

Typical Applications

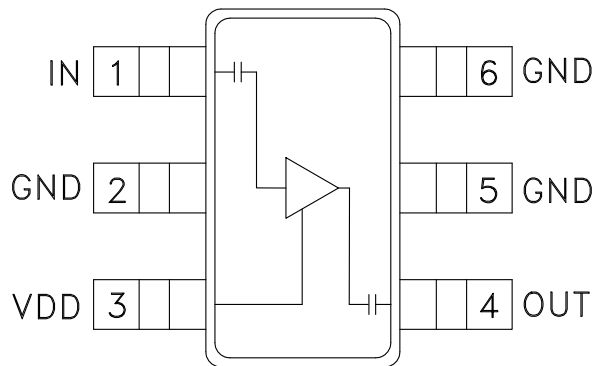
The HMC286 / HMC286E is ideal for:

- BlueTooth
- Home RF
- 802.11 WLAN Radios
- PCMCIA Platforms

Features

- 2.4 GHz LNA
- Noise Figure: 1.7 dB
- Gain: 19 dB
- Single Supply: +3V
- No External Components
- Ultra Small SOT26 Package

Functional Diagram



General Description

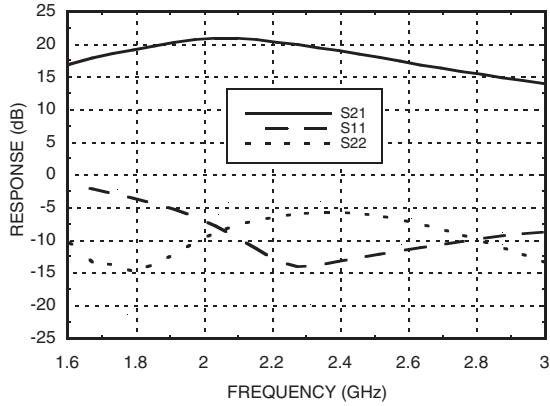
The HMC286 & HMC286E are low cost Low Noise Amplifiers (LNA) for 2.3 to 2.5 GHz spread spectrum applications. The LNA provides 19 dB of gain and a 1.7 dB noise figure from a single positive +3V power supply that consumes only 8.5mA. The typical output 1 dB compression point is +6 dBm at 2.4 GHz. The compact LNA design utilizes on-chip matching for repeatable gain and noise figure performance. In addition, eliminating the external matching circuitry also reduces the overall size of the LNA function. The HMC286 & HMC286E were designed to meet the size constraints of PCMCIA platforms and uses the SOT26 package that occupies 0.118" x 0.118", which makes them a small fully integrated solution that can be easily implemented with other 2.4 GHz ASICs.

Electrical Specifications, $T_A = +25^\circ\text{C}$, $V_{dd} = +3\text{V}$

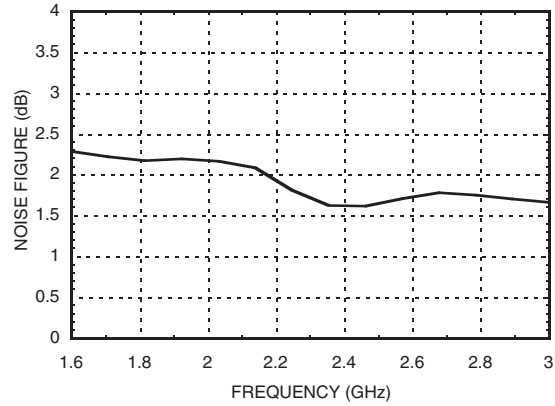
| Parameter | Min. | Typ. | Max. | Units |
|------------------------------------|-----------|-------|------|-------|
| Frequency Range | 2.3 - 2.5 | | | GHz |
| Gain | 16 | 19 | | dB |
| Gain Variation Over Temperature | | 0.015 | 0.03 | dB/°C |
| Gain Flatness | | ±1.25 | | dB |
| Noise Figure | | 1.7 | 2.5 | dB |
| Input Return Loss | | 12 | | dB |
| Output Return Loss | | 4.5 | | dB |
| Output 1 dB Compression (P1dB) | 2 | 6 | | dBm |
| Output Third Order Intercept (IP3) | 9 | 12 | | dBm |
| Supply Current (I _{dd}) | | 8.5 | 12.5 | mA |



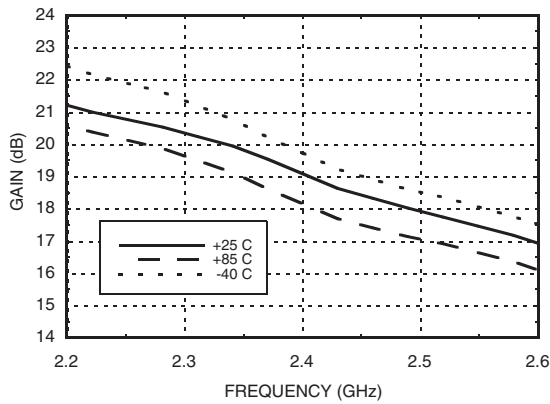
Broadband Gain & Return Loss



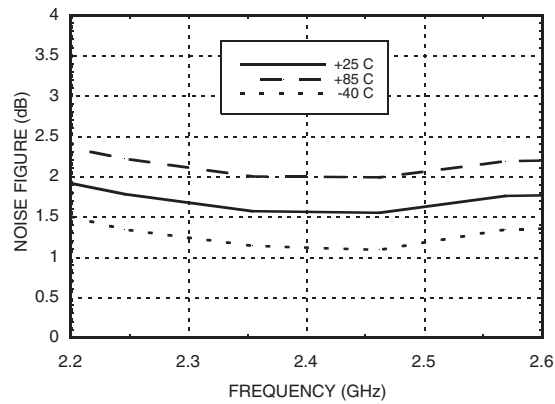
Broadband Noise Figure



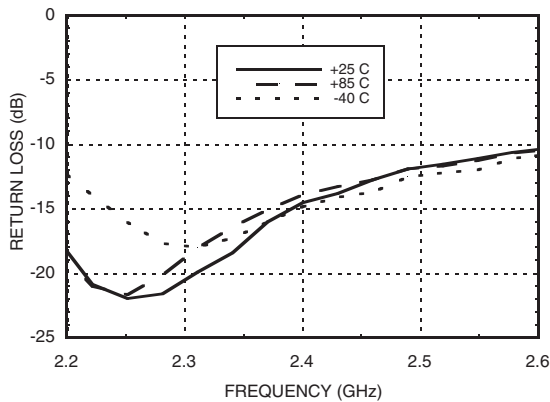
Gain vs. Temperature



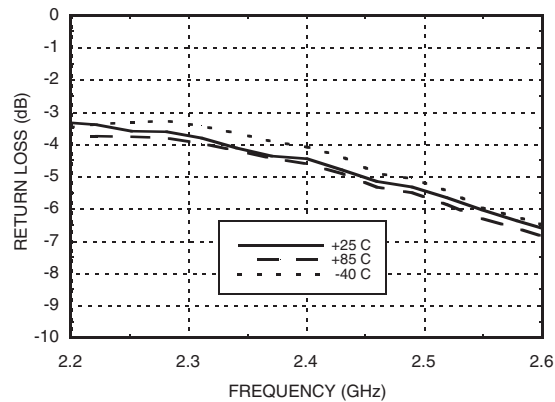
Noise Figure vs. Temperature



Input Return Loss vs. Temperature

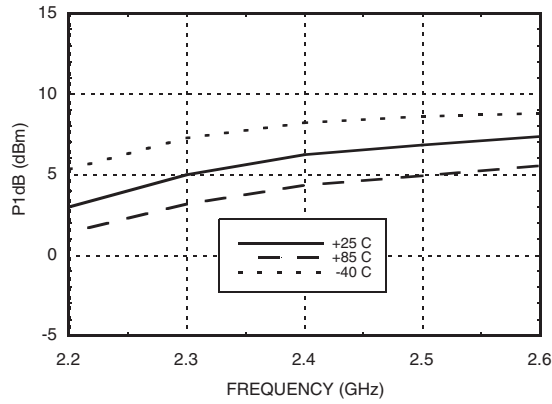


Output Return Loss vs. Temperature

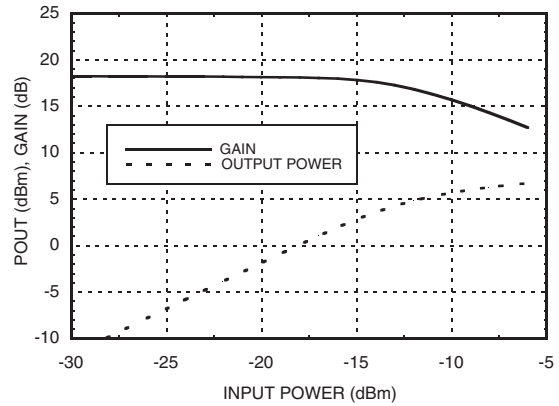




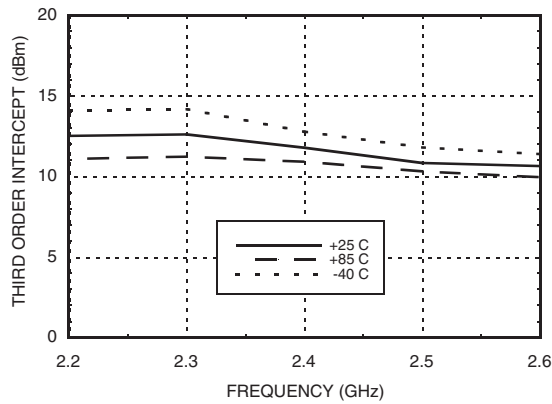
Output P1dB vs. Temperature



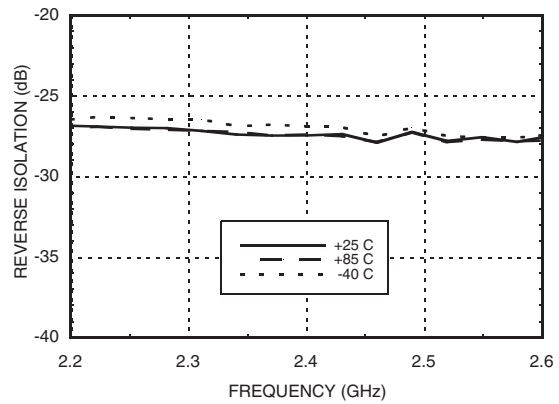
Power Compression @ 2.4 GHz



Output IP3 vs. Temperature



Reverse Isolation vs. Temperature



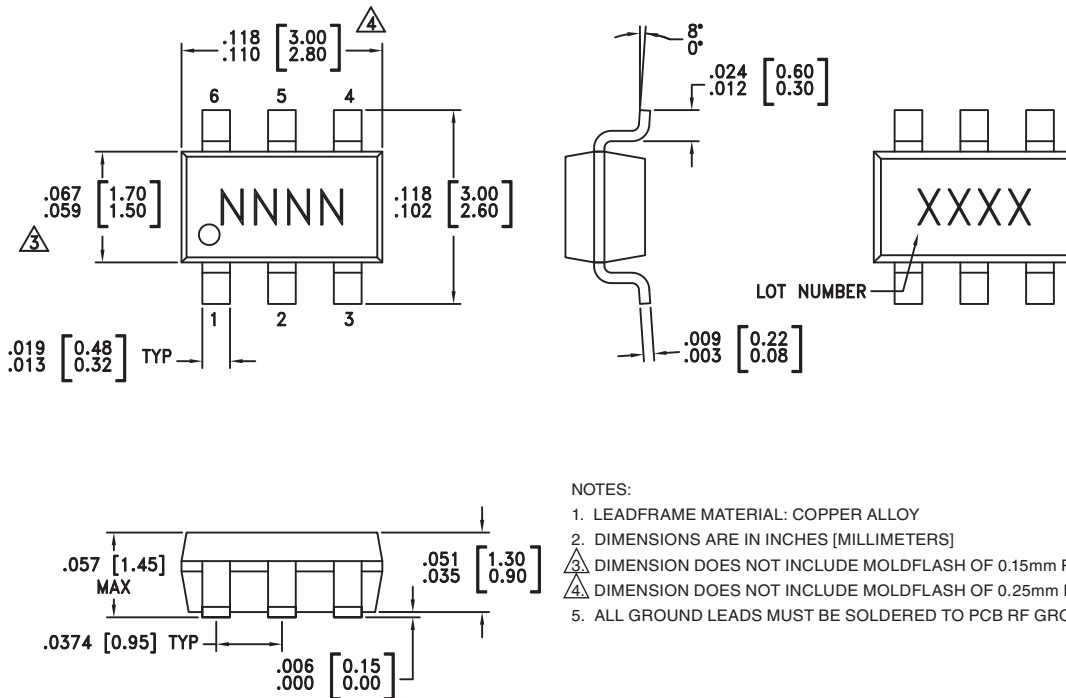
Absolute Maximum Ratings

| | |
|---|----------------|
| Drain Bias Voltage (Vdd) | +7 Vdc |
| RF Input Power (RFIN)(Vdd = +3 Vdc) | 0 dBm |
| Channel Temperature | 150 °C |
| Continuous Pdiss (T = 85 °C) (derate 6.35 mW/°C above 85 °C) | 0.413 W |
| Thermal Resistance (channel to lead) | 157 °C/W |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |
| ESD Sensitivity (HBM) | Class 1A |



ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



- NOTES:
- LEADFRAME MATERIAL: COPPER ALLOY
 - DIMENSIONS ARE IN INCHES [MILLIMETERS]
 - DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
 - DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
 - ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Package Information

| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking ^[3] |
|-------------|--|---------------|---------------------|--------------------------------|
| HMC286 | Low Stress Injection Molded Plastic | Sn/Pb Solder | MSL1 ^[1] | H286 XXXX |
| HMC286E | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 ^[2] | 286E XXXX |

[1] Max peak reflow temperature of 235 °C
 [2] Max peak reflow temperature of 260 °C
 [3] 4-Digit lot number XXXX



MICROWAVE CORPORATION v03.0410



HMC286 / 286E

GaAs MMIC LOW NOISE AMPLIFIER, 2.3 - 2.5 GHz

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AMPLIFIERS - LOW NOISE - SMT

Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|------------|----------|--|---------------------|
| 1 | RFIN | This pin is AC coupled and matched to 50 Ohms. | RFIN |
| 2, 5, 6 | GND | These pins must be connected to RF/DC ground. | |
| 3 | VDD | Power supply voltage. | |
| 4 | RFOUT | This pin is AC coupled and matched to 50 Ohms. | |

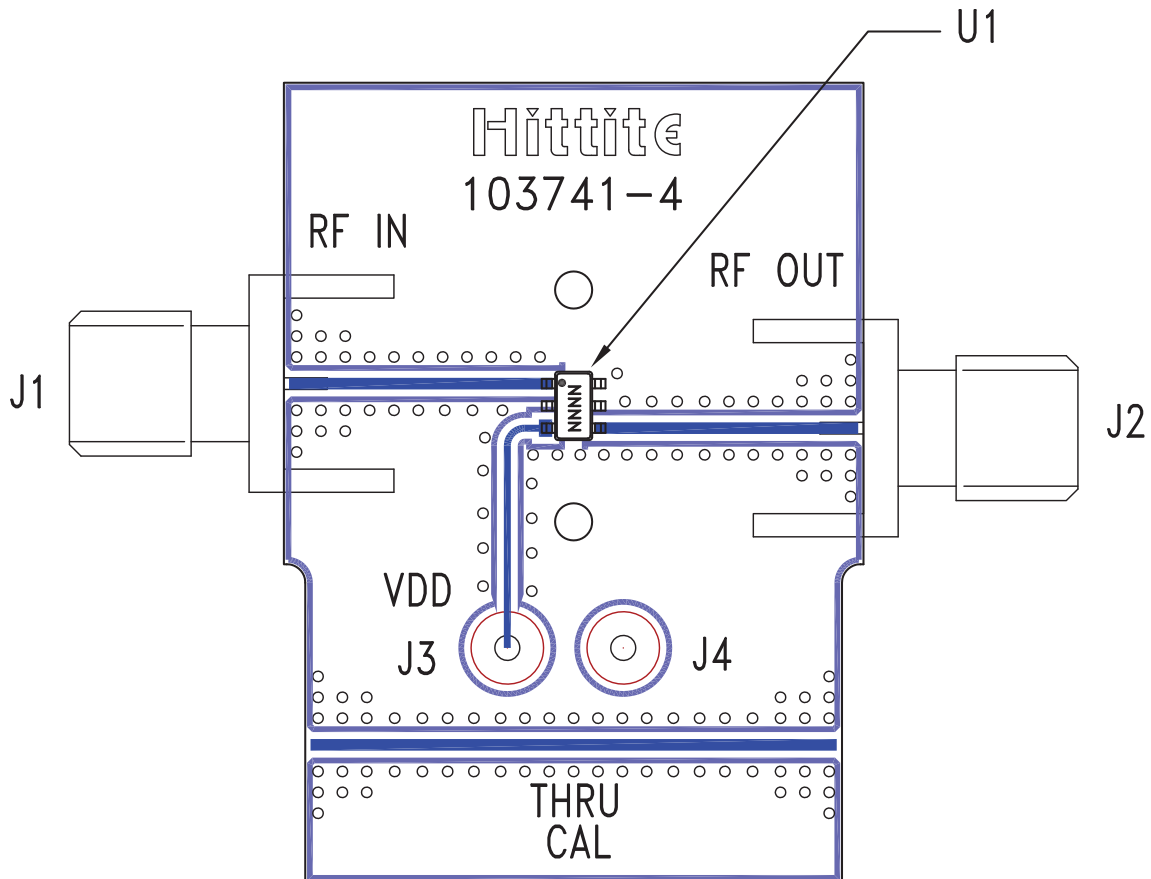
For price, delivery and to place orders: Hittite Microwave Corporation, 20 Alpha Road, Chelmsford, MA 01824

Phone: 978-250-3343 Fax: 978-250-3373 Order On-line at www.hittite.com

Application Support: Phone: 978-250-3343 or apps@hittite.com

www.BDTIC.com/Hittite/

Evaluation PCB



List of Materials for Evaluation PCB 103743^[1]

| Item | Description |
|---------|----------------------------|
| J1, J2 | PCB Mount SMA Connector |
| J3, J4 | DC Pin |
| U1 | HMC286 / HMC286E Amplifier |
| PCB [2] | 103741 Evaluation PCB |

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Roger 4350

The circuit board used in the 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 above. 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.