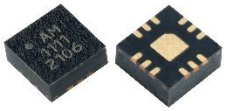
AM1111 – Amplifier

2 to 18 GHz Gain Block

Description

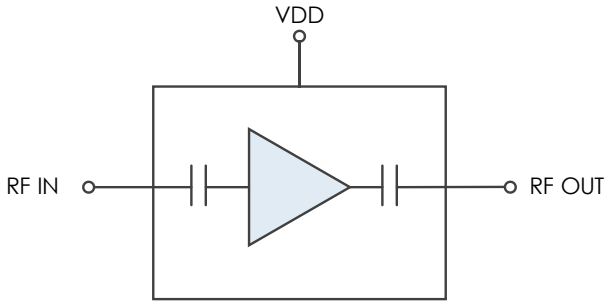
AM1111 is a wideband, cascadable amplifier servicing the 2 to 18 GHz frequency range. The device exhibits exceptional linearity and power handling capabilities across its bandwidth, while maintaining moderate gain and noise figure. Packaged in a 3mm QFN with internal 50Ω matching and DC blocking capacitors on input and output, AM1111 represents a compact total PCB footprint.



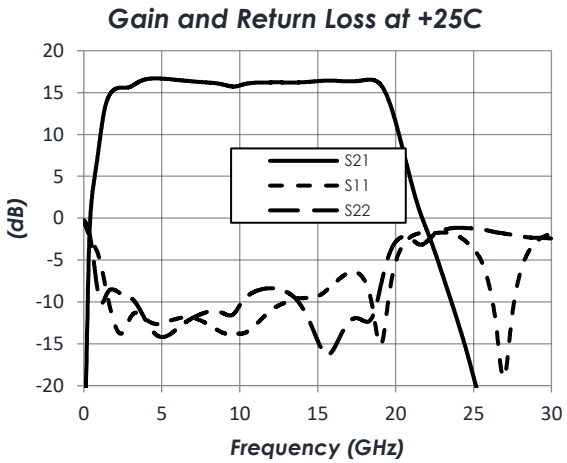
Features

- 16 dB Gain
- 2.5 dB Noise Figure
- +32 dBm OIP3
- +21 dB P1dB
- +5.0 V Operation
- 500 mW Power Consumption
- 3mm QFN
- -40C to +85C Operation

Functional Diagram



Characteristic Performance



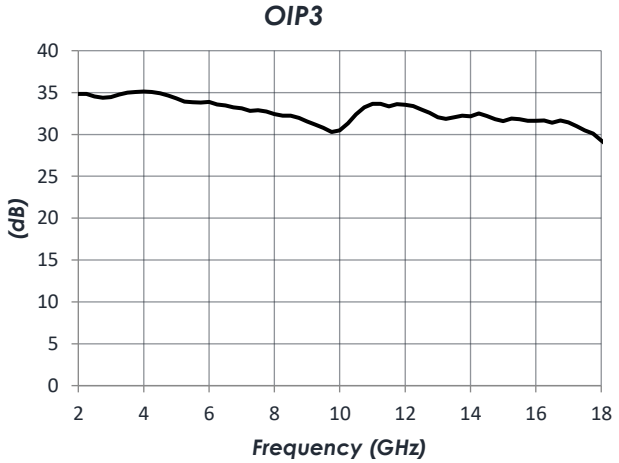


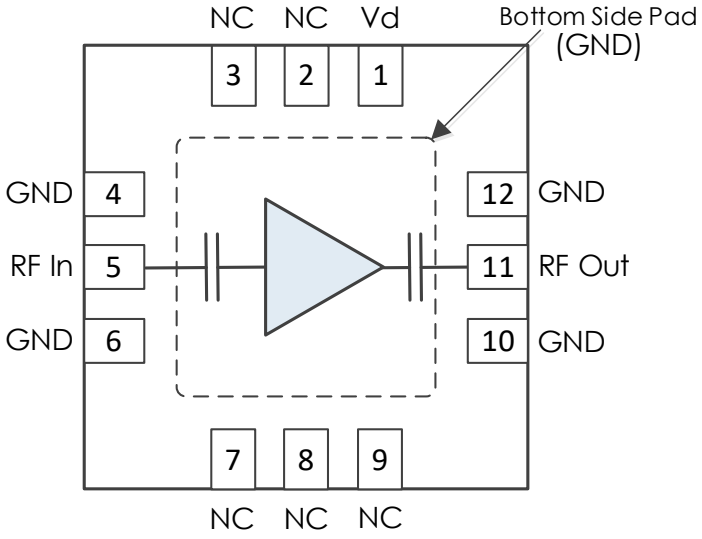
Table of Contents

Revision History

Date	Revision Number	Notes
April 13, 2021	1	Initial Release
July 28, 2022	2	Corrected Eval Board

Pin Layout and Definitions

Note: All Un-Labeled Pins are NC or Ground



Pin Number	Pin Name	Pin Function
1	Vd	DC Power Input
2-3	NC	Not Connected
4	GND	Ground – Common
5	RF In	RF Input – 50 Ohms – DC Blocked
6	GND	Ground – Common
7-9	NC	Not Connected
10	GND	Ground – Common
11	RF Out	RF Output – 50 Ohms – DC Blocked
12	GND	Ground – Common

Note: NC pins may be grounded or left open

Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+5.5 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 3	

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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+4.8 V	+5.0 V	+5.2 V
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 C

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Supply Voltage	VD		+5.0 V	
DC Supply Current	VD = +5.0V		100 mA	
Power Dissipated	VD = +5.0V		500 mW	

RF Performance

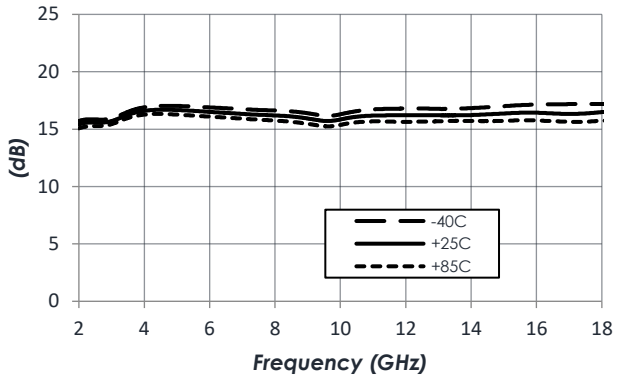
(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		2 GHz		18 GHz
Gain	f = 2 GHz		15 dB	
	f = 10 GHz		16 dB	
	f = 18 GHz		16 dB	
Return Loss	f = 2 GHz		10 dB	
	f = 10 GHz		11 dB	
	f = 18 GHz		9 dB	
Output IP3	f = 10 GHz		31 dBm	
Output P1dB	f = 10 GHz		21 dBm	
Noise Figure	f = 10 GHz		2 dB	

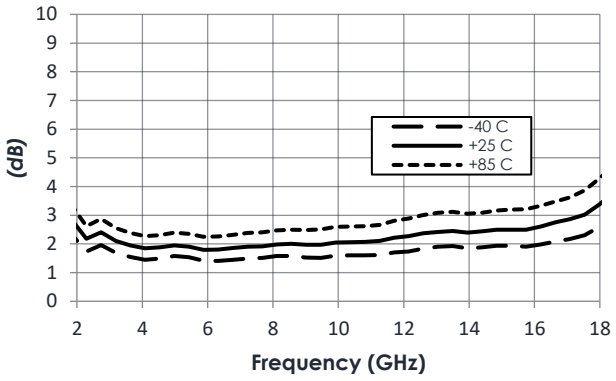
Typical Performance

(VD = +5.0V, T = 25°C unless otherwise specified)

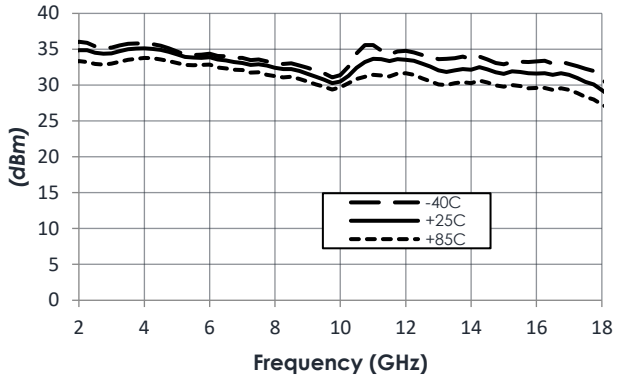
Gain vs Temperature



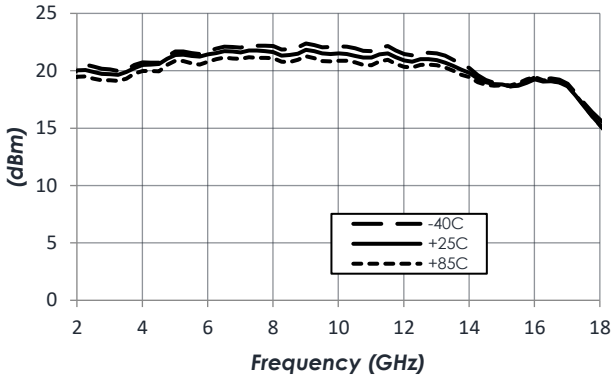
Noise Figure vs Temperature



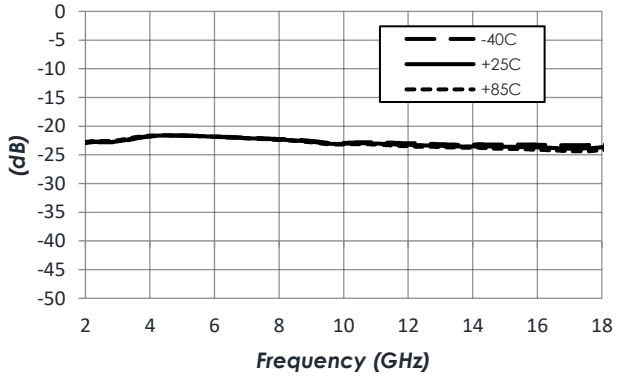
Output IP3 vs Temperature



P1dB vs Temperature



Reverse Isolation vs Temperature

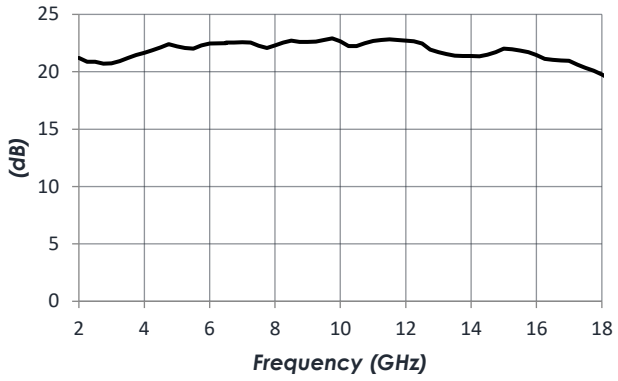


OIP3 Test Conditions: Two -15dBm tones at input with 10 MHz spacing.

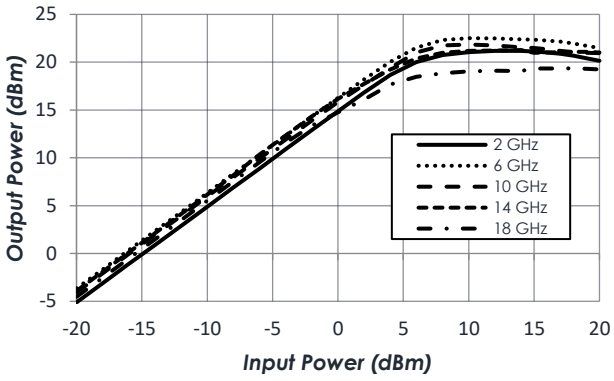
Typical Performance (continued)

(VD = +5.0V, T = 25°C unless otherwise specified)

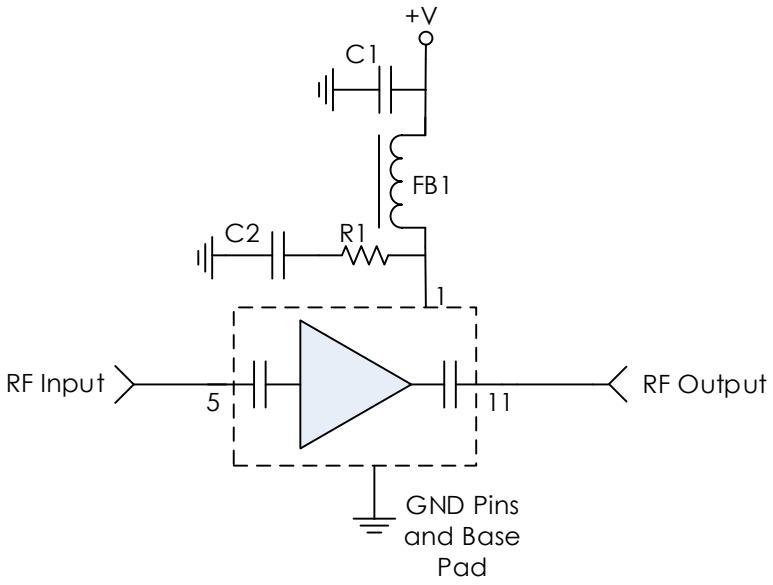
Power Saturation



Pin vs. Pout at +25C



Typical Application



Note: NC pins may be grounded or left open

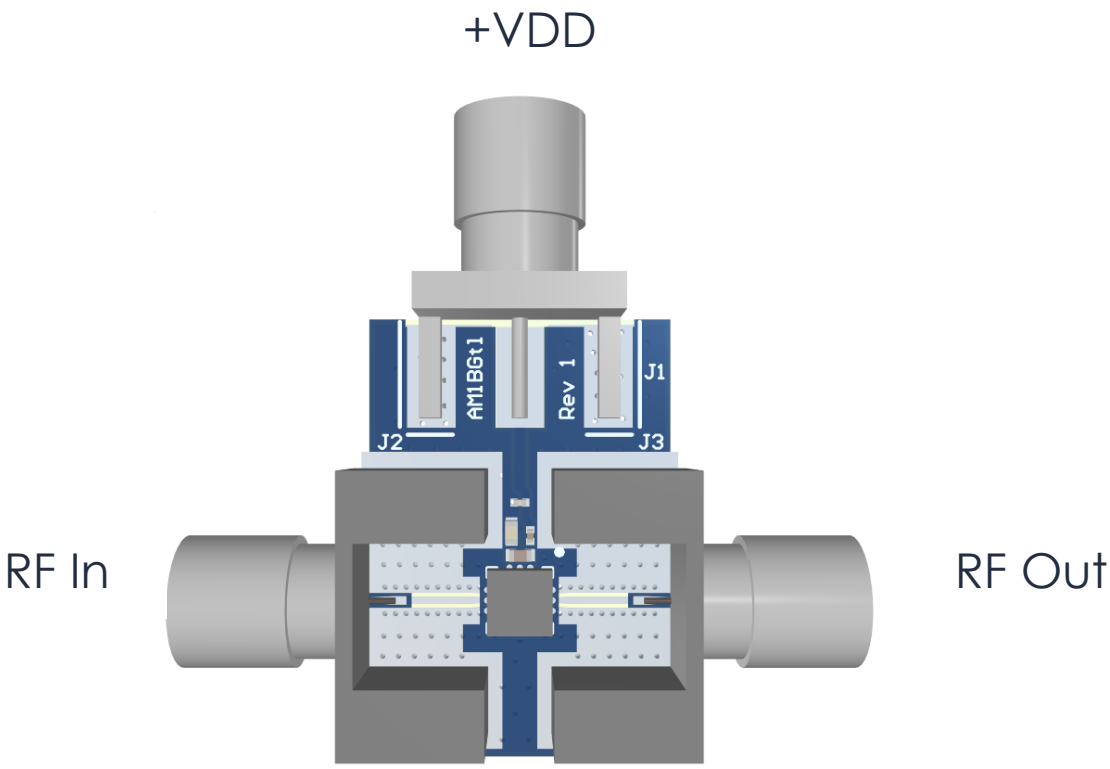
Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1	0.1 uF	GRM155R71C104KA88	Murata
FB1	-	MMZ1005A222E	TDK
R1	15 Ohms	CRCW040215R0FKED	Vishay
C2	10 uF	CL05A106MP8NUB8	Samsung

Notes:

1. RF Input and Output pins are internally DC blocked
2. R1, C1, and C2 are required for proper operation of the AM1111.

Evaluation PC Board



Note: Not all components shown may be installed.

Related Parts

Part Number				Description
AM1053	5 GHz	to	20 GHz	Gain Block
AM1067	5 GHz	to	20 GHz	Bypassable Gain Block
AM1070	DC	to	18 GHz	Broadband Gain Block
AM1071	DC	to	18 GHz	Broadband Gain Block
AM1077	5 GHz	to	20 GHz	Bypassable Gain Block w/ Isolation State
AM1100	2 GHz	to	26.5 GHz	Low Noise Amplifier
AM1101	2 GHz	to	26.5 GHz	Bypassable Amplifier
AM1102	DC	to	22 GHz	Low Noise Amplifier

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)

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