

## 8 dB DC Coupled Amplifier Operating from DC to 2 GHz with 11 dBm P1dB and SMA

The FMAM86000 is general purpose DC coupled amplifier operates with 3 dB Bandwidth of 2000 MHz, designed for wideband signal processing applications. The amplifier offers +11 dBm typ of P1dB, 8 dB typ Gain, IP3 +25 dBm typ with Input/output ports are matched for 50 ohms. This DC coupled amplifier requires a dual input voltage supply of  $\pm 12$  VDC and includes built-in voltage regulation, is unconditionally stable and operates over the temperature range of  $-40^{\circ}\text{C}$  and  $+85^{\circ}\text{C}$ . The rugged compact package assembly is designed to meet MIL-STD-202 environmental test conditions for Humidity, Shock, Vibration, and Altitude.



### Electrical Specifications

(TA =  $+25^{\circ}\text{C}$ , DC Voltage = 9 and 12 Volts, DC Current = 45mA)

Description	Minimum	Typical	Maximum	Units
Frequency Range	DC		2	GHz
Small Signal Gain		8		dB
Output 3rd Intercept Point		+25		dBm
Noise Figure		16	18	dB
Reverse Isolation		50		dB
Slew Rate (Vout = 1.5 V/Step)		5,500		us/V
Second Harmonic Distortion		66		dBc
Third Harmonic Distortion		81		dBc
Settling Time		600		ps
Operating DC Voltage	9	12	15	Volts
Operating DC Current		45	60	mA
Operating Temperature	-40		+85	$^{\circ}\text{C}$

### RF Characteristic Description

Description	Band 1	Band 2	Band 3	Units
Frequency Range	DC to 0	0 to 0.5	0.5 to 1	GHz
Output at 1 dB Compression Point	+12.4	+11.3	+6.5	dBm

### Features:

- 3 dB Bandwidth of 2000 MHz
- P1dB: +11 dBm typ
- Small Signal Gain: 8 dB typ
- IP3: 30 dBm min
- 50 Ohm Input and Output Matched
- $-40$  to  $+85^{\circ}\text{C}$  Operating Temperature
- Unconditionally Stable
- Dual Input Voltage Supply of  $\pm 12$  VDC
- Built-in Voltage Regulator

### Applications:

- Laboratory Applications
- R&D Labs
- Military Radio
- Radar Systems
- Telecom Infrastructure
- Test Instrumentation
- Military & Space
- Communication Systems
- Wireless Communication
- Microwave Radio Systems
- Cellular Base Stations
- Low Noise Amplifier
- General Purpose Amplification
- General Purpose Wireless
- Wideband Gain Block
- IF Amplifier/RF Driver Amplifier
- RF Wideband Front Ends
- RF Pre-amplification

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Parameter	Unit	Minimum	Typical	Maximum
Frequency Range (-3dB)	MHz	0		2000
Power Gain f = 0Hz	dB		8.0	
f = 100MHz	dB		8.0	
f = 500MHz	dB		8.0	
f = 1000MHz	dB		7.8	
f = 1500MHz	dB		7.3	
f = 2000MHz	dB		5.0	
Voltage Gain (RL=∞) f = 0 Hz			+5	
P <sub>1dB</sub> f = 10KHz	dBm		+12.4	
f = 100MHz	dBm		+12.4	
f = 500MHz	dBm		+11.3	
f = 1000MHz	dBm		+6.5	
f = 1500MHz	dBm		+2.0	
f = 2000MHz	dBm		-2.5	
IP3 f = 100MHz	dBm		+39	
f = 300MHz	dBm		+32	
f = 500MHz	dBm		+27	
Slew Rate Vout = 1.5V Step	μs/V		5500	
Output Voltage Swing f = 100MHz	Vp-p		1.6	
f = 500MHz	Vp-p		1.5	
Output Current f = 100MHz	mA		±16	
Output Voltage* Pin= 0dBm				
f = 100KHz RL=∞	Vp-p		3.3	
f = 100MHz RL=∞	Vp-p		2.9	
f = 500MHz RL=∞	Vp-p		1.7	
Second Harmonic Distortion	dBc		-66	
Third Harmonic Distortion	dBc		-81	
Third Order Intermodulation IMD3	dBc		-73	
Reserve Isolation	dB		-50	
Input Offset Voltage	mV		2.0	
Average Offset Voltage Drift	μV/°C		±20	
Input Bias Current	μA			7
Average Bias Current Drift	nA/°C		±55	
Input Voltage Noise f = 1MHz	nV/√Hz		2.5	
Noise Figure f = 100MHz	dB		16	
Return Loss f = 500MHz Input	dB		-25	
Output	dB		-26	
DC Power Supply	V	±8	±12	±18
Supply Current	mA		±45	

**Absolute Maximum Rating**

Parameter	Rating	Units
RF Input Power	+13	dBm
Input DC Voltage	±3	V
Supply Voltage	±20	V
Operating Temperature	-40 to +85	°C
Storage Temperature	-55 to +125	°C



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

**Mechanical Specifications**

**Size**

Length	1.25 in [31.75 mm]
Width	1.25 in [31.75 mm]
Height	0.56 in [14.22 mm]
Weight	0.089 lbs [40.37 g]
Input Connector	SMA Female
Output Connector	SMA Female

**Environmental Specifications**

**Temperature**

Operating Range	-40 to +85 deg C
Storage Range	-55 to +125 deg C

Humidity	MIL-STD-202F, Method 103B, Condition B
Shock	MIL-STD-202F, Method 213B, Condition B
Vibration	MIL-STD-202F, Method 204D, Condition B
Altitude	MIL-STD-202F, Method 105C, Condition B

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

**Plotted and Other Data**

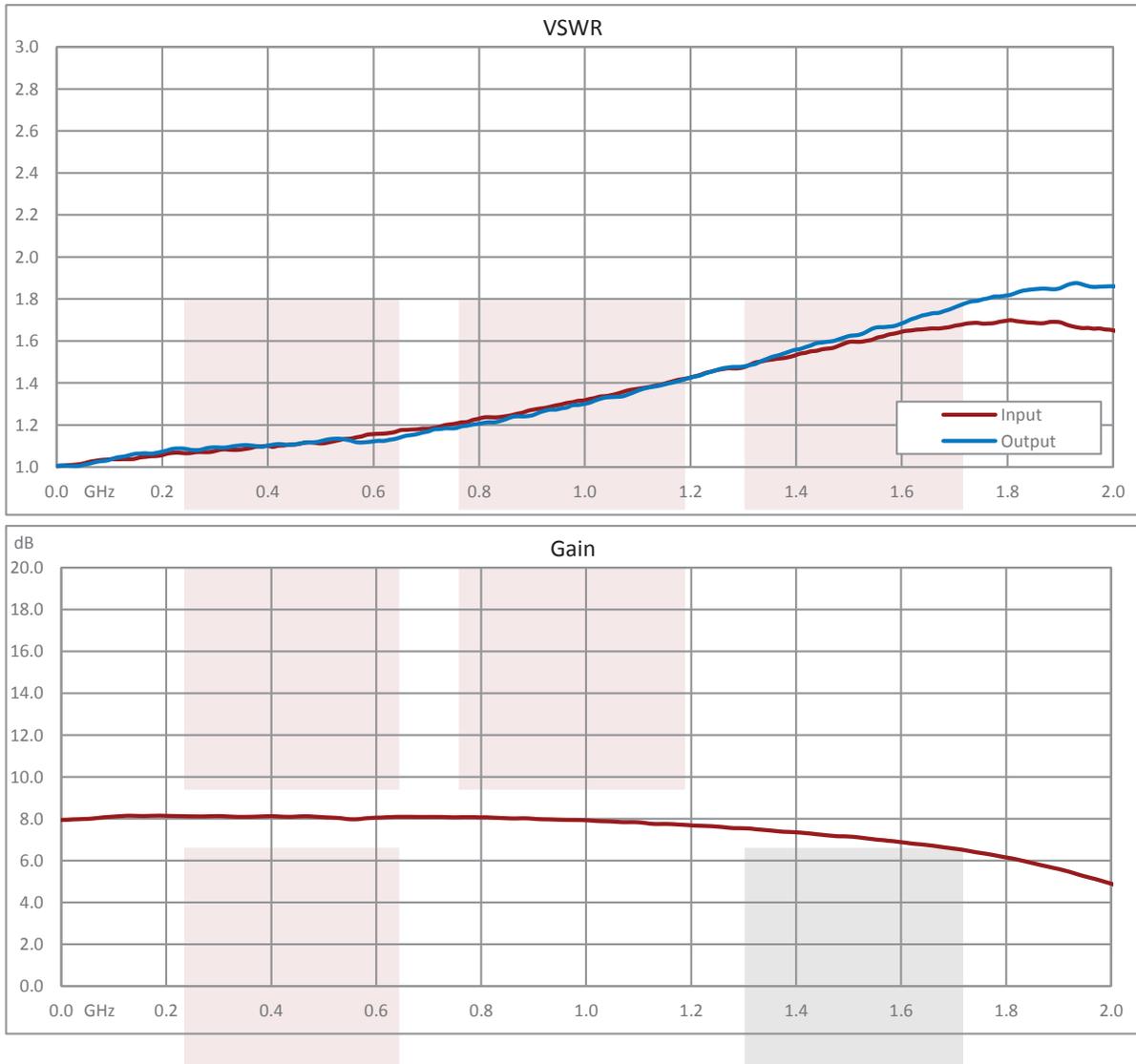
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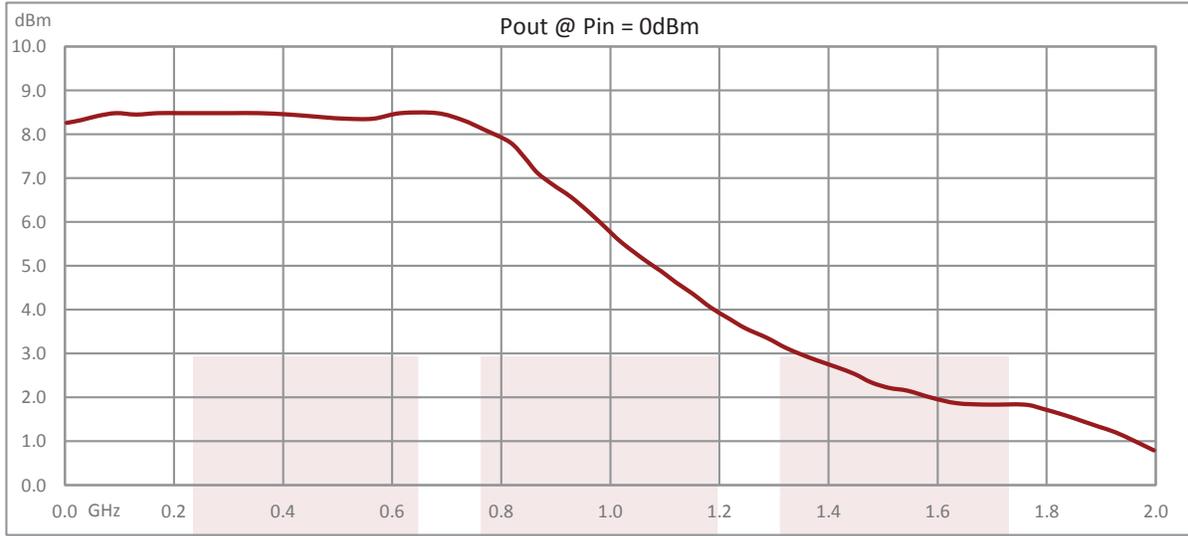
- Values at +25 °C, sea level
- ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in approved ESD Workstation.

## 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.

**Typical Performance Data**



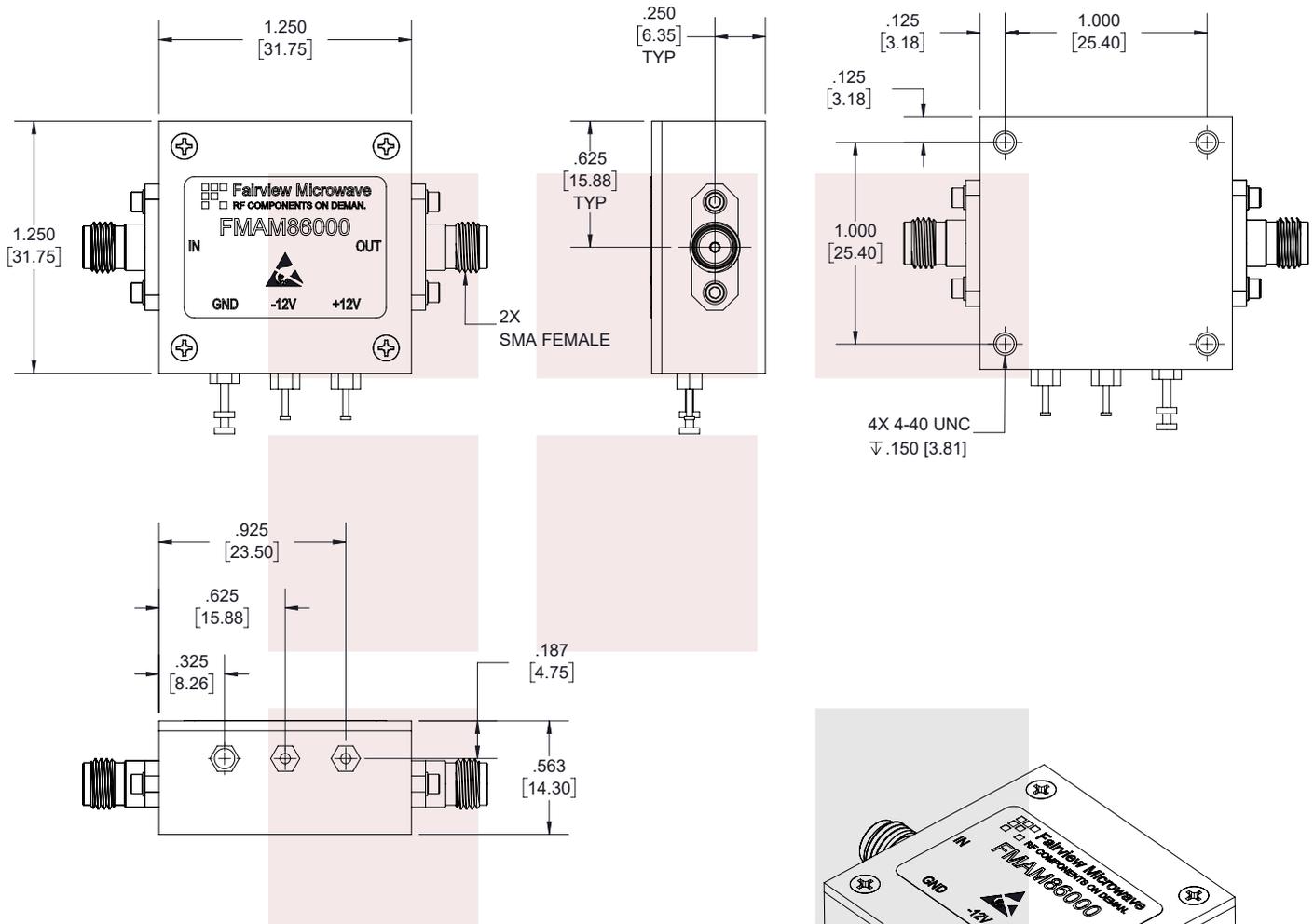


8 dB DC Coupled Amplifier Operating from DC to 2 GHz with 11 dBm P1dB and SMA from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Allen, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: [8 dB DC Coupled Amplifier Operating from DC to 2 GHz with 11 dBm P1dB and SMA FMAM86000](#)

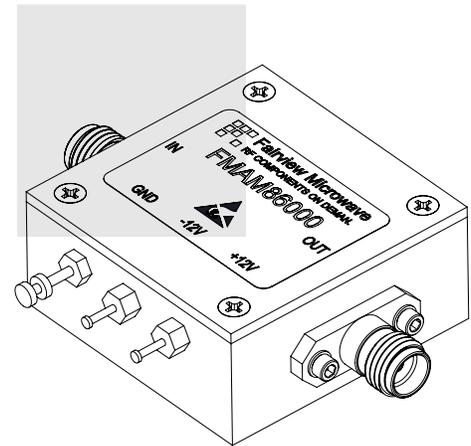
URL: <https://www.fairviewmicrowave.com/8-db-gain-block-amplifier-2-ghz-fmam86000-p.aspx>

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STANDARD TOLERANCES	
.X	±0.2
.XX	±0.01
.XXX	±0.005

\*STANDARD TOLERANCES APPLY ONLY TO DIMENSIONS IN INCHES



		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 8 dB DC Coupled Amplifier Operating from DC to 2 GHz with 11 dBm P1dB and SMA		DWG NO FMAM86000	CAGE CODE 3FKR5
CAD FILE	04/23/18	SHEET	1 OF 1
SCALE	N/A	SIZE	A
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