

ULTRA LOW PHASE NOISE AMPLIFIER, 6 - 12 GHz

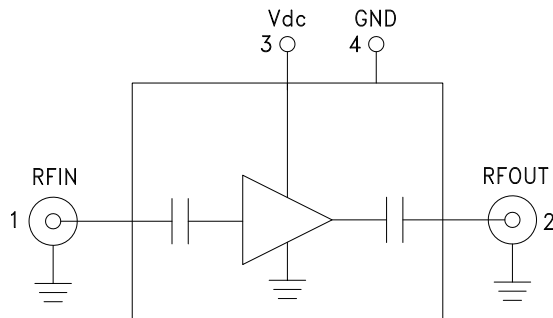


Typical Applications

The HMC-C072 is ideal for:

- Microwave Radio
- Military & Space
- Test Instrumentation
- VSAT

Functional Diagram



Features

- Ultra Low Phase Noise: -167 dBc/Hz @ 1 kHz
- Noise Figure: 4.5 dB
- Gain: 11 dB
- Psat: 22 dBm
- 50 Ohm Matched Input/Output
- Single Supply Voltage: +7V @ 170mA
- Hermetically Sealed Module
- Field Replaceable SMA Connectors
- 55 °C to +85 °C Operating Temperature

General Description

The HMC-C072 is a GaAs HBT Ultra Low Noise Amplifier in a miniature, hermetic module designed to operate between 6 and 12 GHz. This high dynamic range amplifier module provides 11 dB of gain, 4.5 dB noise figure and up to 23 dB of output power with a single supply of +7V. The ultra low phase noise contribution of -167 dBc/Hz at 1 kHz offset, enables superior modulation accuracy within transceiver architectures. The wideband distributed amplifier I/O's are internally matched to 50 Ohms and DC blocked for robust performance. The module features removable SMA connectors which can be detached to allow direct connection of the I/O pins to a microstrip or coplanar circuit.

Electrical Specifications, $T_A = +25\text{ }^\circ\text{C}$, $V_{dc} = +7V$

| Parameter | Min. | Typ. | Max. | Units |
|--|------|--------|------|--------|
| Frequency Range | | 6 - 12 | | GHz |
| Gain | 9 | 11 | | dB |
| Gain Flatness | | ±1 | | dB |
| Gain Variation Over Temperature | | 0.015 | | dB/ °C |
| Noise Figure | | 4.5 | | dB |
| Input Return Loss | | 15 | | dB |
| Output Return Loss | | 15 | | dB |
| Output Power for 1 dB Compression (P1dB) | 17 | 20 | | dBm |
| Saturated Output Power (Psat) | | 22 | | dBm |
| Output Third Order Intercept (IP3) | | 34 | | dBm |
| Phase Noise @ 100 Hz, Psat, 10 GHz | | -157 | | dBc/Hz |
| Phase Noise @ 1 kHz, Psat, 10 GHz | | -167 | | dBc/Hz |
| Phase Noise @ 10 kHz, Psat, 10 GHz | | -176 | | dBc/Hz |
| Phase Noise @ 100 kHz, Psat, 10 GHz | | -180 | | dBc/Hz |
| Supply Current | | 170 | 200 | mA |

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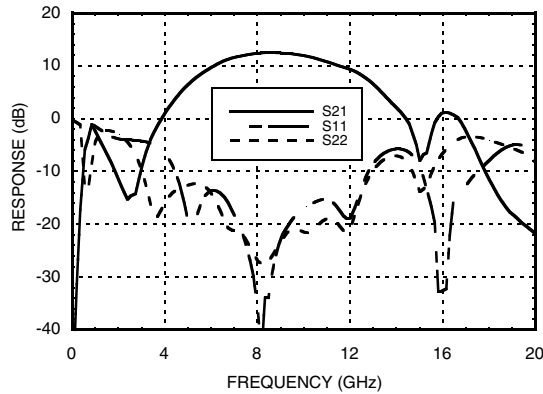
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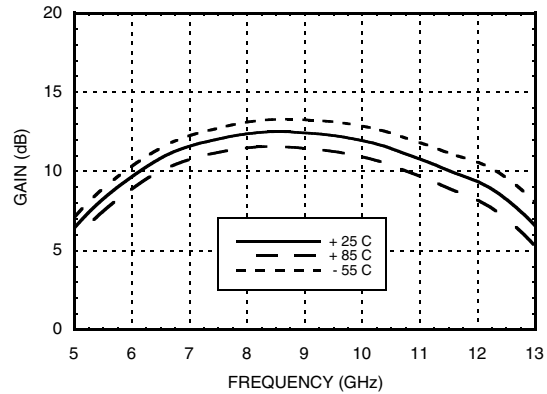


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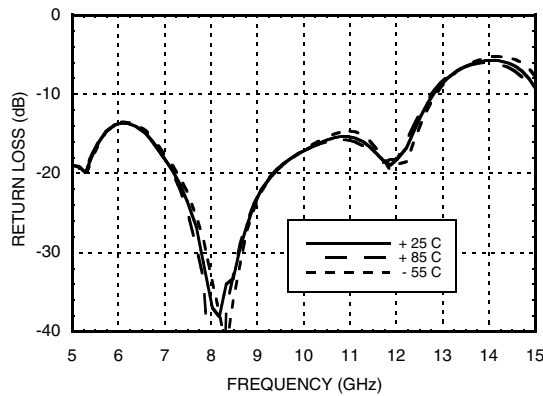
Gain & Return Loss



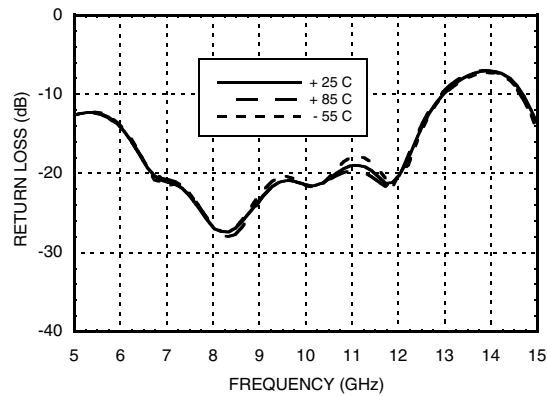
Gain vs. Temperature



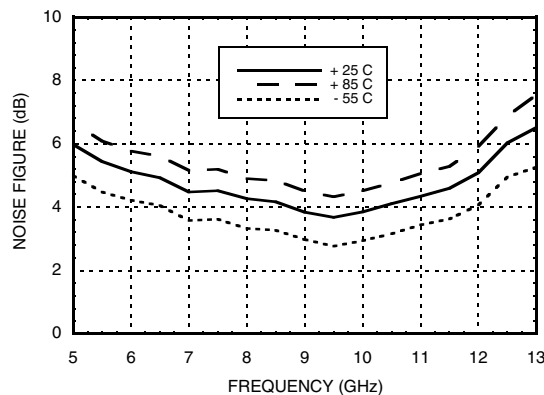
Input Return Loss vs. Temperature



Output Return Loss vs. Temperature



Noise Figure vs. Temperature



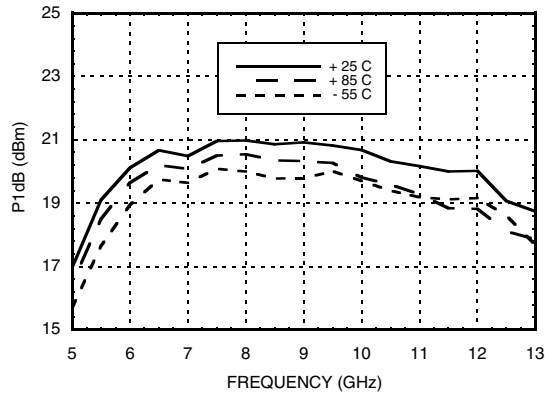
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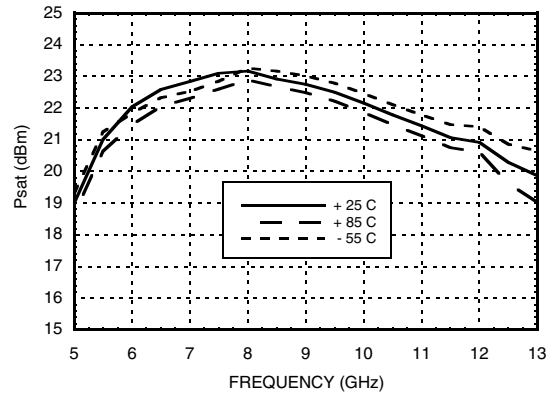


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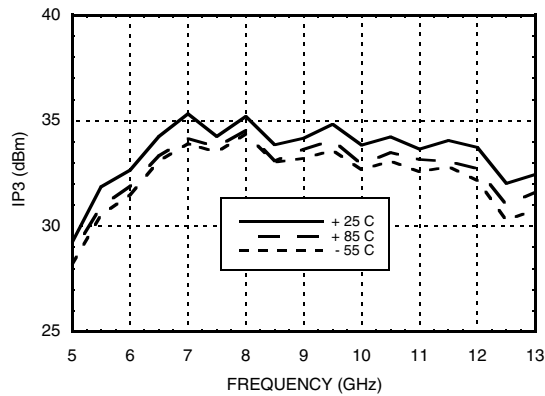
Output P1dB vs. Temperature



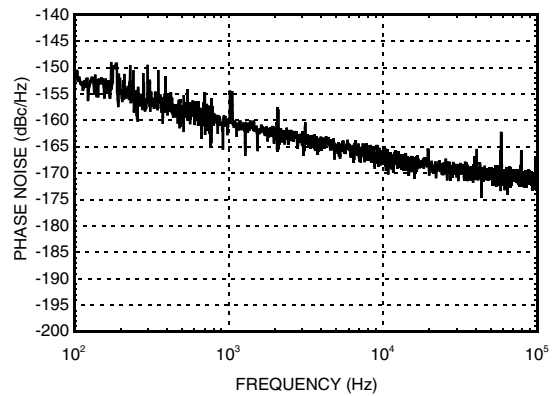
Output Psat vs. Temperature



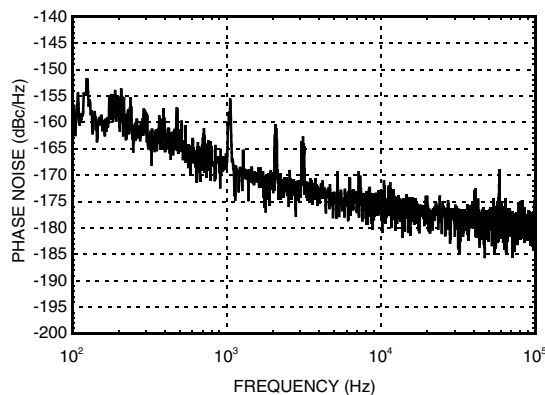
Output IP3 vs. Temperature



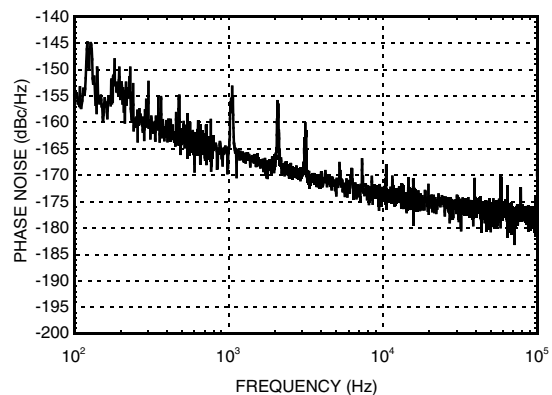
Phase Noise at Pout = 10 dBm @ 10 GHz



Phase Noise at Pout = P1dB @ 10 GHz



Phase Noise at Pout = Psat @ 10 GHz



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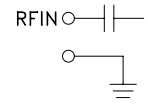
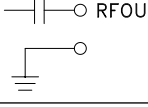
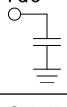

Absolute Maximum Ratings

| | |
|------------------------------|----------------|
| Bias Supply Voltage (Vdc) | +8V |
| RF Input Power (RFIN) | +15 dBm |
| Continuous Pdiss (T = 85 °C) | 1.62W |
| Channel Temperature | 135 °C |
| Thermal Resistance | 20 °C/W |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -55 to +85 °C |



ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

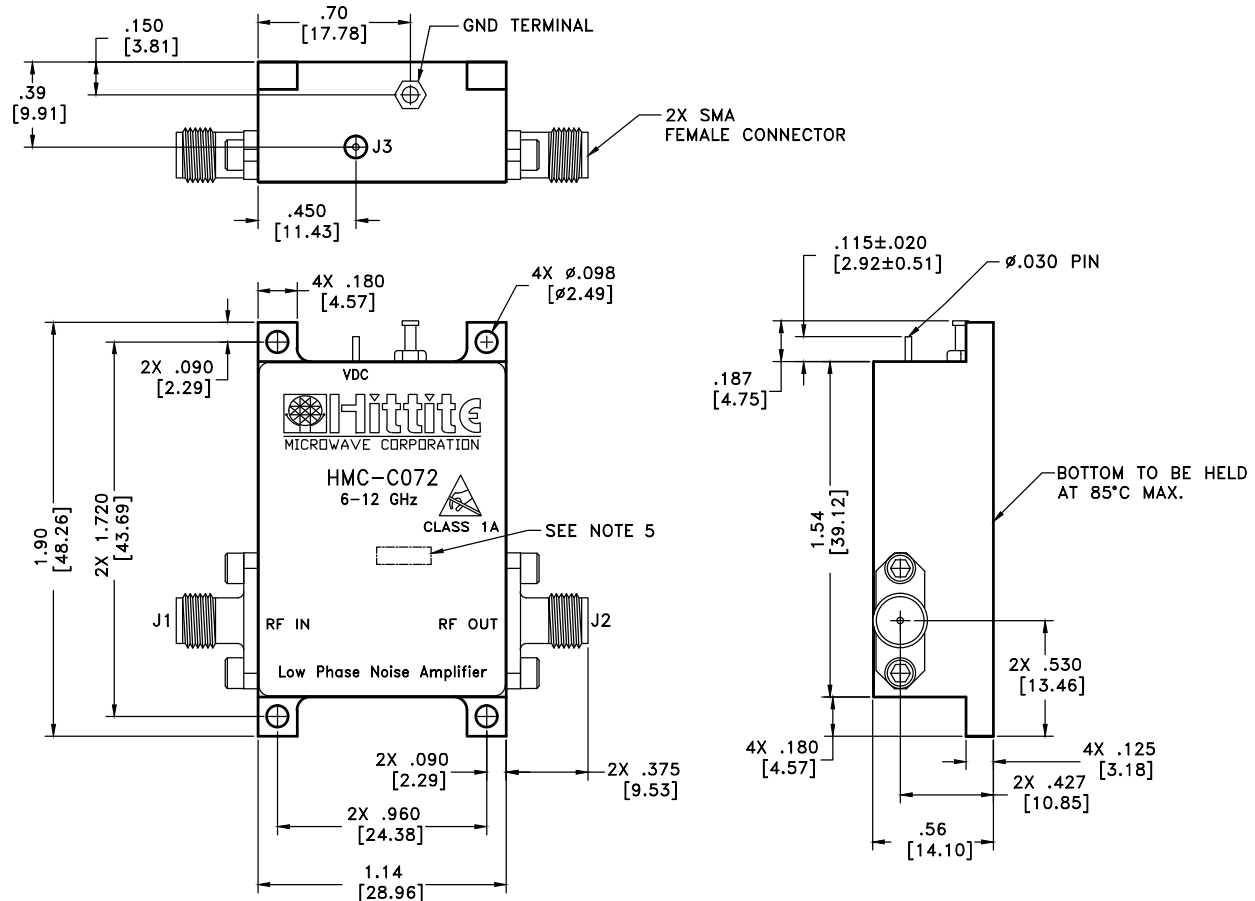
Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|------------|----------------------|---|---|
| 1 | RFIN & RF Ground | RF input connector, coaxial female, field replaceable. This pin is AC coupled and matched to 50 Ohms. |  |
| 2 | RFOUT & RF Ground | RF output connector, coaxial female, field replaceable. This pin is AC coupled and matched to 50 Ohms. |  |
| 3 | Vdc | Power supply voltage for the amplifier. (+7V to +8V) |  |
| 4 | GND | Power supply ground. |  |



**ULTRA LOW PHASE NOISE
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Outline Drawing



Package Information

| | |
|----------------|------------------------|
| Package Type | C-16 |
| Package Weight | 107 gms ^[1] |

[1] ±1 gms Tolerance

NOTES:

1. PACKAGE, LEADS, COVER MATERIAL: KOVAR™
2. FINISH: GOLD PLATE OVER NICKEL PLATE.
3. ALL DIMENSIONS ARE IN INCHES [MILLIMETERS].
4. TOLERANCES:
 - 4.1 .XX = ±.02
 - 4.2 .XXX = ±.010
5. MARK LOT NUMBER ON 0.080 X 0.250 LABEL WHERE SHOWN, WITH 0.030° MIN TEXT HEIGHT.

**Notes:**

v04.0711

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