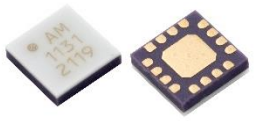
AM1129 – Amplifier

20 MHz to 6 GHz Gain Block



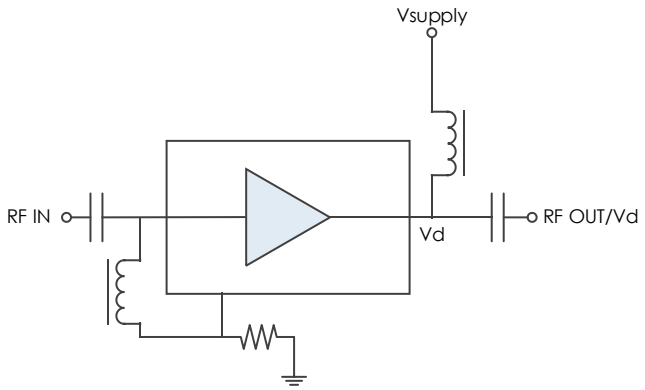
Note: Image is of similar part.

AM1129 is a high dynamic range gain block amplifier operating over the 20 MHz to 6.0 GHz frequency range. The device exhibits exceptional second and third order intercept performance as well as high P1dB and low noise figure. It operates from a single positive supply rail and is packaged in a standard 3mm QFN.

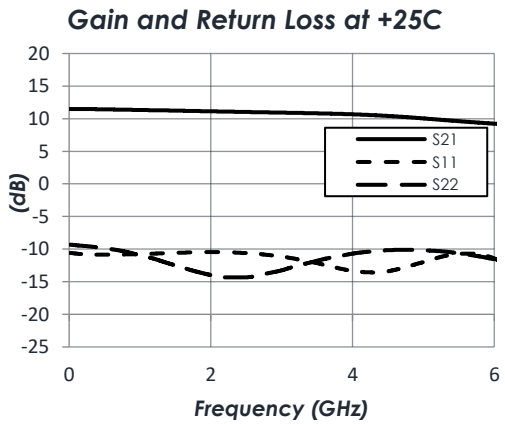
FEATURES

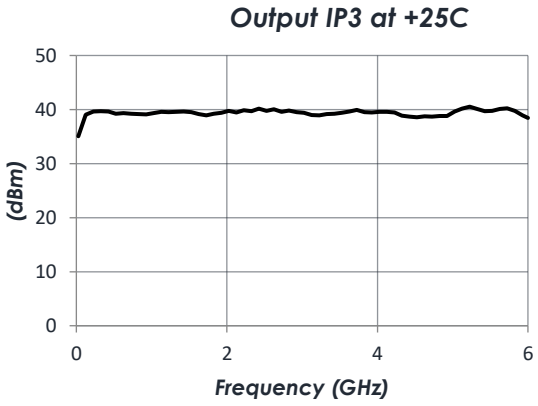
- 40 dBm OIP3
- 63 dBm OIP2
- 2.5 dB Noise Figure
- 24 dBm P1dB
- 11 dB Gain
- +6 V Operation
- 930 mW Power Consumption
- 3mm QFN Ceramic
- -40 to +85C operation

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



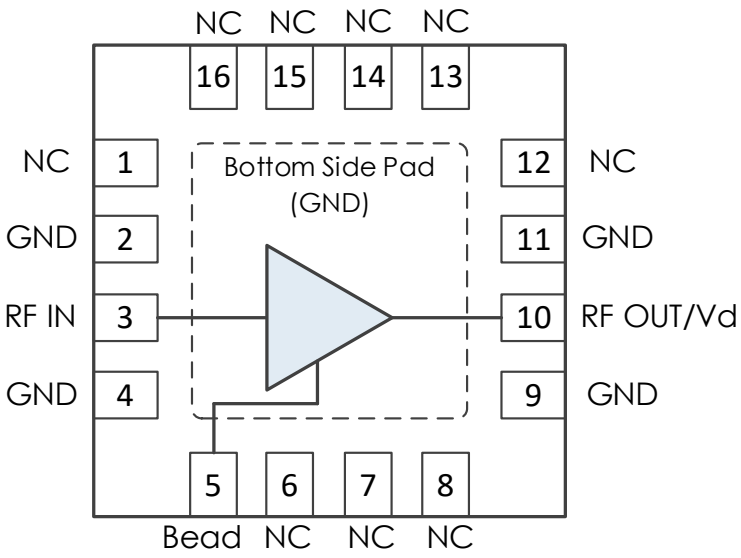


CONTENTS

REVISION HISTORY

Date	Revision	Notes
January 28, 2021	1	Initial Release
March 16, 2021	2	
September 8, 2022	3	Updated Recommended Component List.
June 20, 2023	4	Updated Typical Application and Components.
November 19, 2024	5	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 – DC Coupled, External DC Block Required
4	GND	Ground – Common
5	Bead	Connect to RF IN through external ferrite bead or large inductor with shunt 261 ohm resistor to ground.
6-8	NC	Not Connected *
9	GND	Ground – Common
10	RF OUT/Vd	RF Output and DC Power Input – 50 ohms – DC Coupled, External DC Block Required
11	GND	Ground – Common
12-16	NC	Not Connected *

* NC pins may be grounded or left open.

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+6.3 V
RF Input Power		+20 dBm
Storage Temperature Range	-55C	+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		+6.0 V	
Operating Junction Temperature	-40 C		+85 C

Thermal Information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θ_{JC})	80.7 C/W
Nominal Junction Temperature at +85C Ambient	+160 C
Channel Temperature to Maintain 1 Million Hour MTTF	+175 C

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
DC Supply Voltage			+6.0 V	
DC Supply Current	VDD = +6.0 V		155 mA	
Power Dissipated	VDD = +6.0 V		0.93 W	

RF Performance

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		20 MHz		6 GHz
Gain			+11 dB	
Return Loss			-13.5 dB	
Output IP3			+40 dBm	
Output IP2			+63 dBm	
Output P1dB			+24 dBm	
Noise Figure			+2.5 dB	

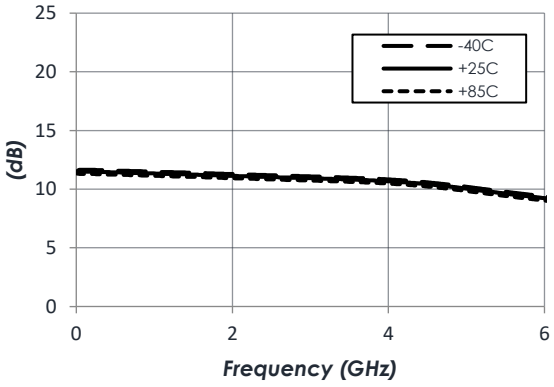
Notes:

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_2)-10*MHz*. IM2 measured at $f_2 - f_1$

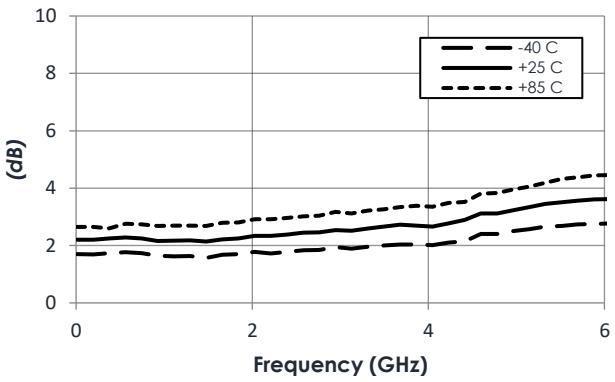
TYPICAL PERFORMANCE

(VDD = 6V, ID = 155mA, T = 25 °C unless otherwise specified)

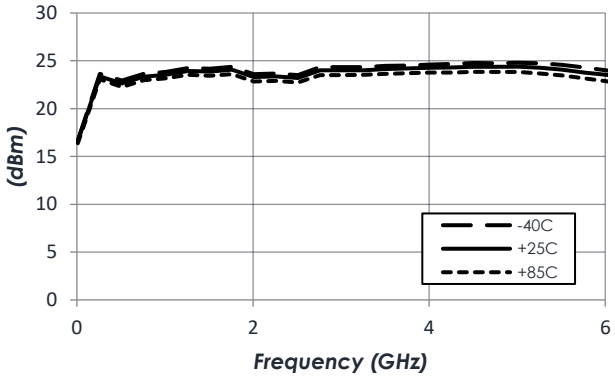
Gain vs Temperature



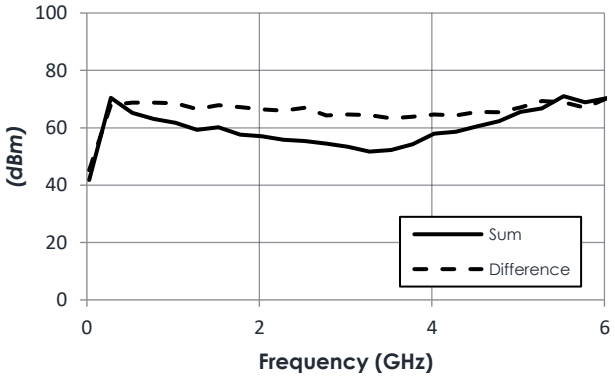
Noise Figure vs Temperature



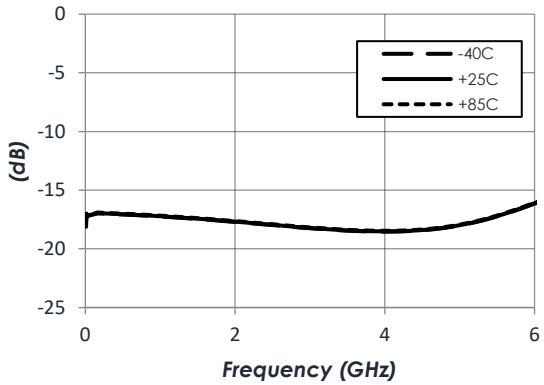
P1dB vs Temperature



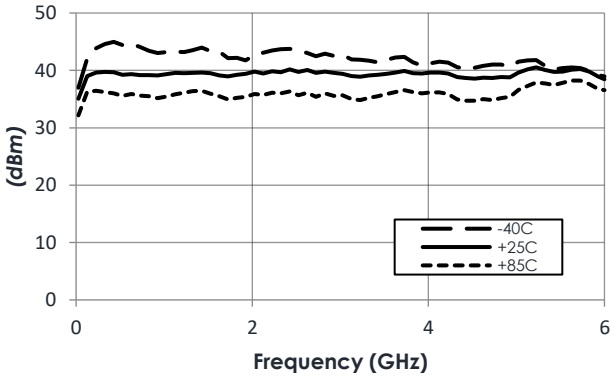
Output IP2



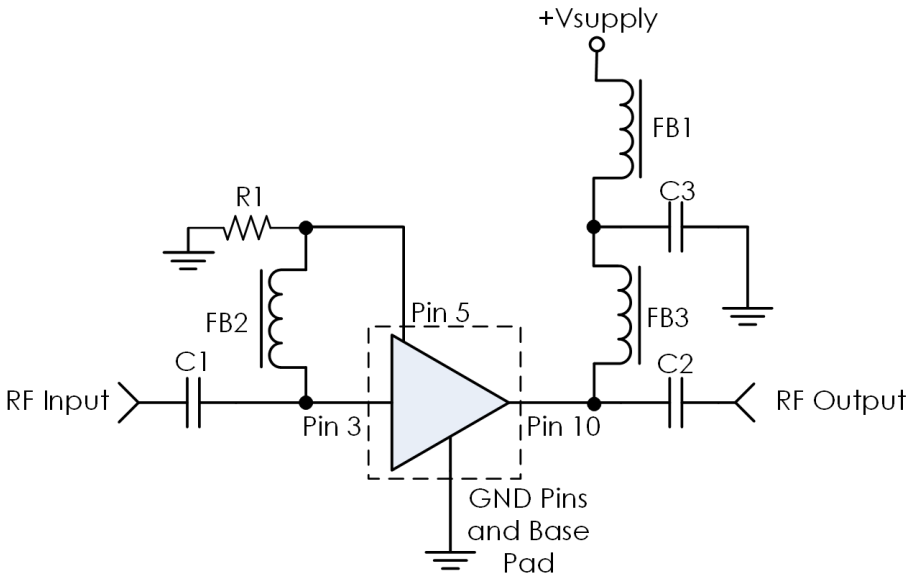
Reverse Isolation vs Temperature



Output IP3 vs Temperature



TYPICAL APPLICATION



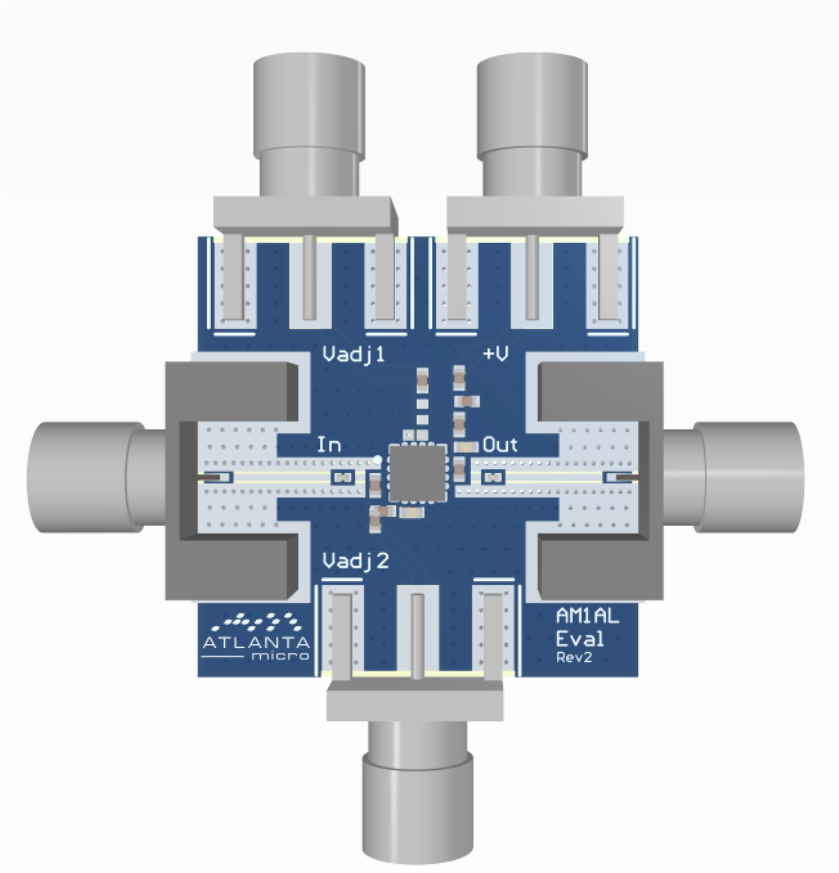
Recommended Component List (or Equivalent)

Part	Value	Part Number	Manufacturer
C1, C2	0.1 µF	0201BB104KW160	Passives Plus
C3	0.1 µF	GRM155R71C104KA88	Murata
FB1, FB3	-	MMZ1005A182E	TDK Corporation
FB2	-	MMZ1005A222E	TDK Corporation
R1	261 Ω	CRCW0402261RFKED	Vishay Dale

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 FB1-3 with different beads, inductors, or bias tees.
4. The function of R1 is to lower the voltage at pin 3. The total DC resistance of FB2 and R1 should equal 263 ohms ± 10 ohms.

EVALUATION PC BOARD



RELATED PARTS

Part Number		Description
AM1122	0.02GHz to 6 GHz	Gain Block
AM1123	0.02GHz to 8 GHz	Gain Block
AM1127	0.02GHz to 6 GHz	Gain Block
AM1143	0.02GHz to 6 GHz	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 (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)

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.

Corporate Headquarters

50 Minuteman Road
Andover, MA 01810 USA
+1 978.967.1401 tel
+1 866.627.6951 tel
+1 978.256.3599 fax

International Headquarters
Mercury International

Avenue Eugène-Lance, 38
PO Box 584
CH-1212 Grand-Lancy 1
Geneva, Switzerland
+41 22 884 5100 tel

Learn more
Visit: mrcy.com
For pricing details, contact: MMICsales@mrcy.com
For technical details, contact: MMICsupport@mrcy.com