47 dB Gain High Power GaN Amplifier at 50 Watt Psat Operating from 2 GHz to 6 GHz with SMA

FMAM5121

Features

- GaN High Power Amplifier Design
- 2000 MHz to 6000 MHz Frequency Range
- Psat 50 Watts typ
- Gain: 47 dB typ
- Gain Flatness +/- 3 dB
- Spurious Supression -60 dBc
- DC Bias +28VDC @ 9A Current
- Max RF input Power +10 dBm
- Enable with TTL Logic Control
- Current Sense and Temperature Sense features
- 50 Ohms Input and Output Matched
- Instantaneous Broadband
- Built-In control and protection circuits
- Class AB
- SMA Female Input/Output Connectors
- D-Sub Control Connector with Mating Female Connector
- Operational Temperature -20°C to +60°C
- Optional Heatsink Available: Model FMAMG5068F

Applications

- Military Radio
- Commmunication Systems
- Multioctave High Gain Power Amplifier
- Band Specific High Power Linear Applications in L and S Frequency bands
- Test and Measurement

Description

The FMAM5121 is a high power amplifier that operates from 2000 MHz to 6000 MHz and generates 50 watts of saturated output power. The module utilizes GaN and chip-and-wire technology in the manufacturing process that ensures state-of-the-art power performance with excellent power-to-volume ratio that's ideal for broadband high power S and C band appications. This Class AB amplifier is designed for a 50 ohm input/output impedance and offers high efficiency and high linearity, operating over a wide dynamic range with impressive typical performance that includes 47 dB of gain, -60 dBc spurious suppression, and -15 dBc harmonics at 40W. The design has input RF power handling capability up to +10 dBm max without damage, and can handle a load VSWR at Pout of 30W of 3.0:1 for all load phase and amplitude conditions under continuous operation. Typical DC bias requirements include +28V and 9A of current at 40W. The module uses an SMA female connectors at the RF input and output ports. The DC interface incorporates a D-Sub 9 pin male connector for DC bias, Enable with TTL logic control, Current sense, and Temperature sense functions. A mating D-Sub socket connector is included. The rugged amplifier design operates over a wide temperature range from -20°C to +60°C, and can withstand relative humidity exposure up to 95% maximum. An available heatsink with cooling fan (model FMAMG5068F) is recommended to maintain an optimum baseplate temperature during operation.

Electrical Specifications (TA = +25°C, DC Voltage = +30Volts, DC Current = 9A)

Description		Min	Typ	Max	Unit
Frequency Range		2		6	GHz
Small Signal Gain			47		dB
Gain Flatness			±3		dB
Pout at Sat.			+47		dBm
Harmonics	@40 Watts		-15		dBc
Spurious	@40 Watts		-60		dBc
Impedance (Input)			50		Ohms
Impedance (Output)			50		Ohms
Operating DC Voltage		+28	+30	+32	Volts
Operating DC Current	*		9		A
OFF/ON Switch Time (10% to 90%)			2	5	µs

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Electrical Specifications (TA = +25°C, DC Voltage = +30Volts, DC Current = 9A)

Description	Min	Typ	Max	Unit
Operating Temperature Range	-20		+60	°C

*@Pout=40W
Electrical Specification Notes:
Allow for 20% Increased DC Current during initial power-up stage

Absolute Maximum Rating

Parameter	Rating
Input RF drive level without damage	+10 dBm (Max)
Load VSWR @ POUT=30W	∞ @ all load phase & amplitude for duration of 1 minute; 3:1 @ all load phase & amplitude continuous
Over Temperature	85°C @ heatsink [restored @ 60°C]

ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in approved ESD Workstation.

Mechanical Specifications

Size

Length	6.2 in [157.48 mm]
Width	3.9 in [99.06 mm]
Height	0.98 in [24.89 mm]
Weight	1.75 lbs [793.79 g]
Input Connector	SMA Female
Output Connector	SMA Female
Bias Connector	9-Pin D-Subminiature Male
Cooling	Baseplate Conduction

Environmental Specifications

Temperature

Operating Range	-20 to +60 deg C
Storage Range	-25 to +60 deg C
Humidity	95%

Compliance Certifications (see product page for current document)

Plotted and Other Data

Notes:
- Values at 25 °C, sea level

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Amplifier Power-up Precautions

1.) Confirm that proper ESD precautions and controls are always in place before handling any Amplifier module.

2.) Confirm adequate thermal management is in place to effectively dissipate heat away from the Amplifier package. The Amplifier operational baseplate temperature must be within the operational temperature range stated in the Amplifier datasheet. Depending on the design and thermal requirements, using a heatsink with cooling fan is always recommended for safe reliable operation. A heat sink without a cooling fan may also be used. Damage caused from overheating will void the warranty.

3.) Confirm adequate system grounding is established. The DC power supply and Amplifier must have a common ground in order to operate properly.

4.) Power Amplifiers may require additional DC Current when initially powered-up. Depending on the design, the input current draw could range from an additional 10% to 100% above the maximum rated DC current of the Amplifier. This varies based on product part number.

5.) Confirm the DC power supply, if limited, is set to allow for additional start-up current that's rated for the Power Amplifier.

6.) Confirm the system is designed and calibrated for 50 ohms. Any impedance mismatch may cause performance issues.

7.) Perform a CALIBRATION (if required) with the loads before connecting the Amplifier to the Network Analyzer to ensure proper performance.

8.) Use a fixed attenuator between the signal source and input port of the Amplifier to optimize the input VSWR match.

9.) Confirm the input power level at the input port of the amplifier does not exceed the maximum rated limit for input power (as stated in the Amplifier datasheet).
P_{in} for Small Signal Gain = P1dB-SSG-10 dB
P_{in} for P1dB = P1dB-SSG+1 dB

10.) Confirm the Network Analyzer is always connected to the Amplifier first before DC power is applied to the Amplifier.

11.) As long as the input and output ports of the amplifier are connected to a 50Ohm load and RF signal power is applied, the Amplifier can be powered up with DC voltage.

12.) Confirm the Amplifier output load is matched for a 50 Ohm impedance and will not exceed the maximum rated VSWR or Return Loss limit for the Amplifier. Exceeding the maximum rated VSWR or Return Loss limit will result in reflected signal power that could damage the Amplifier and void the warranty.

13.) **Power Amplifier connected to an Antenna for signal transmission** - It's strongly recommended to use a high power fixed attenuator pad or an Isolator between the output port of the Amplifier and input port to the antenna. Any reflected signal power due to impedance mismatch will likely damage the Amplifier and void the warranty.

14.) The attenuator or isolator used at the output port of the Amplifier must be rated to handle the output power level and operational frequency band of the amplifier.

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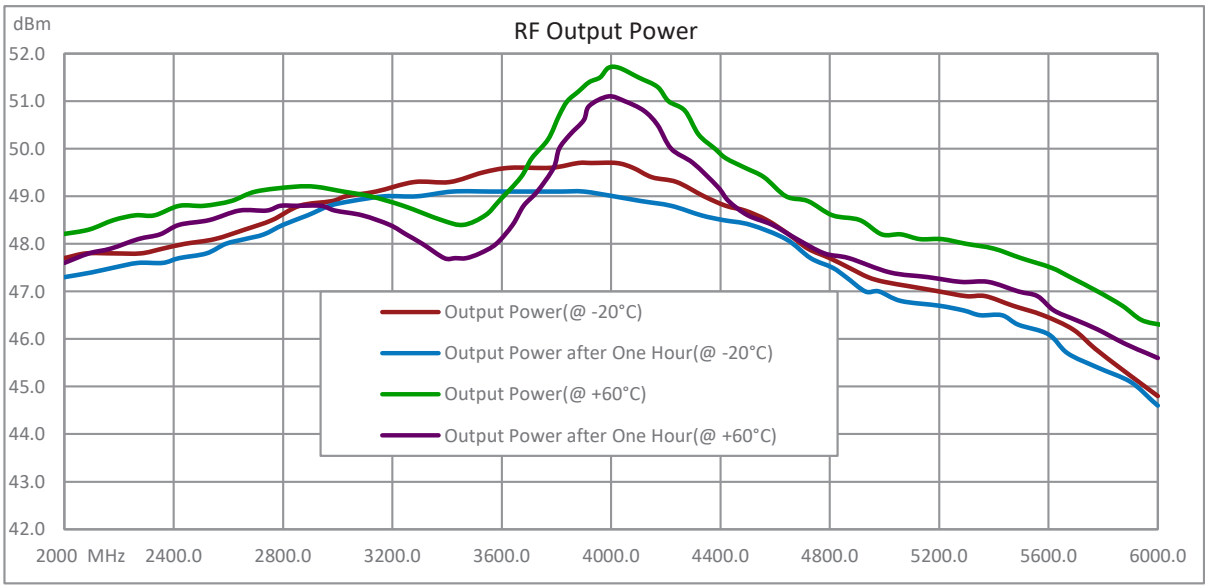
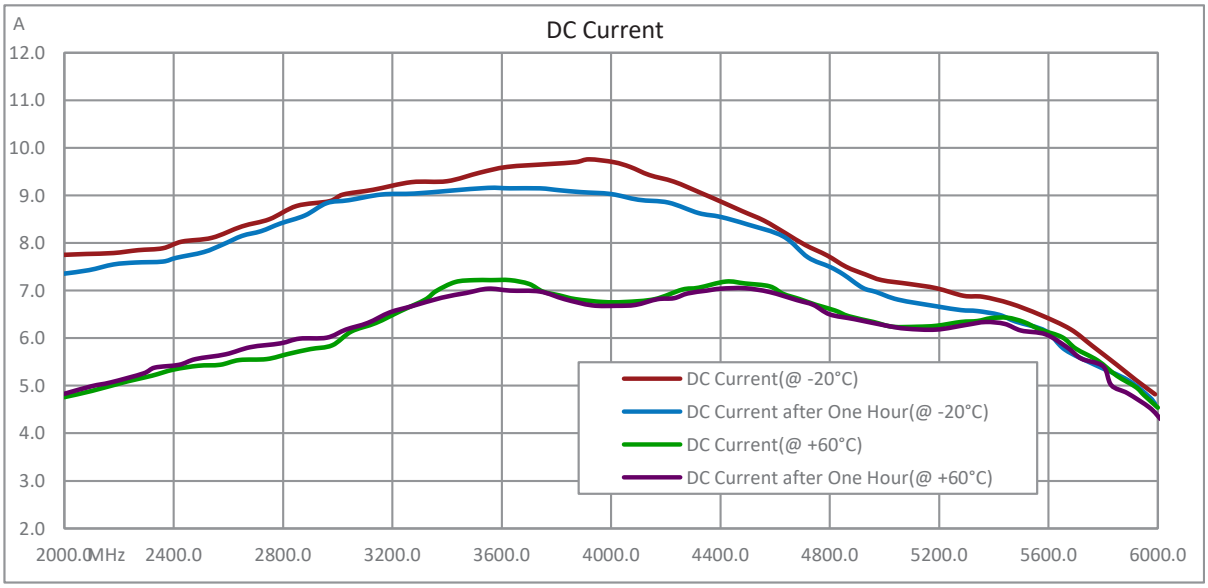
Typical Performance Data





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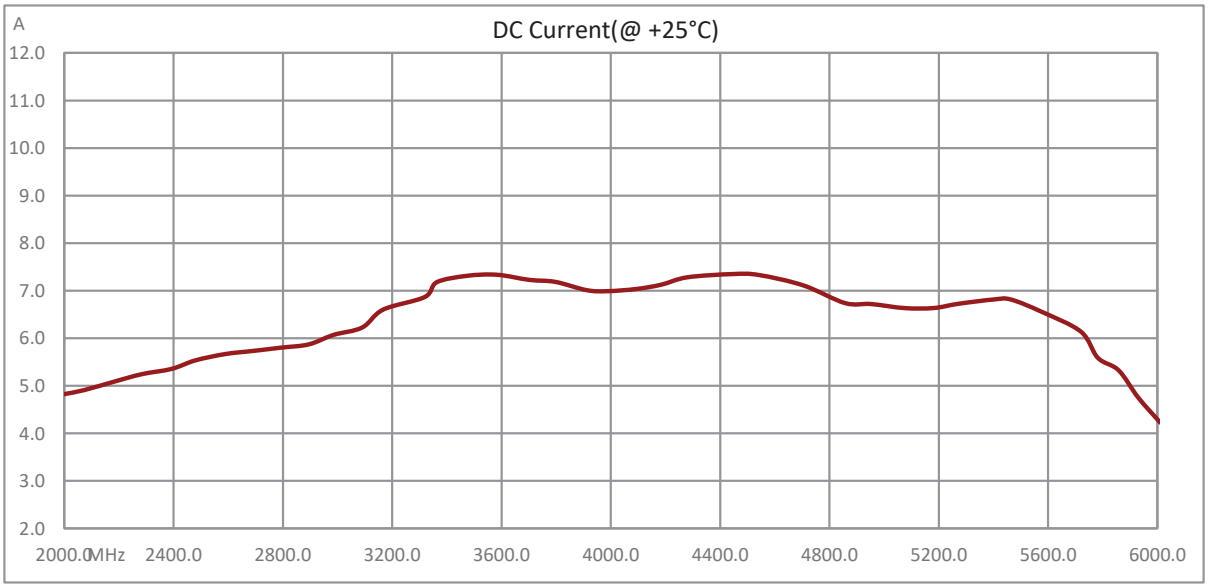

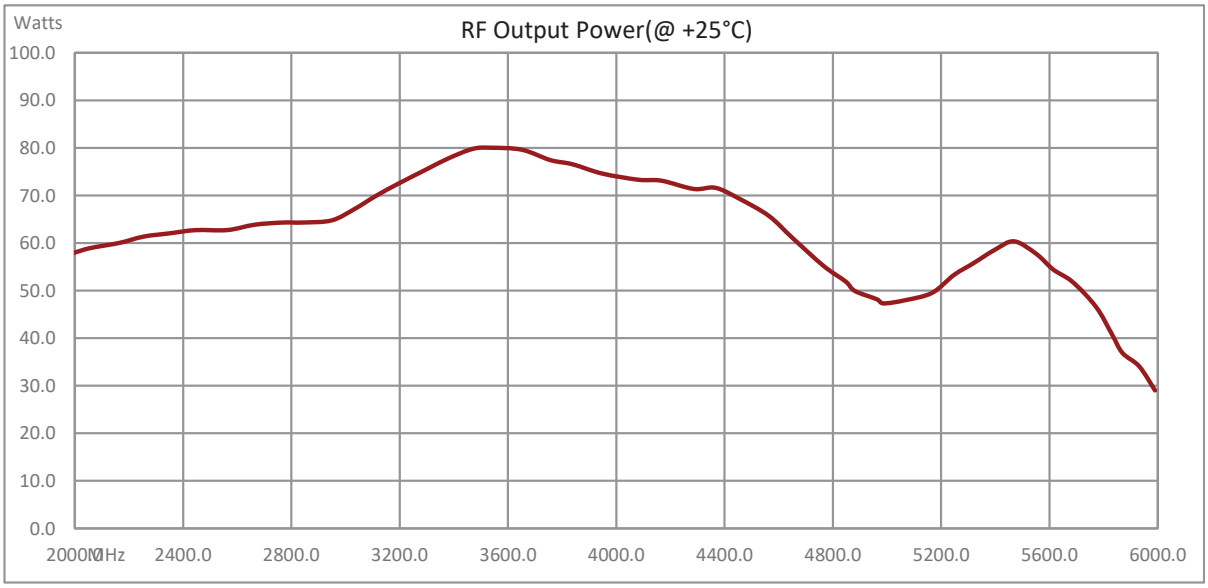

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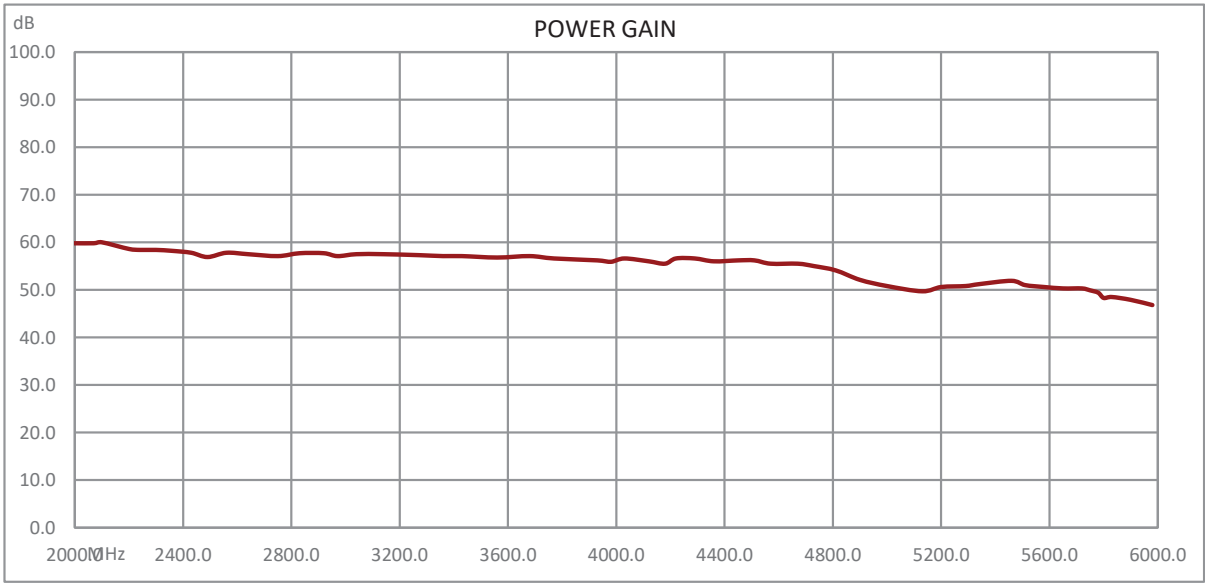

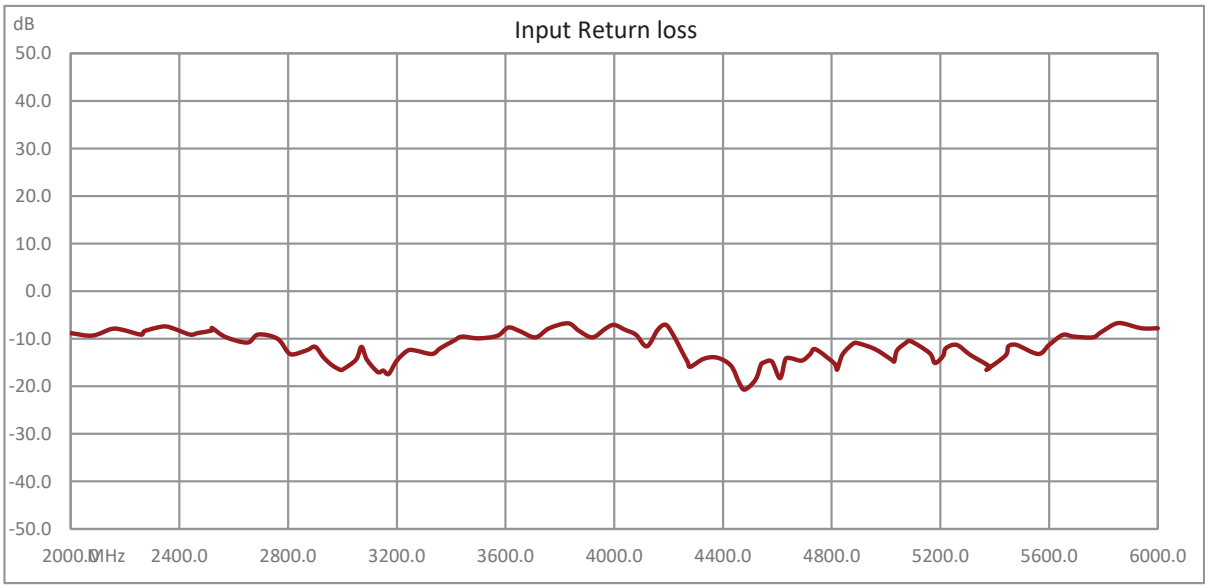

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47 dB Gain High Power GaN Amplifier at 50 Watt Psat Operating from 2 GHz to 6 GHz with SMA from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Lewisville, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: 47 dB Gain High Power GaN Amplifier at 50 Watt Psat Operating from 2 GHz to 6 GHz with SMA FMAM5121

URL: https://www.fairviewmicrowave.com/47-db-gain-high-power-gan-amplifier-at-50-watt-psat-operating-from-2-ghz-to-6-ghz-with-sma-fmam5121-p.aspx

FMAM5121 CAD Drawing

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