

v04.0110



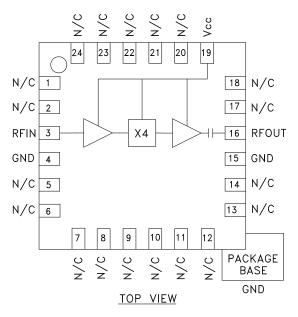
SMT GaAs HBT MMIC x4 ACTIVE FREQUENCY MULTIPLIER, 14.4 - 16.4 GHz OUTPUT

Typical Applications

The HMC370LP4(E) is ideal for:

- Point-to-Point & VSAT Radios
- Fiber Optic
- Military

Functional Diagram



Features

Output Power: 0 dBm

Sub-Harmonic Suppression: >22 dBc

SSB Phase Noise: -140 dBc/Hz Single Supply: +5V @ 55 mA

24 Lead 4x4 mm SMT Package: 16 mm²

General Description

The HMC370LP4(E) is an active miniature x4 frequency multiplier utilizing InGaP GaAs HBT technology in a 4x4 mm leadless surface mount package. Power output is 0 dBm typical from a 5V supply voltage and varies little vs. input power, temperature and supply voltage. Suppression of undesired fundamental and sub-harmonics is >22 dBc typical with respect to output signal level. The low additive SSB phase noise of -140 dBc/Hz at 100 kHz offset helps the user maintain good system noise performance. The HMC370LP4(E) are ideal for use in LO multiplier chains allowing reduced parts count vs. traditional approaches.

Electrical Specifications, $T_A = +25^{\circ}$ C, Vcc = 5V

Parameter	Min.	Тур.	Max.	Units
Frequency Range, Input	3.6 - 4.1		GHz	
Frequency Range, Output	14.4 - 16.4		GHz	
Input Power Range	-15		+5	dBm
Output Power	-4	0		dBm
Sub-Harmonic Suppression		22		dBc
Input Return Loss		18		dB
Output Return Loss		7		dB
SSB Phase Noise (100 kHz Offset) Pin = 0 dBm	1	-140		dBc/Hz
Supply Current (Icc)		55	73	mA

HMC370* PRODUCT PAGE QUICK LINKS

Last Content Update: 02/23/2017

COMPARABLE PARTS -

View a parametric search of comparable parts.

EVALUATION KITS

• HMC370LP4 Evaluation Board

DOCUMENTATION

Data Sheet

• HMC370 Data Sheet

TOOLS AND SIMULATIONS

• HMC370 S-Parameter

REFERENCE MATERIALS -

Quality Documentation

- Package/Assembly Qualification Test Report: LP4, LP4B, LP4C, LP4K (QTR: 2013-00487 REV: 04)
- Package/Assembly Qualification Test Report: Plastic Encapsulated QFN (QTR: 05006 REV: 02)
- Semiconductor Qualification Test Report: GaAs HBT-A (QTR: 2013-00228)

Technical Articles

Active Multipliers & Dividers to Simplify Synthesizers

DESIGN RESOURCES 🖵

- HMC370 Material Declaration
- PCN-PDN Information
- · Quality And Reliability
- Symbols and Footprints

DISCUSSIONS

View all HMC370 EngineerZone Discussions.

SAMPLE AND BUY 🖳

Visit the product page to see pricing options.

TECHNICAL SUPPORT

Submit a technical question or find your regional support number.

DOCUMENT FEEDBACK 🖳

Submit feedback for this data sheet.

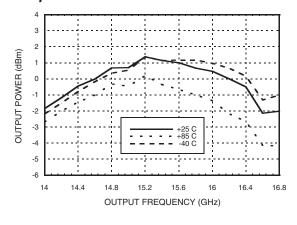


v03.0907

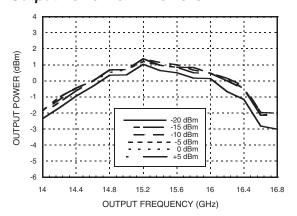


SMT GaAs HBT MMIC x4 ACTIVE FREQUENCY MULTIPLIER, 14.4 - 16.4 GHz OUTPUT

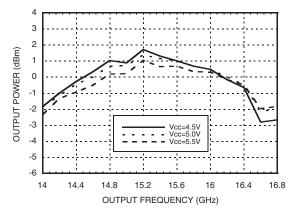
Output Power vs. Temperature @ -10 dBm Drive Level



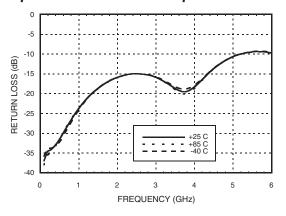
Output Power vs. Drive Level



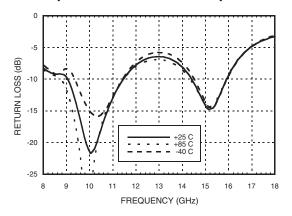
Output Power vs. Supply Voltage @ -10 dBm Drive Level



Input Return Loss vs. Temperature



Output Return Loss vs. Temperature



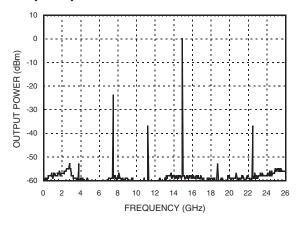


v03.0907

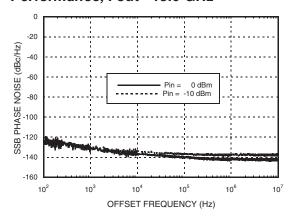


SMT GaAs HBT MMIC x4 ACTIVE FREQUENCY MULTIPLIER, 14.4 - 16.4 GHz OUTPUT

Output Spectrum



SSB Phase Noise Performance, Fout= 15.0 GHz





v03.0907



SMT GaAs HBT MMIC x4 ACTIVE FREQUENCY MULTIPLIER, 14.4 - 16.4 GHz OUTPUT

Absolute Maximum Ratings

RF Input (Vcc = +5V)	+20 dBm
Vcc	+5.5V
Channel Temperature	135 °C
Continuous Pdiss (T=85 °C) (derate 8.1 mW/°C above 85 °C)	530 mW
Thermal Resistance (R _{th}) (junction to ground paddle)	123.6 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

Typical Supply Current vs. Vcc

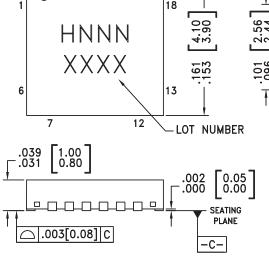
Vcc (V)	Icc (mA)	
4.5	54	
5.0	55	
5.5	57	

Note: Multiplier will operate over full voltage range shown above.

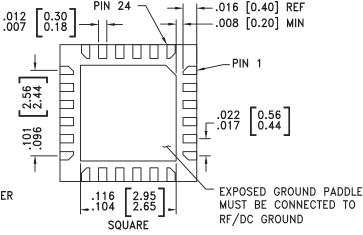


ELECTROSTATIC SENSITIVE DEVICE OBSERVE HANDLING PRECAUTIONS

Outline Drawing



BOTTOM VIEW



NOTES:

- 1. LEADFRAME MATERIAL: COPPER ALLOY
- 2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
- 3. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
- 4. PAD BURR LENGTH SHALL BE 0.15mm MAXIMUM. PAD BURR HEIGHT SHALL BE 0.05mm MAXIMUM.
- 5. PACKAGE WARP SHALL NOT EXCEED 0.05mm.
- 6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
- 7. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED LAND PATTERN.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]	
HMC370LP4	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H370 XXXX	
HMC370LP4E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	H370 XXXX	

- [1] Max peak reflow temperature of 235 $^{\circ}\text{C}$
- [2] Max peak reflow temperature of 260 $^{\circ}\text{C}$
- [3] 4-Digit lot number XXXX



v03.0907



SMT GaAs HBT MMIC x4 ACTIVE FREQUENCY MULTIPLIER, 14.4 - 16.4 GHz OUTPUT

Pin Description

Pin Number	Function	Description	Interface Schematic
1, 2, 5-14, 17, 18, 20-24	N/C	The pins are not connected internally; however, all data shown herein was measured with these pins connected to RF/DC ground externally.	
3	RFIN	RF input needs to be DC blocked only if there is an external DC voltage applied to RF IN.	RFIN ○
4, 15	GND	All ground leads and ground paddle must be soldered to PCB RF/DC ground.	⊖ GND
16	RFOUT	Multiplied Output. AC coupled. No external DC blocks necessary.	— —○ RFOUT
19	Vcc	Supply voltage 5V ± 0.5V.	

ANALOGDEVICES

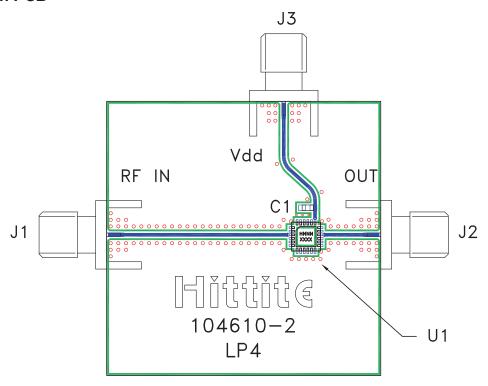
HMC370LP4 / 370LP4E

v03.0907



SMT GaAs HBT MMIC x4 ACTIVE FREQUENCY MULTIPLIER, 14.4 - 16.4 GHz OUTPUT

Evaluation PCB



List of Materials for Evaluation PCB 106137 [1]

Item	Description	
J1 - J3	PCB Mount SMA Connector	
C1	1,000 pF Capacitor, 0603 Pkg.	
U1	HMC370LP4(E) x4 Active Multiplier	
PCB [2]	104610 Eval Board	

^[1] Reference this number when ordering complete evaluation PCB

The circuit board used in the application should be generated with proper RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. The evaluation circuit board shown is available from Hittite upon request.

^[2] Circuit Board Material: Rogers 4350

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Analog Devices Inc.:

HMC370LP4E 106137-HMC370LP4 HMC370LP4 HMC370LP4ETR HMC370LP4TR