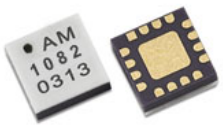
AM1082 – Amplifier

5 GHz to 17 GHz Gain Block

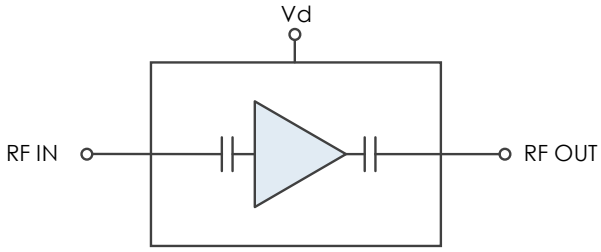


The AM1082 is a high dynamic range, cascadable gain block covering the 5 to 17 GHz frequency range. The amplifier exhibits high gain and output power across its bandwidth, useful for many LO driver applications. Packaged in a 3mm QFN or a shielded module with internal 50Ω matching and DC blocking capacitors, the AM1082 represents a compact total PCB footprint.

FEATURES

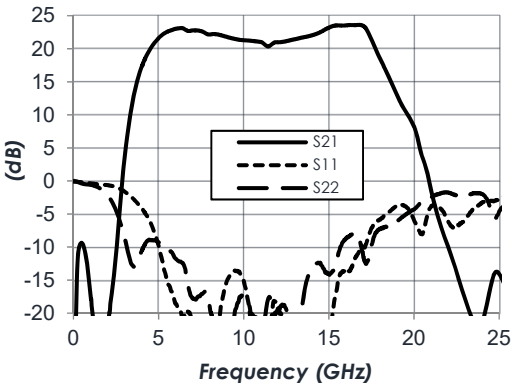
- 22 dB Gain
- <3.0 dB Noise Figure
- +31 dBm OIP3
- +20 dBm P1dB
- +22 dBm PSat
- +5.0 V, 126 mA Supply
- 3mm QFN
- -40C to +85C Operation
- No DC Blocking Caps Required

FUNCTIONAL DIAGRAM

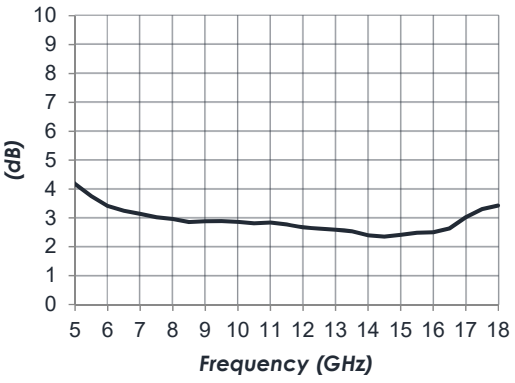


CHARACTERISTIC PERFORMANCE

Gain and Return Loss at +25C



Noise Figure at +25C

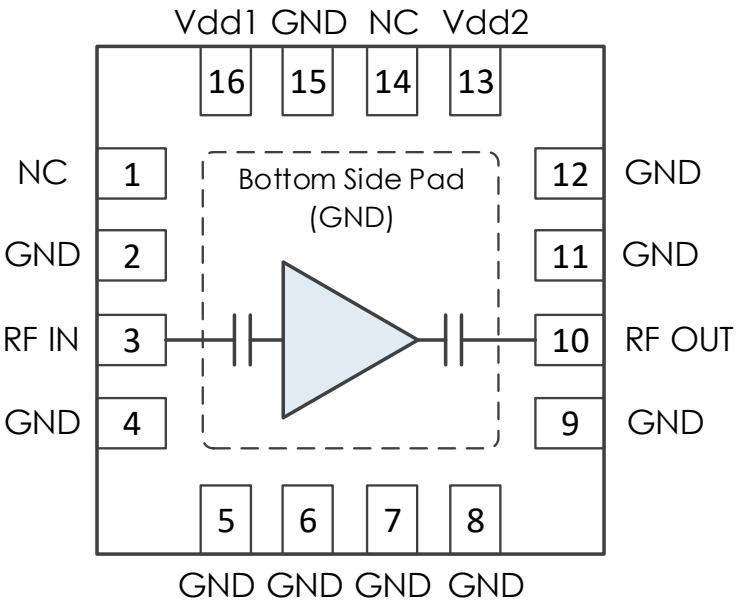


CONTENTS

REVISION HISTORY

Date	Revision	Notes
July 19, 2019	1	Initial Release
November 26, 2019	1A	Updated Description to include shielded module packaging.
June 17, 2024	2	Changed to Mercury branding. No content changes.

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1	NC	Not Connected *
2	GND	Ground – Common
3	RF IN	RF Input – 50 Ohms – AC Coupled
4-9	GND	Not Connected *
10	RF OUT	RF Output – 50 ohms – AC Coupled
11, 12	GND	Ground – Common
13	VDD2	DC Power Input
14	NC	Not Connected *
15	GND	Ground – Common
16	VDD1	DC Power Input

* NC pins may be grounded or left open.

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+6.0 V
RF Input Power		+20 dBm
Operating Junction Temperature	-40 C	+150 C
Storage Temperature Range	-50C	+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. Devices subjected to conditions outside of what is recommended for extended periods may affect device reliability.

Handling Information

	Minimum	Maximum
Storage Temperature Range (Recommended)	-50 C	+125 C
Moisture Sensitivity Level	MSL 3	

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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+4.5 V	+5.0 V	+5.5 V
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+130 C

Thermal Information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θ_{JC})	72

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
DC Supply Voltage			+5.0 V	
DC Supply Current	Vdd1 = Vdd2 = +5.0 V		126 mA	
Power Dissipated	Vdd1 = Vdd2 = +5.0 V		0.63 W	

RF Performance

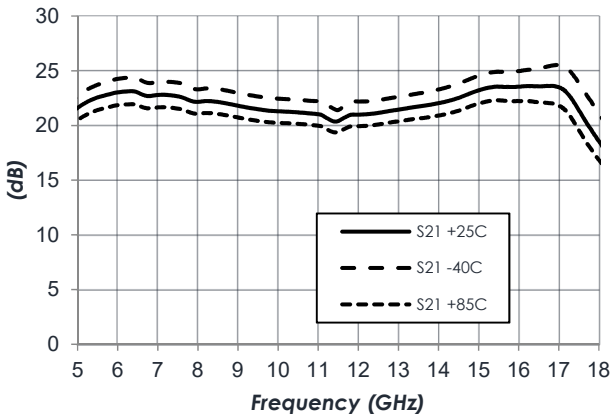
(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		5 GHz		17 GHz
Gain	Vdd1 = Vdd2 = +5.0 V		22 dB	
Return Loss	Vdd1 = Vdd2 = +5.0 V		20 dB	
Output IP3	Vdd1 = Vdd2 = +5.0 V		31 dBm	
Output P1dB	Vdd1 = Vdd2 = +5.0 V		20 dBm	
Noise Figure	Vdd1 = Vdd2 = +5.0 V		3 dB	

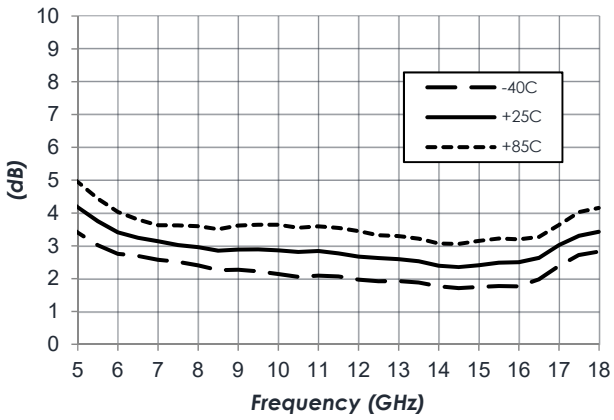
TYPICAL PERFORMANCE

(Vd = +5.0 V, Id = 126 mA)

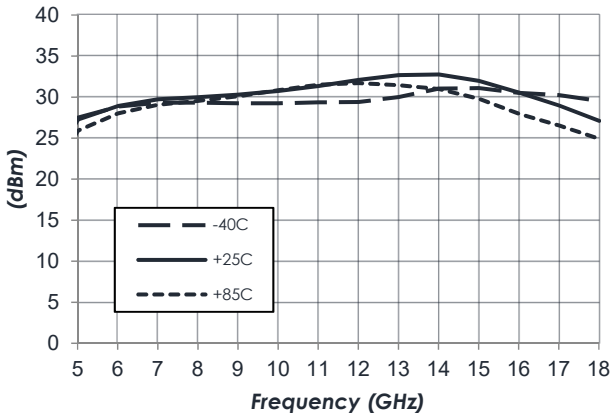
Gain vs Temperature



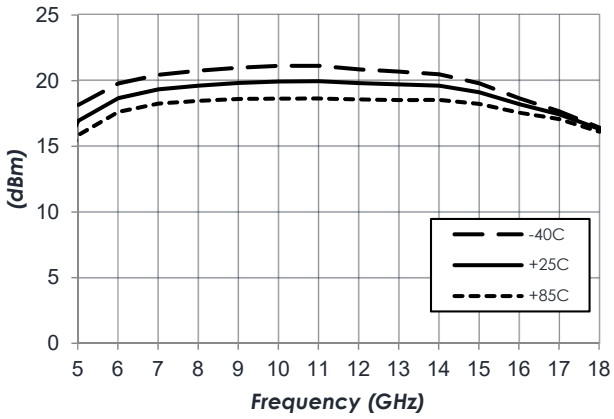
Noise Figure vs Temperature



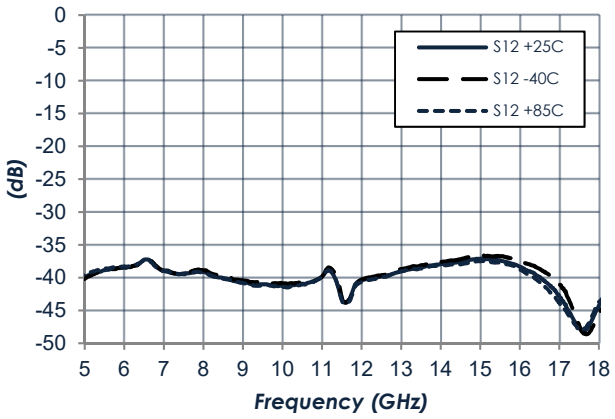
Output IP3 vs Temperature



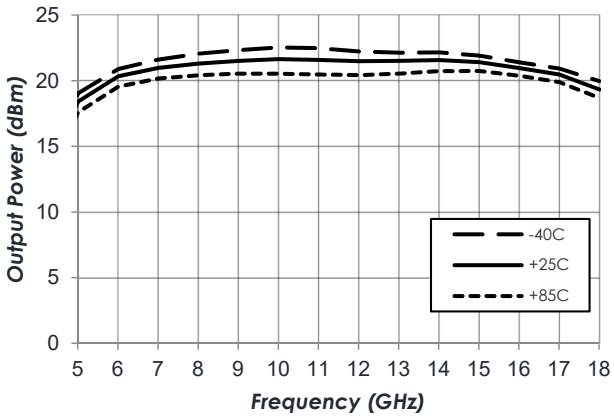
P1dB vs Temperature



Reverse Isolation vs Temperature

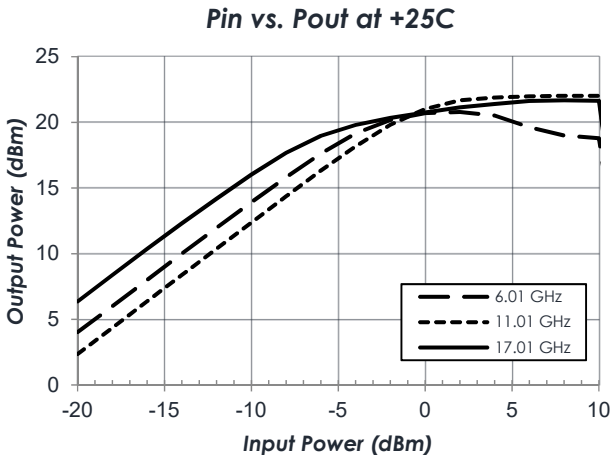


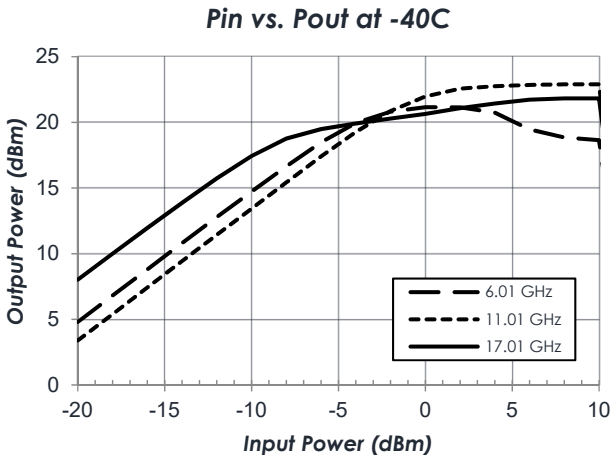
P_Sat vs Temperature

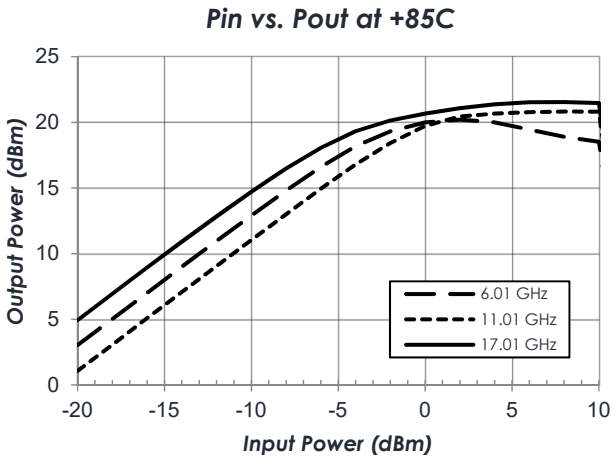


TYPICAL PERFORMANCE (CONTINUED)

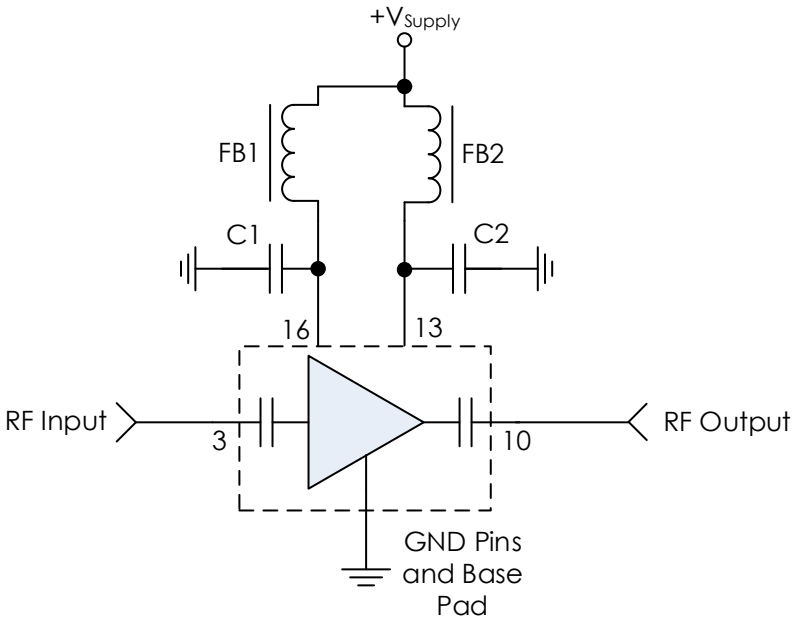
(Vd = +5.0 V, Id = 126 mA)







TYPICAL APPLICATION



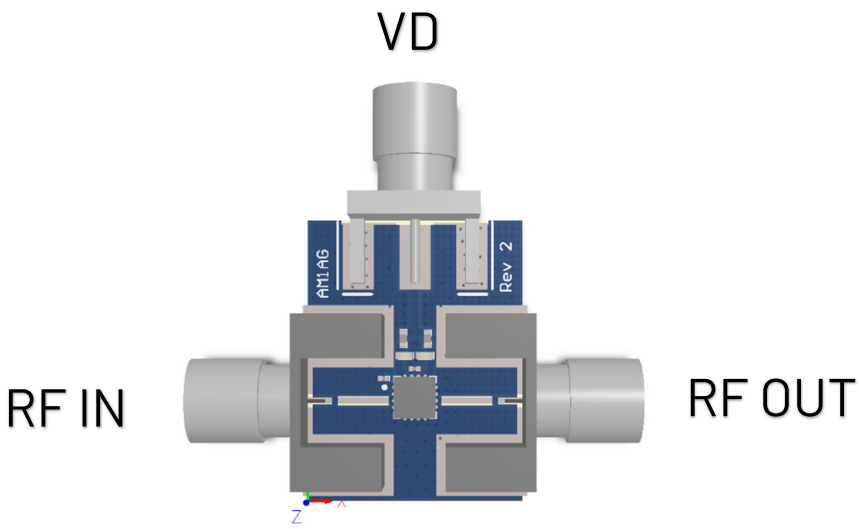
Recommended Component List (or Equivalent)

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

Notes:

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

EVALUATION PC BOARD



PART ORDERING DETAILS

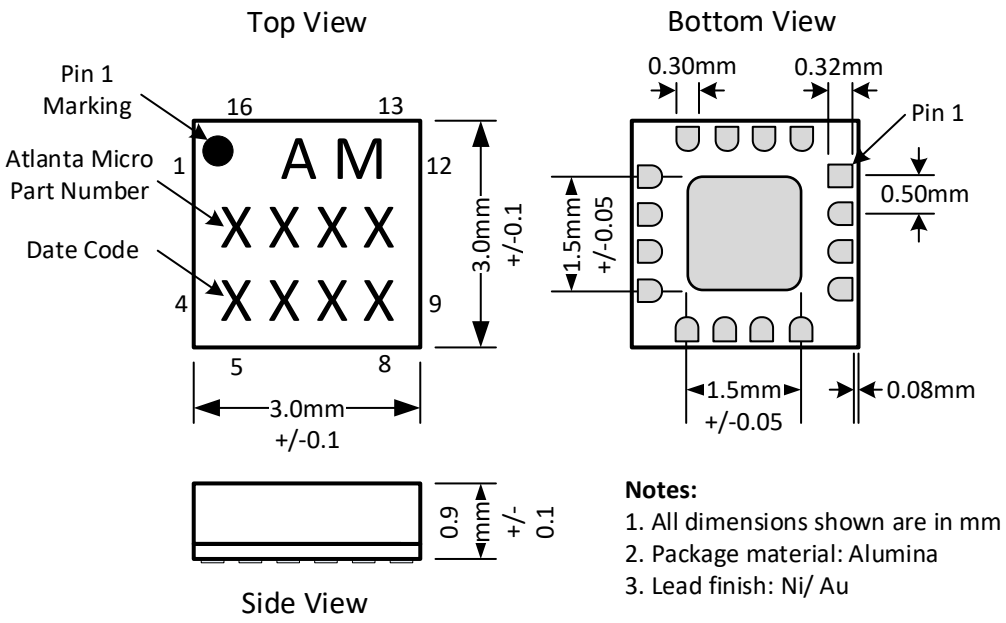
Part Number	Description
AM1082	3mm 16 Lead QFN
AM1082 Eval	AM1082 Evaluation Board
AM1082-M	AM1082 in 0.95" x 1.13" x 0.6" RF-Shielded Module with Integrated Bias Tee and Field Replaceable SMA Connectors

RELATED PARTS

Part Number		Description
AM1053	5 GHz to 20 GHz	+3.3V Gain Block
AM1067	5 GHz to 20 GHz	Bypassable Gain Block
AM1075	5 GHz to 26.5 GHz	Bypassable Gain Block
AM1077	5 GHz to 20 GHz	Bypassable Gain Block w/ Isolation State
AM1070	DC to 18 GHz	+3.3V Broadband Gain Block
AM1071	DC to 18 GHz	+5.0V Broadband Gain Block
AM1085	DC to 6 GHz	+5.0V Gain Block
AM1090	DC to 6 GHz	+5.0V or +8.0V Gain Block

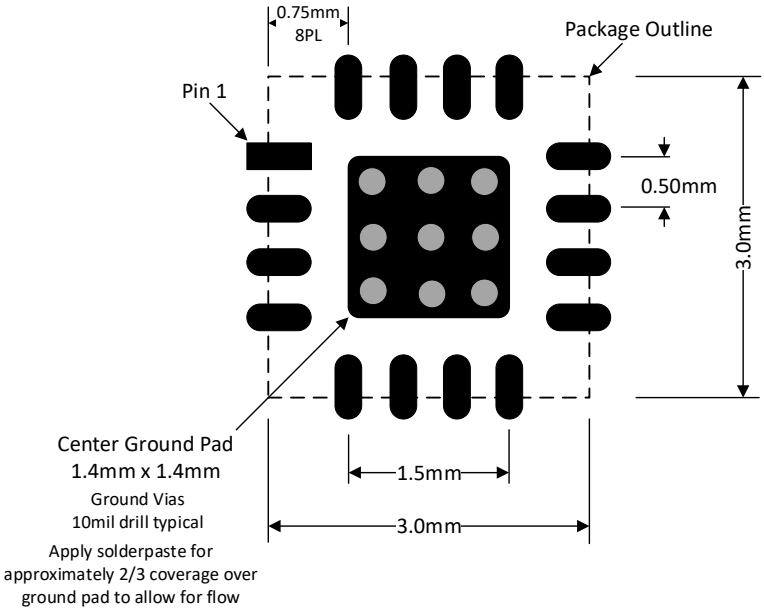
3MM 16 LEAD QFN DETAILS

Package Drawing

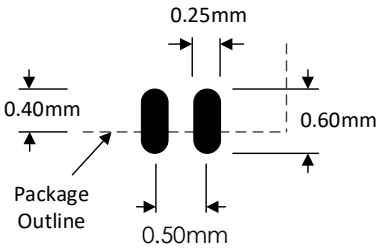


Notes:
1. All dimensions shown are in mm
2. Package material: Alumina
3. Lead finish: Ni/ Au

Recommended Footprint

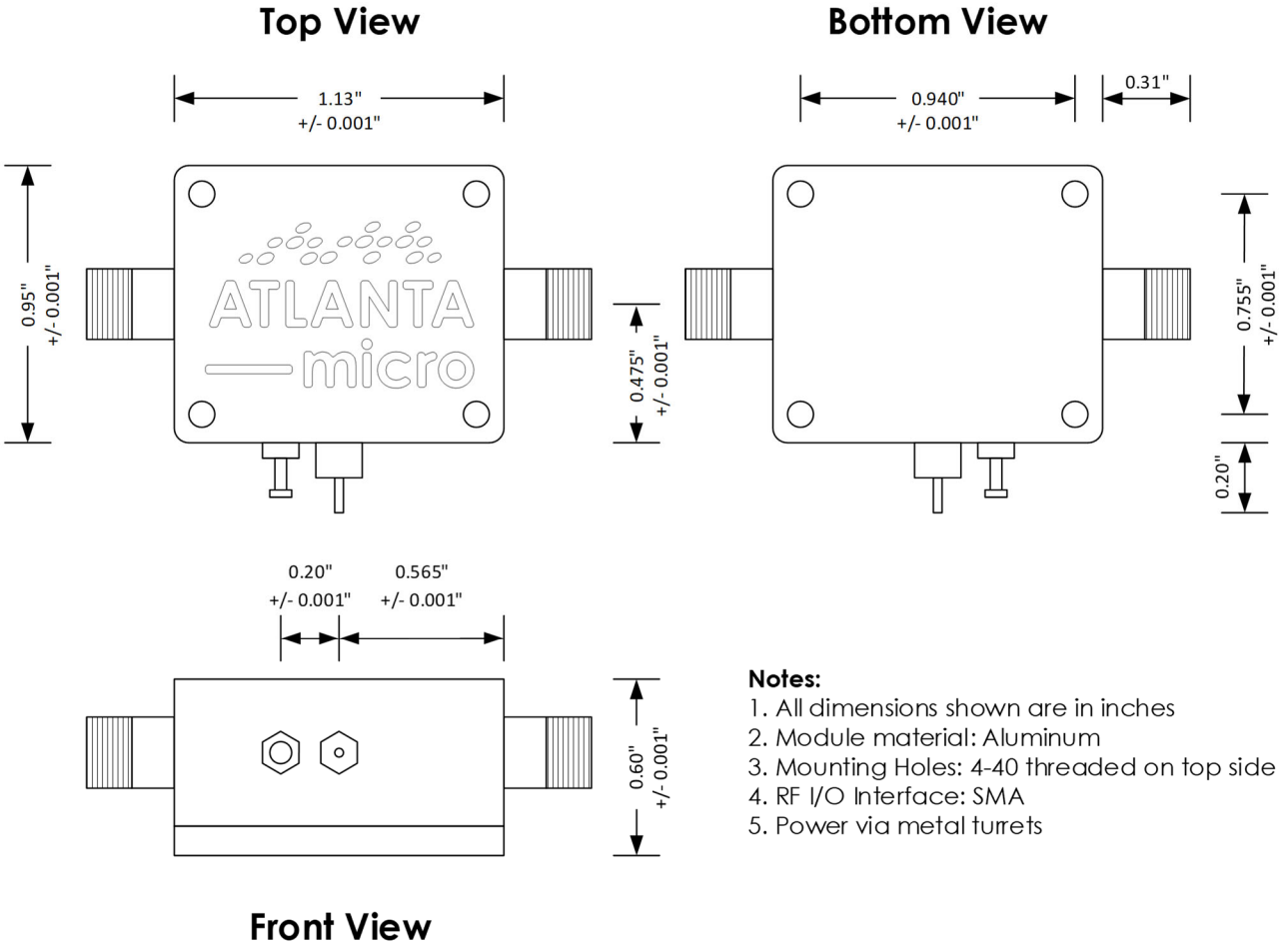


Pad and Spacing Detail



Recommend 0.08mm soldermask
oversize beyond pad outlines

RF SHIELDED MODULE DETAILS



Notes:
1. All dimensions shown are in inches
2. Module material: Aluminum
3. Mounting Holes: 4-40 threaded on top side
4. RF I/O Interface: SMA
5. Power via metal turrets

COMPONENT COMPLIANCE INFORMATION

RoHS: Mercury Systems, 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 Mercury 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 (CrVl)	<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)

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Mercury 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.

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