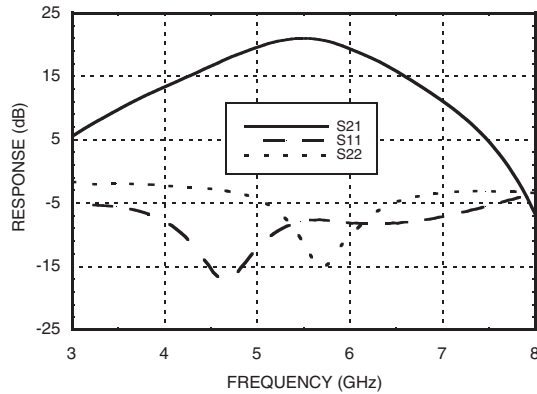


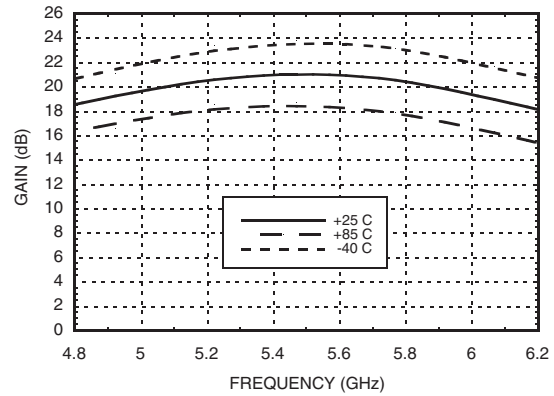


GaAs InGaP HBT MMIC 1 WATT POWER AMPLIFIER, 5.1 - 5.9 GHz

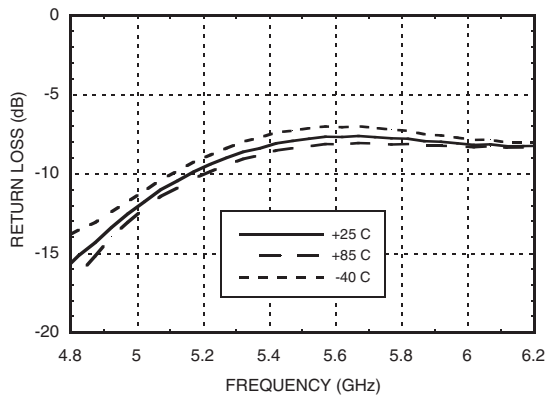
Broadband Gain & Return Loss



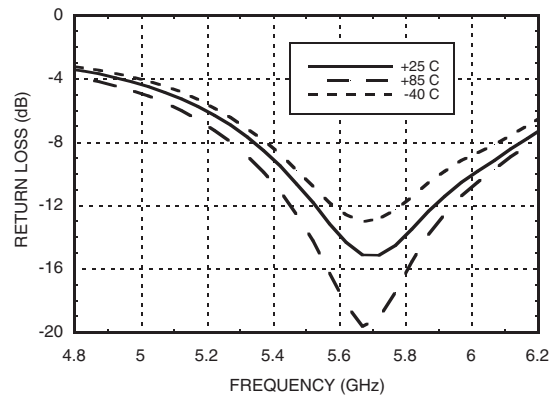
Gain vs. Temperature



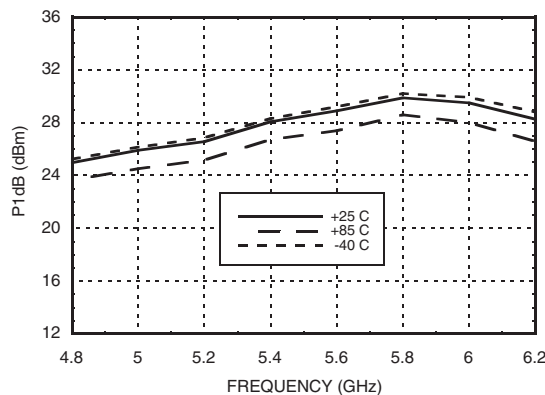
Input Return Loss vs. Temperature



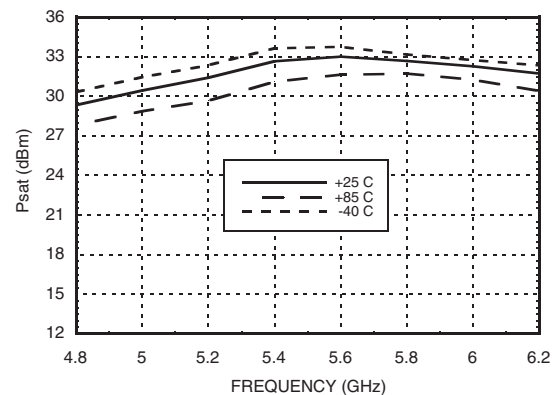
Output Return Loss vs. Temperature*



P1dB vs. Temperature



Psat vs. Temperature



* Output match optimized for 5.7 - 5.9 GHz.

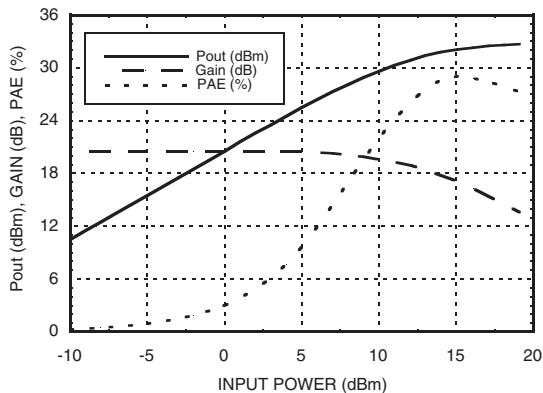
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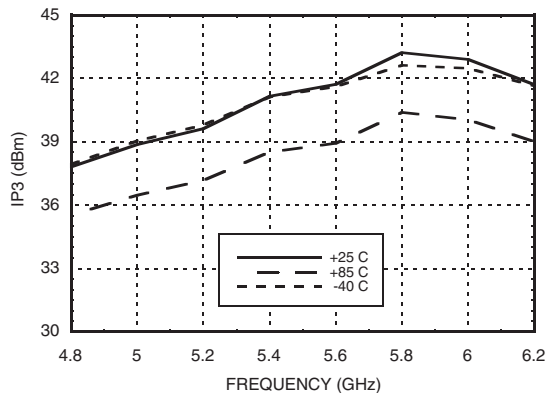


GaAs InGaP HBT MMIC 1 WATT POWER AMPLIFIER, 5.1 - 5.9 GHz

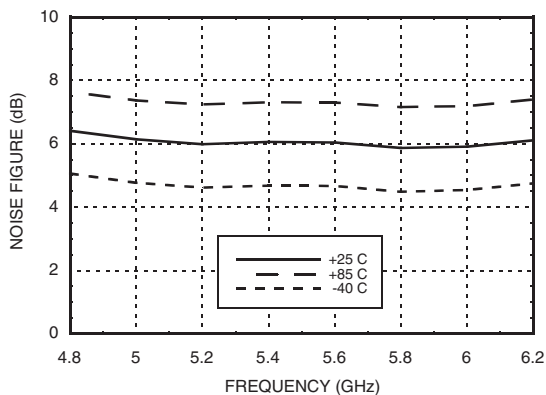
Power Compression @ 5.8 GHz



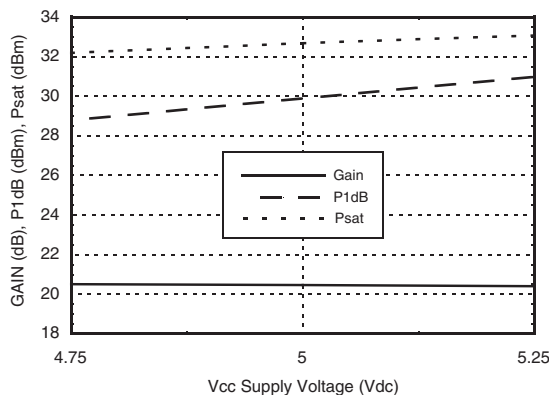
Output IP3 vs. Temperature



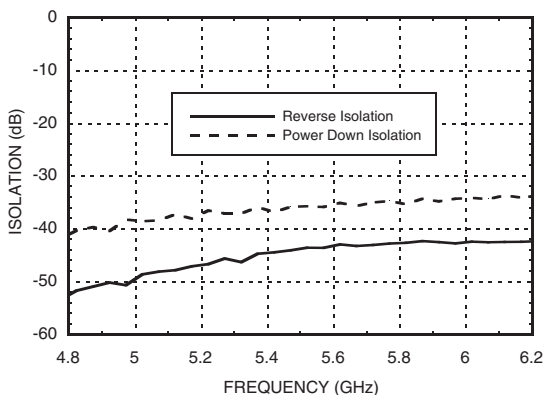
Noise Figure vs. Temperature



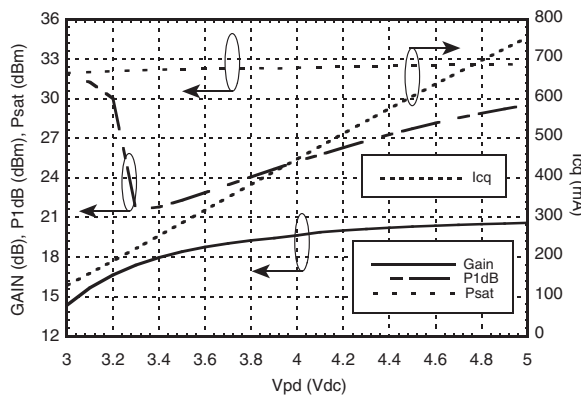
Gain & Power vs. Supply Voltage @ 5.8 GHz



Reverse Isolation vs. Temperature



Gain, Power & Quiescent Supply Current vs. Vpd @ 5.8 GHz



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GaAs InGaP HBT MMIC 1 WATT POWER AMPLIFIER, 5.1 - 5.9 GHz

Typical Supply Current vs. Vs= Vcc1 + Vcc2

Absolute Maximum Ratings

| | |
|---|----------------|
| Collector Bias Voltage (Vcc1, Vcc2) | +5.5 Vdc |
| Control Voltage (Vpd) | +5.5 Vdc |
| RF Input Power (RFIN)(Vs = Vpd = +5Vdc) | +20 dBm |
| Junction Temperature | 150 °C |
| Continuous Pdiss (T = 85 °C) (derate 72.5 mW/°C above 85 °C) | 4.71 W |
| Thermal Resistance (junction to ground paddle) | 13.8 °C/W |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |

| Vs (V) | Icq (mA) |
|--------|----------|
| 4.75 | 725 |
| 5.0 | 750 |
| 5.25 | 780 |

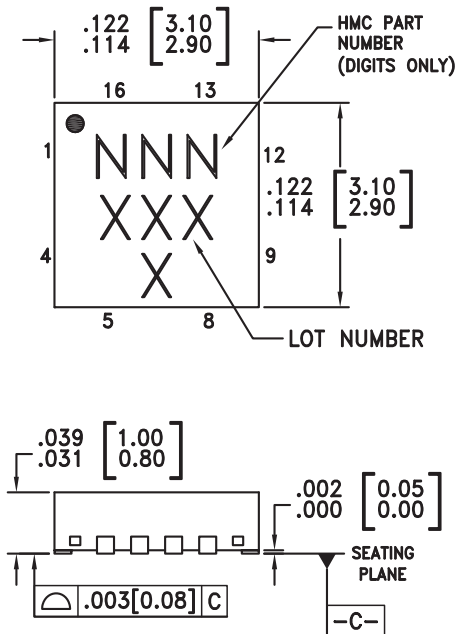
Note: Amplifier will operate over full voltage range shown above



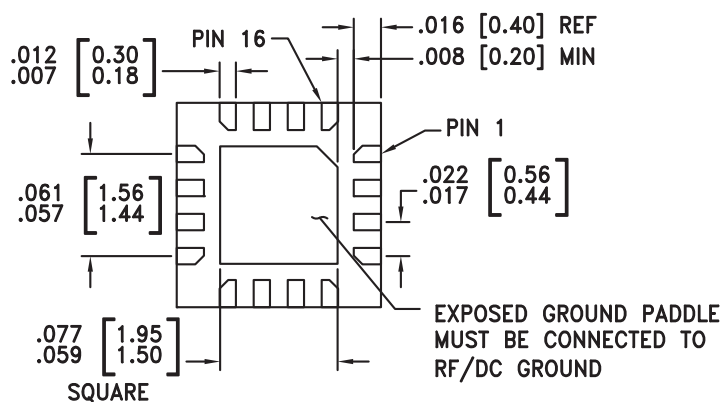
ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

11

Outline Drawing



BOTTOM VIEW



NOTES:

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

Package Information

| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking ^[3] |
|-------------|--|---------------|---------------------|--------------------------------|
| HMC408LP3 | Low Stress Injection Molded Plastic | Sn/Pb Solder | MSL1 ^[1] | 408 XXXX |
| HMC408LP3E | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 ^[2] | 408 XXXX |

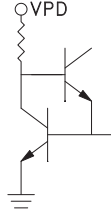
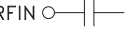
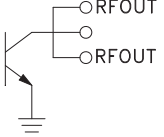
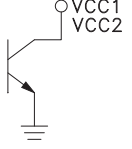

[1] Max peak reflow temperature of 235 °C

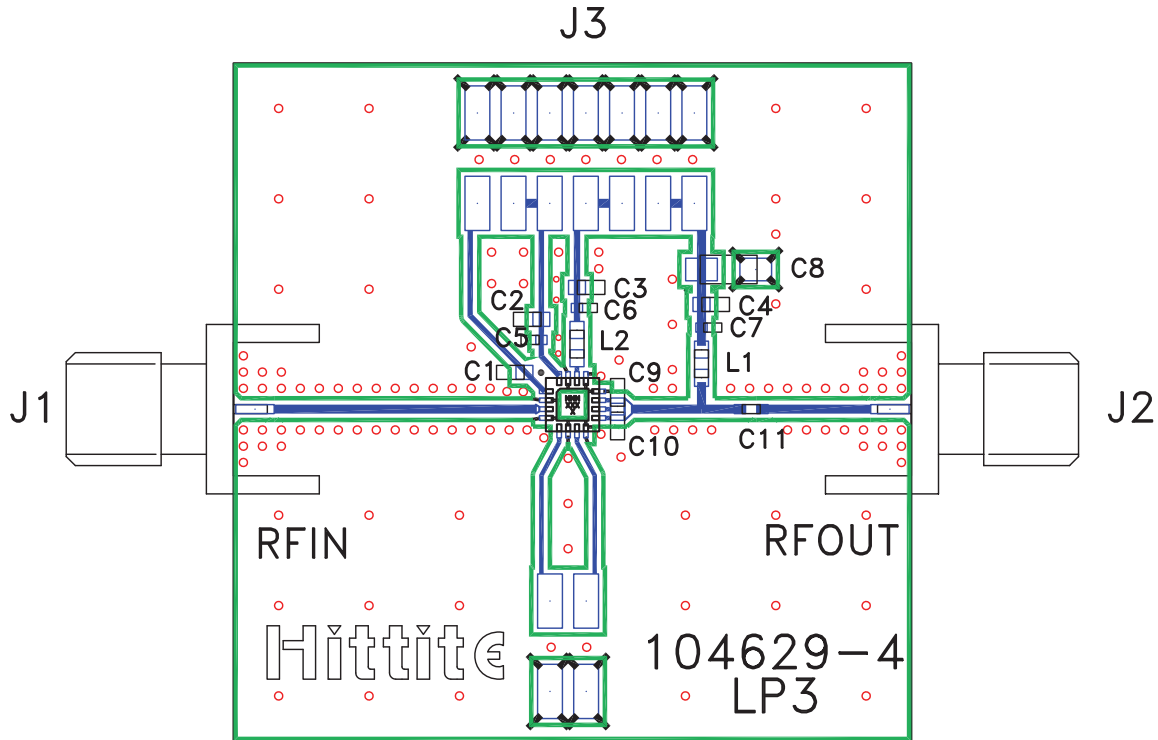
[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX



Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|-------------------------|----------|---|---|
| 1 | Vpd | Power control pin. For maximum power, this pin should be connected to 5V. A higher voltage is not recommended. For lower idle current, this voltage can be reduced. |  |
| 2, 4, 5 - 8, 12, 13, 15 | N/C | No Connection | |
| 3 | RFIN | This pin AC coupled and matched to 50 Ohms. |  |
| 9, 10, 11 | RFOUT | RF output and DC bias for the output stage. |  |
| 14 | Vcc2 | Power supply voltage for the second amplifier stage. External bypass capacitors and pull up choke are required as shown in the application schematic. |  |
| 16 | Vcc1 | Power supply voltage for the first amplifier stage. External bypass capacitors are required as shown in the application schematic. | |
| | GND | Ground: Backside of package has exposed metal ground slug that must be connected to ground thru a short path. Vias under the device are required. |  |


Evaluation PCB

List of Materials for Evaluation PCB 105180 [1]

| Item | Description |
|----------|----------------------------------|
| J1 - J2 | PCB Mount SMA RF Connector |
| J3 | 2 mm DC Header |
| C1 - C4 | 1,000 pF Capacitor, 0603 Pkg. |
| C5 - C7 | 100 pF Capacitor, 0402 Pkg. |
| C8 | 2.2 μ F Tantalum Capacitor |
| C9 - C10 | 0.5 pF Capacitor, 0603 Pkg. |
| C11 | 10 pF Capacitor, 0402 Pkg. |
| L1 - L2 | 1.6 nH Inductor, 0603 Pkg. |
| U1 | HMC408LP3 / HMC408LP3E Amplifier |
| PCB [2] | 104629 Eval Board |

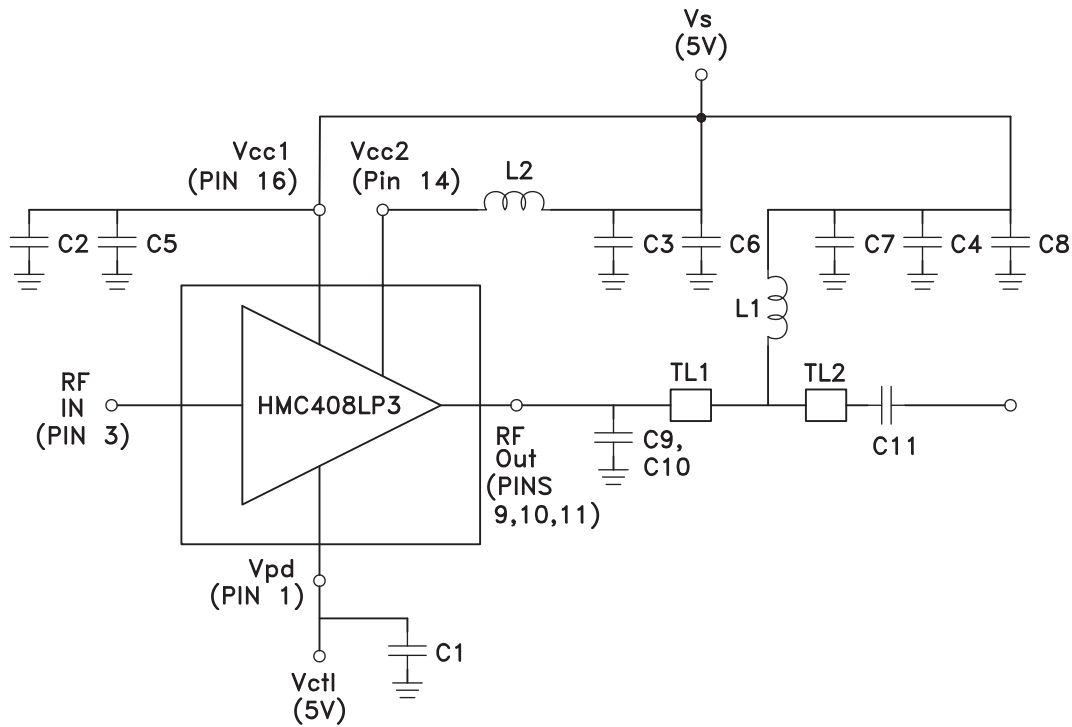
[1] Reference this number when ordering complete evaluation PCB

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



Application Circuit



| Recommended Component Values | |
|------------------------------|----------|
| L1, L2 | 1.6 nH |
| C1 - C4 | 1,000 pF |
| C5 - C7 | 100 pF |
| C8 | 2.2 μF |
| C9 - C10 | 0.5 pF |

| | TL1 | TL2 |
|-----------|--------|--------|
| Impedance | 50 Ohm | 50 Ohm |
| Length | 0.200" | 0.100" |

Note 1: C9, C10 should be located < 0.020" from pins 9, 10, & 11.

Note 2: Application circuit values shown are optimized for 5.7 - 5.9 GHz operation.

Contact our Applications Engineers for optimization of output match for other frequencies.



Notes:

v03.0705

HMC408LP3 / 408LP3E

**GaAs InGaP HBT MMIC 1 WATT
POWER AMPLIFIER, 5.1 - 5.9 GHz**

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LINEAR & POWER AMPLIFIERS - SMT

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