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0.01 GHz to 20 GHz, Ultra Wideband Power Amplifier Module

Data Sheet **HMC-C582**

FEATURES

High gain: 24 dB
P1dB output power: 25 dBm, typical
Single 15 V supply
Hermetically sealed
Field replaceable SMA connector
–40°C to +75°C operating temperature range

APPLICATIONS

Telecommunications infrastructure
Microwave radios and VSATs
Military and space
Test and measurement instrumentation
Fiber optics

FUNCTIONAL BLOCK DIAGRAM

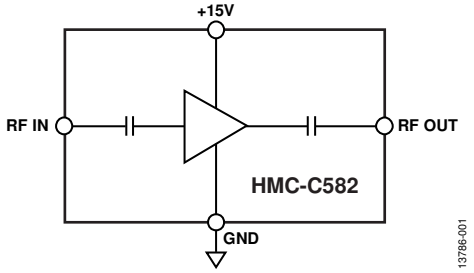

Figure 1.

GENERAL DESCRIPTION

The HMC-C582 is a gallium arsenide (GaAs), monolithic microwave integrated circuit (MMIC), pseudomorphic high electron mobility transfer (pHEMT) power amplifier in a miniature, hermetic module with replaceable SMA connectors that operates between 0.01 GHz and 20 GHz. The amplifier provides typically 24 dB of gain, up to 36 dBm output IP3, and up to 26 dBm of output power at 1 dB gain compression.

Gain flatness is excellent from 0.01 GHz to 20 GHz, making the HMC-C582 ideal for electronic warfare (EW), electronic countermeasures (ECM), radar, fiber optic, and test equipment applications. The wideband amplifier inputs/outputs (I/Os) are internally matched to 50 Ω and are dc blocked. Integrated voltage regulators allow flexible biasing and sequencing control for robust operation.

Rev. 0 **Document Feedback**

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Technical Support **www.analog.com**

HMC-C582* PRODUCT PAGE QUICK LINKS

Last Content Update: 02/23/2017

COMPARABLE PARTS

View a parametric search of comparable parts.

DOCUMENTATION

Data Sheet

- HMC-C582: 0.01 GHz to 20 GHz, Ultra Wideband Power Amplifier Module Data Sheet

REFERENCE MATERIALS

Press

- ADI Expands Portfolio of High Performance RF and Microwave Standard Modules to Facilitate Rapid Prototyping and Faster Time to Market

DESIGN RESOURCES

- HMC-C582 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

DISCUSSIONS

View all HMC-C582 EngineerZone Discussions.

SAMPLE AND BUY

Visit the product page to see pricing options.

TECHNICAL SUPPORT

Submit a technical question or find your regional support number.

DOCUMENT FEEDBACK

Submit feedback for this data sheet.

TABLE OF CONTENTS

REVISION HISTORY

9/2016—Revision 0: Initial Version

SPECIFICATIONS

Bias voltage = 15 V and baseplate temperature = 25°C, unless otherwise noted.

Table 1.

Parameter	Min	Typ	Max	Unit	Test Conditions/Comments
FREQUENCY RANGE	0.01		20	GHz	
GAIN					
0.01 GHz to 1 GHz		24		dB	
1 GHz to 2 GHz	21	24		dB	
2 GHz to 8 GHz	19	23		dB	
8 GHz to 16 GHz	18	22		dB	
16 GHz to 20 GHz	16	21		dB	
GAIN FLATNESS					
0.01 GHz to 1 GHz		±5		dB	
1 GHz to 2 GHz		±2		dB	
2 GHz to 8 GHz		±1.5		dB	
8 GHz to 16 GHz		±1.5		dB	
16 GHz to 20 GHz		±1.5		dB	
GAIN VARIATION OVER TEMPERATURE		0.05		dB/°C	
NOISE FIGURE					
1 GHz to 2 GHz		5.5		dB	
2 GHz to 8 GHz		4.5		dB	
8 GHz to 16 GHz		5.5		dB	
16 GHz to 20 GHz		6.5		dB	
1 dB COMPRESSION (P1dB)					
0.05 GHz to 1 GHz	21	25		dBm	
1 GHz to 2 GHz	22	26		dBm	
2 GHz to 8 GHz	21	25		dBm	
8 GHz to 16 GHz	19	23		dBm	
16 GHz to 20 GHz	18	22		dBm	
OUTPUT THIRD-ORDER INTERCEPT (IP3)					
1 GHz to 2 GHz		36		dBm	
2 GHz to 8 GHz		33		dBm	
8 GHz to 16 GHz		28		dBm	
16 GHz to 20 GHz		26		dBm	
RETURN LOSS					
Input, 0.01 GHz to 20 GHz		−10		dB	
Output, 2 GHz to 20 GHz		−10		dB	
SUPPLY INPUT	14	15	16	V	
CURRENT					
15 V Supply		0.69	0.90	A	

ABSOLUTE MAXIMUM RATINGS

Table 2.

Parameter	Rating
15 V Bias Line	18 V
RF IN Input Level	23 dBm
Operating Temperature Range	−40°C to +75°C
Storage Temperature Range	−55°C to +85°C
ESD Sensitivity, Human Body Model	Class IA

Stresses at or above those listed under Absolute Maximum Ratings may cause permanent damage to the product. This is a stress rating only; functional operation of the product at these or any other conditions above those indicated in the operational section of this specification is not implied. Operation beyond the maximum operating conditions for extended periods may affect product reliability.

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

PIN CONFIGURATION AND FUNCTION DESCRIPTIONS

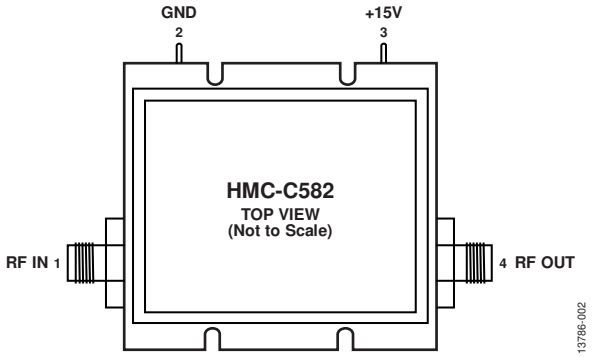


Figure 2. Pin Configuration

Table 3. Pin Function Descriptions

Pin No.	Mnemonic	Description
1	RF IN	Radio Frequency (RF) Input. The RF IN pin is an SMA female connector and is field replaceable. This pin is ac-coupled and matched to 50 Ω.
2	GND	Power Supply Ground.
3	+15V	Supply Voltage Pin.
4	RF OUT	RF Output. The RF OUT pin is an SMA female connector and is field replaceable. This pin is ac-coupled and matched to 50 Ω.

TYPICAL PERFORMANCE CHARACTERISTICS

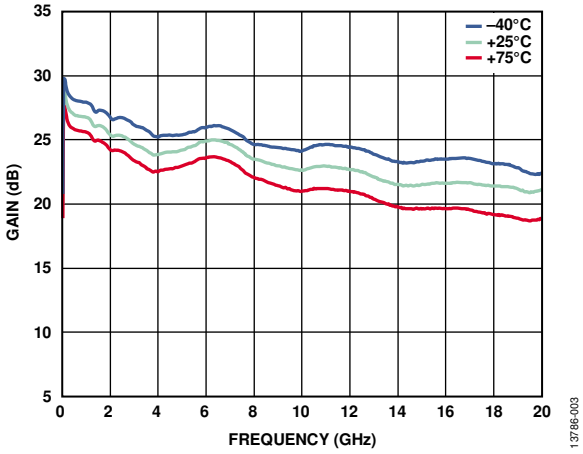


Figure 3. Gain vs. Frequency for Various Temperatures

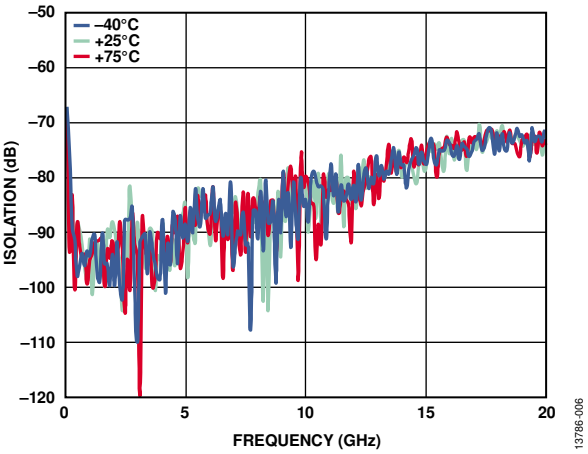


Figure 6. Isolation vs. Frequency for Various Temperatures

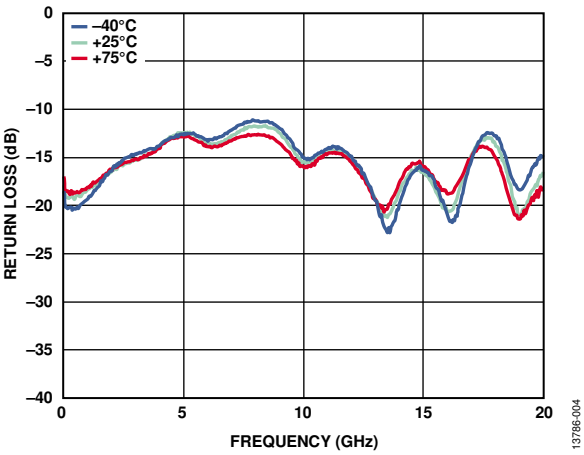


Figure 4. Input Return Loss vs. Frequency for Various Temperatures

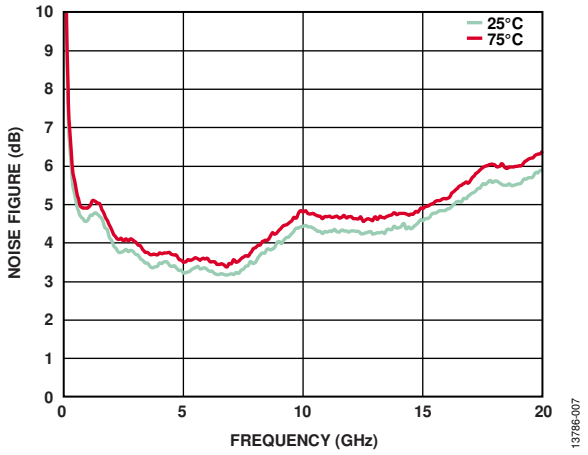


Figure 7. Noise Figure vs. Frequency for Various Temperatures

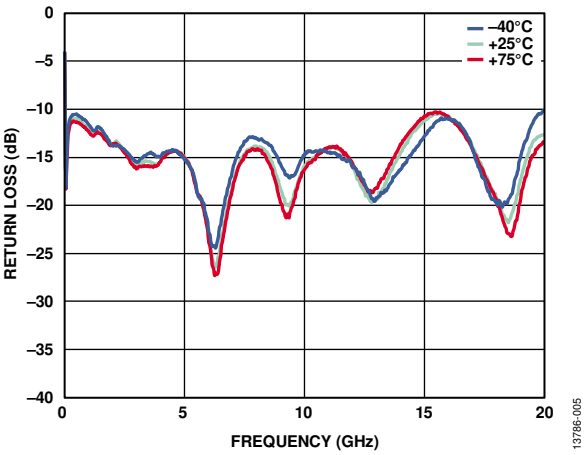


Figure 5. Output Return Loss vs. Frequency for Various Temperatures

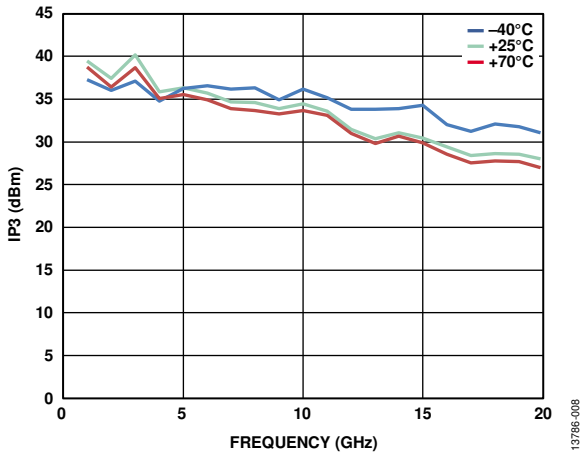


Figure 8. IP3 vs. Frequency for Various Temperatures

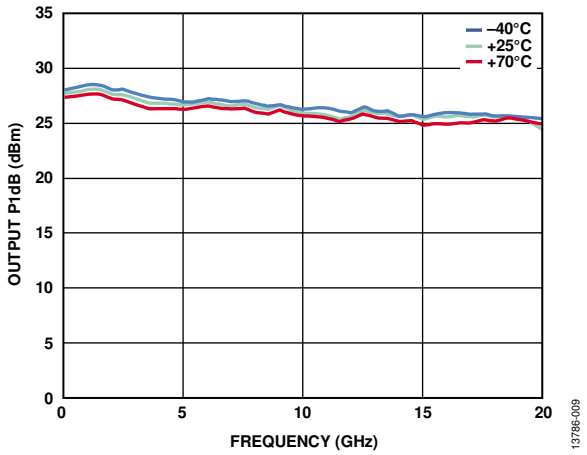


Figure 9. Output P1dB Compression vs. Frequency for Various Temperatures

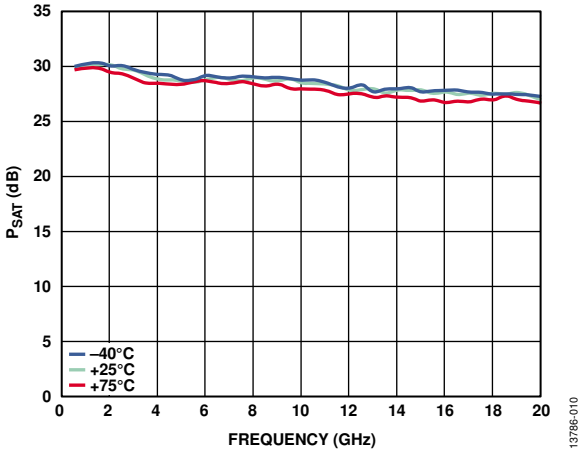


Figure 10. Saturated Output Power (P_{SAT}) vs. Frequency for Various Temperatures

THEORY OF OPERATION

The HMC-C582 multistage amplifier is designed to be mounted to a heat sink of suitable size such that, during operation, the backside case temperature never exceeds 75°C. Operation of the device at backside case temperatures greater than 75°C may result in reduced life of the device.

Prior to applying the dc voltage, terminate both the RF input and the RF output at a 50 Ω impedance. Never disconnect the RF output (RF OUT) when the dc voltage is applied to the device.

APPLICATIONS INFORMATION

The HMC-C582 is a connectorized amplifier module designed with two stage amplifiers to deliver 28 dBm typical power with 20 dB gain from 0.01 GHz to 20 GHz. The bias of the internal amplifiers is supplied by a 15 V dc source that powers a dual voltage regulator through two active bias controllers.

The HMC-C582 is built in a miniature hermetic module with field replaceable SMA connectors for RF input and output.

The package contains four mounting locations for screws that secure the amplifier package in dynamic applications and for thermal contact.

The HMC-C582 features mixed technologies of chip and wire with SMT devices. The internal amplifier contains depletion mode active devices and has built-in bias sequencing circuitry.

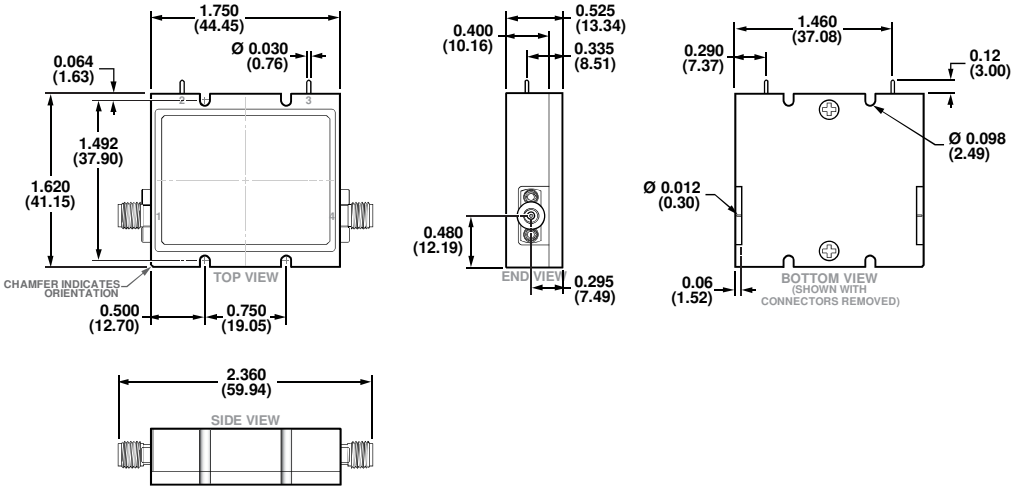
To turn on the amplifier, complete the following steps:

1. Verify the 15 V supply and the GND supply are connected to the correct pins (see Table 3).
2. Verify that the RF input (RF IN) is off.
3. Apply 15 V dc to the supply pin.
4. Apply RF power to the RF IN pin, ensuring it is kept below the maximum RF input power specified in Table 2.

To turn off the amplifier, complete the following steps:

1. Turn the RF input (RF IN) off.
2. Turn the 15 V dc supply off.

OUTLINE DIMENSIONS



CONTROLLING DIMENSIONS ARE IN INCHES; MILLIMETER DIMENSIONS (IN PARENTHESES) ARE ROUNDED-OFF INCH EQUIVALENTS FOR REFERENCE ONLY AND ARE NOT APPROPRIATE FOR USE IN DESIGN.

11-20-2015-A

Figure 11. 4-Lead Module with Connector Interface [MODULE] (ML-4-1)
Dimensions shown in inches and (millimeters)

ORDERING GUIDE

Model[1]	Temperature Range	Package Description	Package Option
HMC-C582	−40°C to +75°C	4-Lead Module with Connector Interface [MODULE]	ML-4-1

[1] This is an RoHs compliant part.