



# HMC341LC3B

## SMT GaAs PHEMT MMIC LOW NOISE AMPLIFIER, 21 - 29 GHz

### Typical Applications

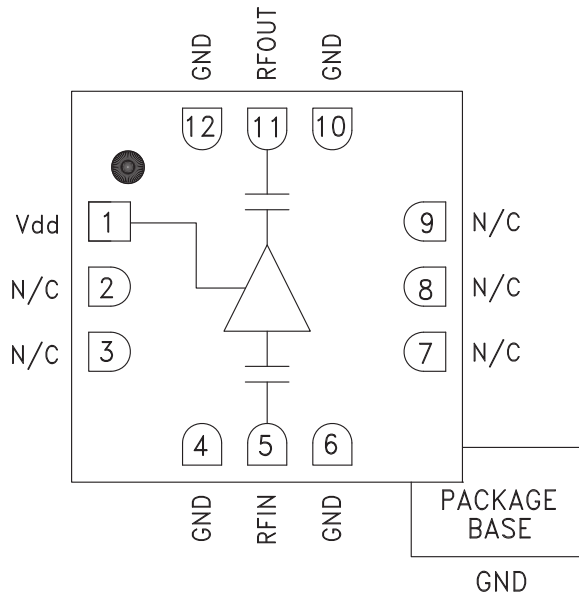
The HMC341LC3B is ideal for:

- Point-to-Point Radios
- Point-to-Multi-Point Radios & VSAT
- Test Equipment & Sensors
- Military End-Use

### Features

- 2.5 dB Noise Figure
- 13 dB Gain
- +3V @ 35 mA Supply
- 50 Ohm Matched Input/Output
- RoHS Compliant 3x3 mm SMT Package

### Functional Diagram



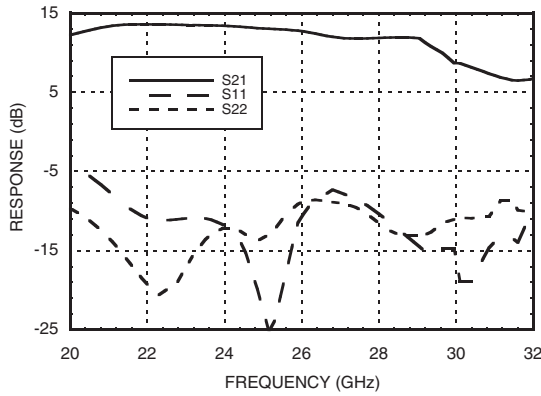
### General Description

The HMC341LC3B is a GaAs PHEMT MMIC Low Noise Amplifier housed in a leadless RoHS compliant SMT package. Operating from 21 to 29 GHz, the amplifier provides 13 dB of gain and a noise figure of 2.5 dB from a single +3V supply. The RF I/Os are DC blocked and matched to 50 Ohms requiring no external components. The HMC341LC3B eliminates the need for wire bonding, allowing the use of surface mount manufacturing techniques.

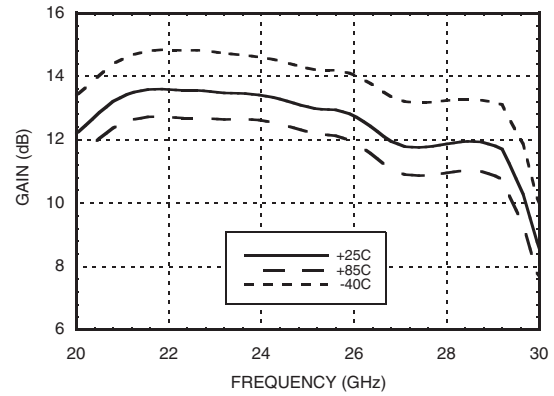
### Electrical Specifications, $T_A = +25^\circ\text{C}$ , $V_{dd} = +3\text{V}$ , $I_{dd} = 35\text{mA}$

| Parameter   | Min.    | Typ.  | Max.  | Min.    | Typ.  | Max.  | Min.    | Typ.  | Max.  | Units |
|---|---------|-------|-------|---------|-------|-------|---------|-------|-------|-------|
| Frequency Range   | 21 - 24 |       |       | 24 - 26 |       |       | 26 - 29 |       |       | GHz   |
| Gain  | 10.5    | 13.5  |       | 10      | 13    |       | 9       | 12    |       | dB    |
| Gain Variation Over Temperature                           |         | 0.016 | 0.025 |         | 0.016 | 0.025 |         | 0.016 | 0.025 | dB/°C |
| Noise Figure  |         | 3.25  | 5     |         | 3     | 3.5   |         | 2.5   | 3     | dB    |
| Input Return Loss   |         | 10    |       |         | 11    |       |         | 9     |       | dB    |
| Output Return Loss  |         | 14    |       |         | 10    |       |         | 9     |       | dB    |
| Output Power for 1 dB Compression (P1dB)                  |         | 8     |       |         | 8.5   |       |         | 8.5   |       | dBm   |
| Saturated Output Power (P <sub>sat</sub> )                |         | 11    |       |         | 11.5  |       |         | 11.5  |       | dBm   |
| Output Third Order Intercept (IP3)                        |         | 19    |       |         | 19    |       |         | 19    |       | dBm   |
| Supply Current (I <sub>dd</sub> ) (V <sub>dd</sub> = +3V) |         | 35    |       |         | 35    |       |         | 35    |       | mA    |

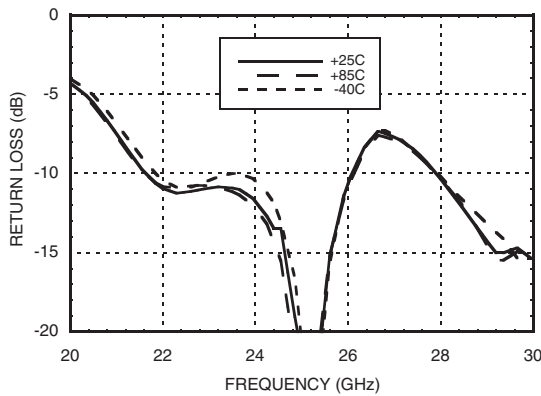
**Broadband Gain & Return Loss**



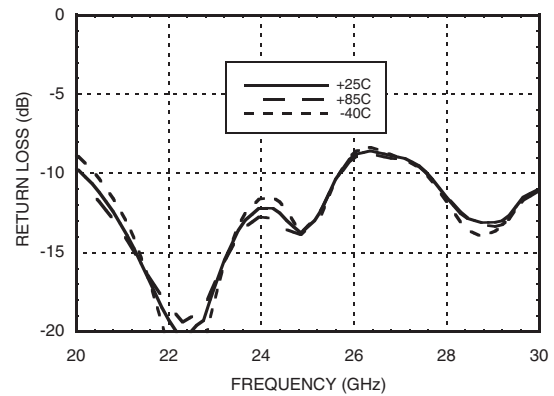
**Gain vs. Temperature**



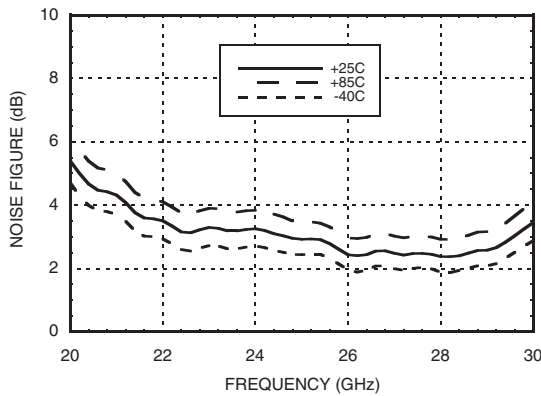
**Input Return Loss vs. Temperature**



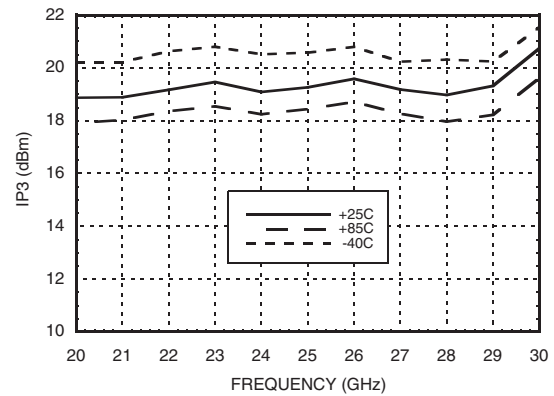
**Output Return Loss vs. Temperature**



**Noise Figure vs. Temperature**

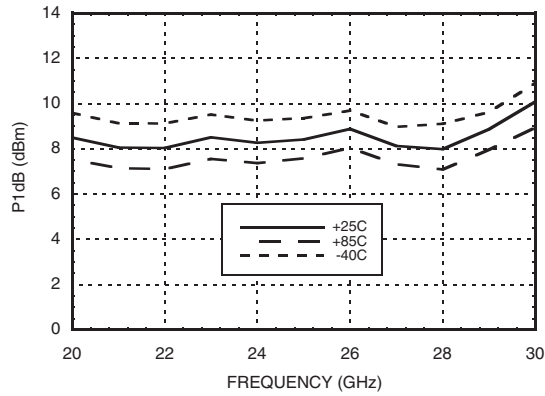


**Output IP3 vs. Temperature**

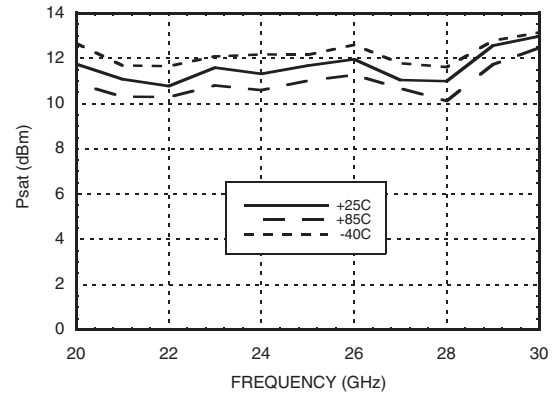




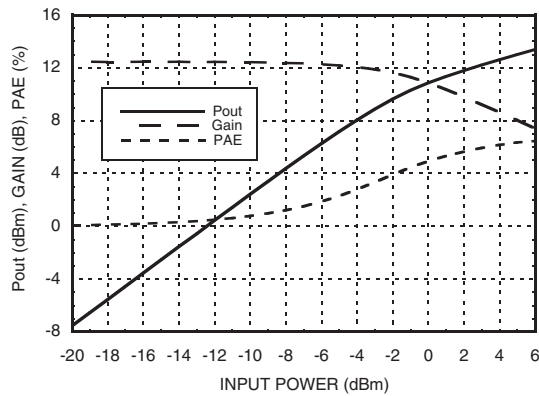
**P1dB vs. Temperature**



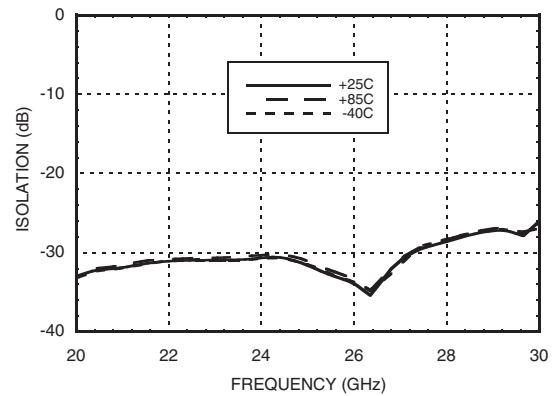
**Psat vs. Temperature**



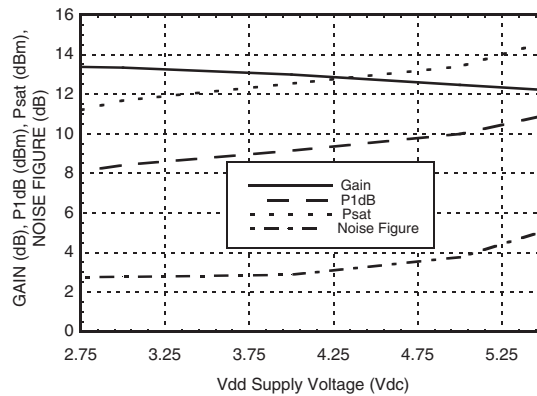
**Power Compression @ 25 GHz**



**Reverse Isolation vs. Temperature**



**Gain, Power & Noise Figure vs. Supply Voltage @ 25 GHz**



### Absolute Maximum Ratings

|  |                |
|--|----------------|
| Drain Bias Voltage (Vdd)   | +5.5 Vdc       |
| RF Input Power (RFIN)(Vdd = +3.0 Vdc)                                      | +5 dBm         |
| Channel Temperature  | 175 °C         |
| Continuous P <sub>diss</sub> (T= 85 °C)<br>(derate 5.43 mW/°C above 85 °C) | 0.489 W        |
| Thermal Resistance<br>(channel to ground paddle)                           | 184 °C/W       |
| Storage Temperature  | -65 to +150 °C |
| Operating Temperature  | -40 to +85 °C  |

### Typical Supply Current vs. Vdd

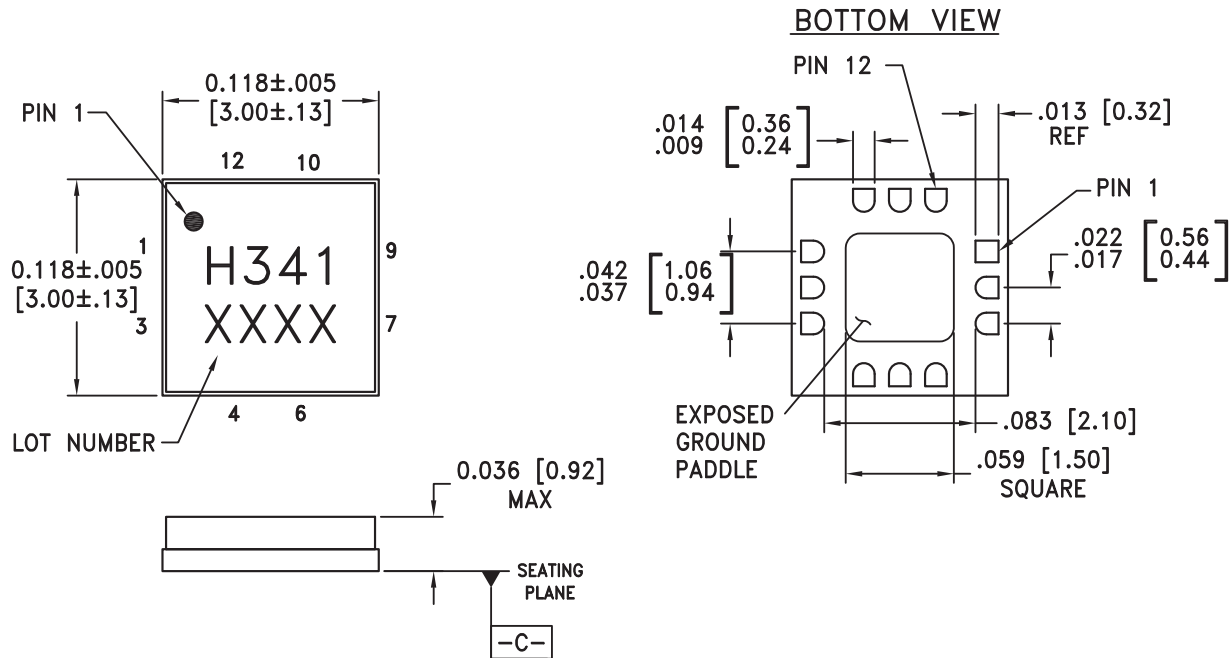
| Vdd (Vdc) | I <sub>dd</sub> (mA) |
|-----------|----------------------|
| +2.7      | 34                   |
| +3.0      | 35                   |
| +4.0      | 38                   |
| +5.0      | 41                   |

Note: Amplifier will operate over full voltage ranges shown above.



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

### Outline Drawing

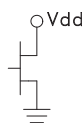

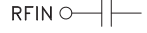
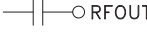


**NOTES:**

1. PACKAGE BODY MATERIAL: ALUMINA.
2. LEAD AND GROUND PADDLE PLATING: GOLD FLASH OVER NICKEL.
3. DIMENSIONS ARE IN INCHES (MILLIMETERS).
4. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
5. PACKAGE WARP SHALL NOT EXCEED 0.05MM DATUM -C-
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
7. CLASSIFIED AS MOISTURE SENSITIVITY LEVEL (MSL) 1.

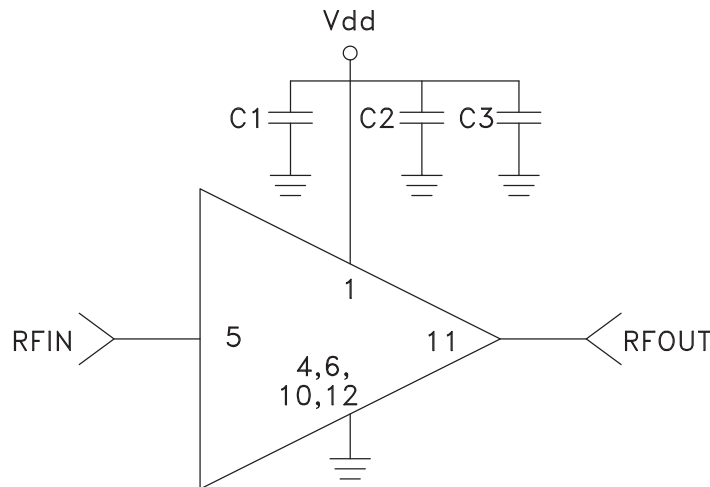


**Pin Descriptions**

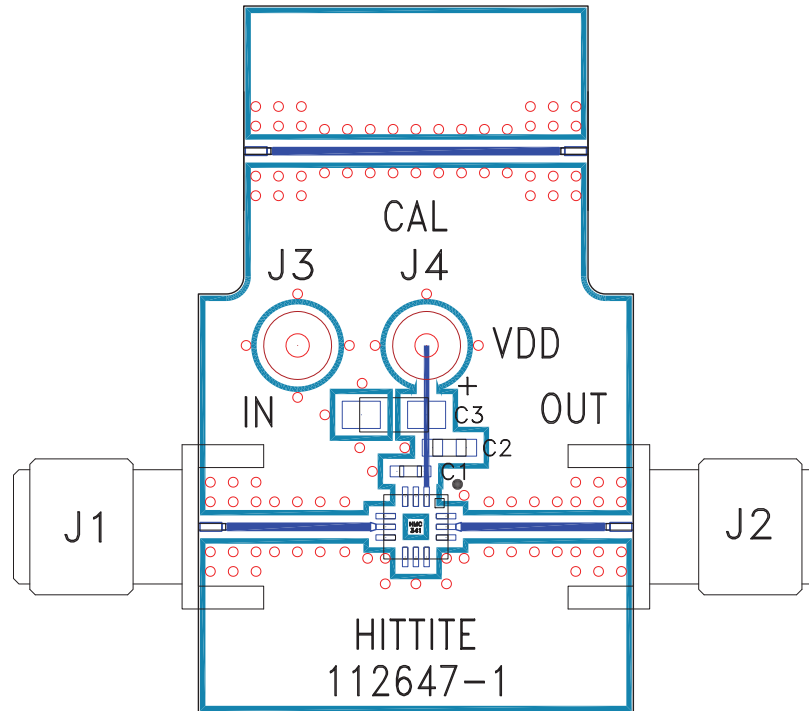
| Pin Number   | Function | Description   | Interface Schematic   |
|--------------|----------|---|---|
| 1            | Vdd      | Power Supply Voltage for the amplifier. External bypass capacitors of 100 pF, 1000pF, and 2.2 $\mu$ F are required. |  |
| 2, 3, 7-9    | N/C      | No connection required. These pins may be connected to RF/DC ground without affecting performance.                  |   |
| 4, 6, 10, 12 | GND      | Package bottom has an exposed metal paddle that must also be connected to RF/DC ground.                             |  |
| 5            | RFIN     | This pin is AC coupled and matched to 50 Ohms from 21 - 29 GHz.   |  |
| 11           | RFOUT    | This pin is AC coupled and matched to 50 Ohms from 21 - 29 GHz.   |  |

**Application Circuit**

| Component | Value       |
|-----------|-------------|
| C1        | 100 pF      |
| C2        | 1,000 pF    |
| C3        | 2.2 $\mu$ F |



**Evaluation PCB**



**List of Materials for Evaluation PCB 112646 [1]**

| Item    | Description                   |
|---------|-------------------------------|
| J1, J2  | SRI K-connector               |
| J3, J4  | DC Pin                        |
| C1      | 100 pF capacitor, 0402 pkg.   |
| C2      | 1,000 pF Capacitor, 0603 pkg. |
| C3      | 2.2µF Capacitor, Tantalum     |
| U1      | HMC341LC3B Amplifier          |
| PCB [2] | 112647 Evaluation PCB         |

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350.

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



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#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.