

AM1142 – Amplifier

20 MHz to 18 GHz Gain Block



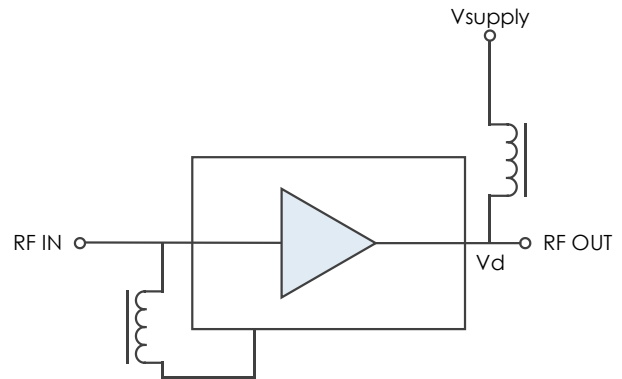
Description

AM1142 is a wideband, cascadable amplifier servicing the 20 MHz to 18 GHz frequency range. The device exhibits exceptional linearity and power handling capabilities across its bandwidth, while maintaining moderate gain and noise figure. With internal 50 Ω matching and packaged in a 3 mm QFN, the AM1142 represents a compact total PCB footprint.

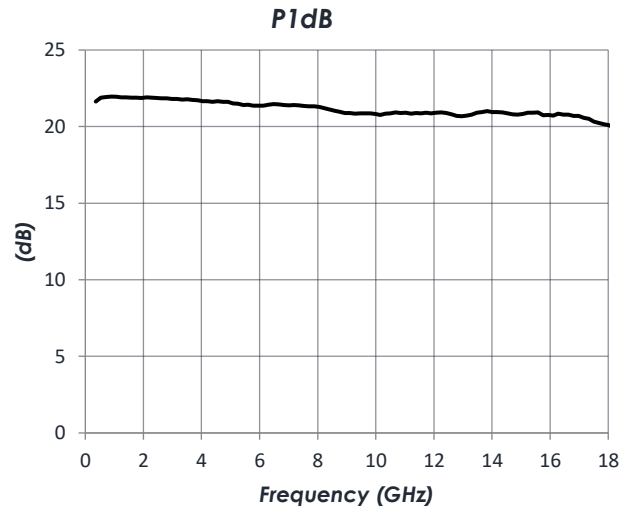
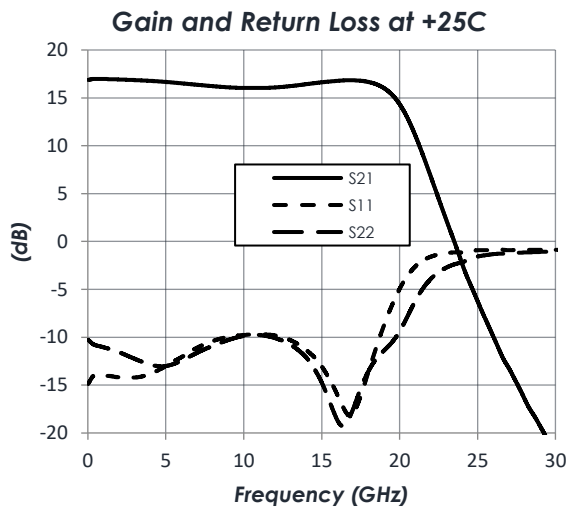
Features

- 17 dB Gain
- +31 dBm OIP3
- +21 dBm P1dB
- 2.4 dB Noise Figure
- +5.0 V Operation
- 3 mm QFN Package
- -40 C to +85 C Operation

Functional Diagram



Characteristic Performance



To obtain price, delivery, or to place an order contact sales@atlantamicro.com
Atlanta Micro Inc., now a part of Mercury Systems
3720 Davinci Ct, Suite 400, Peachtree Corners, GA 30092 • Phone: (470) 253-7640 • www.atlantamicro.com

Table of Contents

Description	1	Recommended Operating Conditions ...	4
Features	1	Thermal Information	4
Functional Diagram	1	DC Electrical Characteristics	5
Characteristic Performance	1	RF Performance	5
Revision History	2	Typical Performance	6
Pin Layout and Definitions	3	Typical Application	7
Specifications	4	Evaluation PC Board	8
Absolute Maximum Ratings	4	Related Parts	8
Handling Information	4	Component Compliance Information	9

Revision History

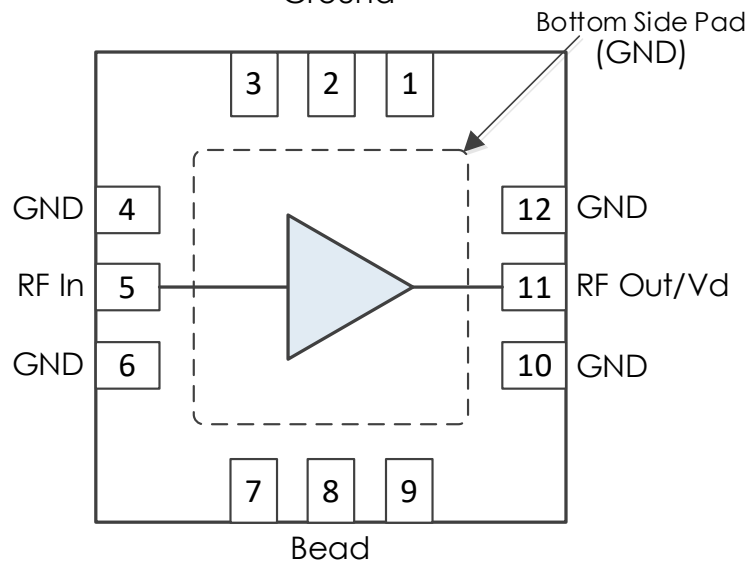
Date	Revision Number	Notes
June 26, 2023	1	Initial Release

AM1142 – Amplifier

20 MHz to 18 GHz Gain Block

Pin Layout and Definitions

Note: All Un-Labeled Pins are NC or Ground



Pin Number	Pin Name	Pin Function
1-3	NC	No Connect
4	GND	Ground – Common
5	RF In	RF Input – 50 Ohms – DC Coupled. External DC blocking capacitor required
6	GND	Ground – Common
7	NC	No Connect
8	Bead	Connect to RF In through external ferrite bead or large inductor
9	NC	No Connect
10	GND	Ground – Common
11	RF Out / Vd	RF Output and DC Power Input – 50 Ohms – DC Coupled. External DC blocking capacitor required
12	GND	Ground – Common

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

AM1142 – Amplifier

20 MHz to 18 GHz Gain Block

Specifications



Absolute Maximum Ratings

	Minimum	Maximum
Device Voltage (Vd)	-0.3 V	+5.5 V
RF Input Power		+20 dBm
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
Moisture Sensitivity Level	MSL 3	



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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Device Voltage (Vd)		+5.0 V	
Operating Case Temperature	-40 C		+85 C

Thermal Information

Junction to Case Thermal Resistance (θ_{JC})	134 C/W
Nominal Junction Temperature at +85 C ambient	+164 C
Channel Temperature to Maintain 1 Million Hour MTF	+175 C

To obtain price, delivery, or to place an order contact sales@atlantamicro.com
 Atlanta Micro Inc., now a part of Mercury Systems
 3720 Davinci Ct, Suite 400, Peachtree Corners, GA 30092 • Phone: (470) 253-7640 • www.atlantamicro.com

AM1142 – Amplifier

20 MHz to 18 GHz Gain Block

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Device Voltage (Vd)			+5.0 V	
DC Device Current	Vd = +5.0V		118 mA	
Power Dissipated By IC	Vd = +5.0V		0.59 W	

RF Performance

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		20 MHz		18 GHz
Gain	f = 0.1 GHz		17 dB	
	f = 10 GHz		16 dB	
	f = 18 GHz		17 dB	
Return Loss	f = 0.1 GHz		-10 dB	
	f = 10 GHz		-10 dB	
	f = 18 GHz		-14 dB	
Reverse Isolation	Vd = +5.0V		22 dB	
Output IP3 ¹	Vd = +5.0V		+31 dBm	
Output P1dB	Vd = +5.0V		+21 dBm	
Noise Figure	Vd = +5.0V		2.4 dB	

Notes:

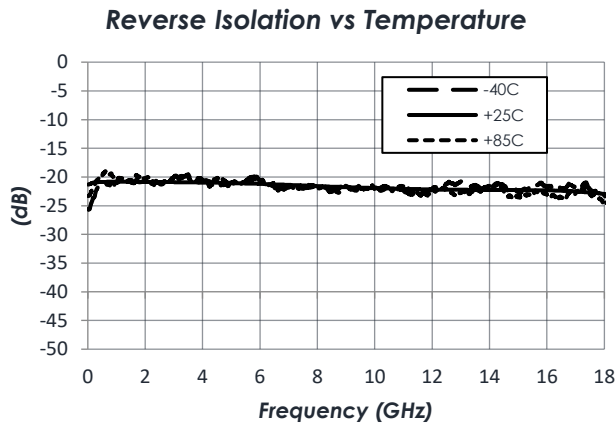
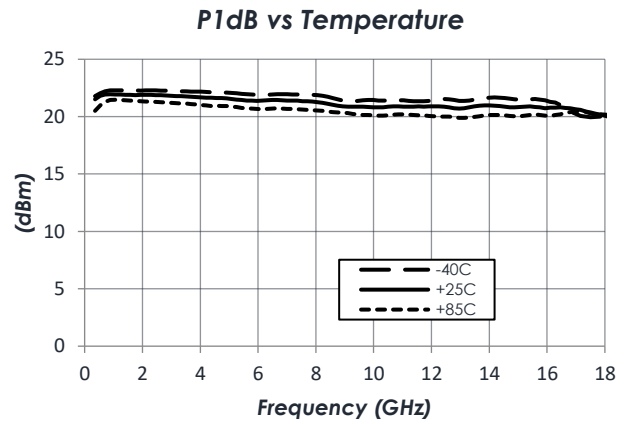
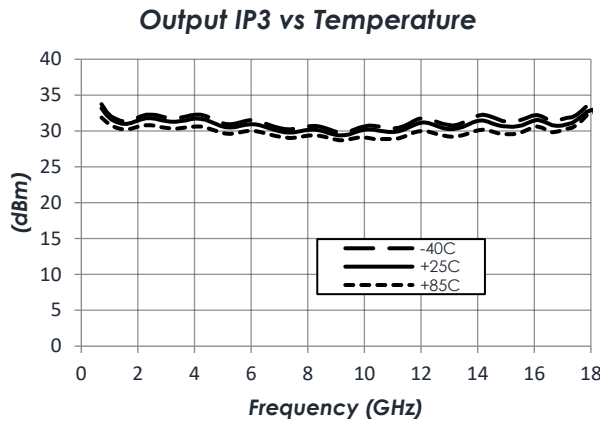
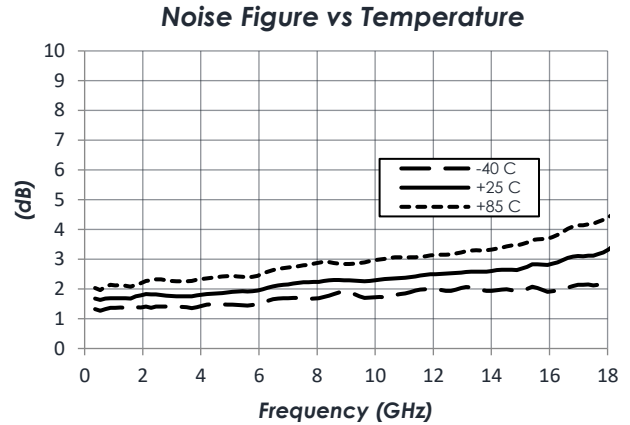
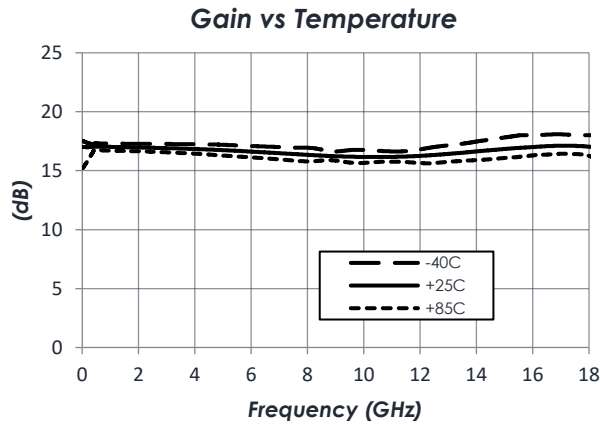
1. OIP3 measured with 10 MHz tone spacing with $P_{out/tone} = -3$ dBm
2. Data measured directly at output of device. Output bias voltage supplied through equipment bias tee and is measured exclusive of bias tee effects. Expect slightly worse performance with bias tee involved in measurements.

AM1142 – Amplifier

20 MHz to 18 GHz Gain Block

Typical Performance

(Vd = +5.0 V, T = 25 °C unless otherwise specified, Bias T de-embedded)

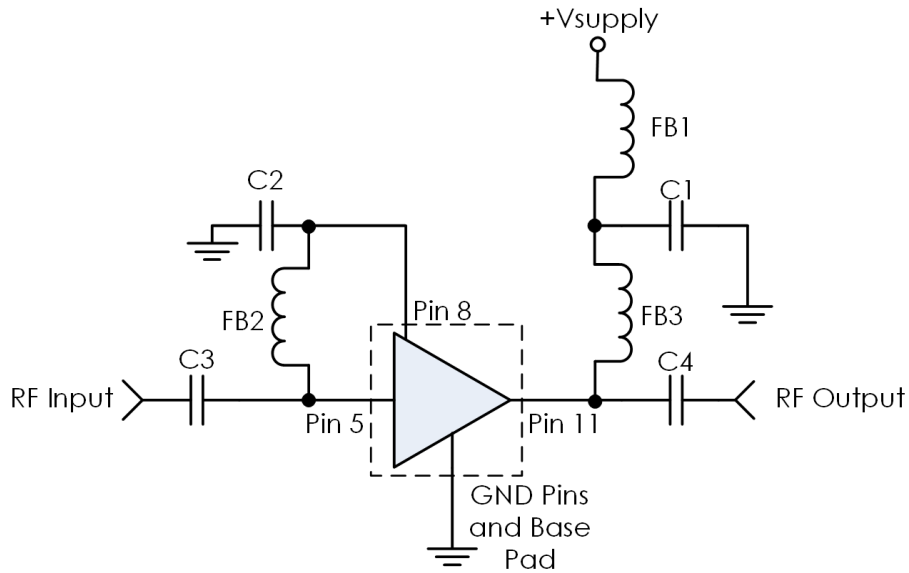


To obtain price, delivery, or to place an order contact sales@atlantamicro.com
 Atlanta Micro Inc., now a part of Mercury Systems
 3720 Davinci Ct, Suite 400, Peachtree Corners, GA 30092 • Phone: (470) 253-7640 • www.atlantamicro.com

AM1142 – Amplifier

20 MHz to 18 GHz Gain Block

Typical Application



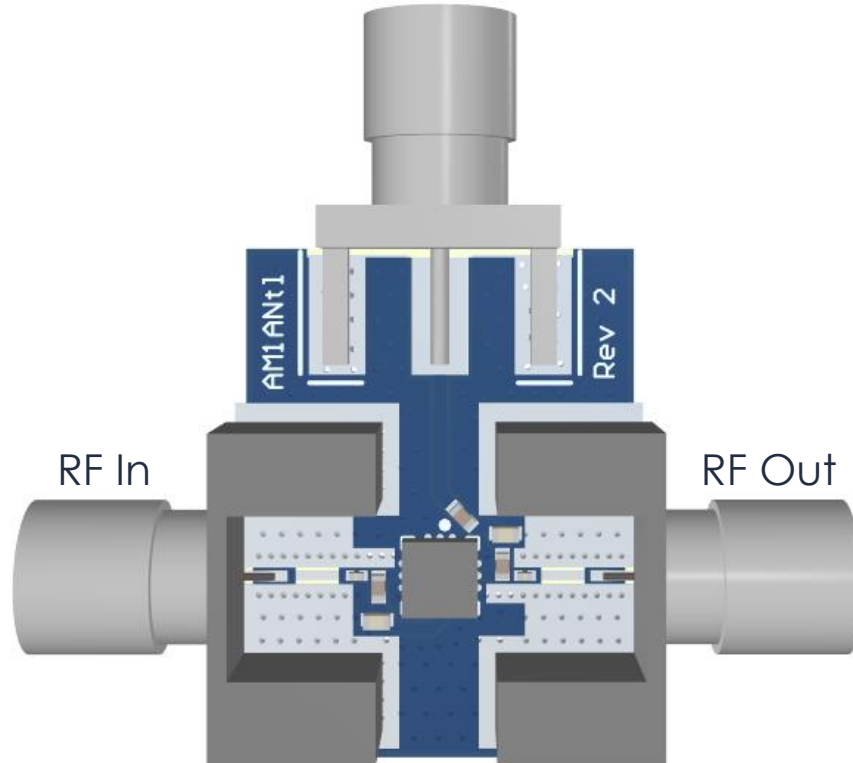
Example Component List:

Part	Value	Part Number	Manufacturer
C1, C2	0.1 μ F	GRM155R71C104KA88	Murata
C3, C4	0.1 μ F	0201BB104KW160	Passive Plus
FB1, FB2, FB3	-	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. Use RF circuit design techniques.
4. RF performance may be improved by replacing FB1, FB2, and/or FB3 with a different bead, inductor, or bias tee.

AM1142 – Amplifier
20 MHz to 18 GHz Gain Block
Evaluation PC Board



Related Parts

Part Number	Description			
AM1053	5 GHz	to	20 GHz	Broadband Gain Block
AM1095	5 GHz	to	22 GHz	Driver Amplifier
AM1102	DC	to	22 GHz	Low Noise Amplifier
AM1109	2 GHz	to	20 GHz	Low Noise Amplifier
AM1111	2 GHz	to	18 GHz	Broadband Gain Block

To obtain price, delivery, or to place an order contact sales@atlantamicro.com
 Atlanta Micro Inc., now a part of Mercury Systems
 3720 Davinci Ct, Suite 400, Peachtree Corners, GA 30092 • Phone: (470) 253-7640 • www.atlantamicro.com

AM1142 – Amplifier

20 MHz to 18 GHz Gain Block



Component Compliance Information

RoHS: Atlanta Micro, Inc. hereby certifies that all products comply with the EC Directive 2011/65/EC on the Restriction of Hazardous Substances, commonly known as EU-RoHS 6 and 10. All products supplied by Atlanta Micro shall be compliant with the European Directive 2011/65/EC based on the following substance list.

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)

REACH: Atlanta Micro, Inc. neither uses nor intentionally adds any of the substances considered to be a Substance of Very High Concern (SVHC) as defined by the EU Regulation (EC) No. 1907-2006 on Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH).

Conflict Materials: Atlanta Micro does not knowingly use materials that are sourced from the Democratic Republic of Congo (DRC) or any other known conflict regions. Atlanta Micro's supply chain is comprised of sources that are both environmentally and socially responsible. We periodically review this requirement with our vendors to ensure continued compliance.

Atlanta Micro takes its responsibility as a global partner seriously and will use due diligence within our supply chain to ensure all standards are met to the best of our knowledge.