LX5560

InGaAs – E-Mode pHEMT Low Noise Amplifier

PRODUCTION DATA SHEET

DESCRIPTION

The LX5560 is a low noise amplifier (LNA) for WLAN applications in the 4.9-6.0 GHz frequency range. This LNA is manufactured with an InGaAs Enhancement mode pseudomorphic HEMT (E-pHEMT) process.

It operates with a single positive voltage supply of 3.3V, with noise figure(NF) of 1.7dB while maintaining input third order intercept point(IIP3) of up to +6dBm.

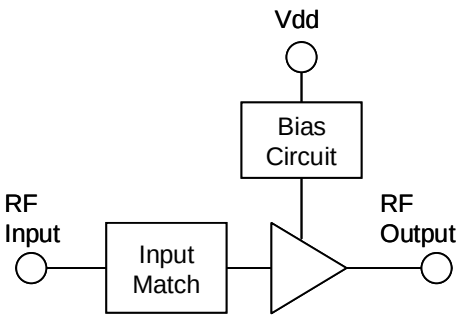
The LNA is implemented with bias circuit and input matching circuit on chip, resulting in simple external circuit. In addition, the on-chip bias circuit provides stable performance of gain, NF and current for voltage variation compared to a general resistor-network bias circuit.

The LX5560 is available in a 12-pin 2mmx2mm micro-lead package(MLPQ-12L).

KEY FEATURES

- 0.5µm InGaAs E-mode pHEMT
- 4.9 - 6GHz Operation
- Single 3.3V Supply
- Gain ~ 12dB
- Noise Figure ~ 1.7dB
- Input IP3 ~ +6dBm
- Input P1dB ~ +2dBm
- On-Chip Bias Circuit
- On-Chip Input Match
- Simple Output Match
- 2x2mm² MLPQ 12 Pin
- Low Profile 0.5mm

BLOCK DIAGRAM

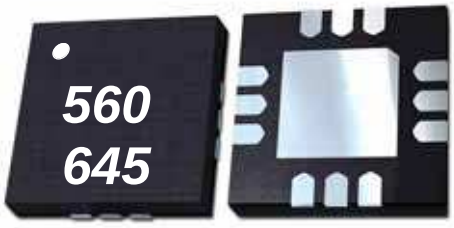


APPLICATIONS

- Wireless LAN 802.11a
- WiMax

IMPORTANT: For the most current data, consult *MICROSEMI*'s website: http://www.microsemi.com

PRODUCT HIGHLIGHT



PACKAGE ORDER INFO

LL	**Plastic MLPQ** **12 pin** RoHS Compliant / Pb-free
LX5560LL	

Note: Available in Tape & Reel. Append the letters "TR" to the part number. (i.e. LX5560LL-TR)

Rev. 1.0, 2006-12-20

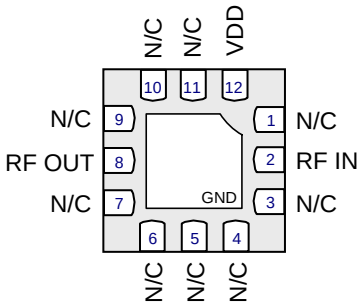
Microsemi
Integrated Products Division
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

ABSOLUTE MAXIMUM RATINGS

DC Supply Voltage, RF Off ..... 4 V
Drain Current ..... 40 mA
Total Power Dissipation ..... 0.15 W
RF Input Power ..... +10 dBm
Operation Ambient Temperature Range ..... -40°C to +85°C
Storage Temperature Range ..... -65°C to 150°C
Package Peak Temp. for Solder Reflow (40 seconds maximum exposure) ... 260°C (+0 -5)

Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of specified terminal.

PACKAGE PIN OUT



LL PACKAGE
(Bottom View)

RoHS / Pb-free NiPdAu Lead Finish

FUNCTIONAL PIN DESCRIPTION

Name	Pin #	Description
RF IN	2	RF Input for the low noise amplifier. This pin is DC-shorted to GND but AC-coupled to the transistor gate.
RF OUT	8	RF Output for the low noise amplifier. This pin is AC-coupled and does not require a DC-blocking capacitor.
VDD	12	Supply Voltage.
GND	Center Metal	The center metal base of the MLP package provides both DC and RF ground.
N/C	1,3,4,5,6,7, 9,10,11	Not Used. They may be treated either as open pins or connected to the ground.

Microsemi
Integrated Products Division
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

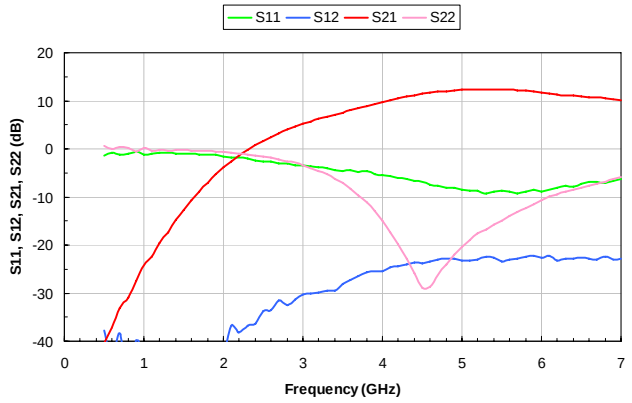
ELECTRICAL CHARACTERISTICS

Nominal test conditions: V_{DD} = 3.3V, I_{DD} = 9.5mA, T_A = 25°C (Room Temperature)

Parameter	Symbol	Test Conditions	LX5560			Units
			Min	Typ	Max	
Application Frequency Range	f		4.9		6	GHz
Small-Signal Gain	S21			12		dB
Noise Figure	NF	Room Temperature		1.7	2.1	dB
Input 3rd Order Intercept Point	IIP3	Freq. 1 = 5.25 GHz, Freq. 2 = 5.27 GHz		6		dBm
Input P1dB	IP1dB	Freq. = 5.5 GHz		2		dBm
Input Return Loss	S11			9		dB
Output Return Loss	S22			10		dB
Supply Voltage	V_{DD}			3.3		V
Supply Current	I_{DD}			9.5		mA

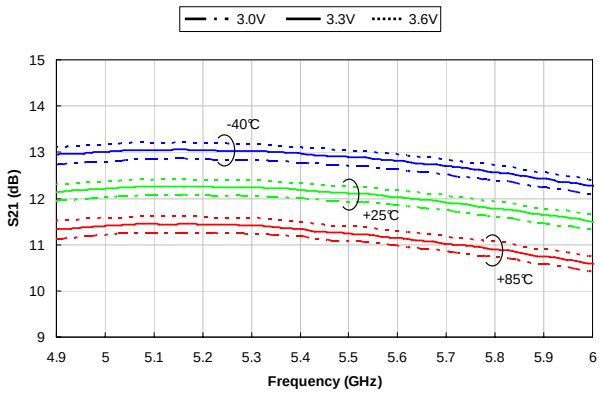
Microsemi
Integrated Products Division
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

S-PARAMETER

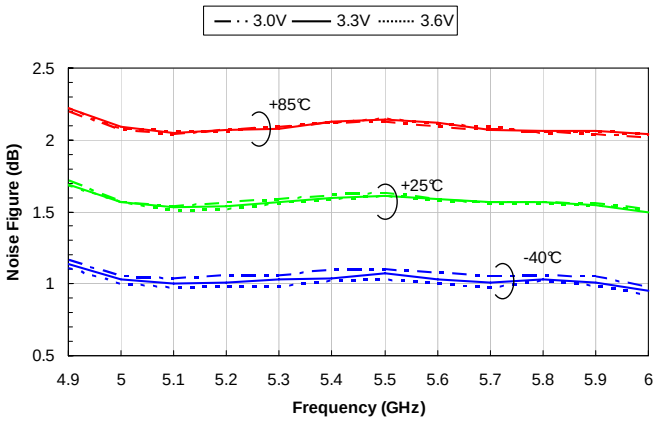


Typical S-Parameter Data at Room Temperature
(Vdd = 3.3V, Idd = 9.5mA at Room Temperature)

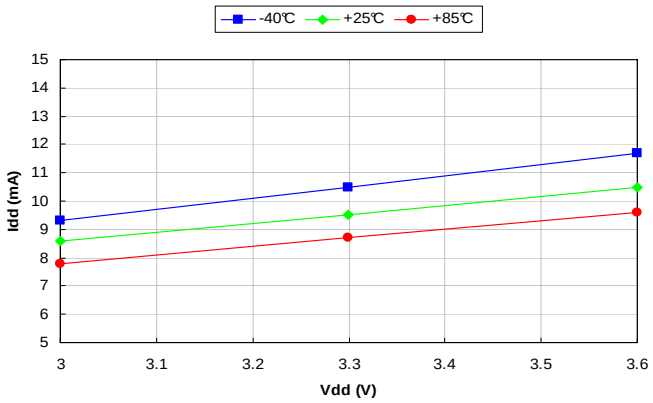
GAIN OVER TEMP



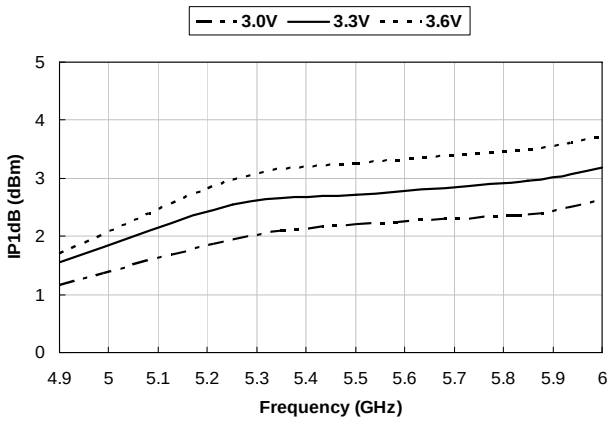
NOISE FIGURE OVER TEMP



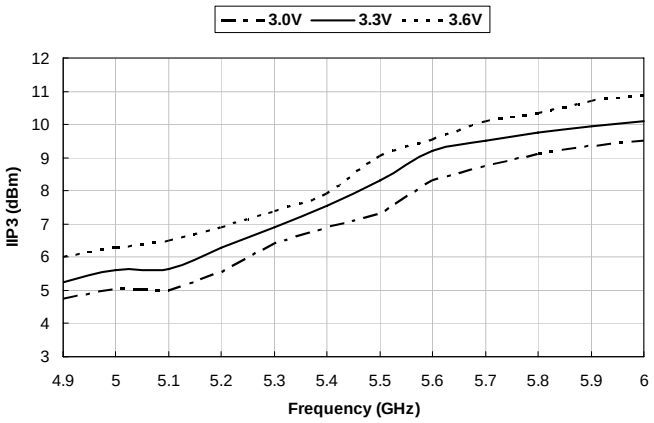
CURRENT OVER TEMP



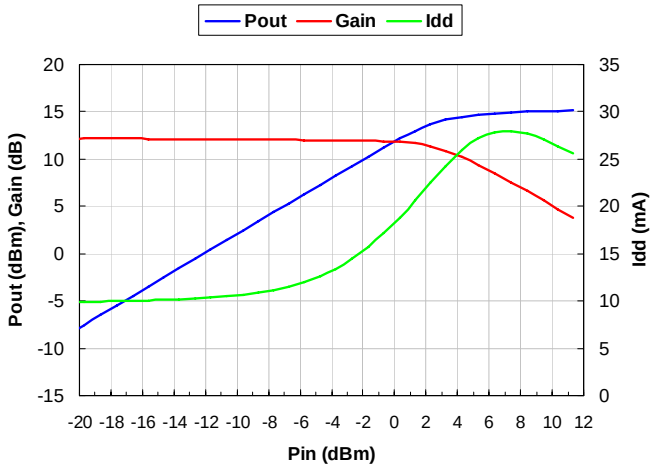
INPUT P1DB (+25°C)



INPUT IP3 (+25°C)



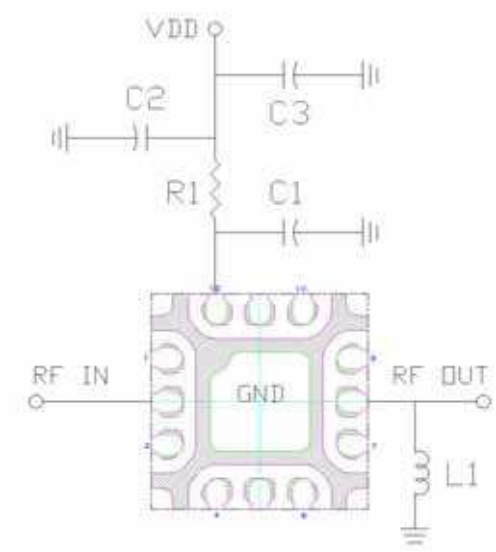
POWER SWEEP @ 5.5GHz



(Vdd=3.3V, Idq=9.5mA at Room Temperature)

Microsemi
Integrated Products Division
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

APPLICATION SCHEMATIC



BOM LIST

Reference Designator	Part Description	Case
C1	Capacitor, 1 pF	0402
C2	Capacitor,1 µF	0603
C3	Capacitor,10 µF	0805
L1	Inductor, 1.5 nH (TOKO : LL1005-FH1N5S)	0402
R1	Resistor, 30 Ohm	0402

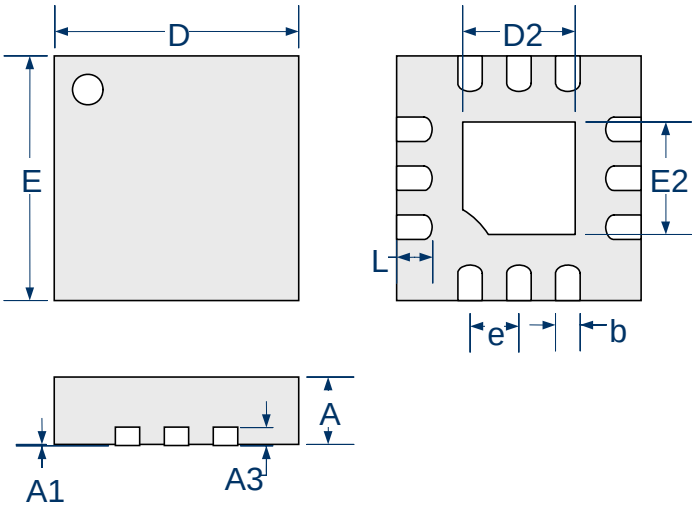
NOTES

- It is recommended to place C1 at ~30mil from MLP package outline.
- It is recommended to place L1 at ~30mil from MLP package outline.
- C2 and C3 are used for standalone evaluation board test only. They can be replaced with a 1nF(0402) in final applications.

Microsemi
Integrated Products Division
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

PACKAGE DIMENSIONS

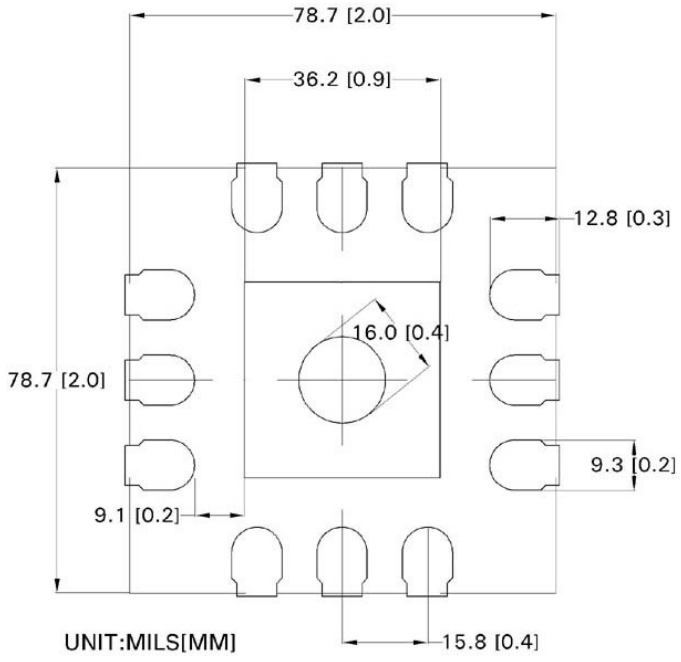
LL 12-Pin MLPQ Plastic (2x2mm)



Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.40	0.50	0.016	0.020
A1	0.00	0.05	0.000	0.002
A3	0.15 REF		0.006 REF	
b	0.15	0.25	0.006	0.010
D	2.00 BSC		0.079 BSC	
D2	0.77	1.02	0.030	0.040
E	2.00 BSC		0.079 BSC	
E2	0.77	1.02	0.030	0.040
e	0.40 BSC		0.016 BSC	
L	0.19	0.39	0.007	0.015

Note:

1. Dimensions do not include mold flash or protrusions; these shall not exceed 0.155mm(.006") on any side. Lead dimension shall not include solder coverage.



Recommended Land Pattern

Microsemi
Integrated Products Division
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

NOTES

Microsemi
Integrated Products Division
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570