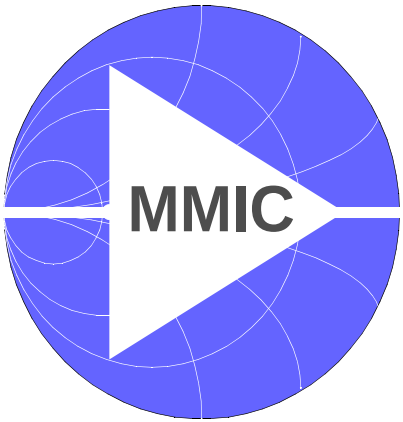
BGA622L7

Silicon Germanium
Wide Band Low Noise Amplifier



Silicon Discretes

Never stop thinking.

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Information

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Warnings

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

BGA622L7
Data Sheet
Revision History: 2004-11-04

Previous Version: 2004-07-27

Page	Subjects (major changes since last revision)

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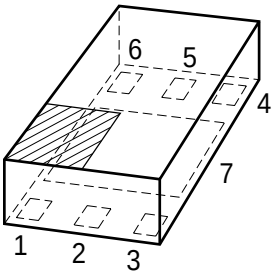
Silicon Germanium **BGA622L7**
Wide Band Low Noise Amplifier

Features

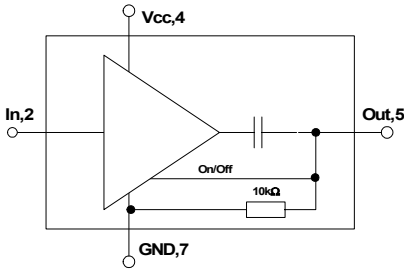
- High gain, $|S_{21}|^2$=17.5 dB at 1.575 GHz
  $|S_{21}|^2$=16.8 dB at 1.9 GHz
  $|S_{21}|^2$=16.2 dB at 2.14 GHz
  $|S_{21}|^2$=15.5 dB at 2.4 GHz
- Low noise figure, NF=1.0 dB at 1.575 GHz
- Operating frequency range 0.5 - 6 GHz
- Typical supply voltage: 2.75V
- On/Off - Switch
- Output-match on chip, input pre-matched
- Low external part count
- Tiny P-TSLP-7-1 leadless package
- 70 GHz f_T - Silicon Germanium technology



P-TSLP-7-1

Applications

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



Description

The BGA622L7 is a wide band low noise amplifier, based on Infineon Technologies' Silicon Germanium Technology B7HF. 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 23 dB together with a high IIP3 up to 24 dBm at GPS frequencies.

ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Package	Marking	Chip
BGA622L7	P-TSLP-7-1	BR	T1535

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
RF input power	P_{IN}	6	dBm
Total power dissipation, T_S < 142 °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	$R_{th\ JS}$	240	K/W

1) T_S is measured on the ground lead at the soldering point

Note: All Voltages refer to GND-Node

Electrical Characteristics at T_A=25°C (measured according to fig. 1)
Vcc=2.75 V, Frequency=1.575 GHz, unless otherwise specified

Parameter	Symbol	min.	typ.	max.	Unit
Insertion power gain	$\|S_{21}\|^2$		17.5		dB
Insertion power gain (Off-State)	$\|S_{21}\|^2$		-23		dB
Input Return Loss (On-State)	RL_{IN}		6		dB
Output Return Loss (On-State)	RL_{OUT}		13		dB
Noise Figure (Z_S=50Ω)	$F_{50\Omega}$		1.0		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		24		dBm
Input Power at 1dB Gain Compression	P_{-1dB}		-20		dBm
Total Device Off Current, V_{CC}=2.75V, V_{out}=V_{CC}	$I_{tot-off}$		260		µA
Total Device On Current, V_{CC}=2.75V	I_{tot-on}		5.8		mA

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

Electrical Characteristics at T_A=25°C (measured according to fig. 1)

Vcc=2.75 V, Frequency=2.14 GHz, unless otherwise specified

Parameter	Symbol	min.	typ.	max.	Unit
Insertion power gain	$\|S_{21}\|^2$		16.2		dB
Insertion power gain (Off-State)	$\|S_{21}\|^2$		-20		dB
Input Return Loss (On-State)	RL_{IN}		7		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		0		dBm
Input Third Order Intercept Point[1)] (Off-State) Δf=1MHz, P_{IN}=-8dBm	IIP_3		22		dBm
Input Power at 1dB Gain Compression	P_{-1dB}		-16		dBm

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

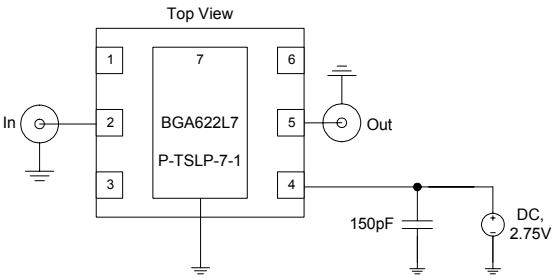
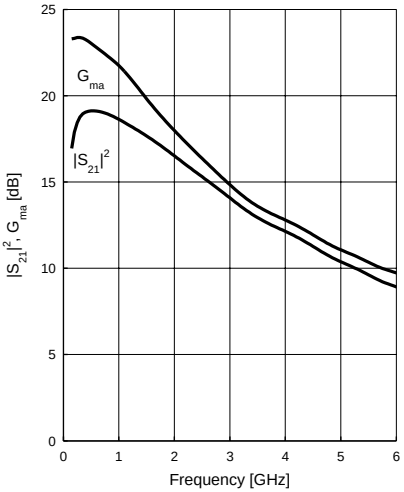
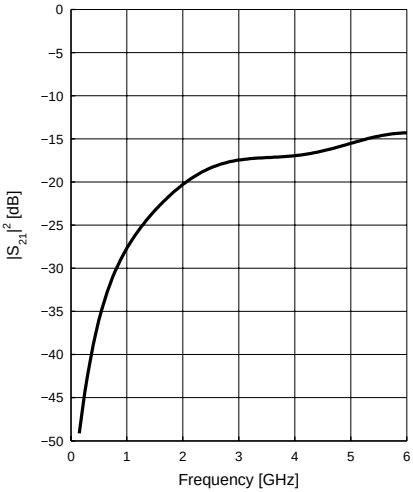


Figure 1 S-Parameter Test Circuit (loss-free microstrip line)

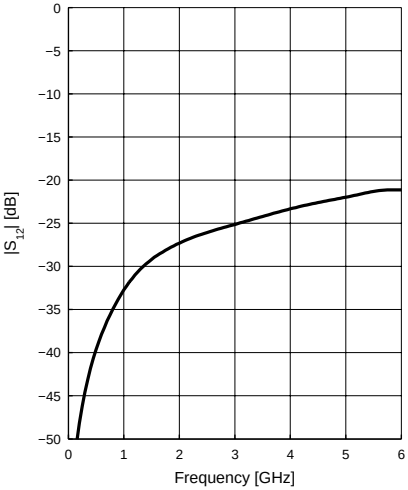
Power Gain $|S_{21}|^2$, G_{ma} = f(f)
V_{CC} = 2.75V, I_{tot-on} = 5.8mA



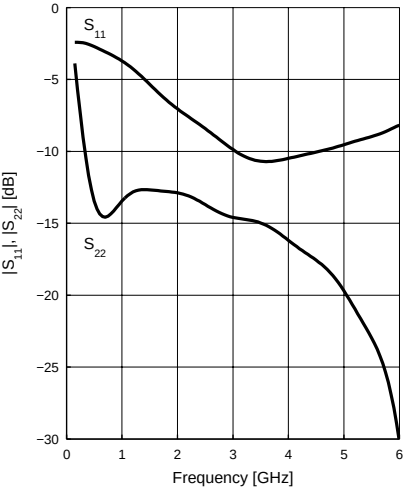
Off Gain $|S_{21}|^2$ = f(f)
V_{CC} = 2.75V, V_{OUT} = 2.75V, $I_{tot-off}$ = 0.3mA



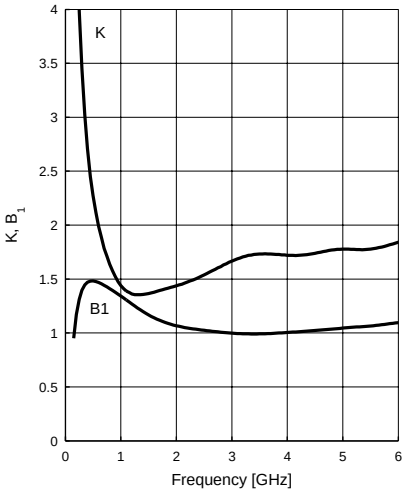
Reverse Isolation $|S_{12}|$ = f(f)
V_{CC} = 2.75V, I_{tot-on} = 5.8mA



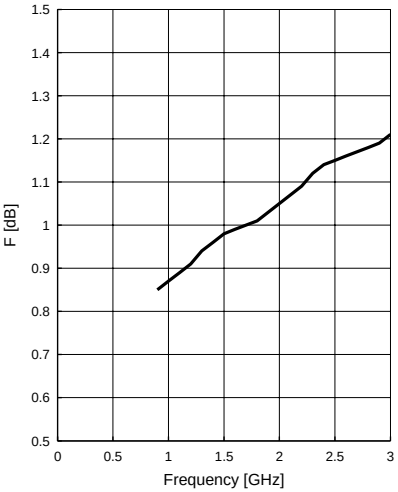
Matching $|S_{11}|$, $|S_{22}|$ = f(f)
V_{CC} = 2.75V, I_{tot-on} = 5.8mA



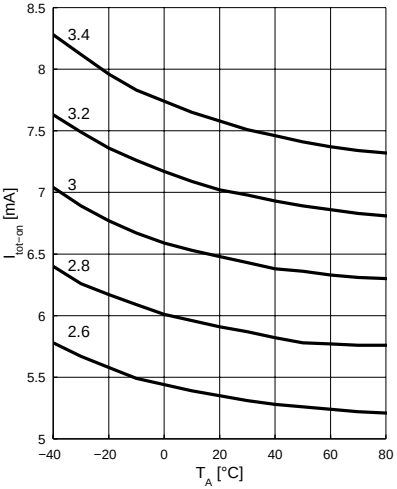
Stability K, B_1 = f(f)
V_{CC} = 2.75V, I_{tot-on} = 5.8mA



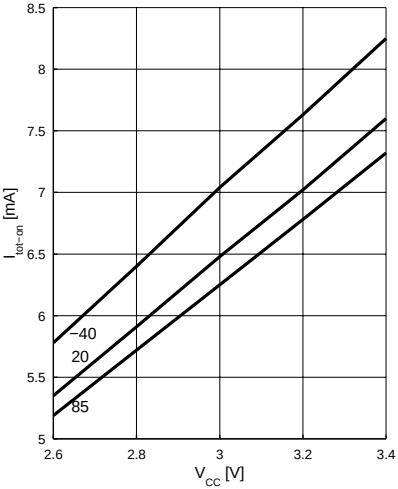
Noise Figure F = f(f)
V_{CC} = 2.75V, I_{tot-on} = 5.8mA, Z_S = 50Ω



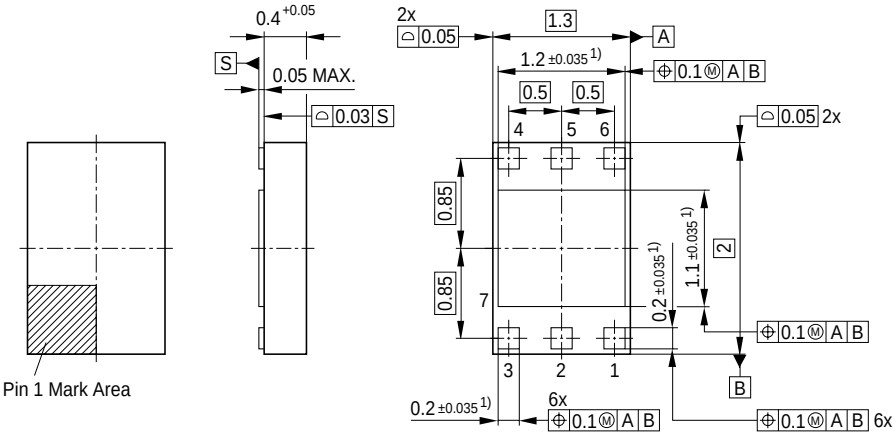
Device Current I_{tot-on} = f(T_A, V_{CC})
V_{CC} = parameter in V



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



Package Outline



1) Dimension applies to plated terminals

Tape loading orientation