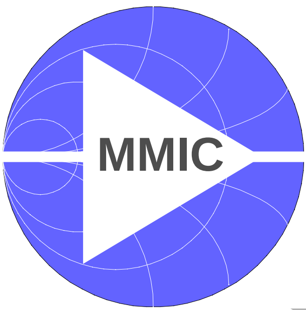
BGA430

Broad Band High Gain LNA



Wireless
Silicon Discretes

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Never stop thinking.

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BGA430
Preliminary data sheet

Revision History:	**2002-05-03**	Preliminary
Previous Version:	2002-01-22	

Page	Subjects (major changes since last revision)
5	Maximum input power specified

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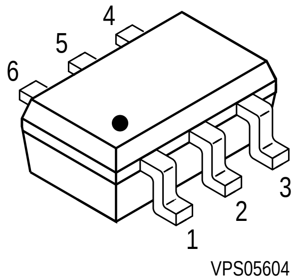
Preliminary

Broad Band High Gain LNA

BGA430

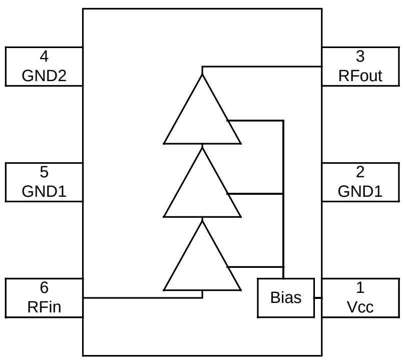
Features

- High gain $|S_{21}|^2$: 32 dB at 0.9 GHz, 28 dB at 2.15 GHz
- Low noise figure $F_{50\Omega}$: 2.2 dB at 0.9 GHz, 2.4 dB at 2.15 GHz
- Matched to 50Ω
- Reverse isolation > 40dB
- Small SOT363 package
- Typical supply voltage: 5V
- SIEGET®-25 technology



Applications

- LNB IF amplifiers
- CATV systems
- Set Top Boxes
- Buffer amplifiers for wide band applications



Description

The BGA430 is a broad band high gain amplifier based upon Infineon Technologies' Silicon Bipolar Technology B6HF. Housed in a small SOT363 package this Silicon Monolithic Microwave Integrated Circuit (MMIC) requires very few external components due to the integrated biasing concept.

Due to the advanced B6HF process the BGA430 achieves an exceptional low noise figure of 2.4 dB and a high gain of 28 dB at 2.15 GHz.

ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Package	Marking	Chip
BGA430	SOT363	PHs	T0509

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Maximum Ratings

Note: All voltages refer to GND-Node

Parameter	Symbol	Value	Unit
Device voltage	V_{CC}	6.5	V
Device current	I_D	35	mA
Current into pin In	I_B	1	mA
Input power[1]	P_{IN}	10	dBm
Total power dissipation, T_S < 80˚C[2]	P_{tot}	228	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

1) Valid for Z_S=Z_L=50Ω, V_{CC}=5V or V_{CC}=0V

2) T_S is measured on the emitter lead at the soldering point to the PCB

Electrical Characteristics at T_A=25˚C (measured on application PCB in fig. 2) **[1]**
V_{CC}=5V, unless otherwise specified

Parameter		Symbol	min.	typ.	max.	Unit
Insertion power gain	f=0.9GHz f=2.15GHz	$\|S_{21}\|^2$		32 28		dB
Noise figure (Z_S=50Ω)	f=0.9GHz f=2.15GHz	NF		2.2 2.4		dB
Output power at 1dB gain compression Z_L=50Ω	 f=0.9GHz f=2.15GHz	P_{-1dB}		 2 3		dBm
Output third order intercept point $Z_{S/L}$=50Ω	 f=0.9GHz f=2.15GHz	OIP_3		 12 13		dBm
Input return loss	f=0.9GHz f=2.15GHz	RL_{In}		20 12		
Output return loss	f=0.9GHz f=2.15GHz	RL_{Out}		9 15		
Device current		I_D		23		mA

1) Note: all measurement results are not compensated for PCB losses: 0.05 dB at 0.9 GHz, 0.2 dB at 2.15 GHz and 0.3 dB at 6 GHz at RFin / RFout

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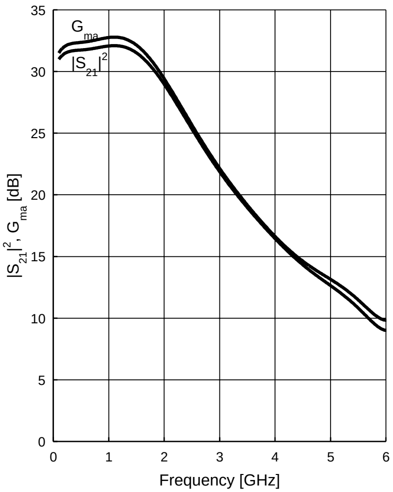
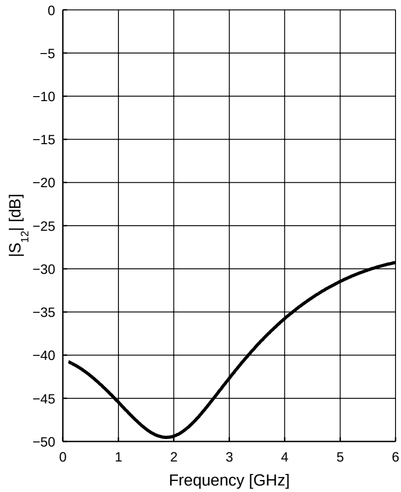
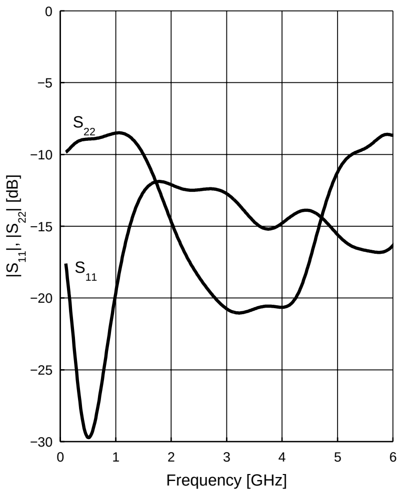
Power Gain $|S_{21}|^2$, $G_{ma} = f(f)$
$V_{CC} = 5V$



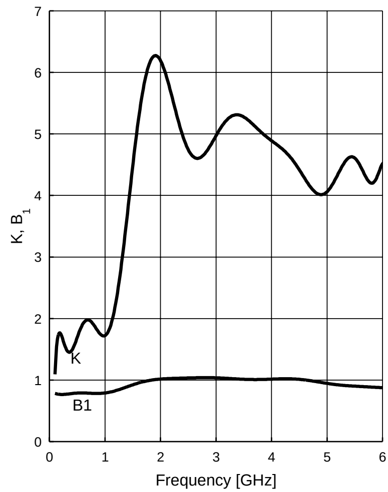
Reverse Isolation $|S_{12}| = f(f)$
$V_{CC} = 5V$



Matching $|S_{11}|$, $|S_{22}| = f(f)$
$V_{CC} = 5V$



Stability K, $B_1 = f(f)$
$V_{CC} = 5V$



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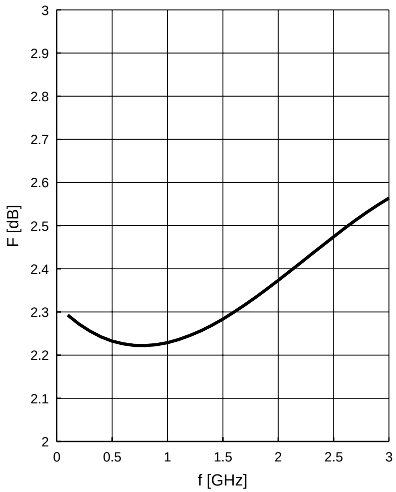
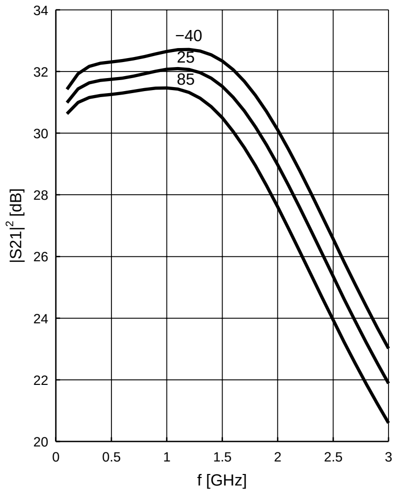
Noise figure F = f(f)

Z_S = 50Ω, V_{CC} = 5V



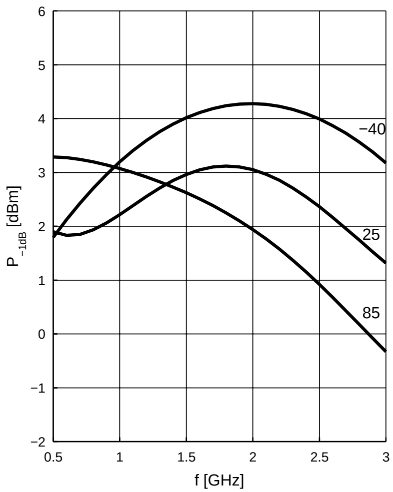
Power Gain $|S21|^2=f(T_A,f)$

T_A = parameter in °C, V_{CC} =5 V



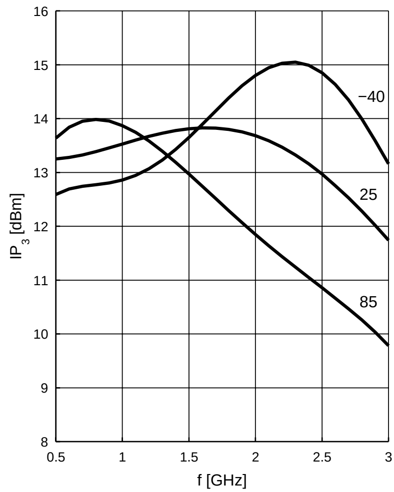
Output Compression Point $P_{-1dB}=f(T_A,f)$

T_A = parameter in °C, V_{CC} =5 V



Output 3rd Order Intercept Point

$IP_3=f(T_A,f)$, T_A = parameter in °C, V_{CC} = 5V



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Typical Application

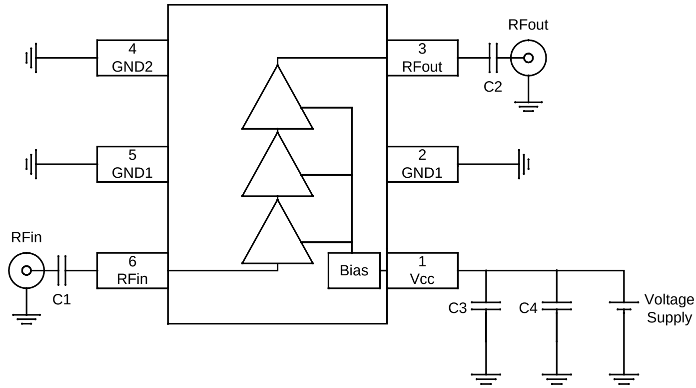
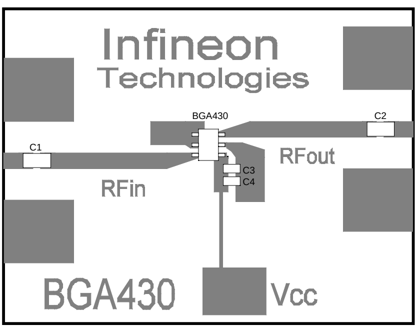


Figure 1 Typical application circuit

Notes:

Due to the high gain of the BGA430 RF blocking at the supply pin (V_{CC}) has to be done very carefully. A broad-band low impedance RF path to GND has to be provided at V_{CC}. If no appropriate RF blocking is used, RF can couple via the internal power lines to the input and the device might oscillate.

PCB layout for the application circuit



Part list:

C1, C2	100 pF coupling capacitors (not used for measurements)
C3	100pF
C4	100pF
IC1	BGA430

Figure 2 Double sided FR4 glass fiber epoxy board, thickness 0.5mm, ε_r=4.5

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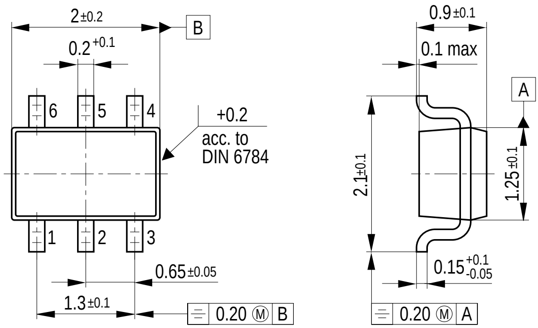
Package Outline



Tape Loading Orientation