v01.0709

# HMC263LP4E

## GaAs MMIC LOW NOISE AMPLIFIER, 24 - 36 GHz

### Typical Applications

The HMC263LP4E is ideal for:

- Millimeterwave Point-to-Point Radios
- LMDS
- VSAT
- SATCOM

### Features

Low Noise Figure: 2.2 dB

High Gain: 20 dB

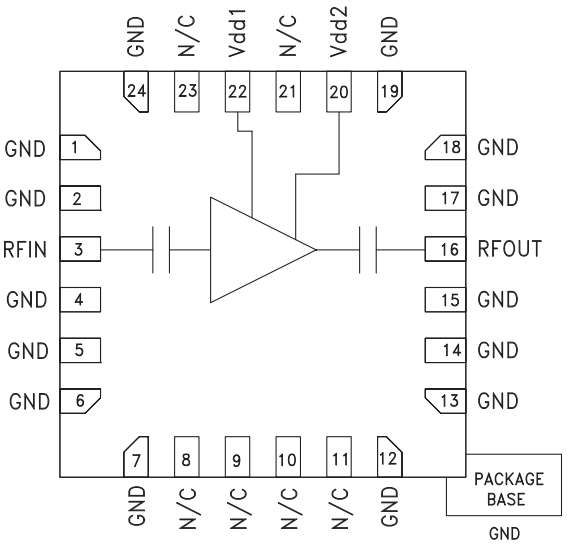
Single Positive Supply: +3V or +5V

DC Blocked RF I/Os

No External Matching

24 Lead 4x4mm QFN Package: 16mm²

### Functional Diagram



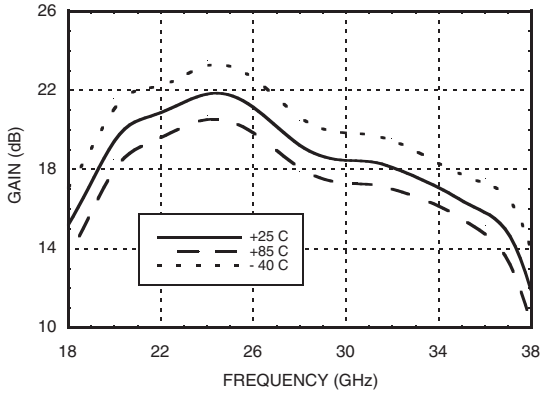

### General Description

The HMC263LP4E is a GaAs MMIC Low Noise Amplifier (LNA) which covers the frequency range of 24 to 36 GHz and is housed in a leadless plastic SMT package. The HMC263LP4E utilizes a GaAs PHEMT process offering 20 dB gain from a single bias supply of + 3V @ 58 mA with a noise figure of 2.2 dB. The HMC263LP4E may be used in conjunction with HMC264LC3B or HMC265LM3 mixers to realize a millimeterwave system receiver. The RF I/Os are DC blocked and matched to 50 Ohms requiring no external components.

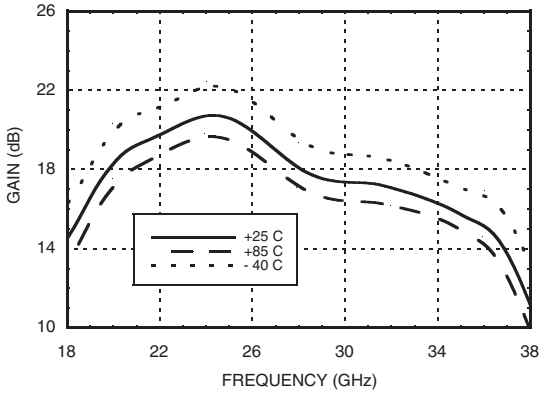
### Electrical Specifications, $T_A$ = +25° C, Vdd = +3V

| Parameter | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency Range | | 24 - 27 | | | 27 - 32 | | | 32 - 36 | | GHz |
| Gain | 19 | 21 | 27 | 17 | 19 | 23 | 15 | 17 | 20 | dB |
| Gain Variation Over Temperature | | 0.03 | | | 0.03 | | | 0.03 | | dB/°C |
| Noise Figure | | 2.0 | 3.0 | | 2.2 | 3.0 | | 2.5 | 4.0 | dB |
| Input Return Loss | | 12 | | | 9 | | | 11 | | dB |
| Output Return Loss | | 10 | | | 9 | | | 9 | | dB |
| Output Power for 1 dB Compression (P1dB) | | 6 | | | 8 | | | 9 | | dBm |
| Saturated Output Power (Psat) | | 9 | | | 11 | | | 12 | | dBm |
| Output Third Order Intercept (IP3) | | 16 | | | 18 | | | 20 | | dBm |
| Supply Current (Idd) (@ Vdd = +3.0V) | | 58 | 77 | | 58 | 77 | | 58 | 77 | mA |

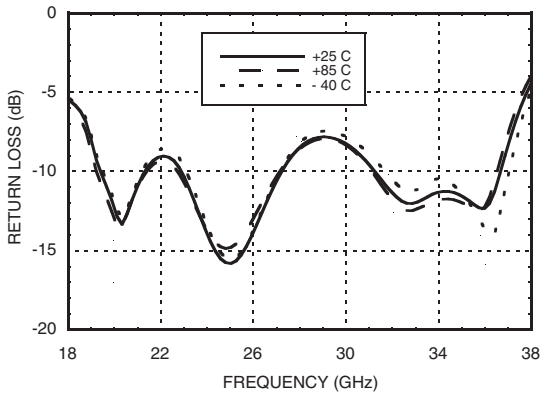
### Gain vs. Temperature @ Vdd = +3V



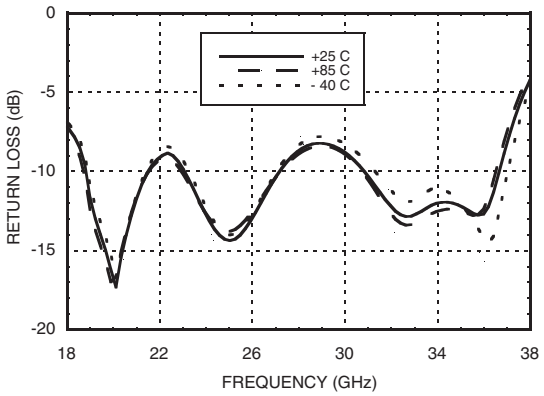

### Gain vs. Temperature @ Vdd = +5V



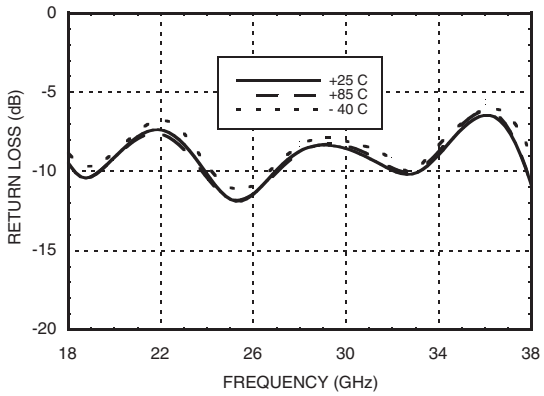

### Input Return Loss @ Vdd = +3V



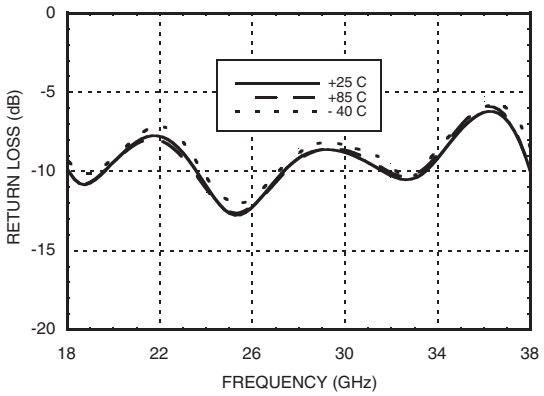

### Input Return Loss @ Vdd = +5V



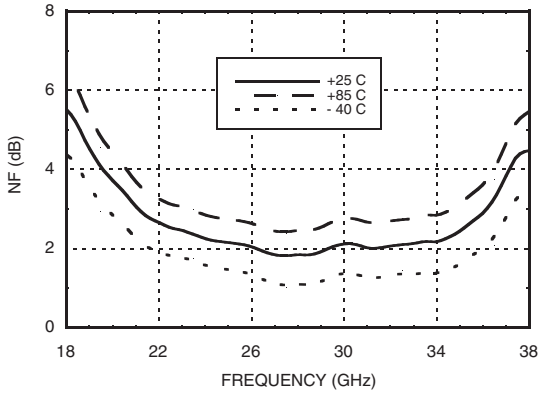

### Output Return Loss @ Vdd = +3V



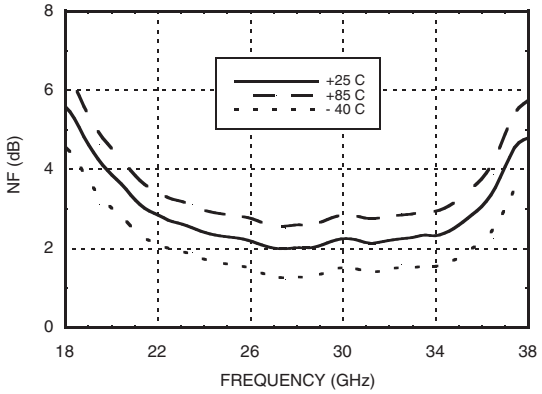

### Output Return Loss @ Vdd = +5V



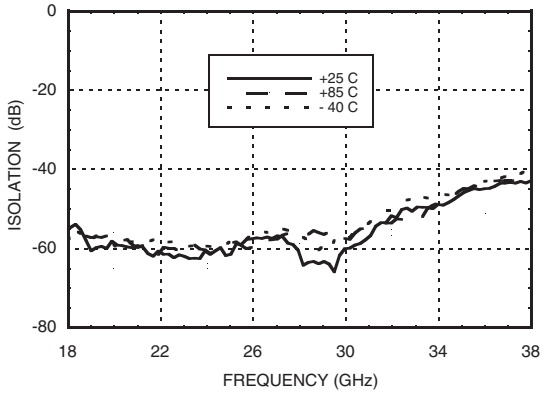
### Noise Figure vs. Temperature @ Vdd = +3V



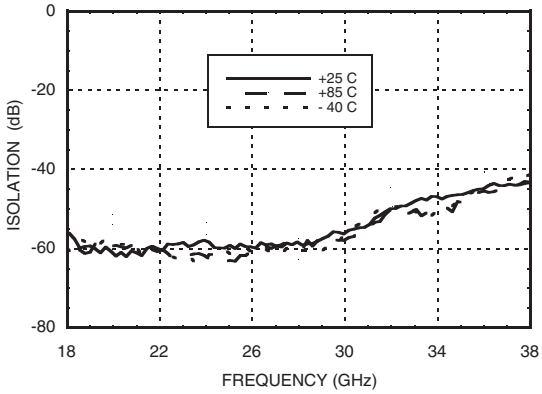

### Noise Figure vs. Temperature @ Vdd = +5V



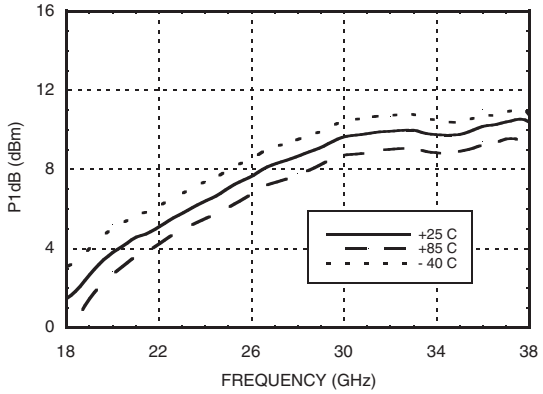

### Isolation @ Vdd = +3V



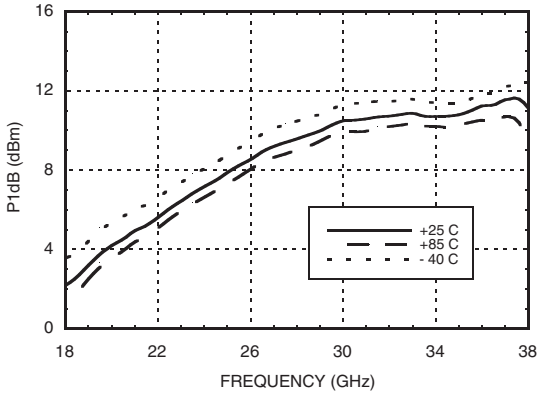

### Isolation @ Vdd = +5V



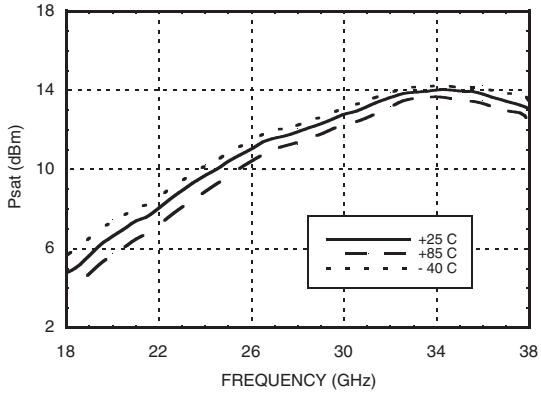

### Output P1dB @ Vdd = +3V



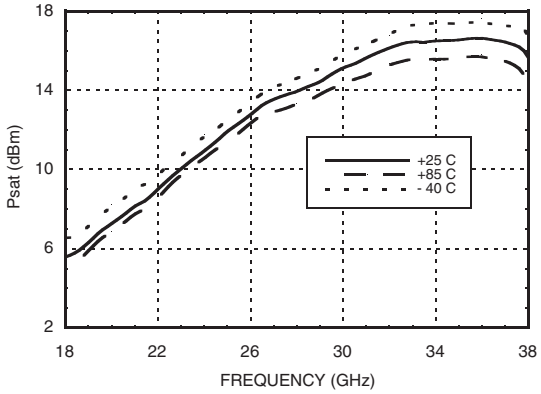

### Output P1dB @ Vdd = +5V



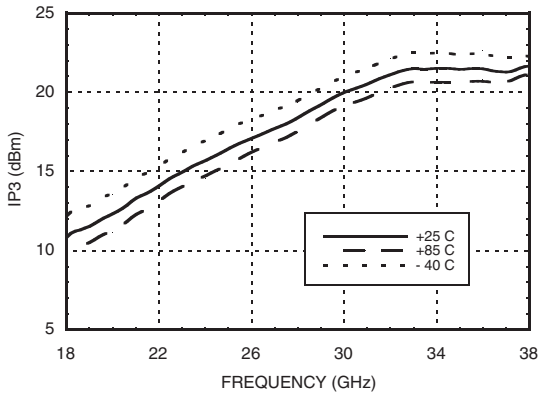
### Psat @ Vdd = +3V



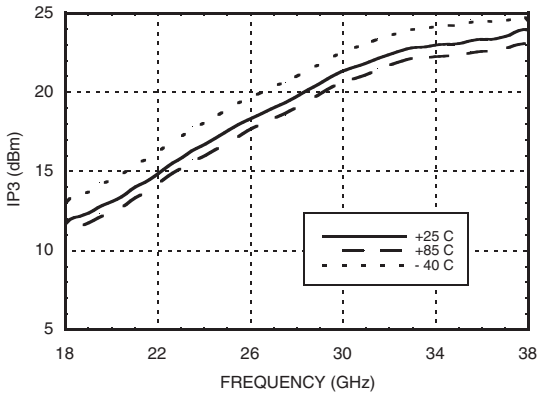

### Psat @ Vdd = +5V




### Output IP3 @ Vdd = +3V




### Output IP3 @ Vdd = +5V



# HMC263LP4E

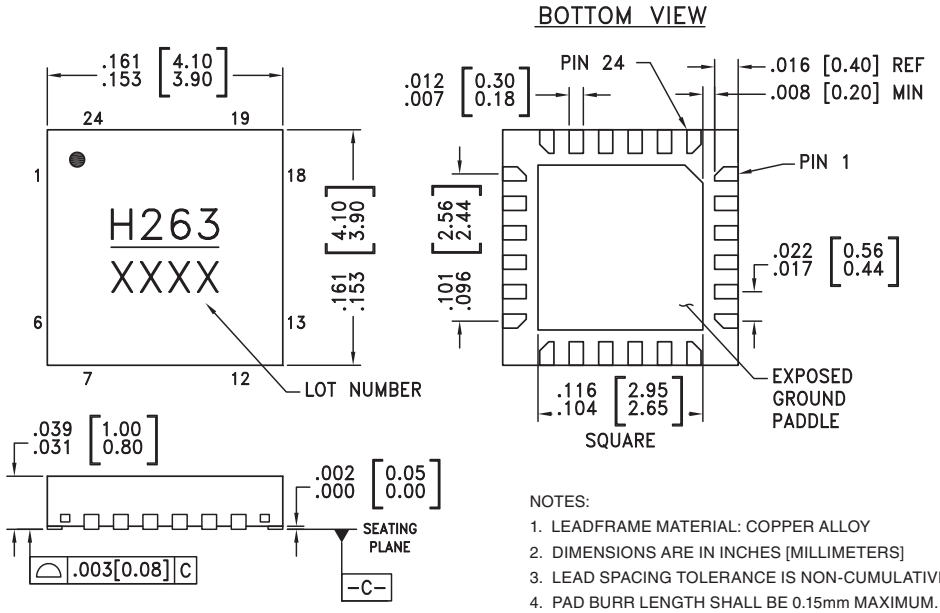
## GaAs MMIC LOW NOISE AMPLIFIER, 24 - 36 GHz

### Absolute Maximum Ratings

| | |
|---|---|
| Drain Bias Voltage (Vdd1, Vdd2) | +5.5 Vdc |
| RF Input Power (RFIN)(Vdd = +3 Vdc) | -5 dBm |
| Channel Temperature | 175 °C |
| Continuous Pdiss (T = 85 °C) (derate 7.7 mW/°C above 85 °C) | 0.7 W |
| Thermal Resistance (channel to ground paddle) | 130 °C/W |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

### Outline Drawing




NOTES:

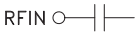
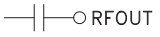
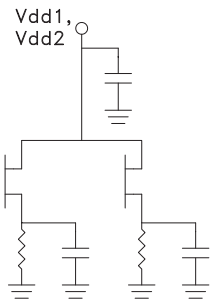
1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
3. LEAD SPACING TOLERANCE IS NON-CUMULATIVE
4. PAD BURR LENGTH SHALL BE 0.15mm MAXIMUM. PAD BURR HEIGHT SHALL BE 0.05mm MAXIMUM.
5. PACKAGE WARP SHALL NOT EXCEED 0.05mm.
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED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

### Package Information

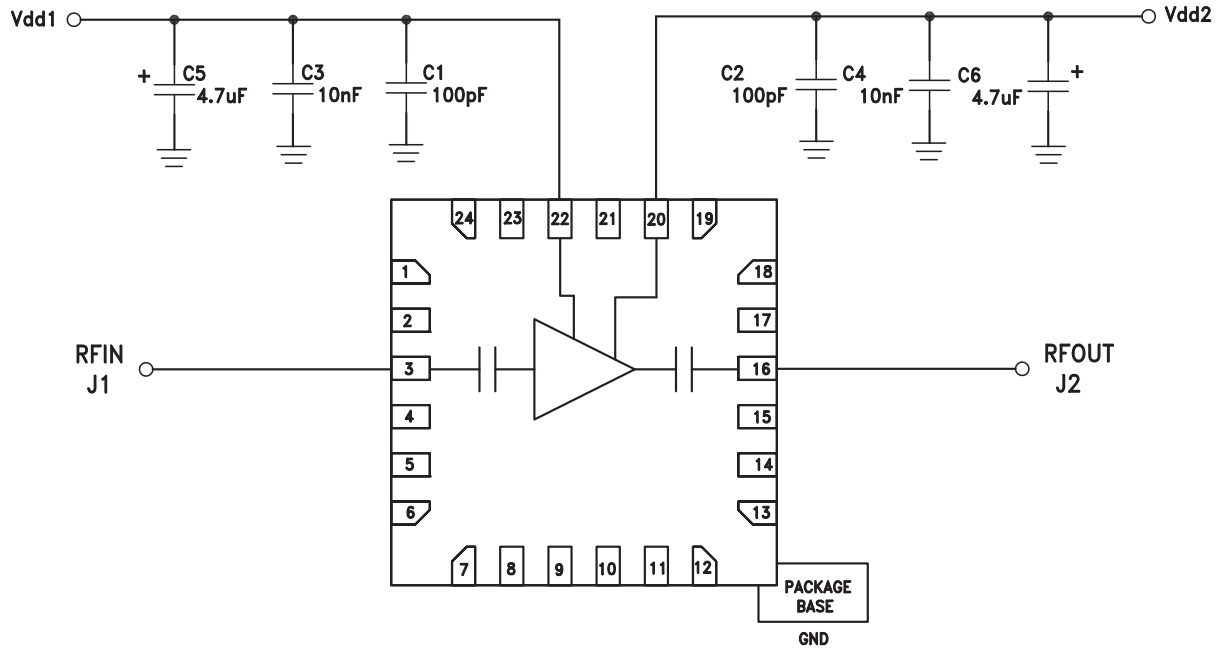
| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking [1] |
|---|---|---|---|---|
| HMC263LP4E | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL3 [2] | H263<br>XXXX |

[1] 4-Digit lot number XXXX
[2] Max peak reflow temperature of 260 °C

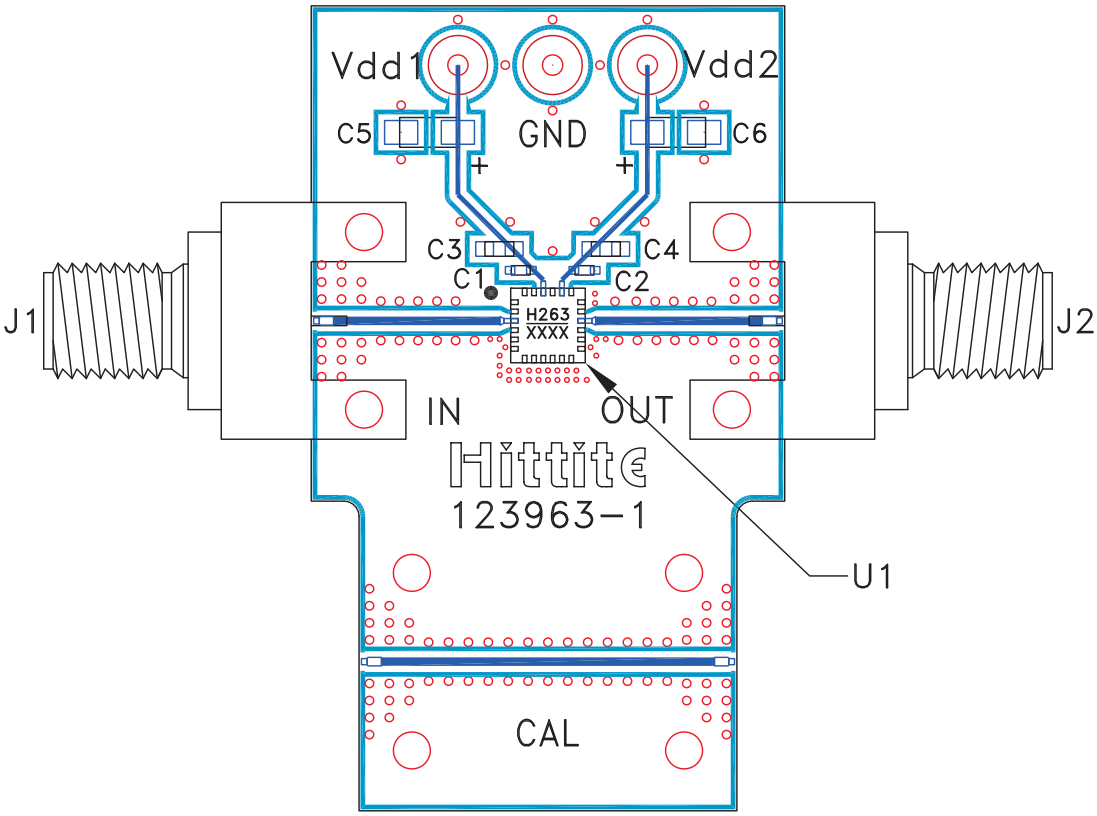
## Pin Description

| Pin Number | Function | Description | Interface Schematic |
|---|---|---|---|
| 1, 2, 4 - 7, 12 - 15, 17 - 19, 24 | GND | Package bottom has exposed metal paddle that must be connected to RF/DC ground. | |
| 3 | RFIN | This pin is AC coupled and matched to 50 Ohm. |   |
| 8 - 11, 21, 23 | N/C | Not connected. | |
| 16 | RFOUT | This pin is AC coupled and matched to 50 Ohm. |   |
| 22, 20 | Vdd1, Vdd2 | Power supply for the 4-stage amplifier. See application circuit for required external components. |   |

## Application Circuit



## Evaluation PCB




## List of Materials for Evaluation PCB 123965 [1]

| Item | Description |
|---|---|
| J1, J2 | PCB Mount K Connector |
| J3 - J5 | DC Pin |
| C1, C2 | 100 pF Capacitor, 0402 Pkg. |
| C3, C4 | 10 nF Capacitor, 0603 Pkg. |
| C5, C6 | 4.7 µF Capacitor, Tantalum |
| U1 | HMC263LP4E |
| PCB [2] | 123963 Evaluation PCB |

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350 or Arlon 25 FR

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 package bottom 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 board should be mounted to an appropriate heat sink. The evaluation circuit board shown is available from Hittite upon request.

**Notes:**

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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**Офис по работе с юридическими лицами:**

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