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MICROWAVE CORPORATION v03.0514



# HMC587LC4B

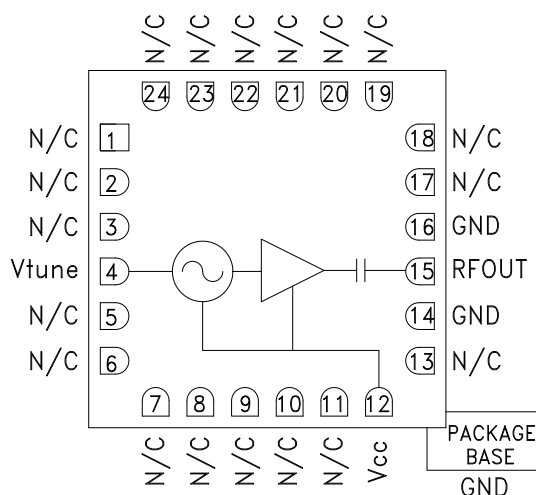
## WIDEBAND MMIC VCO w/ BUFFER AMPLIFIER, 5 - 10 GHz

### Typical Applications

Low noise wideband MMIC VCO for applications such as:

- Industrial/Medical Equipment
- Test & Measurement Equipment
- Military Radar, EW & ECM

### Functional Diagram



### Features

Wide Tuning Bandwidth

Pout: +5 dBm

Low SSB Phase Noise: -95 dBc/Hz @100 kHz

No External Resonator Needed

Single Positive Supply: +5V @ 55 mA

RoHS Compliant 4 x 4 mm SMT Package

### General Description

The HMC587LC4B is a wideband GaAs InGaP Voltage Controlled Oscillator which incorporates the resonator, negative resistance device, and varactor diode. Output power and phase noise performance are excellent over temperature due to the oscillator's monolithic construction. The Vtune port accepts an analog tuning voltage from 0 to +18 volts. The HMC587LC4B VCO operates from a single +5V supply, consumes only 55 mA of current, and is housed in a RoHS compliant SMT package. This wideband VCO uniquely combines the attributes of ultra small size, low phase noise, low power consumption, and wide tuning range.

### Electrical Specifications, $T_A = +25^\circ\text{C}$ , $V_{CC} = +5\text{V}$

| Parameter                                              | Min.       | Typ. | Max. | Units                 |
|--------------------------------------------------------|------------|------|------|-----------------------|
| Frequency Range                                        | 5.0 - 10.0 |      |      | GHz                   |
| Power Output                                           | 0          | 5    |      | dBm                   |
| SSB Phase Noise @ 100 kHz Offset                       |            | -95  |      | dBc/Hz                |
| SSB Phase Noise @ 10 kHz Offset                        |            | -65  |      | dBc/Hz                |
| Tune Voltage (Vtune)                                   | 0          |      | 18   | V                     |
| Supply Current (Icc) ( $V_{CC} = +5.0\text{V}$ )       | 40         |      | 75   | mA                    |
| Tune Port Leakage Current ( $V_{tune} = +18\text{V}$ ) |            |      | 10   | $\mu\text{A}$         |
| Output Return Loss                                     |            | 7    |      | dB                    |
| 2nd Harmonic                                           |            | -15  |      | dBc                   |
| Pulling (into a 2.0:1 VSWR)                            |            | 4    |      | MHz pp                |
| Pushing @ $V_{tune} = +5\text{V}$                      |            | 15   |      | MHz/V                 |
| Frequency Drift Rate                                   |            | 0.8  |      | MHz/ $^\circ\text{C}$ |

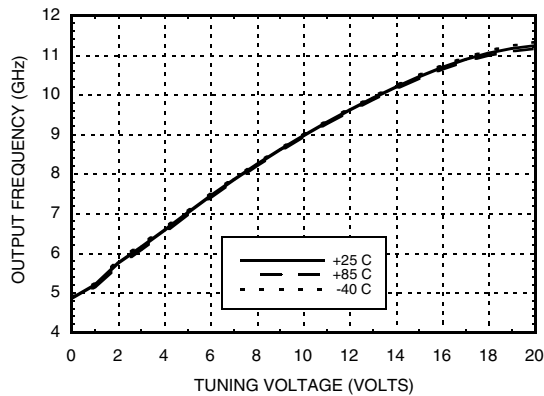
For price, delivery and to place orders: Hittite Microwave Corporation, 2 Elizabeth Drive, Chelmsford, MA 01824

Phone: 978-250-3343 Fax: 978-250-3373 Order On-line at [www.hittite.com](http://www.hittite.com)

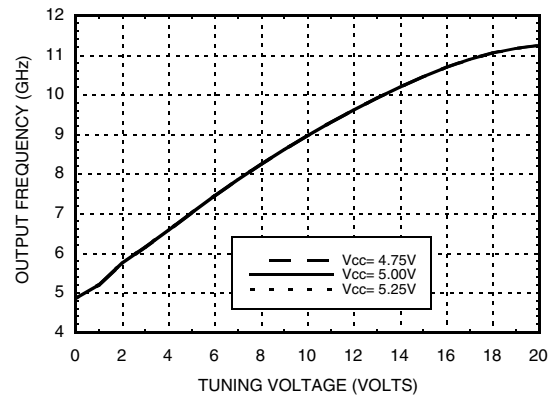
Application Support: Phone: 978-250-3343 or [apps@hittite.com](mailto:apps@hittite.com)

## WIDEBAND MMIC VCO w/ BUFFER AMPLIFIER, 5 - 10 GHz

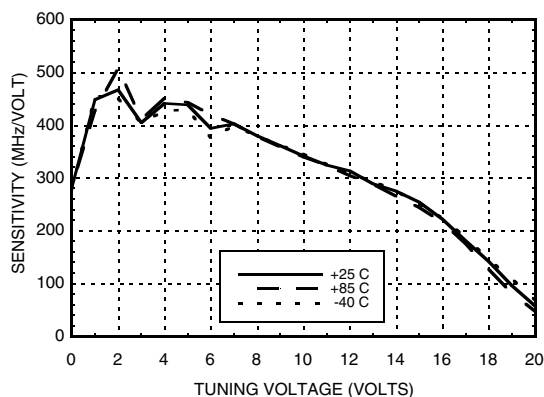
**Frequency vs. Tuning Voltage,  $V_{cc} = +5V$**



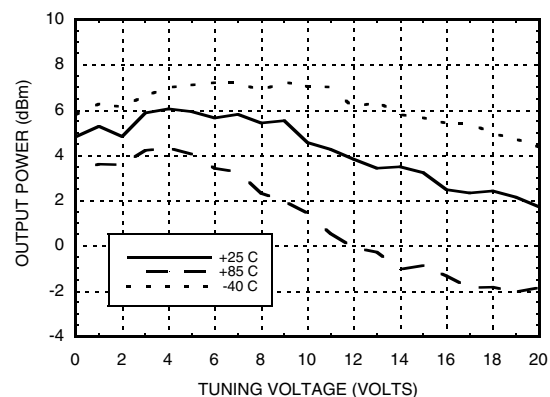
**Frequency vs. Tuning Voltage,  $T = 25^{\circ}C$**



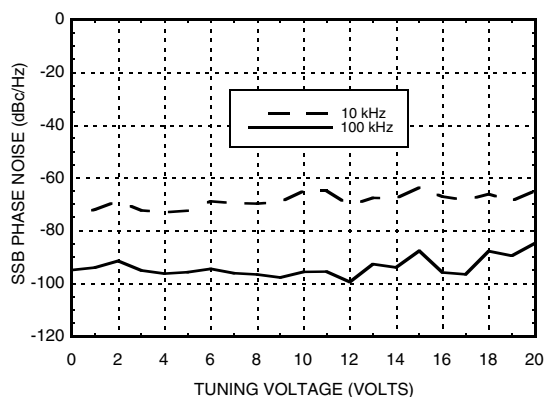
**Sensitivity vs. Tuning Voltage,  $V_{cc} = +5V$**



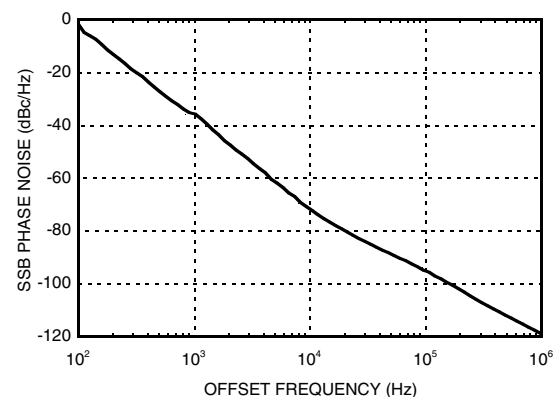
**Output Power vs.  
Tuning Voltage,  $V_{cc} = +5V$**



**SSB Phase Noise vs. Tuning Voltage**



**Typical SSB Phase Noise @  $V_{tune} = +5V$**

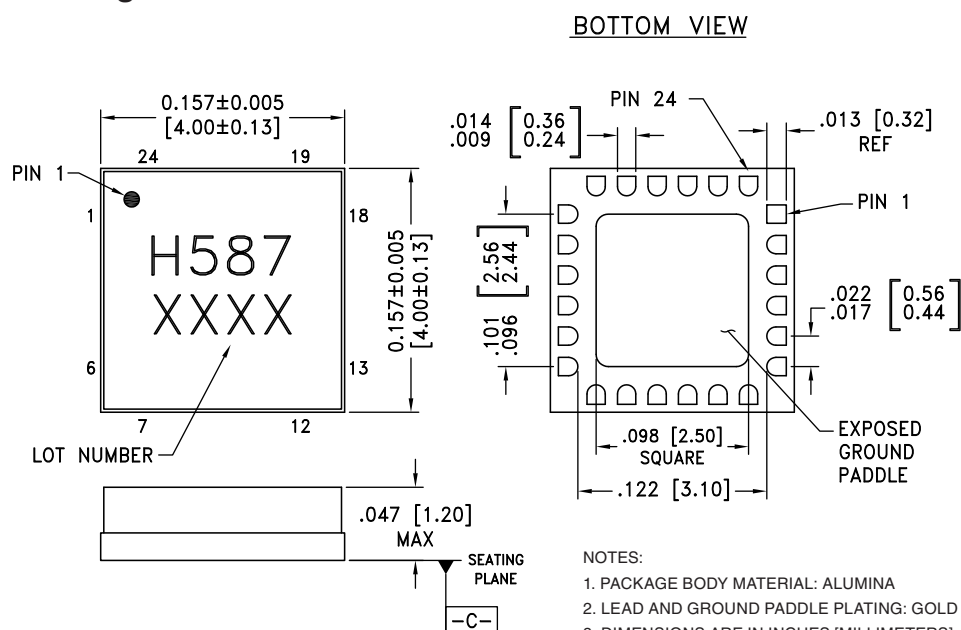




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**HMC587LC4B****WIDEBAND MMIC VCO w/ BUFFER  
AMPLIFIER, 5 - 10 GHz****Absolute Maximum Ratings**

|                                                                           |                |
|---------------------------------------------------------------------------|----------------|
| Vcc                                                                       | +5.5 Vdc       |
| Vtune                                                                     | 0 to +22V      |
| Junction Temperature                                                      | 135 °C         |
| Continuous P <sub>diss</sub> (T = 85°C)<br>(derate 12.5 mW/°C above 85°C) | 625 mW         |
| Thermal Resistance<br>(junction to ground paddle)                         | 80 °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 <sup>[2]</sup> |
|-------------|-----------------------|------------------|---------------------|--------------------------------|
| HMC587LC4B  | Alumina, White        | Gold over Nickel | MSL3 <sup>[1]</sup> | H587<br>XXXX                   |

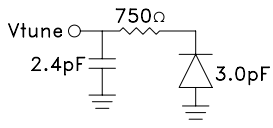
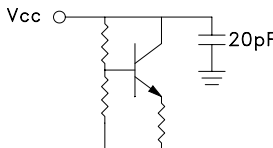
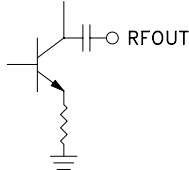
[1] Max peak reflow temperature of 260 °C

[2] 4-Digit lot number XXXX

For price, delivery and to place orders: Hittite Microwave Corporation, 2 Elizabeth Drive, Chelmsford, MA 01824

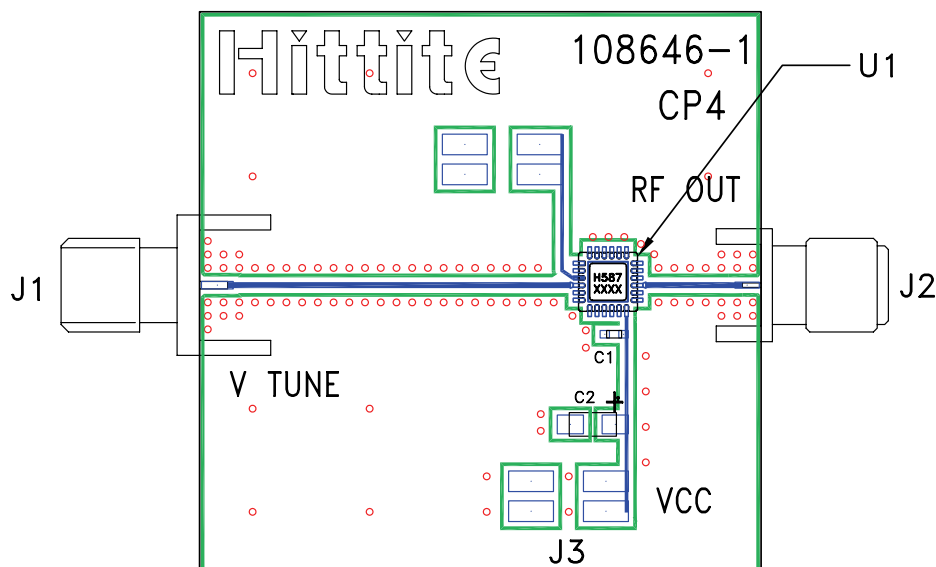
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### Pin Descriptions

| Pin Number                    | Function | Description                                                                                                                                                                           | Interface Schematic                                                                  |
|-------------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1 - 3, 5 - 11,<br>13, 17 - 24 | N/C      | No Connection. These pins may be connected to RF/DC ground. Performance will not be affected.                                                                                         |                                                                                      |
| 4                             | Vtune    | Control Voltage and Modulation Input. Modulation bandwidth dependent on drive source impedance. See "Determining the FM Bandwidth of a Wideband Varactor Tuned VCO" application note. |   |
| 12                            | Vcc      | Supply Voltage Vcc= +5V                                                                                                                                                               |   |
| 14, 16                        | GND      | Package bottom has an exposed metal paddle that must also be RF & DC grounded.                                                                                                        |   |
| 15                            | RFOUT    | RF output (AC coupled)                                                                                                                                                                |  |



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**HMC587LC4B****WIDEBAND MMIC VCO w/ BUFFER  
AMPLIFIER, 5 - 10 GHz****Evaluation PCB****List of Materials for Evaluation PCB 108648 <sup>[1]</sup>**

| Item    | Description                         |
|---------|-------------------------------------|
| J1      | PCB Mount SMA RF Connector, Johnson |
| J2      | PCB Mount SMA Connector, SRI        |
| J3      | DC Header                           |
| C1      | 1000 pF Capacitor, 0402 Pkg.        |
| C2      | 4.7 μF Capacitor, Tantalum          |
| U1      | HMC587LC4B VCO                      |
| PCB [2] | 108646 Eval Board                   |

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 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 and exposed ground 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.



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## HMC587LC4B

**WIDEBAND MMIC VCO w/ BUFFER  
AMPLIFIER, 5 - 10 GHz**

WIDEBAND VCOS - SMT

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

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Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)

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