

53 dB Gain High Power LDMOS Amplifier at 200 Watt Psat Operating from 20 MHz to 520 MHz with Type N Output



FMAM5110

Features

- LDMOS High Power Amplifier Design
- 20 MHz to 500 MHz Frequency Range
- Psat 200 Watts typ
- Gain: 53 dB typ
- Gain Flatness +/- 2 dB
- Spurious Suppression -50 dBc
- DC Bias +32VDC @ 20A of Current
- Max RF Input Power +10 dBm
- Shutdown with TTL Logic Control
- Current and Temperature Monitor features
- 50 Ohms Input and Output Matched
- Instantaneous Broadband
- Built-In control and protection circuits
- Class AB
- SMA Female input and N-Type Female output connectors
- D-Sub Control Connector with Mating Female Connector
- Operational Temperature -20°C to +60°C
- Optional Heatsink Available: Model FMAMG5069F

Applications

- Military Radio
- Communication Systems
- Multioctave High Gain Power Amplifier
- VHF and UHF Linear Applications
- Test and Measurement

Description

The FMAM5110 is a high power amplifier that operates from 20 MHz to 500 MHz and generates 200 watts of saturated output power. The module utilizes LDMOS 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 RF, and VHF and UHF linear applications. 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 53 dB of gain, -50 dBc spurious suppression, and -10 dBc harmonics at 100W. The design has input RF power handling capability up to +10 dBm max without damage, and can handle a load VSWR at Pout of 100W of 3.0:1 for all load phase and amplitude conditions under continuous operation. Typical DC bias requirements include +32V and 20A of current at 200W. The module uses an SMA female connector on the RF input, and an N Type female connector on the RF output. The DC interface incorporates a D-Sub 7 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 FMAMG5069F) is recommended to maintain an optimum baseplate temperature during operation.

Electrical Specifications (TA = +25°C, DC Voltage = +32Volts, DC Current = 20A)

| Description | Min | Typ | Max | Unit |
|------------------------|-----|-----|-----|-------|
| Frequency Range | 20 | | 520 | MHz |
| Small Signal Gain | | 53 | | dB |
| Gain Flatness | | ±2 | | dB |
| Pout at Sat. | | +53 | | dBm |
| Harmonics @100 Watts | | -10 | | dBc |
| Spurious @100 Watts | | -50 | | dBc |
| Impedance (Input) | | 50 | | Ohms |
| Impedance (Output) | | 50 | | Ohms |
| Input Return Loss | | | -10 | dB |
| Operating DC Voltage | +26 | +32 | +34 | Volts |
| Operating DC Current * | | 20 | | A |

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| Description | Min | Typ | Max | Unit |
|------------------------------------|-----|-----|-----|------|
| OFF/ON Switch Time (10% to 90%) | | 2 | 5 | μs |
| Operating Temperature Range | -20 | | +60 | °C |

*@Pout=200W

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=100W | ∞ @ 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 | 7.1 in [180.34 mm] |
| Width | 5.9 in [149.86 mm] |
| Height | 1 in [25.4 mm] |
| Weight | 2.75 lbs [1.25 kg] |
| Input Connector | SMA Female |
| Output Connector | N Female |
| Bias Connector | 7-Pin D-Subminiature Male |
| Cooling | Baseplate Conduction |

Environmental Specifications

| | |
|--------------------|------------------|
| Temperature | |
| Operating Range | -20 to +60 deg C |
| Storage Range | -30 to +75 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

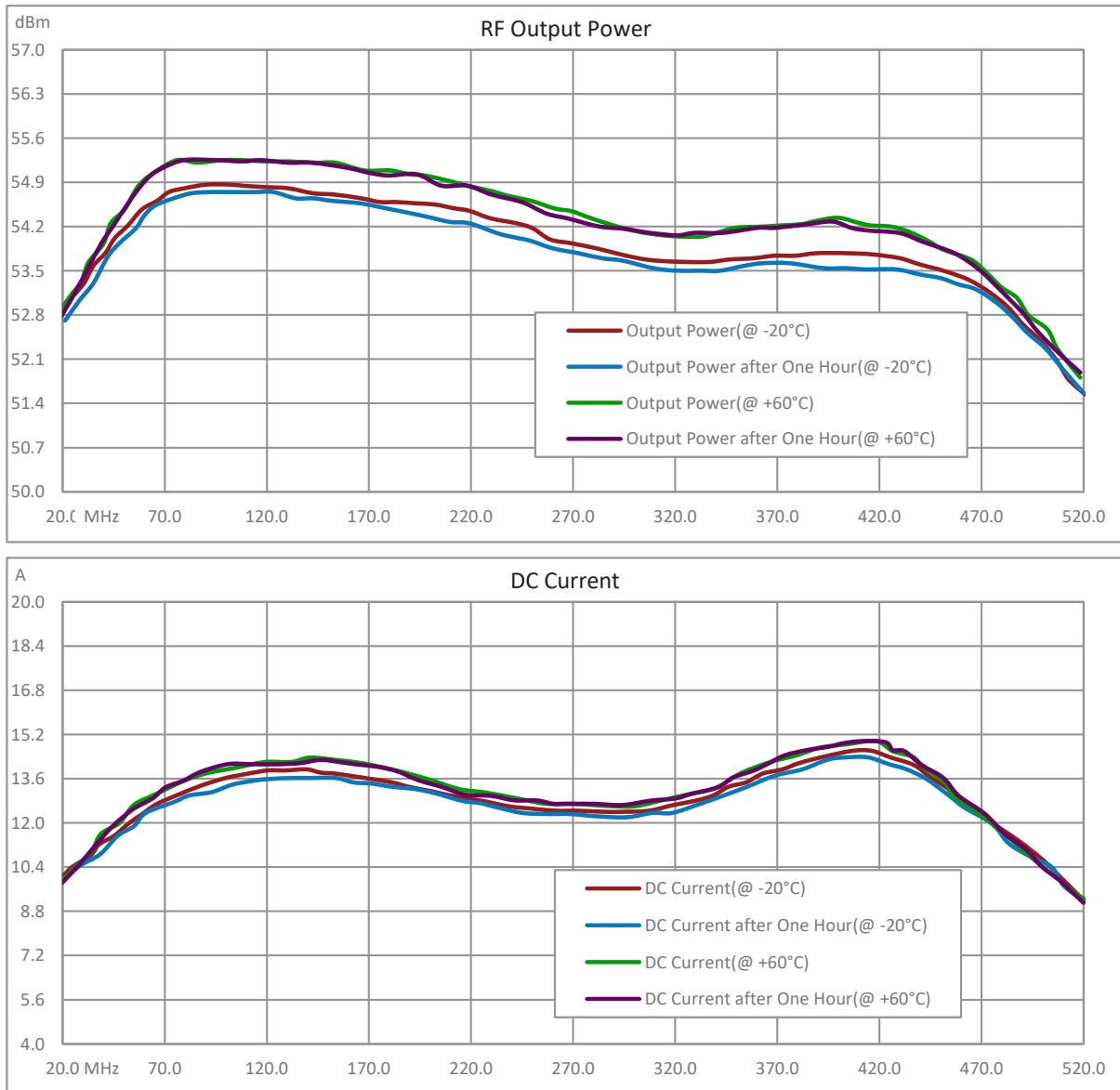
- 1.) Confirm that proper ESD precautions and controls are always in place before handling any Amplifier module.
- 2.) Confirm adequate thermal management is in place to effectively dissipate heat away from the Amplifier package. The Amplifier operational baseplate temperature must be within the operational 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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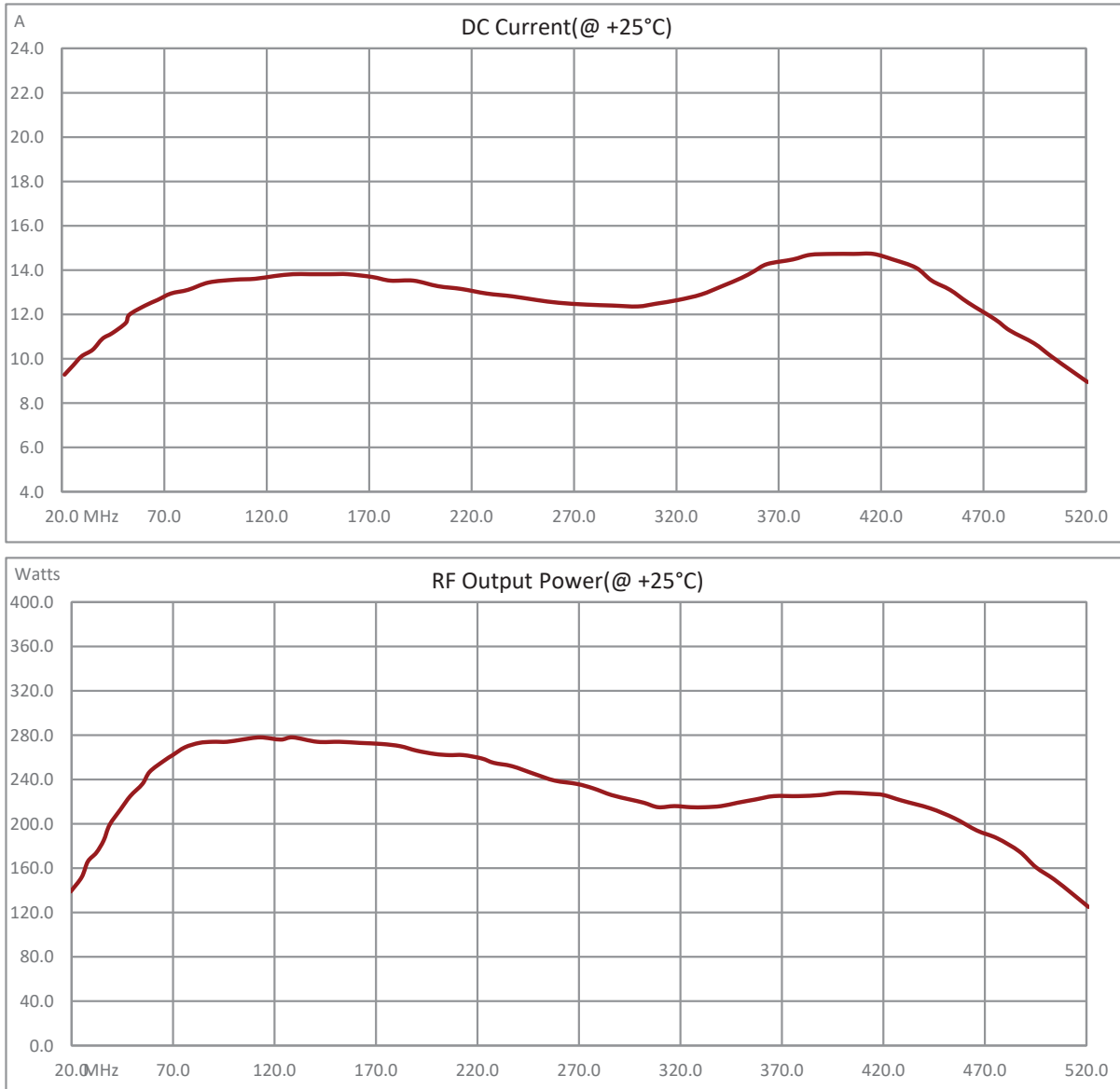
Typical Performance Data



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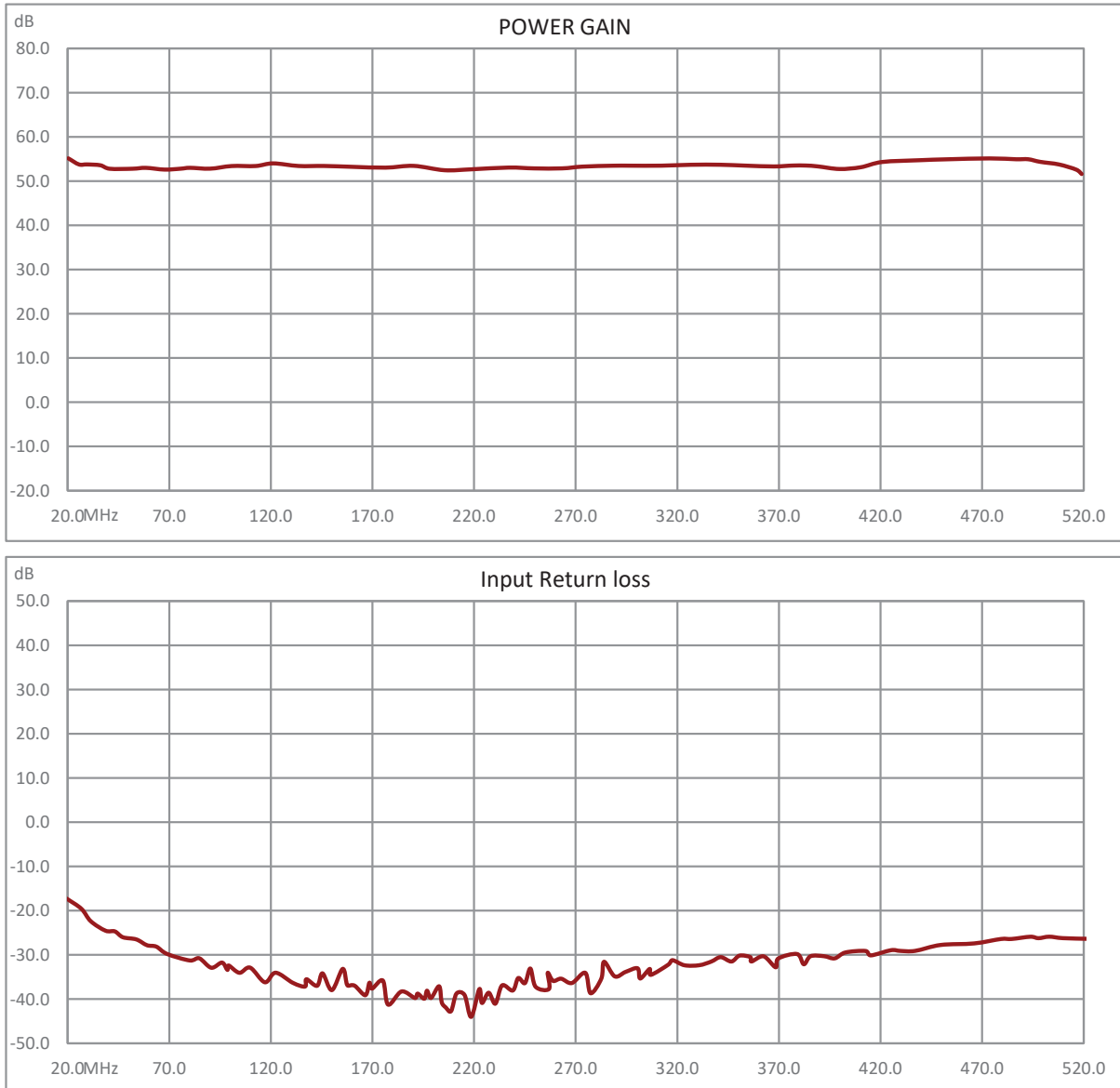
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For additional information on this product, please click the following link: [53 dB Gain High Power LDMOS Amplifier at 200 Watt Psat Operating from 20 MHz to 520 MHz with Type N Output FMAM5110](https://www.fairviewmicrowave.com/53-db-gain-high-power-lmos-amplifier-at-200-watt-psat-operating-from-20-mhz-to-520-mhz-with-type-n-output-fmam5110-p.aspx)

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FMAM5110 CAD Drawing

53 dB Gain High Power LDMOS Amplifier at 200 Watt Psat Operating from 20 MHz to 520 MHz with Type N Ouput

