HMC787ALC3B

v00.0815

GaAs MMIC FUNDAMENTAL MIXER 3 - 11 GHz

Typical Applications

The HMC787ALC3B is ideal for:

- WiMAX Infrastructure
- Microwave Radio
- ISM & UWB Radios
- Test Equipment & Sensors
- Military End-Use

Features

Conversion Loss: 8.8 dB

LO to RF Isolation: 56 dB

LO to IF Isolation: 44 dB

RF to IF Isolation: 23 dB

Input Third-Order Intercept (IP3): 23 dBm

Input Second-Order Intercept (IP2): 62 dBm

Input Power for 1 dB Compression (P1dB): 15 dBm

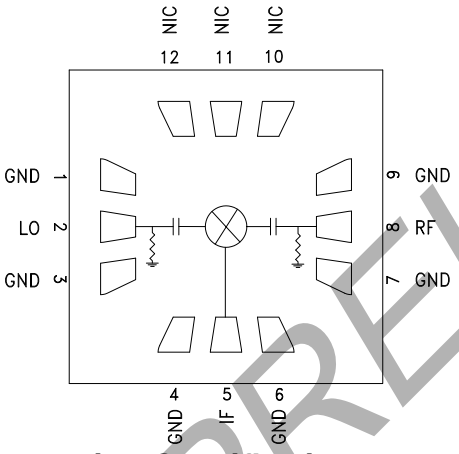
Passive Double-Balanced Topology

Wide IF Bandwidth: DC - 4 GHz

No External Matching Required

12 Lead 3 mm x 3 mm SMT Package

Functional Diagram



General Description

The HMC787ALC3B is a general purpose double balanced mixer in a leadless RoHS compliant SMT package that can be used as an upconverter or downconverter between 3 and 11 GHz. This mixer is fabricated in a GaAs MESFET process and requires no external components or matching circuitry. The HMC787ALC3B provides excellent LO to RF and LO to IF isolation due to optimized balun structures and operates with LO drive level of 17 dBm. The ceramic SMT package eliminates the need for wire bonding and is compatible with high volume surface mount manufacturing techniques.

Electrical Specifications, T_A = +25° C, IF= 100 MHz, LO Power = 17 dBm [1]

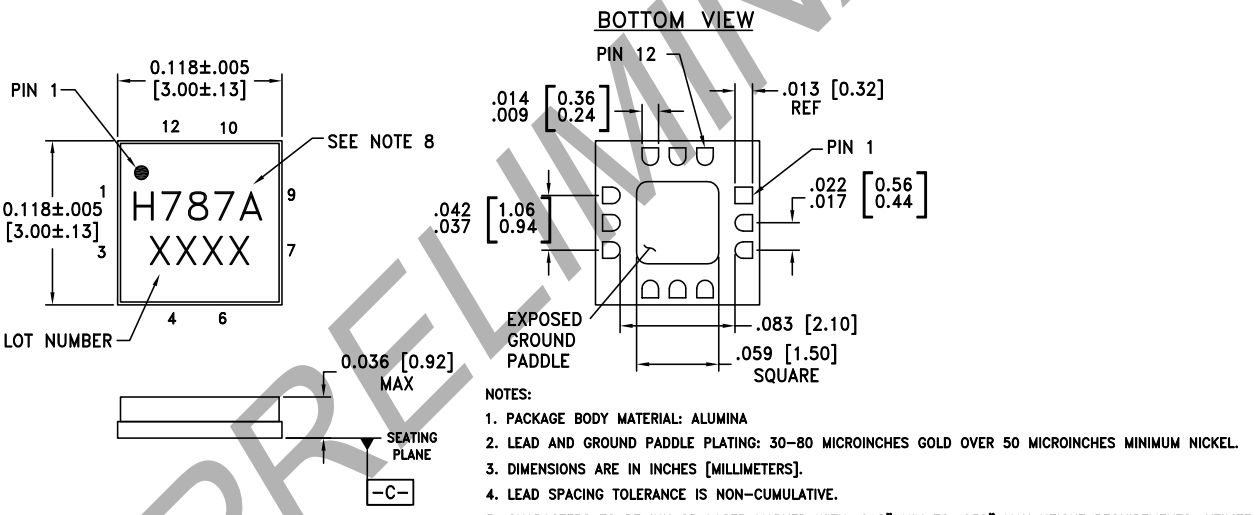
Parameter	Min.	Typ.	Max.	Units
RF Frequency Range	3		11	GHz
LO Frequency Range	3		11	GHz
IF Frequency Range	DC		4	GHz
Conversion Loss		8.8	10	dB
Noise Figure, Single Sideband (SSB)		8.8	10	dB
LO to RF Isolation		56		dB
LO to IF Isolation	32	44		dB
RF to IF Isolation	15	23		dB
Input Third-Order Intercept (IP3)		23		dBm
Input Second-Order Intercept (IP2)		62		dBm
Input Power for 1 dB Gain Compression (P1dB)		15		dBm

[1] Unless otherwise noted, all measurements performed as downconverter with upper sideband selected, IF= 100 MHz

Absolute Maximum Ratings

RF Input	26 dBm
IF Input	26 dBm
LO Drive	26 dBm
Channel Temperature	150 °C
Continuous Pdiss (T = 85 °C) (derate (TBD) mW/°C above 85 °C)	(TBD) mW
Thermal Resistance (R_{TH}) (junction to ground paddle)	(TBD) °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

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. CHARACTERS TO BE INK OR LASER MARKED WITH .018" MIN TO .030" MAX HEIGHT REQUIREMENTS. UTILIZE MAXIMUM CHARACTER HEIGHT BASED ON LID DIMENSIONS AND BEST FIT. LOCATE APPROX. AS SHOWN.
6. PACKAGE WARP SHALL NOT EXCEED 0.05mm DATUM -C-
7. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
8. PART NUMBER MARKING CONFIGURATION:
   HXXX FOR 3 DIGIT HMC #'S (ie. H123)
   XXXX FOR 4 DIGIT HMC #'S (ie. 1234)

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating [2]	Package Marking [1]
HMC787ALC3B	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL3	H787A XXXX

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

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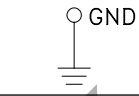
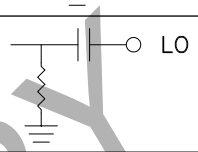
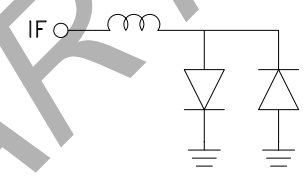
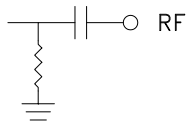
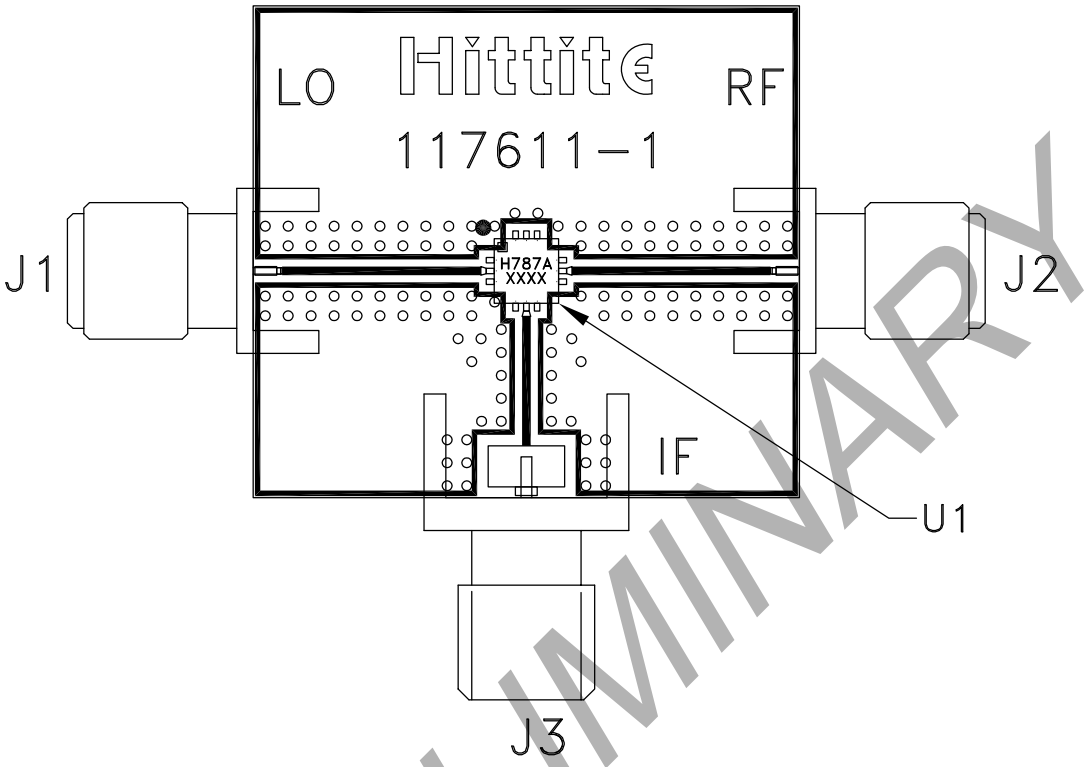
Pin Descriptions

Pin Number	Function	Description	Pin Schematic
1, 3, 4, 6, 7, 9	GND	Ground Connect. These pins and the exposed ground paddle must be connected to RF/dc ground.	
2	LO	Local Oscillator Port. This pin is dc-coupled and matched to 50 Ohms.	
5	IF	Intermediate Frequency Port. This pin is dc-coupled. For applications not requiring operation to dc, block this pin externally using a series capacitor with a value chosen to pass the necessary IF frequency range. For operation to dc, this pin must not source or sink more than 4 mA of current or device non-functionality or device failure may result..	
8	RF	Radio Frequency port. This pin is dc-coupled and matched to 50 Ohms.	
10, 11, 12	NIC	No Internal Connection. These pins are not connected internally.	

Evaluation PCB



Evaluation Order Information

Item	Contents	Part Number
Evaluation PCB Only	HMC787ALC3B Evaluation PCB	EV1HMC787ALC3B [1]

[1] Reference this number when ordering Evaluation PCB Only

List of Materials for Evaluation

Item	Description
J1, J2	SRI SMA Connector
J3	Johnson SMA Connector
U1	HMC787ALC3B
PCB [1]	117611 Evaluation Board

[1] Circuit Board Material: Rogers 4350 or Arlon 25FR

The circuit board used in the application should use 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. 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 Analog Devices upon request.