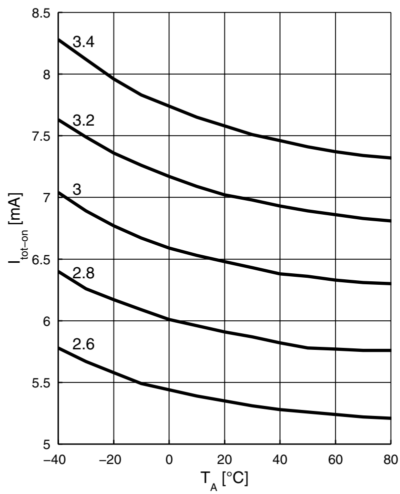
Noise Figure F = f(f)
V_{CC} = 2.75V, I_{tot-on} = 5.8mA, Z_S = 50Ω



Input Compression Point P_{-1dB} = f(V_{CC})
f = 2.14GHz, T_A = –40 ... +85°C



Device Current I_{tot-on} = f(T_A, V_{CC})
V_{CC} = parameter in V



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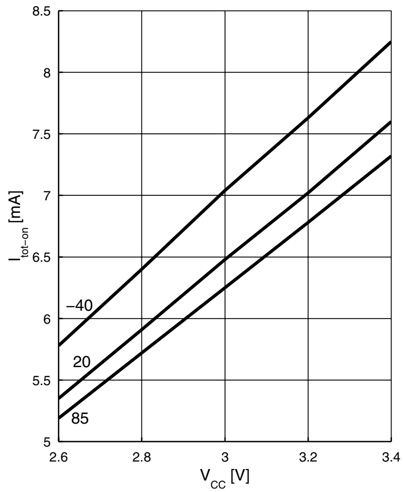
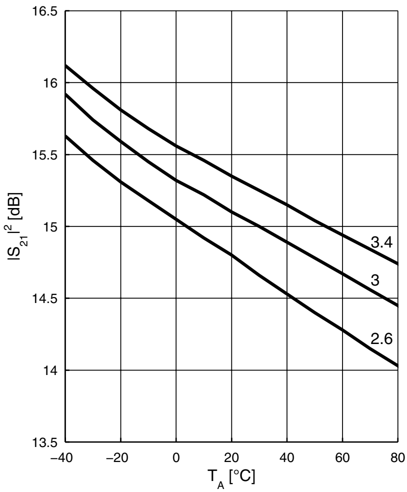
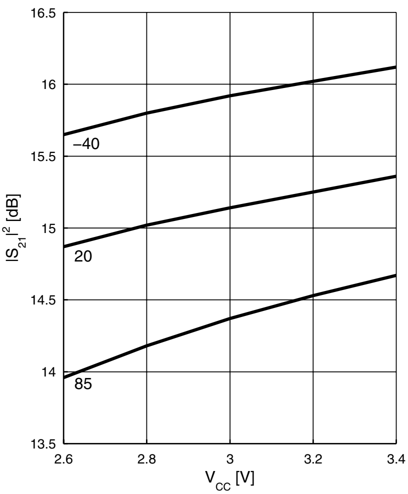
Device Current $I_{tot-on} = f(V_{CC}, T_A)$
T_A = parameter in °C



Power Gain $|S_{21}|^2 = f(T_A, V_{CC})$
f = 2.14GHz, V_{CC} = parameter in V



Power Gain $|S_{21}|^2 = f(V_{CC}, T_A)$
f = 2.14GHz, T_A = parameter in °C



Package Outline