

40 dB Gain High Power GaN Amplifier at 10 Watt Psat Operating from 6 GHz to 18 GHz with SMA

The FMAM5070 is a high power amplifier that operates from 6 GHz to 18 GHz and generates 10 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 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 40 dB gain, 10% power added efficiency, ± 2 dB gain flatness, -10 dBc harmonic suppression, -60 dBc Spurious, and a maximum input power level of +10 dBm. Typical DC bias requirements include +28V and 3A of current. The module uses an SMA female input and output connector. 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 female D-SUB socket connector is included. The rugged amplifier design operates over wide temperature range from -20°C and +60°C and can withstand relative humidity exposure up to 95% maximum. An available heatsink with cooling fan (model PE15G5060F) is recommended to maintain an optimum baseplate temperature during operation.

Electrical Specifications

(TA = +25°C)

| Description | Min | Typ | Max | Unit |
|---------------------------------|-----|---------|------|---------|
| Frequency Range | 6 | | 18 | GHz |
| Small Signal Gain | | 40 | | dB |
| Gain Flatness | | ± 2 | | dB |
| Psat | | 40 | | dBm |
| Efficiency (PAE) | | 10 | | % |
| Harmonics @5 Watts | | -20 | | dBc |
| Spurious @5 Watts | | -60 | -55 | dBc |
| Impedance (Input) | | 50 | | Ohms |
| Impedance (Output) | | 50 | | Ohms |
| Input VSWR | | | 3:01 | |
| Input Return Loss | | | -10 | dB |
| OFF/ON Switch Time (10% to 90%) | | 2 | 5 | μ s |
| Operating DC Voltage | 26 | 28 | 30 | Volts |
| Operating DC Current @10 Watts | | 3 | | A |
| Operating Temperature Range | -20 | | 60 | °C |

Electrical Specification Notes: Allow for 20% Increased DC Current during initial power-up stage



Features:

- GaN Design
- 6 GHz to 18 GHz Frequency Range
- Psat 10 Watts typ
- Power Gain: 40 dB typ
- Power Added Efficiency: 10%
- Gain Flatness ± 2 dB typ
- Enable with TTL Logic Control
- Current and Temperature Sense Functions
- 50 Ohms Input and Output Matched
- Instantaneous Ultra Broadband
- Built-in Control and Protection
- Class AB
- D-Sub Control Connector with Mating Female Connector
- Optional Heatsink Available: FMAMG5060F

Applications:

- Military Radio
- Communication Systems
- High Gain Driver Power Amplifier
- High Gain Output Power Amplifier
- Test and Measurement applications

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Absolute Maximum Rating

| Parameter | Rating |
|-------------------------------------|--|
| Input RF drive level without damage | +10 dBm (MAX) |
| Load VSWR @ Pout = 5 W | ∞ @ 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 | 5.9 in [149.86 mm] |
| Width | 3.54 in [89.92 mm] |
| Height | 0.98 in [24.89 mm] |
| Weight | 1.76 lbs [0.8 kg] |
| Input Connector | SMA Female |
| Output Connector | SMA Female |
| Bias Connector | 9-Pin D-Subminiature Male |

Environmental Specifications
Temperature

| | |
|-----------------|------------------------|
| Operating Range | -20 to +60 deg C |
| Storage Range | -25 to +65 deg C |
| Humidity | 95% Non-Condensing |
| Shock | Normal Truck Transport |
| Vibration | Normal Truck Transport |

Compliance Certifications (see [product page](#) for current document)

Plotted and Other Data

Notes:

- Values at 25 °C, sea level
- Heatsink Required for Proper Operation Recommended Model: FMAMG5060F

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.

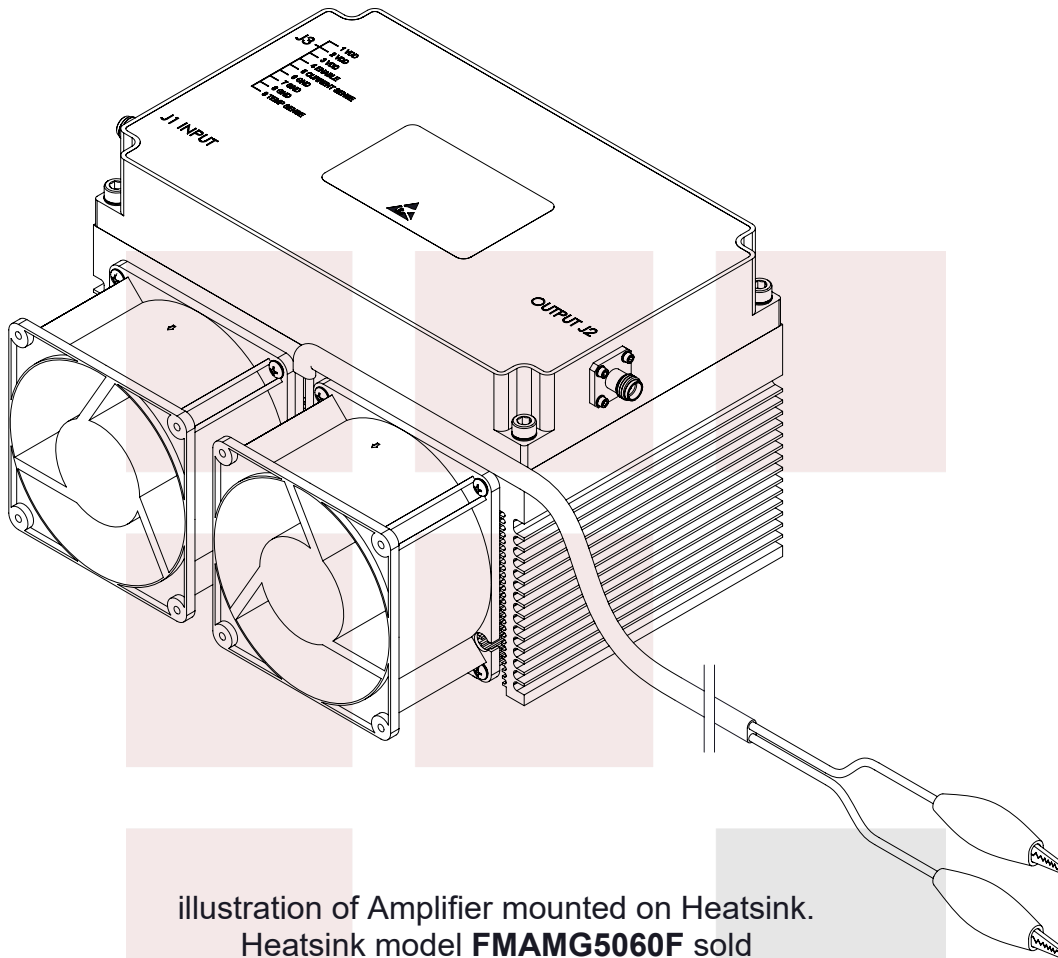
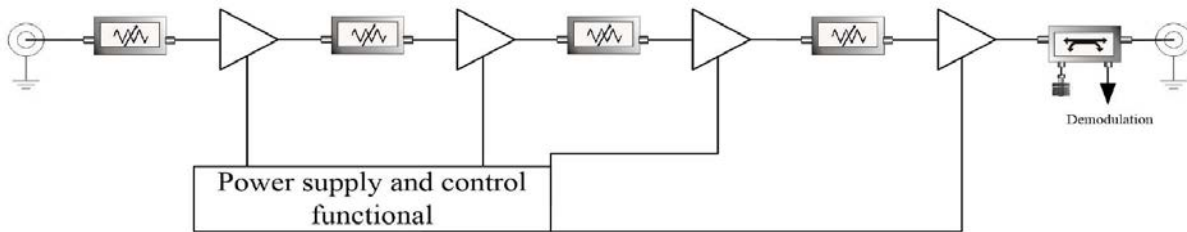
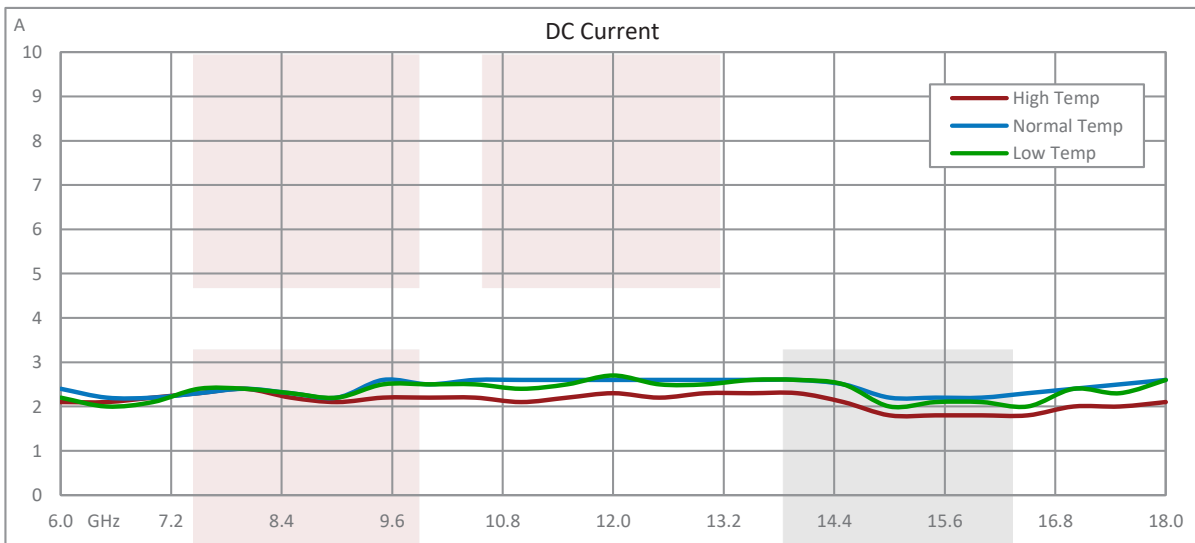
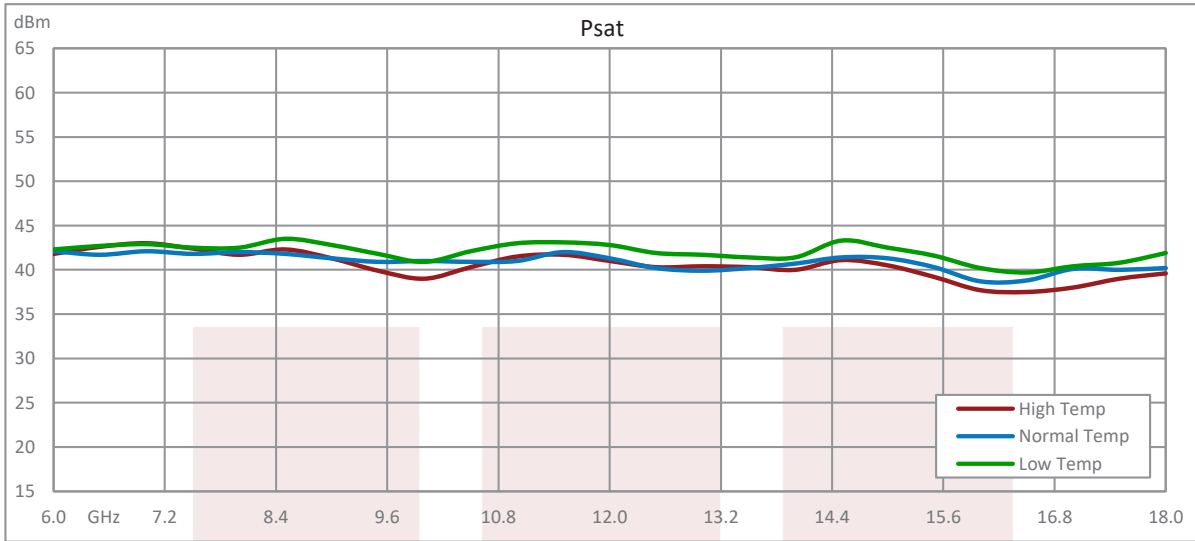


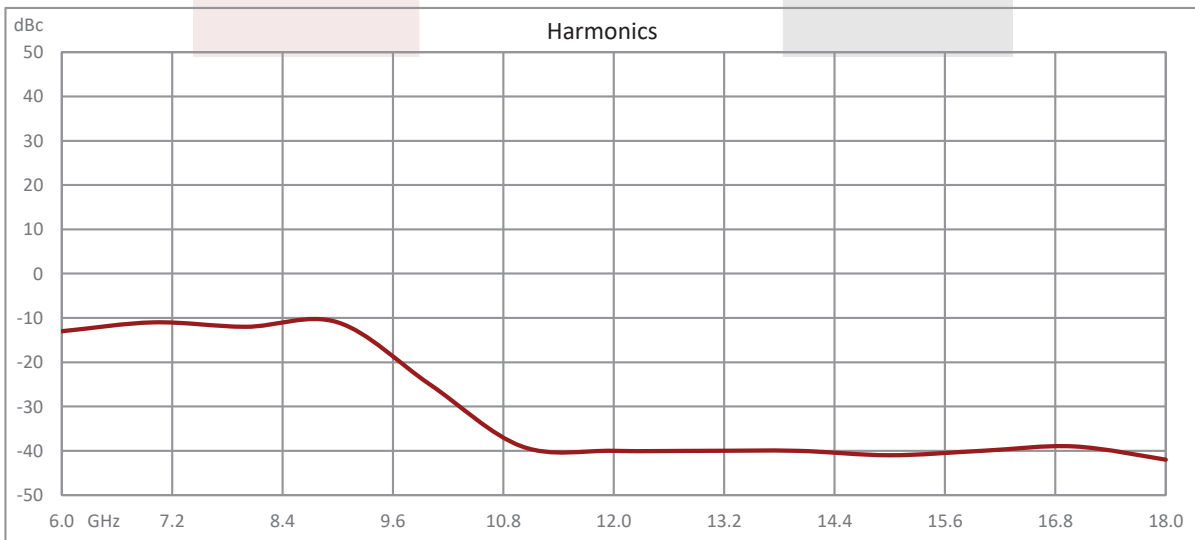
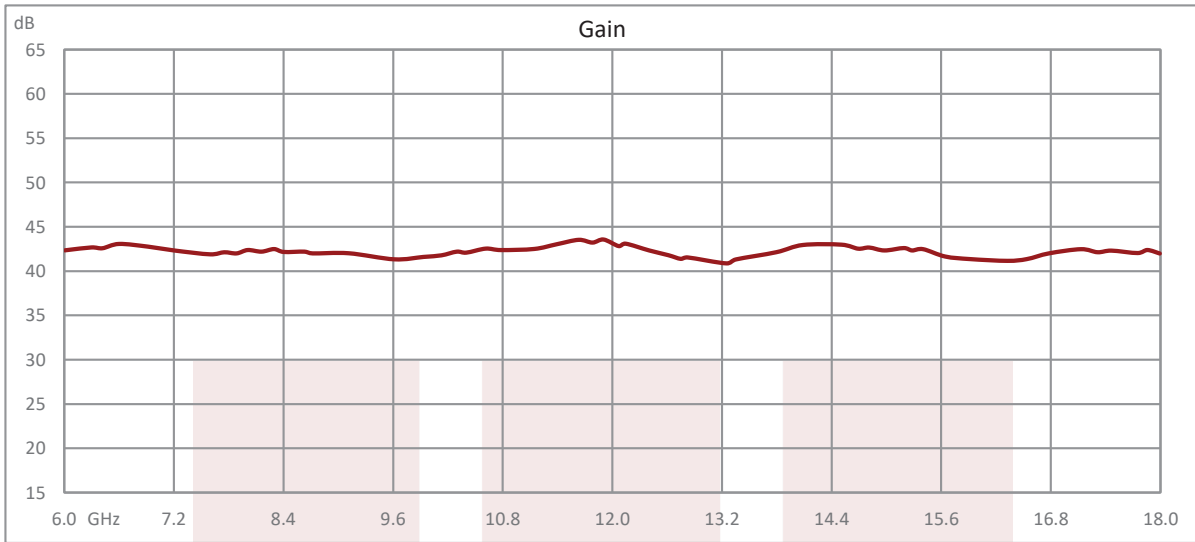
illustration of Amplifier mounted on Heatsink.
 Heatsink model **FMAMG5060F** sold
 separately. (Picture shown for Reference Only)

Functional Block Diagram



Typical Performance Data



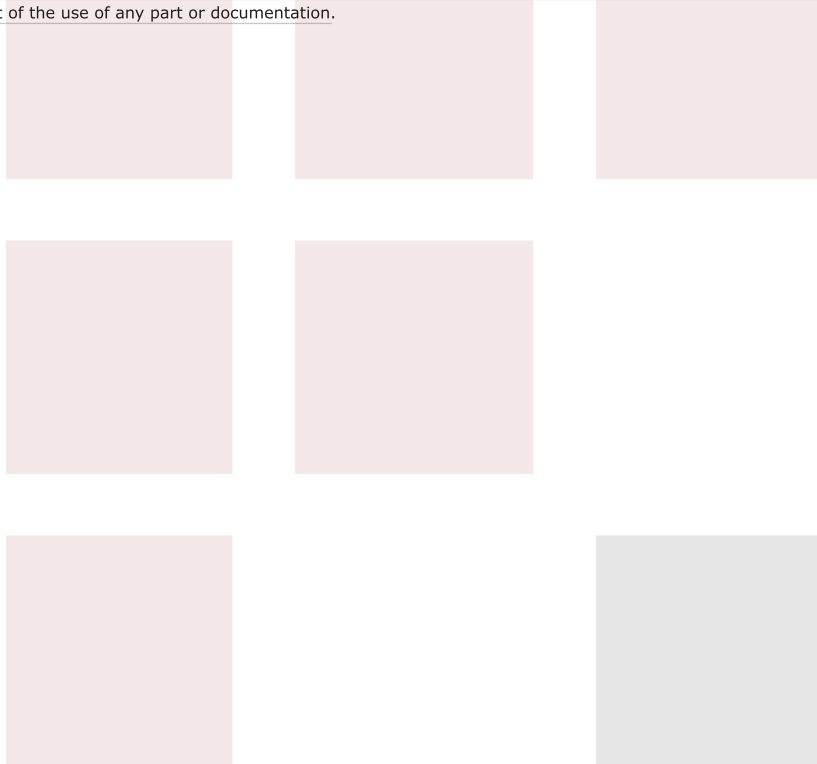


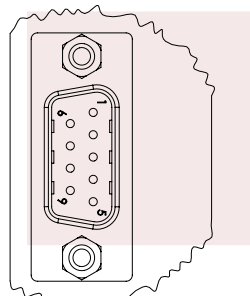
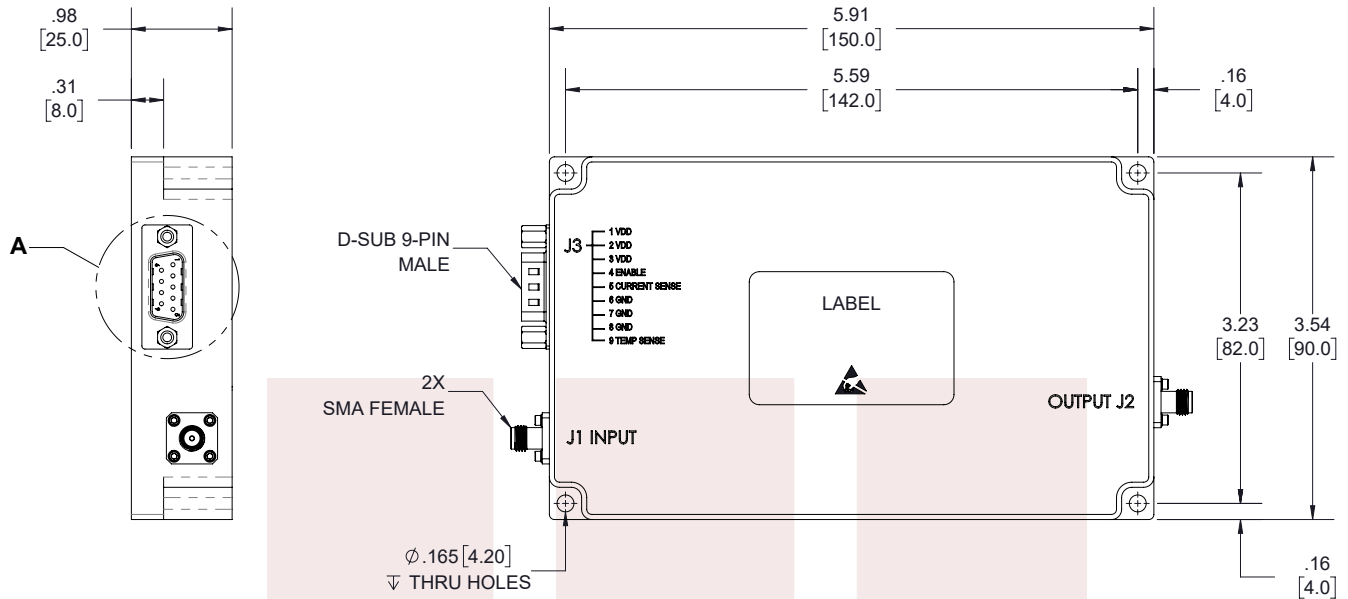
40 dB Gain High Power GaN Amplifier at 10 Watt Psat Operating from 6 GHz to 18 GHz with SMA from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Lewisville, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: [40 dB Gain High Power GaN Amplifier at 10 Watt Psat Operating from 6 GHz to 18 GHz with SMA FMAM5070](#)

URL: <https://www.fairviewmicrowave.com/high-power-amplifier-10watt-fmam5070-p.aspx>

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DETAIL A

| D-SUB 9-PIN, MALE | | |
|-------------------|---------------|--|
| PIN # | DESCRIPTION | SPECIFICATIONS |
| 1,2,3 | VDD | 28 VDC |
| 4 | ENABLE | Amplifier Enable: TTL Logic High (3.3V) (Internally Pulled-Low) |
| 5 | CURRENT SENSE | Analog voltage relative to I_{DD} @100mV per Ampere |
| 6,7,8 | GND | Ground |
| 9 | TEMP SENSE | Analog voltage relative to Module's Temperature @10 mV/°C |

LABEL

Fairview Microwave

 an INFINIT[®] brand

FMAM5070

 S/N: XXXXXXXX

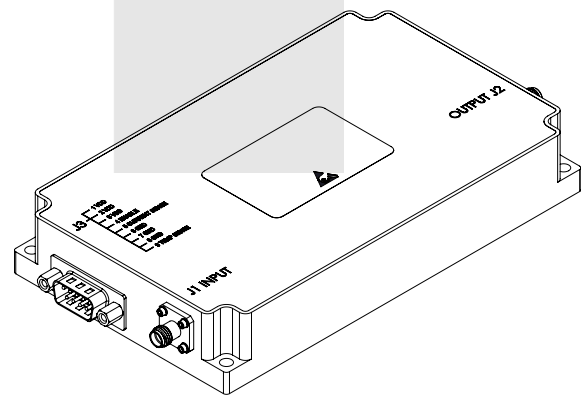
STANDARD TOLERANCES

| | |
|------|--------|
| .X | ±0.2 |
| .XX | ±0.01 |
| .XXX | ±0.005 |

*STANDARD TOLERANCES APPLY ONLY TO DIMENSIONS IN INCHES

NOTES:

- ADEQUATE HEATSINK REQUIRED.



| | | | | | | | |
|--|---|--------------|---------------------------|-----------|---------------------------|--------|------|
| Fairview Microwave an INFINIT [®] brand | NOTES: 1. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE NOMINAL. 2. ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AT ANY TIME. 3. DIMENSIONS ARE IN INCHES [mm]. | | | | | | |
| | TITLE 40 dB Gain High Power GaN Amplifier at 10 Watt Psat Operating from 6 GHz to 18 GHz with SMA | | DWG NO FMAM5070 | | CAGE CODE 3FKR5 | | |
| CAD FILE 07/30/19 | | SHEET 1 OF 1 | | SCALE N/A | | SIZE A | 7361 |