

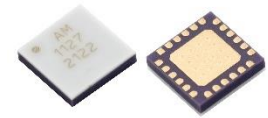
AM1127 – Amplifier

20 MHz to 6 GHz Gain Block



Description

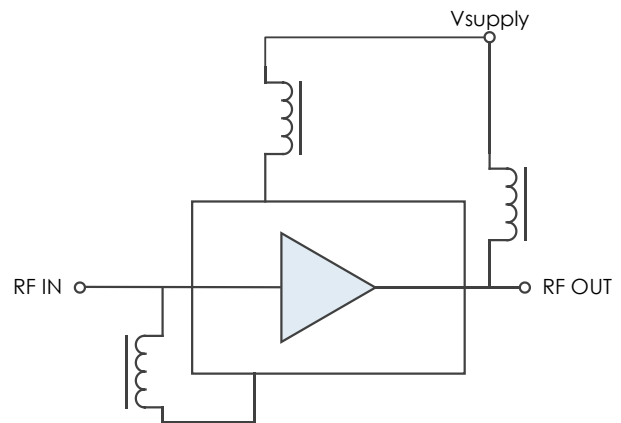
The AM1127 is a high dynamic range cascadable amplifier operating over the 20 MHz to 6.0 GHz frequency range. The device exhibits exceptional second and third order intercept performance as well as high P1dB and low noise figure. With only the need for one positive supply rail and packaged in a 4mm QFN, the AM1127 represents a compact total PCB footprint. Its high gain and linearity make the AM1127 an excellent choice for a receiver front end or transmitter backend.



Features

- 19 dB Gain
- +39 dBm OIP3
- +60 dBm OIP2
- +23 dBm P1dB
- 3.5 dB Noise Figure
- +3.0 to +6.0 V Supply Range
- 300mA Supply Current @ 6V
- 4mm QFN
- -40C to +85C Operation

Functional Diagram



Characteristic Performance

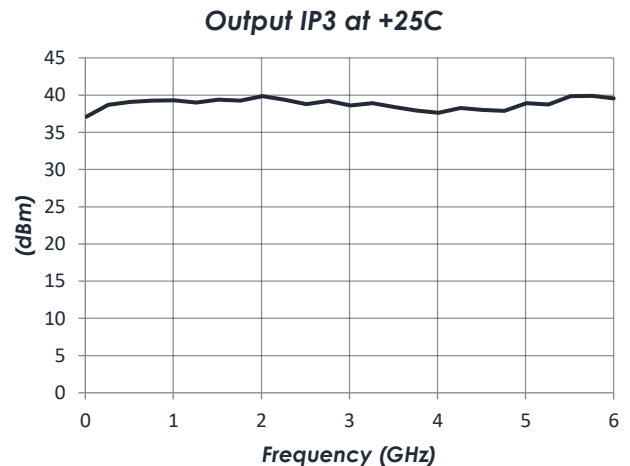
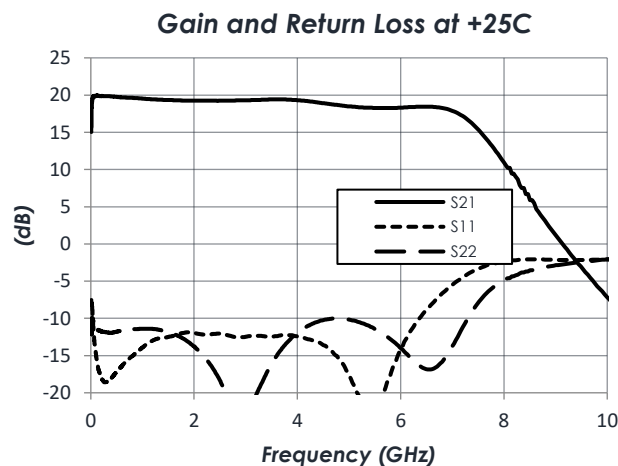


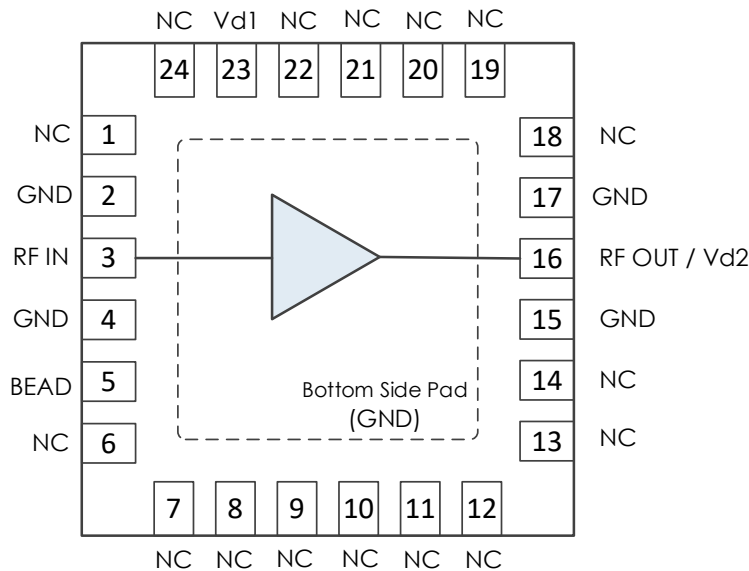
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Revision History

Date	Revision Number	Notes
February 8, 2021	0	Preliminary Release
August 2, 2021	1	Initial Release
August 16, 2021	1.1	Updated component list in Typical Application.
August 19, 2021	2	Added Current Distribution
November 29, 2021	2.1	Corrected Thermal Information

Pin Layout and Definitions



Pin Number	Pin Name	Pin Function
1	NC	No Connect
2	GND	Ground - Common
3	RF IN	RF Input – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required
4	GND	Ground - Common
5	Bead	Connect to RF IN through external ferrite bead or large inductor
6-14	NC	No Connect
15	GND	Ground - Common
16	RF OUT / Vd2	RF Output – 50 Ohms – DC Coupled. VD2 DC Power Input. External Bias Tee Required
17	GND	Ground - Common
18-22	NC	No Connect
23	Vd1	DC Power Input
24	NC	No Connect

***Note: NC pins may be grounded or left open**

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Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+6.3 V
RF Input Power		+20 dBm
Operating Junction Temperature	-40 C	+150 C
Storage Temperature Range	-55 C	+150 C

Note: Any device operation beyond the Absolute Maximum Ratings may result in permanent damage to the device. The values listed in this table are extremes and do not imply functional operation of the device at these or any other conditions beyond what is listed under Recommended Operating Conditions. Any part subjected to conditions outside of what is recommended for an extended amount of time may suffer from reliability concerns.

Handling Information

	Minimum	Maximum
Storage Temperature Range (Recommended)	-50 C	+125 C
Moisture Sensitivity Level	MSL 1	



Atlanta Micro products are electrostatic sensitive.
Follow safe handling practices to avoid damage

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+3 V	+6 V	
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+150 C

Thermal Information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θ_{JC})	32.1

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DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Supply Voltage		+3 V	+6 V	+6 V
DC Supply Current	VDD = +6 V, Total		300 mA	
	VD1 Current		150 mA	
	VD2 Current		150 mA	
Power Dissipated	VDD = +6 V		1.8 W	

RF Performance

(T = 25 °C unless otherwise specified)

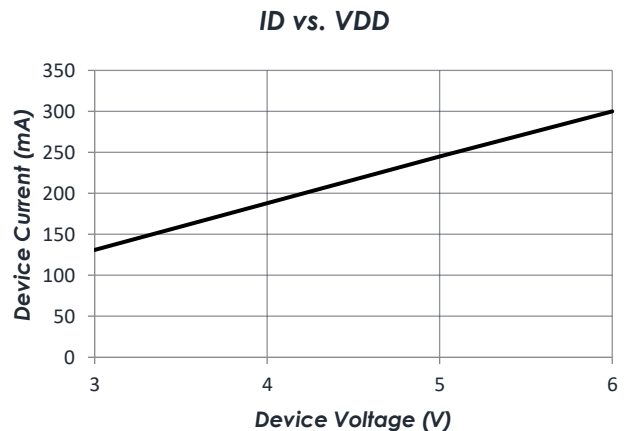
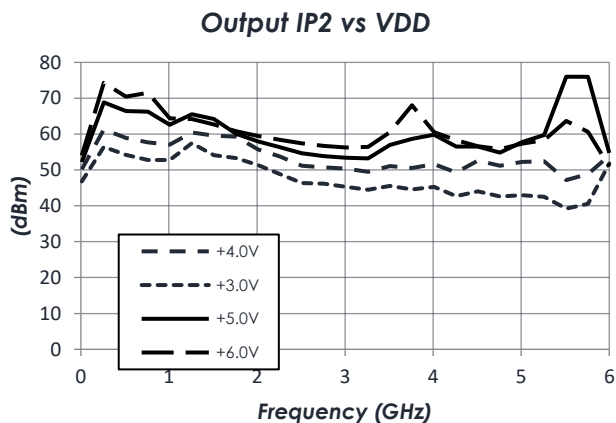
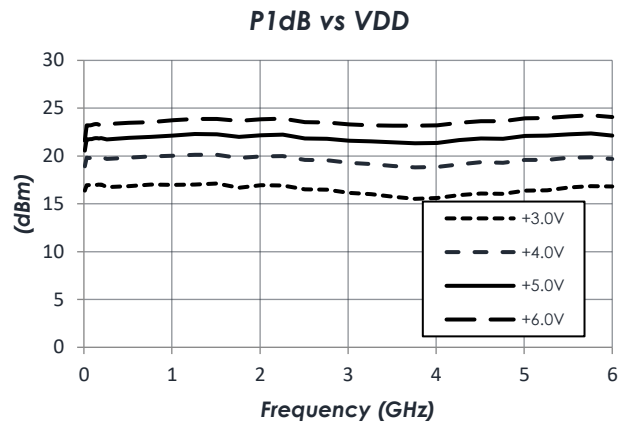
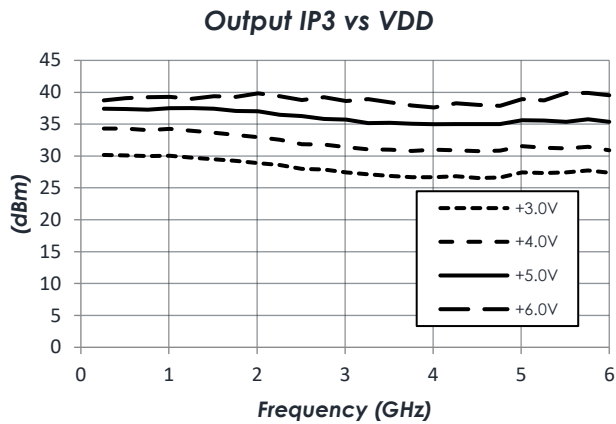
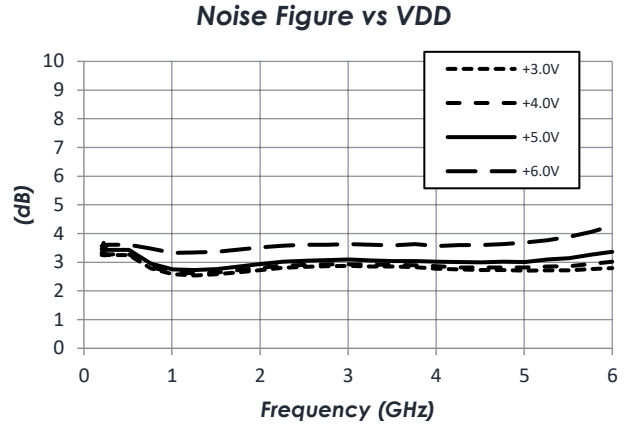
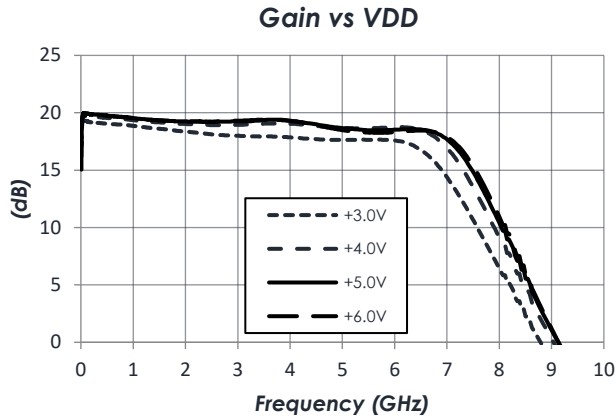
Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		0.02 GHz		6 GHz
Gain			19 dB	
Return Loss			-12 dB	
Output IP3			+39 dBm	
Output P1dB			+23 dBm	
Output OIP2			+60 dBm	
Noise Figure			3.5 dB	

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Typical Performance

(VDD = +6.0V, T = 25 °C unless otherwise specified)



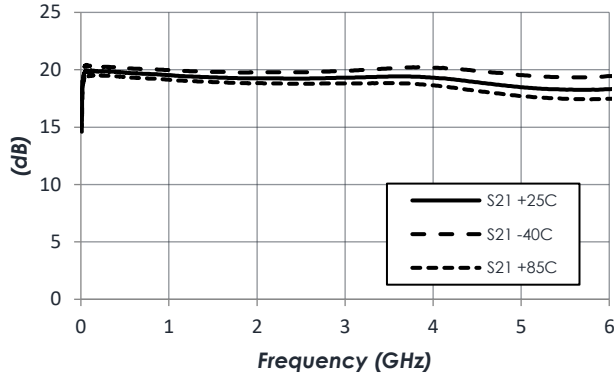
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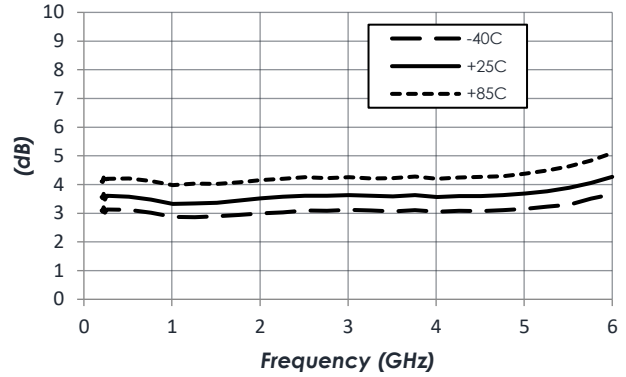
Typical Performance (continued)

(VDD = +6.0V, T = 25 °C unless otherwise specified)

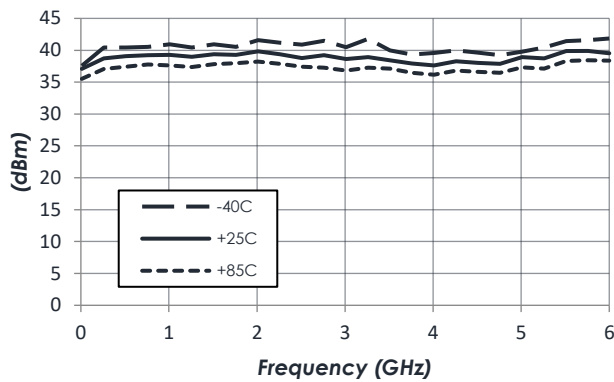
Gain vs Temperature



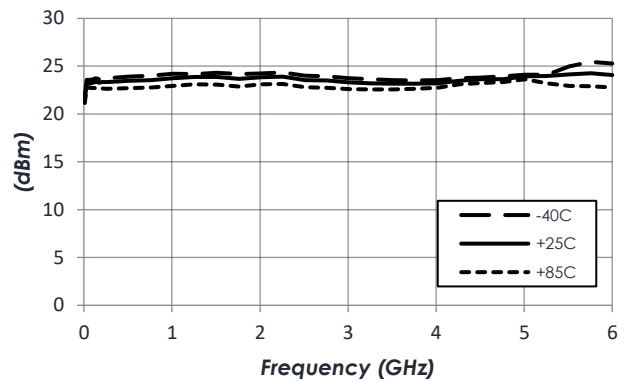
Noise Figure vs Temperature



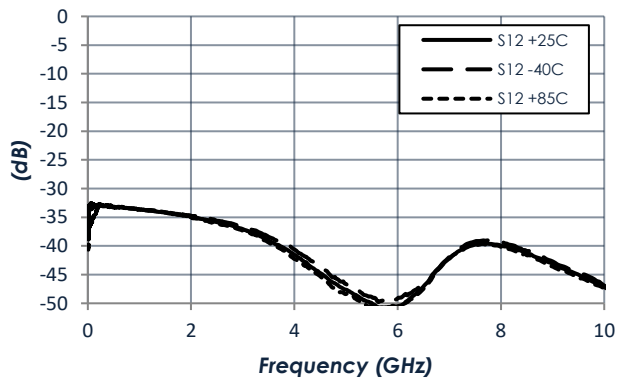
Output IP3 vs Temperature



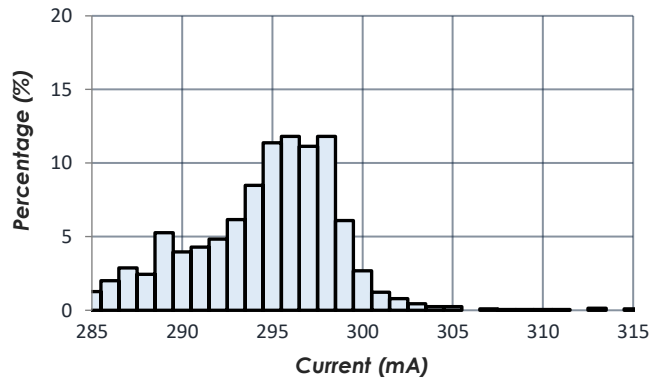
P1dB vs Temperature



Reverse Isolation vs Temperature



Current Distribution



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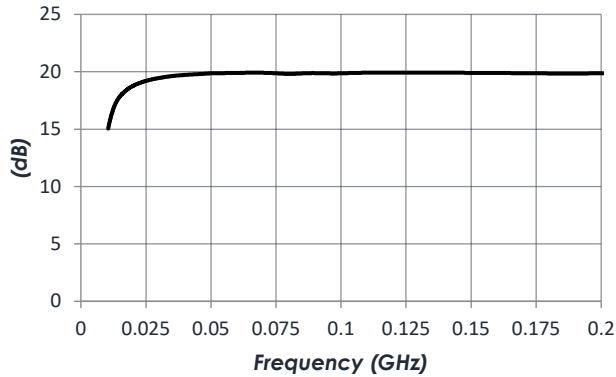
20 MHz to 6 GHz Gain Block



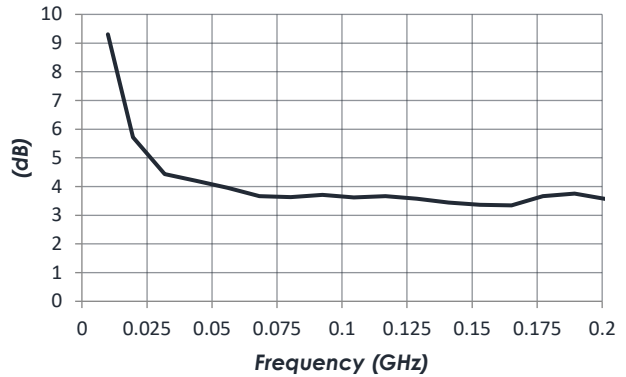
Typical Performance (continued)

(VDD = +6.0V, T = 25 °C unless otherwise specified)

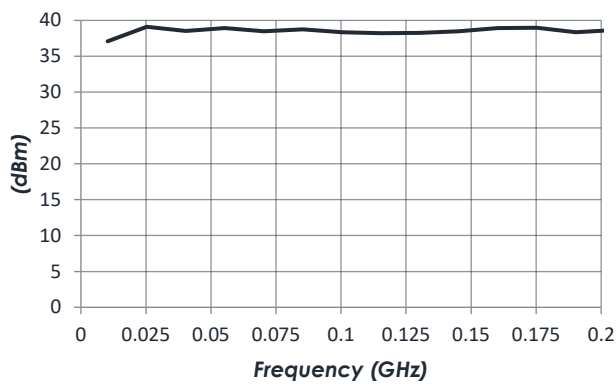
Low Frequency Gain



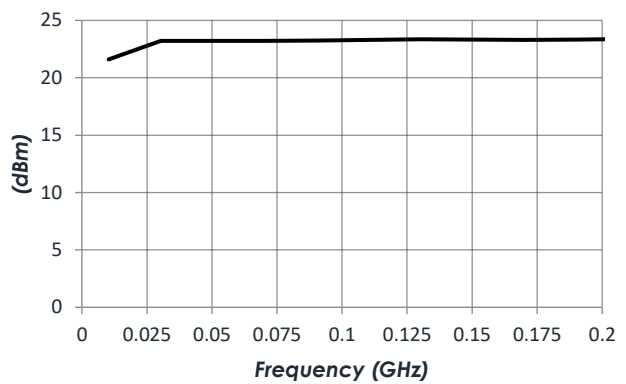
Low Frequency NF



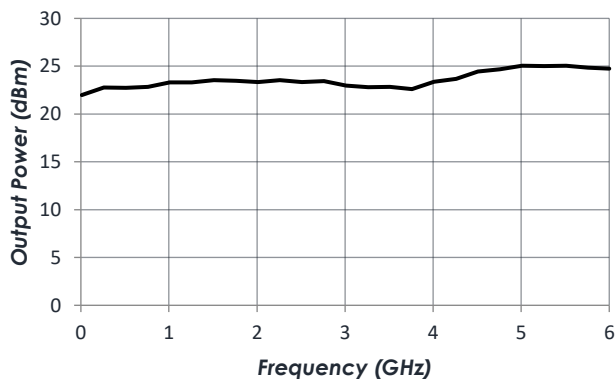
Low Frequency OIP3



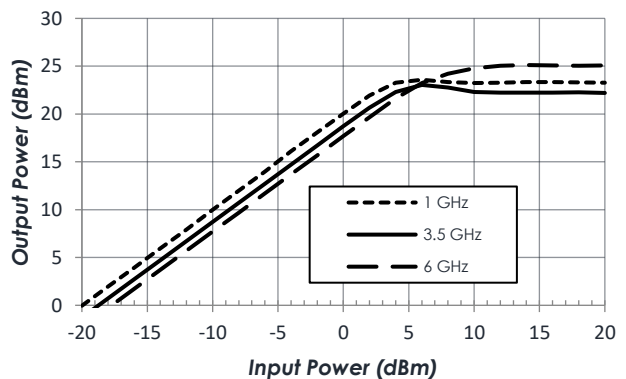
Low Frequency P1dB



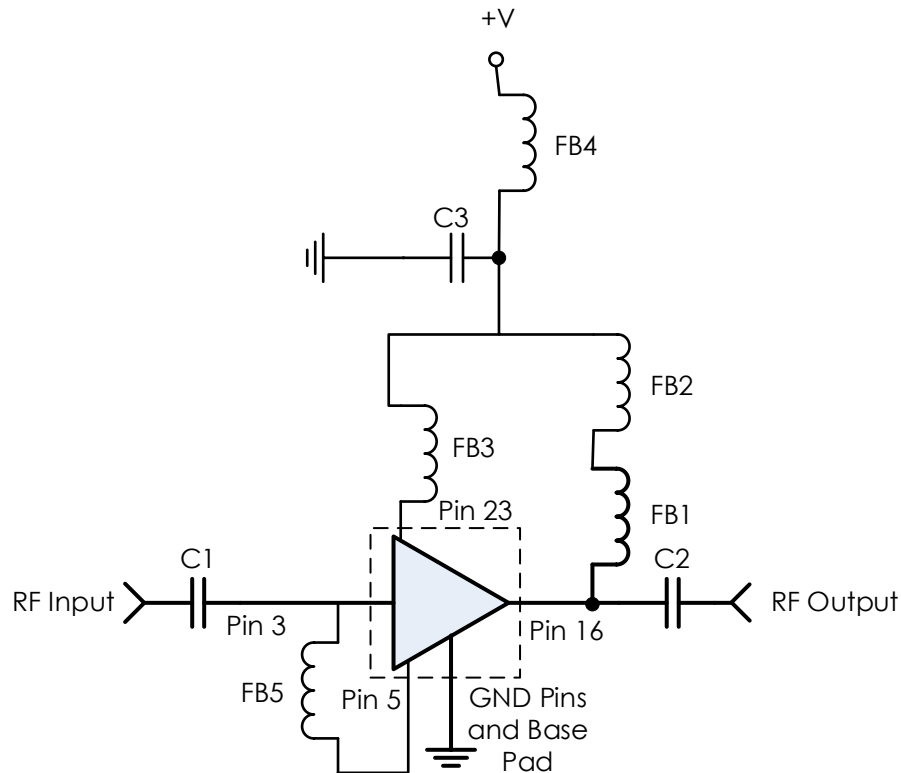
Saturated Output Power



Pin vs. Pout at +25C



Typical Application



Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1, C2	0.1 uF	0402BB104KW106	Passive Plus
C3	0.1 uF	GRM155R71C104KA88	Murata
FB1, FB2, FB3	-	MMZ1005A182ET000	TDK
FB4	-	MMZ1005S102HT000	TDK
FB5	-	MMZ1005A222E	TDK

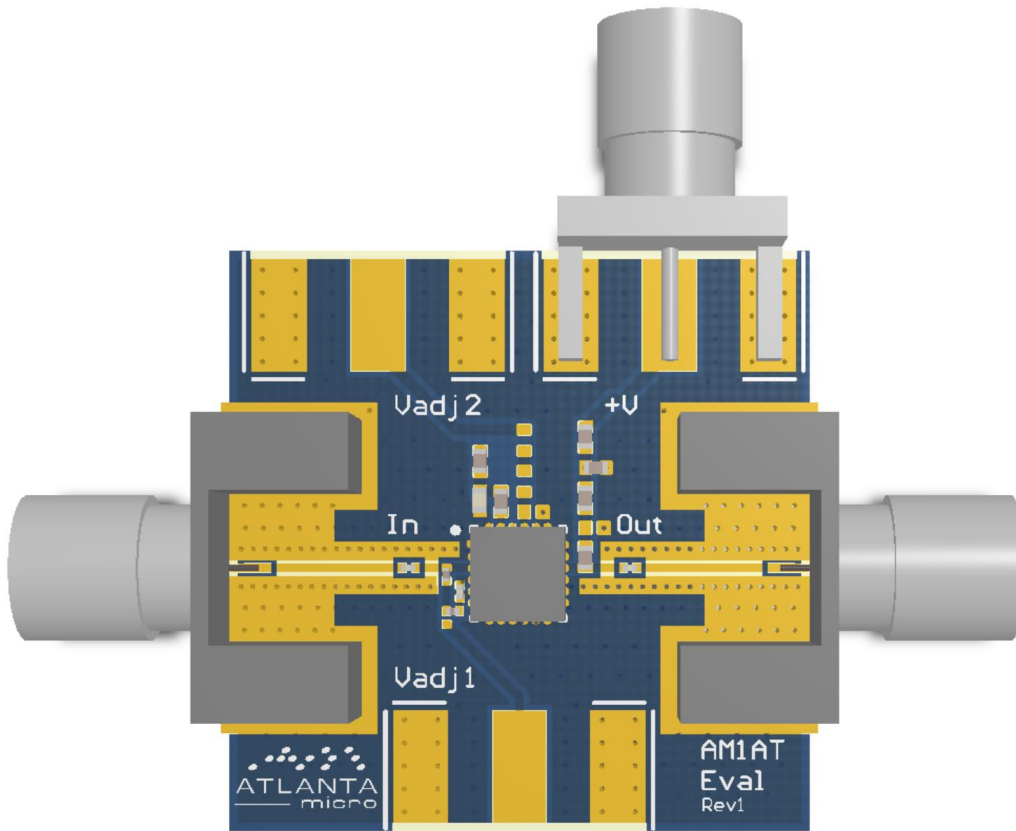
Notes:

1. NC pins may be grounded or left open
2. DC blocking capacitors should be high performance, low-loss, broadband capacitors for optimum performance
3. FB1 and FB2 choke gives best low frequency performance extension without a capacitor to ground
 - a. Low frequency performance may be improved by replacing FB1 and FB2 with a different bead, inductor, or bias tee.

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Evaluation PC Board



Related Parts

Part Number	Description
AM1018C	0.02 GHz to 6 GHz Gain Block
AM1025B	0.02 GHz to 3 GHz Gain Block
AM1084-1	DC to 6 GHz Gain Block
AM1090-1	DC to 6 GHz Gain Block

Component Compliance Information

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Substance List	Allowable Maximum Concentration
Lead (Pb)	<1000 PPM (0.1% by weight)
Mercury (Hg)	<1000 PPM (0.1% by weight)
Cadmium (Cd)	<75 PPM (0.0075% by weight)
Hexavalent Chromium (CrVI)	<1000 PPM (0.1% by weight)
Polybrominated Biphenyls (PBB)	<1000 PPM (0.1% by weight)
Polybrominated Diphenyl ethers (PBDE)	<1000 PPM (0.1% by weight)
Decabromodiphenyl Deca BDE	<1000 PPM (0.1% by weight)
Bis (2-ethylhexyl) Phthalate (DEHP)	<1000 PPM (0.1% by weight)
Butyl Benzyl Phthalate (BBP)	<1000 PPM (0.1% by weight)
Dibutyl Phthalate (DBP)	<1000 PPM (0.1% by weight)
Diisobutyl Phthalate (DIBP)	<1000 PPM (0.1% by weight)

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