



HMC334LP4 / 334LP4E

SiGe WIDEBAND DOWNCONVERTER, 0.8 - 2.7 GHz

Typical Applications

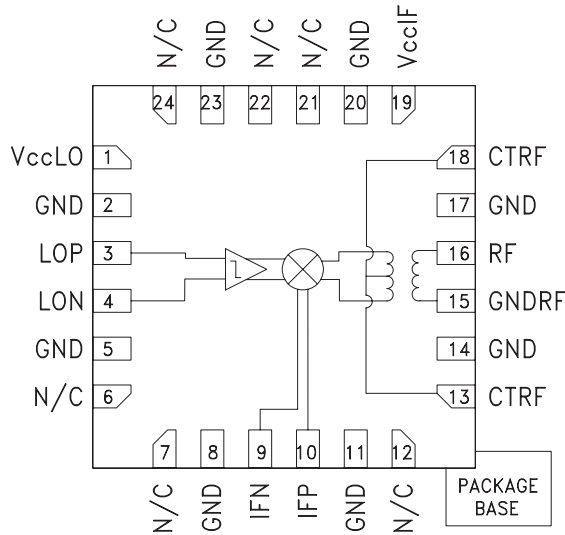
The HMC334LP4 / HMC334LP4E is ideal for Wireless Infrastructure Applications:

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

Features

- Conversion Loss: 0 dB
- LO to RF Isolation: 48 dB
- Single-Ended LO Drive: -6 dBm
- Input IP3: +26 dBm
- SSB Noise Figure: 10.5 dB
- On-Chip RF Balun
- RoHS Compliant 4x4mm QFN Package

Functional Diagram



General Description

The HMC334LP4 & HMC334LP4E are low noise, wideband downconverter RFICs which are ideal for Cellular/3G and WiMAX/4G applications from 0.8 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 173mA from a +5.0V 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,

$T_A = +25^\circ C$, LO = 0 dBm @ 1650 MHz, $V_{SLO} = V_{SIF} = +5V$, IF = 240 MHz, IF Load = 400 Ohms

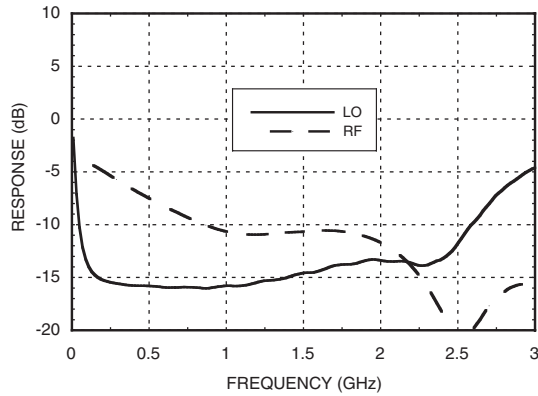
| Parameter | Min. | Typ. | Max. | Units |
|------------------------------------|------------|------|------|-------|
| Frequency Range, RF | 0.8 - 2.7 | | | GHz |
| Frequency Range, LO | 0.01 - 3.3 | | | GHz |
| Frequency Range, IF | 1 - 600 | | | MHz |
| Conversion Gain (IF XFMR Included) | -5 | -1 | | dB |
| SSB Noise Figure | | 10.5 | | dB |
| LO to RF Isolation | 30 | 48 | | dB |
| IF Output Impedance (Diff) | | 400 | | 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 low side LO

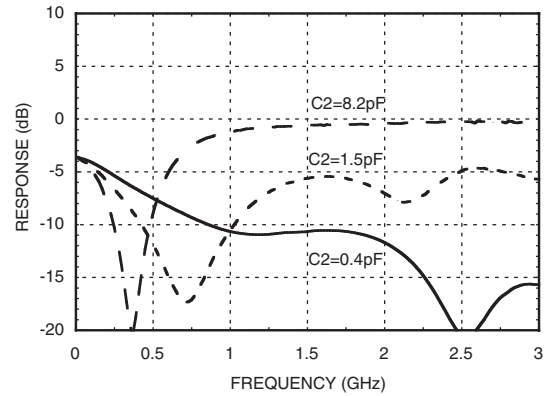
For price, delivery, and to place orders, please contact Hittite Microwave Corporation:
 20 Alpha Road, Chelmsford, MA 01824 Phone: 978-250-3343 Fax: 978-250-3373
 Order On-line at www.hittite.com



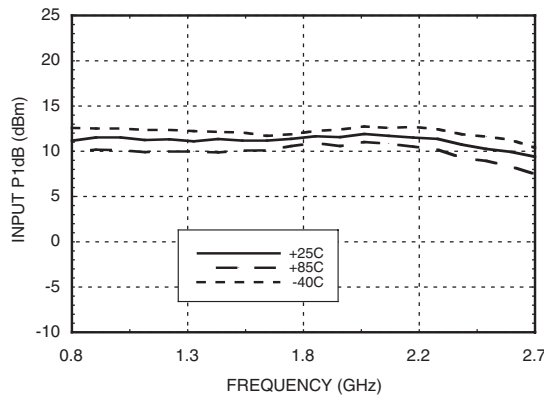
Return Loss @ LO = 0 dBm



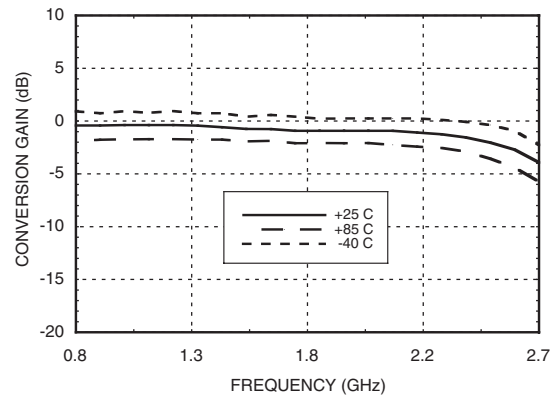
RF Return Loss @ LO = 0 dBm



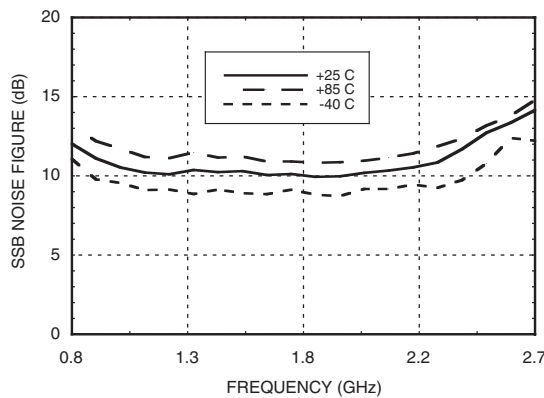
**P1dB vs. Temperature
@ LO = 0 dBm, IF = 240 MHz**



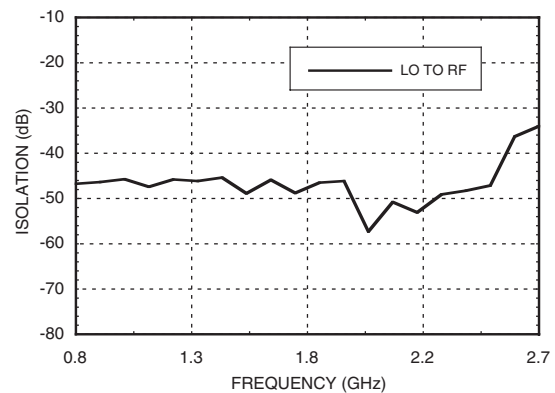
**Conversion Gain vs. Temperature
@ LO = 0 dBm, IF = 240 MHz**



Noise Figure



Isolation @ LO = 0 dBm

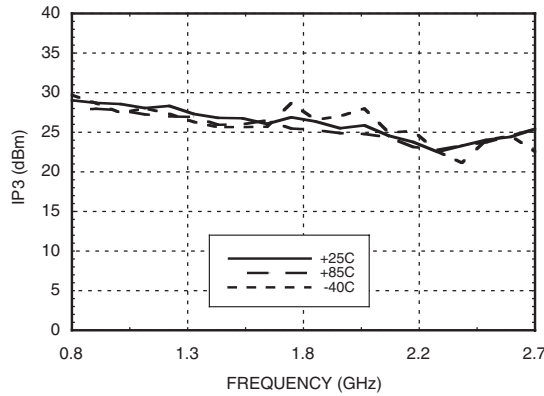


* Unless otherwise noted all measurements with low side LO & IF = 105 MHz.

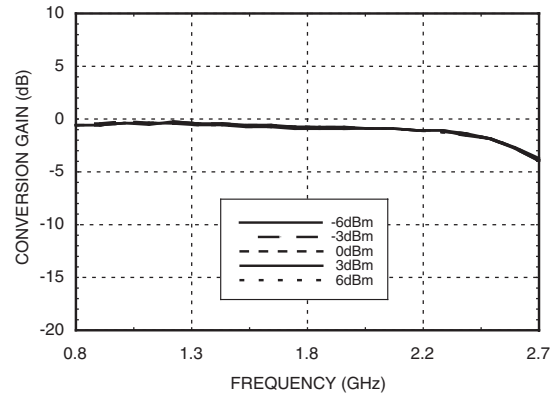


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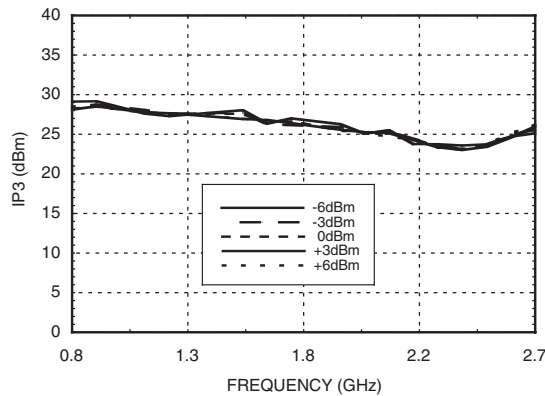
Input IP3 vs. Temperature
@ LO = 0 dBm, IF = 240 MHz



Conversion Gain vs. LO Drive, IF = 360 MHz



Input IP3 vs. LO Drive, IF = 360 MHz



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 |

Typical Supply Current vs. VccLO = VccIF

| VsLO = VsIF (LO + IF) | IsLO + IsIF (mA) |
|-----------------------|------------------|
| +4.5 | 146 |
| +5.0 | 173 |
| +5.5 | 200 |

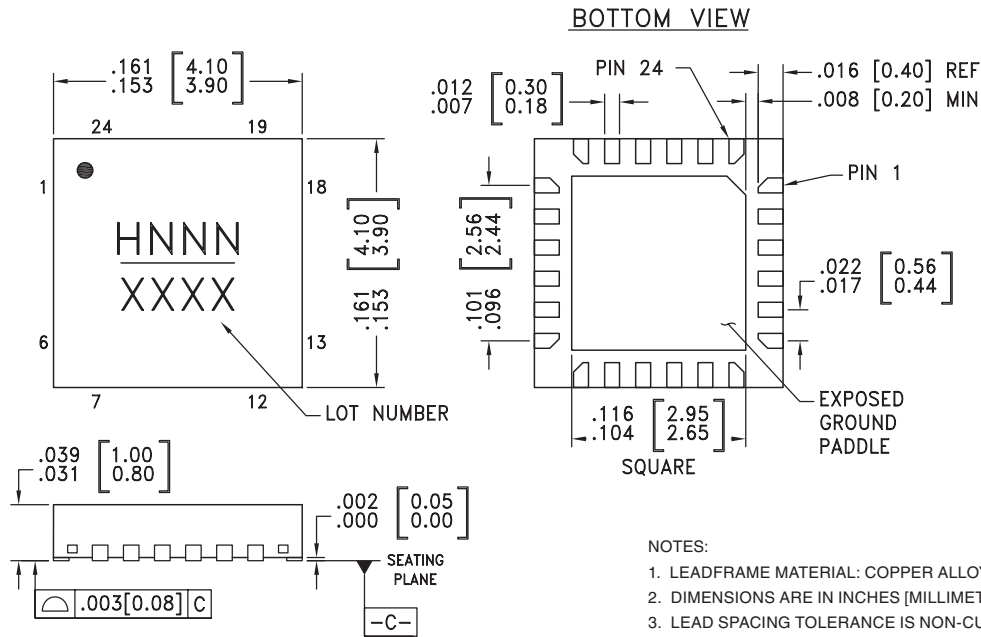
Downconverter will operate over full voltage range shown above.



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

* Unless otherwise noted all measurements with low side LO & IF = 105 MHz.

Outline Drawing



NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
3. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
4. PAD BURR LENGTH SHALL BE 0.15mm MAXIMUM.
PAD BURR HEIGHT SHALL BE 0.05mm MAXIMUM.
5. PACKAGE WARP SHALL NOT EXCEED 0.05mm.
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
7. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED LAND PATTERN.

Package Information

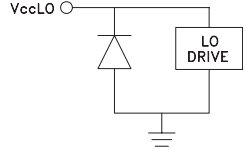

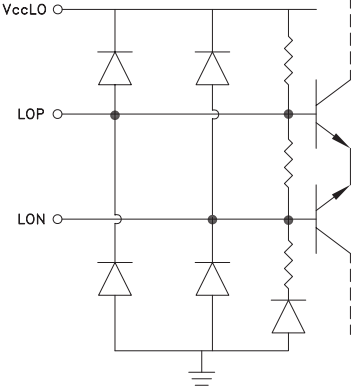
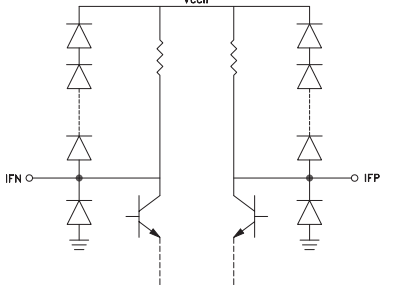
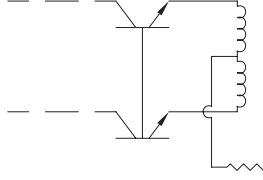
| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking ^[3] |
|-------------|--|---------------|---------------------|--------------------------------|
| HMC334LP4 | Low Stress Injection Molded Plastic | Sn/Pb Solder | MSL1 ^[1] | H334 XXXX |
| HMC334LP4E | RoHS-compliant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

[1] Max peak reflow temperature of 235 °C

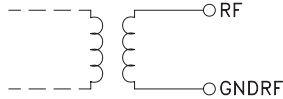
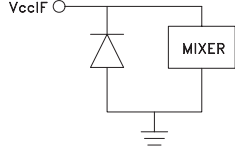
[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX

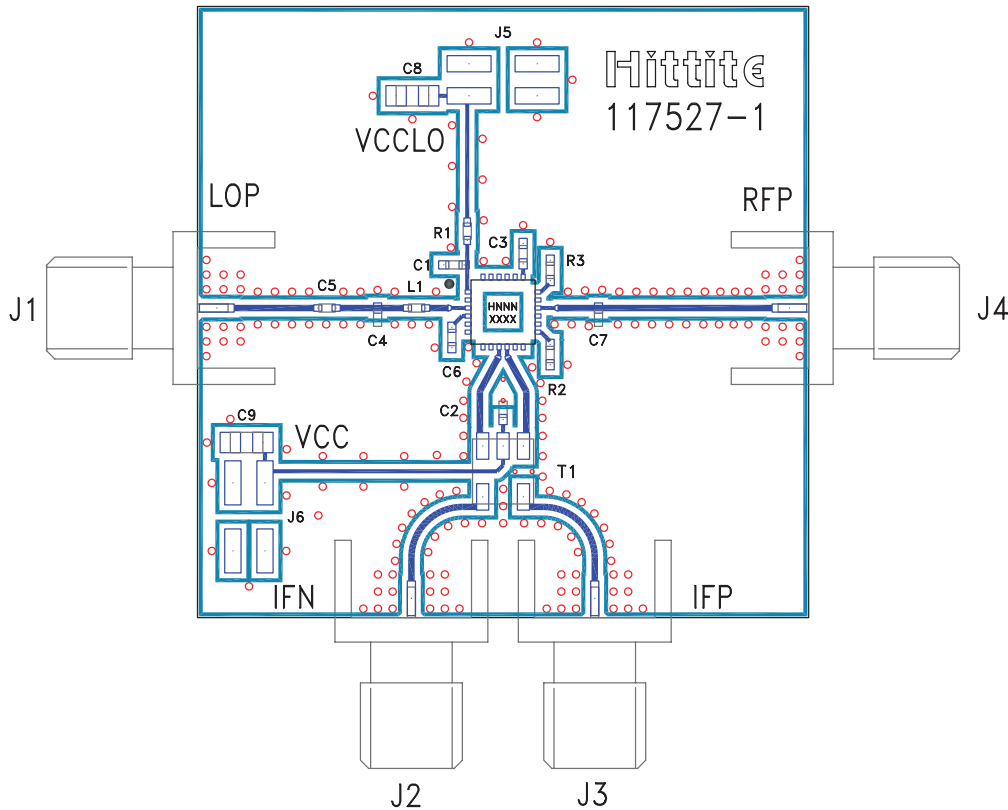
Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|--------------------------------|----------|--|---|
| 1 | VccLO | Supply for LO Amplifier. Draws approximately 120mA from VSLO. |  |
| 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 | No Connection | |
| 9, 10 | IFN, IFP | Differential baseband outputs, 400 ohm differential output impedance. Each port should draw approximately 25mA from VSIF without LO power and 28mA from VSIF with LO power on. |  |
| 13, 18 | CTRF | Center tap of the RF transformer. Biased at 2.2V when connected to ground through a 91 ohm resistor. |  |

Pin Descriptions (Continued)

| Pin Number | Function | Description | Interface Schematic |
|------------|----------|---|---|
| 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 100 - 3000 MHz. | |
| 19 | VccIF | Supply decoupling for the mixer stage. (Typical voltage on this pin will be 4.8V) |  |

Evaluation PCB



List of Materials for Evaluation PCB 115316 [1]

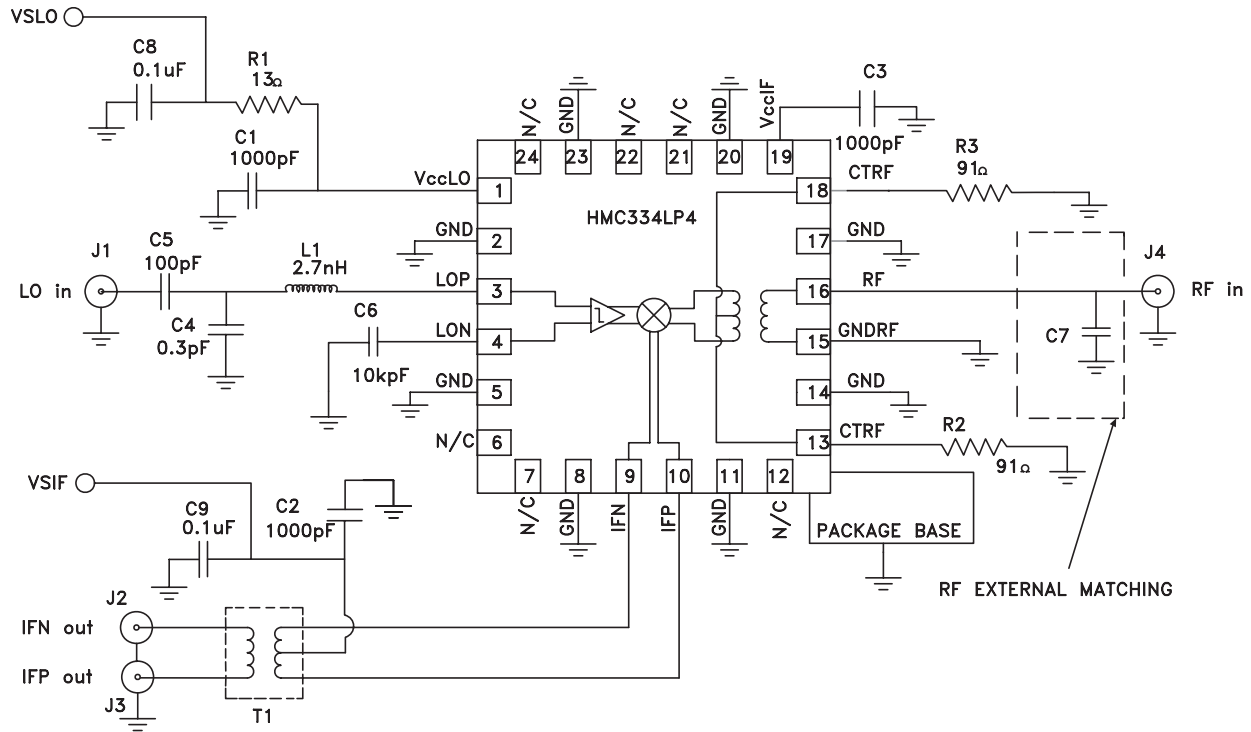
| Item | Description |
|---------|---------------------------------|
| J1 - J4 | Johnson SMA Connector |
| J5 - J6 | 2mm SMT |
| C1 - C3 | 1000 pF Capacitor, 0402 Pkg. |
| C4 | 0.3 pF Capacitor, 0402 Pkg. |
| C5 | 100 pF Capacitor, 0402 Pkg. |
| C6 | 10 KpF Capacitor, 0402 Pkg. |
| C7 | 0.4 pF Capacitor, 0402 Pkg. |
| C8, C9 | 0.1 µF Capacitor, 0805 Pkg. |
| L1 | 2.7 nH Chip Inductor, 0603 Pkg. |
| R1 | 13 Ohm Resistor, 0603 Pkg. |
| R2, R3 | 91 Ohm Resistor, 0603 Pkg. |
| 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.

Evaluation PCB Schematic





Стандарт Электрон Связь

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