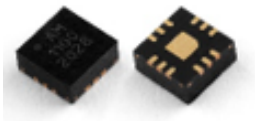


AM1102 – Amplifier

DC to 22 GHz Gain Block

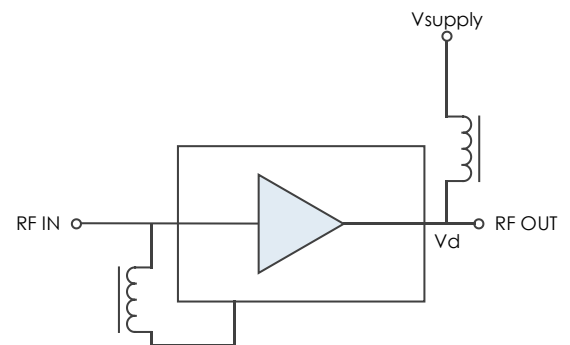


AM1102 is a wideband, cascadable amplifier servicing the DC to 22 GHz frequency range. The device exhibits moderate gain and excellent noise figure over a wide frequency range which makes the AM1102 a useful component for many broadband applications. Packaged in a 3mm QFN with internal 50Ω matching, and drawing less than 160mW of power, the AM1102 is suited for low SWaP applications.

FEATURES

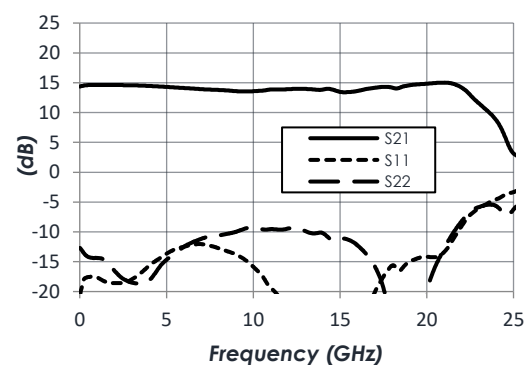
- 14 dB Gain
- 2.3 dB Noise Figure
- +26 dBm OIP3
- +15 dBm P1dB
- +3.3V Operation
- 158 mW Power Consumption
- 3mm QFN
- -40C to +85C Operation

FUNCTIONAL DIAGRAM

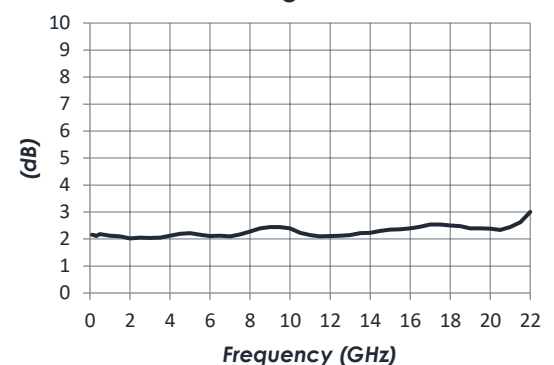


CHARACTERISTIC PERFORMANCE

Gain and Return Loss at +25C



Noise Figure at +25C



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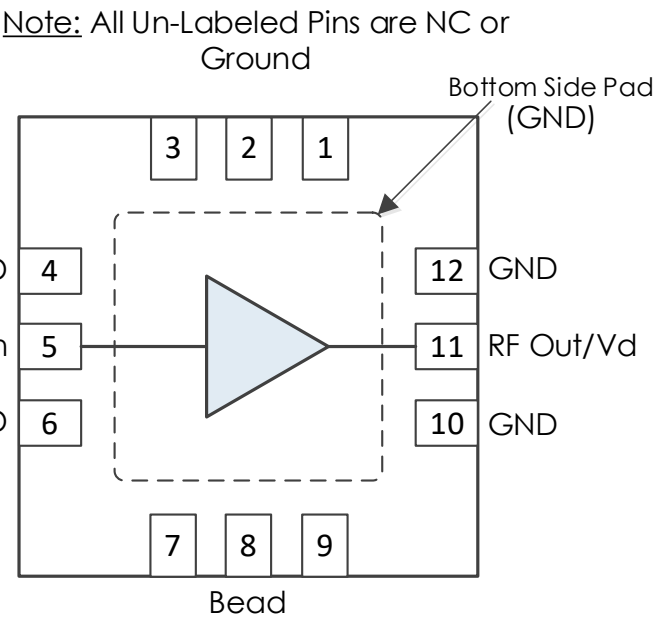
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REVISION HISTORY

Date	Revision	Notes
June 12, 2020	1	Initial Release
February 8, 2021	2	Added Picture and Current Distribution Graph
July 12, 2021	3	Changed Location of Pin 1 Indicator and Added Thermal Resistance
December 6, 2023	3.1	Added notes on bias tee
January 30, 2024	4	Updated Thermal Information
June 11, 2024	5	Changed to Mercury branding. No content changes.
July 21, 2026	5.1	Corrected Thermal table

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1-3	NC	No Connect
4	GND	Ground - Common
5	RF In	RF Input - 50 Ohms - DC Coupled. External DC blocking capacitor required
6	GND	Ground - Common
7	NC	No Connect
8	Bead	Connect to RF In through external ferrite bead or large inductor
9	NC	No Connect
10	GND	Ground - Common
11	RF Out/Vd	RF Output and DC Power Input - 50 Ohms - DC Coupled. External DC blocking capacitor required
12	GND	Ground - Common

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+3.5 V
RF Input Power		+20 dBm
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 3	



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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+3.0 V	+3.3 V	+3.3 V
Operating Case Temperature	-40 C		+85 C

Thermal Information

Thermal Resistance (°C / W)	
Junction to Case Thermal Resistance (θ_{JC})	178 C/W
Nominal Junction Temperature at +85 C ambient	+112 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			+3.3 V	
DC Supply Current		40 mA	46 mA	55 mA
Power Dissipated			158 mW	

RF Performance

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		DC		22 GHz
Gain	f = 0.1 GHz		14.5 dB	
	f = 10 GHz		14 dB	
	f = 21 GHz		15 dB	
Return Loss	f = 0.1 GHz		-14 dB	
	f = 10 GHz		-10 dB	
	f = 21 GHz		-15 dB	
Output IP3	f = 10 GHz		+26 dBm	
Output P1dB	f = 10 GHz		+15 dBm	
Noise Figure	f = 10 GHz		2.3 dB	

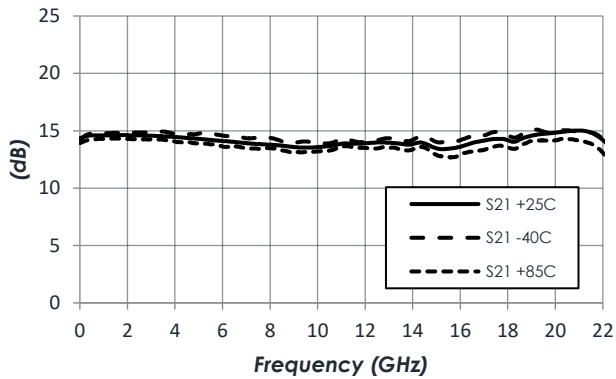
Notes:

1. OIP3 measured with 10MHz tone spacing.
2. Data measured directly at input and output of device exclusive of external bias tee loss.

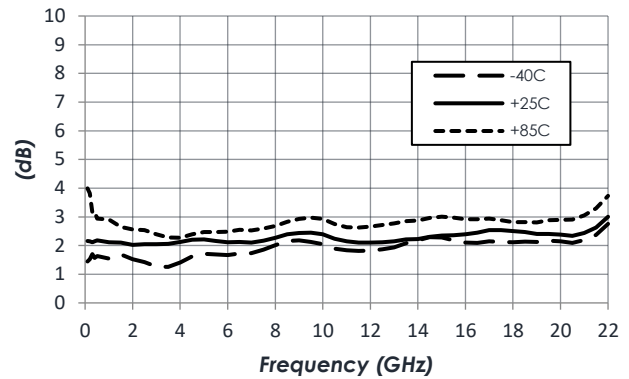
TYPICAL PERFORMANCE

(VDD = +3.3V, T = 25°C unless otherwise specified)

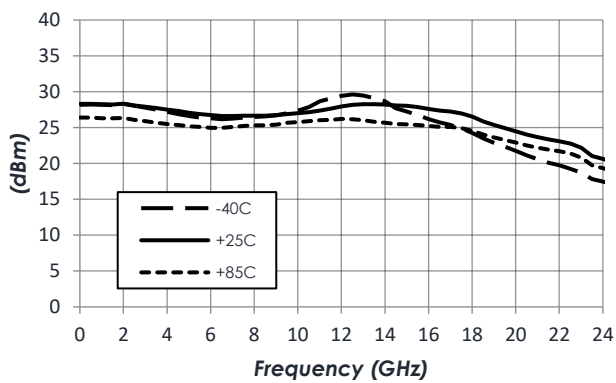
Gain vs Temperature



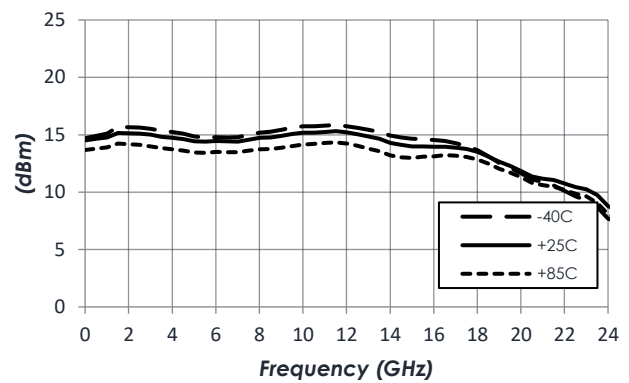
Noise Figure vs Temperature



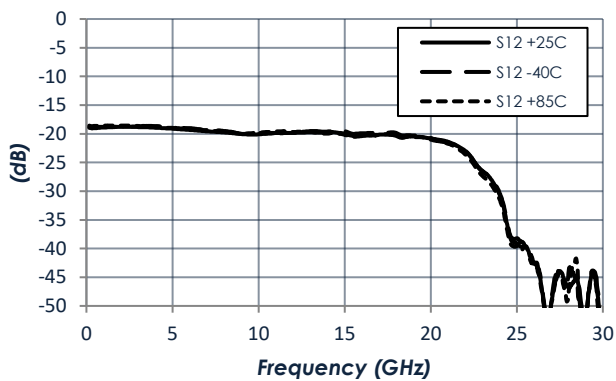
Output IP3 vs Temperature



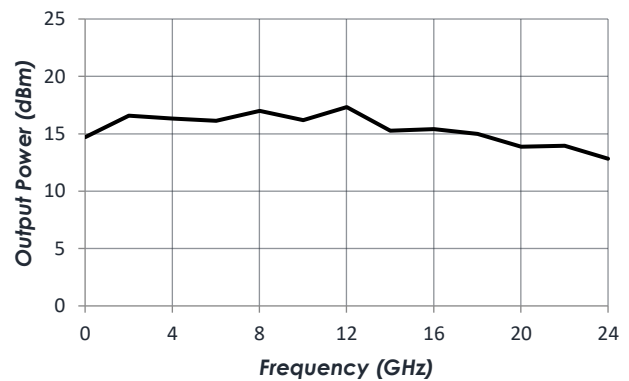
P1dB vs Temperature



Reverse Isolation vs Temperature

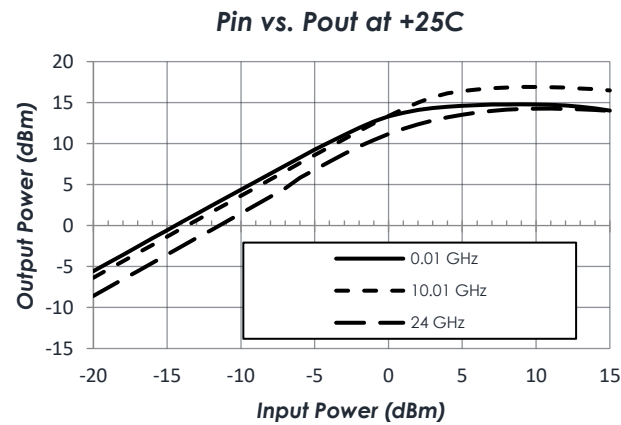


P_Sat at +25C



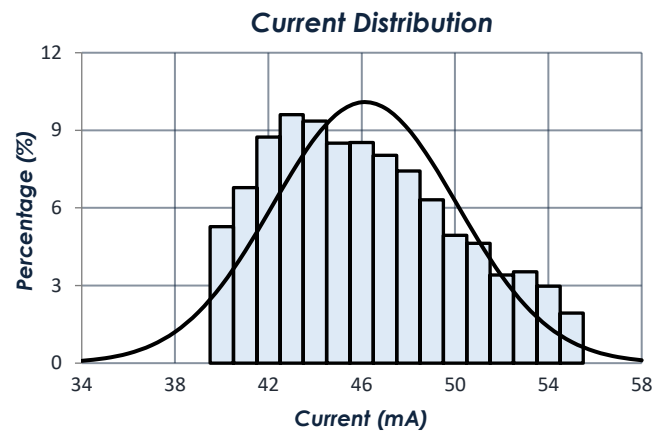
TYPICAL PERFORMANCE (CONTINUED)

(VDD = +3.3V, T = 25°C unless otherwise specified)

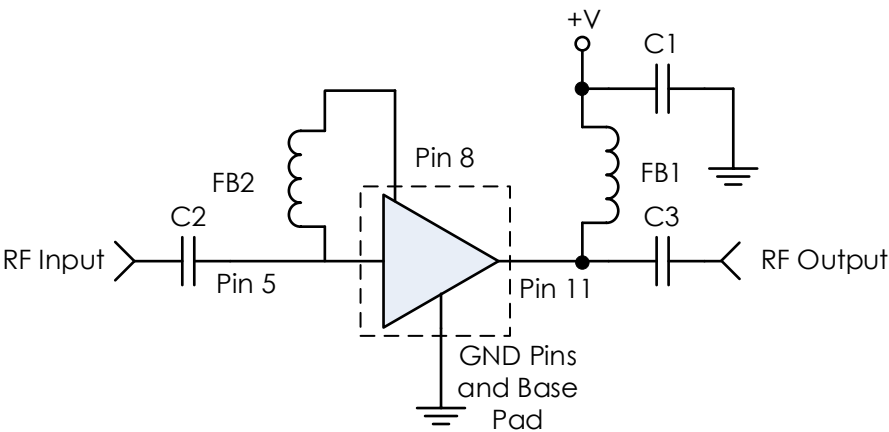


TYPICAL DEVICE CHARACTERISTICS

(VDD = +3.3V, T = 25°C unless otherwise specified)



TYPICAL APPLICATION



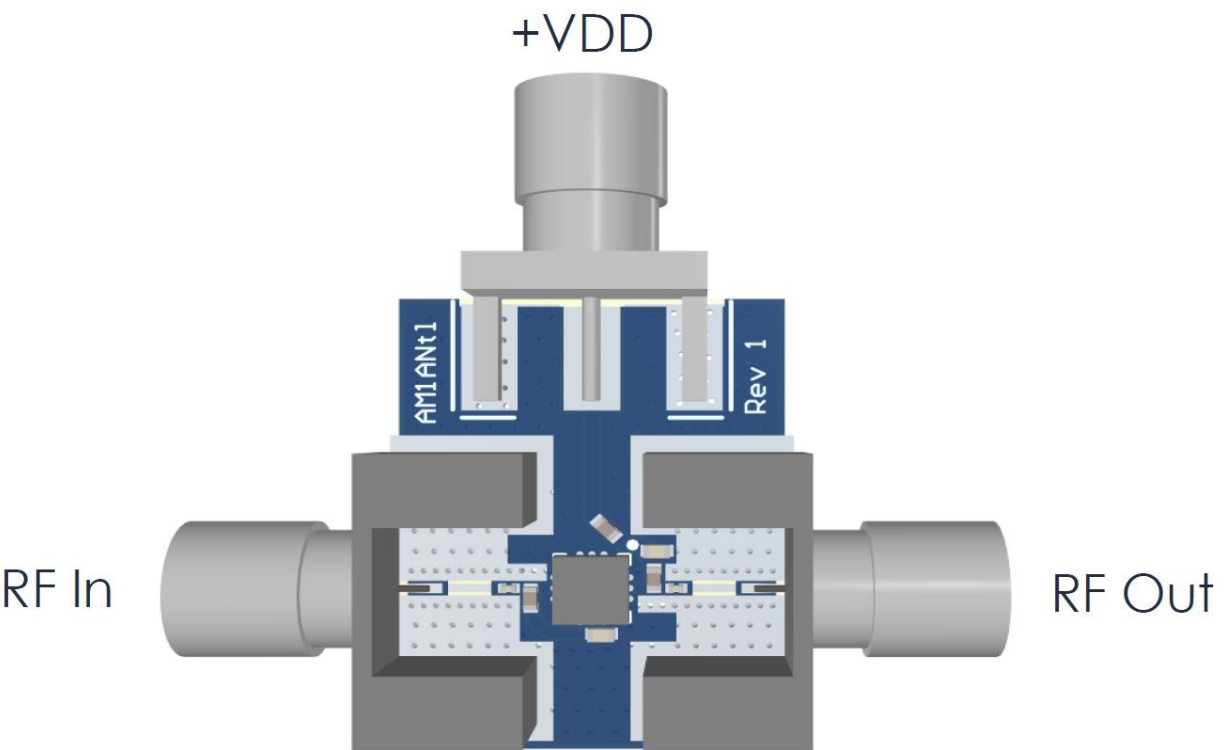
Recommended Component List (or Equivalent)

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

Note:

1. Performance may be improved by replacing FB1 and FB2 with a lower loss inductor or bias tee.

EVALUATION PC BOARD



Note: Not all components shown may be installed.

RELATED PARTS

Part Number		Description
AM1053	5 GHz to 20 GHz	Gain Block
AM1070	DC to 18 GHz	Broadband Gain Block
AM1071	DC to 18 GHz	Broadband Gain Block
AM1100	2 GHz to 26.5 GHz	Low Noise Amplifier
AM1101	2 GHz to 26.5 GHz	Bypassable Amplifier
AM1163-1	DC to 10 GHz	Low Noise Amplifier
AM1164-1	DC to 8 GHz	Low Noise Amplifier

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-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)

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).

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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.



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

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For technical details, contact: MMICsupport@mrcy.com



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