



THE DATASHEET OF HMC334LP4ETR





SiGe WIDEBAND DOWNCONVERTER, 0.6 - 2.7 GHz

Typical Applications

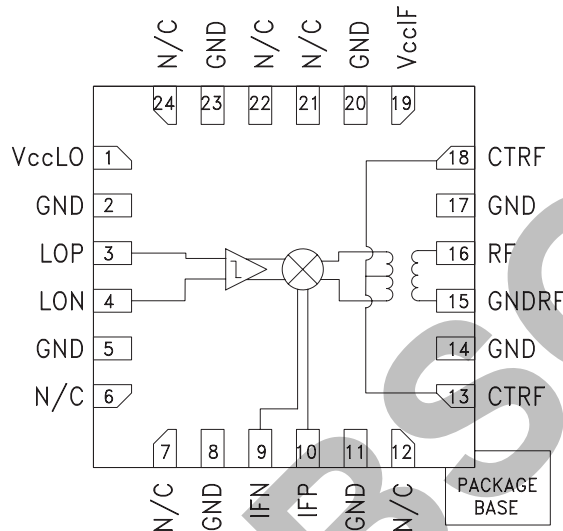
The HMC334LP4(E) is ideal for:

- Basestations & Repeaters
- GSM, GPRS & Edge
- CDMA, W-CDMA & TD-SCDMA
- WiMAX & LTE

Features

- Conversion Loss: 0 dB
- LO to RF Isolation: 48 dB
- Single-Ended LO Drive: -6 to +6 dBm
- Input IP3: +26 dBm
- SSB Noise Figure: 11 dB
- On-Chip RF Balun
- 24 Lead 4x4mm QFN Package: 16 mm²

Functional Diagram



General Description

The HMC334LP4(E) is a low noise, wideband downconverter RFIC which is ideal for Cellular/3G and WiMAX/4G applications from 0.6 to 2.7 GHz. The LO input accepts drive levels from -6 to +6 dBm while the RFIC provides 48 dB of LO to RF isolation, and 0 dB conversion loss. The HMC334LP4(E) will support an IF output bandwidth of up to 600 MHz and consumes only 173 mA from a +5V supply. This wideband active mixer also provides excellent performance in the presence of high level "Blocker" signals, making it ideal for receiver applications in demanding environments.

Electrical Specifications,

$T_A = +25^\circ\text{C}$, $LO = 0\text{ dBm}^*$, $V_{SLO} = V_{SIF} = +5V$, $IF = 240\text{ MHz}$

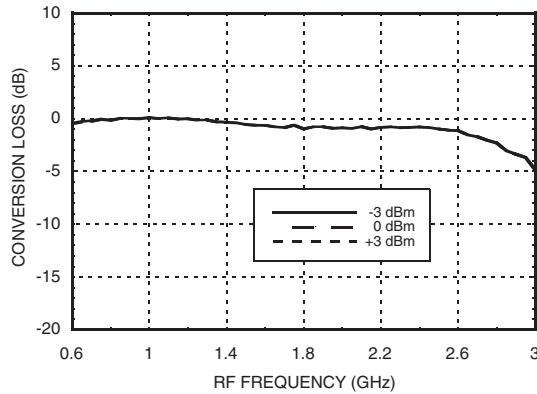
| Parameter | Min. | Typ. | Max. | Units |
|------------------------------------|------------|------|------|-------|
| Frequency Range, RF | 0.6 - 2.7 | | | GHz |
| Frequency Range, LO | 0.35 - 3.0 | | | GHz |
| Frequency Range, IF | 1 - 600 | | | MHz |
| Conversion Gain (IF XFMR Included) | -5 | -1 | | dB |
| SSB Noise Figure | | 11 | | dB |
| LO to RF Isolation | 30 | 48 | | dB |
| IF Output Impedance (Diff) | | 200 | | Ohms |
| IP3 (Input) | | +26 | | dBm |
| 1 dB Compression (Input) | 8.5 | 12 | | dBm |
| LO Drive Input Level | -6 to +6 | | | dBm |
| Supply Current | | 173 | 225 | mA |

*Unless otherwise noted all measurements with $R1 = 13\text{ Ohms}$ and single-ended 50 Ohm IF output with Port J2 or J3 shorted to ground.

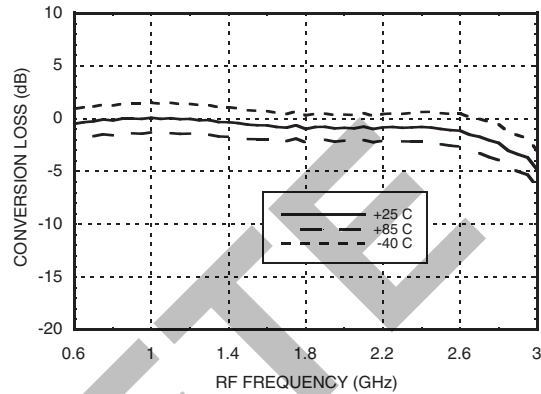


**SiGe WIDEBAND
DOWNCONVERTER, 0.6 - 2.7 GHz**

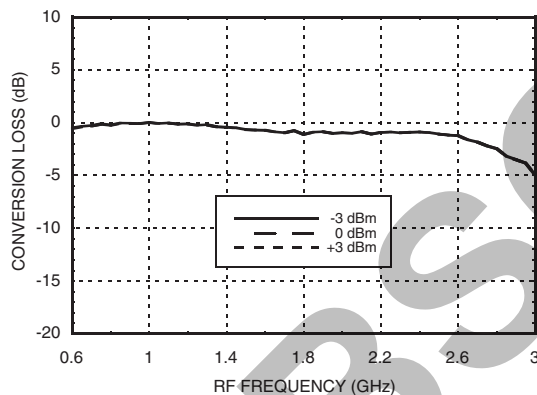
**Conversion Gain vs.
LO Drive, IF = 100 MHz ^[1]**



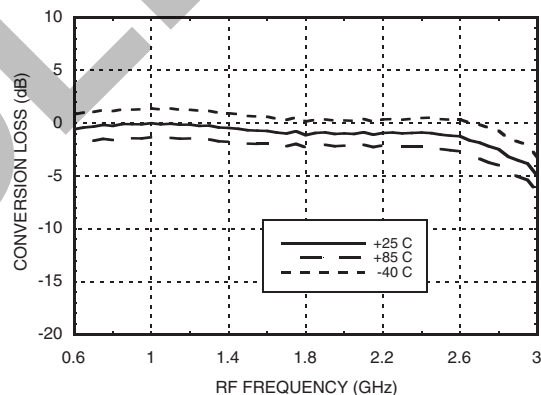
**Conversion Gain vs. Temperature
@ LO = 0 dBm, IF = 100 MHz ^[1]**



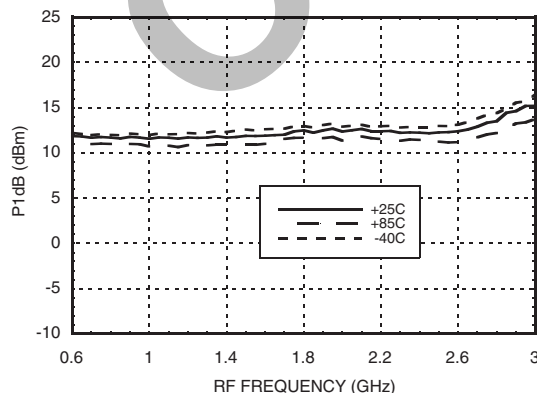
**Conversion Gain vs.
LO Drive, IF = 240 MHz ^[1]**



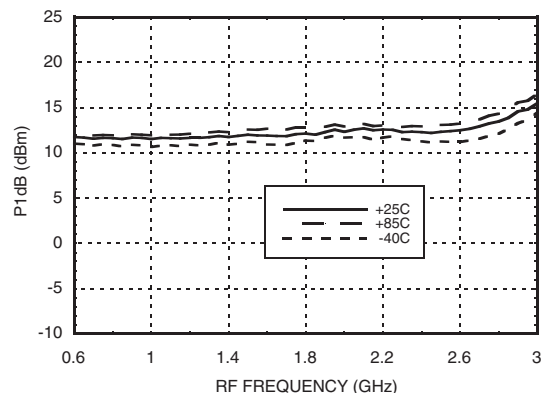
**Conversion Gain vs. Temperature
@ LO = 0 dBm, IF = 240 MHz ^[1]**



**P1dB vs. Temperature
@ LO = 0 dBm, IF = 100 MHz ^[1]**



**P1dB vs. Temperature
@ LO = 0 dBm, IF = 240 MHz ^[1]**



[1] LO < RF
* Unless otherwise noted all measurements with R1= 13 Ohms

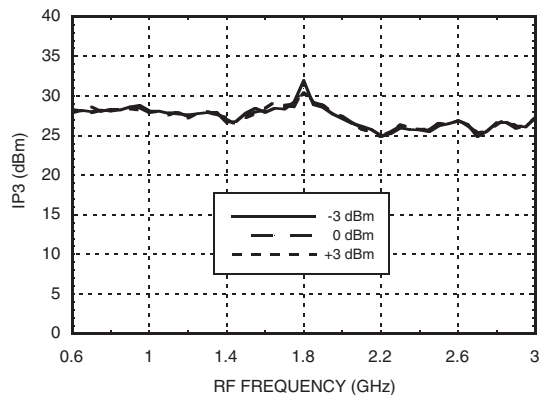
Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at www.analog.com Application Support: Phone: 1-800-ANALOG-D

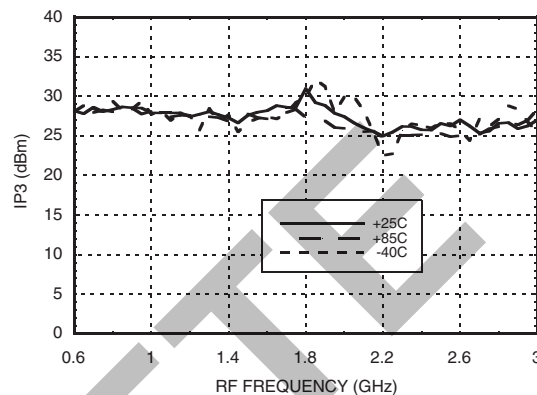


SiGe WIDEBAND DOWNCONVERTER, 0.6 - 2.7 GHz

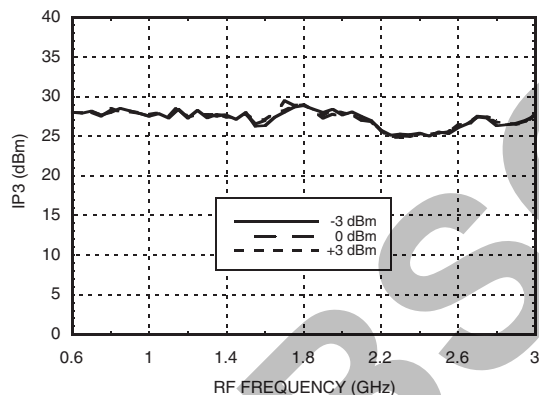
Input IP3 vs. LO Drive, IF = 100 MHz [1]



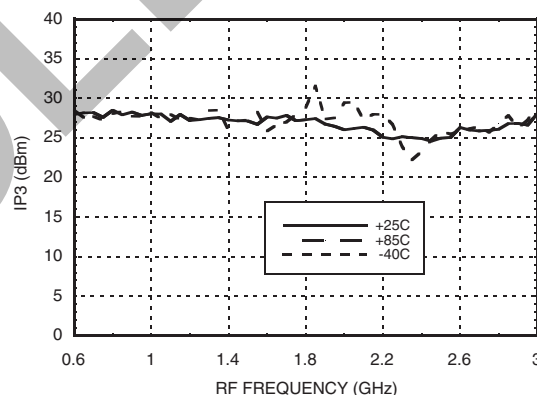
Input IP3 vs. Temperature @ LO = 0 dBm, IF = 100 MHz [1]



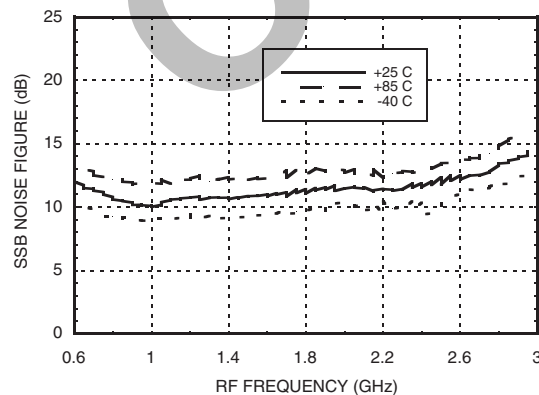
Input IP3 vs. LO Drive, IF = 240 MHz [1]



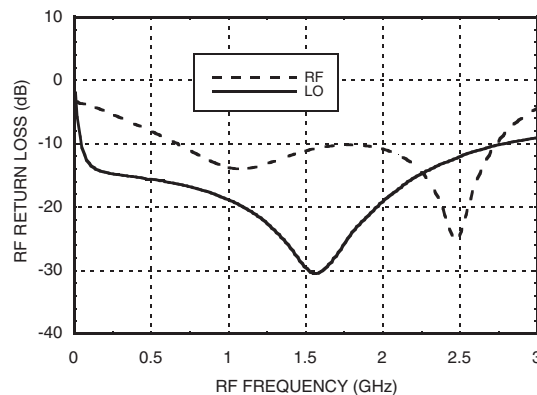
Input IP3 vs. Temperature @ LO = 0 dBm, IF = 240 MHz [1]



Noise Figure [1]



RF Return Loss @ LO = 0 dBm [1]



[1] LO < RF

* Unless otherwise noted all measurements with R1= 13 Ohms

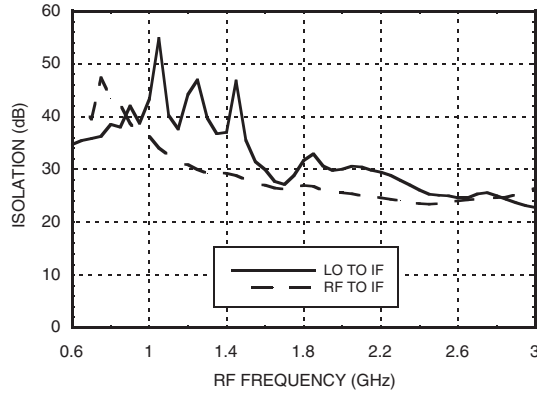
Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at www.analog.com Application Support: Phone: 1-800-ANALOG-D

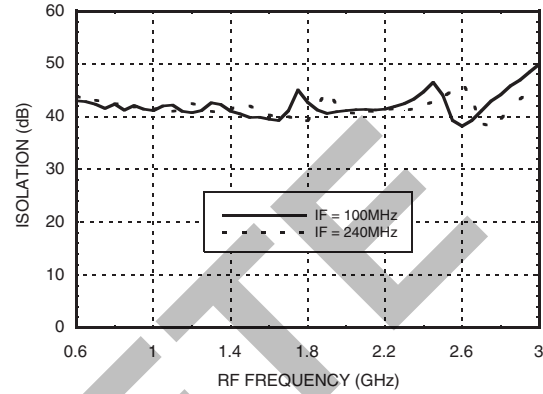


**SiGe WIDEBAND
DOWNCONVERTER, 0.6 - 2.7 GHz**

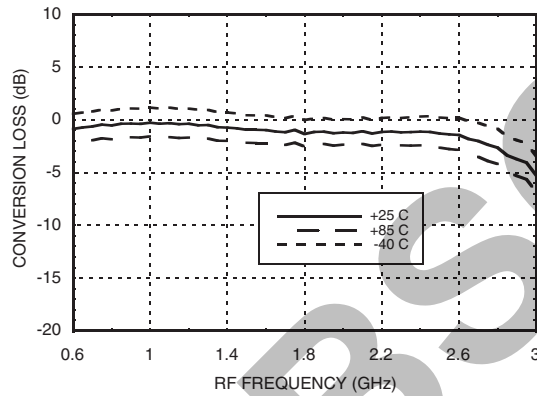
Isolation @ LO = 0 dBm, IF = 100 MHz [1]



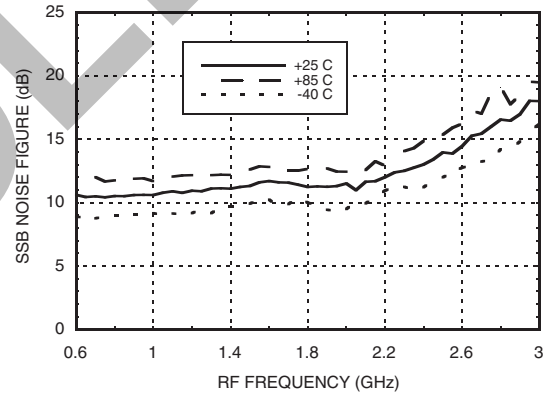
LO - RF Isolation @ LO = 0 dBm [1]



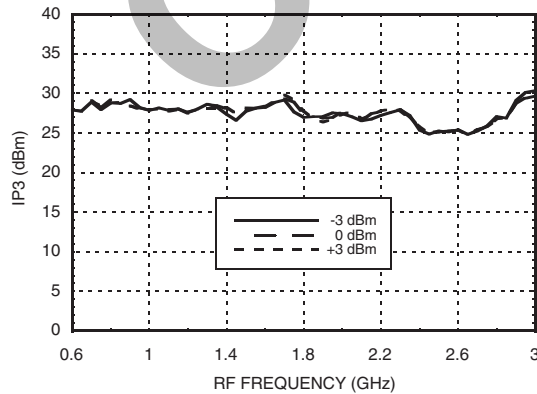
**Conversion Gain vs.
Temperature, IF = 184 MHz, USB [2]**



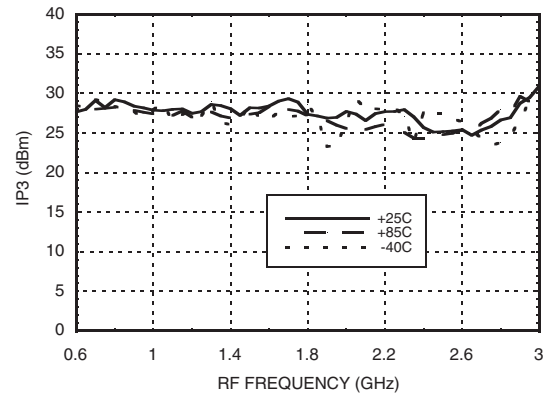
Noise Figure, IF = 184 MHz, USB [2]



**Input IP3 vs.
LO Drive, IF = 184 MHz, USB [2]**



**Input IP3 vs. Temperature
@ LO = 0 dBm, IF = 184 MHz, USB [2]**



[1] LO < RF
[2] LO > RF

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at www.analog.com Application Support: Phone: 1-800-ANALOG-D



SiGe WIDEBAND DOWNCONVERTER, 0.6 - 2.7 GHz

Typical Supply Current vs. Supply Voltage

| VSLO = VSIF (V) | ISLO + ISIF (mA) |
|-----------------|------------------|
| +4.5 | 146 |
| +5.0 | 173 |
| +5.5 | 200 |

Downconverter will operate over full voltage range shown above.

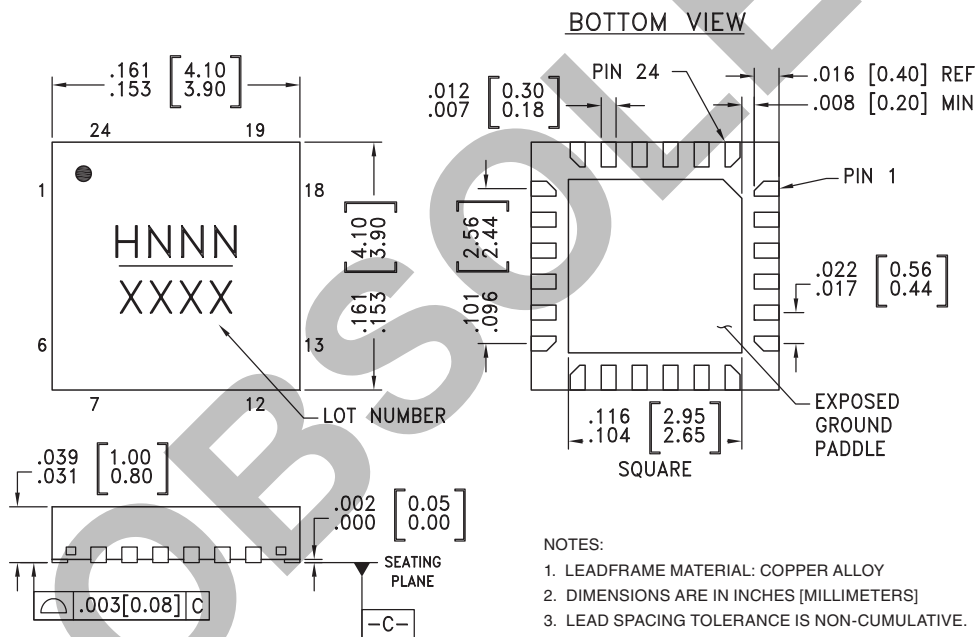
Absolute Maximum Ratings

| | |
|---|---------------|
| RF Input (VSLO = VSIF = +5V) | +21 dBm |
| LO Drive (VSLO = VSIF = +5V) | +12 dBm |
| VccLO, VccIF | +6 Vdc |
| Channel Temperature | 150 °C |
| Continuous Pdiss (T = 85°C) (derate 27.8 mW/°C above 85°C) | 1.8 W |
| Thermal Resistance (channel to ground paddle) | 36 °C/W |
| Storage Temperature | -65 to 150 °C |
| Operating Temperature | -40 to 85 °C |



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

Outline Drawing



Package Information

| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking ^[3] |
|-------------|--|---------------|---------------------|--------------------------------|
| HMC334LP4 | Low Stress Injection Molded Plastic | Sn/Pb Solder | MSL1 ^[1] | H334 XXXX |
| HMC334LP4E | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 ^[2] | H334 XXXX |

[1] Max peak reflow temperature of 235 °C

[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX



Pin Descriptions

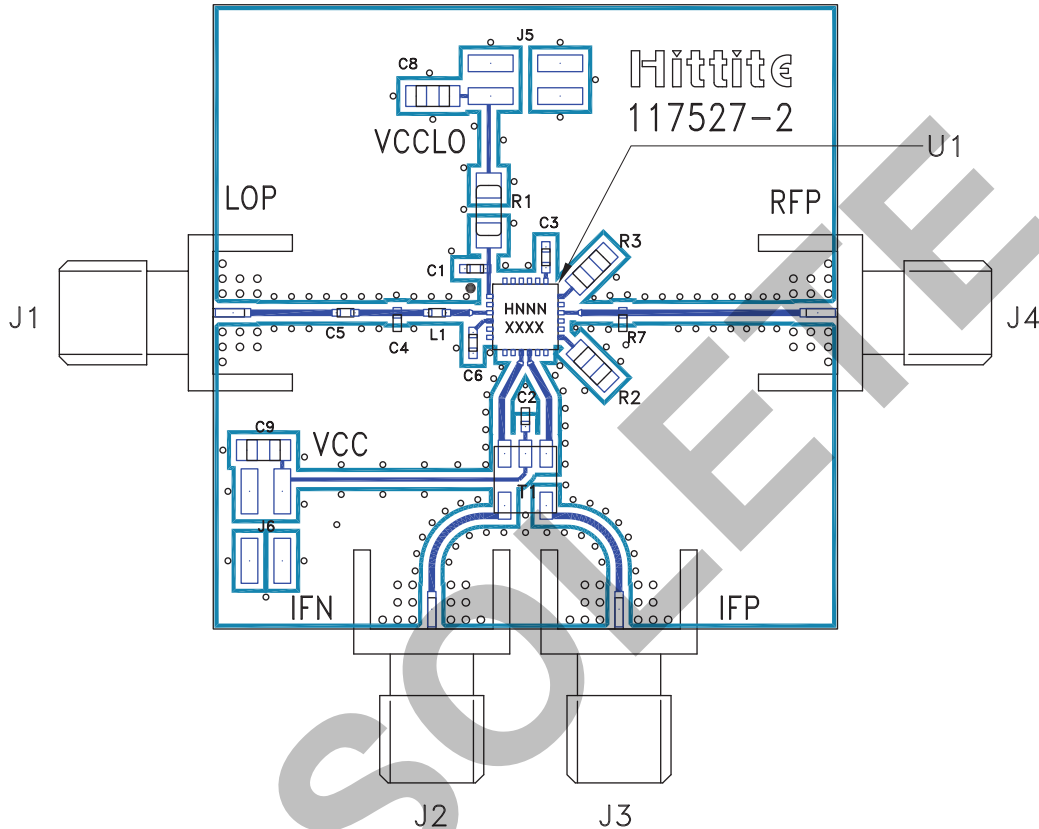
| Pin Number | Function | Description | Interface Schematic |
|-----------------------------|----------|---|---------------------|
| 1 | VccLO | Supply for LO Amplifier. Draws approximately 120mA from VSLO. A 13 Ohm resistor (R1) must be connected externally between the VSLO supply and the VccLO pin. See evaluation PCB schematic. | |
| 2, 5, 8, 11, 14, 17, 20, 23 | GND | These pins and the ground paddle should be connected to a high quality RF/DC ground. | |
| 3 | LOP | LO Input Port. This pin needs a DC blocking capacitor. (Typical voltage on this pin will be 1.5 - 1.8V) | |
| 4 | LON | For single ended applications, this pin should be AC grounded | |
| 6, 7, 12, 21, 22, 24 | N/C | The pins are not connected internally; however, all data shown herein was measured with these pins connected to RF/DC ground externally. | |
| 9, 10 | IFN, IFP | Differential baseband outputs, 200 ohm differential output impedance. Each port should draw approximately 25mA from VSIF without LO power and 28mA from VSIF with LO power on. For single-ended 50 Ohm operation, port J2 or J3 should be shorted to RF/DC ground. See evaluation PCB schematic. | |
| 13, 18 | CTRF | Center tap of the RF transformer. Biased at 2.2V when connected to ground through two 91 ohm resistors. | |
| 15 | GNDRF | Pin to be connected to a high quality RF/DC ground. Also can be used to drive the RF port differentially if needed. | |
| 16 | RF | 50 Ohms impedance can be matched from 600 - 3000 MHz. | |
| 19 | VccIF | Supply decoupling for the mixer stage. (Typical voltage on this pin will be 4.8V) Connect C3 to a high quality RF/DC ground per evaluation PCB schematic. | |

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106
Phone: 781-329-4700 • Order online at www.analog.com
Application Support: Phone: 1-800-ANALOG-D



Evaluation PCB



List of Materials for Evaluation PCB 117528 [1]

| Item | Description |
|---------|---------------------------------|
| J1 - J4 | Johnson SMA Connector |
| J5 - J6 | 2mm SMT |
| C1 - C3 | 1000 pF Capacitor, 0402 Pkg. |
| C4 | 0.3 pF Capacitor, 0402 Pkg. |
| C5 | 100 pF Capacitor, 0402 Pkg. |
| C6 | 10 KpF Capacitor, 0402 Pkg. |
| C7 | 1.3 pF Capacitor, 0402 Pkg. |
| C8, C9 | 0.1 μF Capacitor, 0805 Pkg. |
| L1 | 2.7 nH Chip Inductor, 0603 Pkg. |
| L2 | 2 nH Chip Inductor, 0603 Pkg. |
| R1 | 13 Ohm Resistor, 1206 Pkg. |
| R2, R3 | 91 Ohm Resistor, 0805 Pkg. |
| T1 | M/A-Com 4:1 Balun, MABAES0061 |
| U1 | HMC334LP4 / HMC334LP4E |
| PCB [2] | 117527 Evaluation Board |

[1] Reference this number when ordering complete evaluation PCB

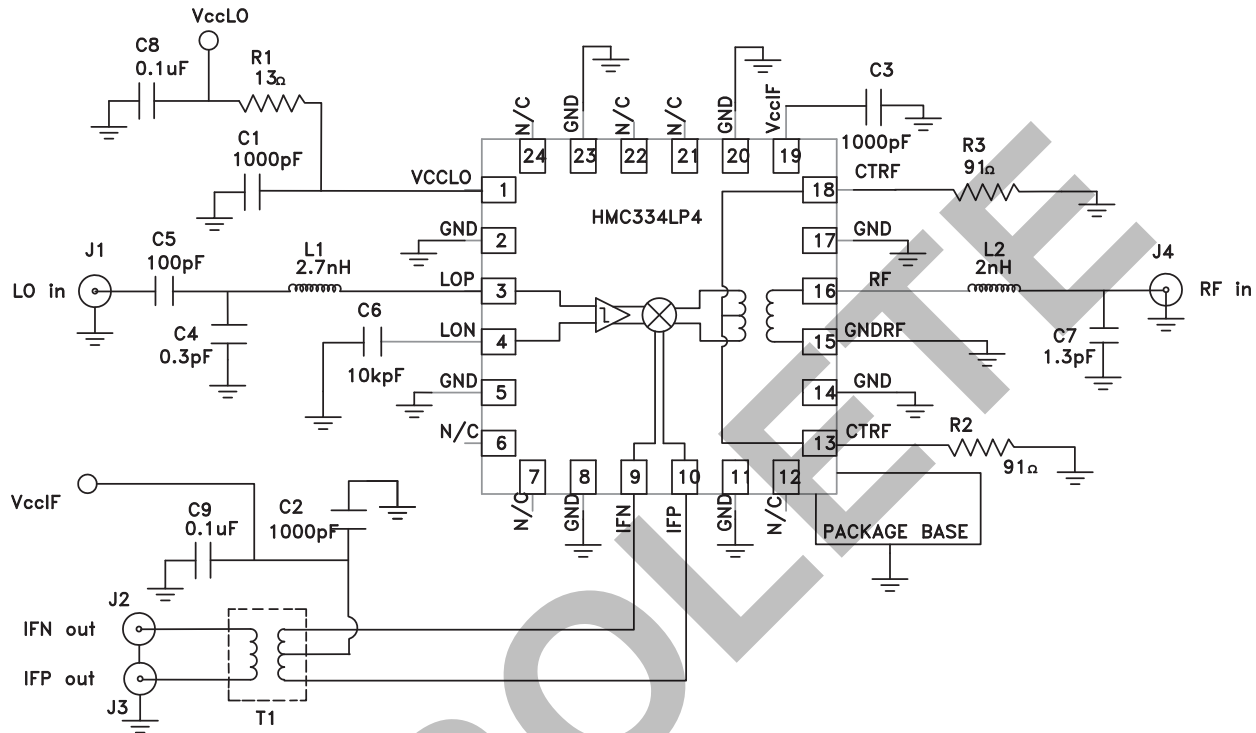
[2] Circuit Board Material: Rogers 4350

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 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 Hittite upon request.



**SiGe WIDEBAND
DOWNCONVERTER, 0.6 - 2.7 GHz**

Evaluation PCB Schematic



Note: For single-ended 50 Ohms operation, port J2 or J3 should be shorted to RF/DC ground.

OBSOLETE

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at www.analog.com Application Support: Phone: 1-800-ANALOG-D

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View HMC334LP4ETR on WIN SOURCE](#)
-  [Analog Devices Inc. Information](#)

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management