AM1144 – Amplifier

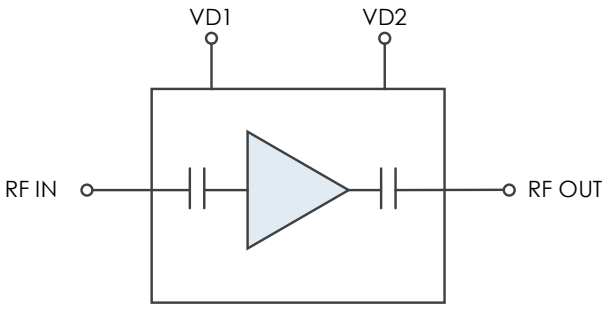
17 to 40 GHz Low Noise Amplifier

The AM1144 is a wideband low noise amplifier that covers the 17 GHz to 40 GHz frequency range. The device exhibits 12dB gain with low noise figure and high output power which makes the AM1144 a useful component for many applications such as 5G wireless and K-band / Ka-band satcom. The device is packaged in a 3mm QFN with internal 50Ω matching and draws 360mW of DC power which makes the AM1144 ideal for demanding, low SWaP applications.

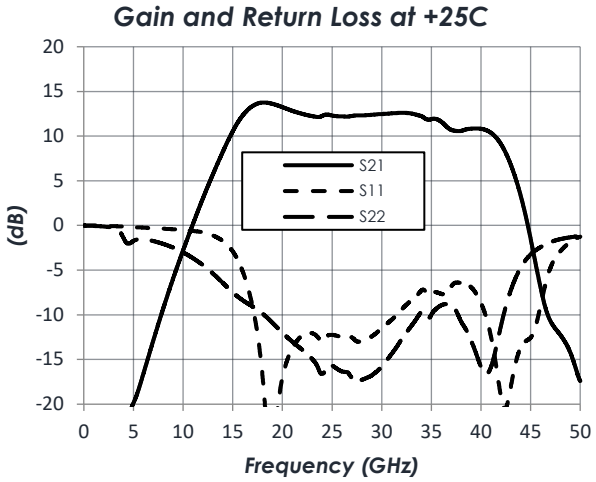
FEATURES

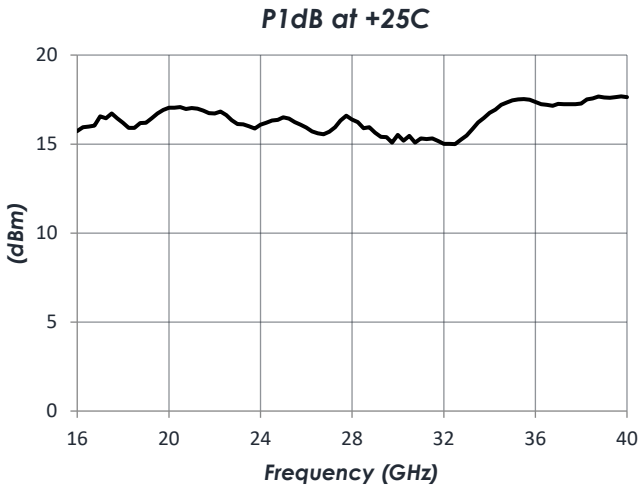
- 12 dB Gain
- 3.5 dB Noise Figure
- +27 dBm OIP3
- +16.5 dB P1dB
- 360 mW DC Power Consumption
- +3.3V Supply
- 3mm QFN Package
- -40C to +85C Operation
- Unconditionally Stable

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



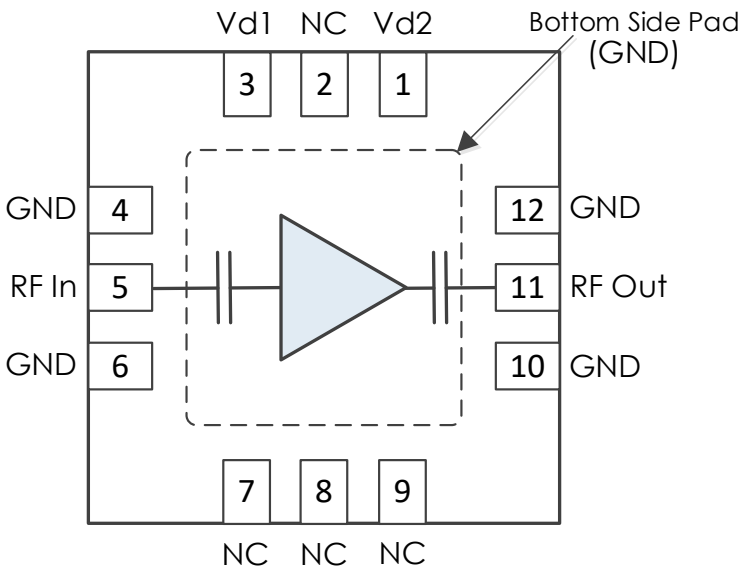


CONTENTS

REVISION HISTORY

Date	Revision	Notes
March 21, 2022	1	Initial Release.
June 26, 2024	2	Changed to Mercury branding. No content changes.

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1	Vd2	DC Power Input 2
2	NC	No Connect
3	Vd1	DC Power Input 1
4	GND	Ground - Common
5	RF In	RF Input – 50 Ohms – AC Coupled
6	GND	Ground - Common
7-9	NC	No Connect
10	GND	Ground - Common
11	RF Out	RF Output – 50 Ohms – AC Coupled
12	GND	Ground - Common

***Note:** NC pins may be grounded or left floating.

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+3.6 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		+3.3 V	
Operating Case Temperature	-40 C		+85 C

Thermal information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θ_{JC})	171.9 C/W
Nominal Junction Temperature at +85C ambient	+147 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	VDD = +3.3V		110 mA	
Power Dissipated	VDD = +3.3V		363mW	

RF Performance

(T = 25 °C unless otherwise specified)

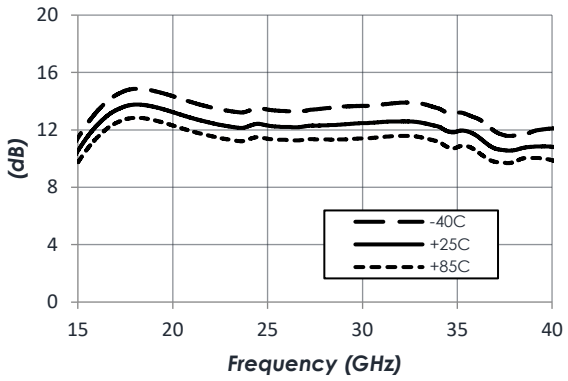
Param	Testing Conditions	Min	Typical	Max
Frequency Range		17 GHz		40 GHz
Gain	f = 17 GHz		13.5 dB	
	f = 28 GHz		12.3 dB	
	f = 40 GHz		10.8 dB	
Return Loss	f = 28 GHz		-13 dB	
Output IP3	f = 28 GHz		+27 dBm	
Output P1dB	f = 28 GHz		+16.4 dBm	
Noise Figure	f = 28 GHz		3.1 dB	

Notes: OIP3 measured with 10MHz tone spacing.

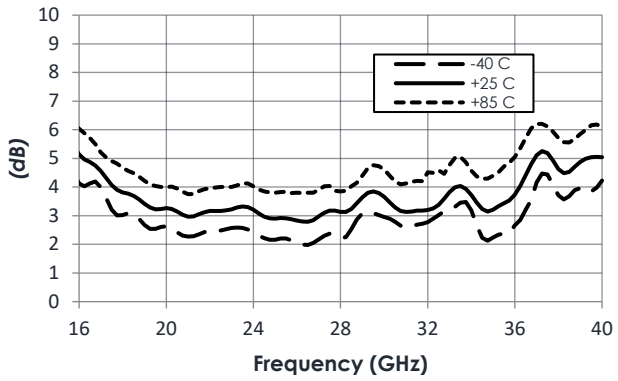
TYPICAL PERFORMANCE

(T = 25 °C unless otherwise specified)

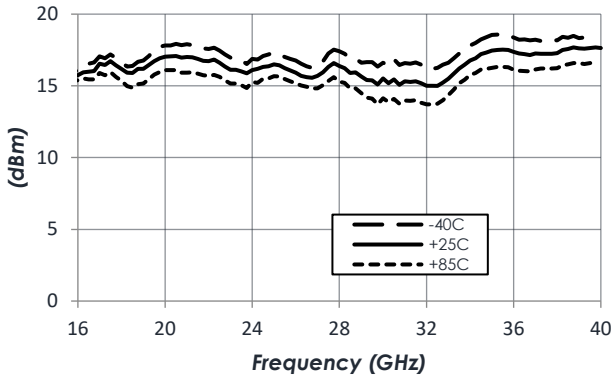
Gain vs Temperature



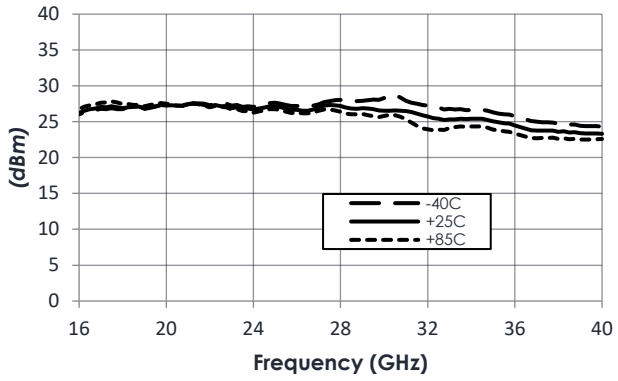
Noise Figure vs Temperature



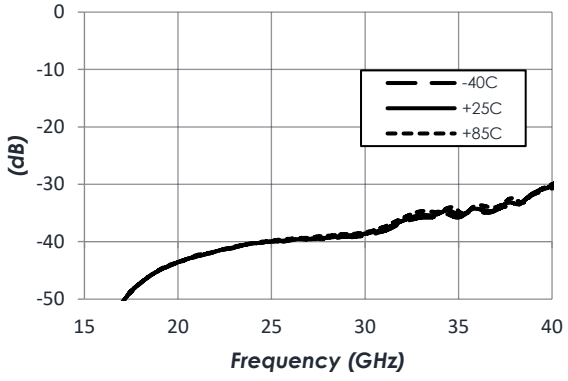
P1dB vs Temperature



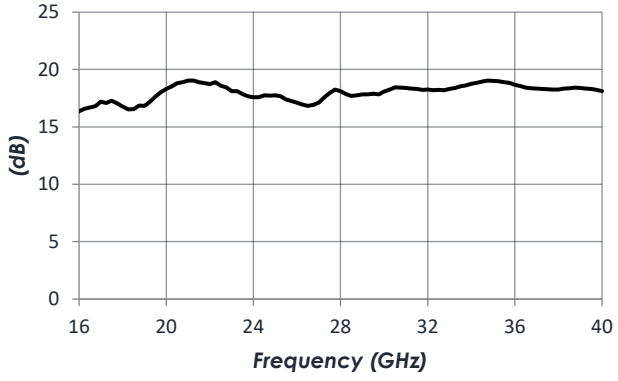
Output IP3 vs Temperature



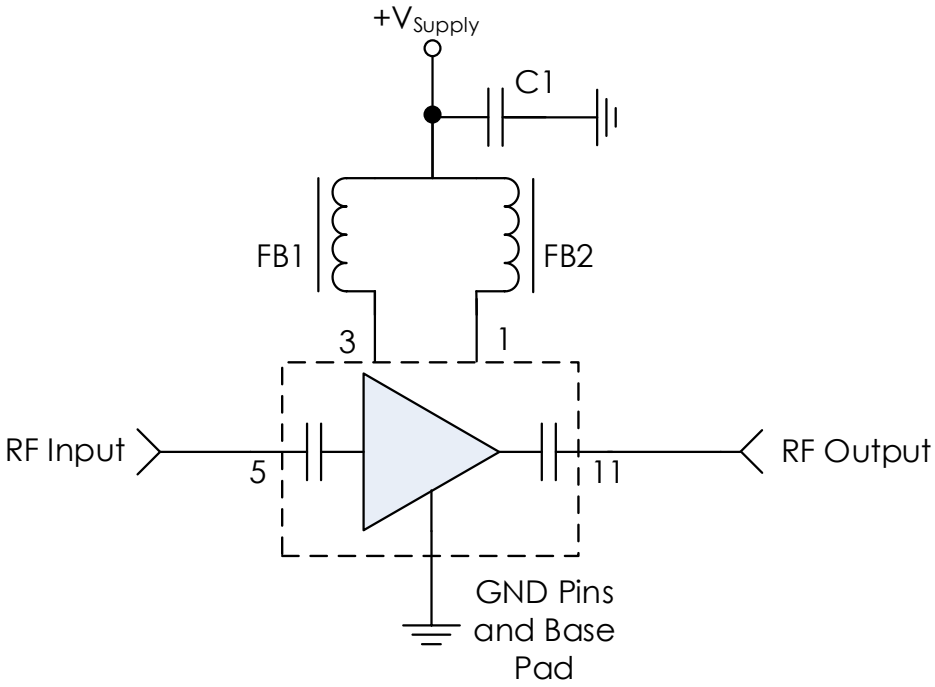
Reverse Isolation vs Temperature



Power Saturation



TYPICAL APPLICATION



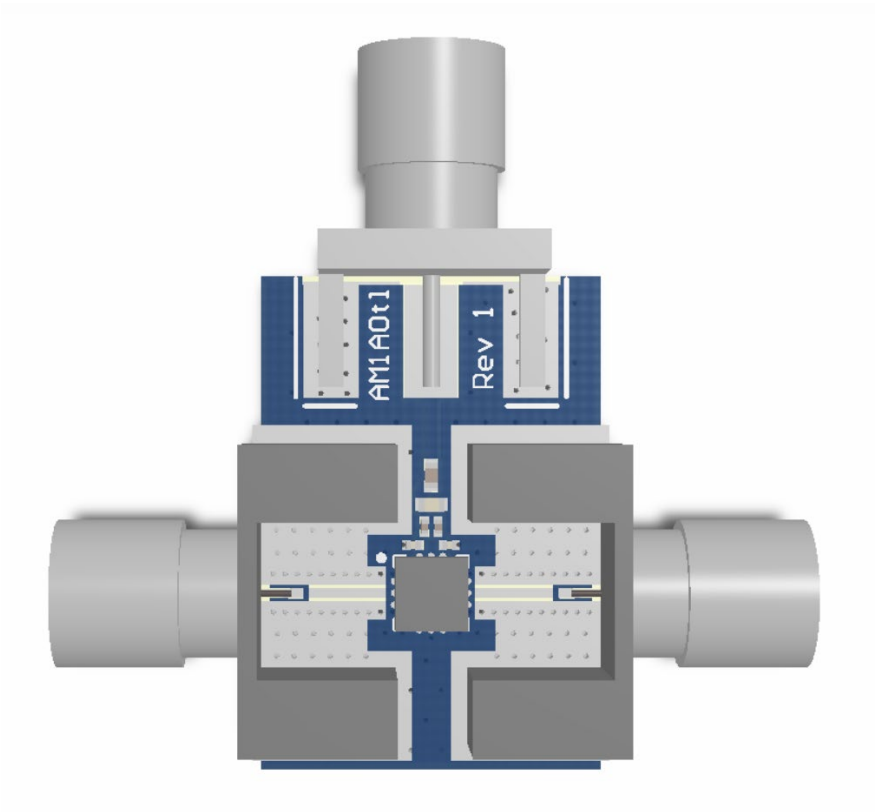
RECOMMENDED COMPONENT LIST (OR EQUIVALENT)

Part	Value	Part Number	Manufacturer
C1	0.1 µF	C1005X7R1H104K05BB	TDK
FB1	-	MMZ1005A222E	TDK

Note:

1. AM1144 is AC coupled. No external DC blocking caps are required.

EVALUATION PC BOARD



RELATED PARTS

Part Number		Description
AM1099	26 GHz to 32 GHz	Low Noise Amplifier
AM1100	2 GHz to 26.5 GHz	Low Noise Amplifier
AM1102	DC to 22 GHz	Low Noise Amplifier
AM1134	6 GHz to 26.5 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-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