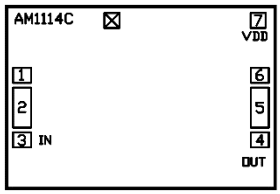
AM1114-D – Amplifier

2 to 18 GHz Slope Correcting Gain Block

Description

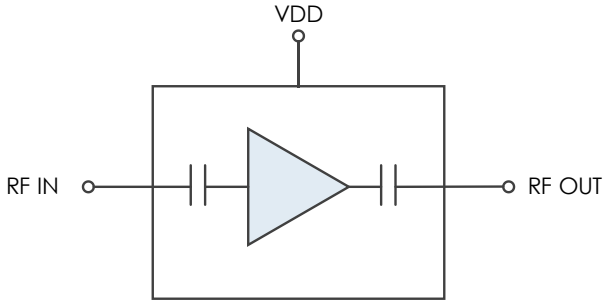
AM1114-D is a wideband, cascadable amplifier servicing the 2 to 18 GHz frequency range. The device exhibits low gain at the lower frequencies ascending to moderate gain at the higher frequencies. The increasing gain across frequency makes the AM1114-D an ideal solution to equalize gain/insertion loss across an RF system. Available as bare die in a 1.34mm x 0.91mm footprint with internal DC blocking capacitors and 50Ω matching.



Features

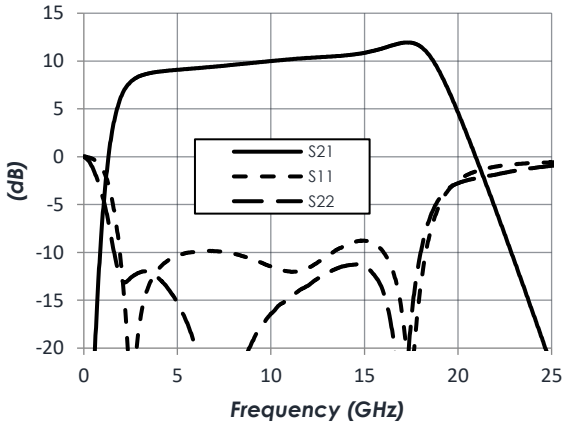
- 5.1 dB Gain Slope
- 6.3 dB Gain at 2 GHz
- 11.4 dB Gain at 18 GHz
- 3.3 dB Noise Figure
- +30 dBm OIP3
- +17 dBm P1dB
- +3.3V Operation
- 205 mW Power Consumption
- 1.34mm x 0.91mm
- -40C to +85C Operation

Functional Diagram

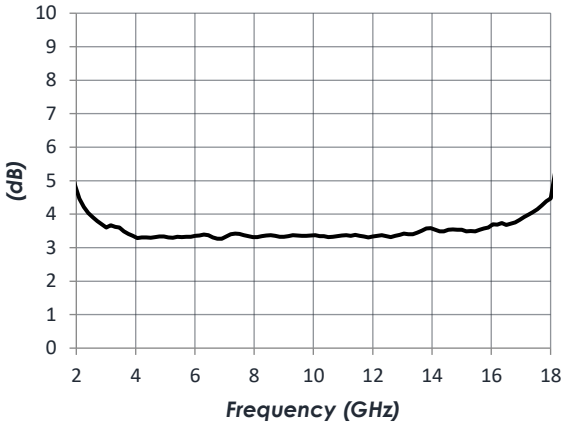


Characteristic Performance

Gain and Return Loss at +25C



Noise Figure at +25C



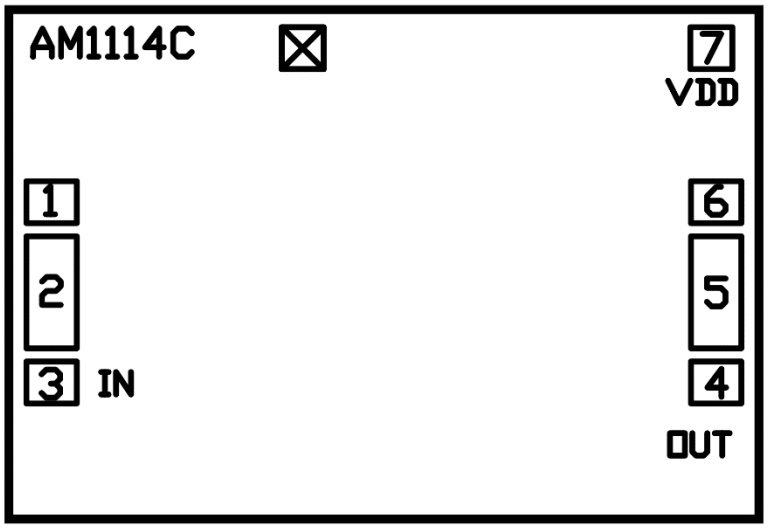
To obtain price, delivery, or to place an order contact MMICsales@mrcy.com
Atlanta Micro Inc., now a part of Mercury Systems
3720 Davinci Ct, Suite 400, Peachtree Corners, GA 30092 ● Phone: (470) 253-7640 ● www.atlantamicro.com

Table of Contents

Revision History

Date	Revision Number	Notes
April 28, 2022	1	Initial Release
April 12, 2024	2	Updated Plots and Diagrams

Pin Layout and Definitions



Pin Number	Pin Name	Pin Function
1	GND	Ground – Common
2	RF In	RF Input – 50 Ohms – DC Blocked
3	GND	Ground – Common
4	GND	Ground – Common
5	RF Out	RF Output – 50 Ohms – DC Blocked
6	GND	Ground – Common
7	Vd	DC Power Input

Note: NC pins may be grounded or left open

Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+3.5 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
ESD Sensitivity – Human Body Model (HBM)	Class 0A	

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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage		+3.3 V	
Operating Case Temperature	-40 C		+85 C

Thermal Information

Thermal Resistance (channel to backside ground)	284 C/W
Nominal Junction Temperature at +85C Ambient	+141 C
Channel Temperature to Maintain 1 Million Hour MTTF	+175 C

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Supply Voltage			+3.3 V	
DC Supply Current	VDD = +3.3V	56 mA	62 mA	68 mA
Power Dissipated	VDD = +3.3V		205 mW	

RF Performance

(T = 25 °C unless otherwise specified)

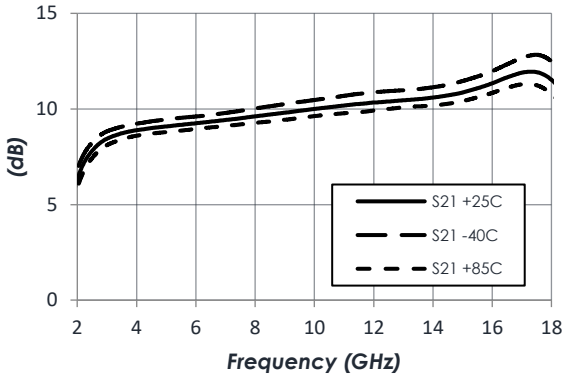
Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		2 GHz		18 GHz
Gain	f = 2 GHz		6.3 dB	
	f = 10 GHz		10 dB	
	f = 18 GHz		11.4 dB	
Return Loss	f = 2 GHz		-11 dB	
	f = 10 GHz		-12 dB	
	f = 18 GHz		-10 dB	
Output IP3	f = 10 GHz		30 dBm	
Output P1dB	f = 10 GHz		17 dBm	
Noise Figure	f = 10 GHz		3.3 dB	

***Note:** OIP3 measured with 10MHz tone spacing with tone level of P_{in} = -10dBm

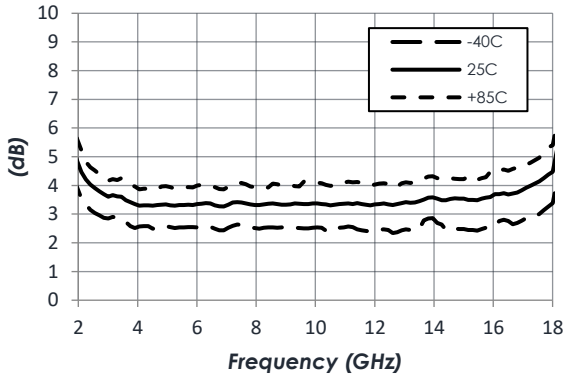
Typical Performance

(VDD = +3.3V, T = 25°C unless otherwise specified)

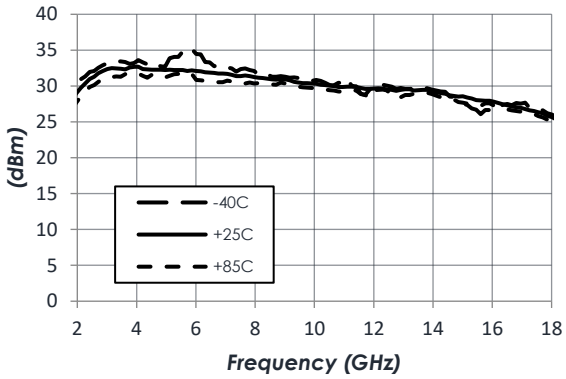
Gain vs Temperature



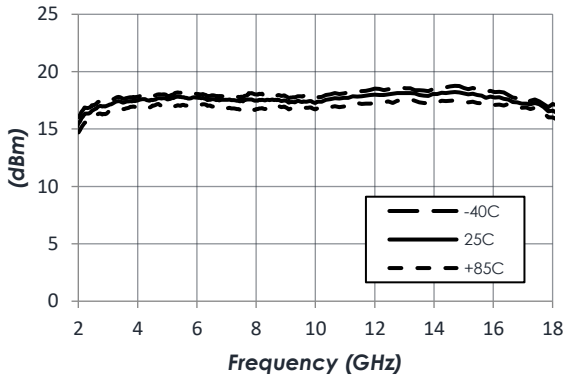
Noise Figure vs Temperature



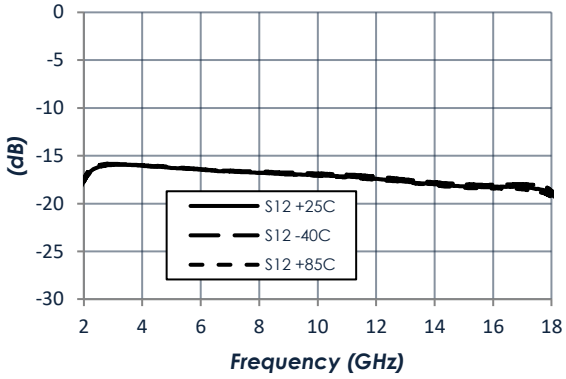
Output IP3 vs Temperature



P1dB vs Temperature



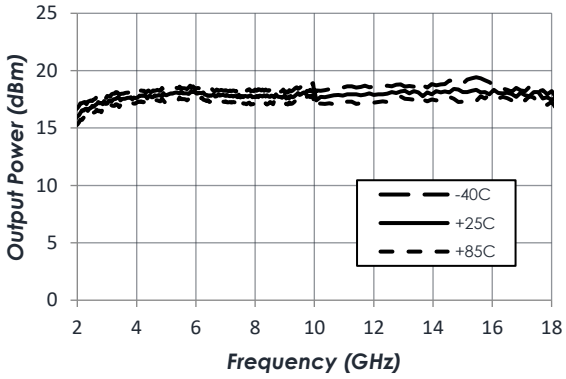
Reverse Isolation vs Temperature



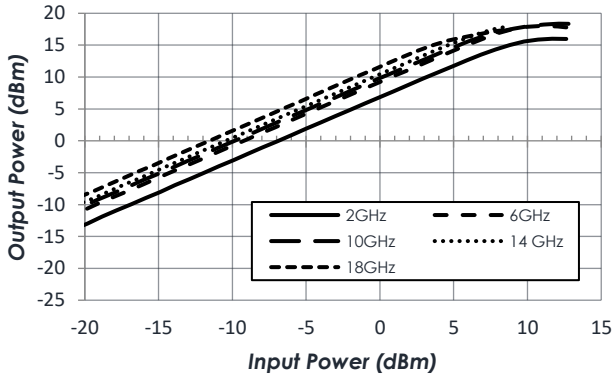
Typical Performance Continued

(VDD = +3.3V, T = 25°C unless otherwise specified)

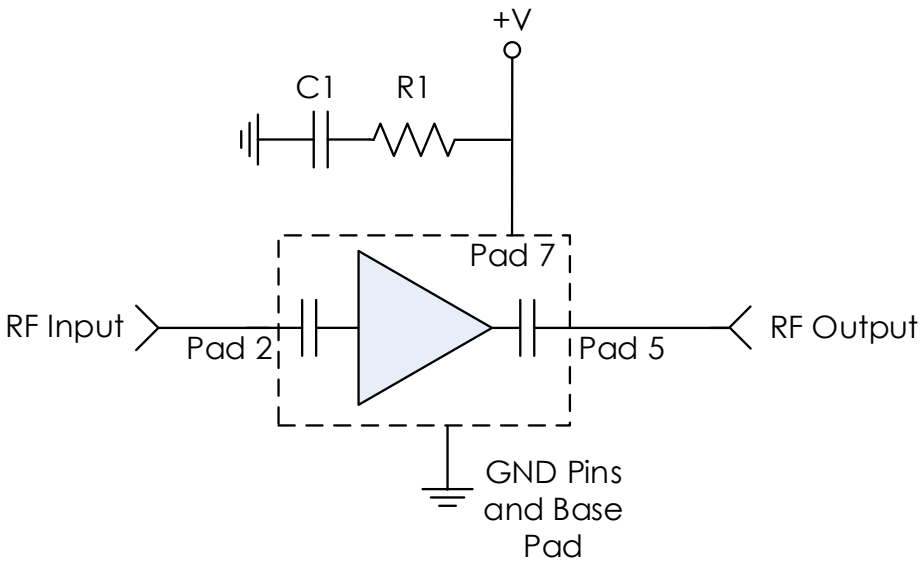
P_Sat vs Temperature



Pin vs. Pout at +25C



Typical Application



Note: NC pins may be grounded or left open

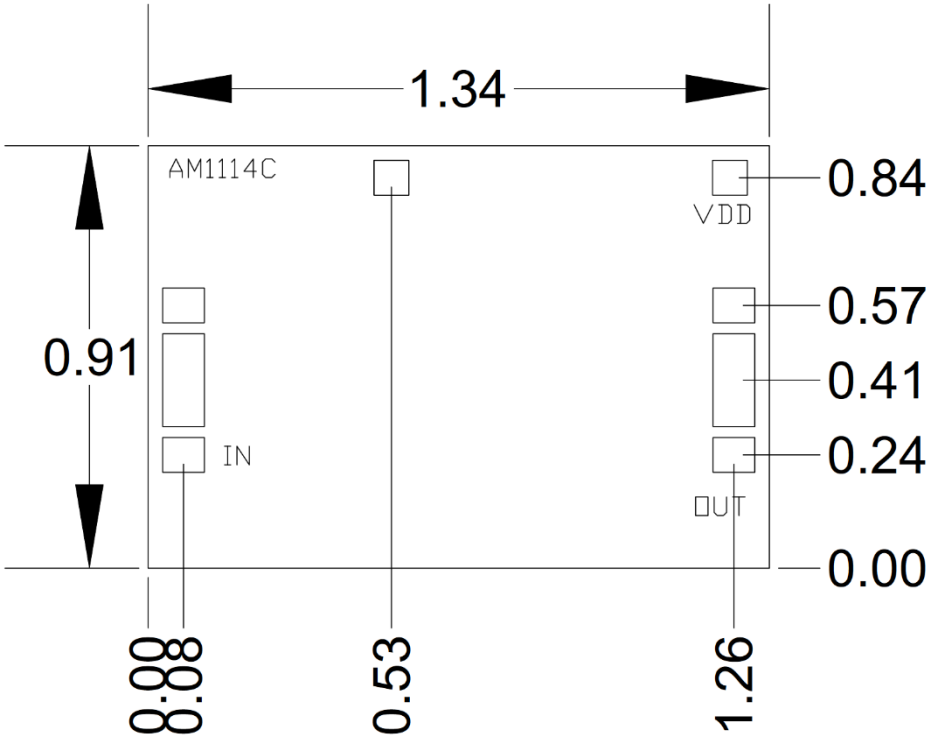
Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1	100 pF	SKT01A101Z10A6	Tecdia
R1	10 Ω	TDR-100F-9x12x6-E	Tecdia

Notes:

1. R1 and C1 are required for proper operation of the AM1114-D.
2. RF Input and RF Output connections are internally DC blocked.

Die Dimensions



Notes:

1. Units in mm.

Part Ordering Details

Description	Part Number
1.34mm x 0.91mm Bare Die	AM1114-D
3mm 12 Lead QFN	AM1114
AM1114 3mm QFN Evaluation Board	AM1114-Eval

Recommended Wire Bonds

Notes:

1. RF pads should have one bond.
2. All RF bonds should be minimum length and minimum loop height for optimum performance.
3. Bonds should be 1mil, gold.

Related Parts

Part Number				Description
AM1102-D	DC	to	22 GHz	Low Noise Amplifier
AM1110-D	2 GHz	to	18 GHz	Slope Correcting Amplifier, 9dB Slope
AM1113-D	2 GHz	to	18 GHz	Slope Correcting Amplifier, 7dB Slope

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-ethylheyl) 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.