AM1074 – Amplifier

6 GHz to 26.5 GHz Gain Block

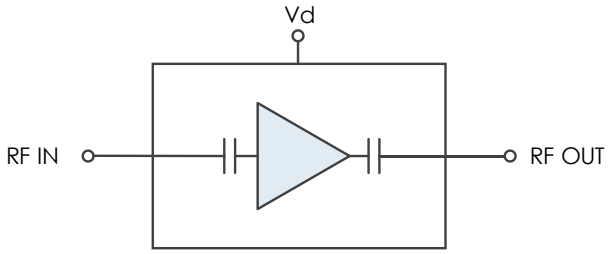
Description

The AM1074 is a high dynamic range cascadable gain block covering the 6 GHz to 26.5 GHz frequency range. The device is capable of producing a max of +18 dBm output power with a single +3.3V supply, useful for many LO driver applications. The AM1074 exhibits a low noise figure, high third order intercept performance, and gain stability over the operating temperature range while offering internal 50Ω matching all packaged in a 3mm QFN.

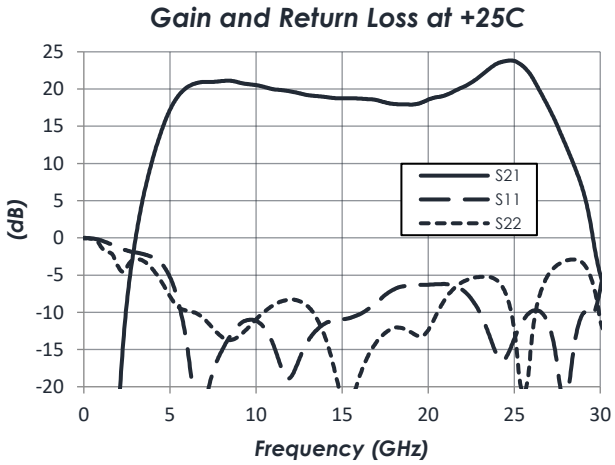
Features

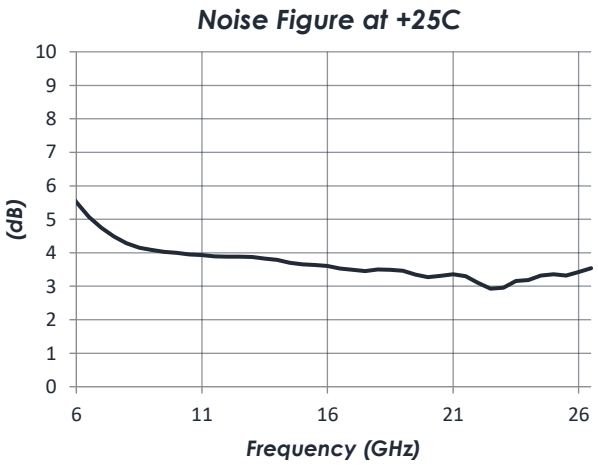
- 20 dB Gain TYP
- 3.7 dB Noise Figure
- +27 dBm OIP3
- +14 dBm P1dB
- +3.3 V, 85 mA TYP
- 3mm QFN
- -40 C to +85 C Operation
- No DC Blocking Caps Required

Functional Diagram



Characteristic Performance





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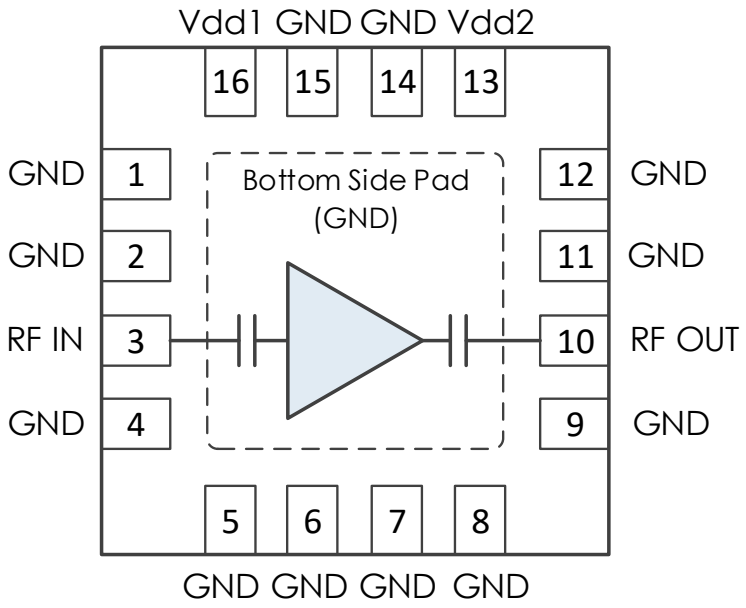
Revision History

Date	Revision Number	Notes
August 15, 2018	1	Initial Release

Pin Layout and Definitions



Pin Number	Pin Name	Pin Function
1, 2	GND	Ground - Common
3	RF In	RF Input – 50 Ohms – AC Coupled
4-9	GND	Ground - Common
10	RF Out	RF Output – 50 Ohms – AC Coupled
11, 12	GND	Ground - Common
13	VDD2	DC Power Input
14, 15	GND	Ground - Common
16	VDD1	DC Power Input
Case GND	GND	Ground - Common

Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+3.7 V
RF Input Power		+20 dBm
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	+3.3 V	+3.5 V
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+133 C

Thermal Information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θ_{JC})	172

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Supply Voltage			+3.3 V	
DC Supply Current	VDD1 = VDD2 = +3.3 V		85 mA	
Power Dissipated	VDD1 = VDD2 = +3.3 V		0.28 W	

RF Performance

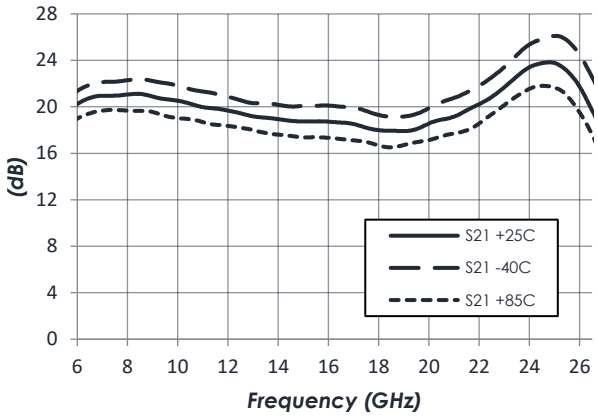
(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		6 GHz		26.5 GHz
Gain	f = 6 GHz		20.2 dB	
	f = 16 GHz		18.7 dB	
	f = 26.5 GHz		19.7 dB	
Return Loss	f = 6 GHz		14.5 dB	
	f = 16 GHz		10.3 dB	
	f = 26.5 GHz		9.9 dB	
Output IP3			+27 dBm	
Output P1dB			+14 dBm	
Noise Figure			3.7 dB	

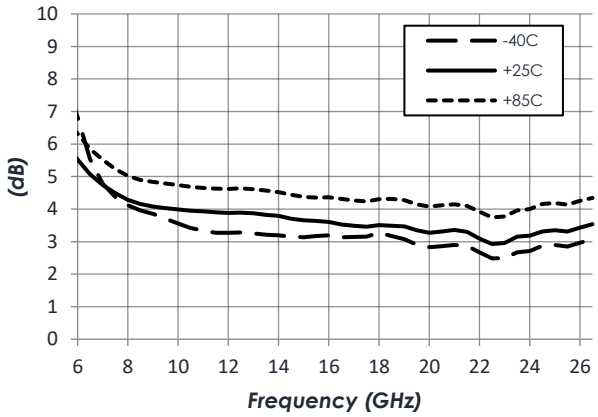
Typical Performance

(VDD1 = VDD2 = +3.3 V)

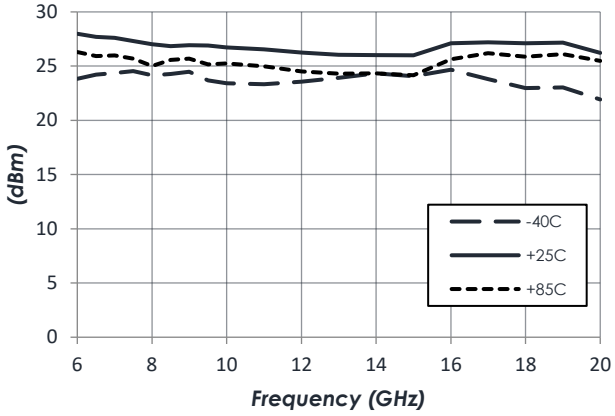
Gain vs Temperature



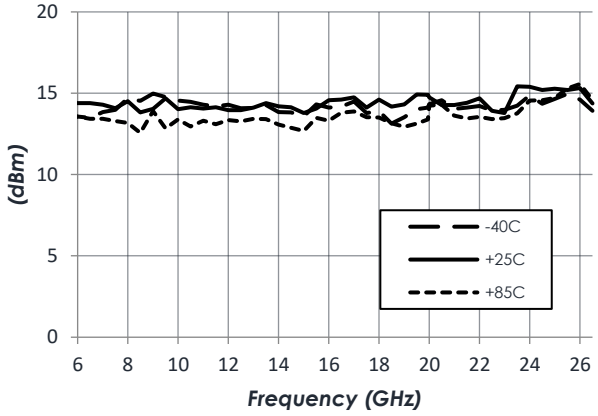
Noise Figure vs Temperature



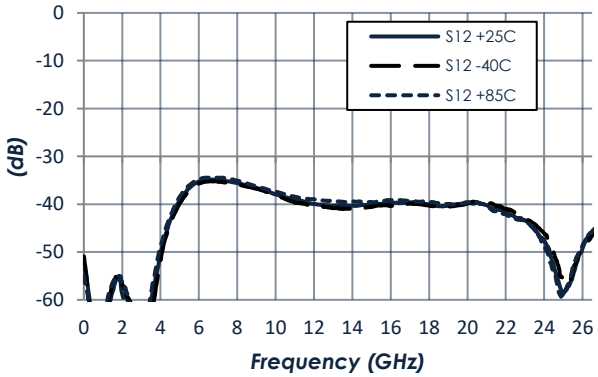
Output IP3 vs Temperature



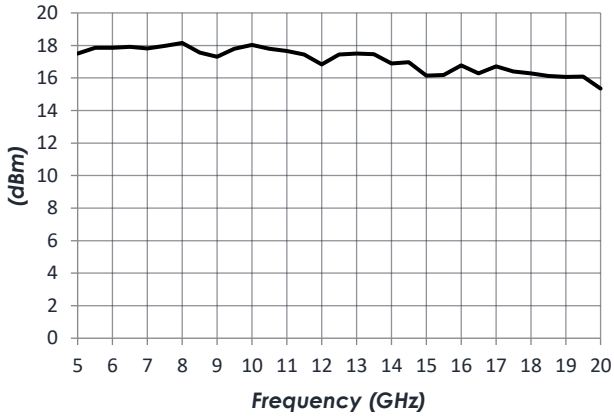
P1dB vs Temperature



Reverse Isolation vs Temperature

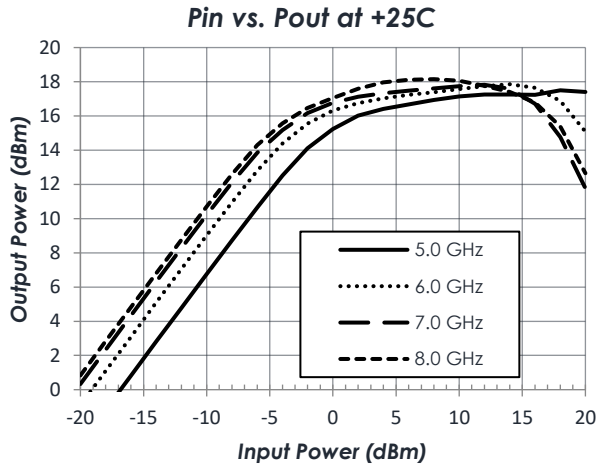


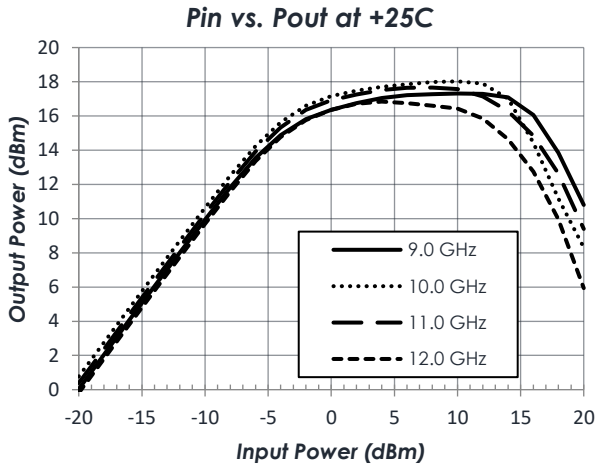
Power Saturation at +25C

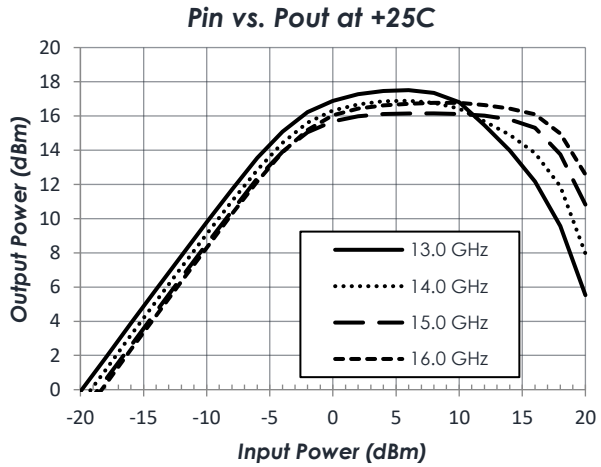


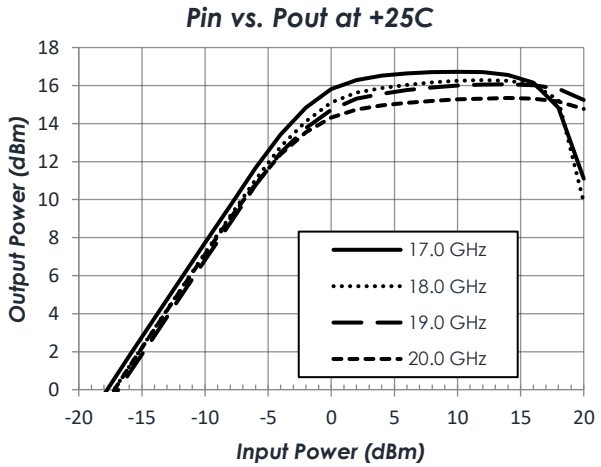
Typical Performance (continued)

(VDD1 = VDD2 = +3.3 V)



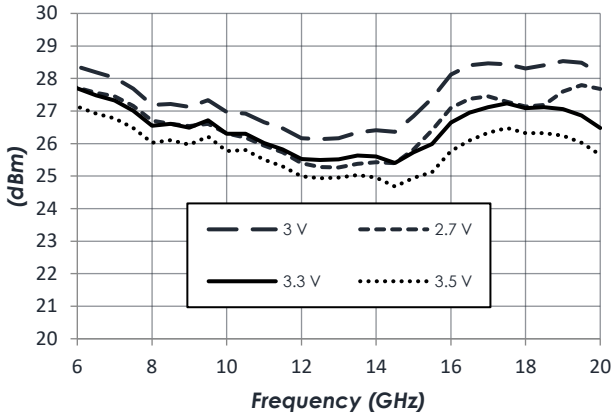




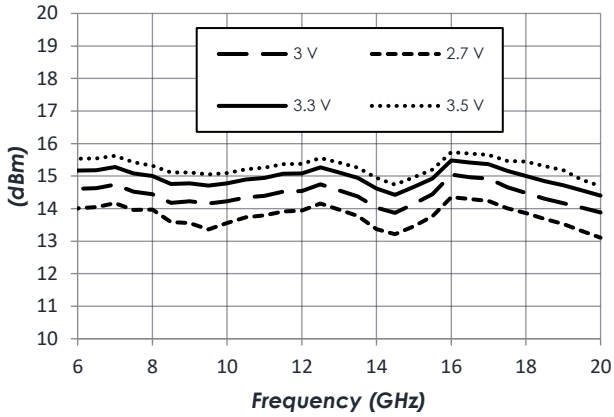


Typical Performance (continued)

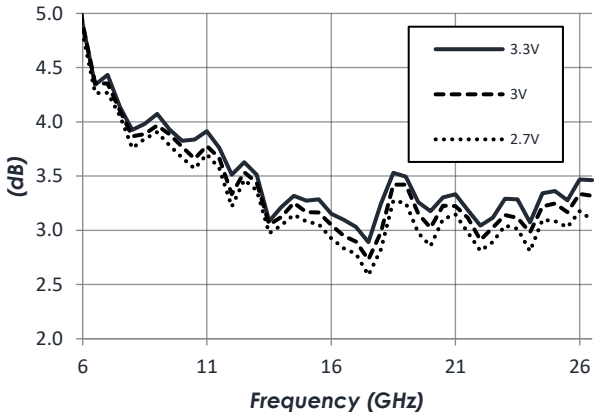
Output IP3 vs VDD



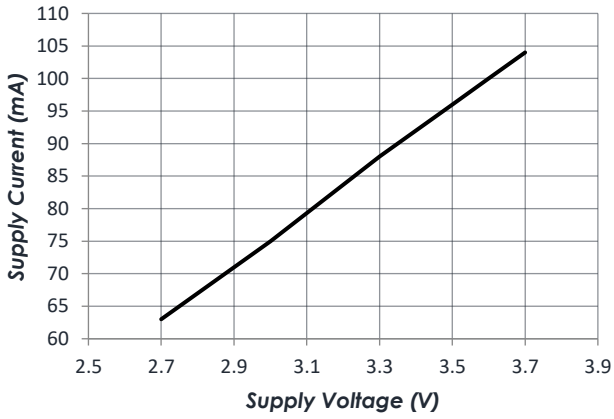
P1dB vs VDD



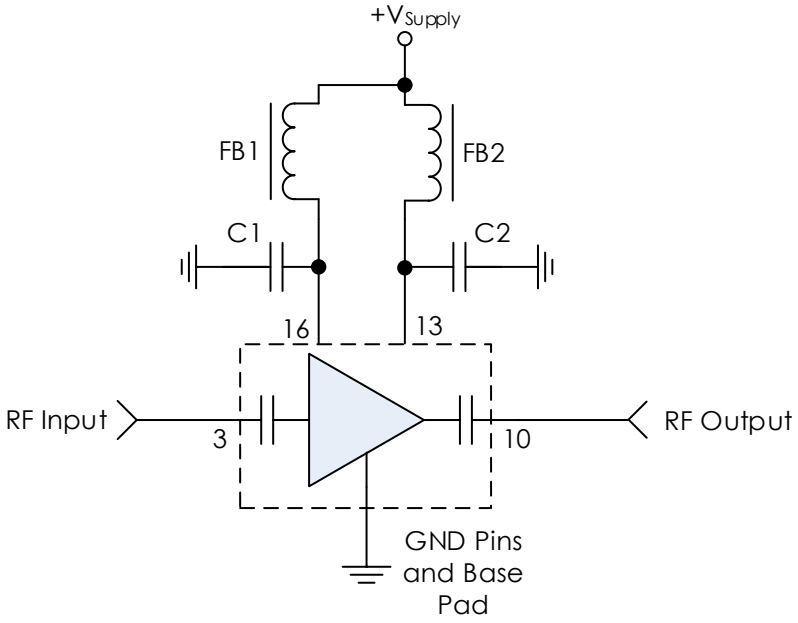
Noise Figure vs VDD



ID vs. VDD



Typical Application



Recommended Component List (or equivalent):

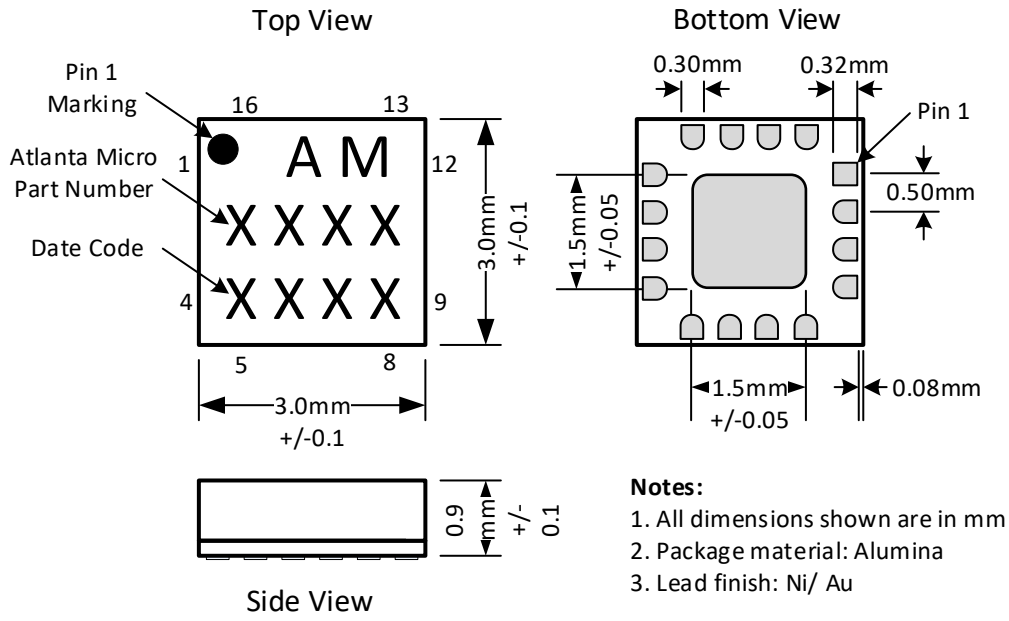
Part	Value	Part Number	Manufacturer
FB1, FB2	-	MMZ1005A222E	TDK
C1, C2	0.1µF	C1005X7R1H104K050BB	TDK

Notes:

1. RF Input and RF Output pins are internally DC blocked.

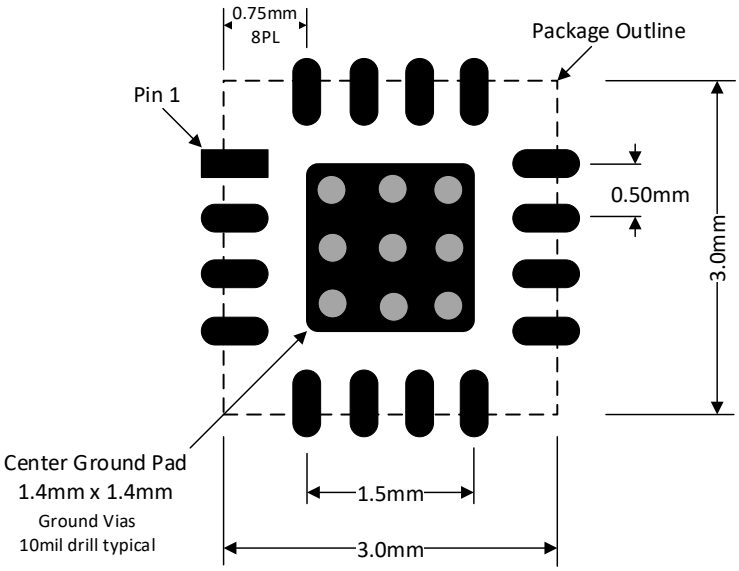
Package Details

Package Drawing

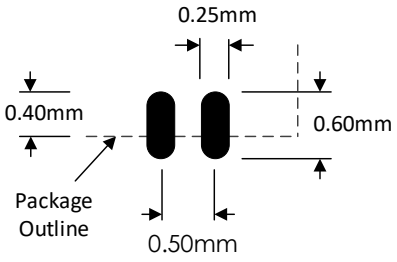


Notes:
1. All dimensions shown are in mm
2. Package material: Alumina
3. Lead finish: Ni/ Au

Recommended Footprint

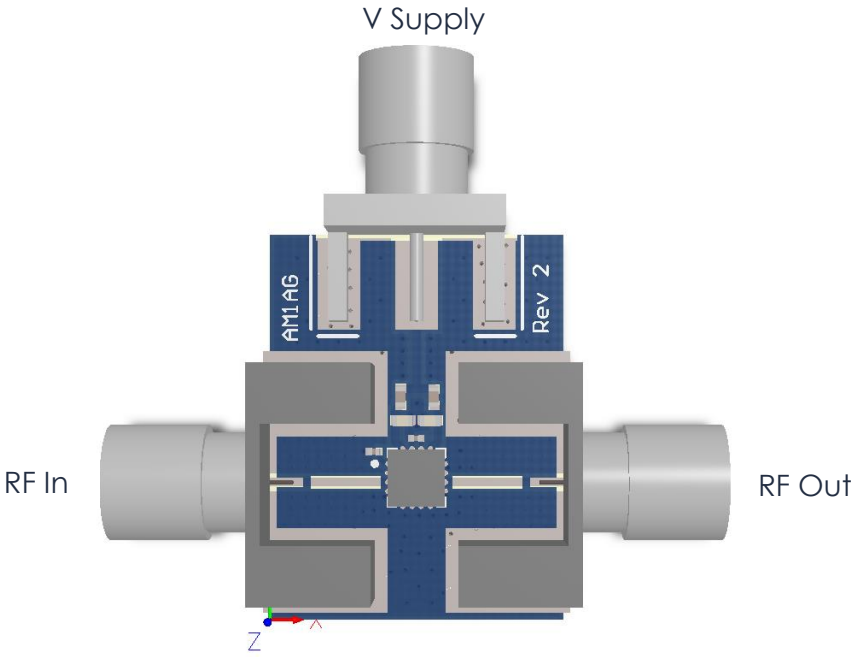


Pad and Spacing Detail



Recommend 0.08mm soldermask
oversize beyond pad outlines

Evaluation PC Board



Related Parts

Part Number	Description
AM1053	5 GHz to 20 GHz Gain Block
AM1063	DC to 10 GHz Gain Block
AM1064	DC to 8 GHz Gain Block
AM1065	DC to 8 GHz Bypassable Gain Block
AM1067	5 GHz to 20 GHz Bypassable Gain Block
AM1073	DC to 8 GHz Bi-directional Bypassable Gain Block
AM1077	5 GHz to 20 GHz Bypassable Gain Block w/ Isolation State

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 RoHS II. 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)

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).

Conflict Materials: Atlanta Micro does not knowingly use materials that are sourced from the Democratic Republic of Congo (DRC) or any other known conflict regions. Atlanta Micro's supply chain is comprised of sources that are both environmentally and socially responsible. We periodically review this requirement with our vendors to ensure continued compliance.

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.