HMC374 / 374E

v00.0405

SMT PHEMT LOW NOISE AMPLIFIER, 0.3 - 3.0 GHz

Typical Applications

The HMC374 / HMC374E is ideal for:

- Cellular/PCS/3G
- WCS, MMDS & ISM
- Fixed Wireless & WLAN
- Private Land Mobile Radio

Features

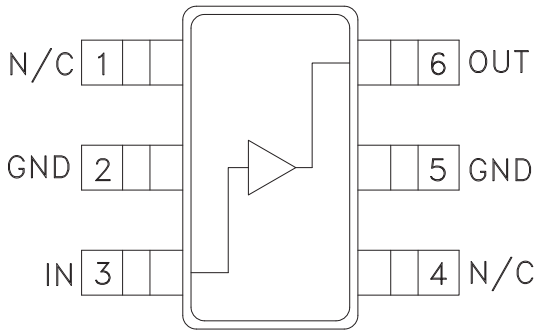
Single Supply: Vdd = +2.75 to +5.5V

Low Noise Figure: 1.5 dB

High Output IP3: +37 dBm

No External Matching Required

Functional Diagram



General Description

The HMC374 & HMC374E are general purpose broad band Low Noise Amplifiers (LNA) for use in the 0.3 - 3 GHz frequency range. The LNA provides 15 dB of gain and a 1.5 dB noise figure from a single positive supply of +2.75 to +5.5V. The low noise figure coupled with a high P1dB (22 dBm) and high OIP3 (37 dBm) make this part ideal for cellular applications. The compact LNA design utilizes on-chip matching for repeatable gain and noise figure performance. To minimize board area the design is offered in a low cost SOT26 package that occupies only 0.118" x 0.118".

Electrical Specifications, T_A = +25° C, Vdd= +5V

Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range		0.3 - 1.0			1.0 - 2.0			2.0 - 3.0		GHz
Gain	12	15		10	13		6	9		dB
Gain Variation Over Temperature		0.01	0.02		0.01	0.02		0.01	0.02	dB/°C
Noise Figure		1.5	1.9		1.6	2.0		1.8	2.2	dB
Input Return Loss		5			8			13		dB
Output Return Loss		7			9			9		dB
Output 1 dB Compression (P1dB)		22			22			22		dBm
Saturated Output Power (Psat)		23			23			23		dBm
Output Third Order Intercept (IP3)		37			37			37		dBm
Supply Current (Idd) (Vdd = +5V)		90			90			90		mA

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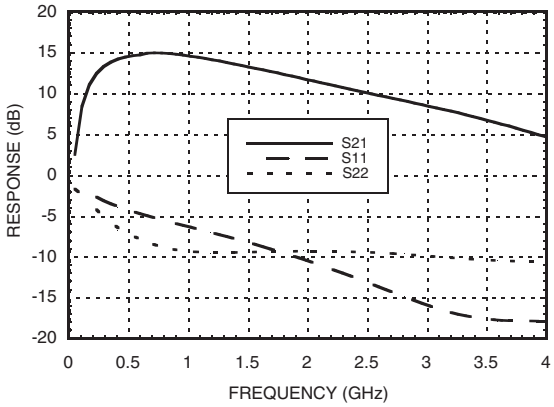
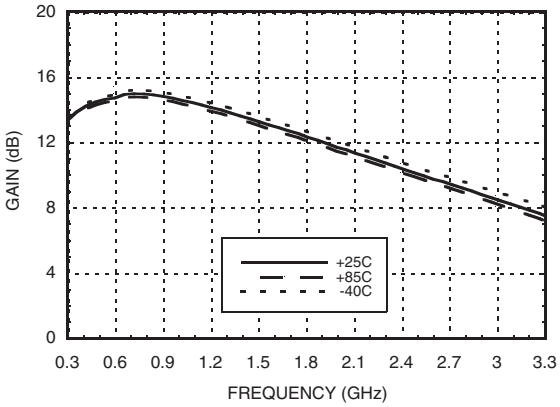
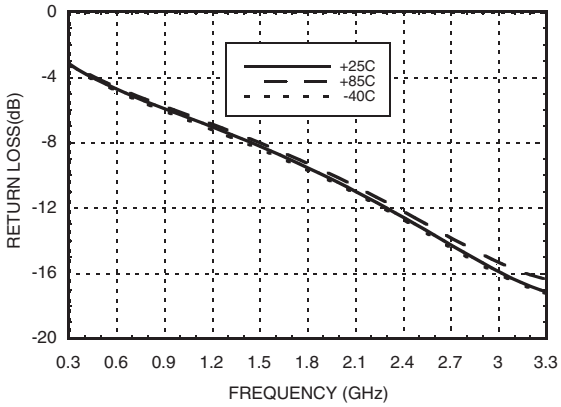
Broadband Gain & Return Loss



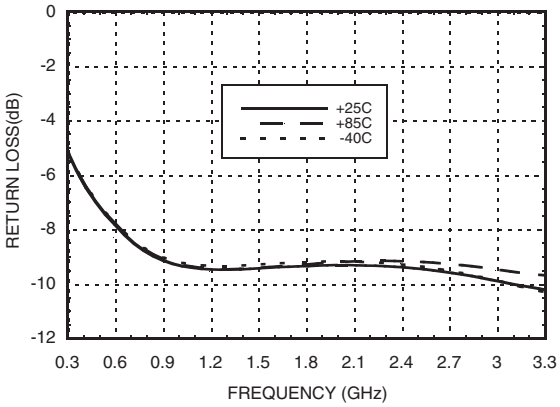
Gain vs. Temperature



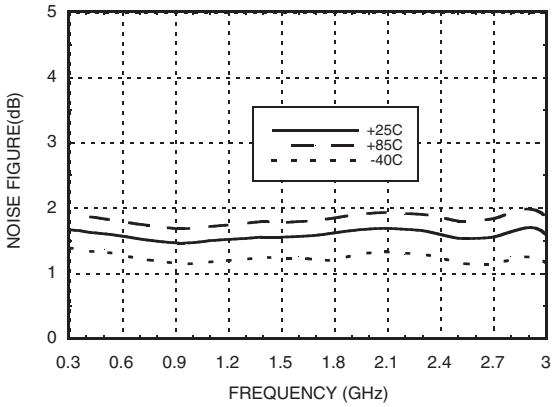
Input Return Loss vs. Temperature



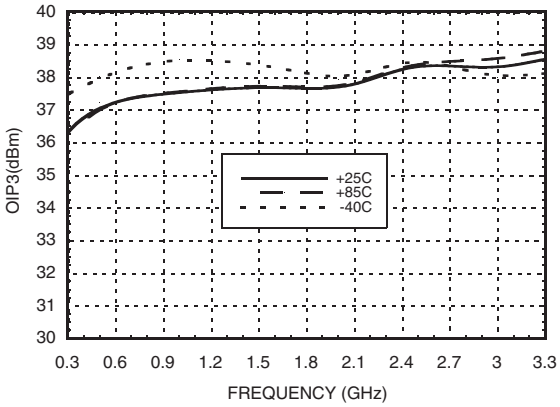
Output Return Loss vs. Temperature



Noise Figure vs. Temperature



Output IP3 vs. Temperature



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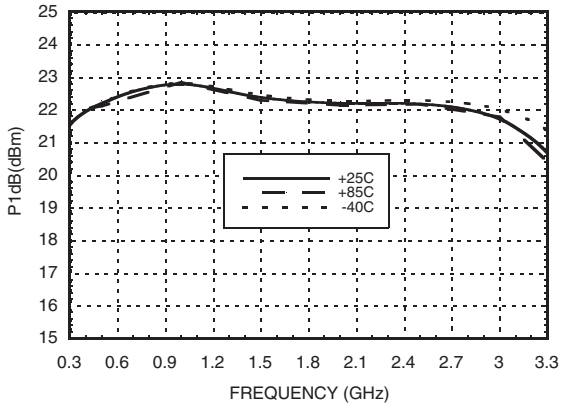
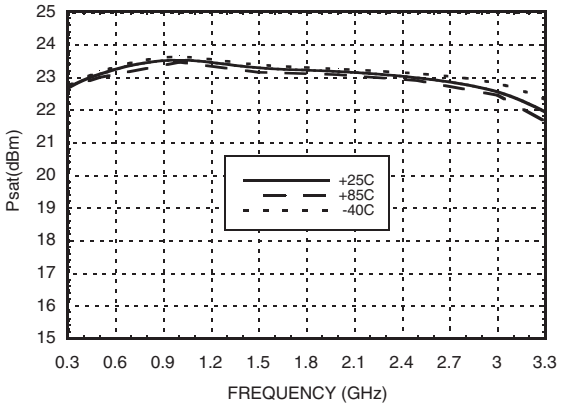
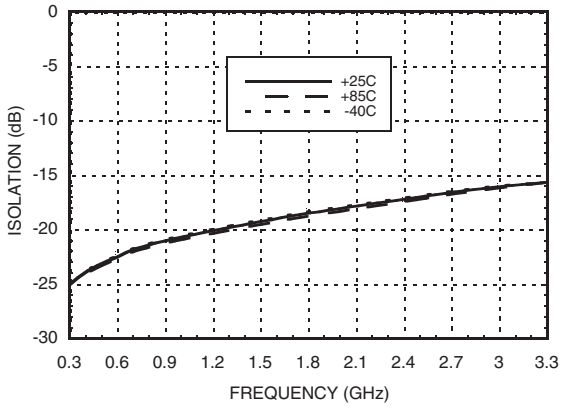
P1dB vs. Temperature



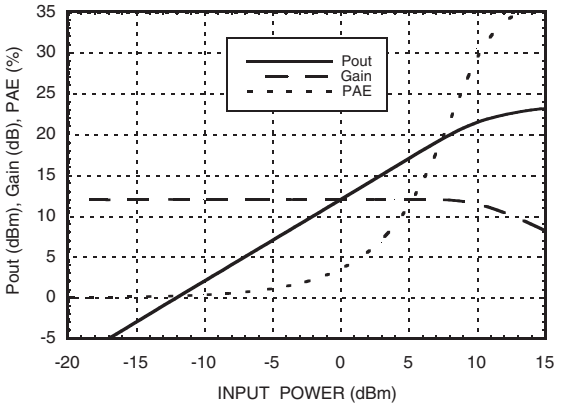
Psat vs. Temperature



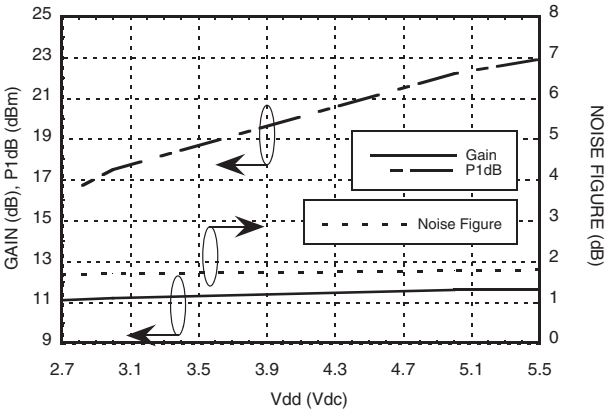
Reverse Isolation vs. Temperature



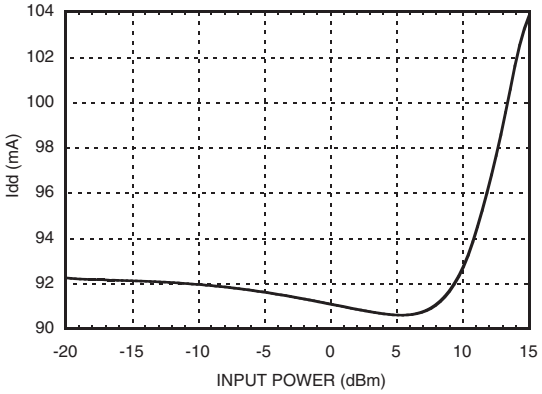
Power Compression @ 2 GHz



Gain, Noise Figure & Power vs. Supply Voltage @ 2 GHz



Current vs. Power @ 2 GHz



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Absolute Maximum Ratings

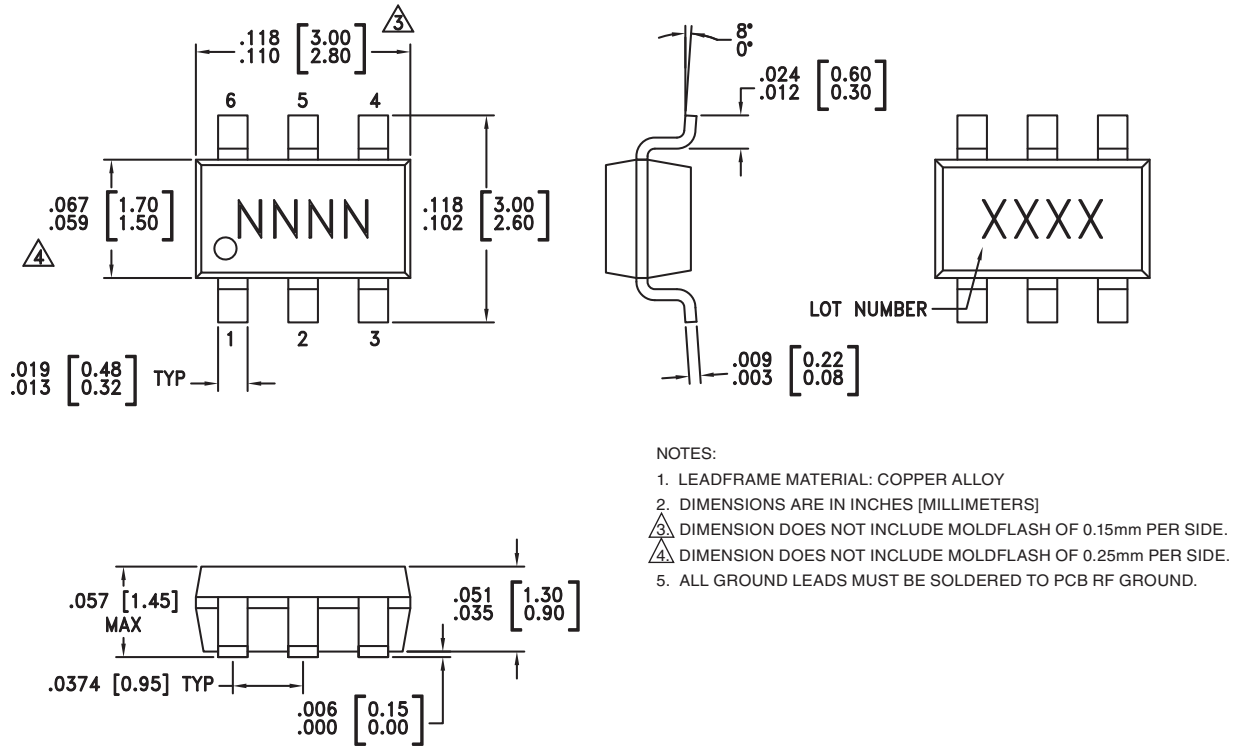
Drain Bias Voltage (Vdd)	+7.0 Vdc
RF Input Power (RFIN)(Vdd = +5.0 Vdc)	15 dBm
Channel Temperature	150 °C
Continuous Pdiss (T = 85 °C) (derate 7.5 mW/°C above 85 °C)	0.488 W
Thermal Resistance (channel to lead)	133 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

Typical Supply Current vs. Vdd

Vdd (V)	Idd (mA)
2.7	89
3.0	89
5.0	90
5.5	90

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
5. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC374	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H374 XXXX
HMC374E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	374E XXXX

[1] Max peak reflow temperature of 235 °C
[2] Max peak reflow temperature of 260 °C
[3] 4-Digit lot number XXXX

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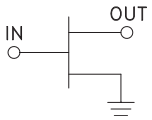
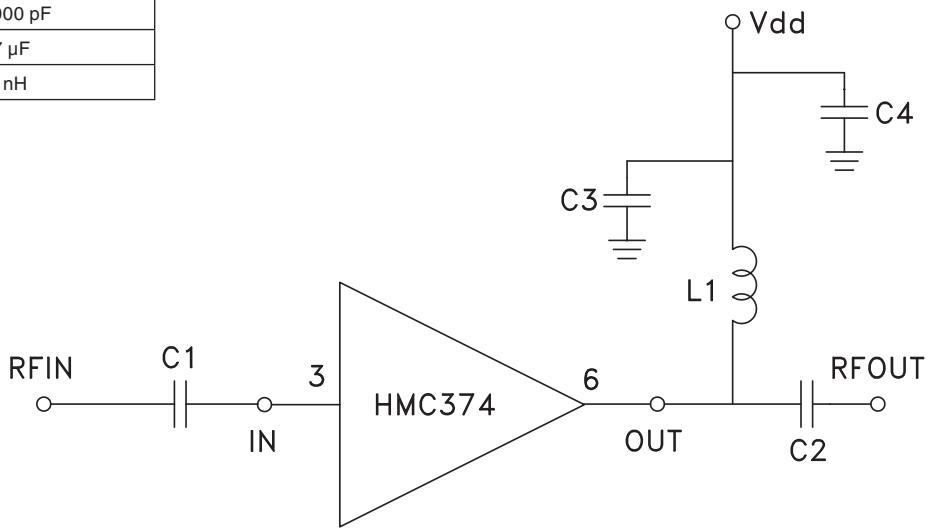
Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1,4	N/C	These pins may be connected to RF/DC ground. Performance will not be affected.	
2, 5	GND	These pins must be connected to RF/DC ground.	
3	IN	This pin is DC coupled. An off-chip DC blocking capacitor is required.	
6	OUT	RF output and DC Bias for the output stage. See application circuit for off-chip components.	

Application Circuit

Recommended Component Values	
C1, C2	150 pF
C3	1,000 pF
C4	4.7 µF
L1	27 nH



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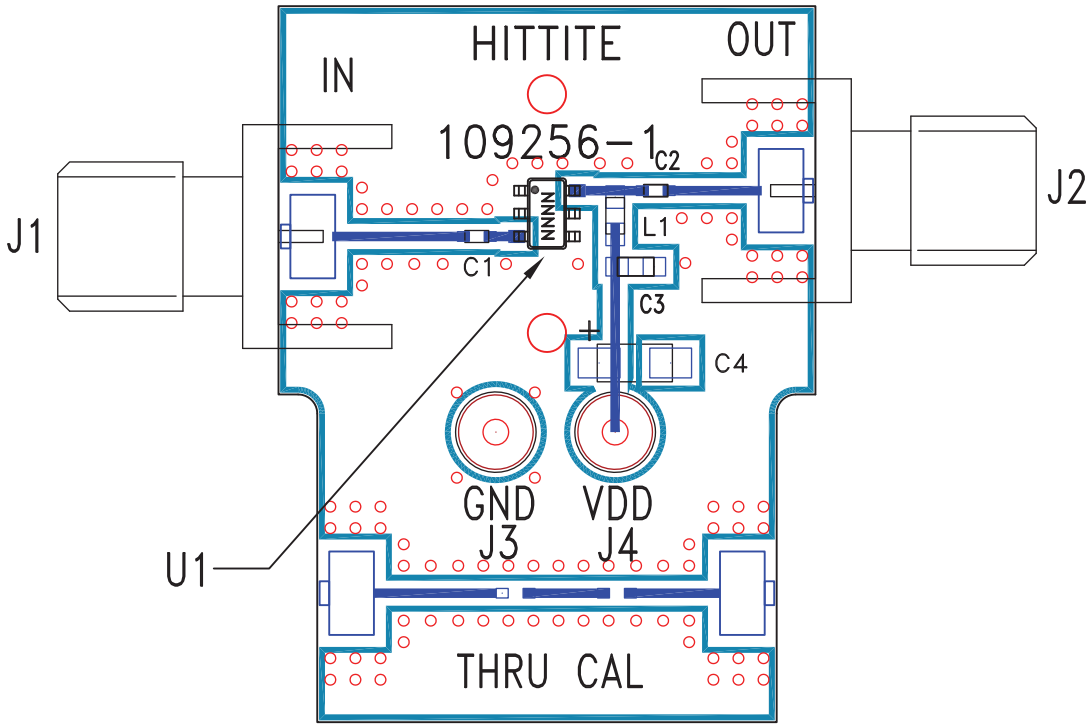
Evaluation PCB



List of Materials for Evaluation PCB 109258 [1]

Item	Description
J1, J2	PCB Mount SMA Connector
J3, J4	DC Pin
C1, C2	150 pF Capacitor, 0402 Pkg.
C3	1000 pF Capacitor, 0603 Pkg.
C4	4.7 Capacitor, Tantalum
L1	27 nH Inductor, 0603 Pkg.
U1	HMC374 / HMC374E Amplifier
PCB [2]	109256 Evaluation PCB

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Roger 4350

The circuit board used in the final application should use RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads should be connected directly to the ground plane similar to that shown above. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown is available from Hittite upon request.

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