

AM1102 – Amplifier

DC to 22 GHz Gain Block

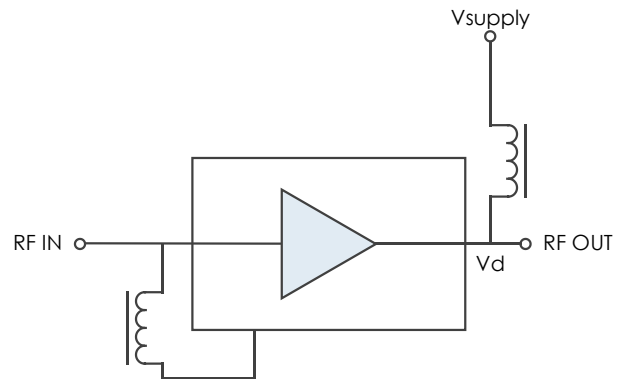
Description

AM1102 is a wideband, cascadable amplifier servicing the DC to 22 GHz frequency range. The device exhibits moderate gain and excellent noise figure over a wide frequency range which makes the AM1102 a useful component for many broadband applications. Packaged in a 3mm QFN with internal 50Ω matching, and drawing less than 160mW of power, the AM1102 is suited for low SWaP applications.

Features

- 14 dB Gain
- 2.3 dB Noise Figure
- +26 dBm OIP3
- +15 dB P1dB
- +3.3V Operation
- 158 mW Power Consumption
- 3mm QFN
- -40C to +85C Operation

Functional Diagram



Characteristic Performance

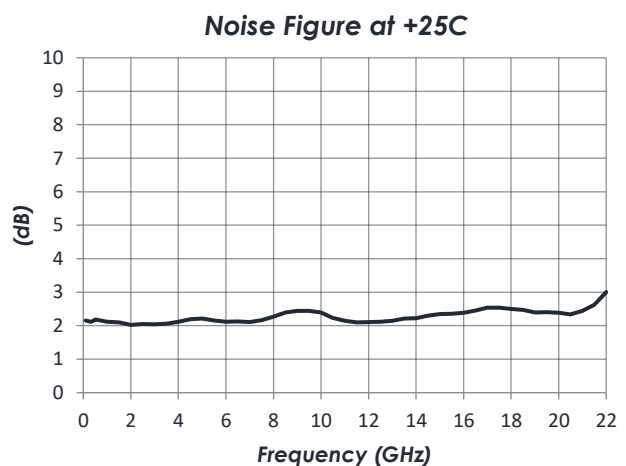
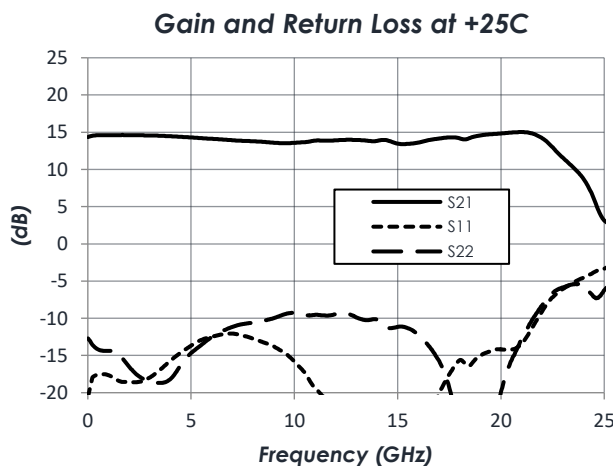


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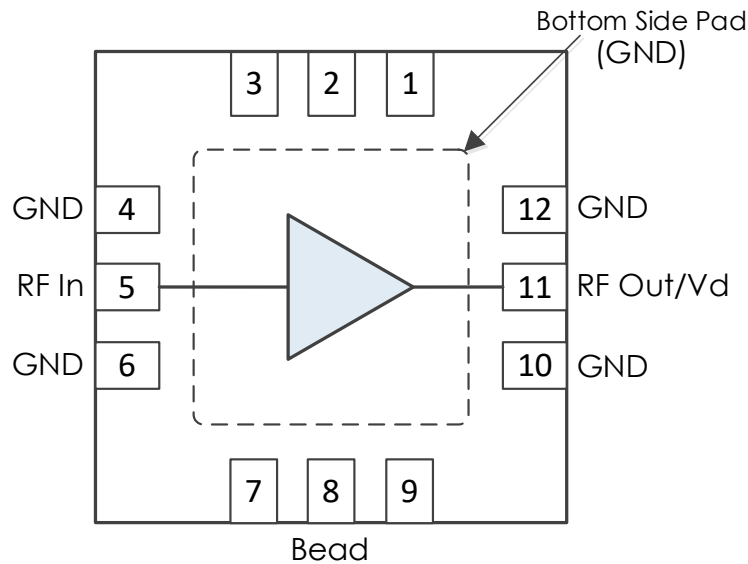
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Revision History

Date	Revision Number	Notes
June 12, 2020	1	Initial Release

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

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Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+3.5 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	+3.0 V	+3.3 V	+3.3 V
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 C

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DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Supply Voltage			+3.3 V	
DC Supply Current			48 mA	
Power Dissipated			158 mW	

RF Performance

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		DC		22 GHz
Gain	f = 0.1 GHz		14.5 dB	
	f = 10 GHz		14 dB	
	f = 21 GHz		15 dB	
Return Loss	f = 0.1 GHz		-14 dB	
	f = 10 GHz		-10 dB	
	f = 21 GHz		-15 dB	
Output IP3	f = 10 GHz		+26 dBm	
Output P1dB	f = 10 GHz		+15 dBm	
Noise Figure	f = 10 GHz		2.3 dB	

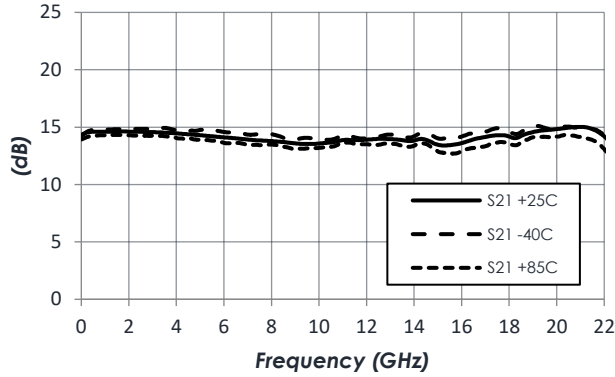
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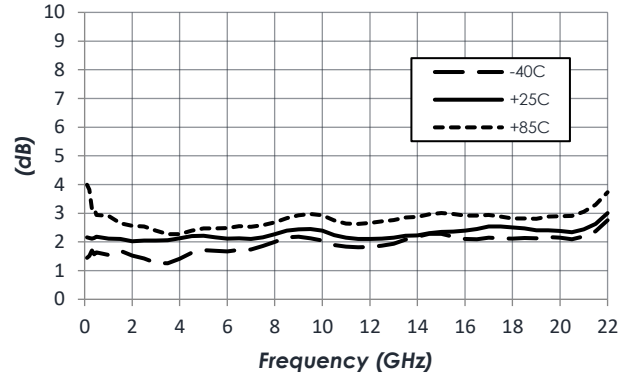
Typical Performance

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

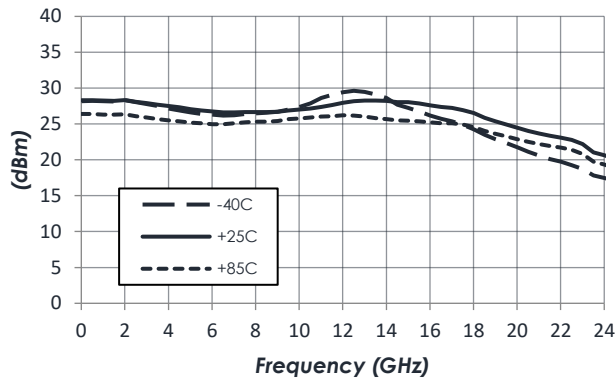
Gain vs Temperature



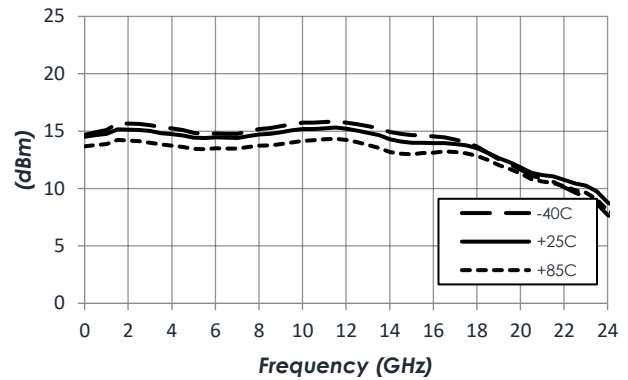
Noise Figure vs Temperature



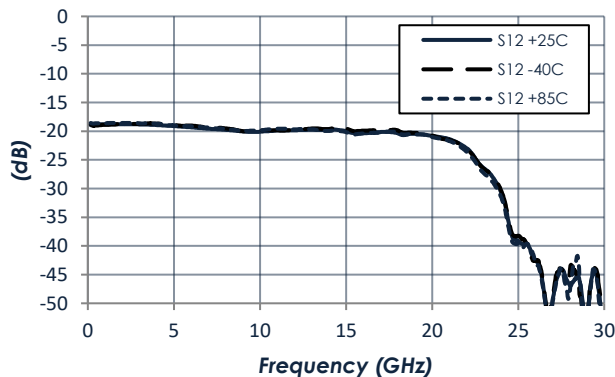
Output IP3 vs Temperature



P1dB vs Temperature



Reverse Isolation vs Temperature



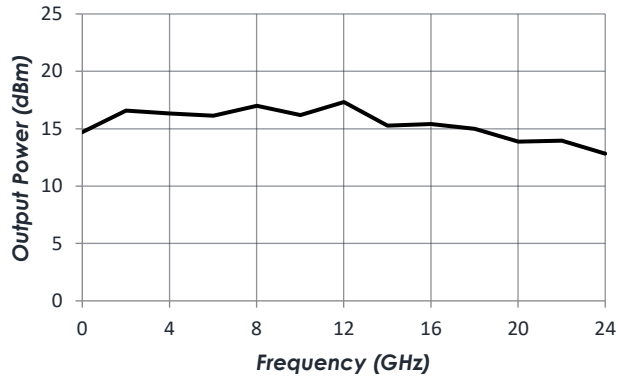
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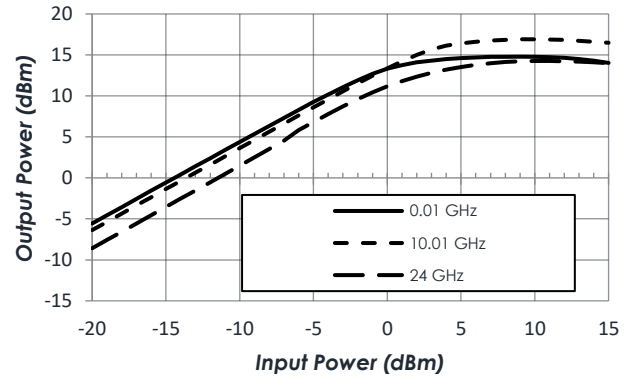
Typical Performance (continued)

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

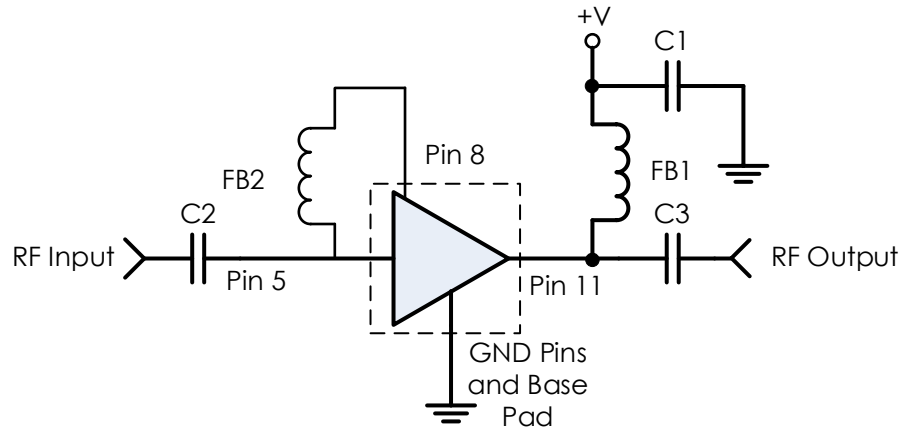
P_{Sat} at +25C



Pin vs. Pout at +25C



Typical Application



Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1	0.1 μ F	GRM155R71C104KA88	Murata
C2, C3	0.1 μ F	0201BB104KW160	Passives Plus
FB1, FB2	-	MMZ1005A222E	TDK

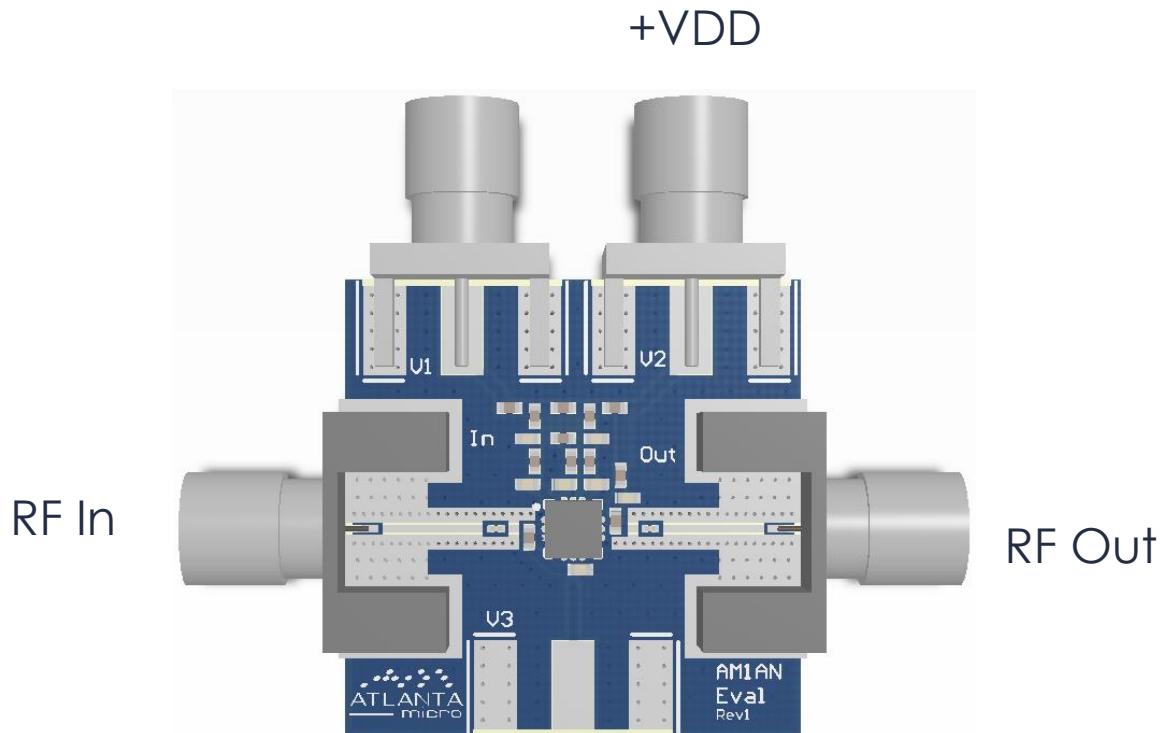
Notes:

1. DC Blocking capacitors should be high performance, low-loss, broadband capacitors for optimum performance.

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Evaluation PC Board



Related Parts

Part Number	Description		
AM1053	5 GHz	to 20 GHz	Gain Block
AM1070	DC	to 18 GHz	Broadband Gain Block
AM1071	DC	to 18 GHz	Broadband Gain Block
AM1100	2 GHz	to 16.5 GHz	Low Noise Amplifier
AM1101	2 GHz	to 26.5 GHz	Bypassable Amplifier
AM1163-1	DC	to 10 GHz	Low Noise Amplifier
AM1164-1	DC	to 8 GHz	Low Noise Amplifier

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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