



SMT GaAs MMIC x2 ACTIVE FREQUENCY MULTIPLIER, 13 - 24.6 GHz OUTPUT

Typical Applications

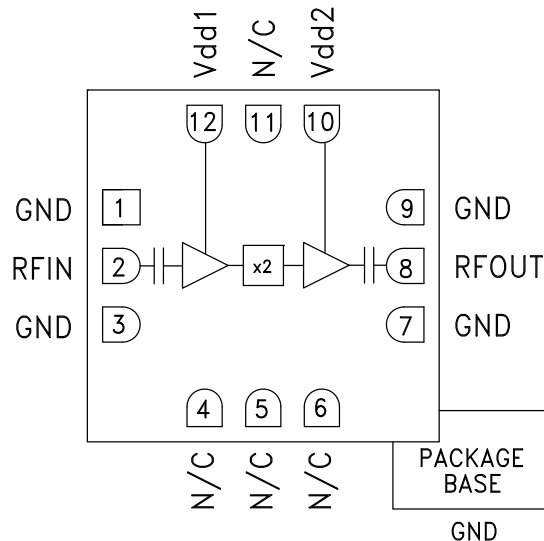
The HMC814LC3B is ideal for:

- Clock Generation Applications:
SONET OC-192 & SDH STM-64
- Point-to-Point & VSAT Radios
- Test Instrumentation
- Military & Space
- Sensors

Features

- High Output Power: +17 dBm
- Low Input Power Drive: 0 to +6 dBm
- Fo Isolation: >20 dBc @ Fout = 19 GHz
- 100 kHz SSB Phase Noise: -136 dBc/Hz
- Single Supply: +5V @ 88 mA
- 12 Lead 3x3 mm SMT Package: 9 mm²

Functional Diagram



General Description

The HMC814LC3B is a x2 active broadband frequency multiplier utilizing GaAs pHEMT technology in a leadless RoHS compliant SMT package. When driven by a +4 dBm signal, the multiplier provides +17 dBm typical output power from 13 to 24.6 GHz. The Fo, 3Fo and 4Fo isolations are >20 dBc at 19 GHz. The HMC814LC3B is ideal for use in LO multiplier chains for Pt-to-Pt & VSAT Radios yielding reduced parts count vs. traditional approaches. The low additive SSB Phase Noise of -136 dBc/Hz at 100 kHz offset helps maintain good system noise performance. The RoHS packaged HMC814LC3B eliminates the need for wire bonding, and allows the use of surface mount manufacturing techniques.

Electrical Specifications, $T_A = +25^\circ C$, $V_{dd1}, V_{dd2} = +5V$, +4 dBm Drive Level

Parameter	Min.	Typ.	Max.	Units
Frequency Range, Input	6.5 - 12.3			GHz
Frequency Range, Output	13 - 24.6			GHz
Output Power	14	17		dBm
Fo Isolation (with respect to output level)		25		dBc
3Fo Isolation (with respect to output level)		25		dBc
Input Return Loss	4	10		dB
Output Return Loss	6	12		dB
SSB Phase Noise (100 kHz Offset @ Input Frequency = 19 GHz)		-136		dBc/Hz
Supply Current (I _{dd1} & I _{dd2})	70	88	100	mA

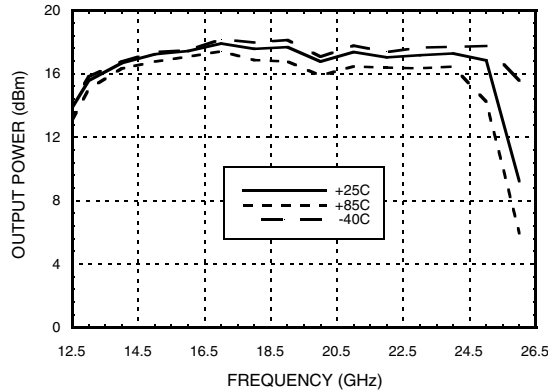
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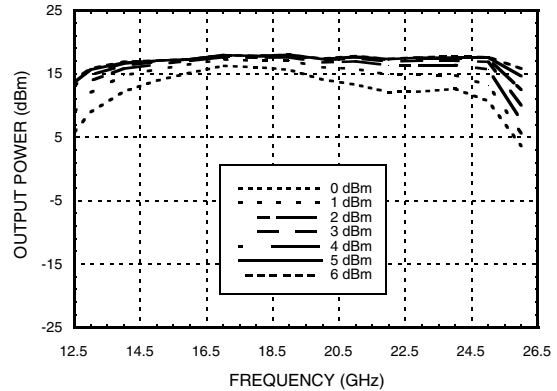


SMT GaAs MMIC x2 ACTIVE FREQUENCY MULTIPLIER, 13 - 24.6 GHz OUTPUT

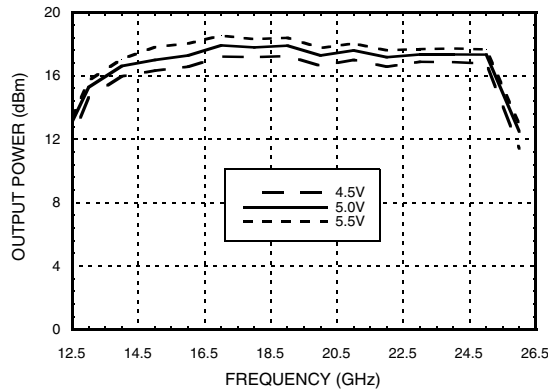
Output Power vs. Temperature @ +4 dBm Drive Level



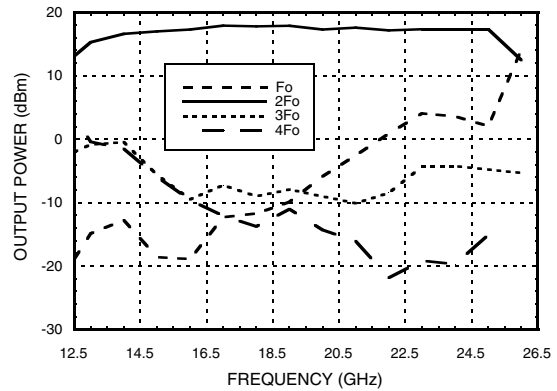
Output Power vs. Drive Level



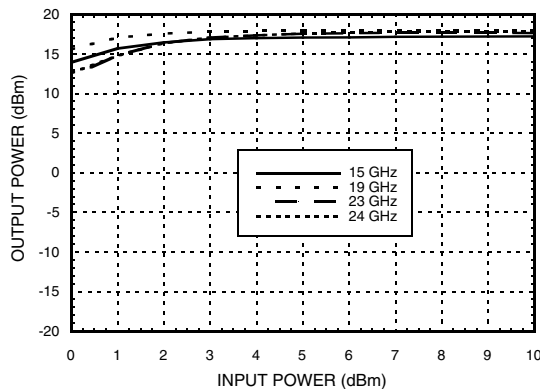
Output Power vs. Supply Voltage @ +4 dBm Drive Level



Isolation @ +4 dBm Drive Level



Output Power vs. Input Power



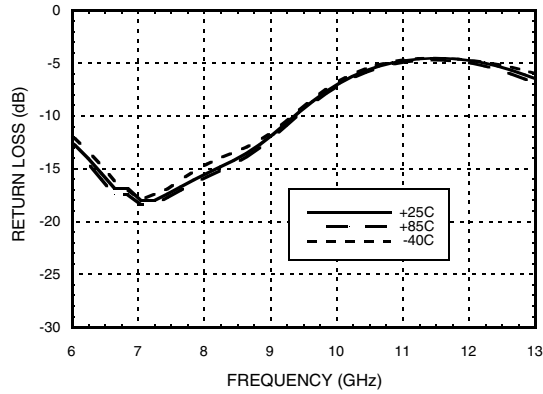
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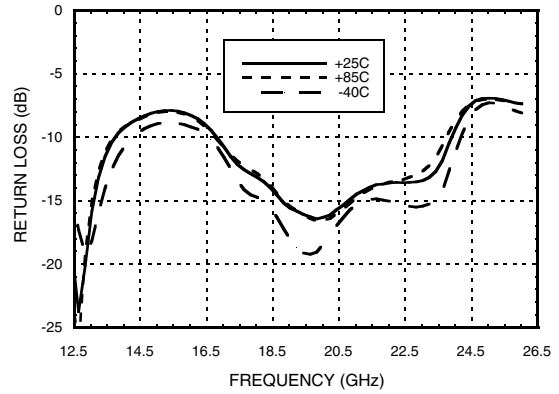


**SMT GaAs MMIC x2 ACTIVE FREQUENCY
MULTIPLIER, 13 - 24.6 GHz OUTPUT**

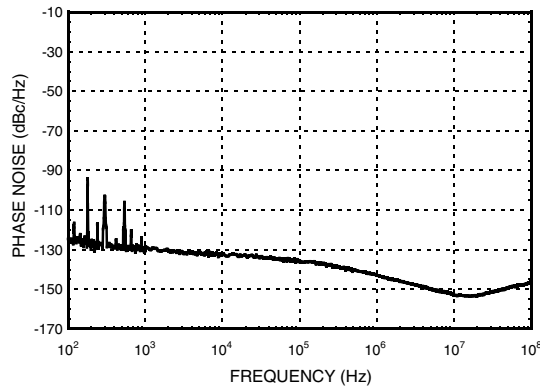
Input Return Loss vs. Temperature



Output Return Loss vs. Temperature



Phase Noise @ 19 GHz



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SMT GaAs MMIC x2 ACTIVE FREQUENCY MULTIPLIER, 13 - 24.6 GHz OUTPUT



Absolute Maximum Ratings

RF Input (Vdd = +5V)	+10 dBm
Supply Voltage (Vdd1, Vdd2)	+5.5 Vdc
Channel Temperature	175 °C
Continuous P _{diss} (T= 85 °C) (derate 8.3 mW/°C above 85 °C)	743 mW
Thermal Resistance (channel to ground paddle)	121 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 0 (Passed 150 V)

Typical Supply Current vs. Vdd

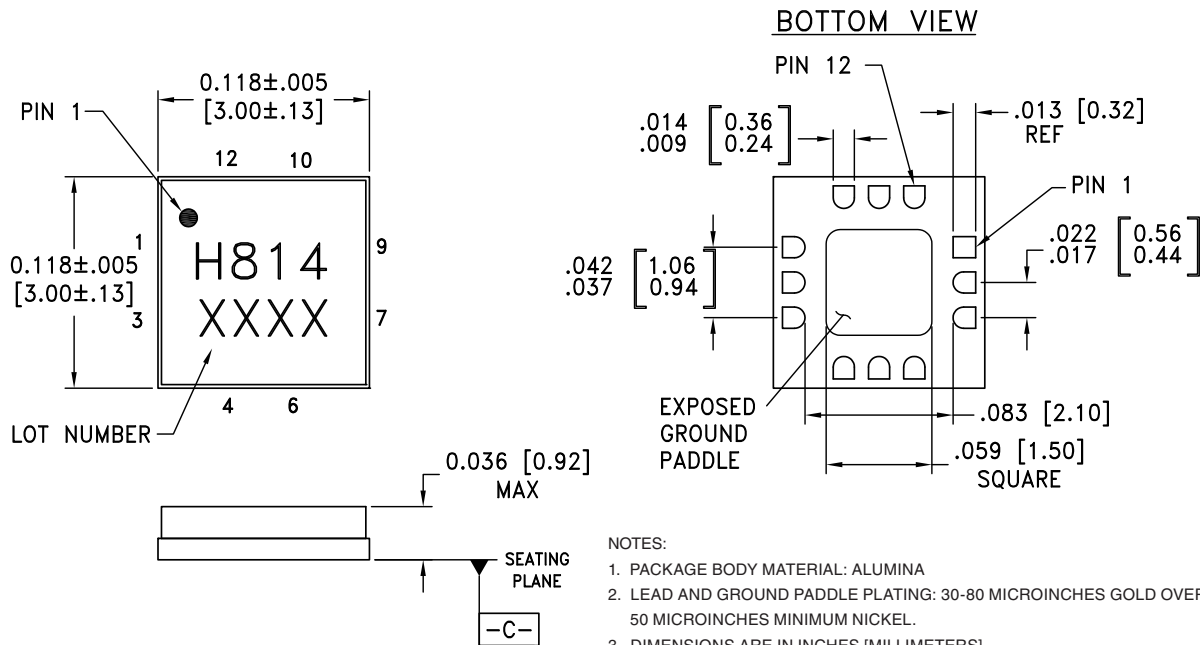
Vdd (Vdc)	I _{dd} (mA)
4.5	87
5.0	88
5.5	89

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



ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



- NOTES:
1. PACKAGE BODY MATERIAL: ALUMINA
 2. LEAD AND GROUND PADDLE PLATING: 30-80 MICROINCHES GOLD OVER 50 MICROINCHES MINIMUM NICKEL.
 3. DIMENSIONS ARE IN INCHES [MILLIMETERS].
 4. LEAD SPACING TOLERANCE IS NON-CUMULATIVE
 5. PACKAGE WARP SHALL NOT EXCEED 0.05mm DATUM [-C-]
 6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [2]
HMC814LC3B	Alumina, White	Gold over Nickel	MSL3 [1]	H814 XXXX

[1] Max peak reflow temperature of 260 °C

[2] 4-Digit lot number XXXX



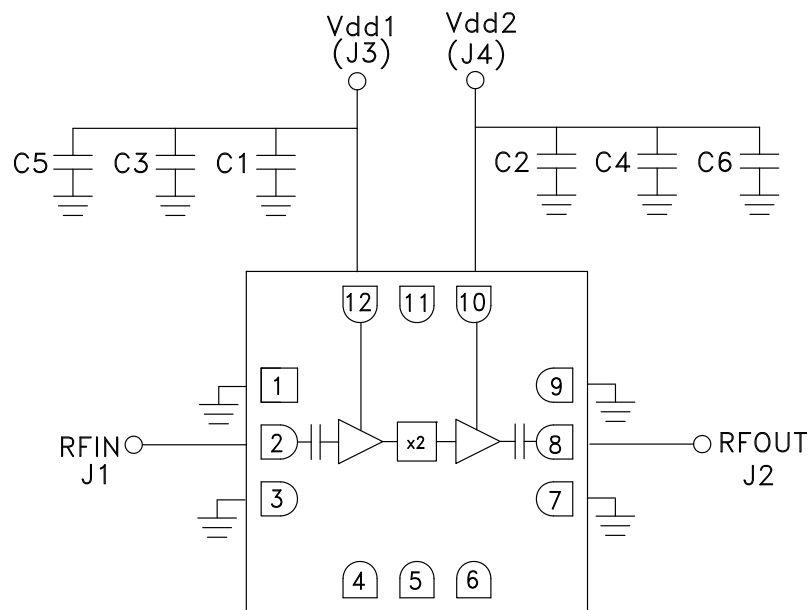
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Pin Description

Pin Number	Function	Description	Interface Schematic
1, 3, 7, 9	GND	Package bottom must also be connected to RF/DC ground.	
2	RFIN	This pin is AC coupled and matched to 50 Ohms.	
4 - 6, 11	N/C	These pins are not connected internally; however, all data shown herein was measured with these pins connected to RF/ DC ground.	
8	RFOUT	This pin is AC coupled and matched to 50 Ohms.	
10, 12	Vdd2, Vdd1	Supply voltage 5V ± 0.5V. External bypass capacitors of 100 pF, 1,000 pF and 2.2 μF are recommended.	

Application Circuit

Component	Value
C1, C2	100 pF
C3, C4	1,000 pF
C5, C6	2.2 μF



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