HMC264

v02.1007

GaAs MMIC SUB-HARMONICALLY PUMPED MIXER, 20 - 32 GHz

Typical Applications

The HMC264 is ideal for:

- Microwave Point-to-Point Radios
- LMDS
- SATCOM

Features

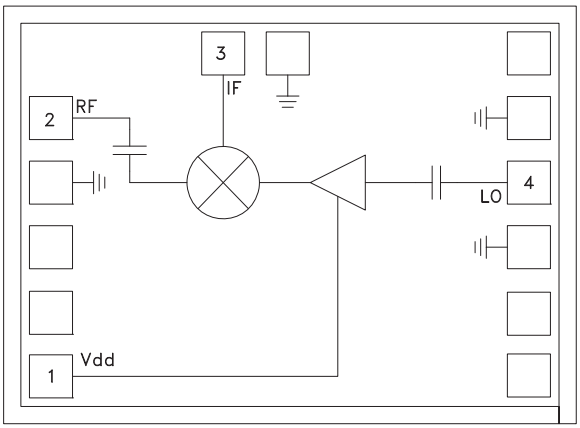
Integrated LO Amplifier: -4 dBm Input

Sub-Harmonically Pumped (x2) LO

High 2LO/RF Isolation: 40 dB

Small Size: 1.32 x 0.97 x 0.1 mm

Functional Diagram



General Description

The HMC264 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 -4 dBm nominal drive requirement. All data is measured with the chip in a 50 ohm test fixture connected via 0.025 mm (1 mil) diameter wire bonds of minimal length <0.31 mm (<12 mils).

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

Parameter	IF = 1 GHz LO = 0 dBm & Vdd = +4V			IF = 1 GHz LO = -4 dBm & Vdd = +4V			IF = 1 GHz LO = -4 dBm & Vdd = +3V			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range, RF		24 - 32			20 - 30			22 - 29		GHz
Frequency Range, LO		12 - 16			10 - 15			10.5 - 14.5		GHz
Frequency Range, IF		DC - 6			DC - 6			DC - 4		GHz
Conversion Loss		10	13		10	12		9	11	dB
Noise Figure (SSB)		10	13		10	12		9	11	dB
2LO to RF Isolation	29	35		29	40		18	22 ~ 30		dB
2LO to IF Isolation	32	40		29	40 ~ 50		25	30		dB
IP3 (Input)	5	13		5	13		3	10		dBm
1 dB Gain Compression (Input)	+3	+6		-3	0 ~ +4		-5	0 ~ +3		dBm
Supply Current (Idd)		28	50		28	50		25	50	mA

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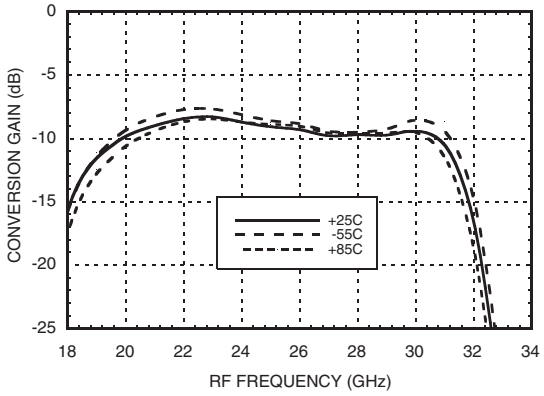
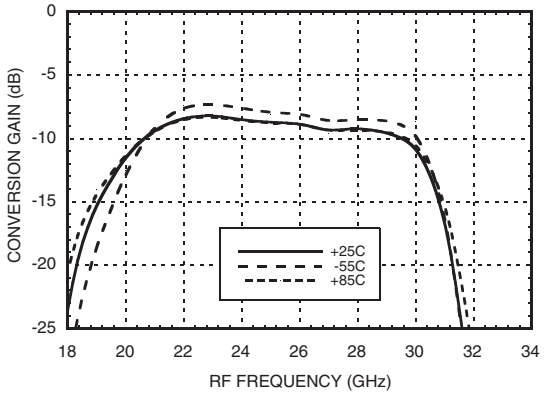
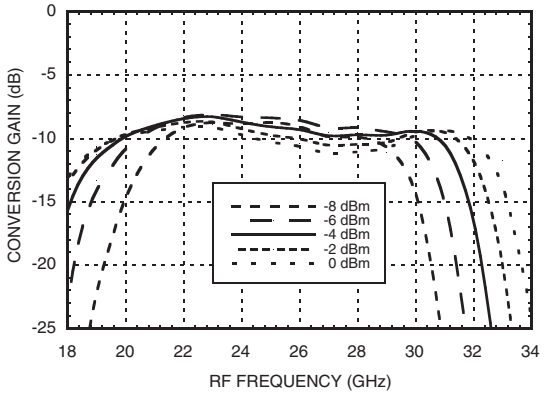
Conversion Gain vs. Temperature @ LO = -4 dBm, Vdd = +4V



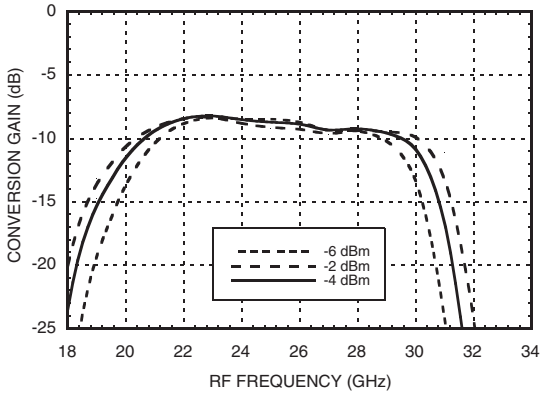
Conversion Gain vs. Temperature @ LO = -4 dBm, Vdd = +3V



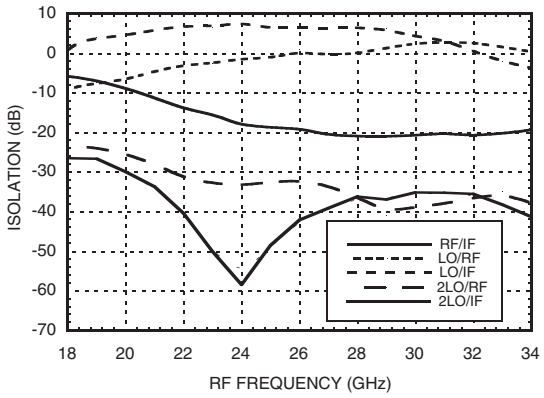
Conversion Gain vs. LO Drive @ Vdd = +4V



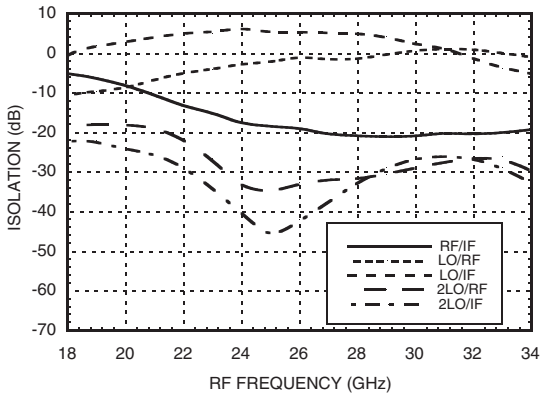
Conversion Gain vs. LO Drive @ Vdd = +3V



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



Isolation @ LO = -4 dBm, Vdd = +3V



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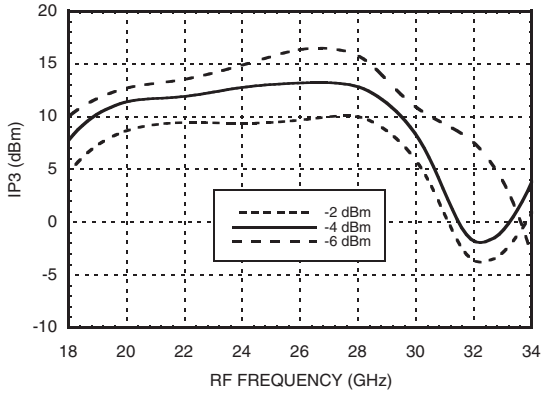
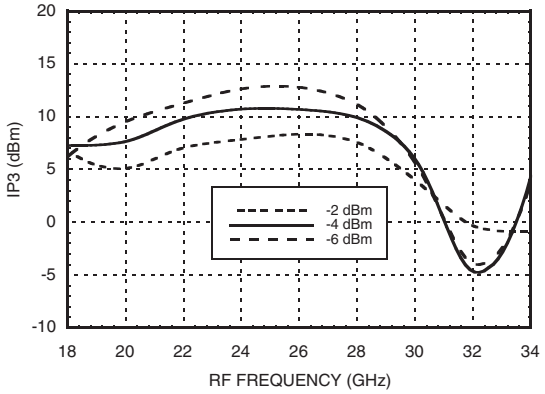
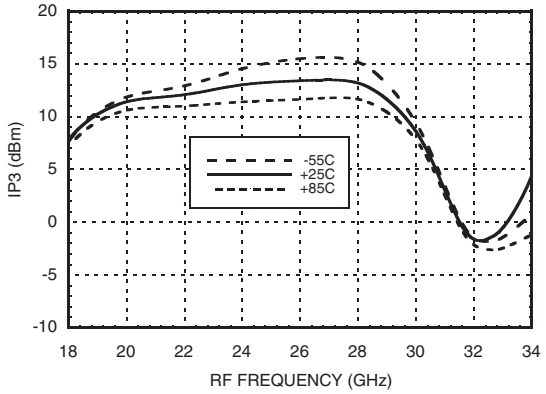
Input IP3 vs. LO Drive @ Vdd = +4V



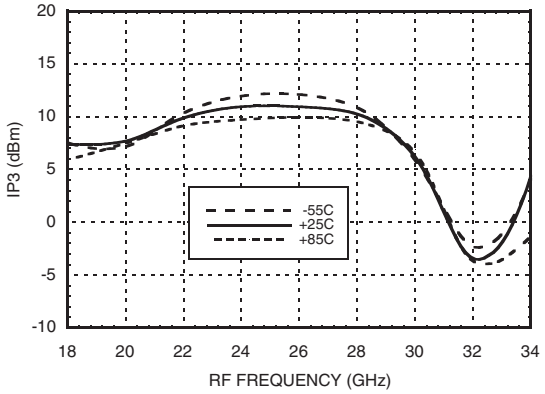
Input IP3 vs. LO Drive @ Vdd = +3V



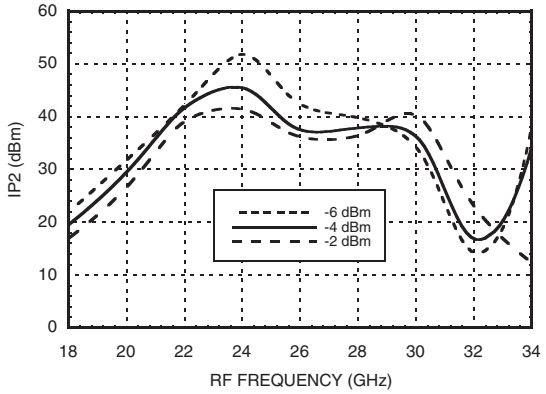
Input IP3 vs. Temperature @ LO = -4 dBm, Vdd = +4V



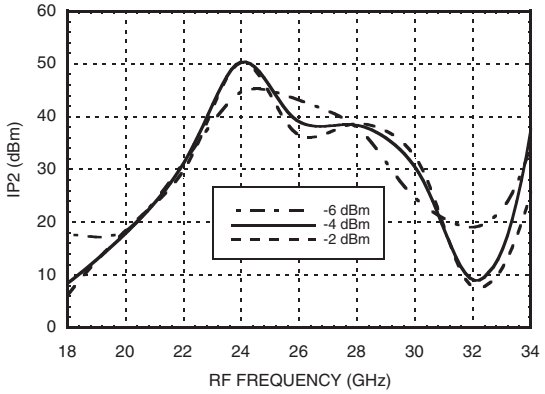
Input IP3 vs. Temperature @ LO = -4 dBm, Vdd = +3V



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



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



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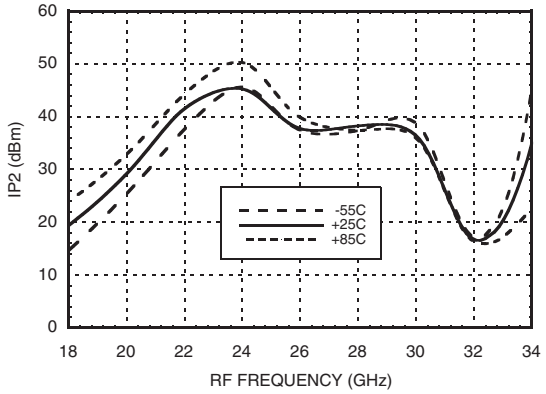
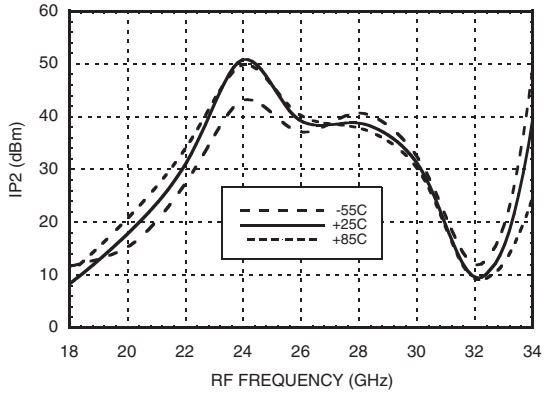
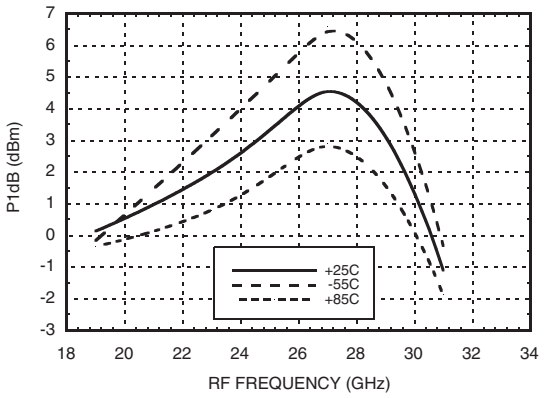
Input IP2 vs. Temperature @ LO = -4 dBm, Vdd = +4V



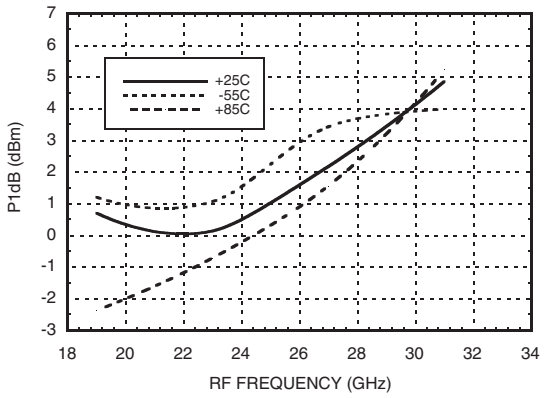
Input IP2 vs. Temperature @ LO = -4 dBm, Vdd = +3V



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



Input P1dB vs. Temperature @ LO = -4 dBm, Vdd = +3V



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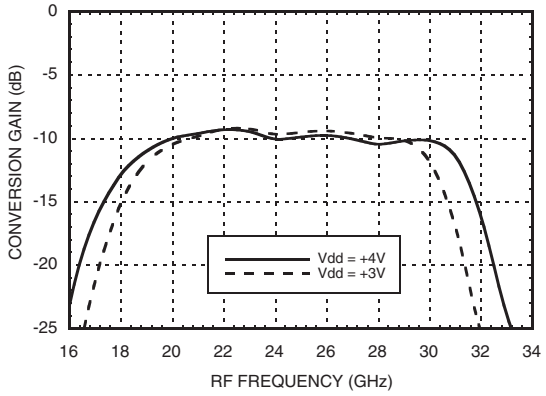
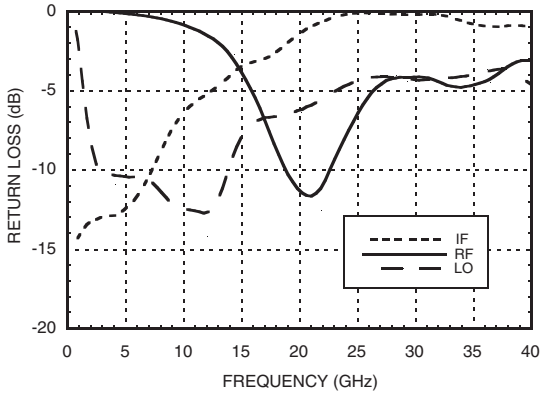
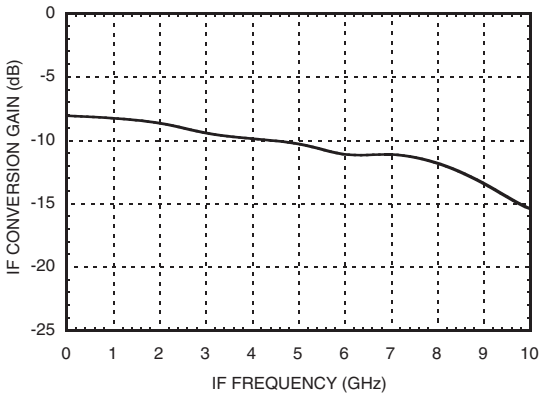
Upconverter Performance
Conversion Gain, LO = -4 dBm



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



IF Bandwidth @ LO = -4 dBm, Vdd = +4V



MxN Spurious Outputs
@ LO Drive = -4 dBm, Vdd = +4V

	nLO					
mRF	±5	±4	±3	±2	±1	0
-3						
-2	-36					
-1	-54	-22	-34			
0				-15	+26	
1				x	-30	-10
2		-54	-38	-66		
3	-74	-67				

RF = 30 GHz @ -10 dBm
LO = 13.5 GHz @ -4 dBm
All values in dBc below the IF power level

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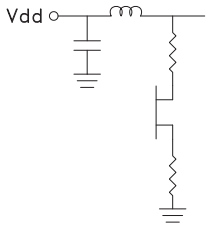
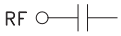
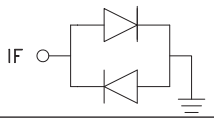
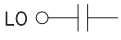
Absolute Maximum Ratings

RF / IF Input (Vdd = +4V)	+13 dBm
LO Drive (Vdd = +4V)	+13 dBm
Vdd	+5.5 Vdc
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

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.	

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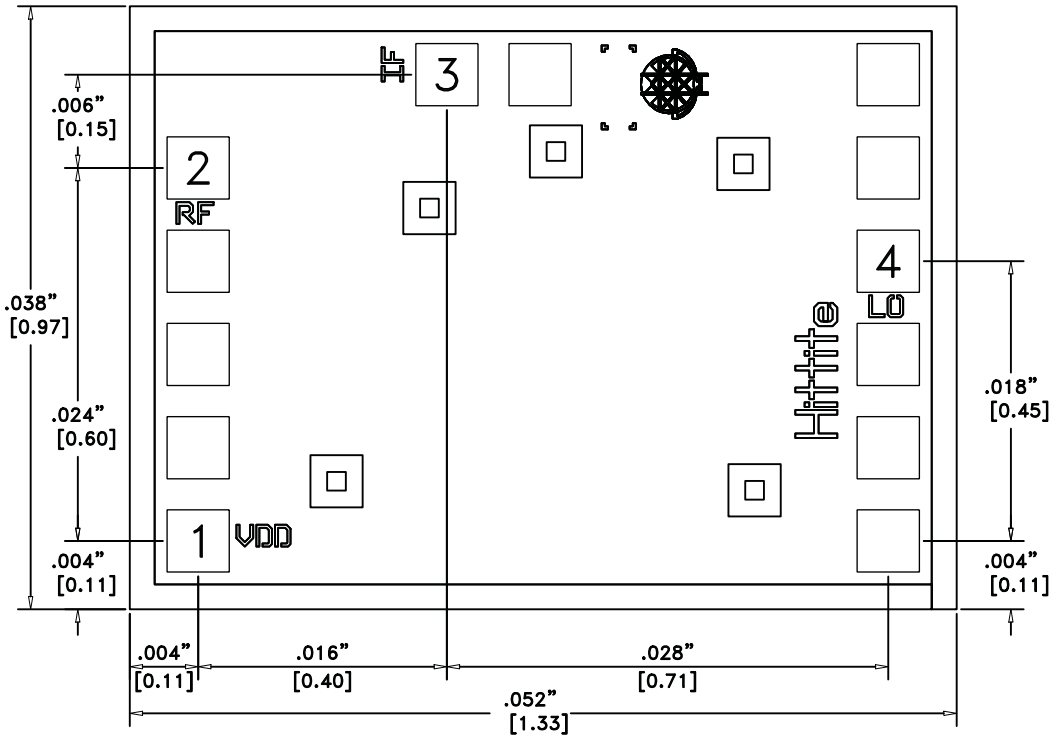
Outline Drawing



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.

NOTES:

1. ALL DIMENSIONS ARE IN INCHES [MM].
2. DIE THICKNESS IS .004".
3. TYPICAL BOND PAD IS .004" SQUARE.
4. BOND PAD SPACING CENTER TO CENTER IS .006".
5. BACKSIDE METALLIZATION: GOLD.
6. BOND PAD METALLIZATION: GOLD.
7. BACKSIDE METAL IS GROUND.
8. CONNECTION NOT REQUIRED FOR UNLABELED BOND PADS.

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