HMC337

v02.1007

GaAs MMIC SUB-HARMONICALLY PUMPED MIXER, 17 - 25 GHz

Typical Applications

The HMC337 is ideal for:

- 18 and 23 GHz Microwave Radios
- Up and Down Converter for Point-to-Point Radios
- Satellite Communication Systems

Features

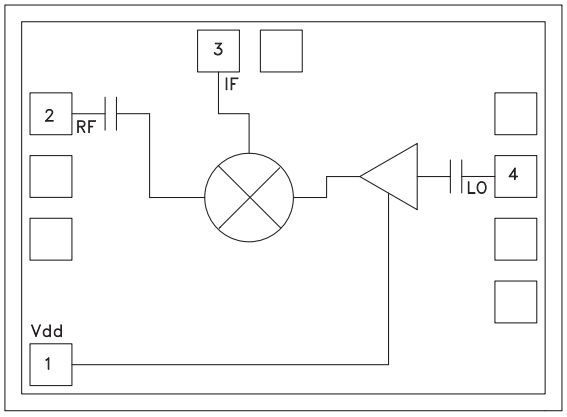
Integrated LO Amplifier: -5 dBm Input

Sub-Harmonically Pumped (x2) LO

High 2LO/RF Isolation: > 25 dB

Die Size: 1.32 x 0.97 x 0.1mm

Functional Diagram



General Description

The HMC337 chip is a sub-harmonically pumped (x2) MMIC mixer with an integrated LO amplifier which can be used as an upconverter or downconverter. The chip utilizes a GaAs PHEMT technology that results in a small overall chip area of 1.28mm^2. The 2LO to RF isolation is excellent eliminating the need for additional filtering. The LO amplifier is a single bias (+3V to +4V) two stage design with only -5 dBm nominal drive requirement. All data is measured with the chip in a 50 ohm test fixture connected via 0.076 mm (3 mil) ribbon bonds of minimal length <0.31 mm (<12 mils).

Electrical Specifications, T_A = +25° C, As a Function of Vdd

Parameter	IF = 1 GHz LO = -5 dBm & Vdd = +4V			IF = 1 GHz LO = -5 dBm & Vdd = +3V			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range, RF	17 - 25			18 - 24			GHz
Frequency Range, LO	8.5 - 12.5			9 - 12			GHz
Frequency Range, IF	DC - 3			DC - 3			GHz
Conversion Loss		9	13		9	13	dB
Noise Figure (SSB)		9	13		9	13	dB
2LO to RF Isolation	10	25 - 30		10	25 - 30		dB
2LO to IF Isolation	27	40 - 50		30	40 - 50		dB
IP3 (Input)	3	10		2	9		dBm
1 dB Compression (Input)	-5	0		-6	-1		dBm
Supply Current (Idd)		28	50		25	50	mA

** Unless otherwise noted, all measurements performed as downconverter, IF= 1 GHz.*

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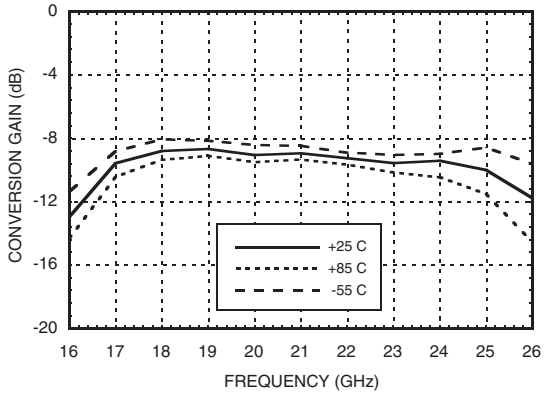
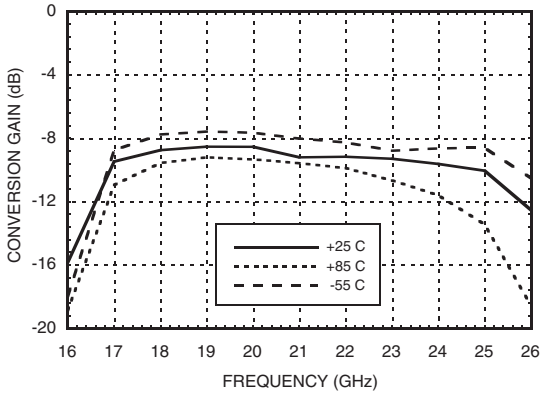
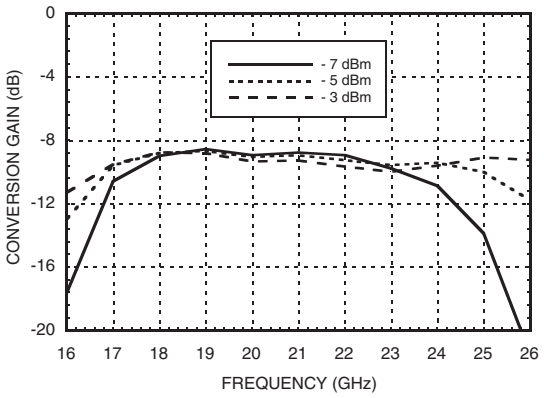
Conversion Gain vs. Temperature @ LO = -5 dBm, Vdd= +4V



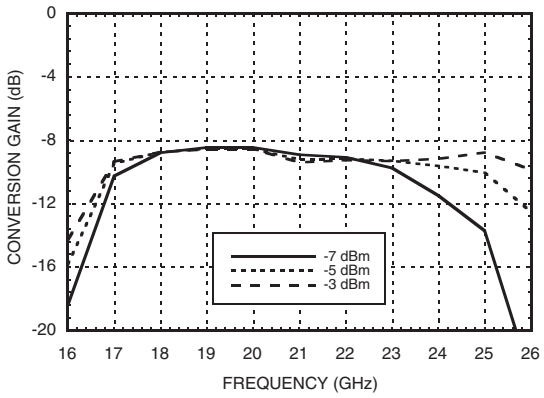
Conversion Gain vs. Temperature @ LO = -5 dBm, Vdd= +3V



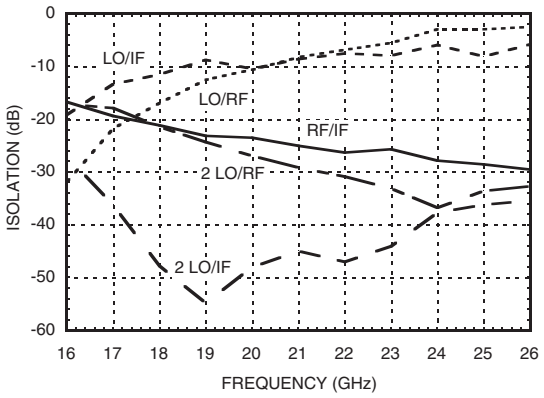
Conversion Gain vs. LO Drive @ Vdd = +4V



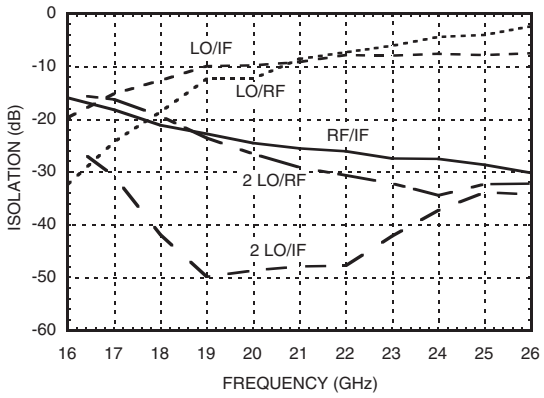
Conversion Gain vs. LO Drive @ Vdd = +3V



Isolation @ LO = -5 dBm, Vdd = +4V



Isolation @ LO = -5 dBm, Vdd = +3V



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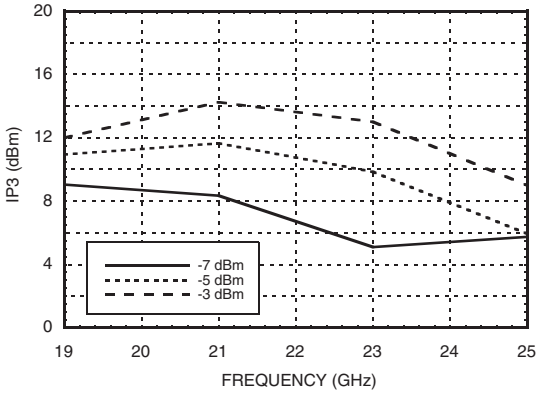
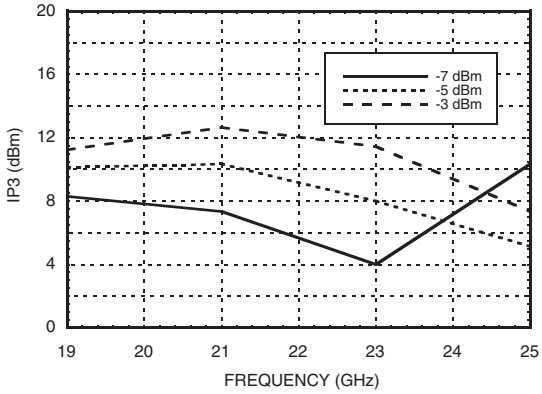
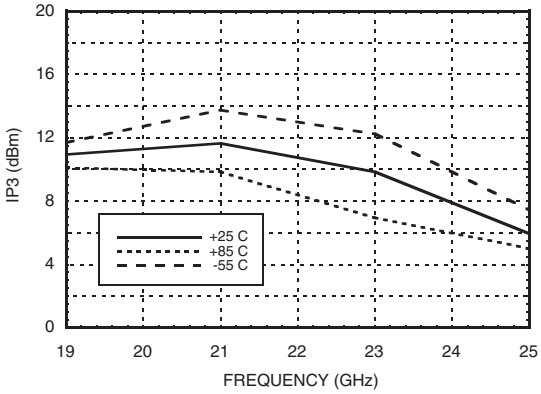
Input IP3 vs. LO Drive @ Vdd = +4V *



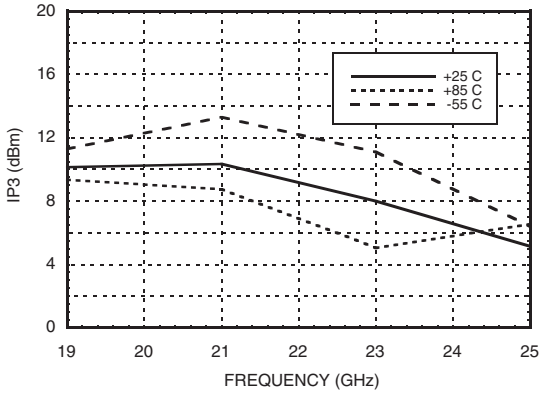
Input IP3 vs. LO Drive @ Vdd = +3V *



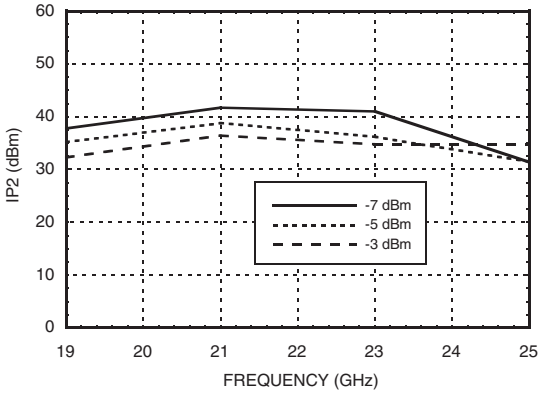
Input IP3 vs. Temperature @ LO = -5 dBm, Vdd = +4V *



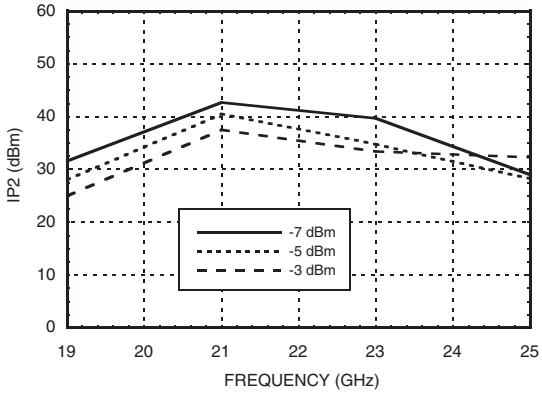
Input IP3 vs. Temperature @ LO = -5 dBm, Vdd = +3V *



Input IP2 vs. LO Drive @ Vdd = +4V *



Input IP2 vs. LO Drive @ Vdd = +3V *



* Two-tone input power = -10 dBm each tone, 1 MHz spacing.

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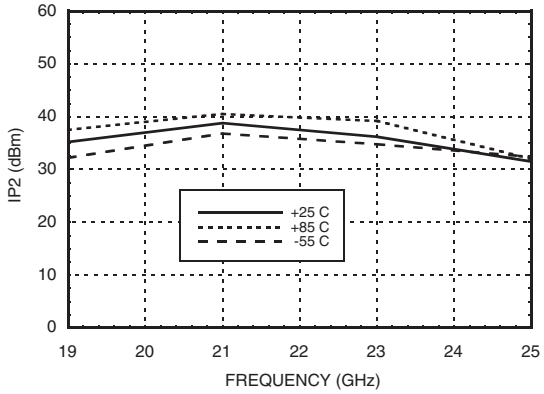
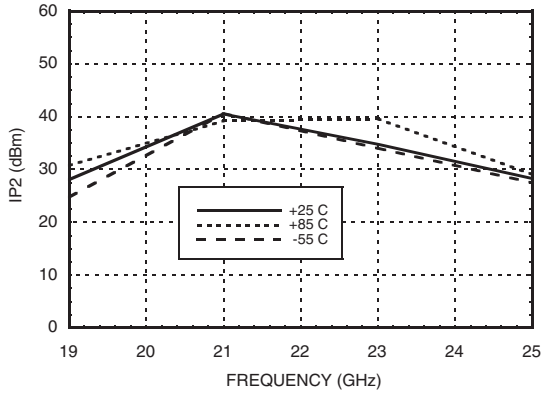
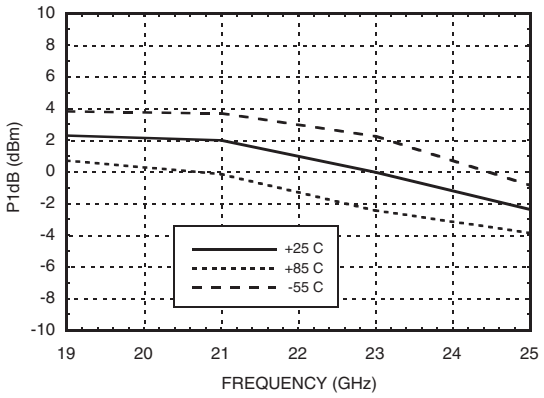
Input IP2 vs. Temperature @ LO = -5 dBm, Vdd = +4V *



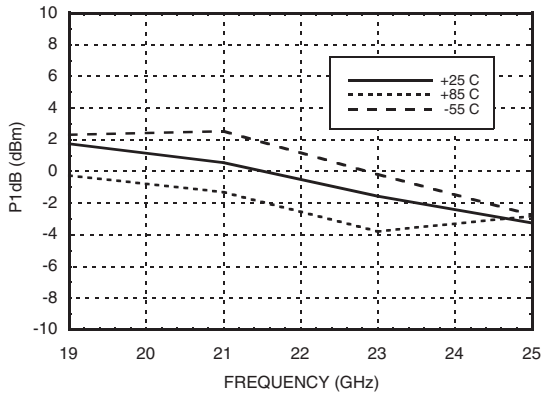
Input IP2 vs. Temperature @ LO = -5 dBm, Vdd = +3V *



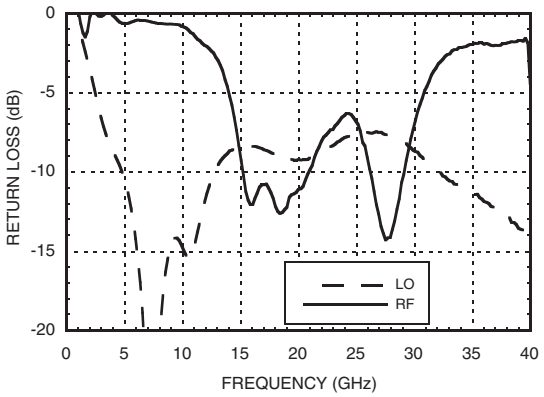
Input P1dB vs. Temperature @ LO = -5 dBm, Vdd = +4V



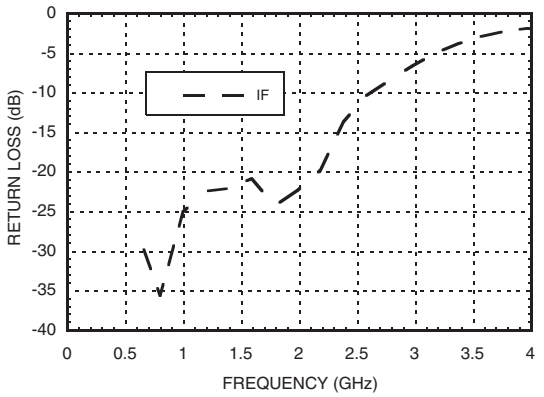
Input P1dB vs. Temperature @ LO = -5 dBm, Vdd = +3V



RF & LO Return Loss @ LO = -5 dBm, Vdd = +4V



IF Return Loss @ LO = -5 dBm, Vdd = +4V



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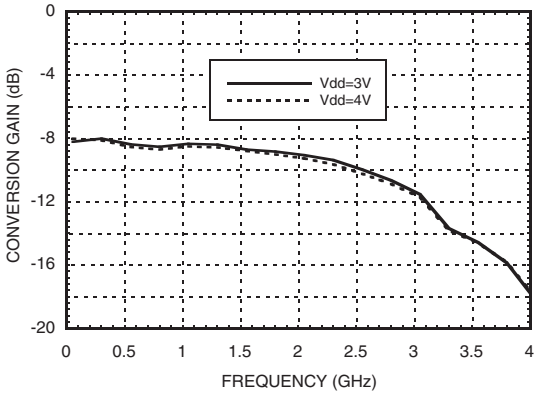
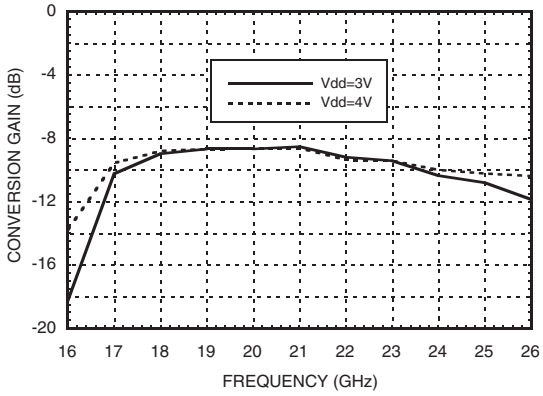
IF Bandwidth @ LO = -5 dBm



Upconverter Performance Conversion Gain, LO = -5 dBm Vdd = +4V



MxN Spurious @ IF Port, Vdd = +4V

	nLO					
mRF	±5	±4	±3	±2	±1	0
-3						
-2	61					
-1	59	31	52			
0			23	34	-5	
1				X	47	19
2		49	48	79	60	
3	88	71	95			

RF = 22 GHz @ -10 dBm
LO = 10.5 GHz @ -5 dBm
All values in dBc below IF power level.
Measured as downconverter.

MXN Spurious @ RF Port, Vdd = +4V

	nLO					
mIF	±5	±4	±3	±2	±1	0
-3		56	86	48	102	
-2		65	25	59	53	
-1			33	X	48	
0			-10	16	-9	
1			37	X	43	17
2			30	50	40	61
3			77	57	80	66

IF = 1 GHz @ -10 dBm
LO = 10.5 GHz @ -5 dBm
All values in dBc below RF power level.
Measured as upconverter.

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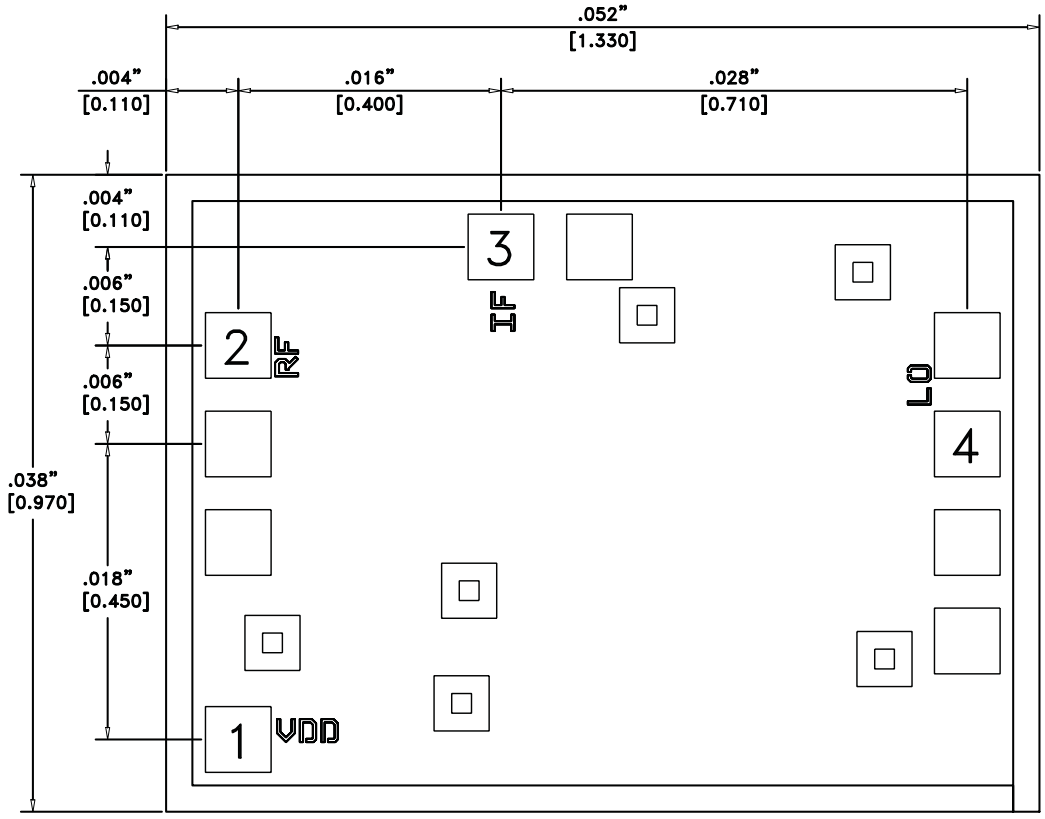
Absolute Maximum Ratings

RF / IF Input (Vdd = +5V)	+13 dBm
LO Drive (Vdd = +5V)	+13 dBm
Vdd	5.5V
Continuous Pdiss (Ta = 85 °C) (derate 2.64 mW/°C above 85 °C)	238 mW
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



NOTES:

1. ALL DIMENSIONS IN INCHES (MILLIMETERS)
2. ALL TOLERANCES ARE ±0.001 (0.025)
3. DIE THICKNESS IS 0.004 (0.100) BACKSIDE IS GROUND
4. BOND PADS ARE 0.004 (0.100) SQUARE
5. BOND PAD SPACING, CTR-CTR: 0.006 (0.150)
6. BACKSIDE METALLIZATION: GOLD
7. BOND PAD METALLIZATION: GOLD

Die Packaging Information [1]

Standard	Alternate
GP-2 (Gel Pack)	[2]

[1] Refer to the "Packaging Information" section for die packaging dimensions.
[2] For alternate packaging information contact Hittite Microwave Corporation.

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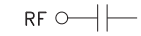
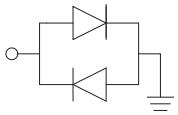
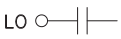
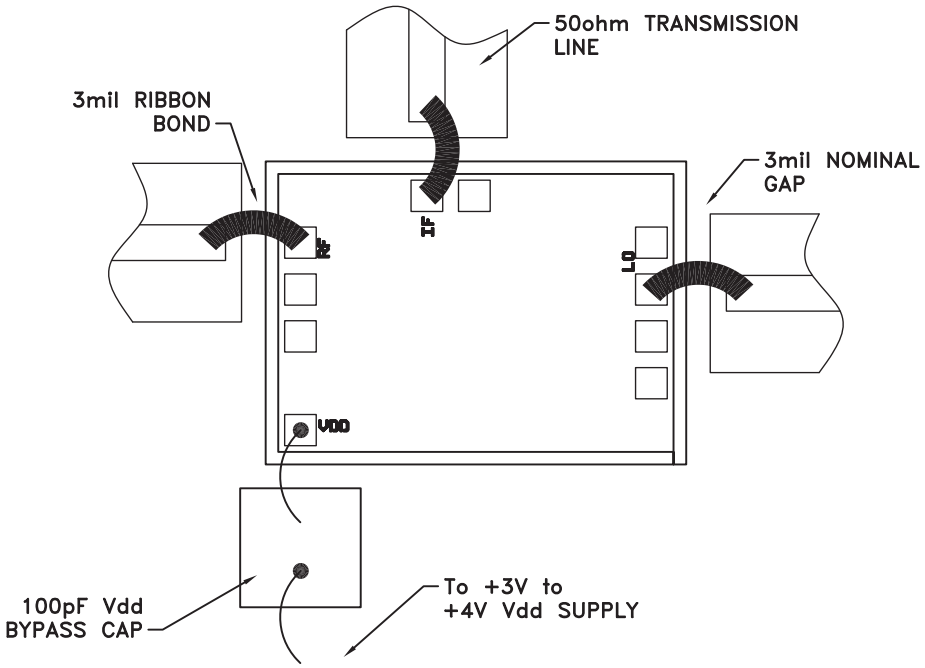
Pad Descriptions

Pad Number	Function	Description	Interface Schematic
1	Vdd	Power supply for the LO Amplifier. An external RF bypass capacitor of 100 - 330 pF is required. A MIM border capacitor is recommended. The bond length to the capacitor should be as short as possible. The ground side of the capacitor should be connected to the housing ground.	
2	RF	This pad is AC coupled and matched to 50 Ohm.	
3	IF	This pad is DC coupled and should be DC blocked externally using a series capacitor whose value has been chosen to pass the necessary IF frequency range. Any applied DC voltage to this pin will result in die non-function and possible die failure.	
4	LO	This pad is AC coupled and matched to 50 Ohm.	

Assembly Diagram



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