

## 14 dB DC Coupled Amplifier Operating from DC to 1.5 GHz with 11 dBm P1dB and SMA

The FMAM86001 is general purpose DC coupled amplifier operates with 3 dB Bandwidth of 1500 MHz, designed for wideband signal processing applications. The amplifier offers +11 dBm typ of P1dB, 14 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		1.5	GHz
Small Signal Gain		14		dB
Output 3rd Intercept Point +24		+27		dBm
Noise Figure		16	18	dB
Input VSWR		1.2:1	1.5:1	
Output VSWR		1.2:1	1.5:1	
Reverse Isolation	45	55		dB
Slew Rate (Vout = 1.8 V/Step)		5,500		us/V
Second Harmonic Distortion		63		dBc
Third Harmonic Distortion	45	55		dBc
Settling Time		2	3	ns
Operating DC Voltage	9	12	15	Volts
Operating DC Current		45	60	mA
Operating Temperature	-40		+85	$^{\circ}\text{C}$

### Features:

- 3 dB Bandwidth of 1500 MHz
- P1dB: +11 dBm typ
- Small Signal Gain: 14 dB typ
- IP3: +25 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	Frequency	Unit	Minimum	Typical	Maximum
Frequency Range (-3dB)		MHz	0		1500
Power Gain S <sub>21</sub>	f = 0Hz	dB	13.0	14.0	
	f = 100MHz	dB	13.0	14.0	
	f = 500MHz	dB	12.9	13.9	
	f = 1000MHz	dB	11.8	12.8	
	f = 1500MHz	dB	10.5	11.4	
Voltage Gain (R <sub>L</sub> =∞)	f = 0 Hz		9.5	10	
P <sub>1dB</sub>	f = 10KHz	dBm	+10.0	+12.0	
	f = 100MHz	dBm	+10.5	+12.5	
	f = 500MHz	dBm	+9.0	+11.0	
	f = 1000MHz	dBm	+4.5	+6.5	
	f = 1500MHz	dBm	+0.5	+2.5	
IP <sub>3</sub>	f = 100MHz	dBm	+33	+37	
	f = 300MHz	dBm	+24	+27	
	f = 500MHz	dBm	+22	+25	
Slew Rate V <sub>out</sub> = 1.8V/Step		μs/V	4500	5500	
Output Voltage	f = 100KHz	Vp-p	1.4	1.7	
Pin=-5dBm R <sub>L</sub> = 50 Ω	f = 100MHz	Vp-p	1.4	1.7	
Output Voltage *	f = 100KHz	Vp-p	2.5	3.5	
Pin=-5dBm R <sub>L</sub> = ∞	f = 100MHz	Vp-p	2.3	3.3	
Reverse Isolation S <sub>12</sub>	f = 750MHz	dB	-45	-55	
Output Current	f = 100MHz	mA	±15	±18	
Noise Figure	f = 750MHz	dB		16	18
Second Harmonic Distortion	f = 100MHz	dBc	-53	-63	
Third Harmonic Distortion	f = 100MHz	dBc	-45	-55	
Third Order Intermod IMD <sub>3</sub>	f = 100MHz	dBc	-57	-67	
Settling Time		ns		2.0	3.0
Input VSWR S <sub>11</sub>	f = 750MHz			1.2:1	1.5:1
Output VSWR S <sub>22</sub>	f = 750MHz			1.2:1	1.5:1
DC Power Supply		V	±9	±12	±15
Supply Current		mA		±45	±60

\* Unit can drive a high impedance or capacitive load

**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	0.0907 lbs [41.14 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**

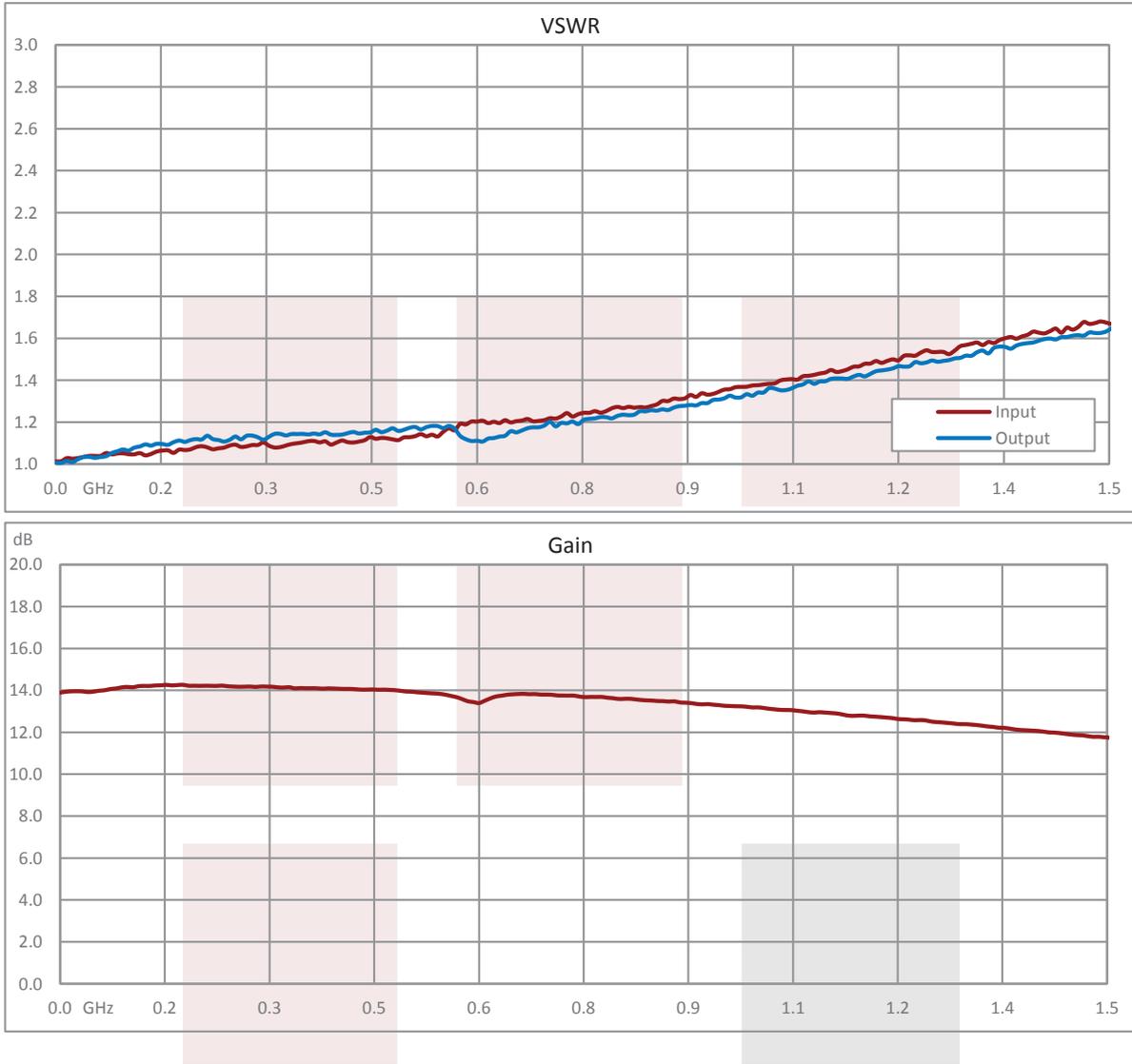
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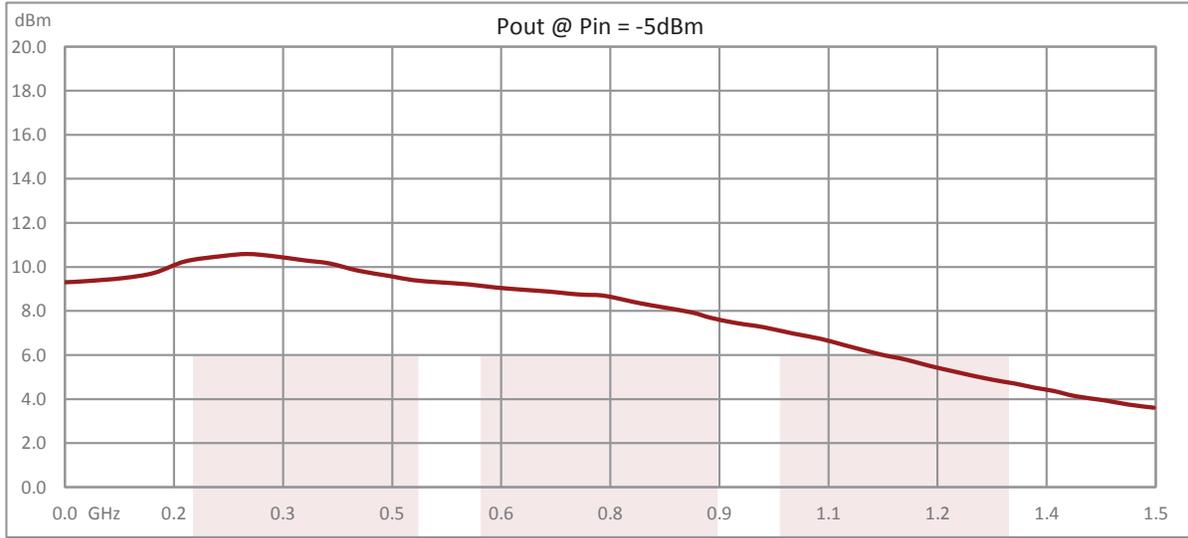
- Values at +25 °C, sea level
- ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in approved ESD Workstation.

## 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**



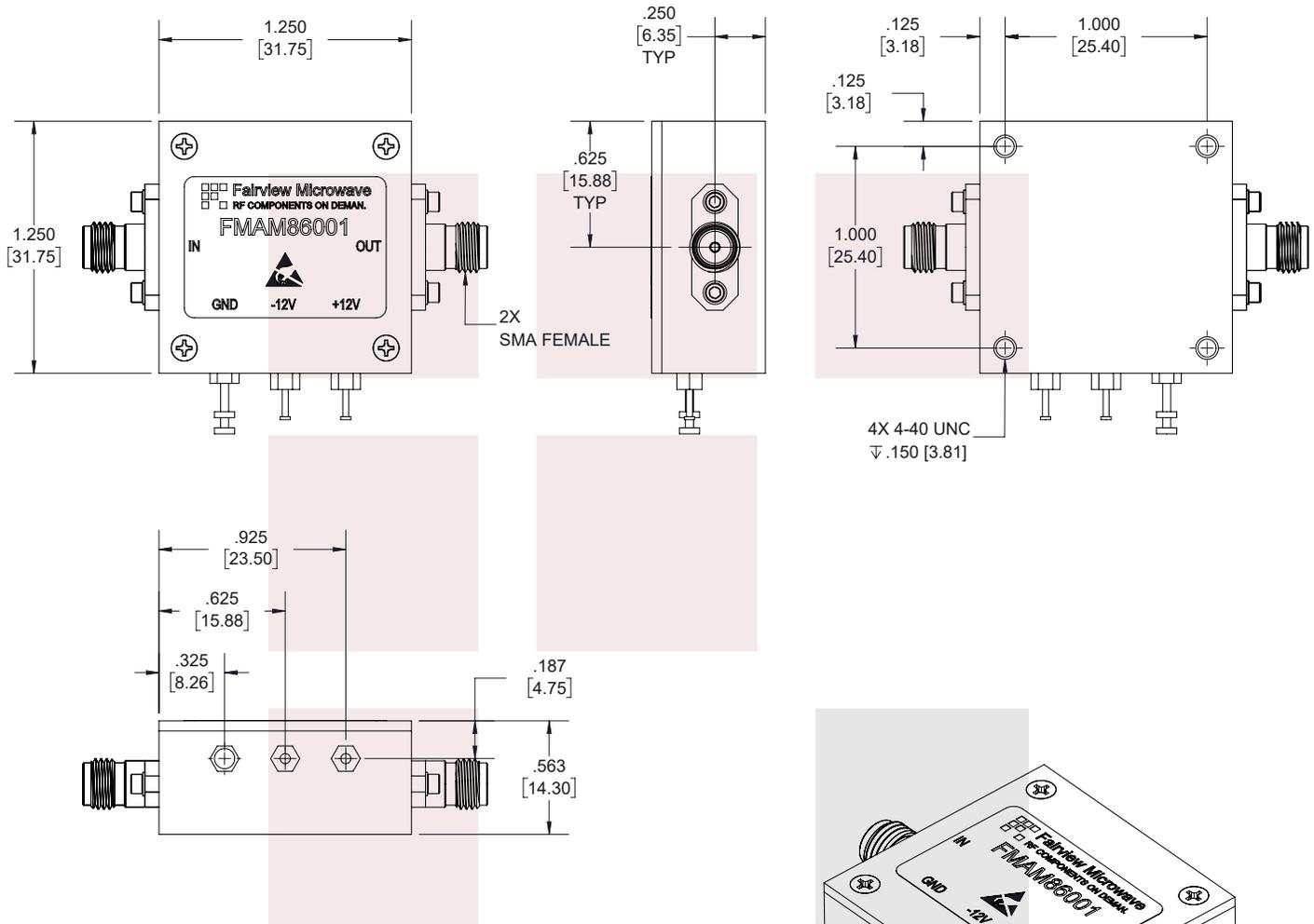


14 dB DC Coupled Amplifier Operating from DC to 1.5 GHz with 11 dBm P1dB and SMA from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Allen, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: [14 dB DC Coupled Amplifier Operating from DC to 1.5 GHz with 11 dBm P1dB and SMA FMAM86001](#)

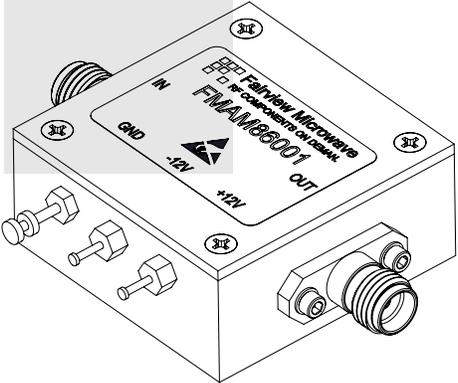
URL: <https://www.fairviewmicrowave.com/14-db-gain-block-amplifier-1.5-ghz-fmam86001-p.aspx>

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

\*STANDARD TOLERANCES APPLY ONLY TO DIMENSIONS IN INCHES



<p><b>Fairview Microwave</b> an INFINIT<sup>®</sup> brand</p>		<p>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].</p>				
TITLE		DWG NO		CAGE CODE		
14 dB DC Coupled Amplifier Operating from DC to 1.5 GHz with 11 dBm P1dB and SMA		FMAM86001		3FKR5		
CAD FILE	10/11/19	SHEET	1 OF 1	SCALE	N/A	SIZE A
						7361