

# AM1090 – Amplifier

## DC to 6 GHz Gain Block

### Description

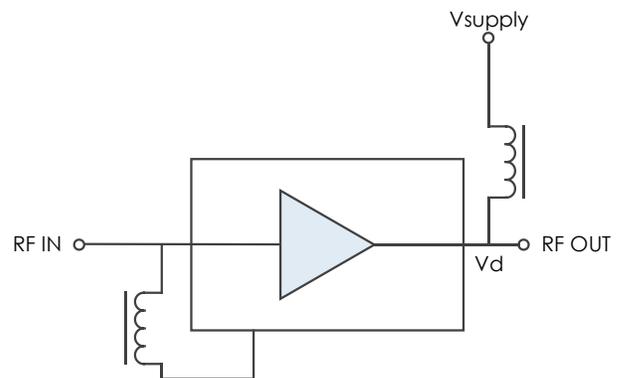
The AM1090 is a DC-coupled amplifier covering up to 6 GHz. The device exhibits a moderate positive gain slope, providing frequency equalization useful in many broadband applications. With internal 50Ω matching and packaged in a 3mm QFN or a shielded module, the AM1090 represents a compact total PCB footprint.



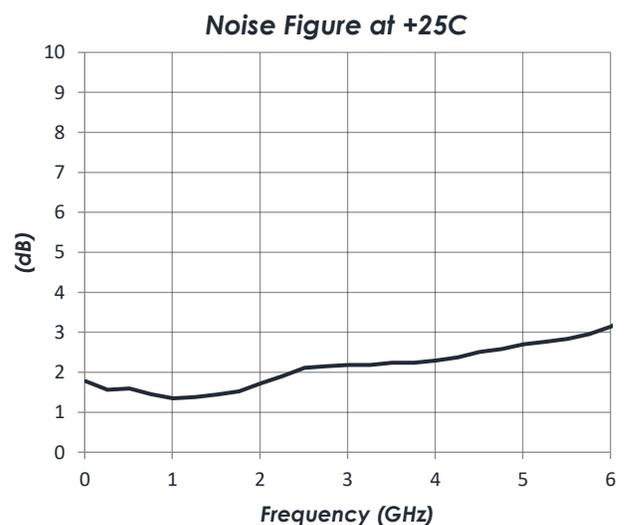
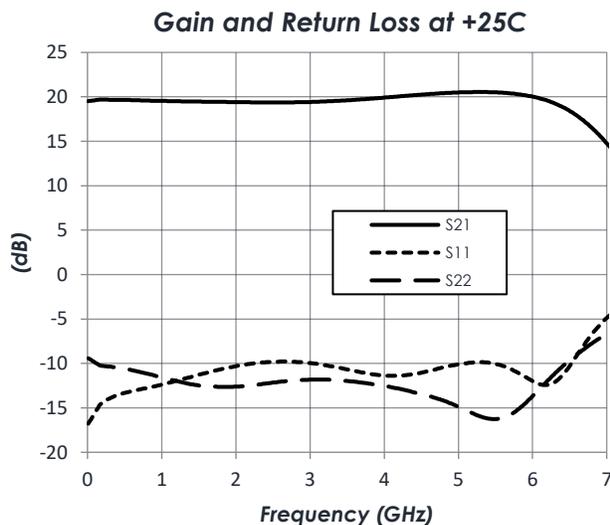
### Features

- 20 dB Gain
- 2.1 dB Noise Figure
- +35 dBm OIP3
- +21 dBm P1dB
- +5.0V or +8.0V Operation
- 1.3mm x 2mm DFN or 3mm QFN
- -40C to +85C Operation
- Available in RF Shielded Module

### Functional Diagram



### Characteristic Performance



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### Revision History

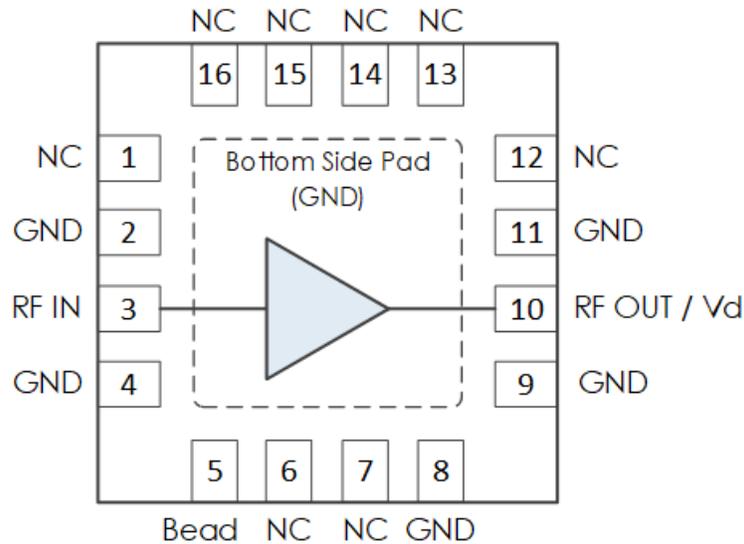
Date	Revision Number	Notes
July 23, 2019	1	Initial Release
September 24, 2019	2	Added 1.3mm x 2mm DFN picture to first page. Corrected evaluation board image. 1.3mm x 2mm DFN marking details corrected.
November 26, 2019	2A	Updated Description to include shielded module packaging
March 18, 2020	3	Storage temperature updated. Package lead finish updated. Module drawing updated.
November 11, 2020	4	Package and Module information moved to main product page on website.

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## Pin Layout and Definitions

### AM1090-1: 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*

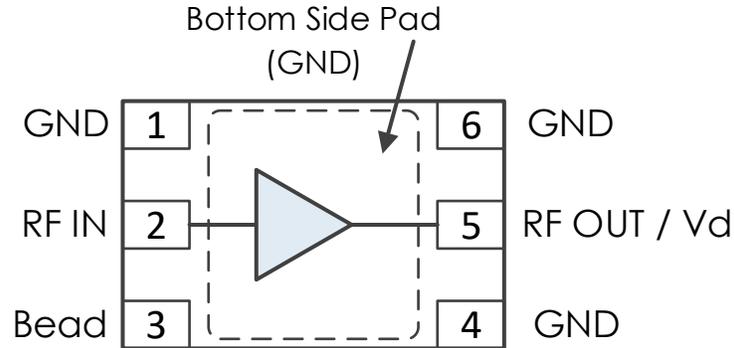
\*NC pins may be grounded or left open

# AM1090 – Amplifier

DC to 6 GHz Gain Block

## Pin Layout and Definitions (Continued)

AM1090-2: 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

# AM1090 – Amplifier

## DC to 6 GHz Gain Block



### Specifications

#### Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+10.0V
RF Input Power		+21dBm
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		+5.0 V	+8.0 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 ( $\theta_{JC}$ )	25

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## DC to 6 GHz Gain Block

### DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Supply Voltage			+5.0 V	+8.0 V
DC Supply Current	V Supply = +5.0 V		89 mA	
	V Supply = +8.0 V		198 mA	
Power Dissipated	V Supply = +5.0 V		0.45 W	
	V Supply = +8.0 V		1.6 W	

### RF Performance

(T = 25 °C unless otherwise specified)

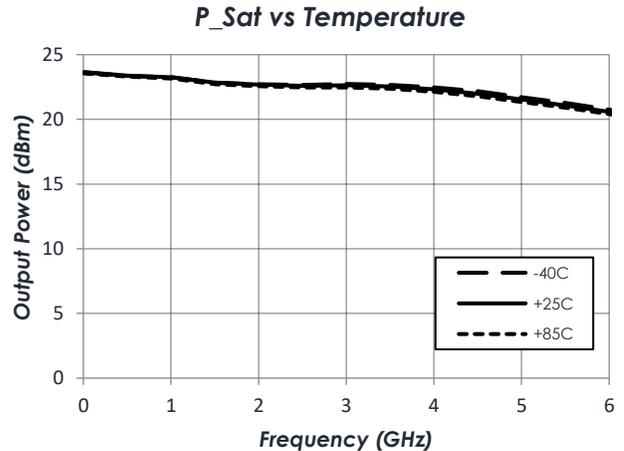
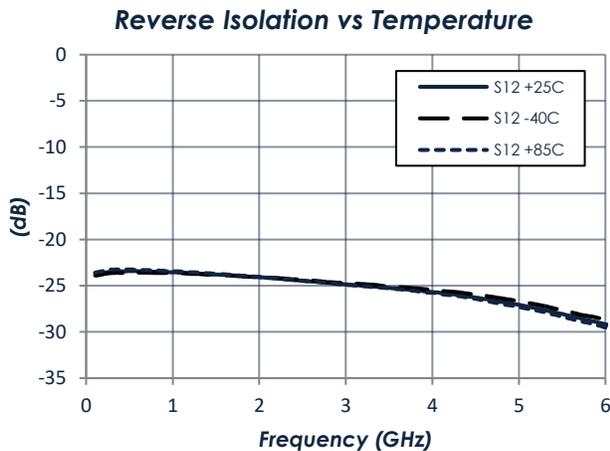
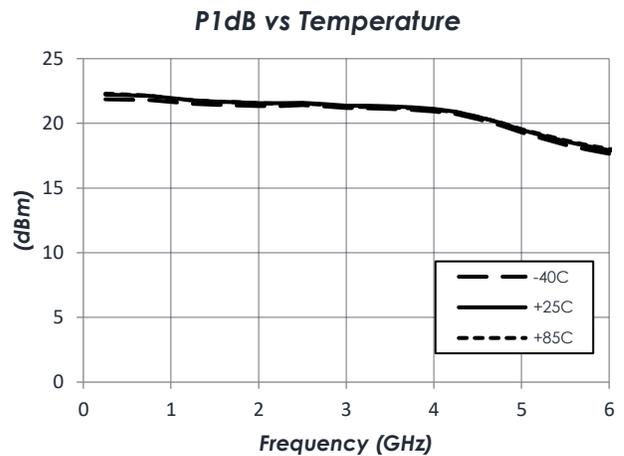
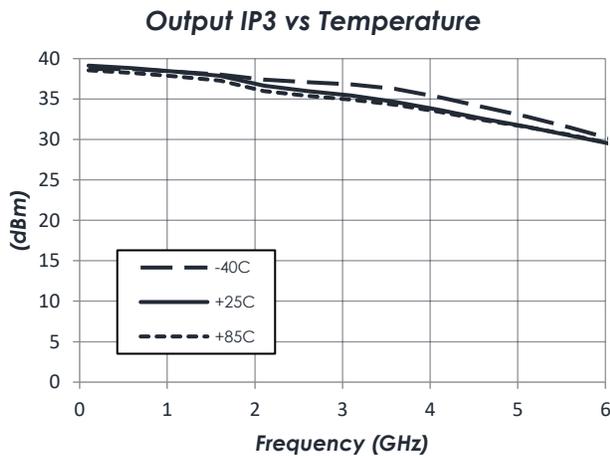
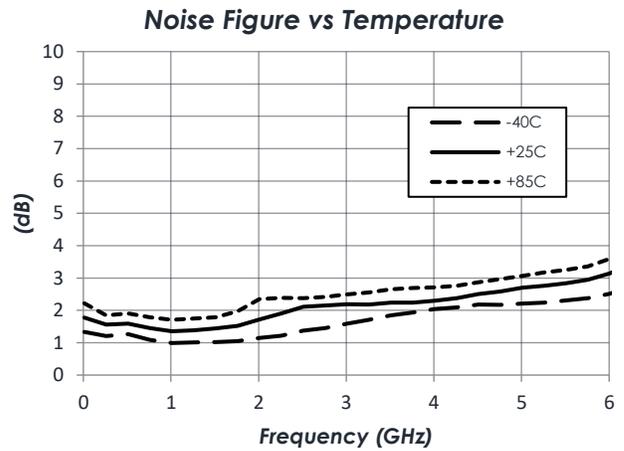
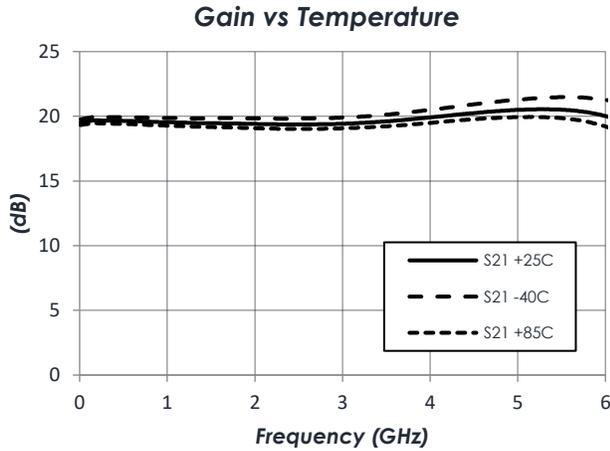
Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		DC		6 GHz
Gain	V Supply = +5.0 V		20 dB	
Return Loss	V Supply = +5.0 V		10 dB	
Output IP3			35 dBm	
Output P1dB			21 dBm	
Noise Figure			2.1 dB	

# AM1090 – Amplifier

## DC to 6 GHz Gain Block

### Typical Performance

(Vd = +5.0 V, Id = 89 mA)



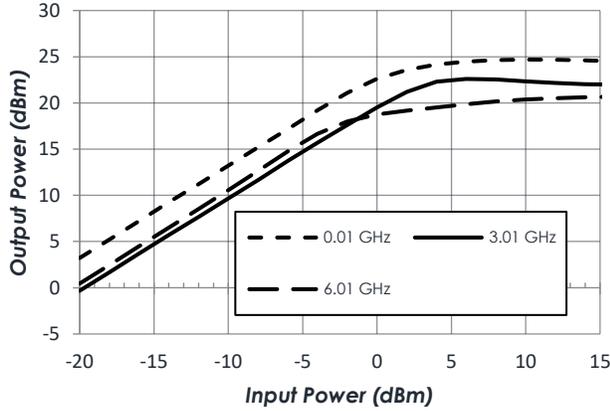
# AM1090 – Amplifier

## DC to 6 GHz Gain Block

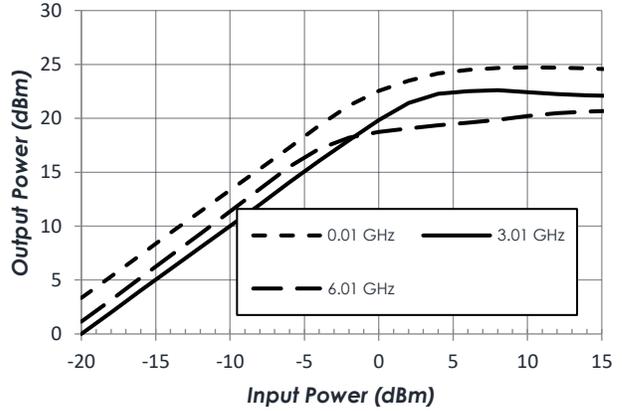
### Typical Performance (continued)

(Vd = +5.0 V, Id = 89 mA, T = 25C unless otherwise specified)

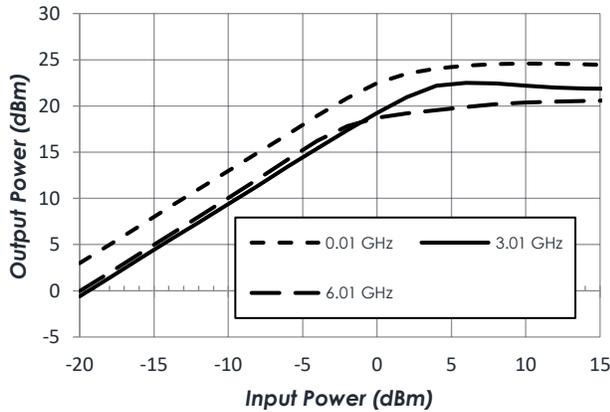
**Pin vs. Pout at +25C**



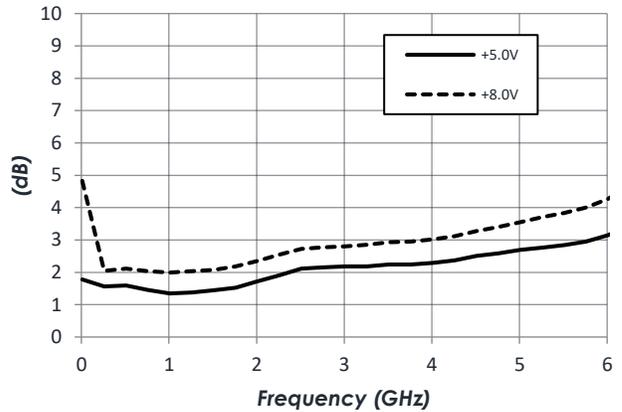
**Pin vs. Pout at -40C**



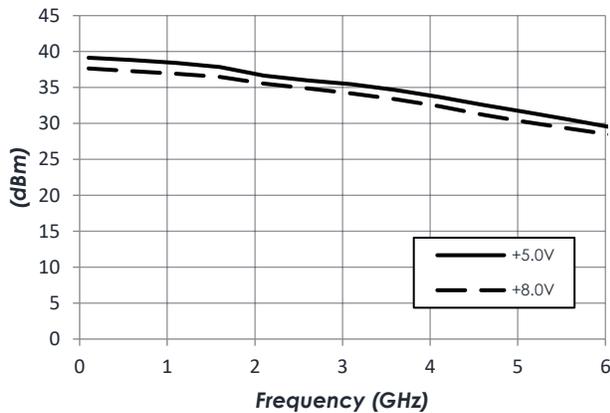
**Pin vs. Pout at +85C**



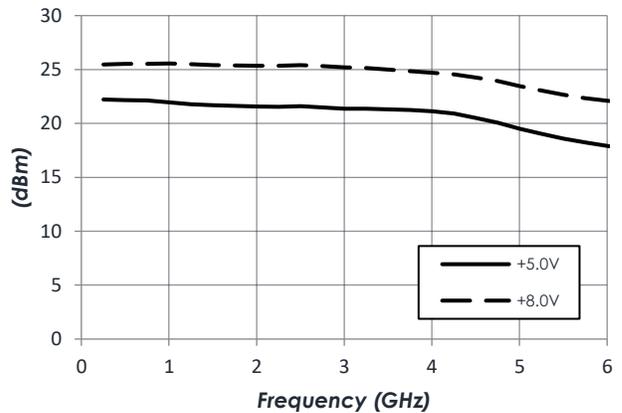
**Noise Figure vs VDD**



**Output IP3 vs VDD**



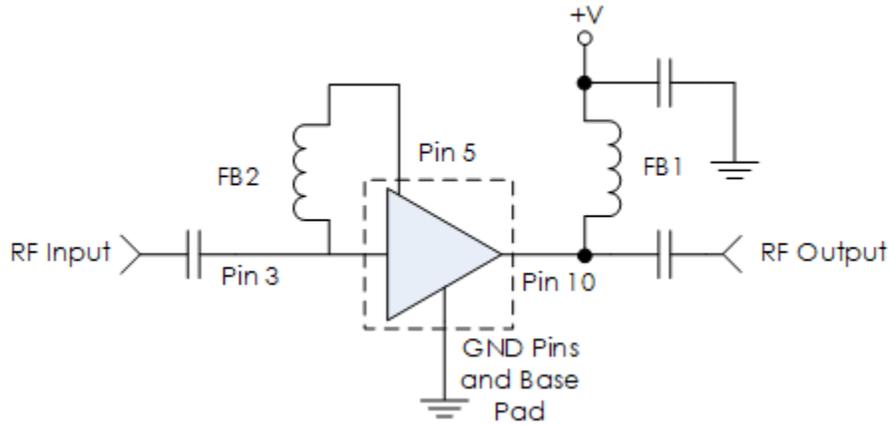
**P1dB vs VDD**



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## Typical Application



### Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1, C2	0.1 $\mu$ F	0402BB104KW160	Passives Plus
C3	0.1 $\mu$ F	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

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## DC to 6 GHz Gain Block

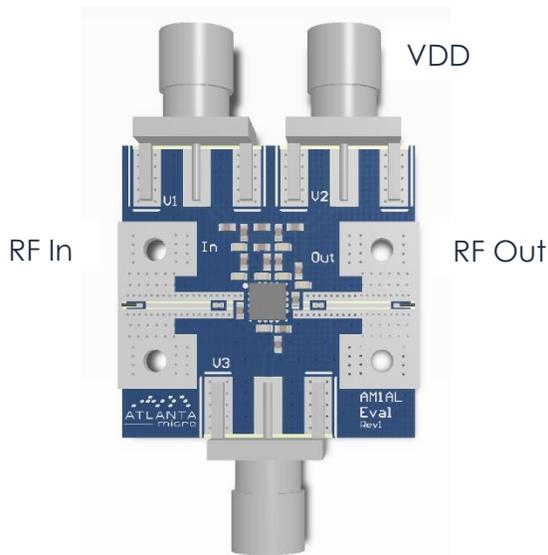
### Part Ordering Details

Description	Part Number
3mm 16 Lead QFN	AM1090-1
1.3mm x 2mm 6 Lead DFN	AM1090-2
AM1090-1 Evaluation Board	AM1090-1 Eval
AM1090-2 Evaluation Board	AM1090-2 Eval
AM1090 in 0.95" x 1.13" x 0.6" RF-Shielded Module with Integrated Bias Tee and Field Replaceable SMA Connectors	AM1090-M

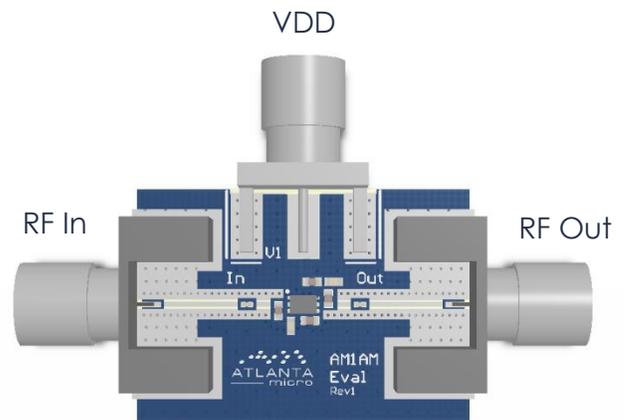
### Related Parts

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
AM1063-1	DC to 10 GHz Gain Block
AM1064-1	DC to 8 GHz Gain Block
AM1065	DC to 8 GHz Bypassable Gain Block
AM1073	DC to 8 GHz Bidirectional / Bypassable Gain Block
AM1084	DC to 6 GHz +3.3V or +5.0V Gain Block
AM1085	DC to 6 GHz +5.0V Gain Block

### Evaluation PC Board



AM1090-1 Eval



AM1090-2 Eval

To obtain price, delivery, or to place an order contact [sales@atlantamicro.com](mailto:sales@atlantamicro.com)  
 Atlanta Micro Inc., 3720 Davinci Ct, Suite 125, Norcross, GA 30092 • Phone: (470) 253-7640 • [www.atlantamicro.com](http://www.atlantamicro.com)

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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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