AM1122 – Amplifier

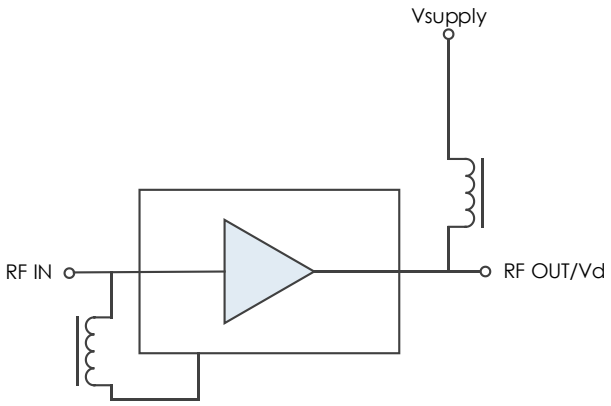
20 MHz to 6 GHz Gain Block

The AM1122 is a cascadable gain block servicing the 20 MHz to 6 GHz frequency range. The device has exceptional second and third order linearity, which makes it ideally suited in highly linear applications. Packaged in a 3mm QFN, the AM1122 represents a compact total PCB footprint.

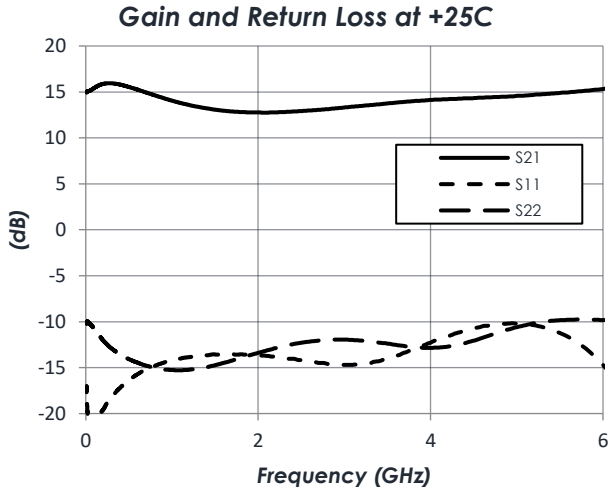
FEATURES

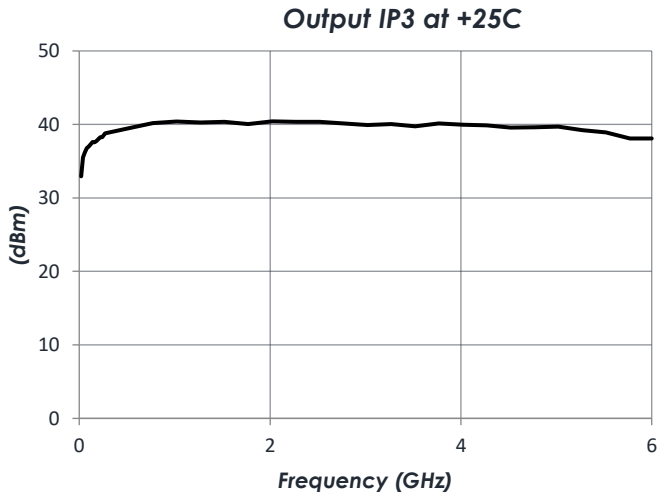
- +40 dBm OIP3
- +52 dBm OIP2
- 15 dB Gain
- +26 dBm P1dB
- 4.5 dB Noise figure
- +8.0V Operation
- 1.8 W Power Consumption
- 3mm QFN Ceramic
- -40C to +85C Operation

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE





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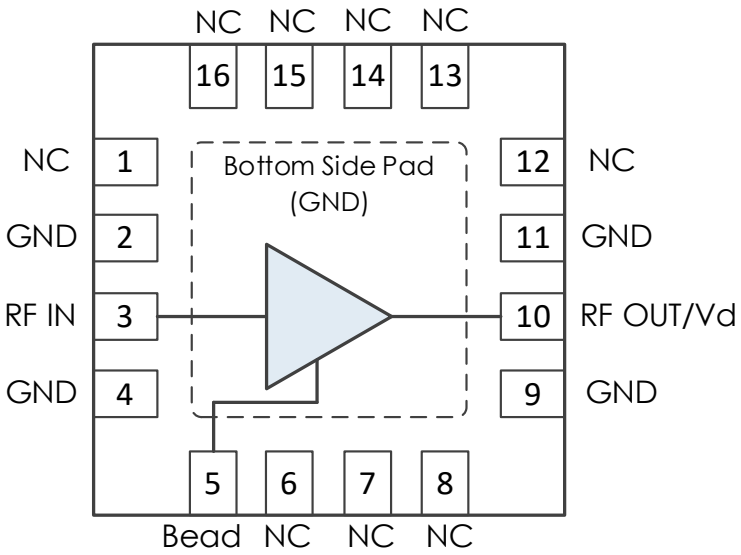
REVISION HISTORY

Date	Revision	Notes
September 23, 2021	1	Initial Release
September 28, 2023	2	Updated Absolute Maximum Ratings.
November 19, 2024	3	Changed to Mercury branding. No content changes.
September 17, 2025	4	Updated image for Eval Board Rev2

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1	NC	No Connect
2	GND	Ground - Common
3	RF IN	RF Input – External DC Blocking Capacitor Required
4	GND	Ground - Common
5	Bead	Connect to RF In through external ferrite bead or large inductor
6-8	NC	No Connect
9	GND	Ground - Common
10	RF OUT / Vd	RF Output and DC Power Input – External Bias Tee Required
11	GND	Ground - Common
12-16	NC	No Connect

Note: NC pins may be grounded or left open.

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+10 V
RF Input Power		+20dBm
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
Moisture Sensitivity Level	MSL 1	

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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+7.7V	+8.0 V	+8.3V
Operating Case Temperature	-40 C		+85 C

Thermal Information

Junction to Case Thermal Resistance (θ_{JC})	31.6 C/W
Nominal Junction Temperature at +85C Ambient	+141 C
Channel Temperature to Maintain 1 Million Hour MTTF	+175 C

DC Electrical Characteristics

(VDD = 8V, ID = 222mA, T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
DC Supply Voltage		+7.7V	+8.0 V	+8.3V
DC Supply Current	VDD = +8.0 V		222 mA	
Power Dissipated	VDD = +8.0 V		1.77 W	

RF Performance

(VDD = 8V, ID = 222mA, T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		20 MHz		6 GHz
Gain			15 dB	
Return Loss			10 dB	
Output IP3			40 dBm	
Output IP2			52 dBm	
Output P1dB			26 dBm	
Noise Figure			4.5 dB	

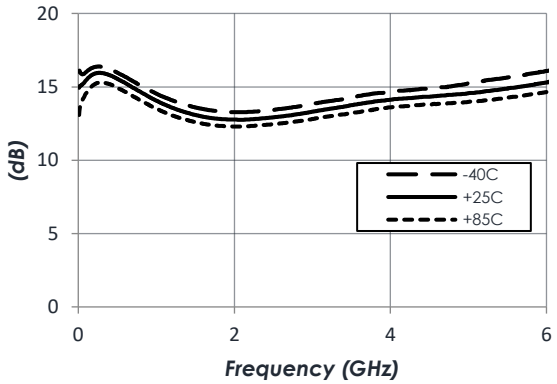
Notes:

1. IP3 measured with 10MHz tone spacing.
2. IP2 characterized with sum and difference measurements.
   - IP2 sum measured with 10MHz tone spacing. IM2 measured at f_1+f_2
   - IP2 difference measured with tones at $f_1$and f_2=(2× f_1)-10*MHz*. IM2 measured at $f_2 - f_1$

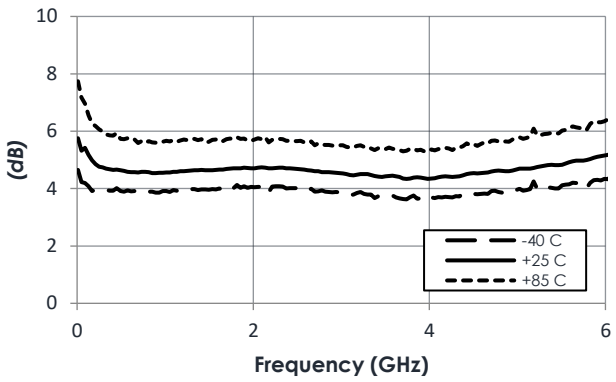
TYPICAL PERFORMANCE

(VDD = 8V, ID = 222mA, T = 25 °C unless otherwise specified)

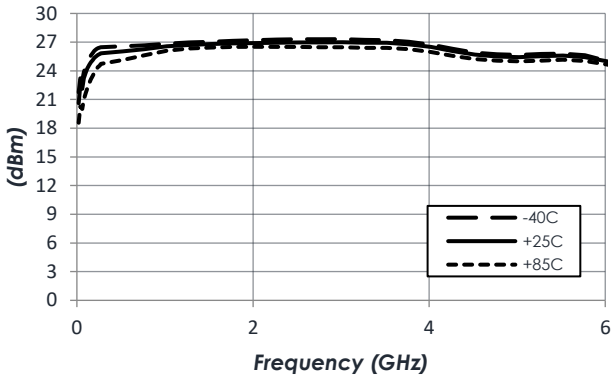
Gain vs Temperature



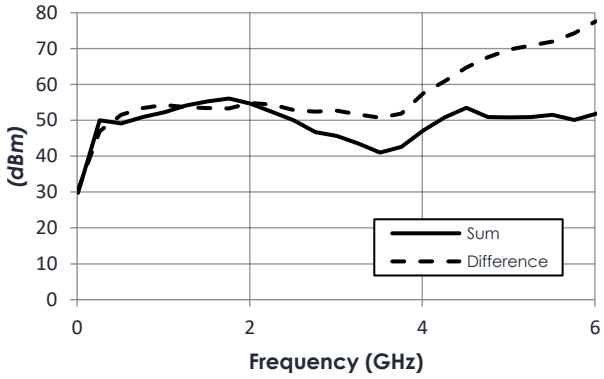
Noise Figure vs Temperature



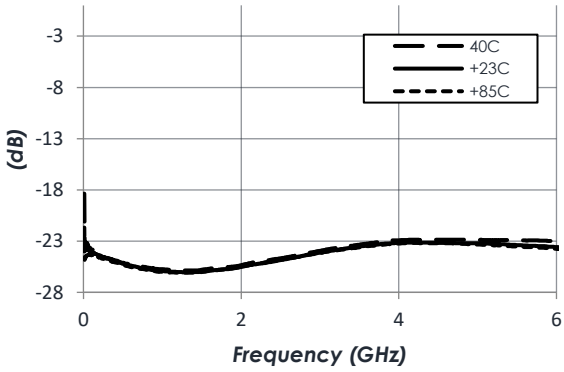
P1dB vs Temperature



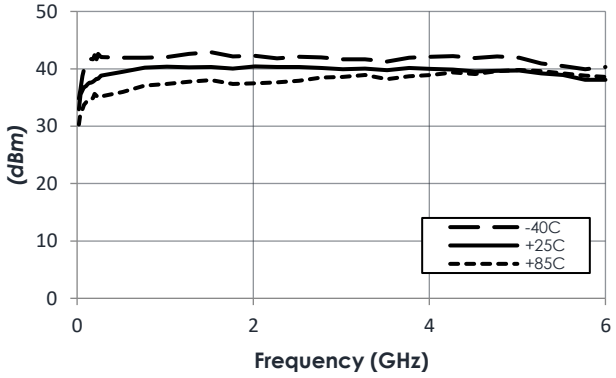
Output IP2



Reverse Isolation vs Temperature

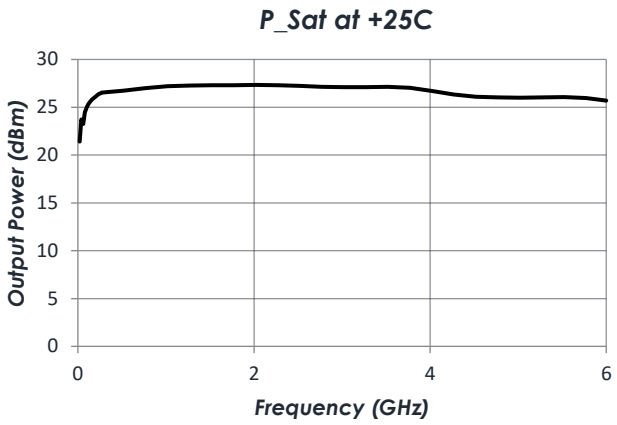


Output IP3 vs Temperature

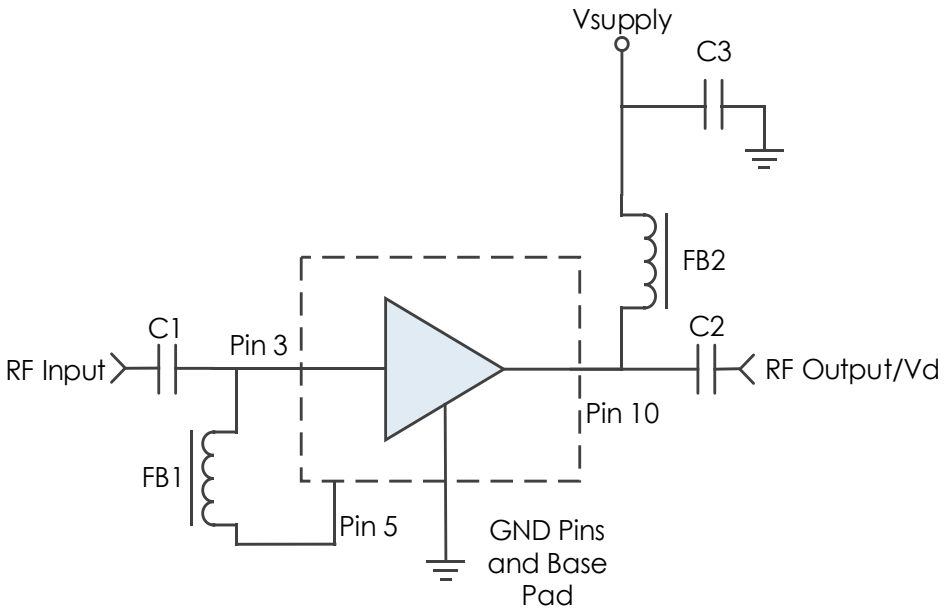


TYPICAL PERFORMANCE (CONTINUED)

(VDD = 8V, ID = 222mA, T = 25 °C unless otherwise specified)



TYPICAL APPLICATION



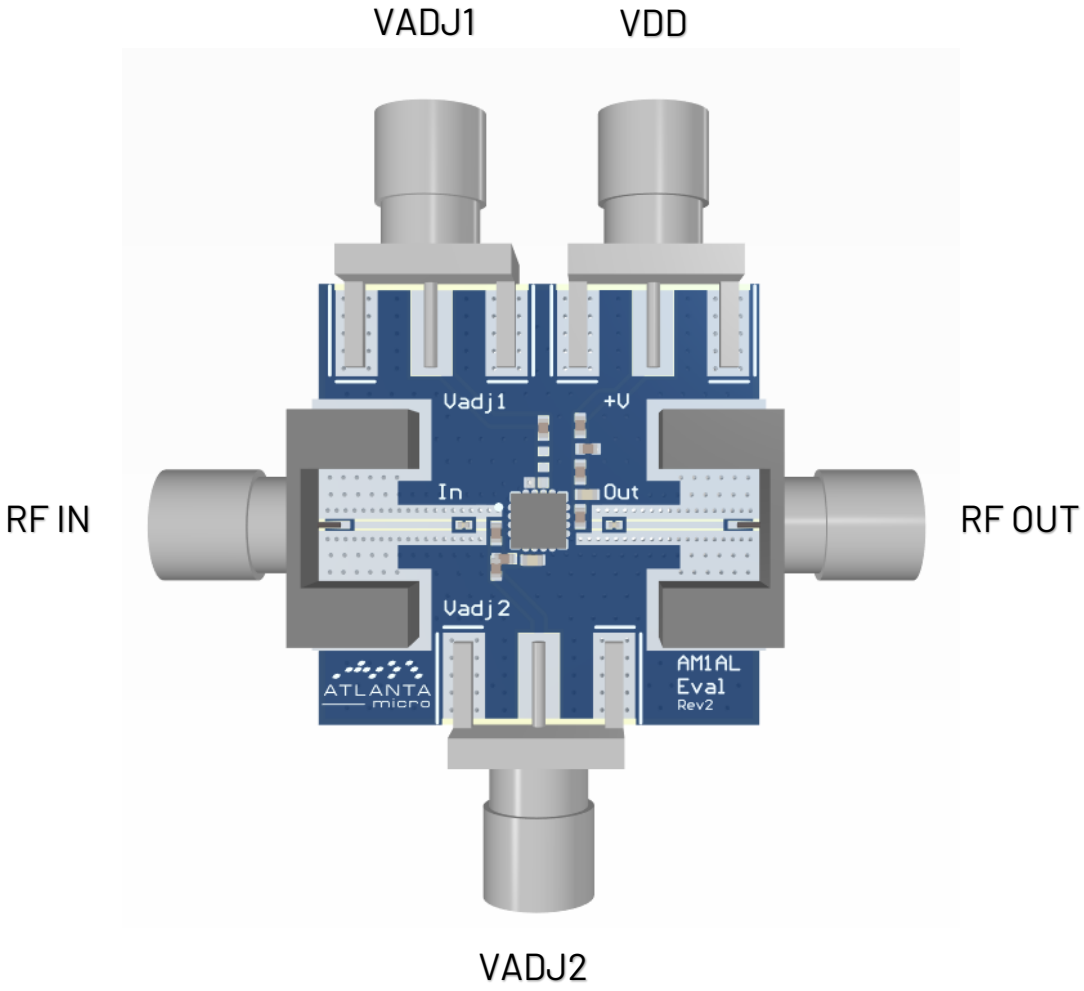
RECOMMENDED COMPONENT LIST (OR EQUIVALENT)

Part	Value	Part Number	Manufacturer
C1, C2	0.1 uF	0201BB104KW160	Passives Plus
C3	0.1 uF	GRM155R71C104KA88	Murata
FB1	-	MMZ1005A222E	TDK
FB2	-	BLM15HG102SN1	Murata

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. Low frequency performance may be improved by replacing FB2 with a larger value bead, inductor, or bias tee.

EVALUATION PC BOARD



RELATED PARTS

Part Number		Description
AM1025	0.02GHz to 3GHz	Gain Block
AM1082	5 GHz to 17 GHz	Driver Amplifier
AM1090	DC to 6GHz	Gain Block
AM1123	0.02GHz to 8GHz	Gain Block
AM1127	0.02GHz to 6GHz	Gain Block

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 (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: Mercury Systems, 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: Mercury does not knowingly use materials that are sourced from the Democratic Republic of Congo (DRC) or any other known conflict regions. Mercury'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.

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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