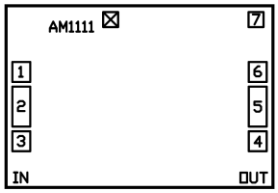
AM1111-D – Amplifier

2 to 18 GHz Driver Amplifier

Description

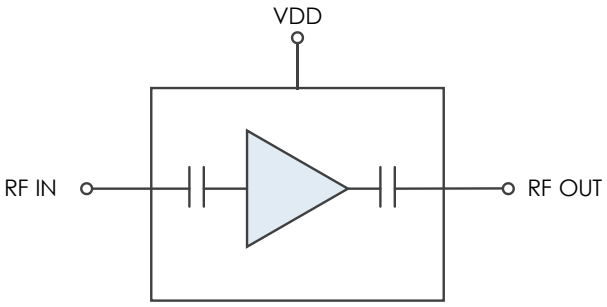
AM1111-D is a wideband, cascadable amplifier servicing the 2 to 18 GHz frequency range. The device exhibits exceptional linearity and high 1dB compression across its bandwidth, while maintaining moderate gain and low noise figure. Available as bare die in a 1.34mm x 0.91mm footprint with internal DC blocking capacitors.



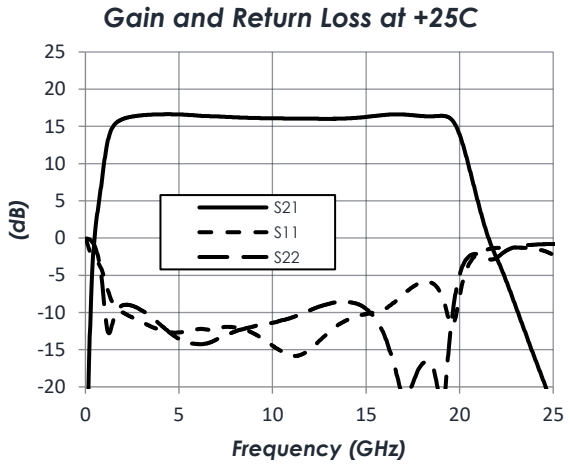
Features

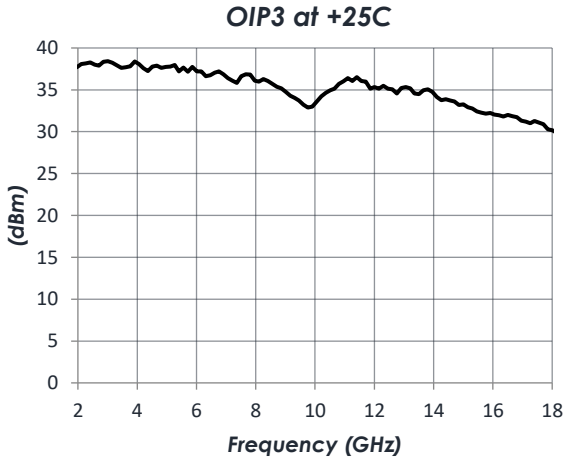
- 16 dB Gain
- 2 dB Noise Figure
- +35 dBm OIP3
- +21 dBm P1dB
- +5.0V Supply
- 600 mW Power Consumption
- -40C to +85C Operation

Functional Diagram



Characteristic Performance





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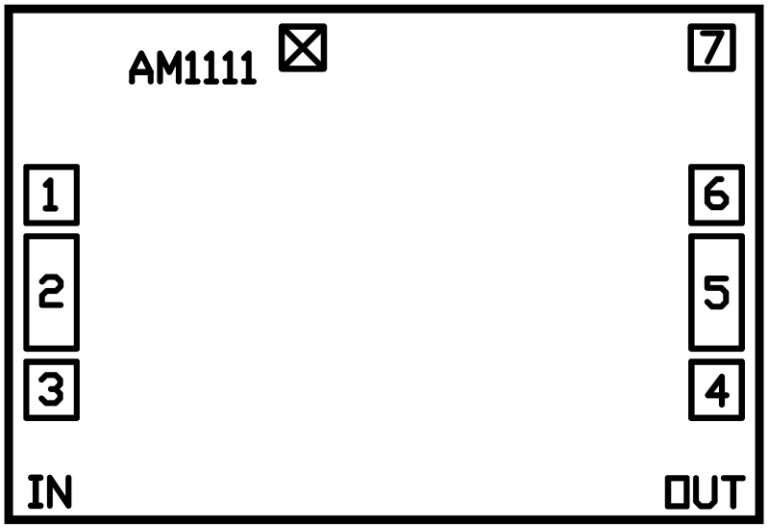
Revision History

Date	Revision Number	Notes
April 19, 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, 4	GND	Ground – Common
5	RF Out	RF Output – 50 Ohms – DC Blocked
6	GND	Ground – Common
7	Vd	DC Power Input

Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+5.5
RF Input Power		+20dBm
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 1A	

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

Thermal Information

Thermal Resistance (channel to backside ground)	132 C/W
Nominal Junction Temperature at +85C Ambient	162 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			+5.0 V	
DC Supply Current	Vd = +5.0 V		118 mA	
Power Dissipated	Vd = +5.0 V		580 mW	

RF Performance

(T = 25 °C unless otherwise specified)

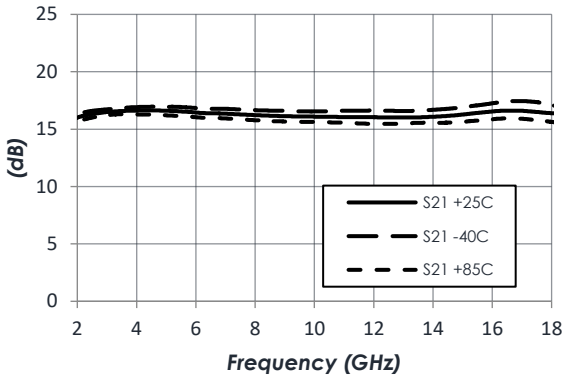
Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		2 GHz		18 GHz
Gain	f = 2 GHz		16 dB	
	f = 10 GHz		16 dB	
	f = 18 GHz		16.4 dB	
Return Loss	f = 2 GHz		-9 dB	
	f = 10 GHz		-11 dB	
	f = 18 GHz		-6 dB	
Output IP3	f = 10 GHz		+33 dBm	
Output P1dB	f = 10 GHz		+21.6 dBm	
Noise Figure	f = 10 GHz		1.9 dB	

Note: OIP3 measured with two tones at 10 MHz spacing with -15dBm input power

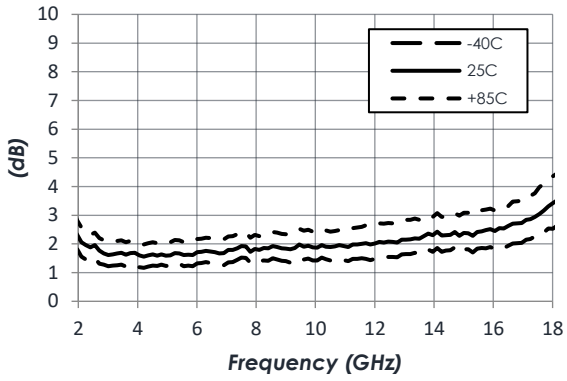
Typical Performance

(VDD=5.0V and T=25C unless otherwise specified.)

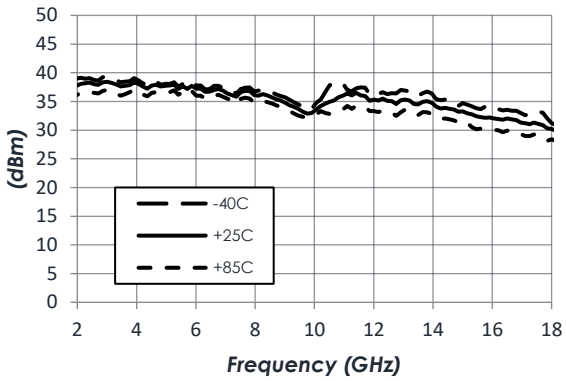
Gain vs Temperature



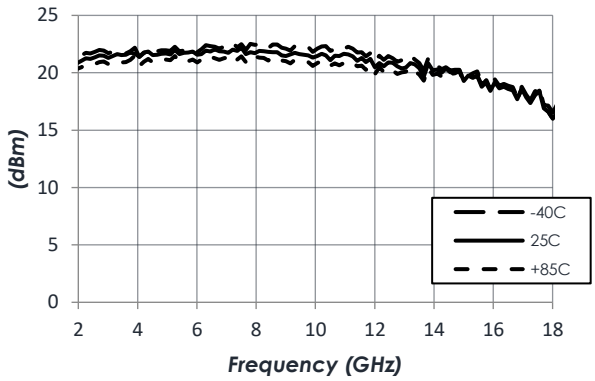
Noise Figure vs Temperature



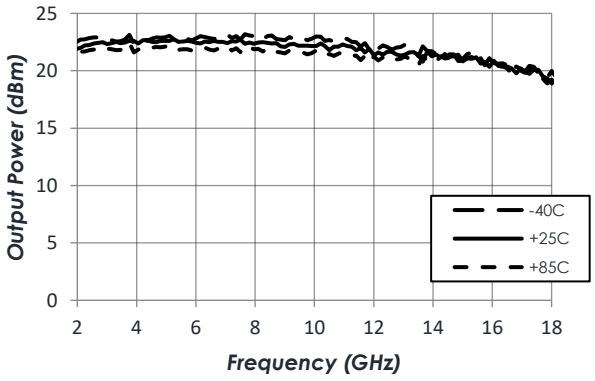
Output IP3 vs Temperature



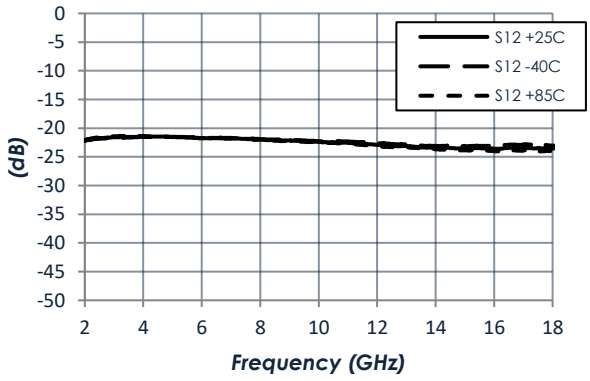
P1dB vs Temperature



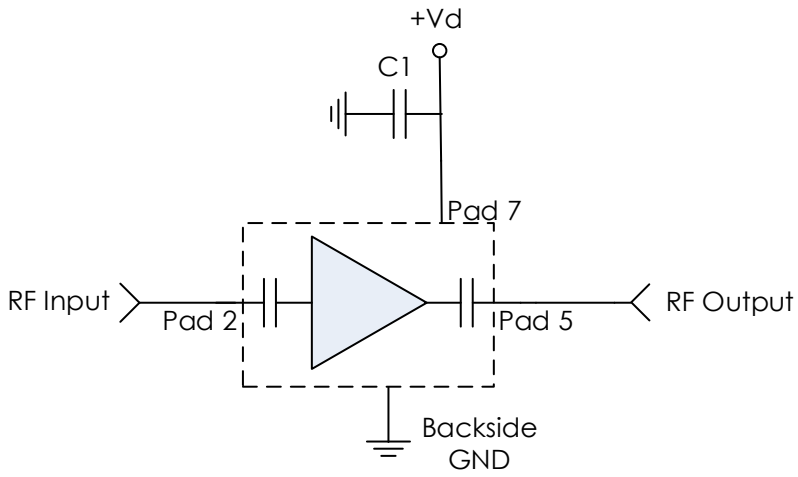
P_Sat vs Temperature



Reverse Isolation vs Temperature



Typical Application



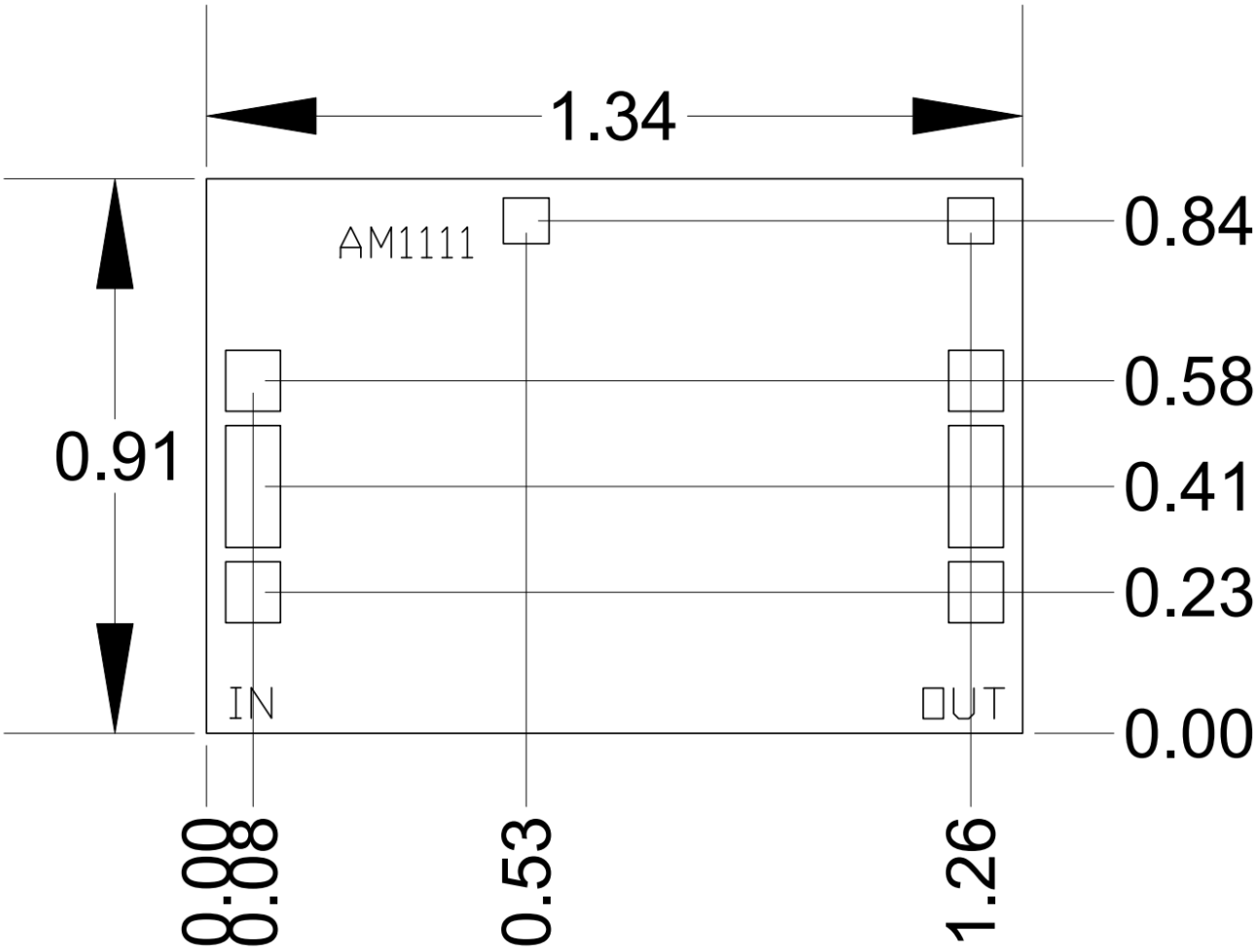
Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1	470 pF	SKT04C147M11A6-25	Tecdia

Notes:

1. C1 required for proper operation of AM1111-D to 2GHz.
2. C1 should be placed as close to the die as possible.
3. RF Input and RF Output connections are internally DC blocked.

Die Dimensions



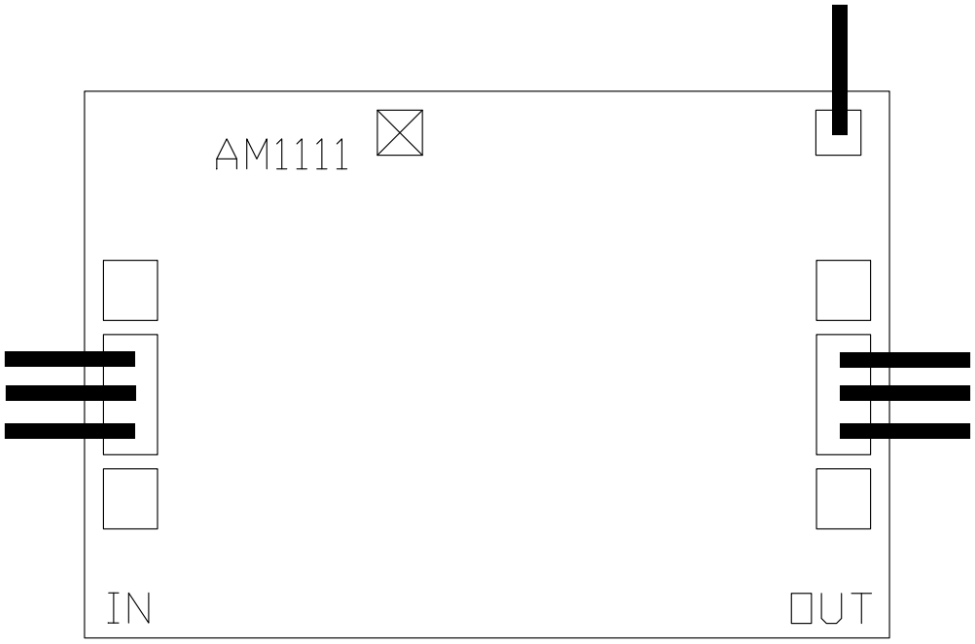
Notes:

1. Units in mm.

Part Ordering Details

Description	Part Number
1.34mm x 0.91mm Bare Die	AM1111-D
3mm 12 Lead QFN	AM1111
AM1111 3mm QFN Evaluation Board	AM1111 Eval

Recommended Wire Bonds



Notes:

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

Related Parts

Part Number				Description
AM1100-D	2 GHz	to	26.5 GHz	Low Noise Amplifier
AM1102-D	20 MHz	to	22 GHz	Low Noise Amplifier
AM1142-D	20 MHz	to	18 GHz	Driver 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)

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).

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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.