

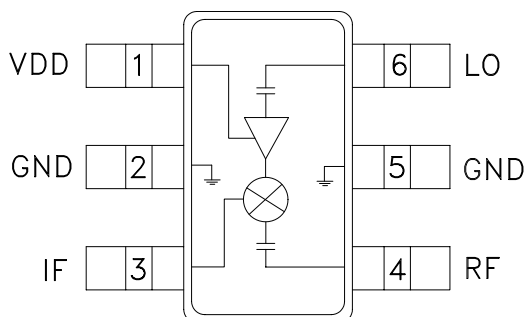
GaAs MMIC MIXER w/ INTEGRATED LO AMPLIFIER, 2.0 - 2.8 GHz

Typical Applications

The HMC332 is ideal for:

- MMDS
- PCMCIA
- WirelessLAN
- WCDMA micro-BTS

Functional Diagram



Features

Integrated LO Amplifier w/ $P_{diss} < 20$ mW
 Conversion Loss / Noise Figure: 8.0 dB
 Low LO Drive Level: 0 dBm
 Input IP3: +10 dBm
 Single Positive Supply: 3V to 5V

General Description

The HMC332 is a single balanced mixer IC with an integrated LO amplifier. This converter IC can operate as an upconverter or downconverter between 2.0 GHz and 2.8 GHz. With the integrated LO amplifier, the mixer requires an LO drive level of only 0 dBm, and requires only 6 mA from a single positive +3V rail. The mixer has 8 dB of conversion loss, an input P1dB of 0 dBm, and an input third order intercept point of +10 dBm.

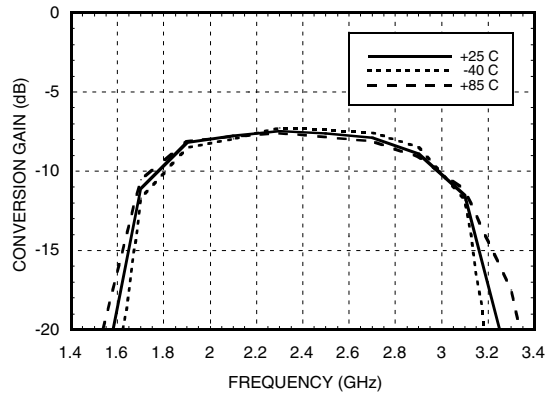
Electrical Specifications, $T_A = +25^\circ C$

Parameter	IF = 100 MHz LO = 0 dBm & Vdd = +3V			Units
	Min.	Typ.	Max.	
Frequency Range, RF & LO	2.0 - 2.8			GHz
Frequency Range, IF	DC - 1.0			GHz
Conversion Loss		8	10	dB
Noise Figure (SSB)		8	10	dB
LO to RF Isolation	11	20		dB
LO to IF Isolation	2	5		dB
RF to IF Isolation	11	17		dB
IP3 (Input)	4	10		dBm
1 dB Compression (Input)	-4	0		dBm
Supply Current (Idd)		6		mA

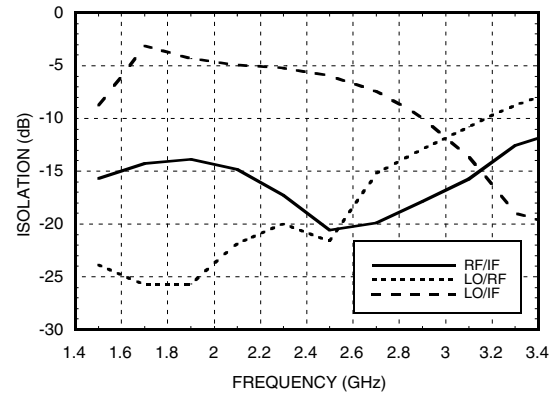
* Unless otherwise noted, all measurements performed as downconverter, IF= 100 MHz.

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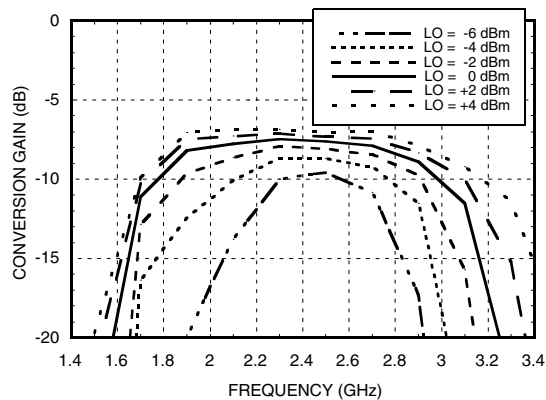
**Conversion Gain vs.
Temperature @ LO = 0 dBm**



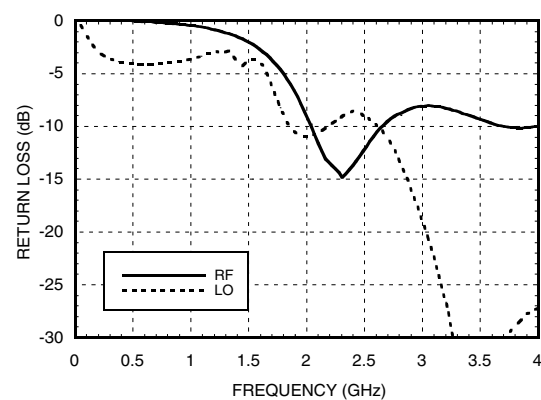
Isolation @ LO = 0 dBm



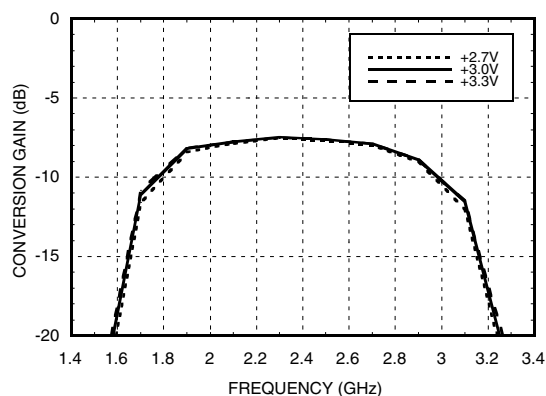
Conversion Gain vs. LO Drive



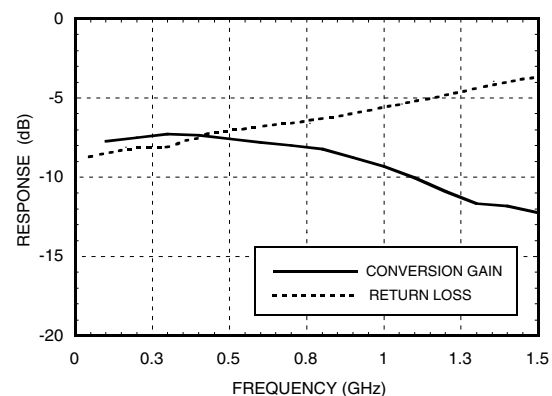
Return Loss @ LO = 0 dBm



Conversion Gain vs. Vdd @ LO = 0 dBm



IF Bandwidth @ LO = 0 dBm

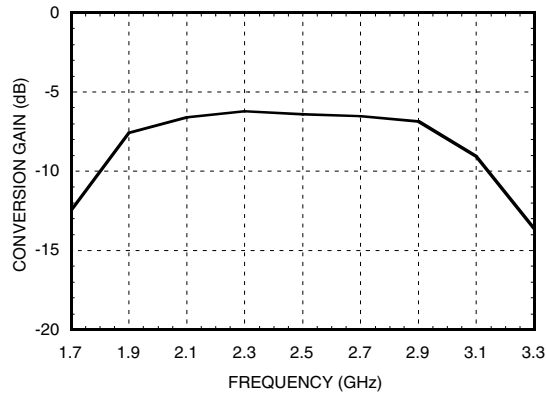


12

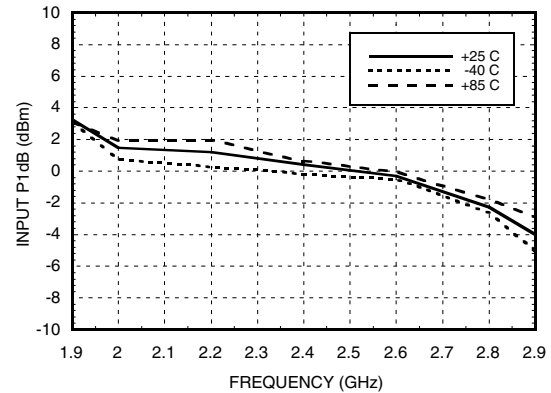
MIXERS - SMT

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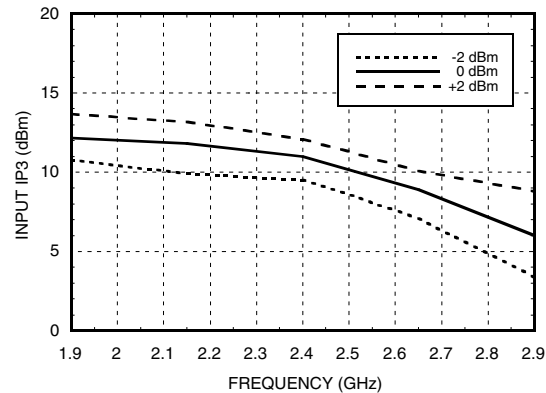
Upconverter Performance
Conversion Gain @ LO = 0 dBm



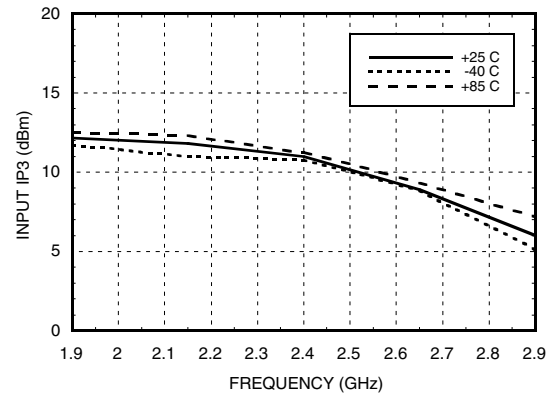
Input P1dB vs.
Temperature @ LO = 0 dBm



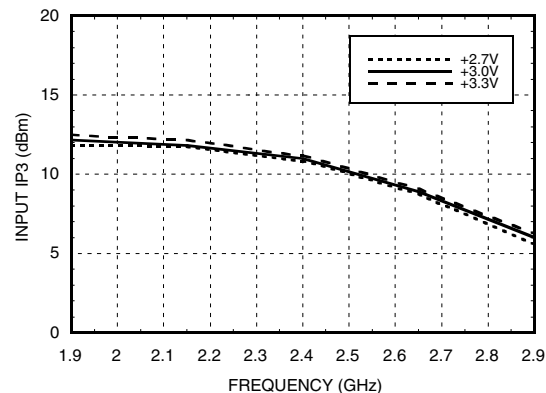
Input IP3 vs. LO Drive*



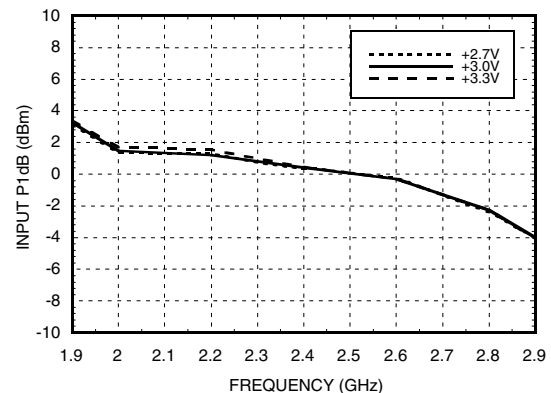
Input IP3 vs.
Temperature @ LO = 0 dBm*



Input IP3 vs. Vdd @ LO = 0 dBm*



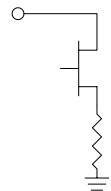
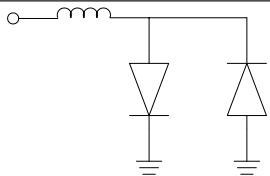
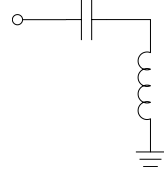
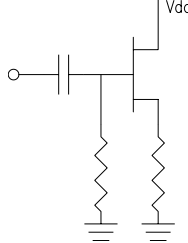
Input P1dB vs. Vdd @ LO = 0 dBm



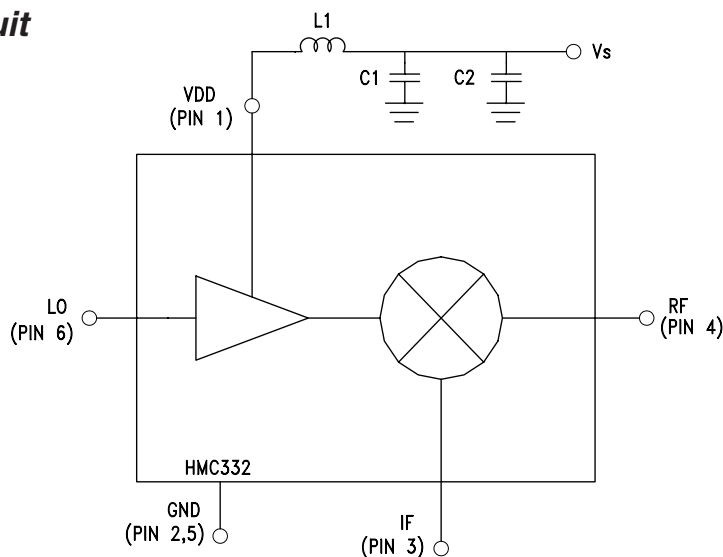
* Two-tone input power = -10 dBm each tone, 1 MHz spacing.

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Pin Descriptions

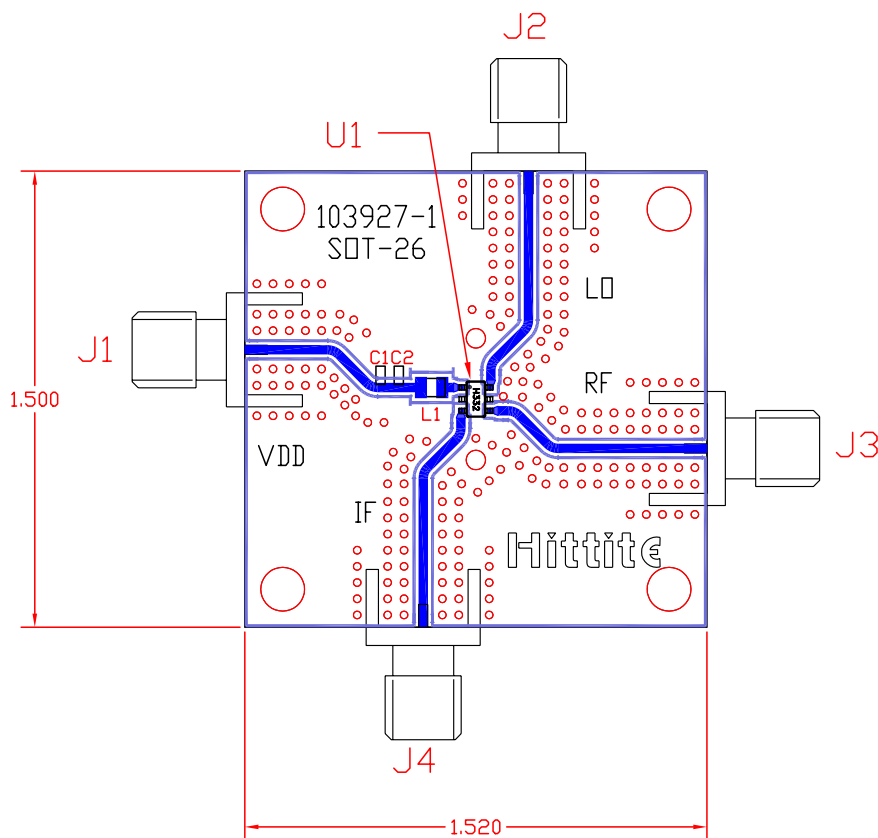
Pin Number	Function	Description	Interface Schematic
1	Vdd	Power supply for the LO Amplifier. Two external RF bypass capacitors (10 pF & 10,000 pF) and an external inductor (4.7 nH) are required.	
2, 5	GND	Ground: Pin must connect to RF ground.	
3	IF Port	IF Port: This pin is DC coupled. For applications not requiring operation to DC, this port should be DC blocked externally using a series capacitor whose value have been chosen to pass the necessary IF frequency range. For operation to DC, this pin must not source/sink more than 3mA of current or die non-function and possible die failure will result.	
4	RF Port	RF Port: This pin is AC coupled and matched to 50 Ohm from 2.0 - 2.8 GHz.	
6	LO Port	LO Port: This pin is AC coupled and matched to 50 Ohm from 2.0 - 2.8 GHz.	

Application Circuit



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Evaluation PCB



List of Materials

Item	Description
J1 - J4	PC Mount SMA RF Connector
C1	10 pF Capacitor, 0603 Pkg.
C2	.01 μ F Capacitor, 0603 Pkg.
L1	4.7 nH Inductor, 0805 Pkg.
U1	HMC332 Mixer
PCB*	103927 Evaluation Board
* Circuit Board Material: Rogers 4350	

The circuit board used in the final application should use RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads 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 Hittite upon request.