



GaAs HBT MMIC 2 WATT POWER AMPLIFIER, 0.4 - 2.7 GHz

Typical Applications

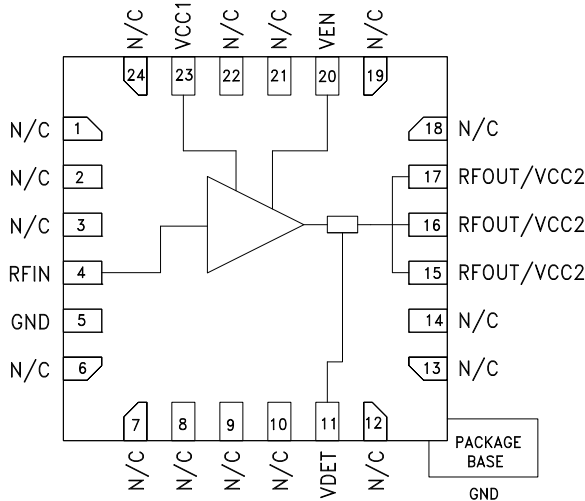
The HMC921LP4E is ideal for:

- Cellular/3G & WiMAX/LTE/4G
- Fixed Wireless & WLAN
- CATV, Cable Modem & DBS
- Microwave Radio & Test Equipment
- IF & RF Applications

Features

- High Output IP3: +48 dBm
- High Output P1dB: +33 dBm
- High Gain: 16 dB @ 900 MHz
- Single Supply: +5V
- 32% PAE @ +33 dBm Pout
- Adjustable Bias Current
- 24 Lead 4x4 mm SMT Package: 16 mm²

Functional Diagram



General Description

The HMC921LP4E is a high linearity GaAs HBT MMIC 2 watt power amplifier operating from 0.4 to 2.7 GHz and is housed in a RoHS compliant 4x4 mm QFN leadless package. The HMC921LP4E utilizes a minimum number of external components and operates from a single +5V supply. This versatile power amplifier can be biased for both low quiescent current and high quiescent current modes by adjusting a single external resistor.

Electrical Specifications, $T_A = +25^\circ\text{C}$, $V_{cc1} = V_{cc2} = V_{EN} = +5V$ [1]

| Parameter | 400 mA (R1 = 270 Ω) | | | | | | | | | | | | | | | |
|---|---------------------|------|------|------------|------|------|-------------|------|------|-------------|------|------|-------------|------|------|---------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | Units |
| Frequency Range | 350 - 500 | | | 800 - 1000 | | | 1800 - 2000 | | | 2000 - 2200 | | | 2500 - 2800 | | | MHz |
| Gain | 17 | 19 | | 14 | 16 | | 9 | 11 | | 9.5 | 10.5 | | 8 | 9 | | dB |
| Gain Variation Over Temperature | | 0.01 | | | 0.01 | | | 0.01 | | | 0.01 | | | 0.01 | | dB / °C |
| Input Return Loss | 9 | 12 | | 10 | 15 | | 5 | 10 | | 8 | 12 | | 6 | 11 | | dB |
| Output Return Loss | 6 | 10 | | 5 | 9 | | 8 | 9 | | 6 | 7 | | 9 | 10 | | dB |
| Output Power for 1dB Compression (P1dB) | 32.5 | 34 | | 30.5 | 32 | | 31 | 32.5 | | 32 | 32.5 | | 33 | 33.3 | | dBm |
| Saturated Output Power (Psat) | | 35 | | | 34 | | | 34 | | | 34 | | | 34.5 | | dBm |
| Output Third Order Intercept (IP3) | | 47 | | | 44 | | | 43 | | | 43 | | | 45 | | dBm |
| Noise Figure | | 12.9 | | | 9 | | | 8.5 | | | 6.9 | | | 6.5 | | dB |
| Supply Current (Icq) | Ien | 8 | | | 8 | | | 8 | | | 8 | | | 8 | | mA |
| | Icc1 | 12 | | | 12 | | | 12 | | | 12 | | | 12 | | mA |
| | Icc2 | 400 | | | 400 | | | 400 | | | 400 | | | 400 | | mA |

[1] Specifications and data reflect HMC921LP4E measured using the respective application circuits for each designated frequency band found herein. Contact the HMC Applications Group for assistance in optimizing performance for your application.



GaAs HBT MMIC 2 WATT POWER AMPLIFIER, 0.4 - 2.7 GHz

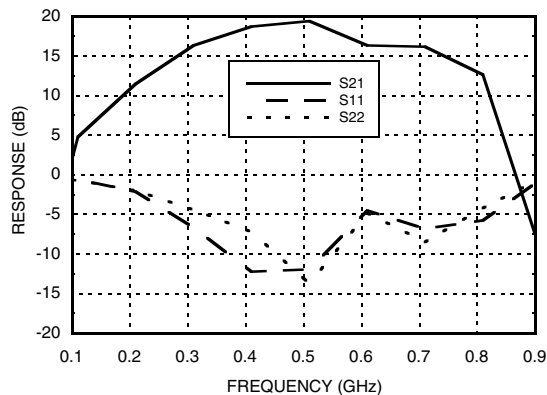
Electrical Specifications, $T_A = +25^\circ\text{C}$, $V_{cc1} = V_{cc2} = V_{EN} = +5V$ [1]

| Parameter | 700 mA ($R_1 = 130 \Omega$) | | | | | | | | | | | | Units | | | |
|---|-------------------------------|------|------|------------|------|------|-------------|------|------|-------------|------|------|-------------|------|--|---------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | | | | |
| Frequency Range | 350 - 500 | | | 800 - 1000 | | | 1800 - 2000 | | | 2000 - 2200 | | | 2600 - 2800 | | | MHz |
| Gain | 19 | 19.5 | | 14 | 16 | | 9 | 11 | | 10.3 | 10.8 | | 8 | 9 | | dB |
| Gain Variation Over Temperature | | 001 | | | 0.01 | | | 0.01 | | | 0.01 | | | 0.01 | | dB / °C |
| Input Return Loss | 9 | 12 | | 11 | 15 | | 6 | 10 | | 9 | 13 | | 6 | 12 | | dB |
| Output Return Loss | 6 | 10 | | 6 | 9 | | 8 | 9 | | 6 | 7.5 | | 9 | 10 | | dB |
| Output Power for 1dB Compression (P1dB) | 33 | 34.5 | | 31 | 32.5 | | 31.5 | 33 | | 32.8 | 33.5 | | 33 | 34 | | dBm |
| Saturated Output Power (Psat) | | 35 | | | 34 | | | 34 | | | 34.5 | | | 35 | | dBm |
| Output Third Order Intercept (IP3) | | 43 | | | 45 | | | 46 | | | 47 | | | 47 | | dBm |
| Noise Figure | | 14 | | | 9 | | | 8.5 | | | 8 | | | 8 | | dB |
| Supply Current (Icq) | Ien | | | | | | | | | | | | | | | mA |
| | Icc1 | 13 | | | 13 | | | 13 | | | 13 | | | 13 | | mA |
| | Icc2 | 14 | | | 14 | | | 14 | | | 14 | | | 14 | | mA |
| | | 700 | | | 700 | | | 700 | | | 700 | | | 700 | | mA |

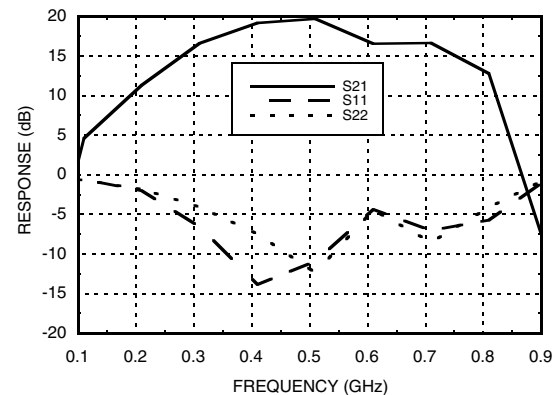
[1] Specifications and data reflect HMC921LP4E measured using the respective application circuits for each designated frequency band found herein. Contact the HMC Applications Group for assistance in optimizing performance for your application.

450 MHz Tune

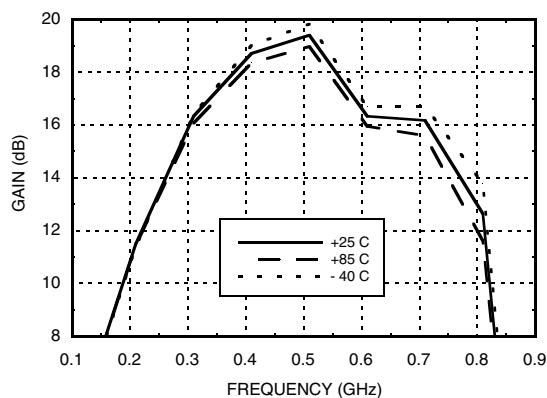
Broadband Gain & Return Loss @ 400mA



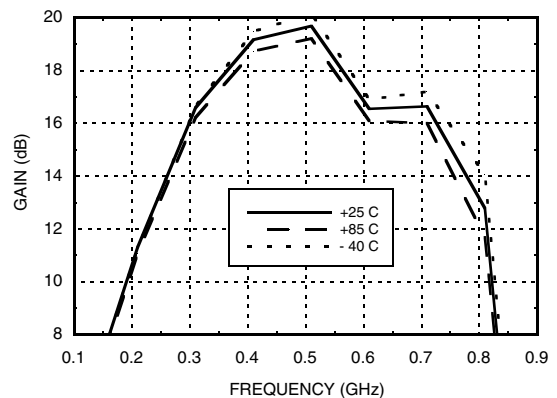
Broadband Gain & Return Loss @ 700mA

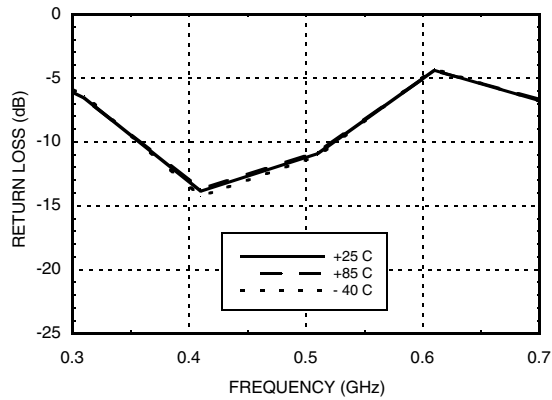
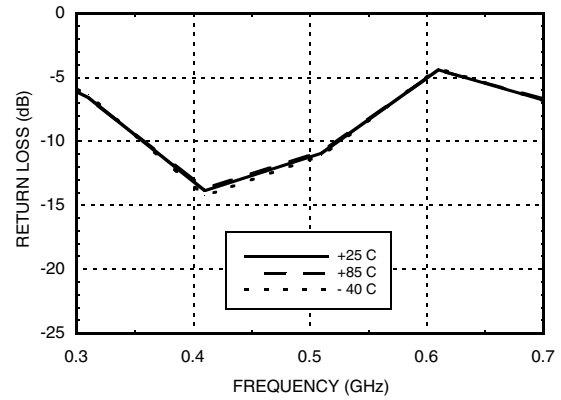
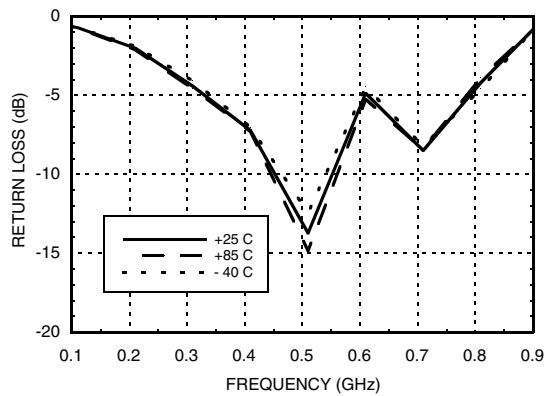
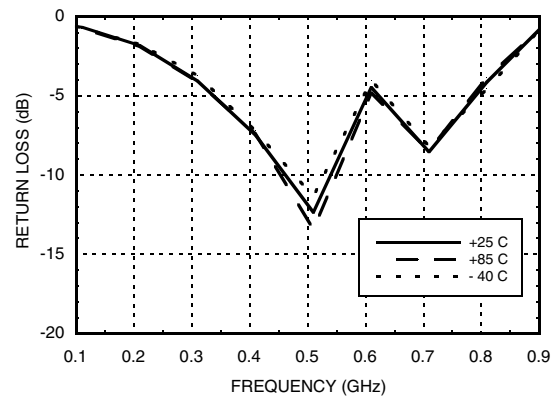
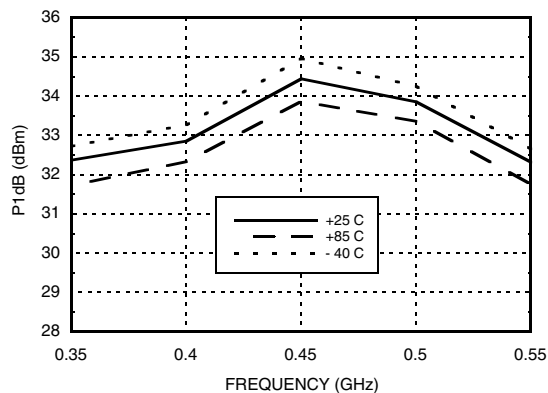
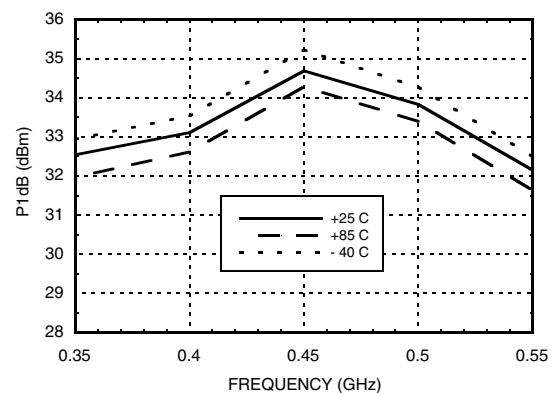


Gain vs. Temperature @ 400mA



Gain vs. Temperature @ 700mA



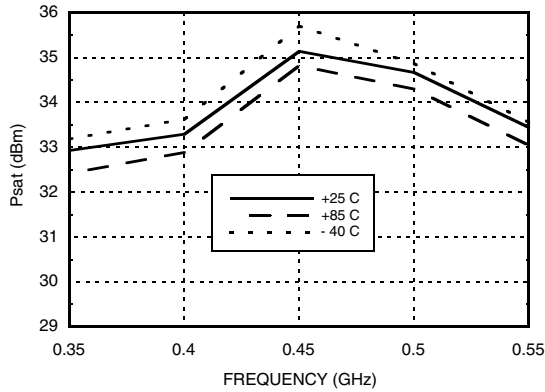

**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz**
450 MHz Tune
Input Return Loss @ 400 mA

Input Return Loss @ 700 mA

Output return Loss @ 400 mA

Output return Loss @ 700 mA

P1dB vs. Temperature @ 400 mA

P1dB vs. Temperature @ 700 mA




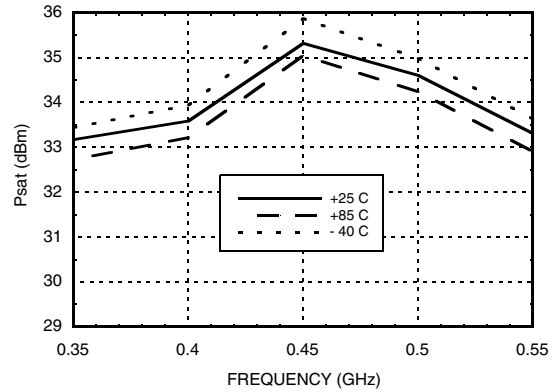
**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz**

450 MHz Tune

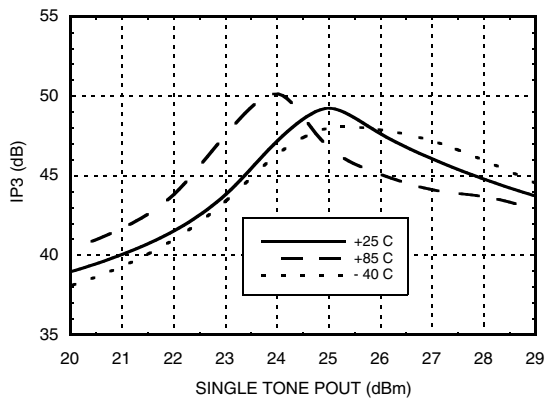
Psat vs. Temperature @ 400mA



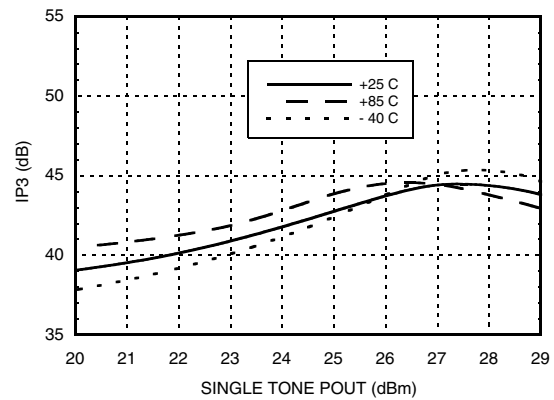
Psat vs. Temperature @ 700mA



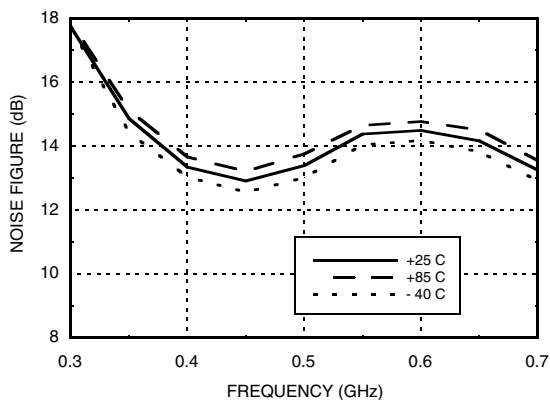
Output IP3 vs. Output Power @ 400mA



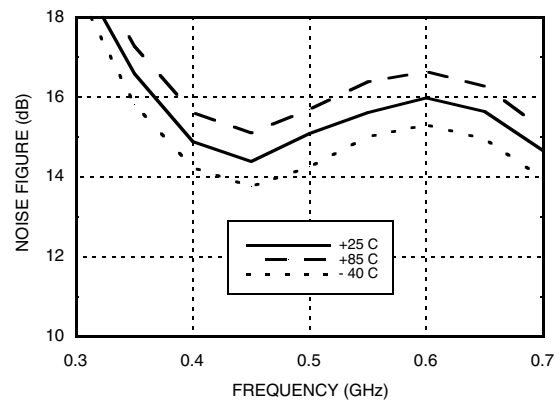
Output IP3 vs. Output Power @ 700mA



Noise Figure vs. Temperature @ 400mA

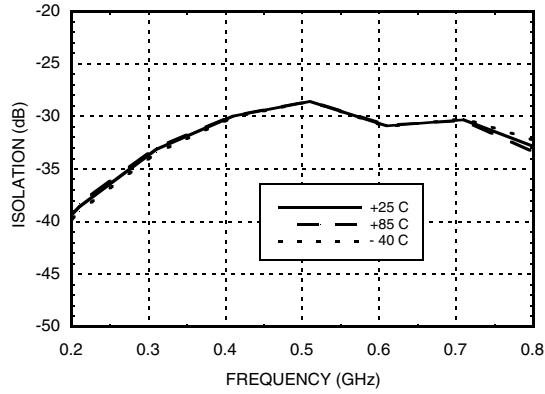
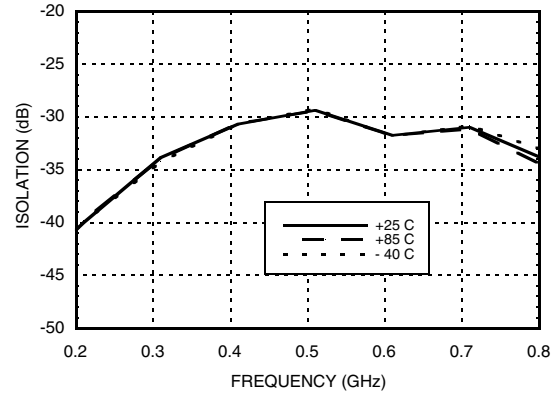
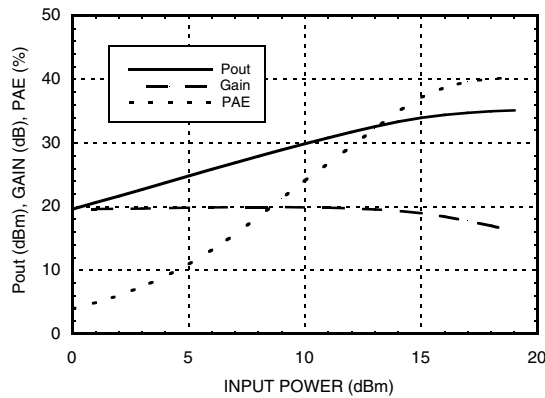
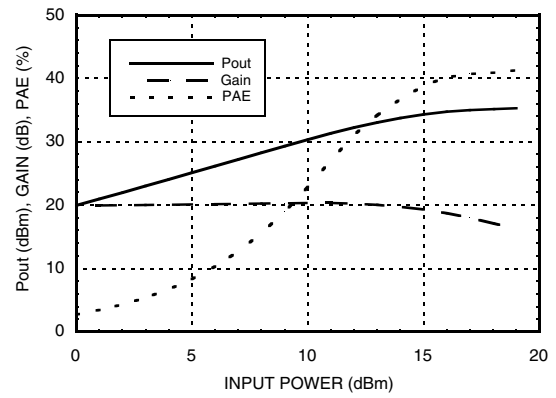


Noise Figure vs. Temperature @ 700mA



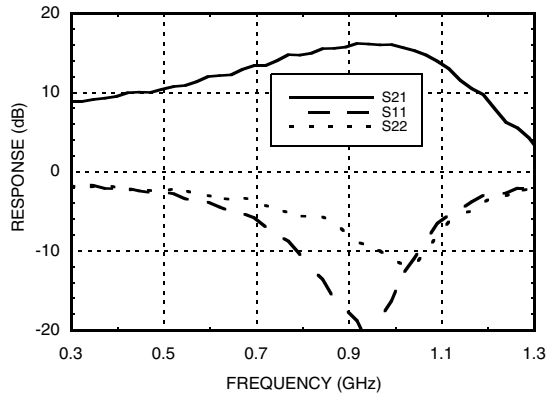
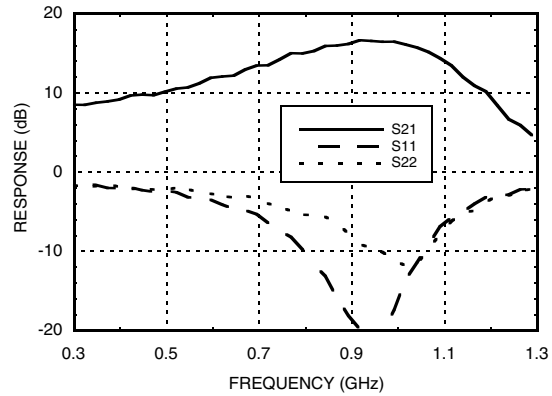
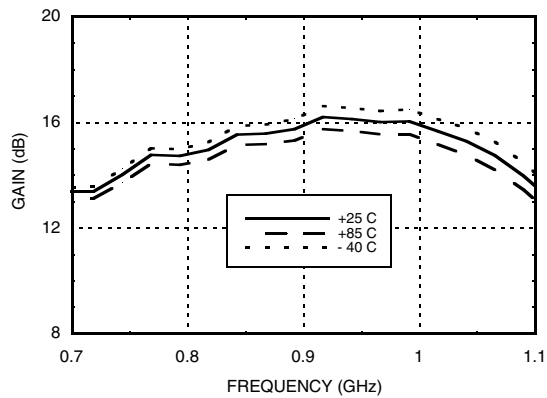
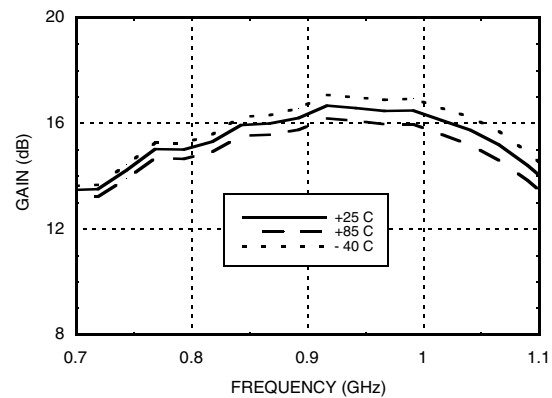
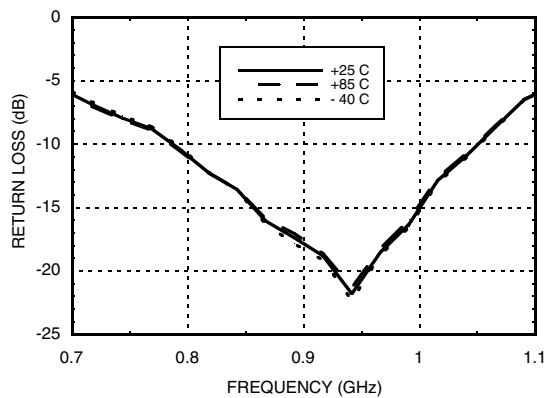
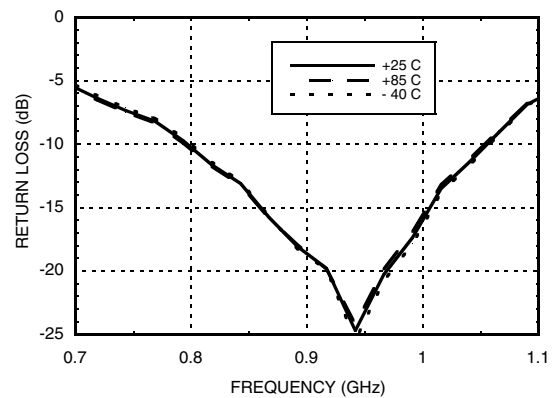


**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz
450 MHz Tune**

Reverse Isolation vs. Temperature 400mA

Reverse Isolation vs. Temperature 700mA

Power Compression @ 400mA

Power Compression @ 700mA




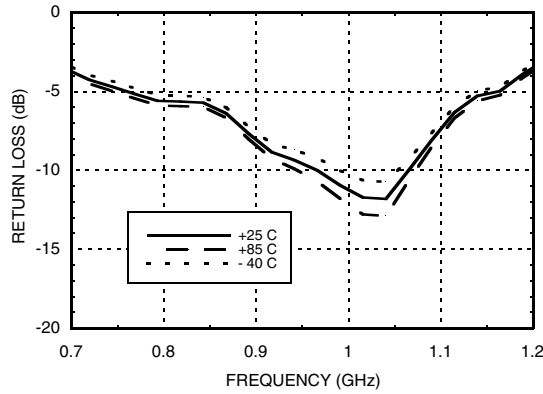
**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz
900 MHz Tune**

Broadband Gain & Return Loss @ 400 mA

Broadband Gain & Return Loss @ 700 mA

Gain vs. Temperature @ 400 mA

Gain vs. Temperature @ 700 mA

Input Return Loss vs. Temperature 400mA

Input Return Loss vs. Temperature 700mA


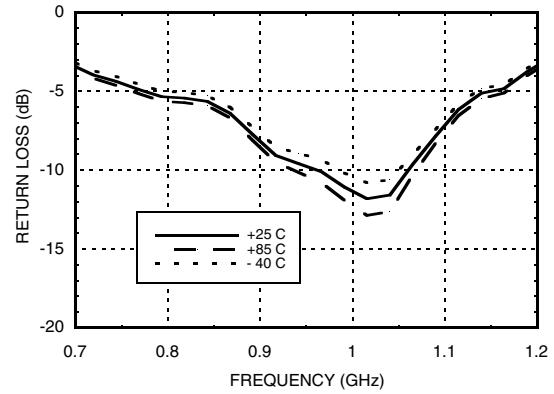


GaAs HBT MMIC 2 WATT POWER AMPLIFIER, 0.4 - 2.7 GHz 900 MHz Tune

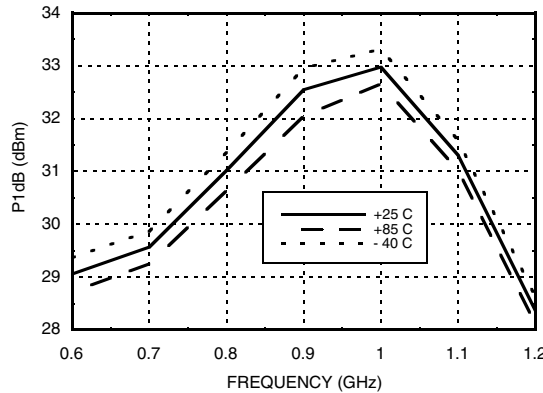
Output Return Loss @ 400mA



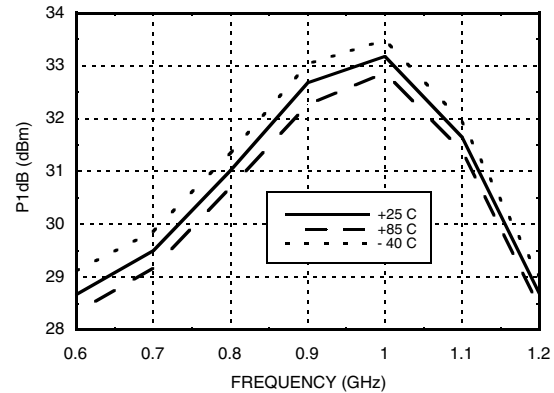
Output Return Loss @ 700mA



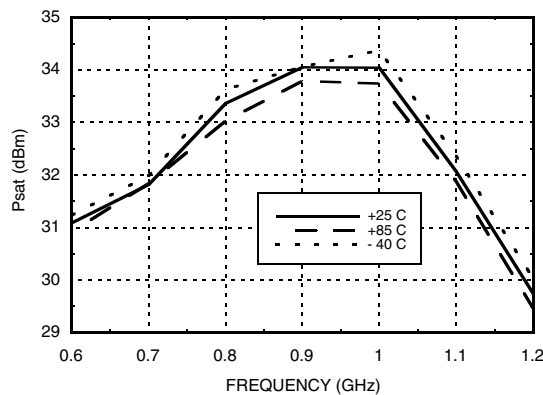
P1dB vs. Temperature @ 400 mA



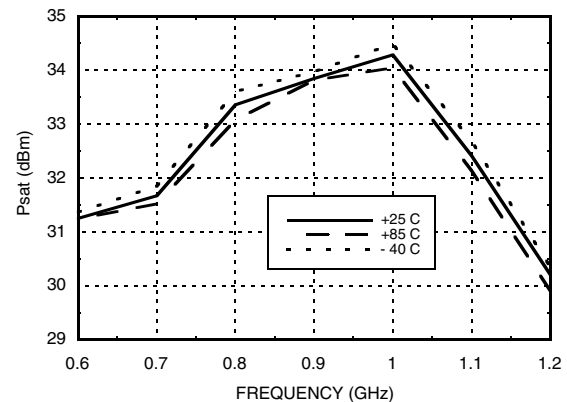
P1dB vs. Temperature @ 700 mA



Psat vs. Temperature @ 400 mA



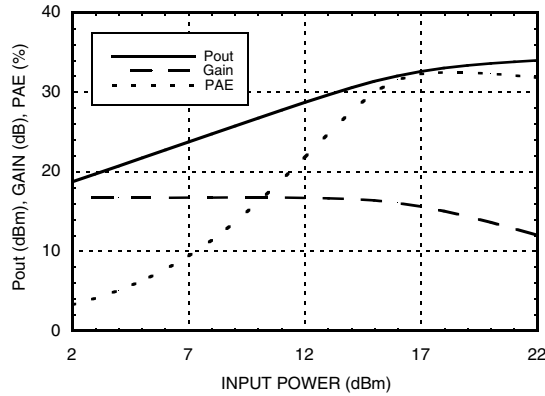
Psat vs. Temperature @ 700 mA



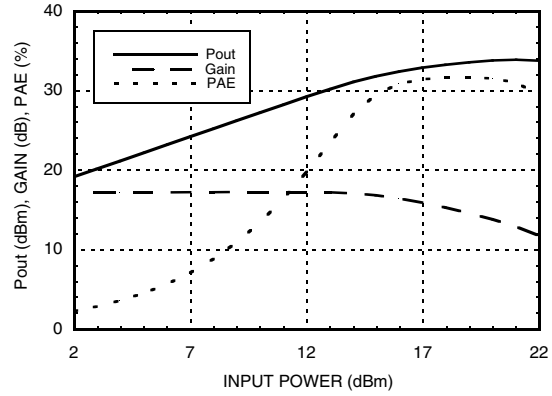


GaAs HBT MMIC 2 WATT POWER AMPLIFIER, 0.4 - 2.7 GHz 900 MHz Tune

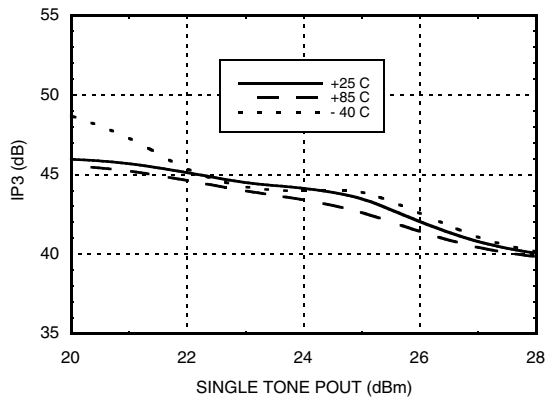
Power Compression @ 400 mA



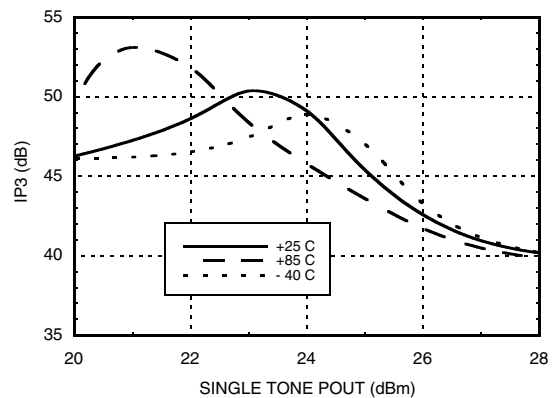
Power Compression @ 700 mA



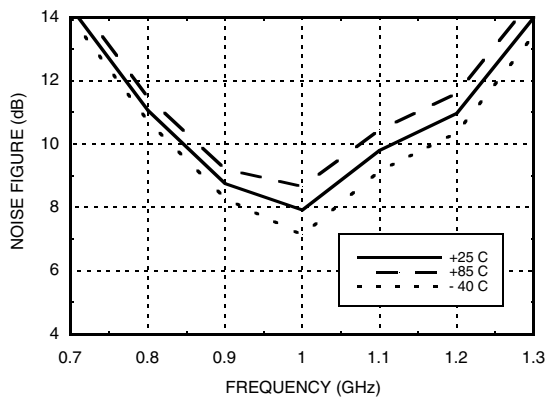
Output IP3 vs. Output Power @ 400 mA



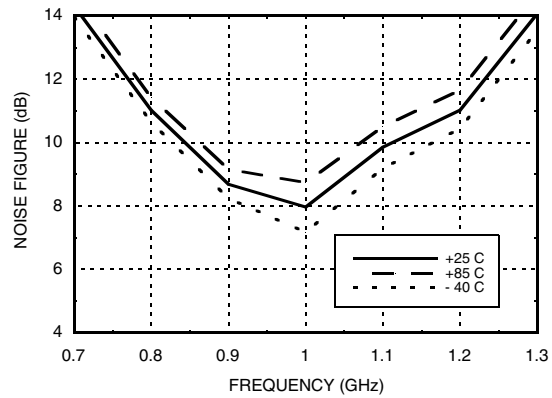
Output IP3 vs. Output Power @ 700 mA



Noise Figure vs. Temperature 400 mA



Noise Figure vs. Temperature 700 mA

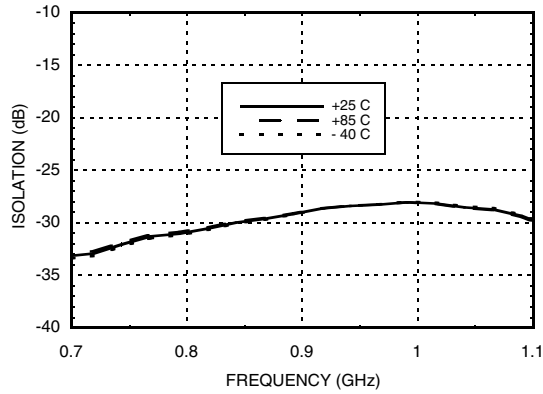




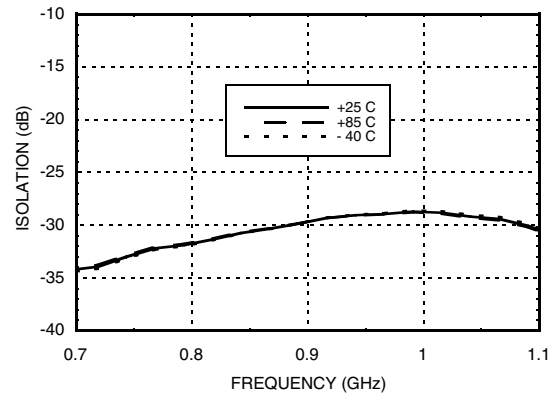
GaAs HBT MMIC 2 WATT POWER AMPLIFIER, 0.4 - 2.7 GHz 900 MHz Tune

AMPLIFIERS - LINEAR & POWER - SMT

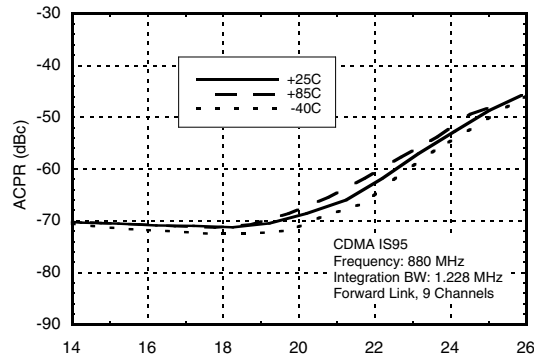
Reverse Isolation vs. Temperature 400mA



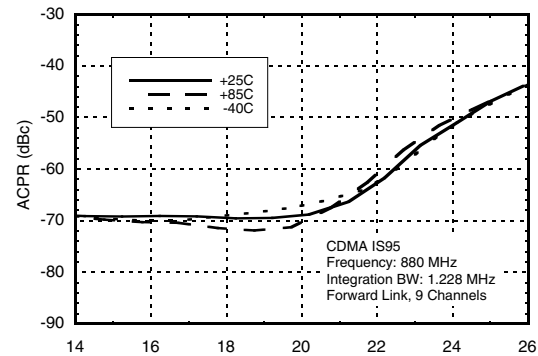
Reverse Isolation vs. Temperature 700mA



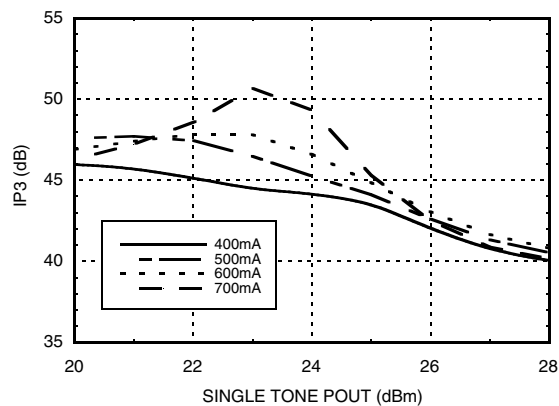
**ACPR vs. Temperature @ 880 MHz
CDMA 2000, 9 Channels Forward, 400 mA**



**ACPR vs. Temperature @ 880 MHz
CDMA 2000, 9 Channels Forward, 700 mA**



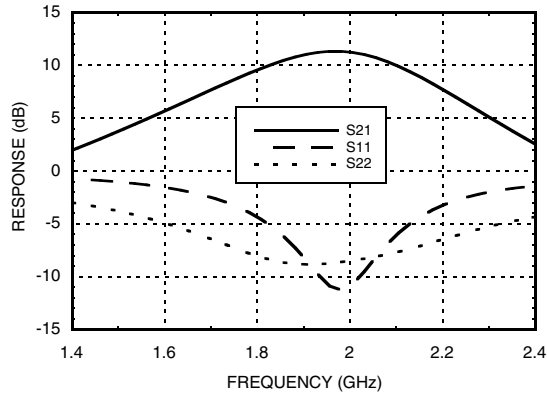
Output IP3 vs. Bias Current



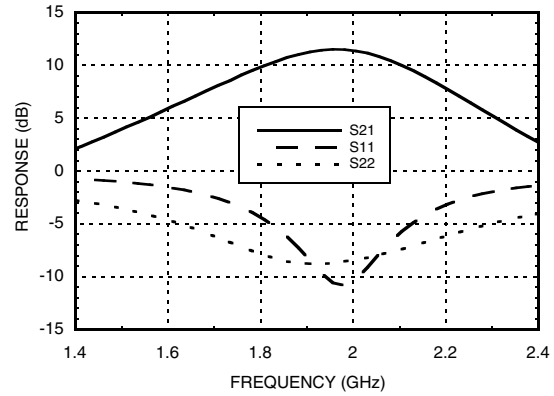


**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz
1900 MHz Tune**

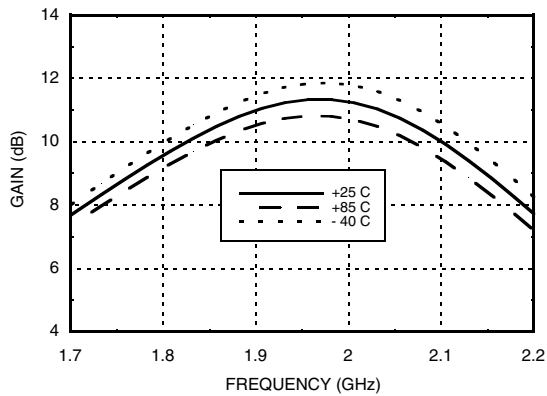
Broadband Gain & Return Loss @ 400 mA



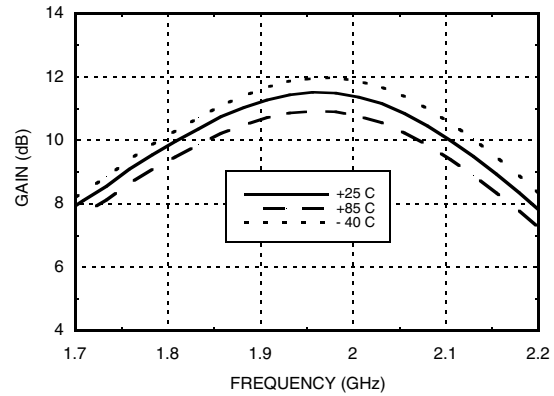
Broadband Gain & Return Loss @ 700 mA



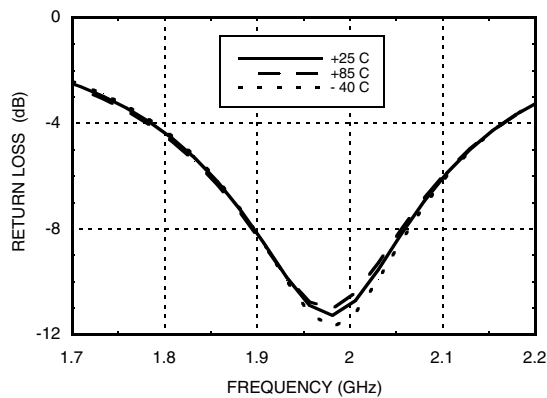
Gain vs. Temperature @ 400 mA



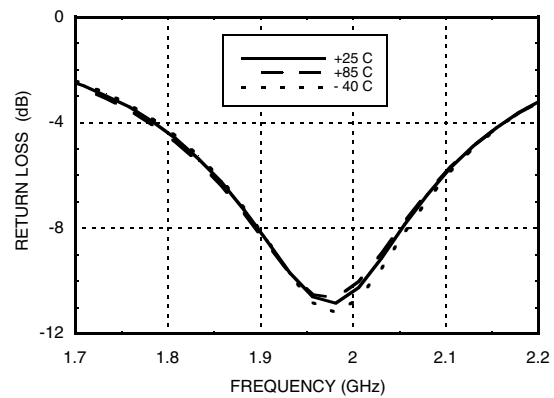
Gain vs. Temperature @ 700 mA

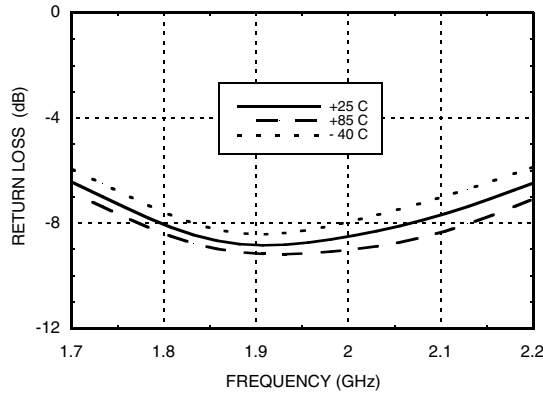
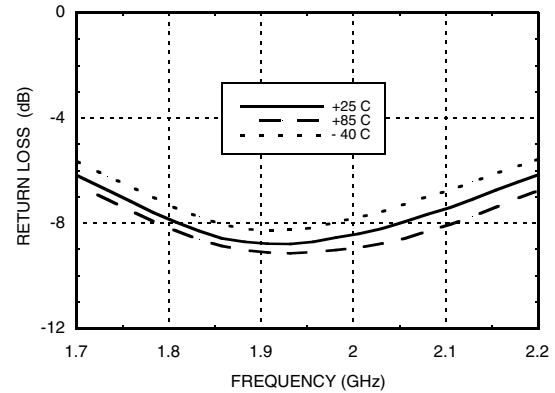
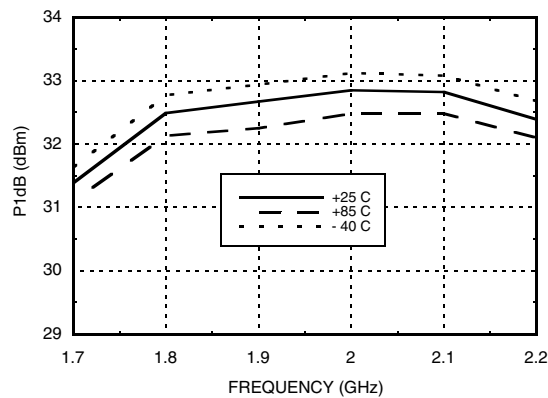
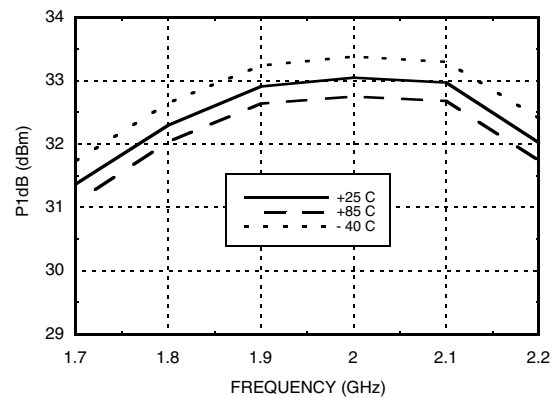
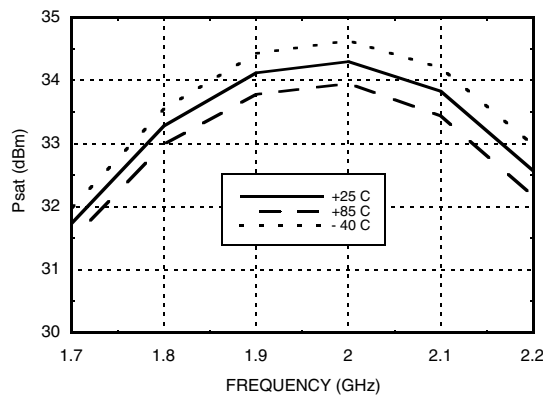
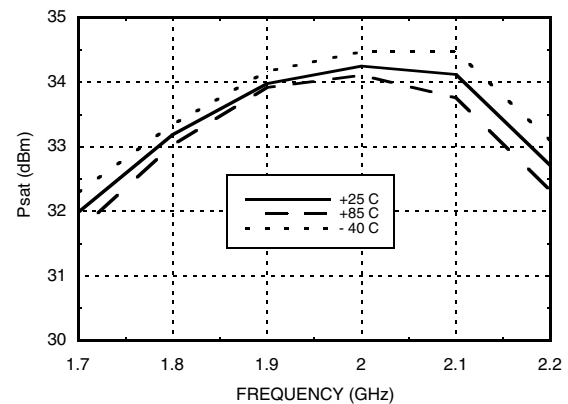


Input Return Loss @ 400 mA



Input Return Loss @ 700 mA

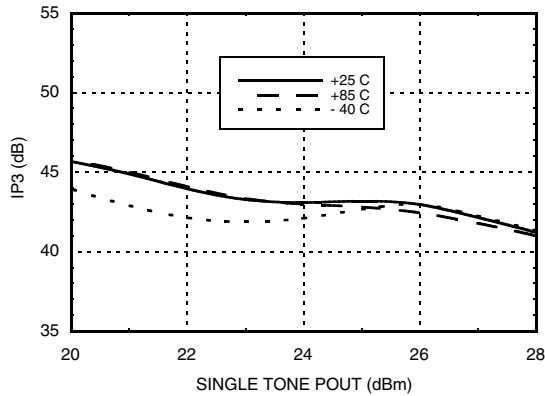



**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz**
1900 MHz Tune
Output Return Loss @ 400 mA

Output Return Loss @ 700 mA

P1dB vs. Temperature @ 400 mA

P1dB vs. Temperature @ 700 mA

Psat vs. Temperature @ 400 mA

Psat vs. Temperature @ 700 mA


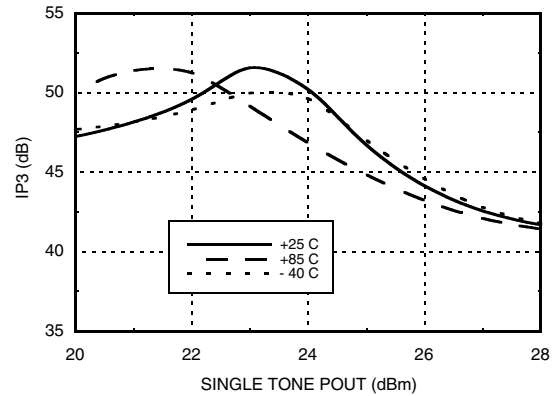


GaAs HBT MMIC 2 WATT POWER AMPLIFIER, 0.4 - 2.7 GHz 1900 MHz Tune

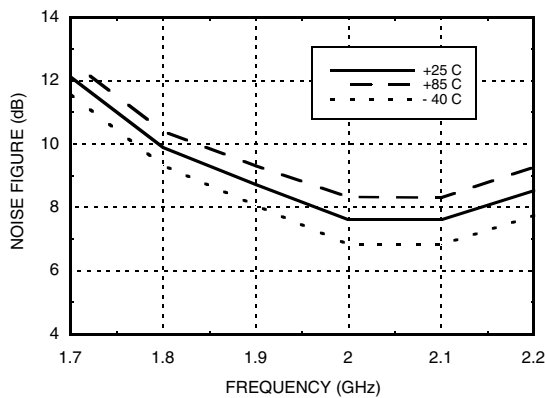
Output IP3 vs. Output Power @ 400 mA



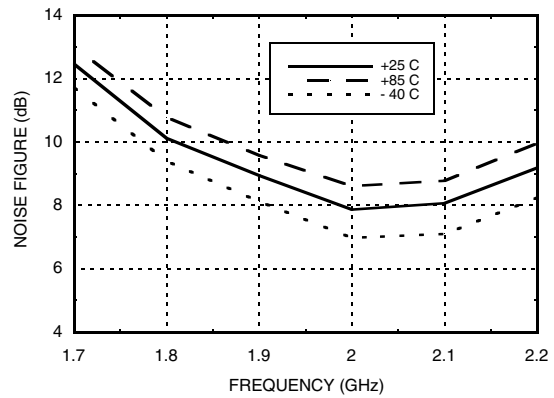
Output IP3 vs. Output Power @ 700 mA



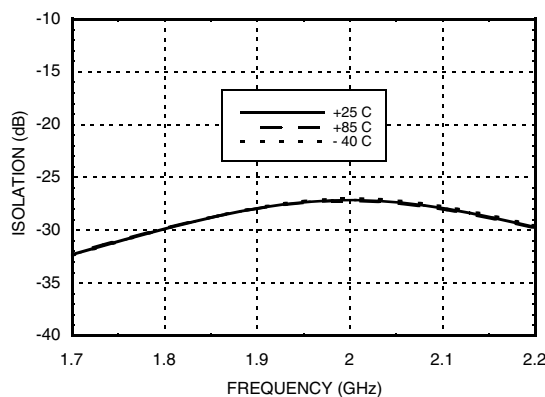
Noise Figure vs. Temperature @ 400 mA



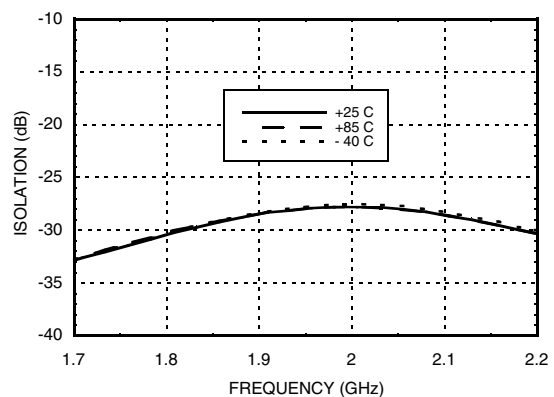
Noise Figure vs. Temperature @ 700 mA



Reverse Isolation vs. Temperature 400 mA

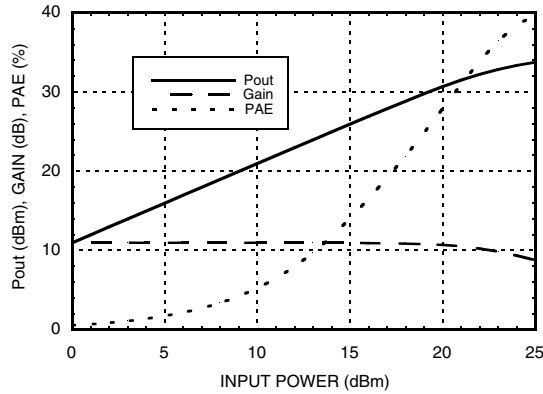


Reverse Isolation vs. Temperature 700 mA

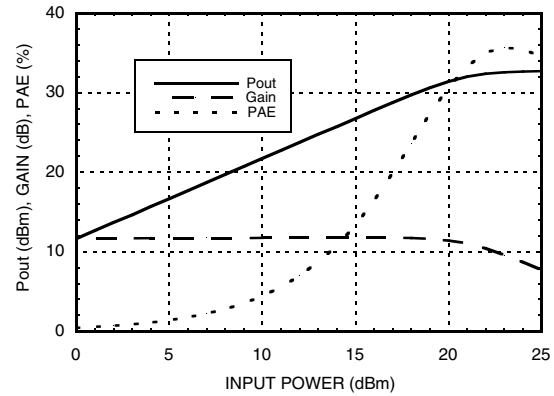


GaAs HBT MMIC 2 WATT POWER AMPLIFIER, 0.4 - 2.7 GHz 1900 MHz Tune

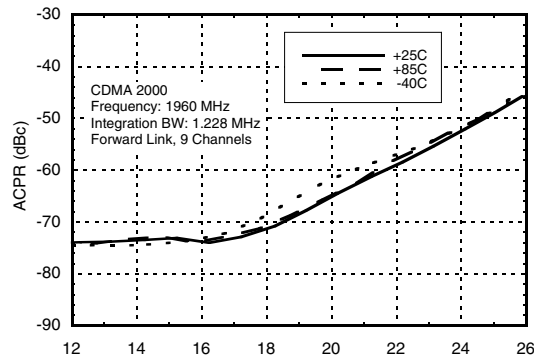
Power Compression @ 400 mA



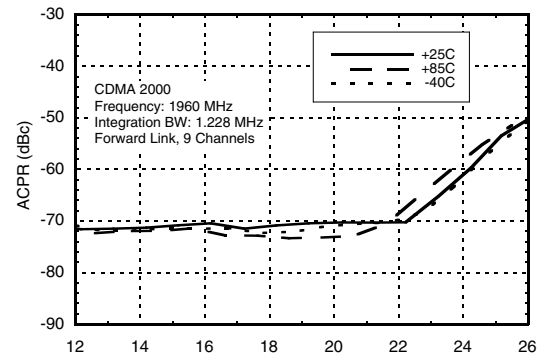
Power Compression @ 700 mA



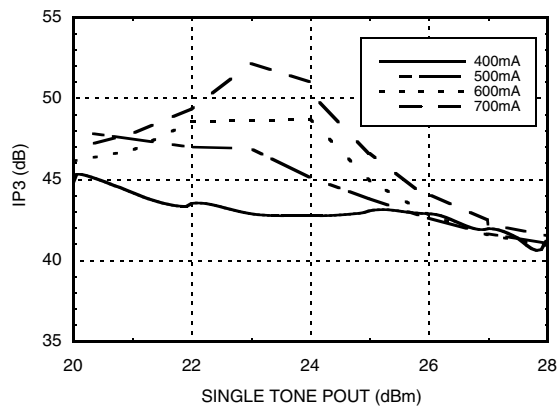
**ACPR vs. Temperature @ 1960 MHz
CDMA 2000, 9 Channels Forward, 400 mA**



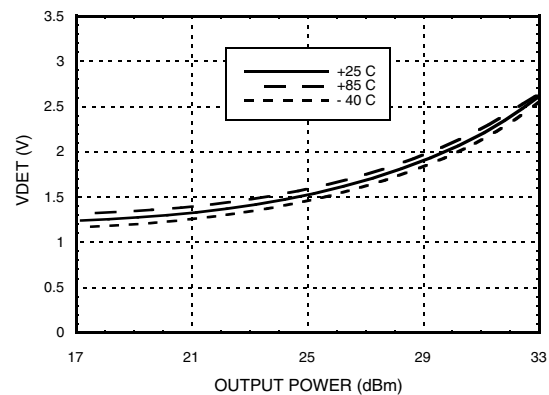
**ACPR vs. Temperature @ 1960 MHz
CDMA 2000, 9 Channels Forward, 700 mA**



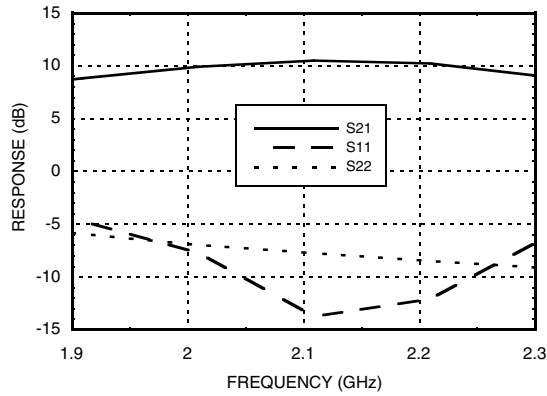
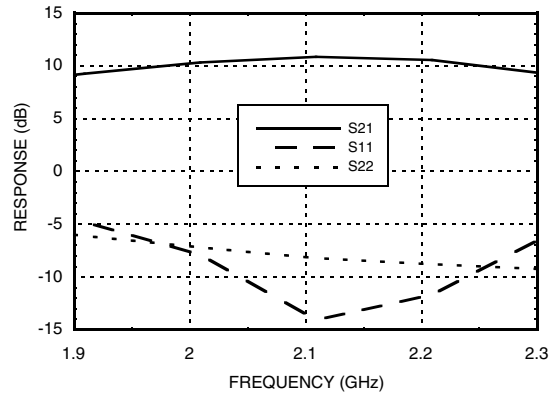
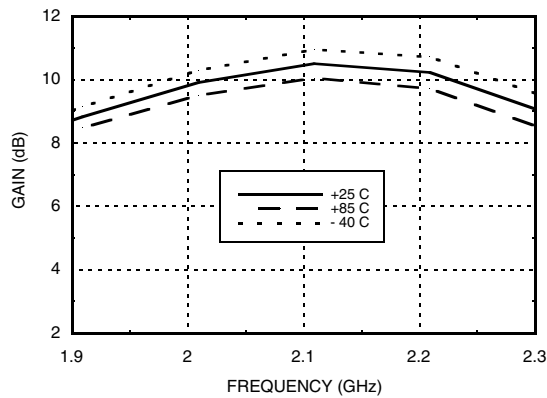
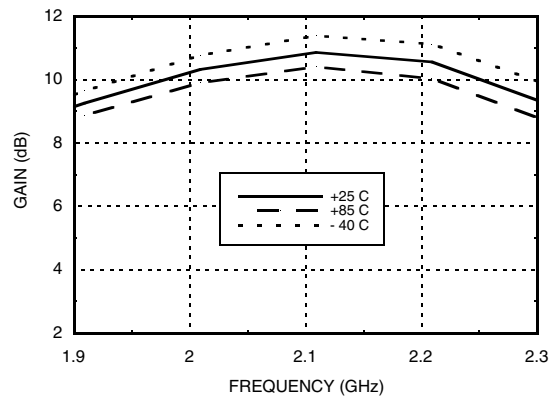
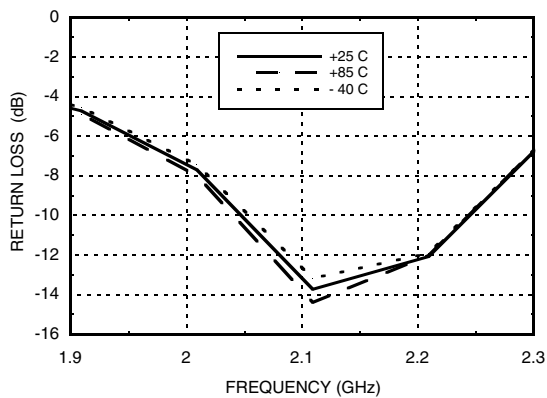
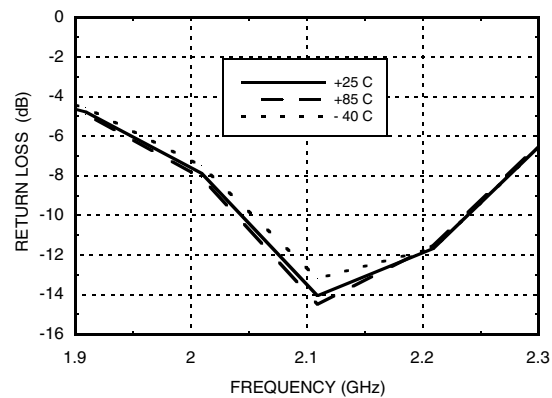
Output IP3 vs. Bias Current



VDET Output Voltage vs. Temperature

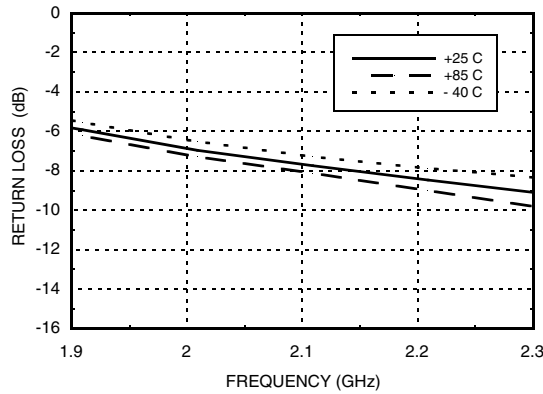
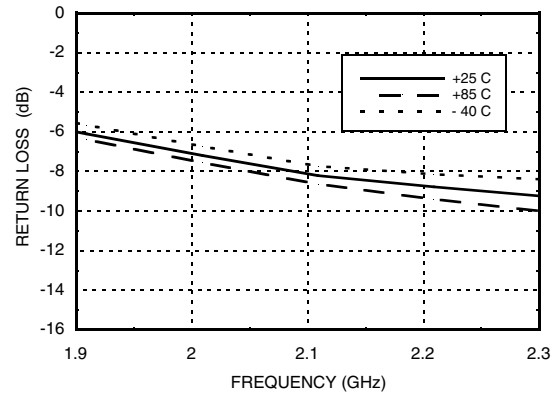
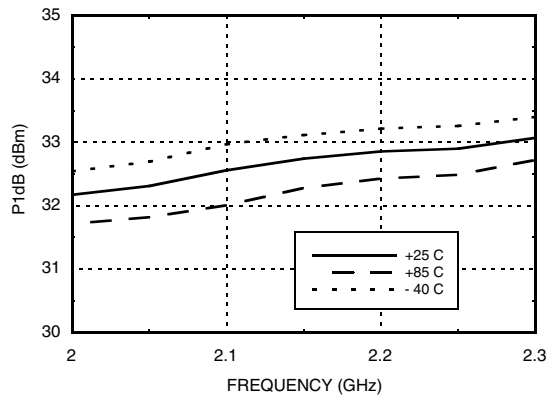
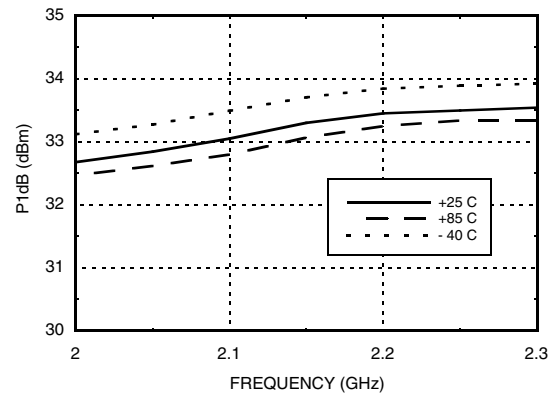
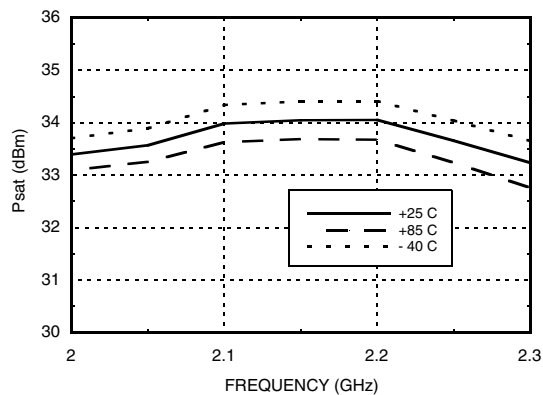
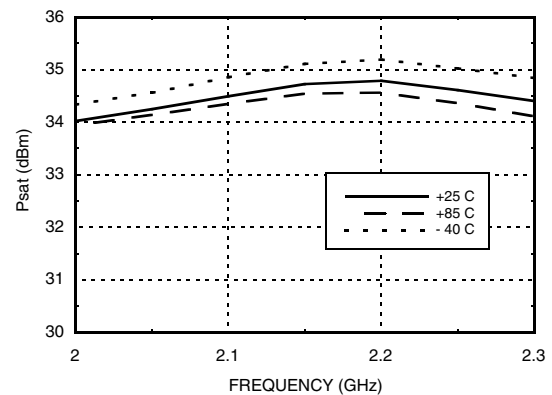


**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz
2150 MHz Tune**

Broadband Gain & Return Loss @ 400 mA

Broadband Gain & Return Loss @ 700 mA

Gain vs. Temperature @ 400 mA

Gain vs. Temperature @ 700 mA

Input Return Loss @ 400 mA

Input Return Loss @ 700 mA


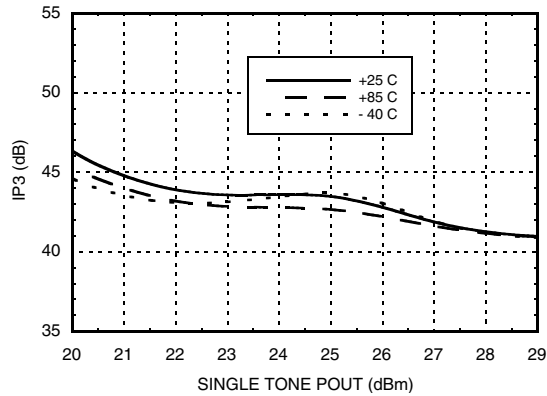
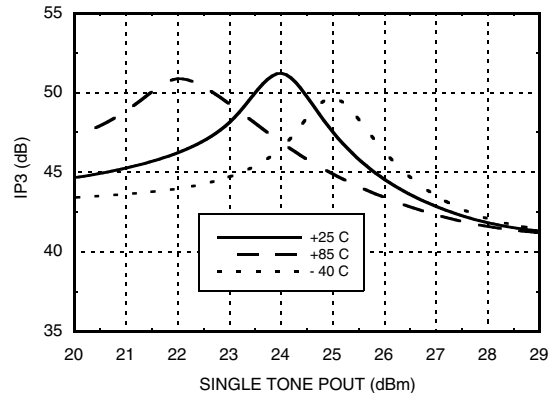
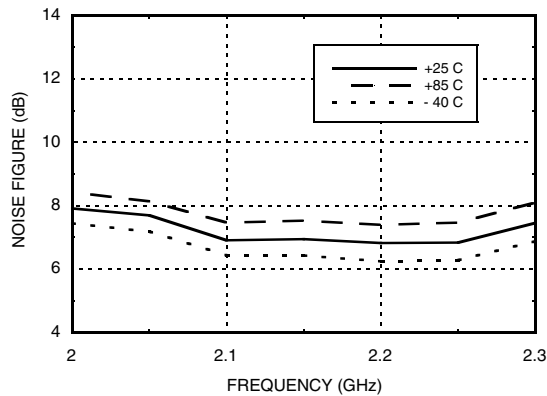
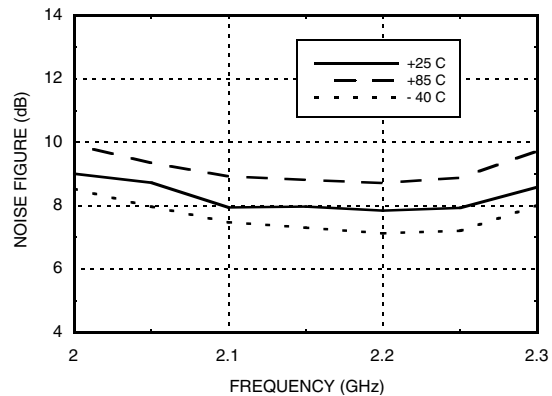
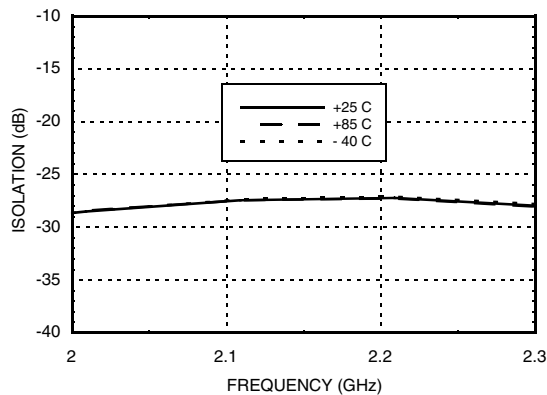
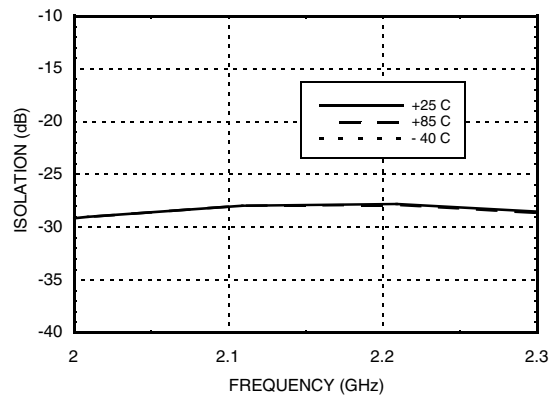


**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz
2150 MHz Tune**

Output Return Loss @ 400 mA

Output Return Loss @ 700 mA

P1dB vs. Temperature @ 400 mA

P1dB vs. Temperature @ 700 mA

Psat vs. Temperature @ 400 mA

Psat vs. Temperature @ 700 mA


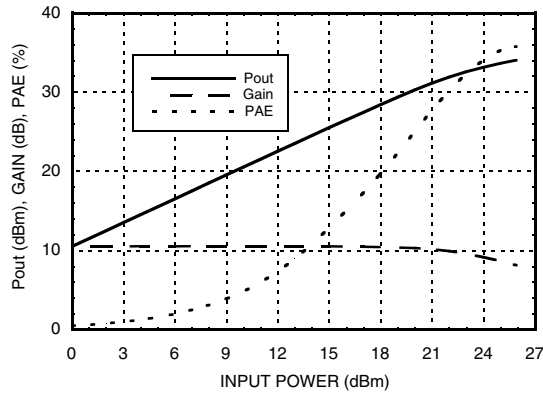
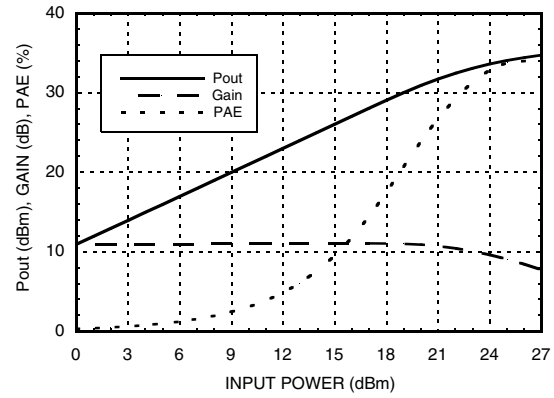


**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz
2150 MHz Tune**

Output IP3 vs Output Power @ 400 mA

Output IP3 vs Output Power @ 700 mA

Noise Figure vs. Temperature @ 400 mA

Noise Figure vs. Temperature @ 700 mA

Reverse Isolation vs. Temperature 400 mA

Reverse Isolation vs. Temperature 700 mA




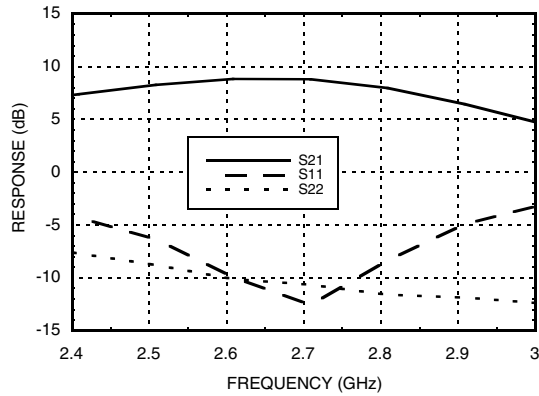
**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz
2150 MHz Tune**

Power Compression @ 400 mA

Power Compression @ 700 mA


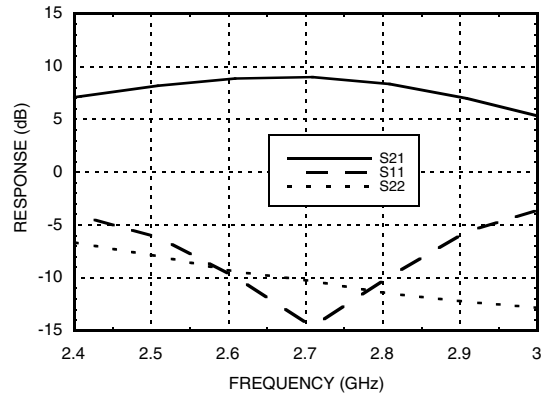


**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz
2700 MHz Tune**

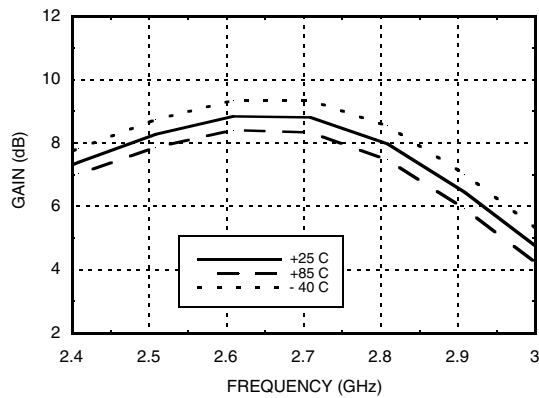
Broadband Gain & Return Loss @ 400 mA



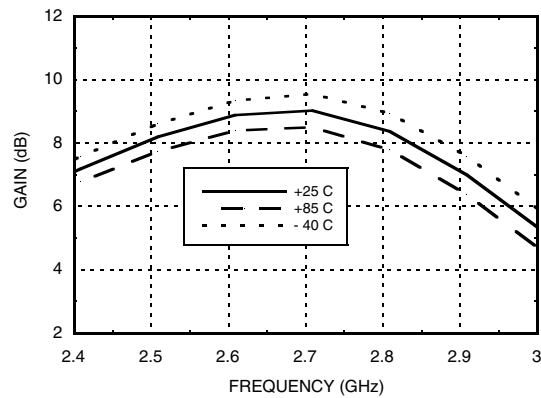
Broadband Gain & Return Loss @ 700 mA



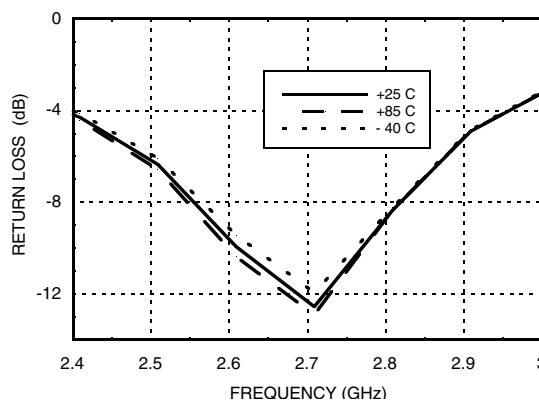
Gain vs. Temperature @ 400 mA



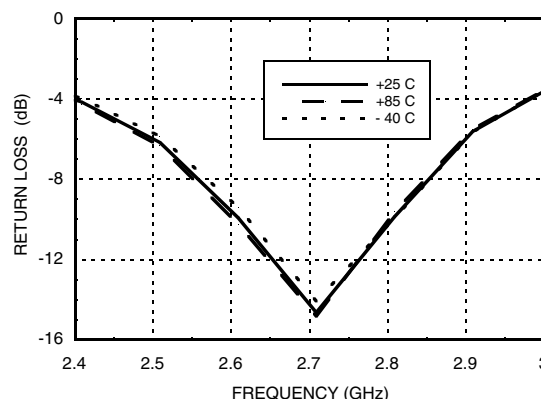
Gain vs. Temperature @ 700 mA



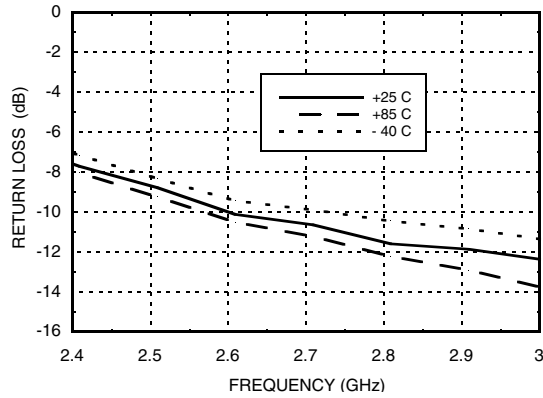
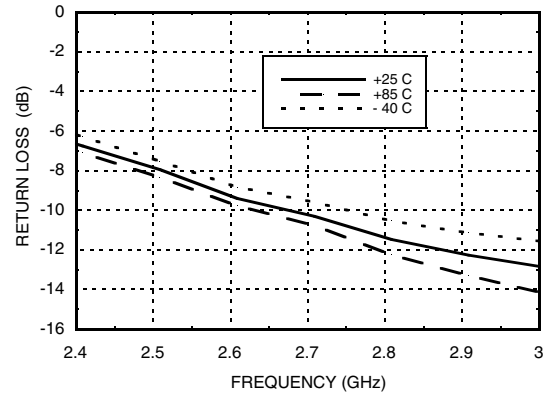
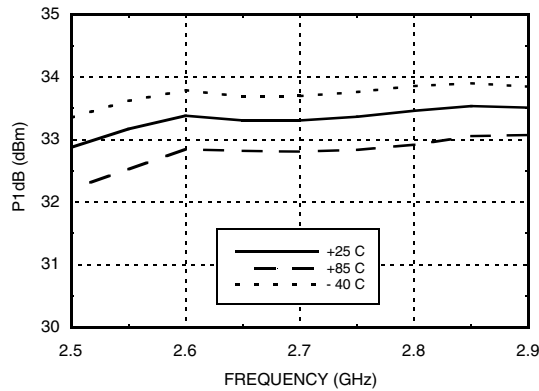
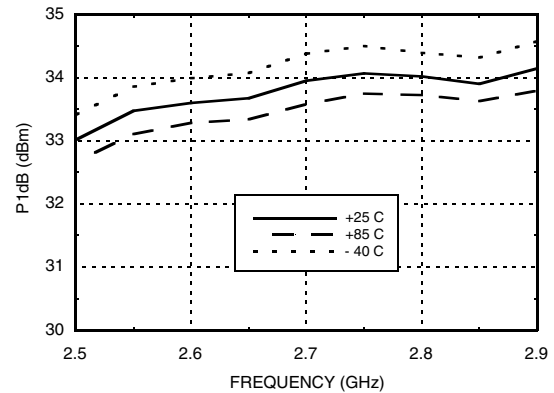
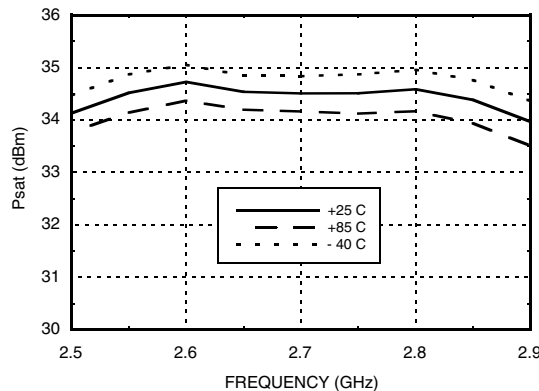
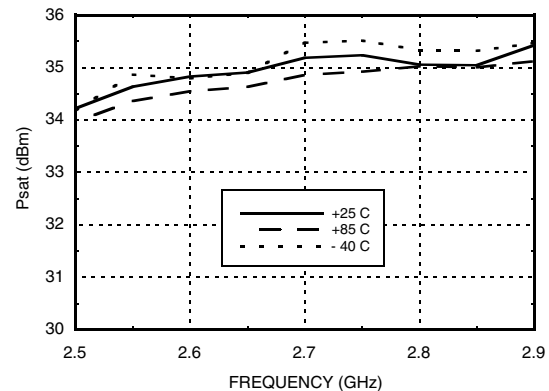
Input Return Loss @ 400 mA



Input Return Loss @ 700 mA



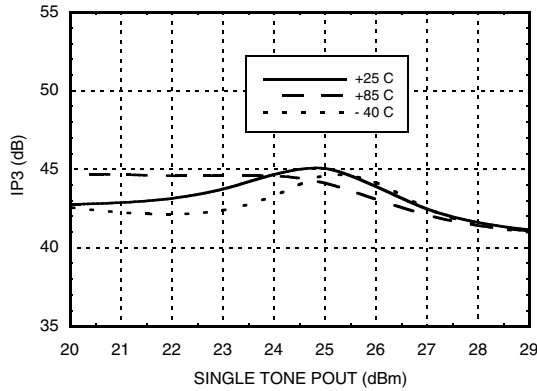
**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz
2700 MHz Tune**

Output Return Loss @ 400 mA

Output Return Loss @ 700 mA

P1dB vs. Temperature @ 400 mA

P1dB vs. Temperature @ 700 mA

Psat vs. Temperature @ 400 mA

Psat vs. Temperature @ 700 mA


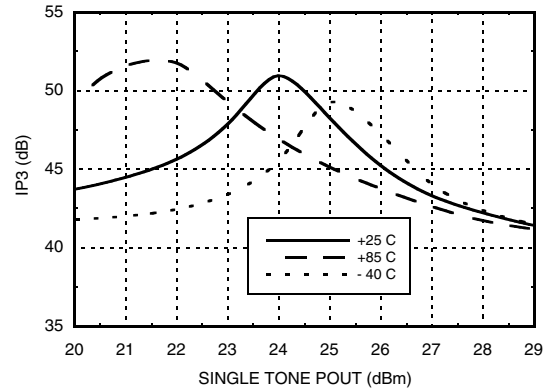


GaAs HBT MMIC 2 WATT POWER AMPLIFIER, 0.4 - 2.7 GHz 2700 MHz Tune

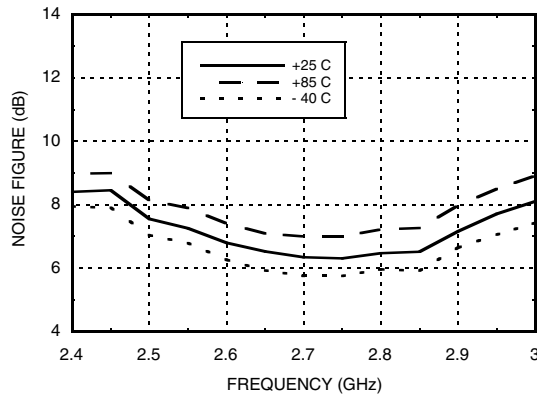
Output IP3 vs. Output Power @ 400 mA



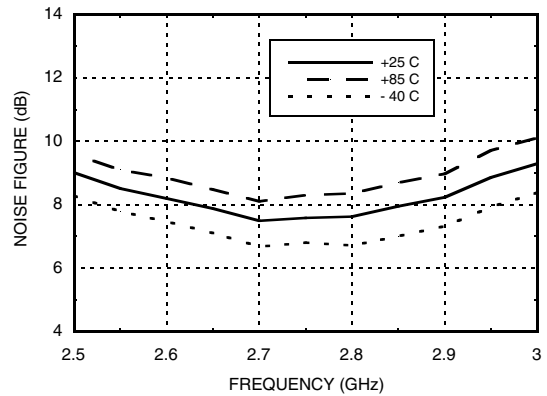
Output IP3 vs. Output Power @ 700 mA



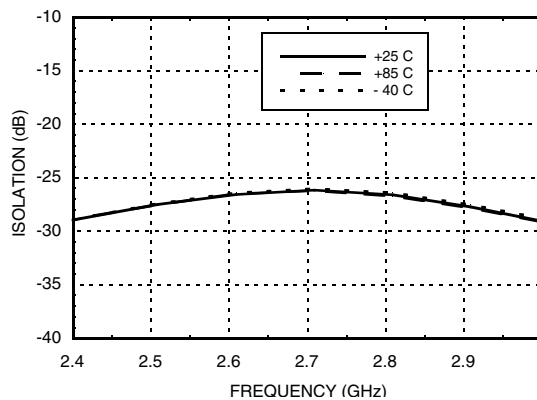
Noise Figure vs. Temperature @ 400 mA



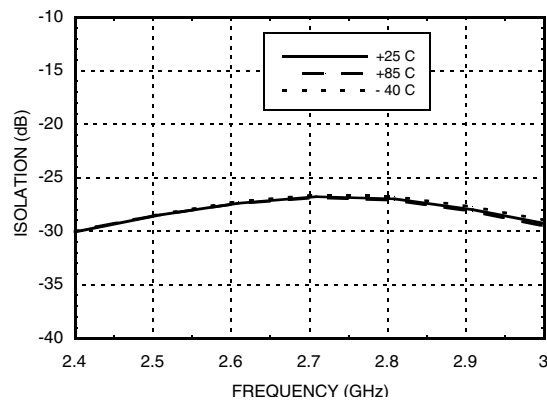
Noise Figure vs. Temperature @ 700 mA



Reverse Isolation vs. Temperature 400 mA

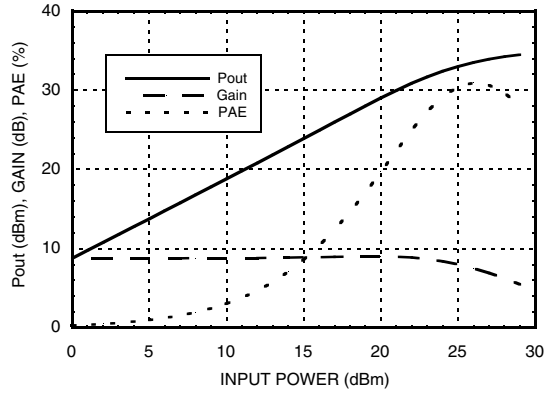
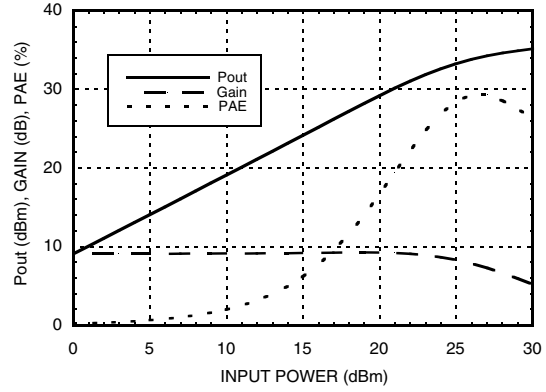


Reverse Isolation vs. Temperature 700 mA





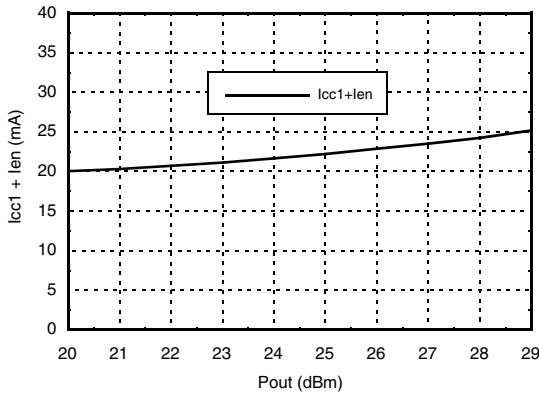
**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz
2700 MHz Tune**

Output IP3 vs. Output Power @ 400 mA

Output IP3 vs. Output Power @ 700 mA


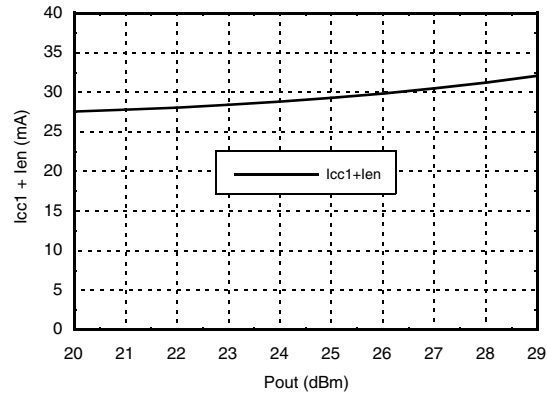


GaAs HBT MMIC 2 WATT POWER AMPLIFIER, 0.4 - 2.7 GHz

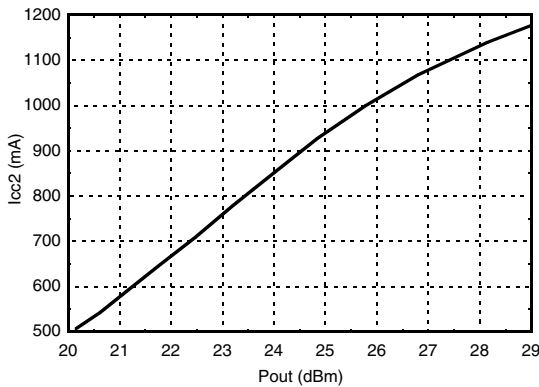
Icc1 + IEN vs. Output Power @ 400 mA



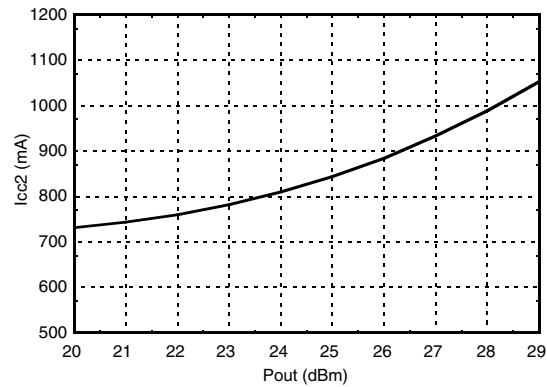
Icc1 + IEN vs. Output Power @ 700 mA



Icc2 vs. Output Power @ 400 mA



Icc2 vs. Output Power @ 700 mA



Absolute Maximum Ratings

| | |
|---|---|
| Collector Bias Voltage (Vcc1, Vcc2) | +5.5V |
| RF Input Power (RFIN) | +21 dBm @ 900 MHz +26 dBm @ 1900 MHz |
| Junction Temperature | 150 °C |
| Continuous P _{diss} (T = 85 °C) (derate 67.9 mW/°C above 85 °C) | 4.4 W |
| Thermal Resistance (junction to ground paddle) | 14.72 °C/W |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |
| ESD Sensitivity (HBM) | Class 1C |

Recommended Bias Resistor Value

Bias Current vs. R1, Ven = 5V

| Vcc1 = Vcc2 (V) | R1 (Ohms) | IEN + Icc1 + Icc2 (mA) |
|-----------------|-----------|------------------------|
| 5V | 270 | 420 |
| | 225 | 522 |
| | 175 | 625 |
| | 130 | 715 |

Bias Current vs. R1, Ven = 0V

| Vcc1 = Vcc2 (V) | R1 (Ohms) | IEN + Icc1 + Icc2 (mA) |
|-----------------|-----------|------------------------|
| 5V | 270 | 2.6 |
| | 225 | 2.6 |
| | 175 | 2.6 |
| | 130 | 2.6 |

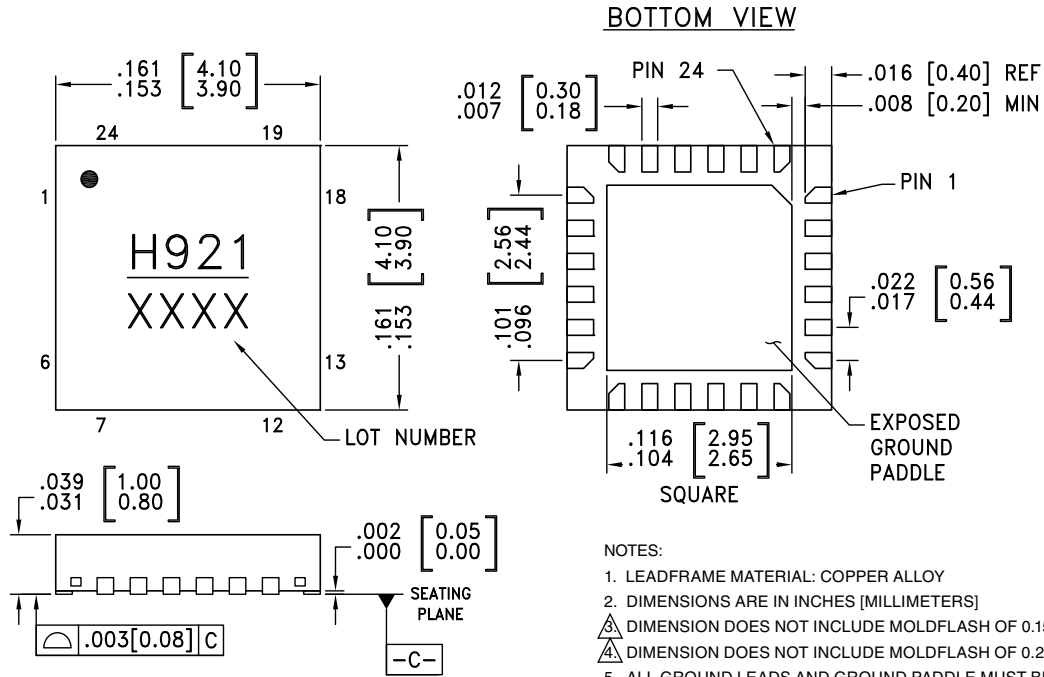


**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**



GaAs HBT MMIC 2 WATT POWER AMPLIFIER, 0.4 - 2.7 GHz

Outline Drawing



Package Information

| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking ^[1] |
|-------------|--|---------------|---------------------|--------------------------------|
| HMC921LP4E | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 ^[2] | H921 XXXX |

[1] 4-Digit lot number XXXX

[2] Max peak reflow temperature of 260 °C

Pin Descriptions

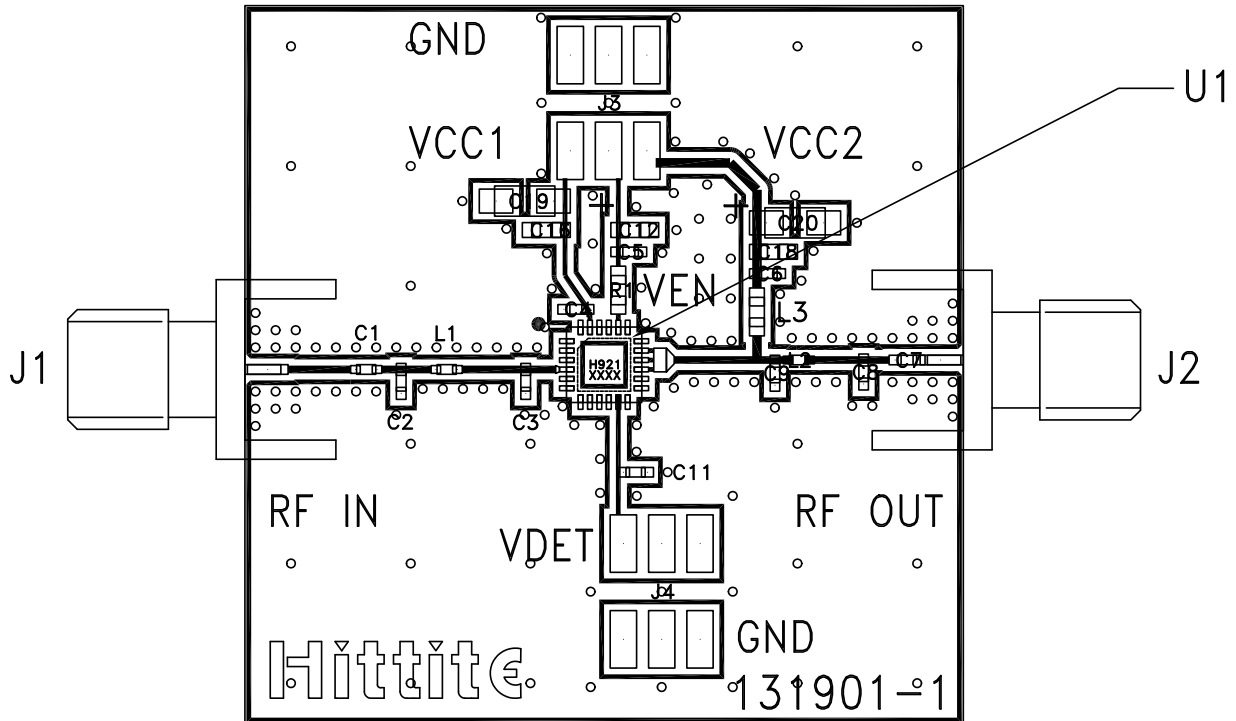
| Pin Number | Function | Description | Interface Schematic |
|--|--------------|--|---------------------|
| 1 - 3, 6 - 10, 12 - 14, 18, 19, 21, 22, 24 | N/C | The pins are not connected internally; however, all data shown herein was measured with these pins connected to RF/DC ground externally. | |
| 4 | RFIN | This pin is DC coupled. Off chip matching components are required. See Application Circuit herein. | |
| 15 - 17 | RFOUT / Vcc2 | RF output and DC Bias input for the amplifier. Off chip matching components are required. See Application Circuit herein. | |
| 5 | GND | These pins & package bottom must be connected to RF/DC ground. | |
| 11 | VDET | DC voltage output proportional to RFOUT signal. | |
| 20 | VEN | Power control pin. This voltage can be reduced or R1 resistor value increased to reduce quiescent current. For full power down, apply < 0.5V | |
| 23 | Vcc1 | DC power supply pin for bias circuitry | |

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

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

450 MHz Evaluation PCB



List of Materials for 450 MHz Evaluation PCB 131903 [1]

| Item | Description |
|---------------|------------------------------|
| J1, J2 | SMA Connector |
| J3, J4 | DC Pin |
| C1, C9 | 30 pF Capacitor, 0402 Pkg. |
| C2 | 15 pF Capacitor, 0402 Pkg. |
| C3 | 27 pF Capacitor, 0402 Pkg. |
| C4 - C6, C11 | 100 pF Capacitor, 0402 Pkg. |
| C9, C20 | 2.2 uF Capacitor, Case A |
| C12, C16, C18 | 1000 pF Capacitor, 0402 Pkg. |
| R1 | 130 ohms Resistor, 0603 Pkg. |
| L1 | 3.6 nH Inductor, 0402 Pkg. |
| L2 | 4.7 nH Inductor, 0402 Pkg. |
| L3 | 150 nH Inductor, 0603 Pkg. |
| U1 | HMC921LP4E Amplifier |
| PCB [2] | 131901 Evaluation PCB |

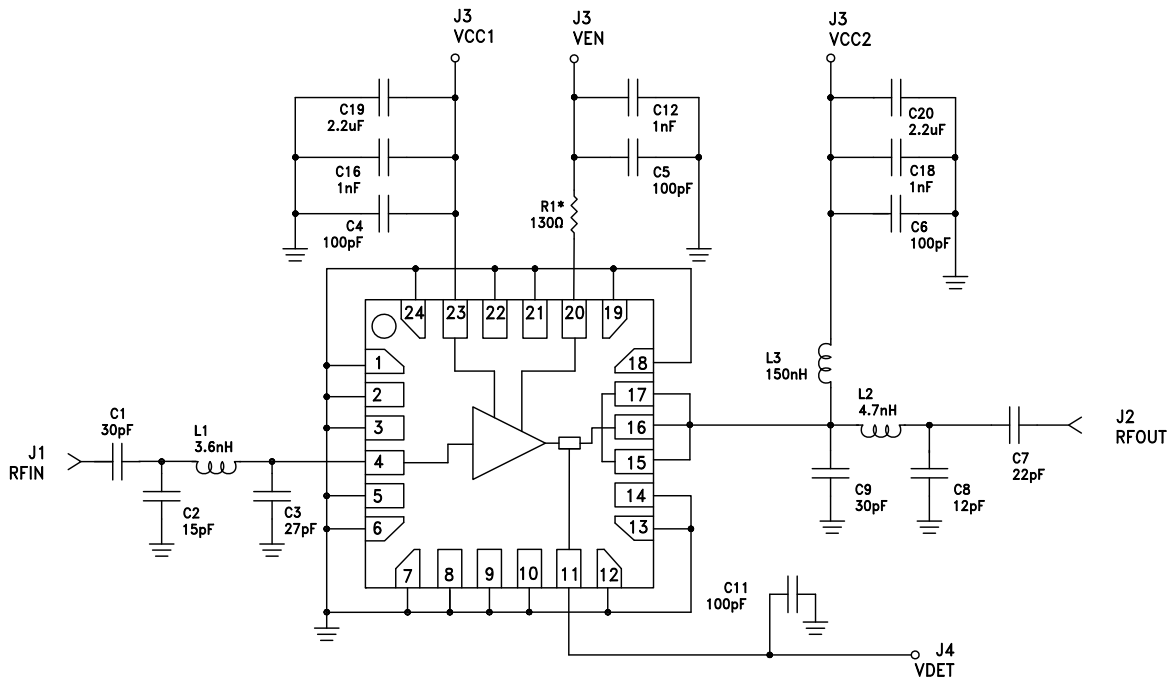
[1] Reference this number when ordering complete evaluation PCB

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

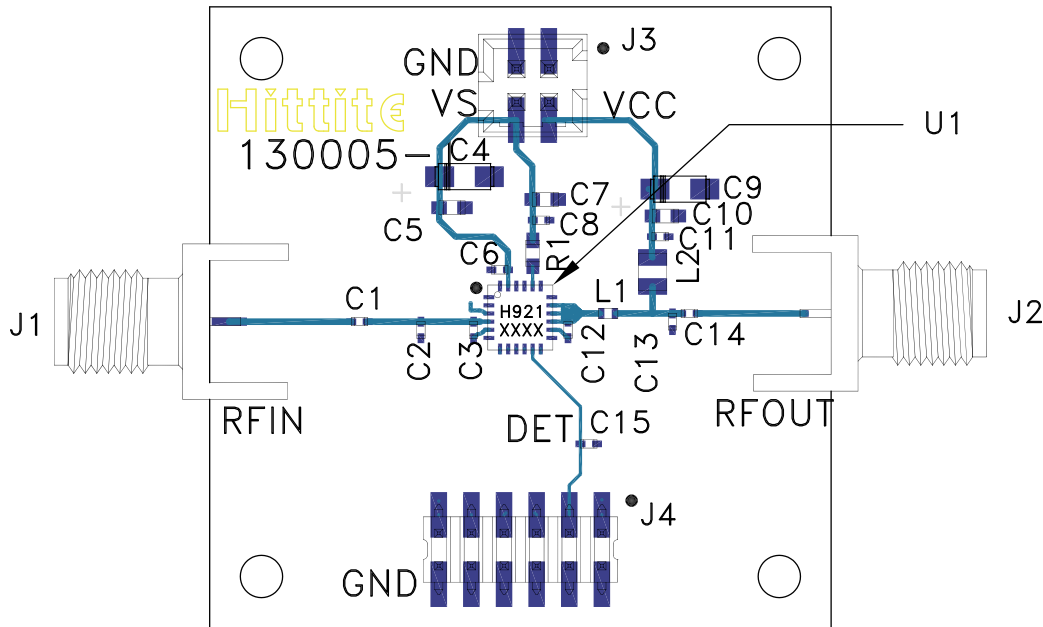
The circuit board used in this application should use RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect 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.

450 MHz Application Circuit

This circuit was used to specify the performance for 350 - 500 MHz operation. Contact the HMC Applications Group for assistance in optimizing performance for your application.



* R1 = 130 Ohms for 700 mA bias, 270 Ohms for 400 mA bias.

900 MHz Evaluation PCB

List of Materials for 900 MHz Evaluation PCB 130007 [1]

| Item | Description |
|-----------------------|---------------------------------|
| J1 - J2 | PCB Mount SMA Connector |
| J3 - J4 | 2 mm DC Header |
| C1 | 22 pF Capacitor, 0402 Pkg. |
| C2 | 7.5 pF Capacitor, 0402 Pkg. |
| C3 | 5.6 pF Capacitor, 0402 Pkg. |
| C4, C9 | 2.2 μ F Capacitor, Tantalum |
| C5, C7, C10 | 1000 pF Capacitor, 0603 Pkg. |
| C6, C8, C11, C14, C15 | 100 pF Capacitor, 0402 Pkg. |
| C12, C13 | 8.2 pF Capacitor, 0402 Pkg. |
| L1 | 0.78 nH Inductor, 0402 Pkg. |
| L2 | 48 nH Inductor, 0402 Pkg. |
| R1 | 130 Ohms Resistor, 0603 Pkg. |
| U1 | HMC921LP4E Linear Amplifier |
| PCB [2] | 130005 Evaluation PCB |

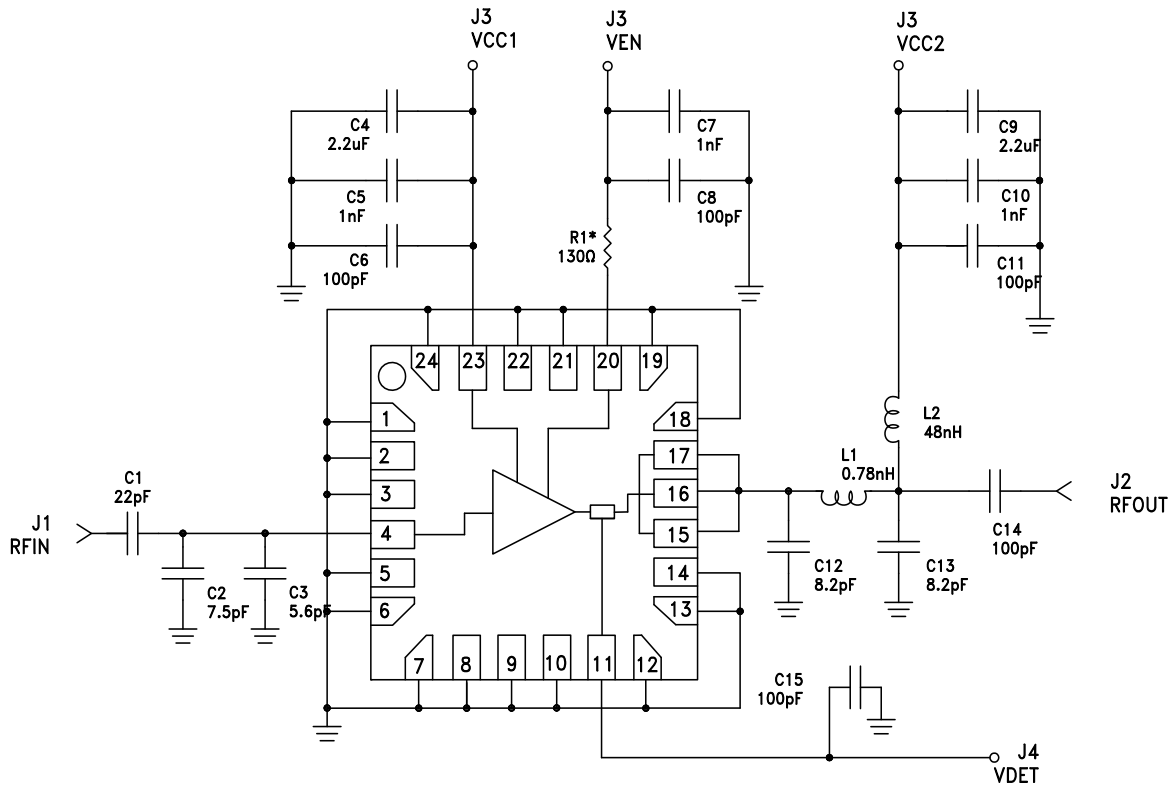
[1] Reference this number when ordering complete evaluation PCB

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

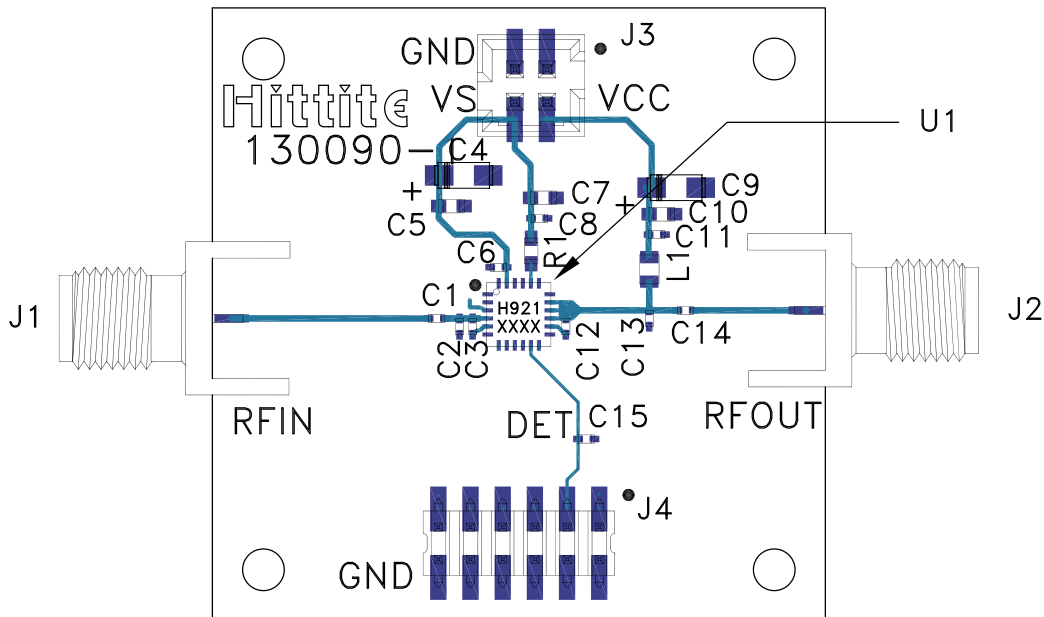
The circuit board used in this application should use RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect 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.


**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz**
900 MHz Application Circuit

This circuit was used to specify the performance for 800 - 1000 MHz operation. Contact the HMC Applications Group for assistance in optimizing performance for your application.



* R1 = 130 Ohms for 700 mA bias, 270 Ohms for 400 mA bias.

1900 MHz Evaluation PCB

List of Materials for 1900 MHz Evaluation PCB 130008 [1]

| Item | Description |
|-----------------------|---------------------------------|
| J1 - J2 | PCB Mount SMA Connector |
| J3 - J4 | 2 mm DC Header |
| C1 | 0.9 pF Capacitor, 0402 Pkg. |
| C2 | 0.9 pF Capacitor, 0402 Pkg. |
| C3 | 1.8 pF Capacitor, 0402 Pkg. |
| C4, C9 | 2.2 μ F Capacitor, Tantalum |
| C5, C7, C10 | 1000 pF Capacitor, 0603 Pkg. |
| C6, C8, C11, C14, C15 | 100 pF Capacitor, 0402 Pkg. |
| C12 | 3.6 pF Capacitor, 0402 Pkg. |
| C13 | 2.7 pF Capacitor, 0402 Pkg. |
| L1 | 18 nH Inductor, 0402 Pkg. |
| R1 | 130 Ohms Resistor, 0603 Pkg. |
| U1 | HMC921LP4E Linear Amplifier |
| PCB [2] | 130090 Evaluation PCB |

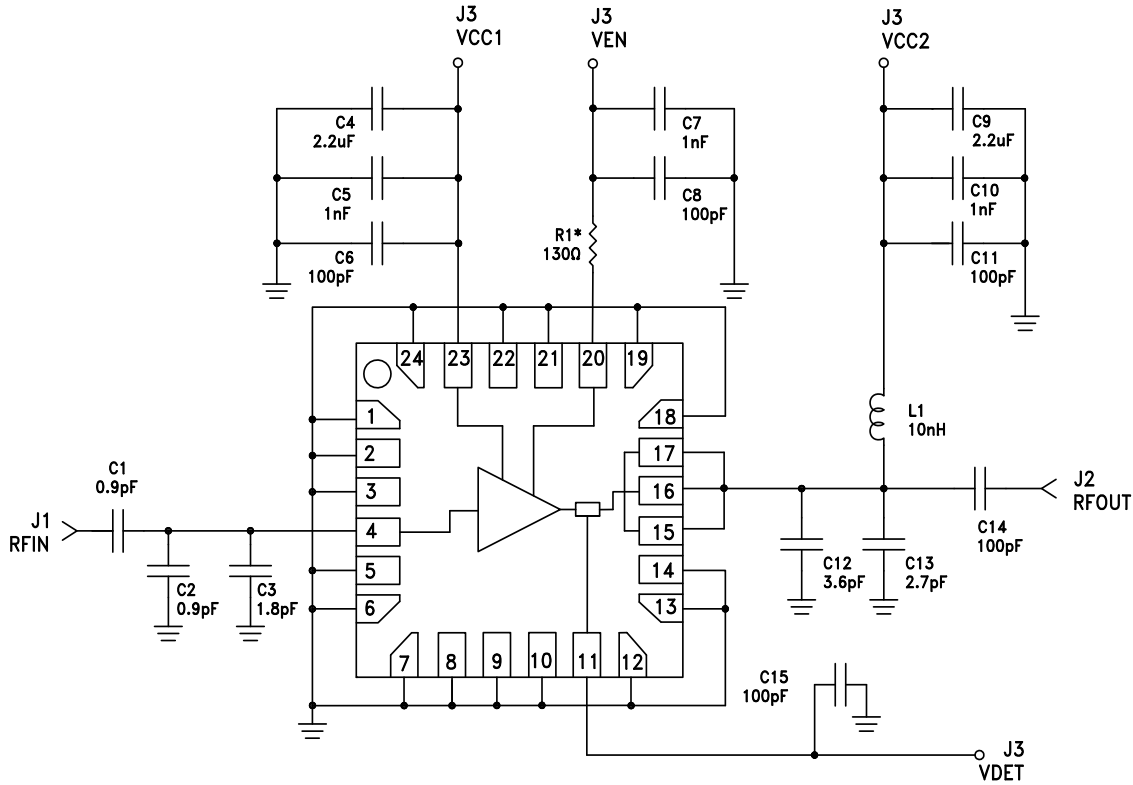
[1] Reference this number when ordering complete evaluation PCB

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

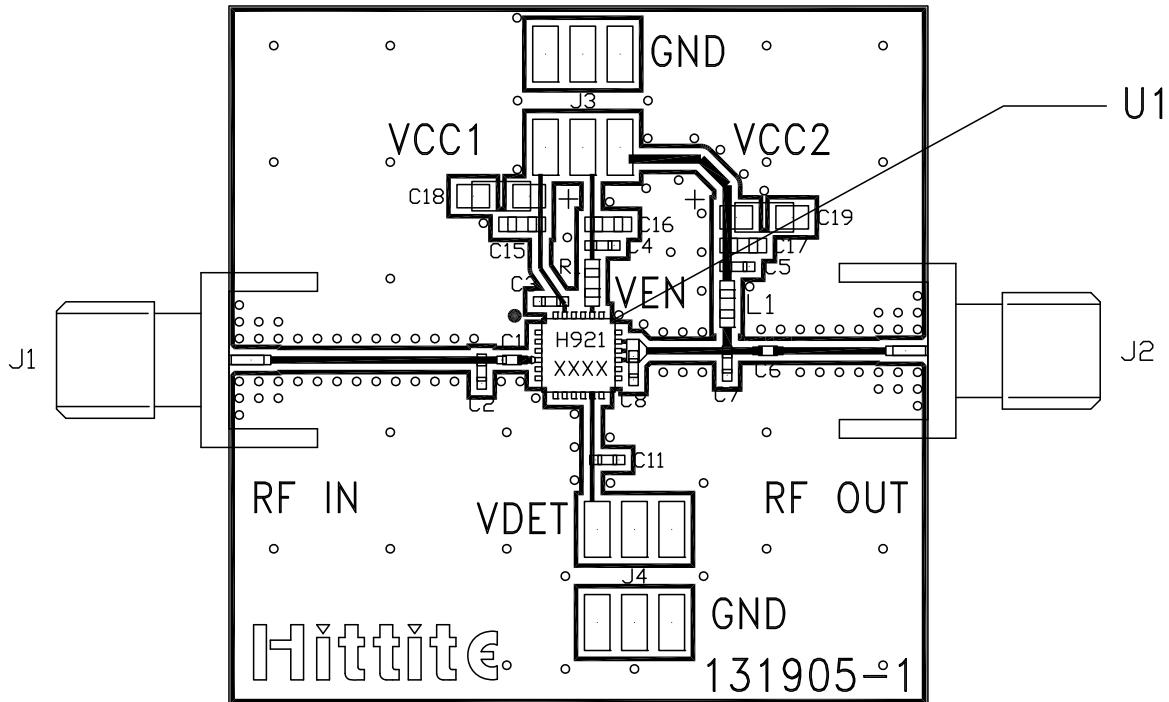
The circuit board used in this application should use RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect 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.


**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz**
1900 MHz Application Circuit

This circuit was used to specify the performance for 1800 - 2000 MHz operation. Contact the HMC Applications Group for assistance in optimizing performance for your application.



* R1 = 130 Ohms for 700 mA bias, 270 Ohms for 400 mA bias.

2150 MHz Evaluation PCB

List of Materials for 2150 MHz Evaluation PCB 131924 [1]

| Item | Description |
|---------------|------------------------------|
| J1, J2 | SMA Connector |
| J3, J4 | DC Pin |
| C1 | 3.9 pF Capacitor, 0402 Pkg. |
| C2, C8 | 4.3 pF Capacitor, 0402 Pkg. |
| C7 | 1.8 pF Capacitor, 0402 Pkg. |
| C3 - C6, C11 | 100 pF Capacitor, 0402 Pkg. |
| C15, C16, C17 | 1000 pF Capacitor, 0402 Pkg. |
| C18, C19 | 2.2 uF Capacitor, Case A. |
| R1 | 130 ohms Resistor, 0603 Pkg. |
| L1 | 10 nH Inductor, 0603 Pkg. |
| U1 | HMC921LP4E Amplifier |
| PCB [2] | 131905 Evaluation PCB |

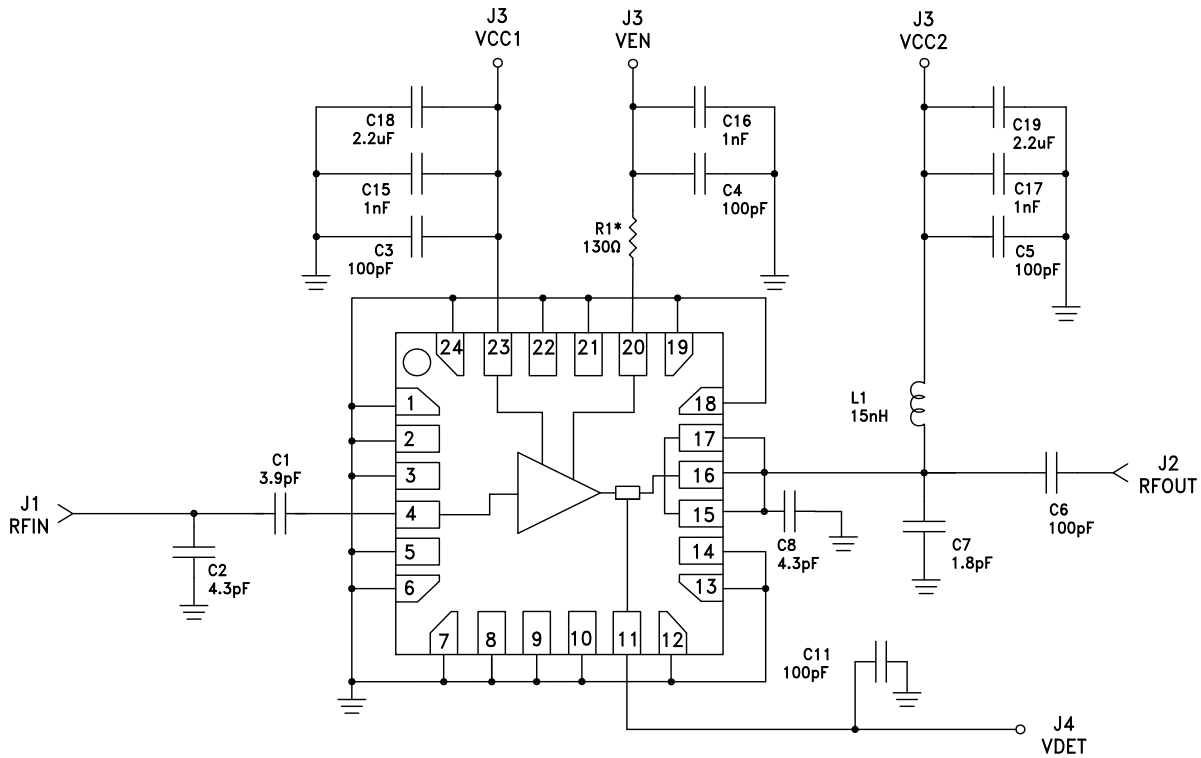
[1] Reference this number when ordering complete evaluation PCB

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

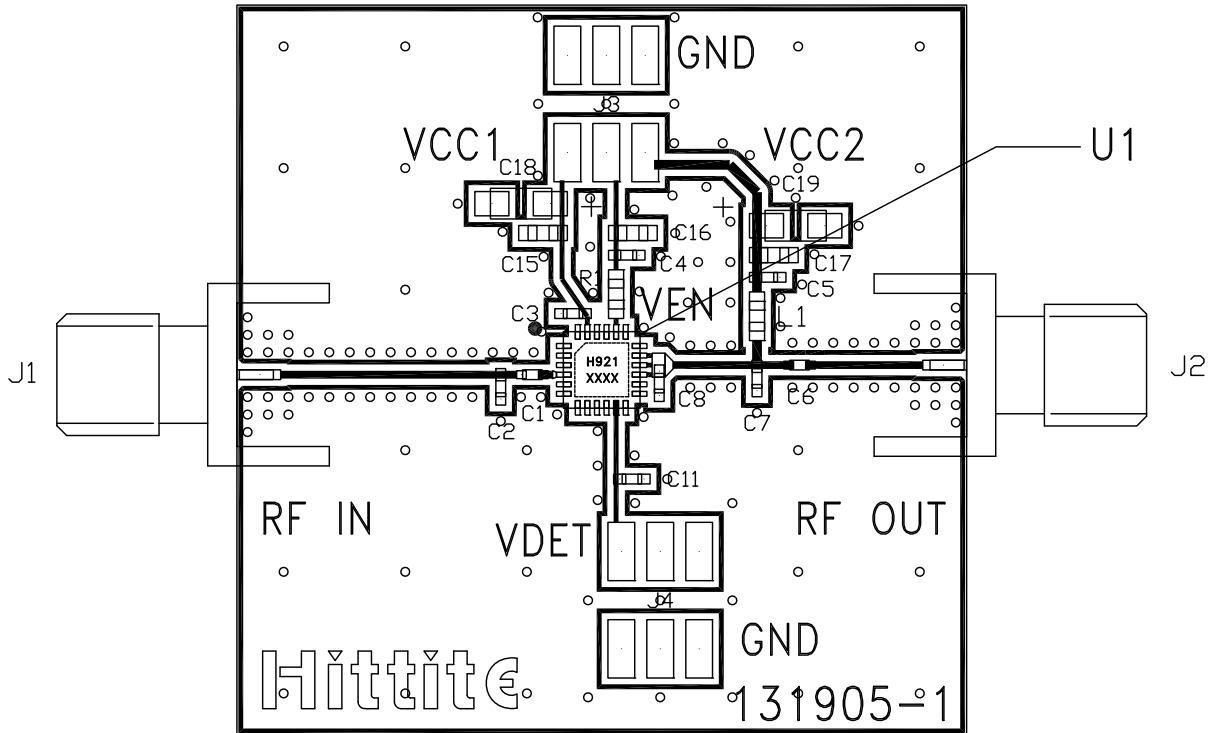
The circuit board used in this application should use RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect 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.


2150 MHz Application Circuit

This circuit was used to specify the performance for 2000 - 2200 MHz operation. Contact the HMC Applications Group for assistance in optimizing performance for your application.



* R1 = 130 Ohms for 700 mA bias, 270 Ohms for 400 mA bias.

2700 MHz Evaluation PCB

List of Materials for 2700 MHz Evaluation PCB 131907 [1]

| Item | Description |
|---------------|------------------------------|
| J1, J2 | SMA Connector |
| J3, J4 | DC Pin |
| C1, C2 | 2.4 pF Capacitor, 0402 Pkg. |
| C7 | 1.3 pF Capacitor, 0402 Pkg. |
| C3 - C6, C11 | 100 pF Capacitor, 0402 Pkg. |
| C15, C16, C17 | 1000 pF Capacitor, 0402 Pkg. |
| C18, C19 | 2.2 uF Capacitor, Case A. |
| R1 | 130 ohms Resistor, 0603 Pkg. |
| L1 | 10 nH Inductor, 0603 Pkg. |
| U1 | HMC921LP4E Amplifier |
| PCB [2] | 131905 Evaluation PCB |

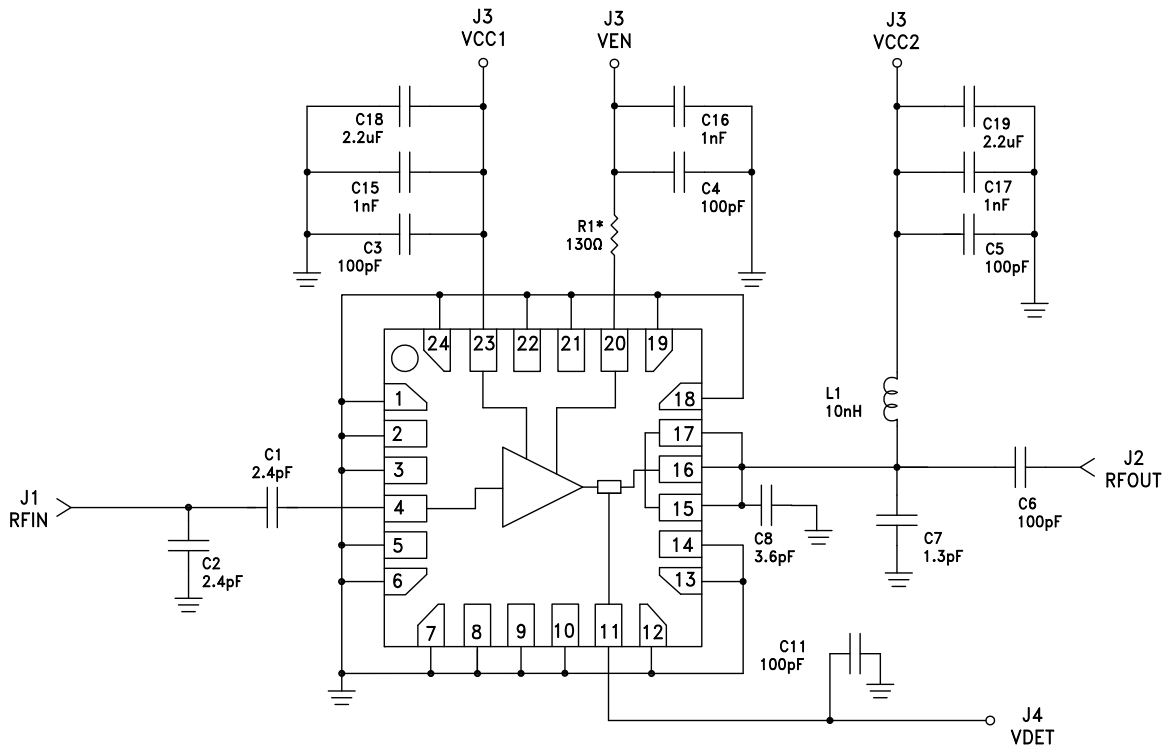
[1] Reference this number when ordering complete evaluation PCB

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

The circuit board used in 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.

2700 MHz Application Circuit

This circuit was used to specify the performance for 2500 - 2800 MHz operation. Contact the HMC Applications Group for assistance in optimizing performance for your application.



* R1 = 130 Ohms for 700 mA bias, 270 Ohms for 400 mA bias.



**GaAs HBT MMIC 2 WATT
POWER AMPLIFIER, 0.4 - 2.7 GHz**

Notes:

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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