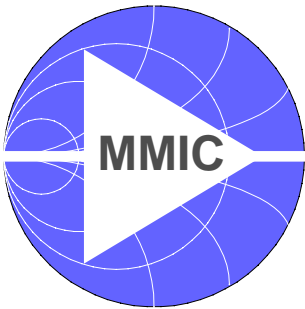


# BGA430

Broad Band High Gain LNA



Preliminary

Wireless  
Silicon Discretes



Never stop thinking.

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**BGA430****Preliminary data sheet****Revision History:**      **2002-05-03**

Preliminary

Previous Version:      2002-01-22

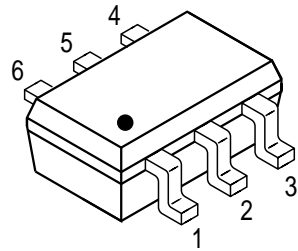
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Page	Subjects (major changes since last revision)
5	Maximum input power specified

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**Features**

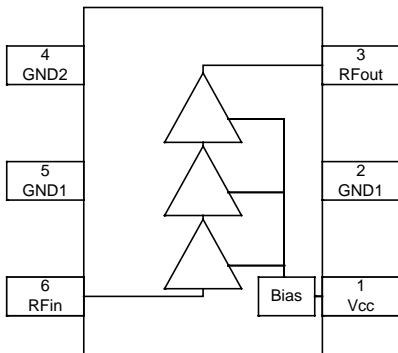
- High gain  $|S_{21}|^2$ : 32 dB at 0.9 GHz, 28 dB at 2.15 GHz
- Low noise figure  $F_{50\Omega}$ : 2.2 dB at 0.9 GHz, 2.4 dB at 2.15 GHz
- Matched to 50Ω
- Reverse isolation > 40dB
- Small SOT363 package
- Typical supply voltage: 5V
- SIEGET<sup>®</sup>-25 technology



VPS05604

**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

**Preliminary**
**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 <sup>1)</sup>	$P_{IN}$	10	dBm
Total power dissipation, $T_S < 80^\circ\text{C}^{2)}$	$P_{tot}$	228	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Ambient temperature range	$T_A$	-65 ... +150	$^\circ\text{C}$
Storage temperature range	$T_{STG}$	-65 ... +150	$^\circ\text{C}$
Thermal resistance: junction-soldering point	$R_{thJS}$	300	K/W

<sup>1)</sup> Valid for  $Z_S=Z_L=50\Omega$ ,  $V_{CC}=5V$  or  $V_{CC}=0V$

<sup>2)</sup>  $T_S$  is measured on the emitter lead at the soldering point to the PCB

**Electrical Characteristics** at  $T_A=25^\circ\text{C}$  (measured on application PCB in fig. 2) <sup>1)</sup>

$V_{CC}=5V$ , unless otherwise specified

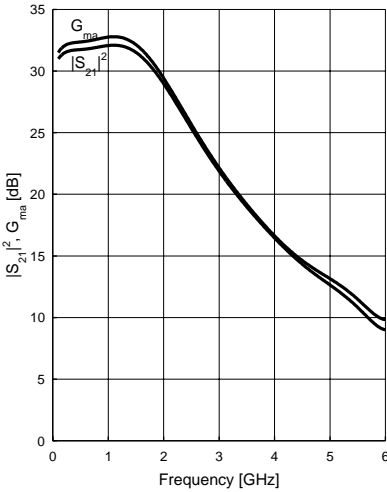
Parameter		Symbol	min.	typ.	max.	Unit
Insertion power gain	f=0.9GHz	$ S_{21} ^2$		32		dB
	f=2.15GHz			28		
Noise figure ( $Z_S=50\Omega$ )	f=0.9GHz	NF		2.2		dB
	f=2.15GHz			2.4		
Output power at 1dB gain compression $Z_L=50\Omega$	f=0.9GHz	$P_{-1dB}$		2		dBm
	f=2.15GHz			3		
Output third order intercept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

<sup>1)</sup> 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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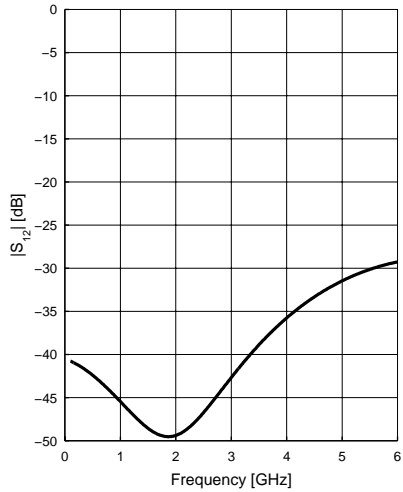
**Power Gain**  $|S_{21}|^2, G_{ma} = f(f)$

$V_{CC} = 5V$



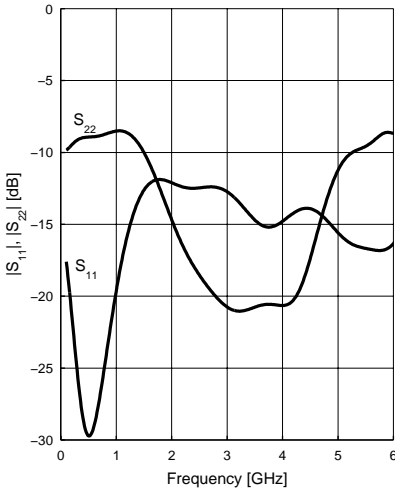
**Reverse Isolation**  $|S_{12}| = f(f)$

$V_{CC} = 5V$



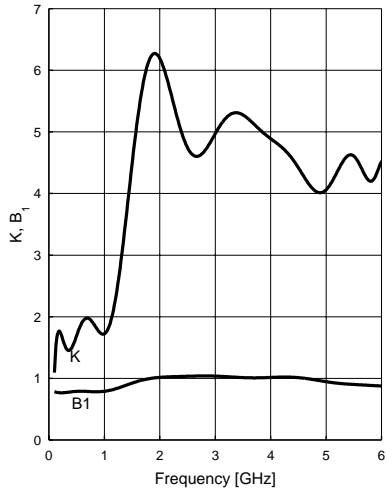
**Matching**  $|S_{11}|, |S_{22}| = f(f)$

$V_{CC} = 5V$



**Stability**  $K, B_1 = f(f)$

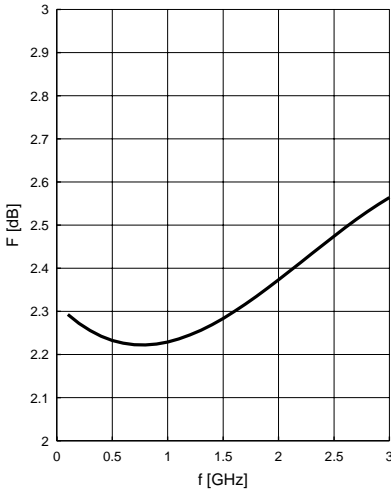
$V_{CC} = 5V$



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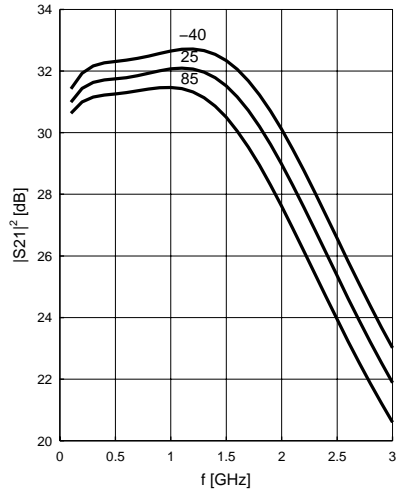
**Noise figure**  $F = f(f)$

$Z_S = 50\Omega, V_{CC} = 5V$



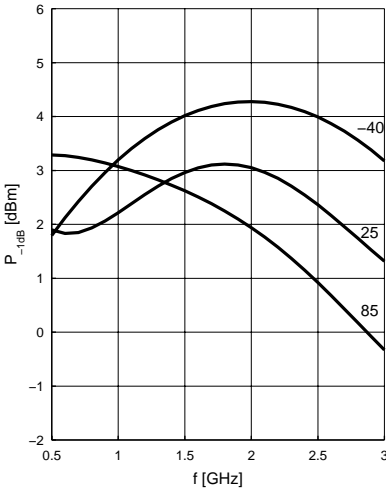
**Power Gain**  $|S_{21}|^2 = f(T_A, f)$

$T_A = \text{parameter in } ^\circ\text{C}, V_{CC} = 5V$



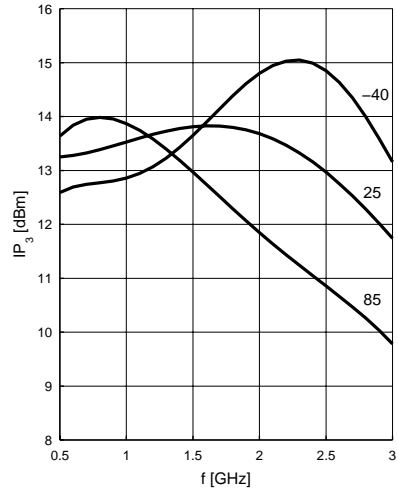
**Output Compression Point**  $P_{-1dB} = f(T_A, f)$

$T_A = \text{parameter in } ^\circ\text{C}, V_{CC} = 5V$



**Output 3rd Order Intercept Point**

$IP_3 = f(T_A, f), T_A = \text{parameter in } ^\circ\text{C}, V_{CC} = 5V$



Preliminary

Typical Application

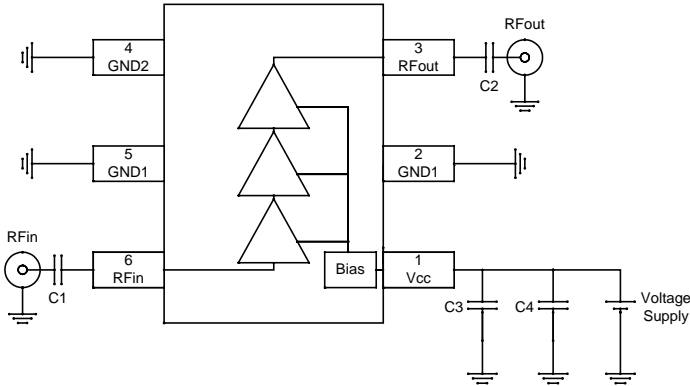
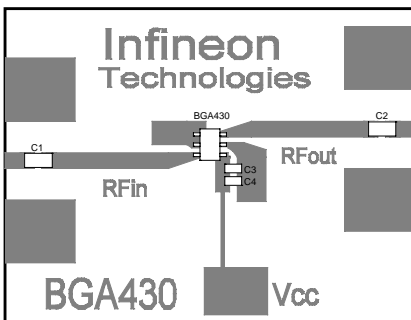


Figure 1 Typical application circuit

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:

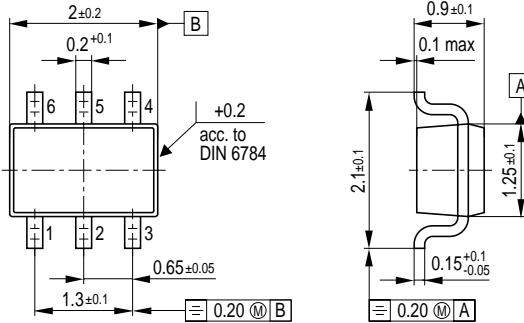
C1, C2	100 pF coupling capacitors (not used for measurements)
C3	100pF
C4	100pF
IC1	BGA430

Figure 2 Double sided FR4 glass fiber epoxy board, thickness 0.5mm,  $\epsilon_r=4.5$

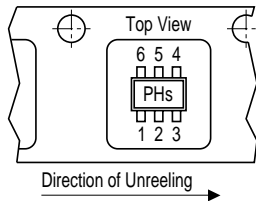


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Package Outline



Tape Loading Orientation



Marking on SOT-363 package (for example PHs) corresponds to pin 1 of device

Position in tape: pin 1 opposite of feed hole side

EHA07193