AM1084 – Amplifier

DC to 6 GHz Gain Block

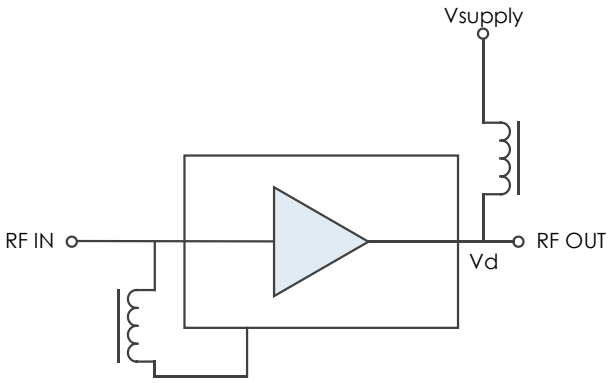
Description

The AM1084 is a DC-coupled amplifier covering up to 6 GHz. The device exhibits high second and third order intercept performance, excellent gain stability over the operating temperature range, and a moderate positive gain slope providing frequency equalization useful in many broadband applications. With internal 50Ω matching and packaged in a 3mm QFN or 1.3mm x 2mm DFN, the AM1084 represents a compact total PCB footprint.

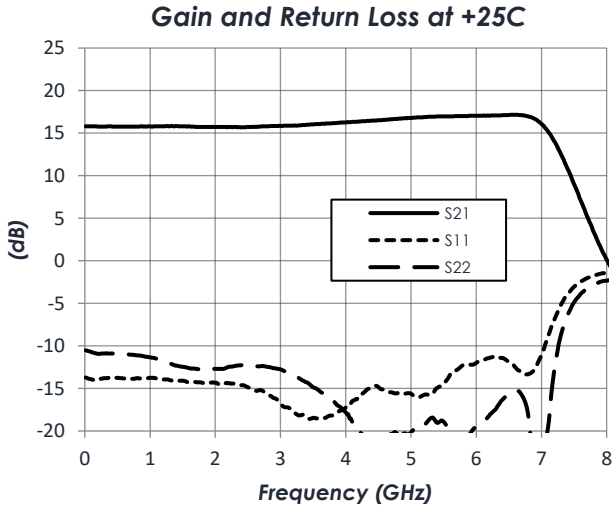
Features

- 16 dB Gain
- 2.3 dB Noise Figure
- +37 dBm OIP3
- +48 dBm OIP2
- +21 dBm P1dB
- +3.3V, 69 mA or +5.0V, 112 mA
- 1.3mm x 2mm DFN or 3mm QFN
- -40C to +85C Operation
- Available in RF Shielded Module

Functional Diagram



Characteristic Performance



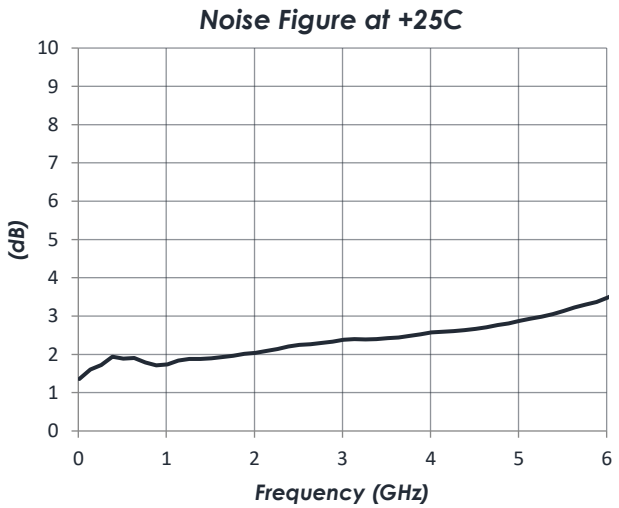


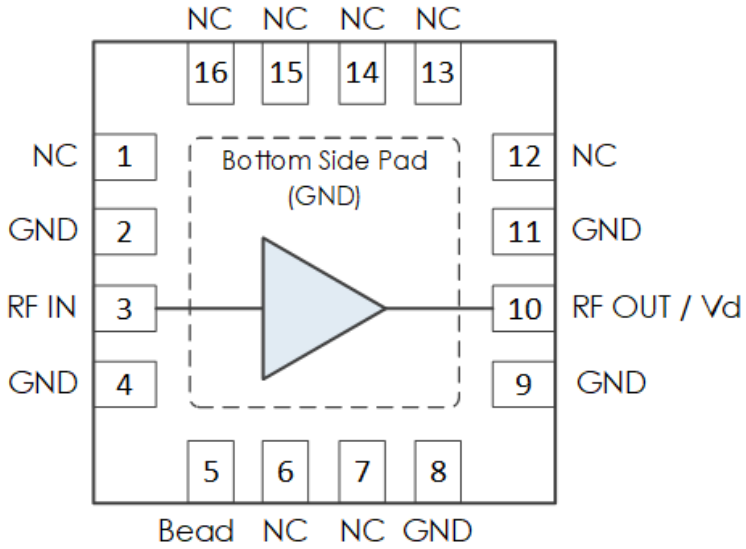
Table of Contents

Revision History

Date	Revision Number	Notes
January 8, 2020	1	Initial Release
November 11, 2020	2	Package and Module information moved to main product page on website.

Pin Layout and Definitions

AM1084-1: 3mm QFN

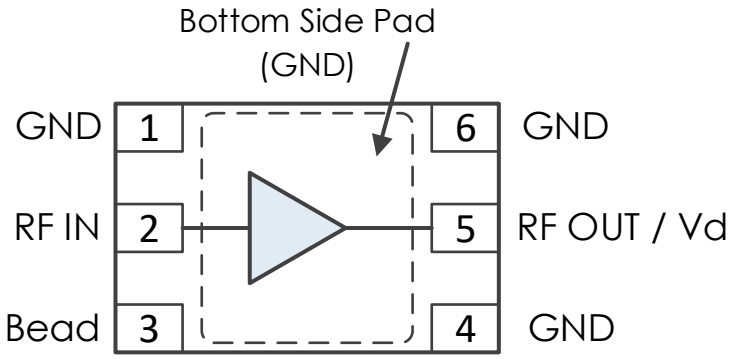


Pin Number	Pin Name	Pin Function
1	NC	Not Connected*
2	GND	Ground - Common
3	RF In	RF Input – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required
4	GND	Ground - Common
5	Bead	Connect to RF In through external ferrite bead or large inductor
6,7	NC	Not Connected*
8,9	GND	Ground - Common
10	RF Out / Vd	RF Output – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required
11	GND	Ground - Common
12-16	NC	Not Connected*

*NC pins may be grounded or left open

Pin Layout and Definitions (Continued)

AM1084-2: 1.3mm x 2mm DFN



Pin Number	Pin Name	Pin Function
1	GND	Ground – Common
2	RF In	RF Input – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required
3	Bead	Connect to RF In through external ferrite bead or large inductor
4	GND	Ground – Common
5	RF Out	RF Output – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required
6	GND	Ground – Common

Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+6.0 V
RF Input Power		+20dBm
Operating Junction Temperature	-40 C	+150 C
Storage Temperature Range	-50 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 1	

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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+2.7 V	+5.0 V	+5.2 V
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 C

Thermal Information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θ_{JC})	32

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Supply Voltage		+2.7 V	+5.0 V	+5.2 V
DC Supply Current	VD = +3.3 V		69 mA	
	VD = +5.0 V		112 mA	
Power Dissipated	VD = +3.3 V		0.23 W	
	VD = +5.0 V		0.56 W	

RF Performance

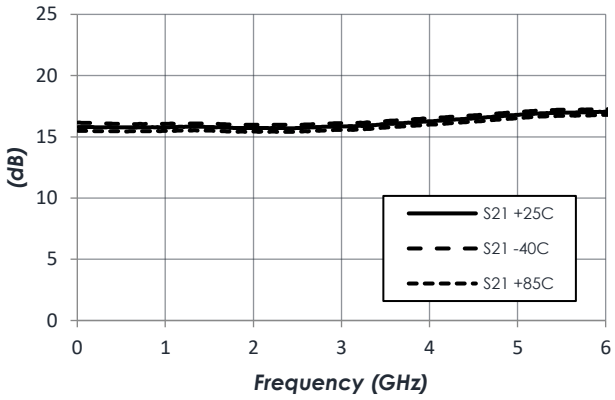
(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		DC		6 GHz
Gain	VD = +5.0 V		16 dB	
Return Loss	VD = +5.0 V		15 dB	
Output IP3	VD = +5.0 V		37 dBm	
Output IP2	VD = +5.0 V		48 dBm	
Output P1dB	VD = +5.0 V		21 dBm	
Output PSat	VD = +5.0 V		21.5 dBm	
Noise Figure	VD = +5.0 V		2.3 dB	

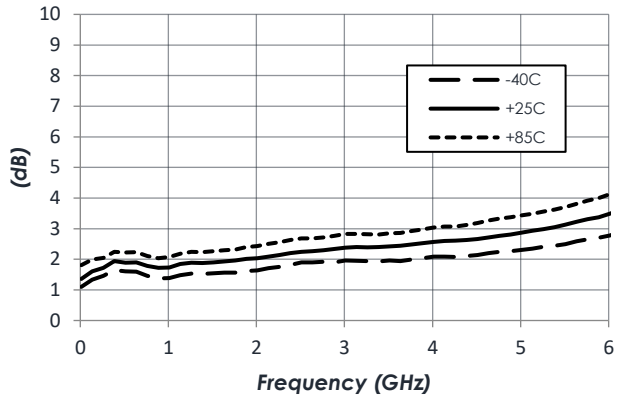
Typical Performance

(VD = +5.0 V, Id = 112 mA)

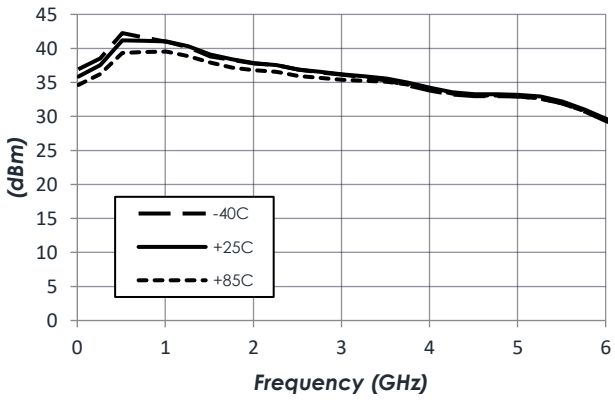
Gain vs Temperature



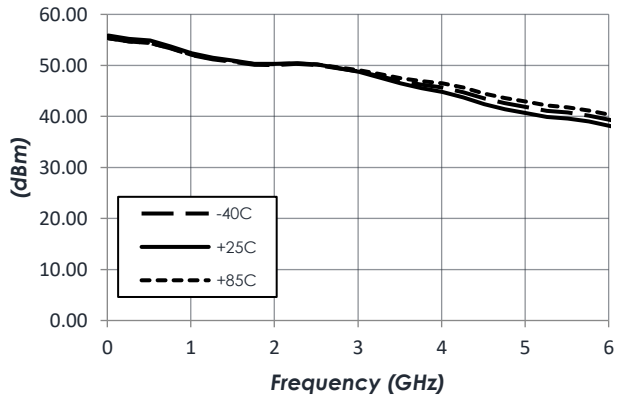
Noise Figure vs Temperature



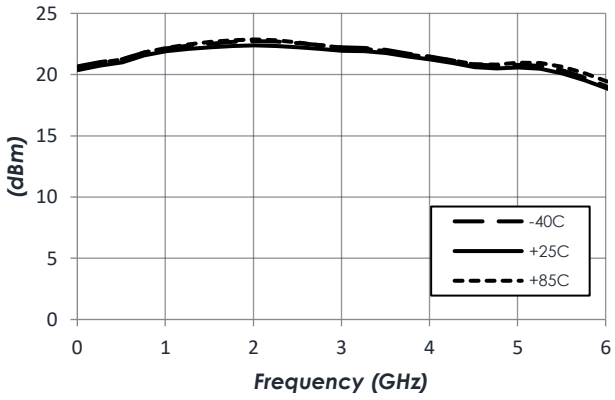
Output IP3 vs Temperature*



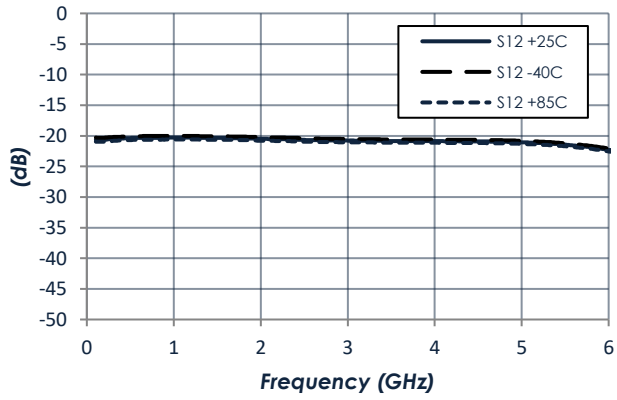
Output IP2 vs Temperature*



P1dB vs Temperature



Reverse Isolation vs Temperature

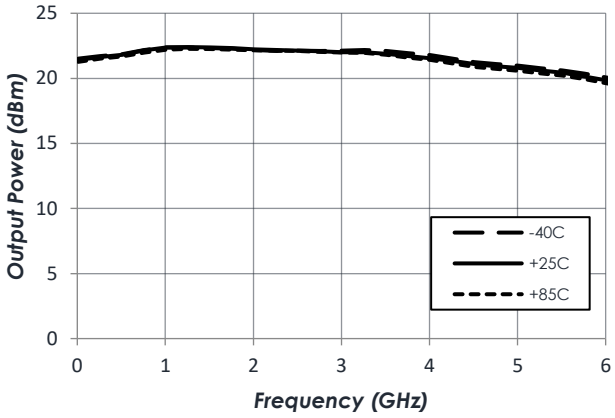


***Note:** Measured with 2 tone test; tone spacing 10 MHz

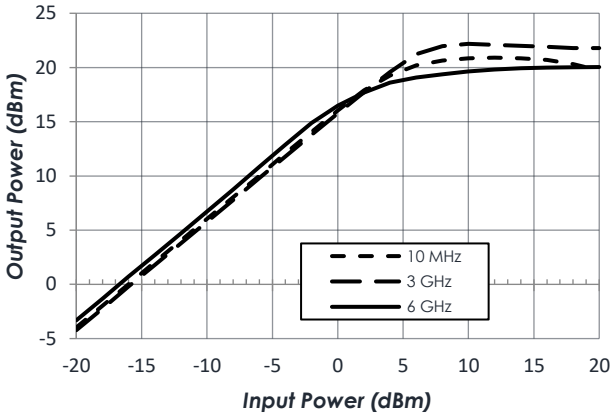
Typical Performance (continued)

(VD = +5.0 V, Id = 112 mA)

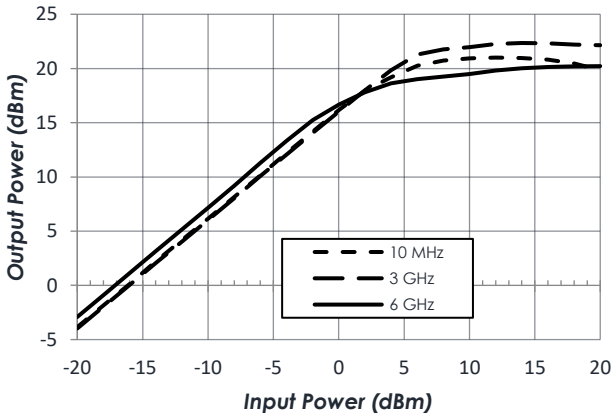
P_Sat vs Temperature



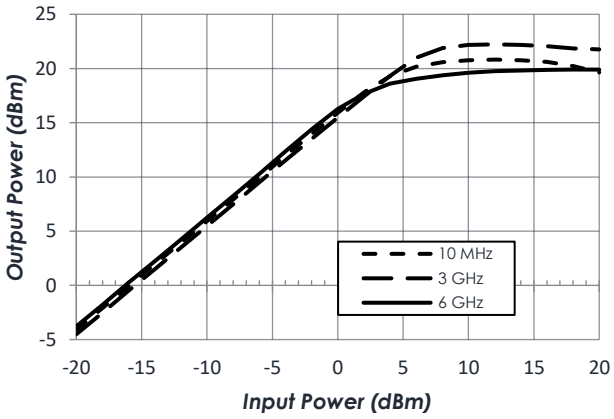
Pin vs. Pout at +25C



Pin vs. Pout at -40C



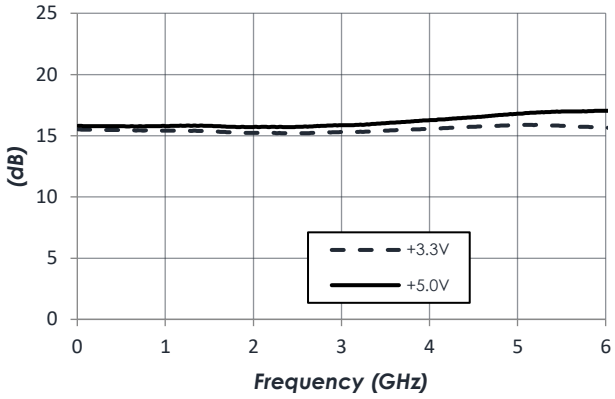
Pin vs. Pout at +85C



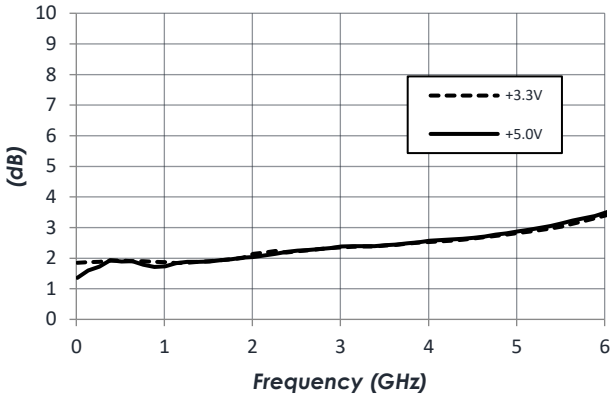
Typical Performance (continued)

(T = 25 °C unless otherwise specified)

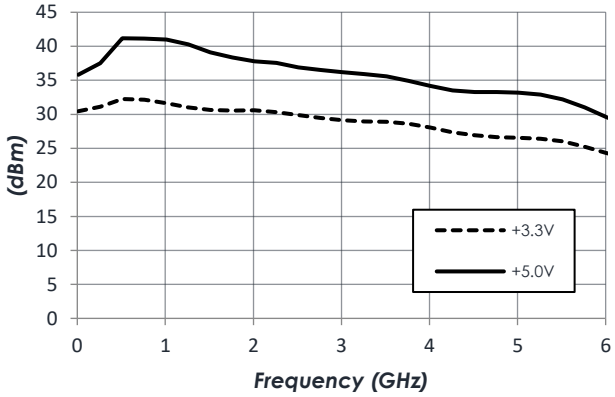
Gain vs VD



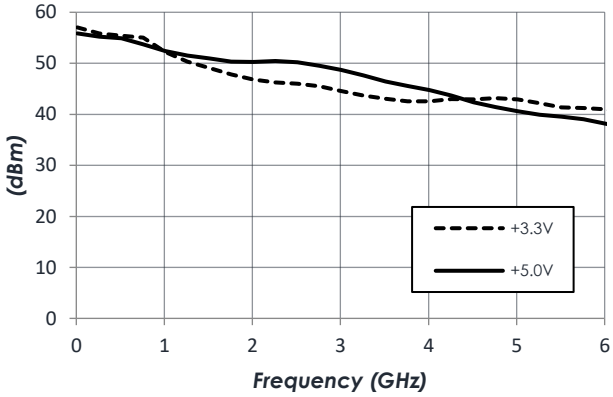
Noise Figure vs VD



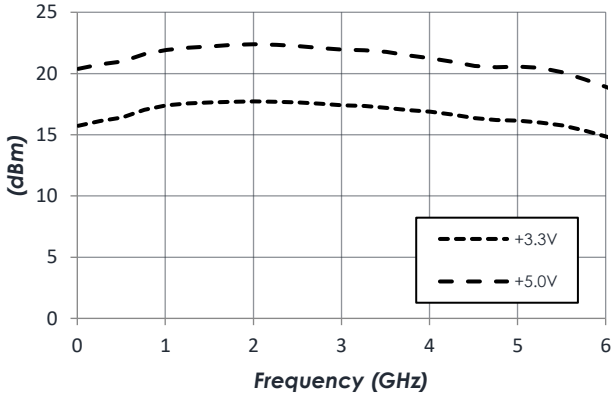
Output IP3 vs VD*



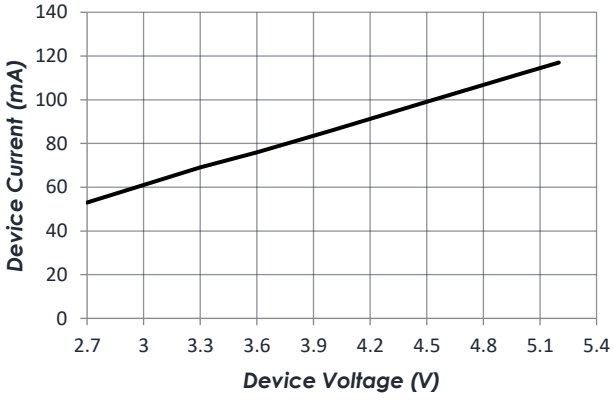
Output IP2 vs VD*



P1dB vs VD

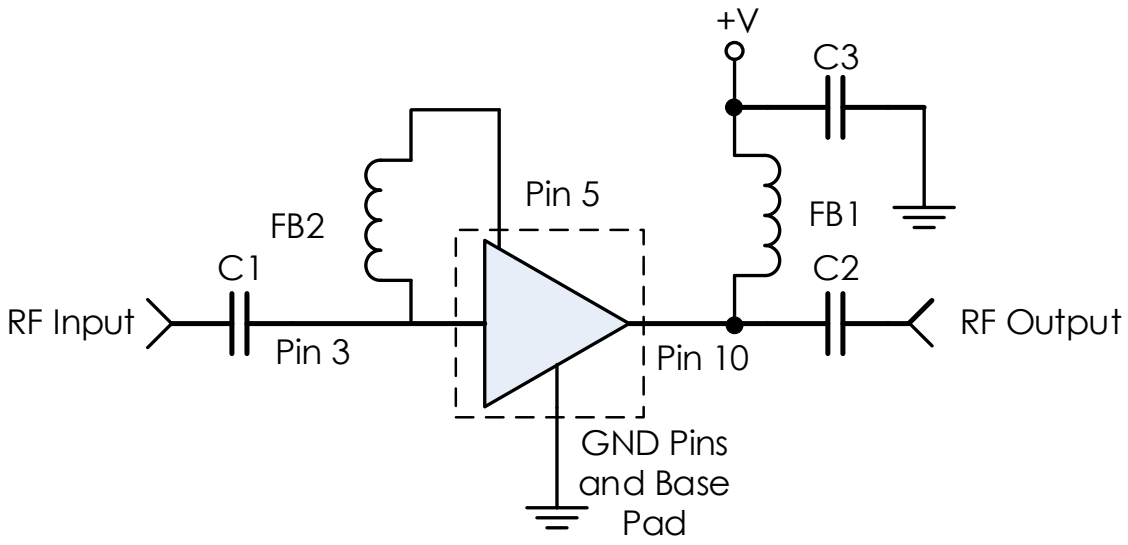


ID vs. VD



***Note:** Measured with 2 tone test; tone spacing 10 MHz

Typical Application



Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1, C2	0.1µF	0402BB104KW160	Passives Plus
C3	0.1µF	GRM155R71C104KA88	Murata
FB1, FB2	-	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. FB1 and FB2 can be substituted for a different bead or inductor to extend performance lower in frequency.

Part Ordering Details

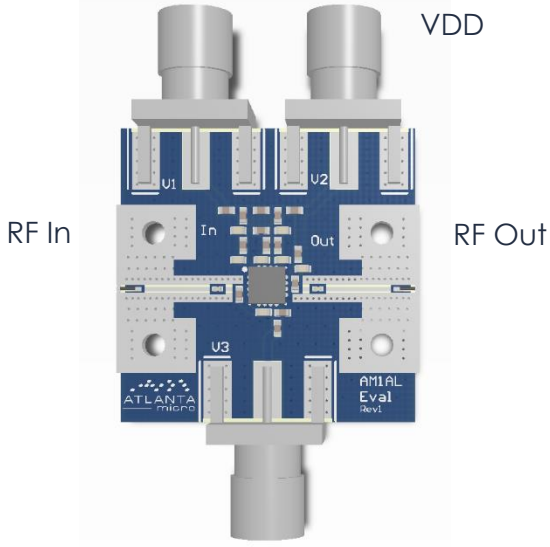
Description	Part Number
3mm 16 Lead QFN	AM1084-1
1.3mm x 2mm 6 Lead DFN	AM1084-2
AM1084-1 Evaluation Board	AM1084-1 Eval
AM1084-2 Evaluation Board	AM1084-2
AM1084-1 in 0.95" x 1.13" x 0.6" RF-Shielded Module with Integrated Bias Tee and Field Replaceable SMA Connectors	AM1084-M

Related Parts

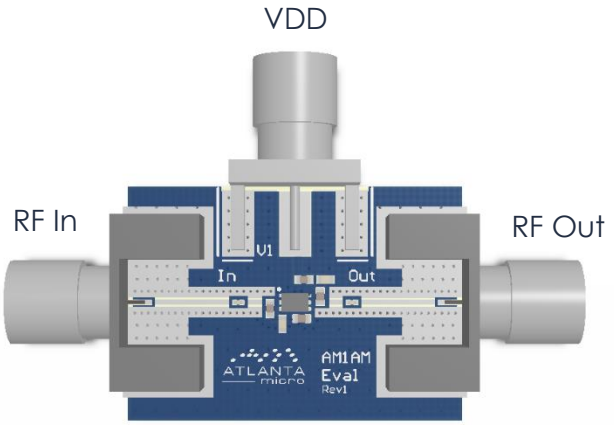
Part Number				Description
AM1016B	20 MHz	to	6 GHz	+3.3V Gain Block
AM1018C	20 MHz	to	6 GHz	+5.0V Gain Block
AM1025B	20 MHz	to	3 GHz	+8.0V Gain Block (High P1dB)
AM1031C	20 MHz	to	8 GHz	+3.3V Gain Block
AM1065	DC	to	8 GHz	Bypassable Gain Block
AM1073	DC	to	8 GHz	Bidirectional / Bypassable Gain Block
AM1085	DC	to	6 GHz	+5.0V Gain Block
AM1090	DC	to	6 GHz	+5.0V or +8.0V Gain Block
AM1163-1	DC	to	10 GHz	Gain Block
AM1164-1	DC	to	8 GHz	Gain Block

Evaluation PC Board

(Not all components shown will necessarily installed)



AM1084-1 Eval



AM1084-2 Eval

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.