

## WIDEBAND POWER AMPLIFIER MODULE, 21 - 31 GHz

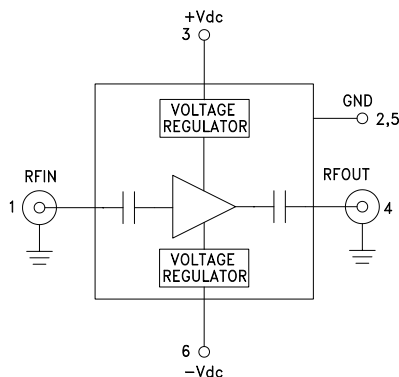


### Typical Applications

The HMC-C020 Wideband PA is ideal for:

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

### Functional Diagram



### Features

- Gain: 15 dB @ 27 GHz
- P1dB Output Power: +24 dBm @ 27 GHz
- Noise Figure: 5 dB @ 27 GHz
- Spurious-Free Operation
- Regulated Supply and Bias Sequencing
- Hermetically Sealed Module
- Field Replaceable 2.92mm connectors
- 55 °C to +85 °C Operating Temperature

### General Description

The HMC-C021 is a GaAs MMIC pHEMT Distributed Power Amplifier in a miniature, hermetic module with replaceable 2.92mm connectors which operates between 21 and 31 GHz. The amplifier provides 15 dB of gain, 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-C021 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, $T_A = +25^\circ\text{C}$ , $+V_{dc} = +8\text{V to } +15\text{V}$ , $-V_{dc} = -4.5\text{V to } -10\text{V}^*$

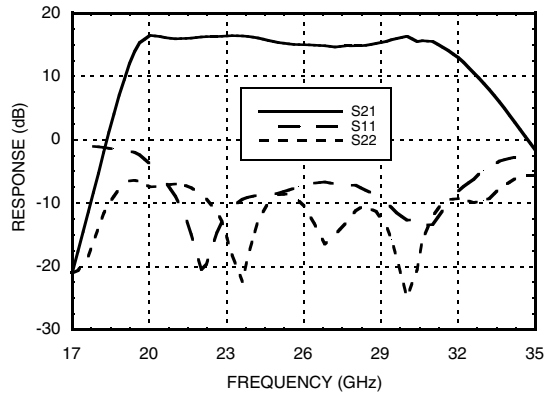
Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range	21 - 24		24 - 31				GHz
Gain	13	16	18	12	15	18	dB
Gain Flatness	±0.20		±1.0				dB
Gain Variation Over Temperature	-0.03		-0.04				dB/ °C
Noise Figure	5.0		7.0				dB
Input Return Loss	7		7				dB
Output Return Loss	7		10				dB
Output Power for 1 dB Compression (P1dB)	20	23		20	23		dBm
Saturated Output Power (P <sub>sat</sub> )	24		24				dBm
Output Third Order Intercept (IP3)	30		34				dBm
Positive Supply Current (+IDC)	215		215				mA
Negative Supply Current (-IDC)	5.8		5.8				mA

\* Data recorded at  $+V_{dc} = +12\text{V}$  and  $-V_{dc} = -5\text{V}$

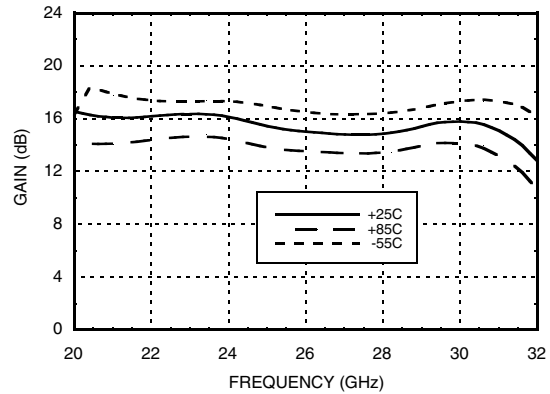


**WIDEBAND POWER AMPLIFIER  
MODULE, 21 - 31 GHz**

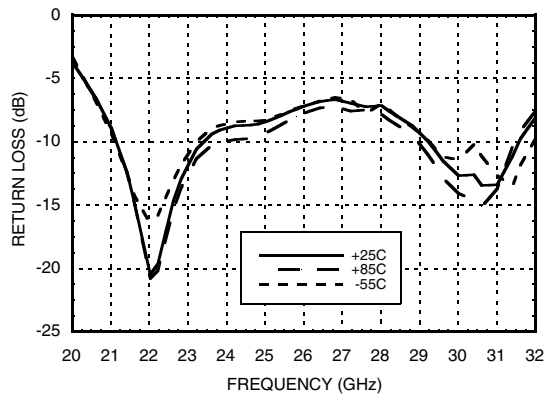
**Gain & Return Loss**



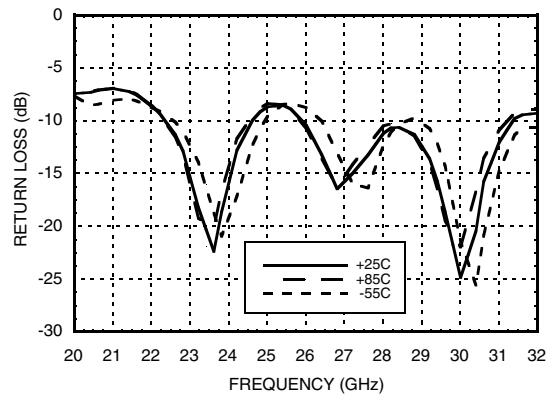
**Gain vs. Temperature**



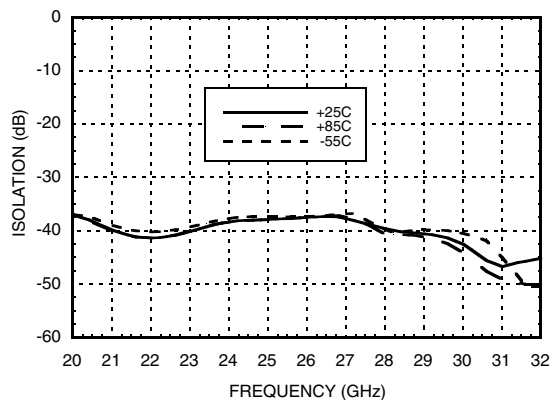
**Input Return Loss vs. Temperature**



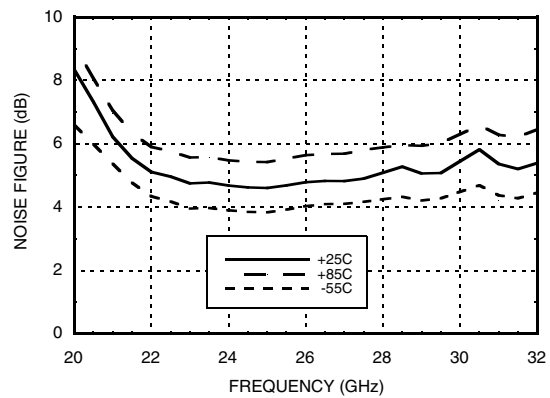
**Output Return Loss vs. Temperature**



**Reverse Isolation vs. Temperature**



**Noise Figure vs. Temperature**



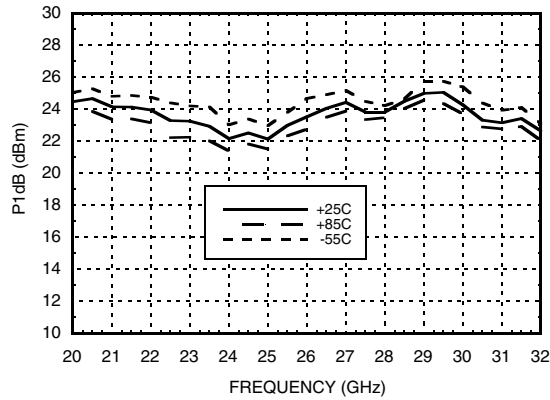
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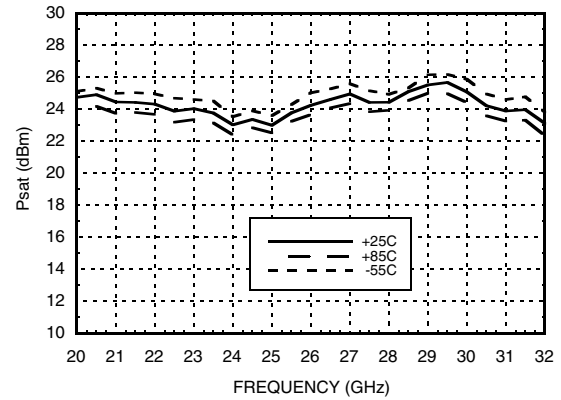


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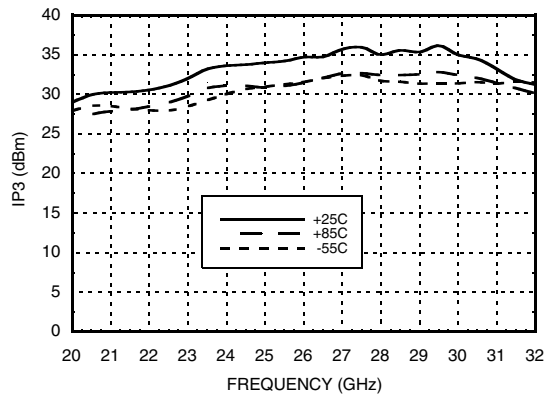
**P1dB vs. Temperature**



**Psat vs. Temperature**



**Output IP3 vs. Temperature**



**Absolute Maximum Ratings**

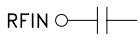

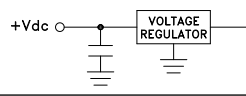
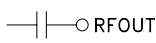
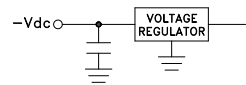
Positive Bias Supply Voltage (+Vdc)	+17V Max
Negative Bias Supply (-Vdc)	-16V Min.
RF Input Power (RFIN)	+20 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

**WIDEBAND POWER AMPLIFIER  
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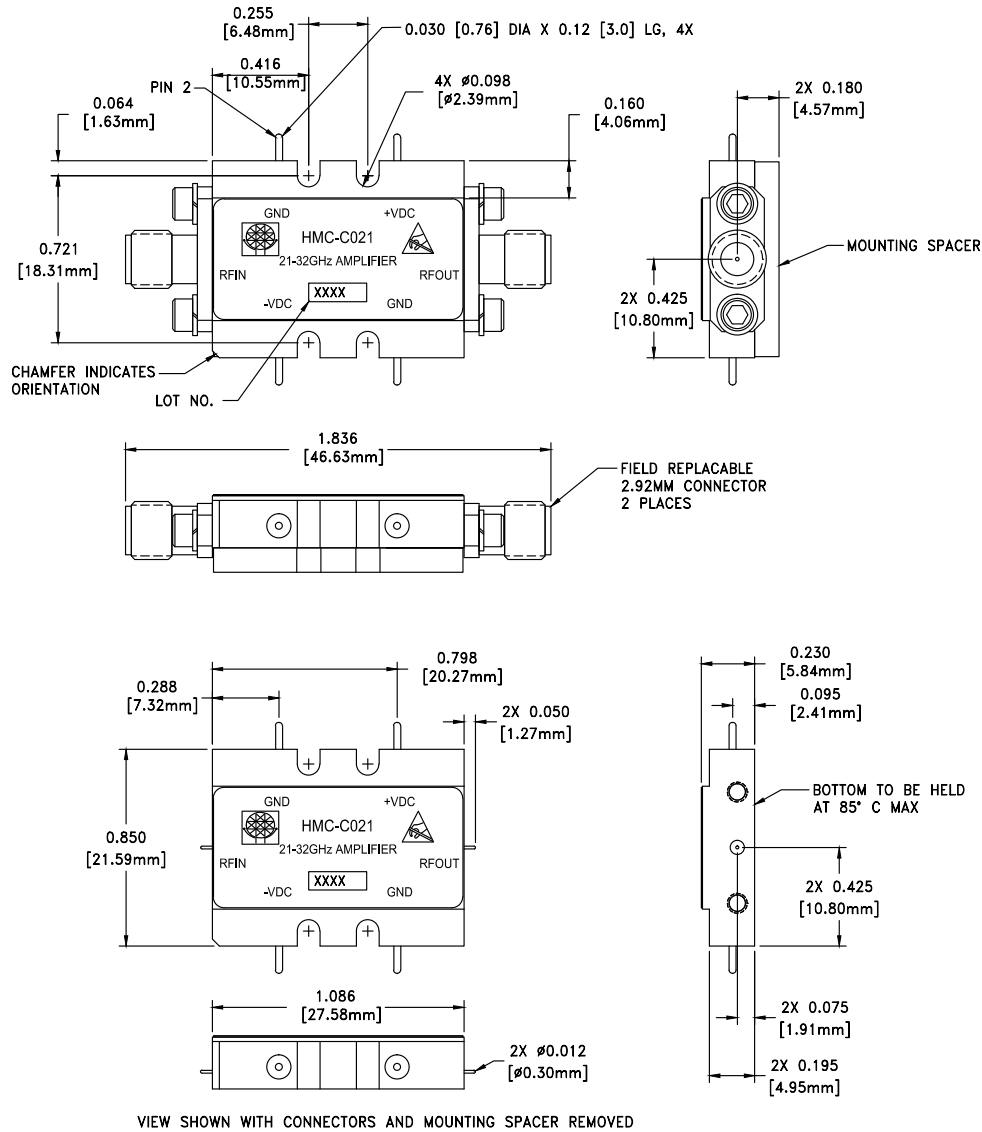
**Pin Descriptions**

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.	RFIN 
2, 5	GND	Power supply ground.	GND 
3	+Vdc	Positive power supply voltage for the amplifier.	+Vdc 
4	RFOUT	RF output connector, 2.92mm female. This pin is AC coupled and matched to 50 Ohms.	 RFOUT
6	-Vdc	Negative power supply voltage for the amplifier	-Vdc 

**WIDEBAND POWER AMPLIFIER  
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**Outline Drawing**



**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

**WIDEBAND POWER AMPLIFIER  
MODULE, 21 - 31 GHz****Notes:**