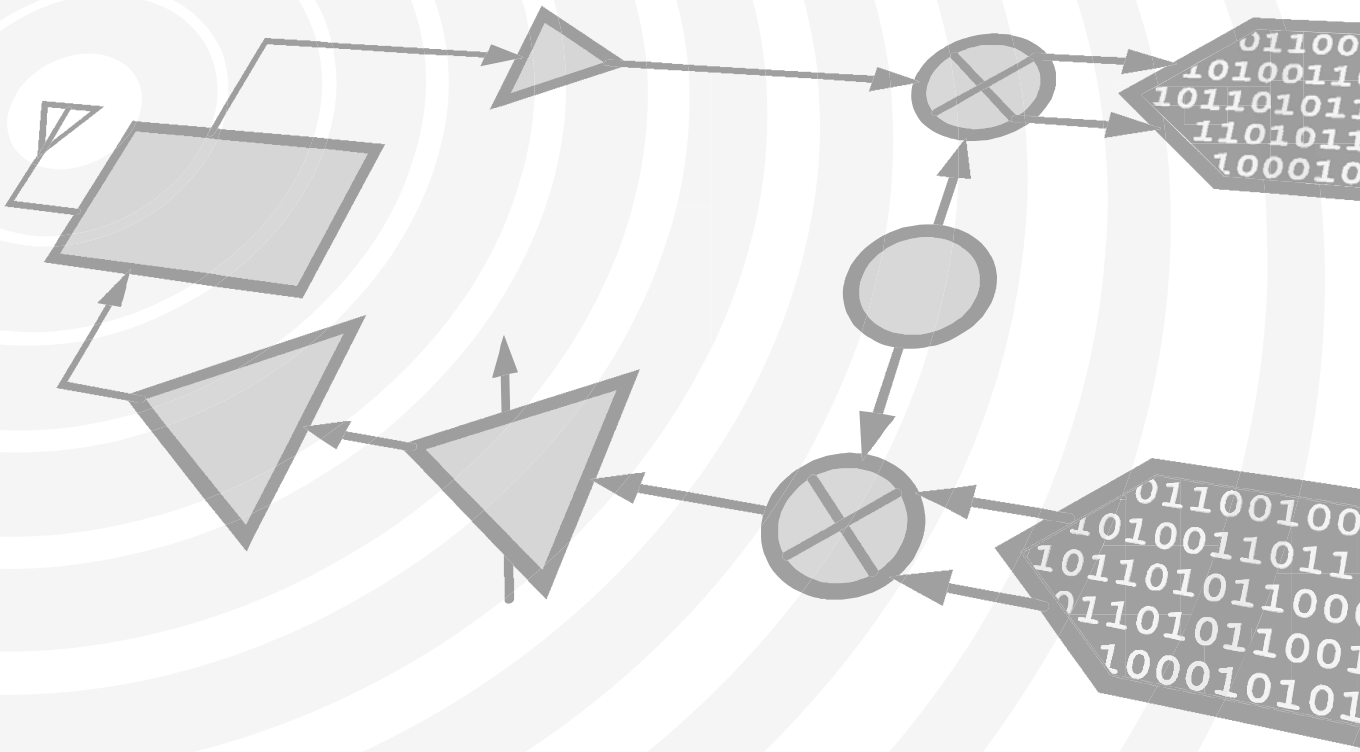
ANALOG DEVICES

Hittite MICROWAVE PRODUCTS FROM ANALOG DEVICES

# Analog Devices Welcomes Hittite Microwave Corporation

**NO CONTENT ON THE ATTACHED DOCUMENT HAS CHANGED**



www.analog.com

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Hittite MICROWAVE CORPORATION v03.0310

# HMC-C020

## WIDEBAND POWER AMPLIFIER MODULE, 17 - 24 GHz


## Typical Applications

The HMC-C020 Wideband PA is ideal for:

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

## Features

Gain: 22 dB

P1dB Output Power: +24 dBm

Noise Figure: 3.5 dB

Spurious-Free Operation

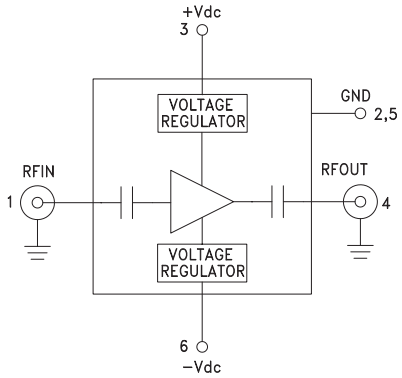
Regulated Supply and Bias Sequencing

Hermetically Sealed Module

Field Replaceable 2.92mm connectors

-55 °C to +85 °C Operating Temperature

## Functional Diagram




## General Description

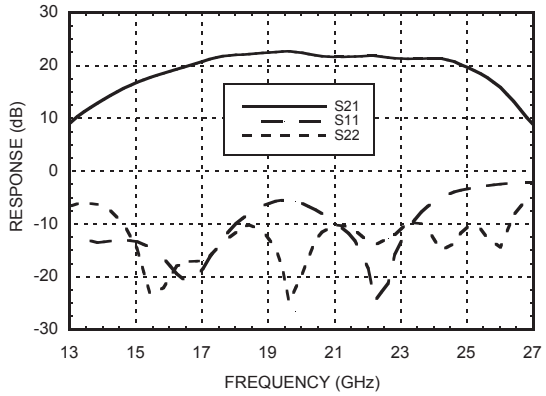
The HMC-C020 is a GaAs MMIC PHEMT Power Amplifier in a miniature, hermetic module with replaceable 2.92mm connectors which operates between 17 and 24 GHz. The amplifier provides 22 dB of gain, 3.5 dB noise figure, +33 dBm output IP3 and up to +24 dBm of output power at 1 dB gain compression. The wideband amplifier I/Os are internally matched to 50 Ohms and are DC blocked making the HMC-C020 ideal for EW, ECM RADAR and test equipment applications. Integrated voltage regulators allow for flexible biasing of both the negative and positive supply pins, while internal bias sequencing circuitry assures robust operation.

## Electrical Specifications, $T_A$ = +25° C, +Vdc = +8V to +15V, -Vdc = -4V to -10V*

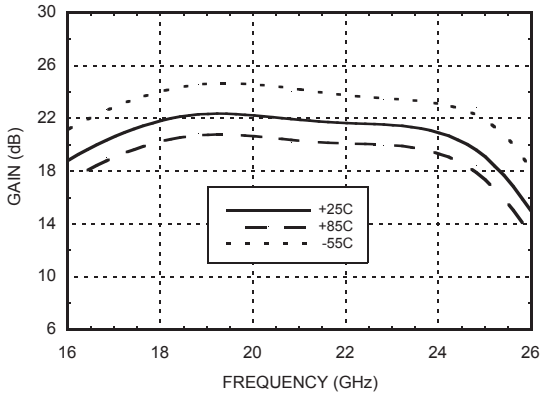
| Parameter | Min. | Typ. | Max. | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|
| Frequency Range | | 17 - 20 | | | 20 - 24 | | GHz |
| Gain | 19 | 22 | 24 | 19 | 22 | 24 | dB |
| Gain Flatness | | ±1.0 | | | ±0.5 | | dB |
| Gain Variation Over Temperature | | -0.03 | -0.04 | | -0.03 | -0.04 | dB/ °C |
| Noise Figure | | 3.5 | 5.5 | | 4.5 | 6.5 | dB |
| Input Return Loss | | 7 | | | 7 | | dB |
| Output Return Loss | | 10 | | | 10 | | dB |
| Output Power for 1 dB Compression (P1dB) | 20 | 23 | | 20 | 24 | | dBm |
| Saturated Output Power (Psat) | | 25 | | | 26 | | dBm |
| Output Third Order Intercept (IP3) | | 33 | | | 33 | | dBm |
| Positive Supply Current (+IDC) | | 250 | | | 250 | | mA |
| Negative Supply Current (-IDC) | | 5.2 | | | 5.2 | | mA |

* Data recorded at +Vdc = +12V and - Vdc = -5V

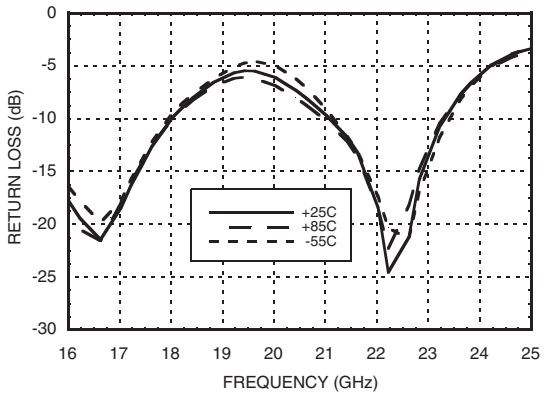
### Gain & Return Loss



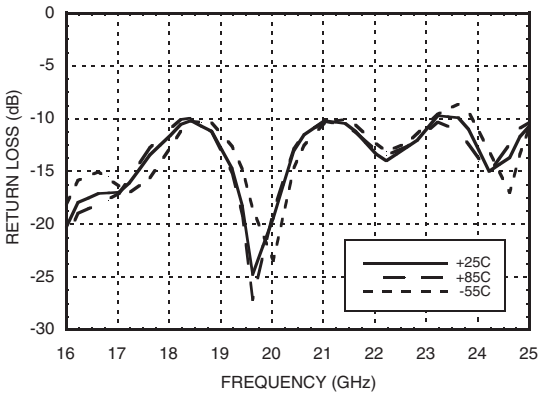

### Gain vs. Temperature



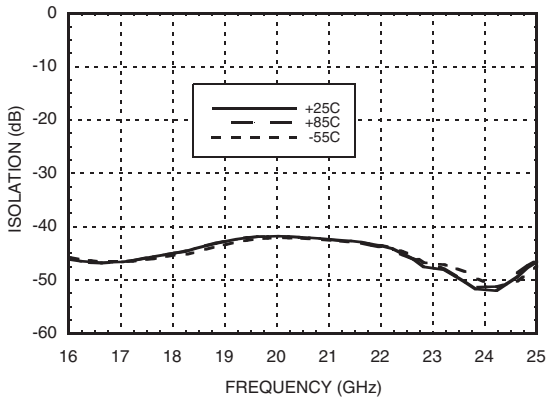

### Input Return Loss vs. Temperature



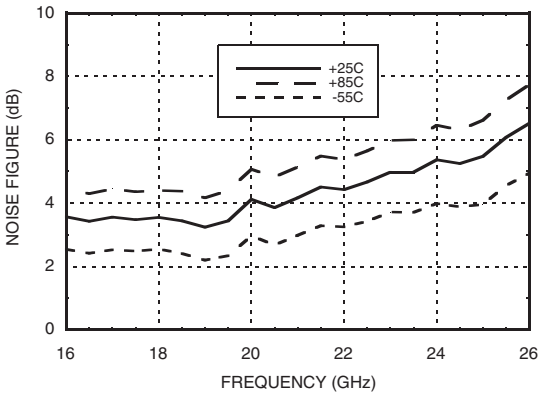

### Output Return Loss vs. Temperature



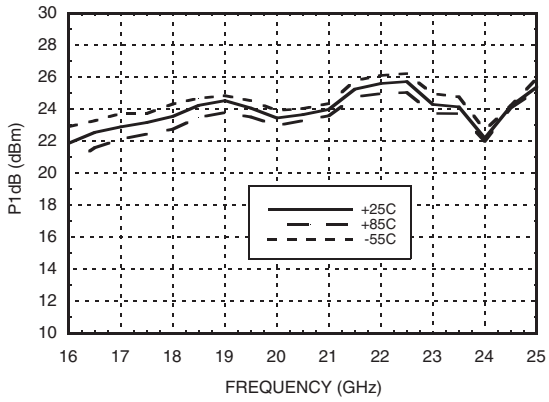

### Reverse Isolation vs. Temperature



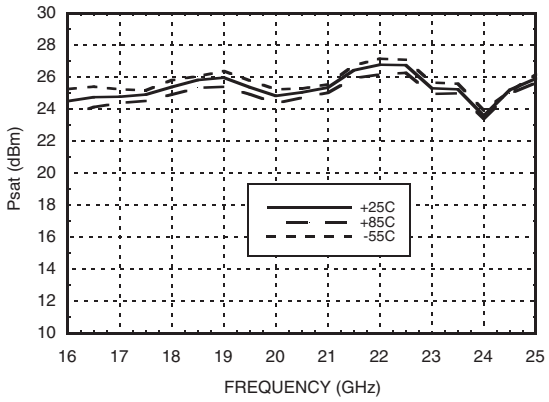

### Noise Figure vs. Temperature



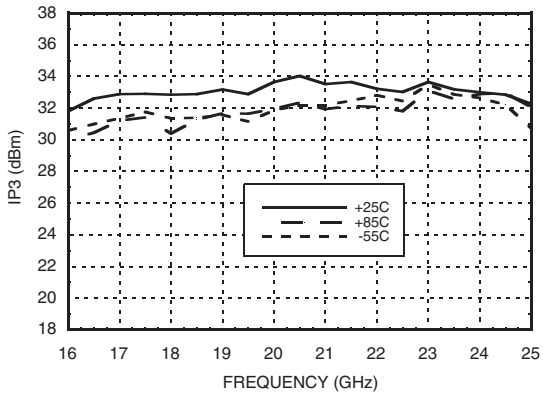
### P1dB vs. Temperature




### Psat vs. Temperature




### Output IP3 vs. Temperature

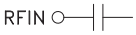
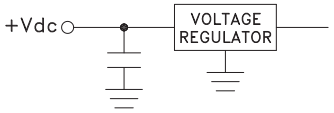
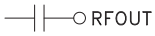
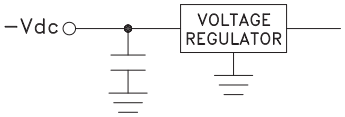



### Absolute Maximum Ratings

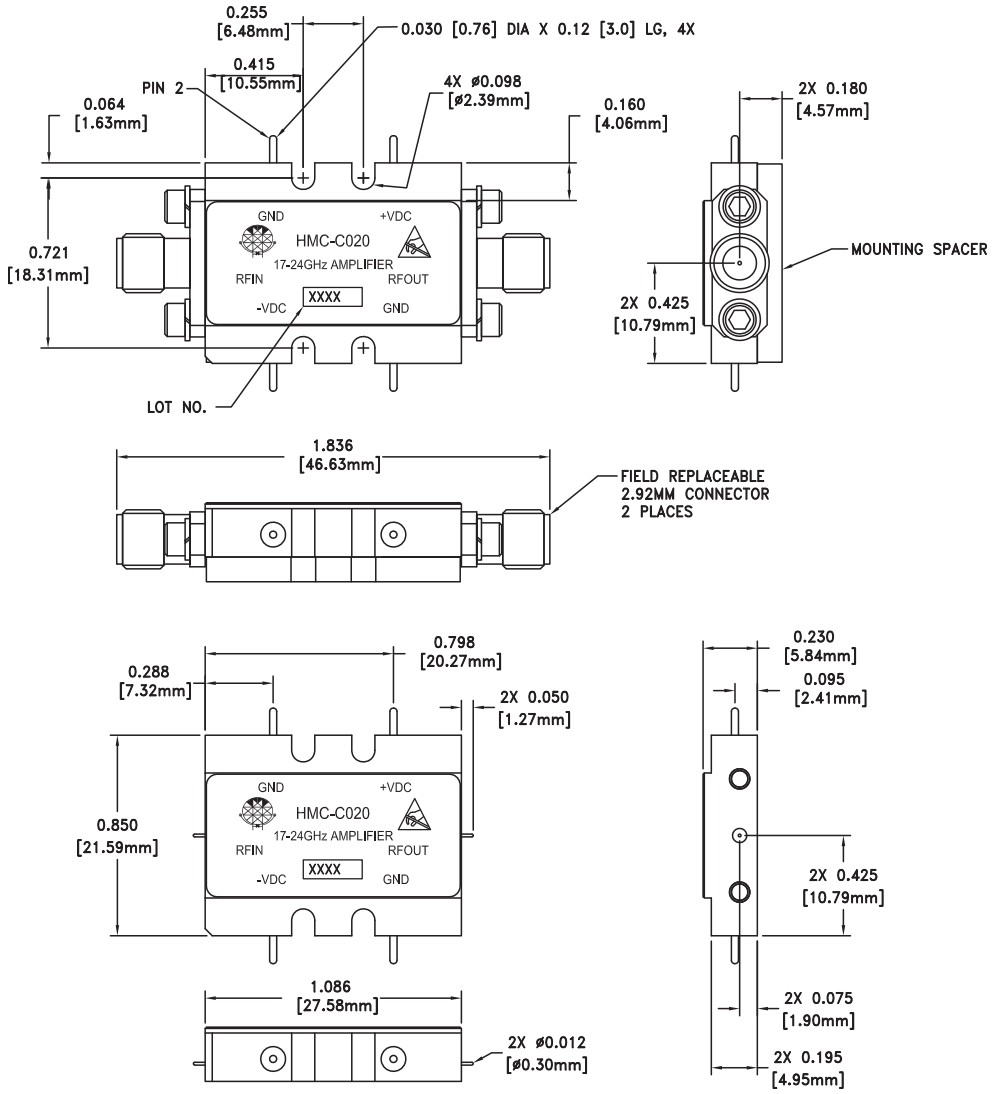
| | |
|---|---|
| Positive Bias Supply Voltage (+Vdc) | +17V Max |
| Negative Bias Supply (-Vdc) | -16V Min. |
| RF Input Power (RFIN) | +20 dBm |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -55 to +85 °C |

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

## Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|---|---|---|---|
| 1 | RFIN | RF input connector, 2.92mm female, field replaceable. This pin is AC coupled and matched to 50 Ohms. |   |
| 2, 5 | GND | Power supply ground. |   |
| 3 | +Vdc | Positive power supply voltage for the amplifier. |   |
| 4 | RFOUT | RF output connector, 2.92mm female. This pin is AC coupled and matched to 50 Ohms. |   |
| 6 | -Vdc | Negative power supply voltage for the amplifier |   |

## Outline Drawing




VIEW SHOWN WITH CONNECTORS REMOVED

## Package Information

| | |
|---|---|
| Package Type | C-10 |
| Package Weight [1] | 18.7 gms [2] |
| Spacer Weight | 3.3 gms [2] |

[1] Includes the connectors

[2] ±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 = ±0.02
   4.2 .XXX = ±0.010
5. FIELD REPLACEABLE 2.92mm CONNECTORS TENSOLITE 231CCSF OR EQUIVALENT

**Notes:**