

# AM1147 – Amplifier

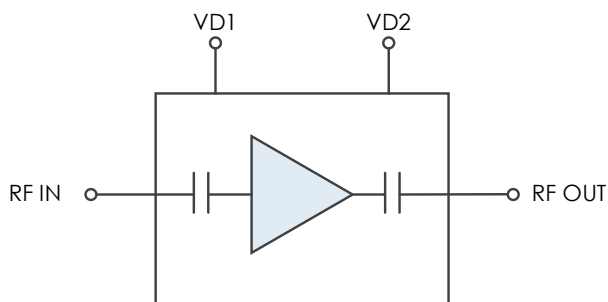
## 6 to 26.5 GHz Slope Correcting Gain Block

**AM1147 is a wideband, cascadable amplifier servicing the 6 to 26.5 GHz frequency range.** The device exhibits low gain at the lower frequencies ascending to moderate gain at the higher frequencies. The increasing gain across frequency makes the AM1147 an ideal solution to equalize gain/insertion loss across an RF system. Combining both gain and equalization while packaged in a 3mm QFN with internal 50Ω matching, the AM1147 is a small form-factor solution that can enable low SWaP applications.

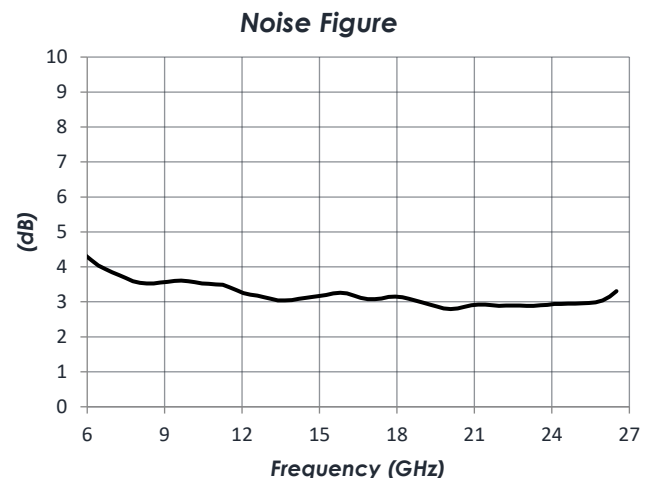
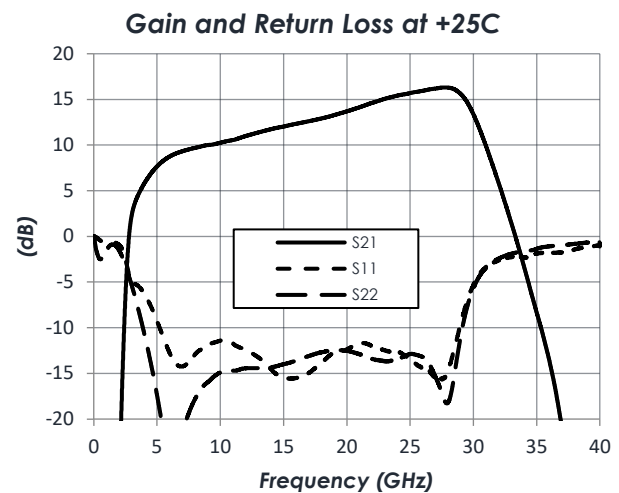
### FEATURES

- 7.5 dB Gain Slope
- 8.5 dB Gain at 6 GHz
- 16 dB Gain at 26.5 GHz
- 3 dB Noise Figure
- +24 dBm OIP3
- +12 dBm P1dB
- +3.3V Operation
- 3mm QFN
- -40°C to +85°C Operatio

### FUNCTIONAL DIAGRAM



### CHARACTERISTIC PERFORMANCE



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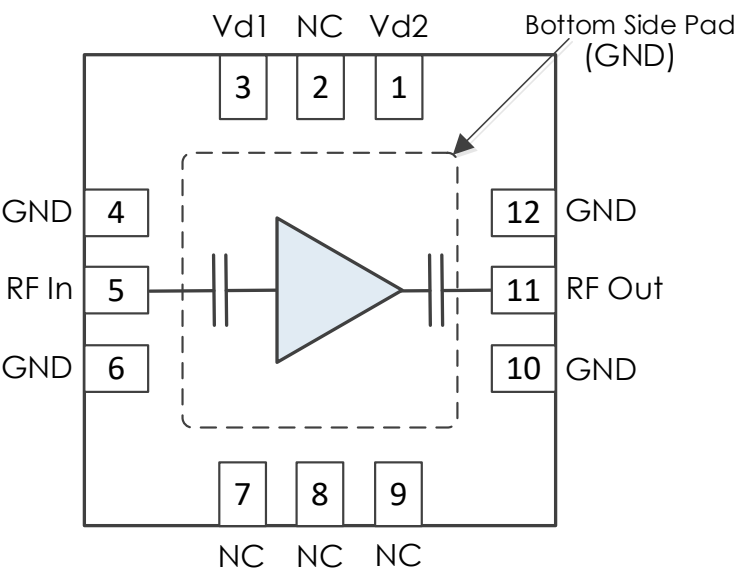
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REVISION HISTORY

Date	Revision	Notes
November 14, 2022	1	Initial Release.
June 26, 2022	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 open.

## SPECIFICATIONS

## Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+3.6 V
RF Input Power		15 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 ( $\theta_{JC}$ )	212 C/W
Nominal Junction Temperature at +85C ambient	150 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		86 mA	
Power Dissipated	VDD = +3.3V		284 mW	

**RF Performance**

(T = 25 °C unless otherwise specified)

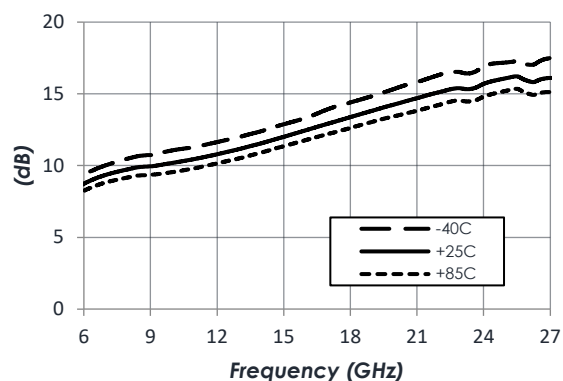
Param	Testing Conditions	Min	Typical	Max
Frequency Range		6 GHz		26.5 GHz
Insertion Loss	f = 6 GHz		8.7 dB	
	f = 16 GHz		12.3 dB	
	f = 26.5 GHz		16.1 dB	
Return Loss	f = 6 GHz		-13 dB	
	f = 16 GHz		-13 dB	
	f = 26.5 GHz		-14 dB	
Output IP3	f = 16 GHz		24 dBm	
Output P1dB	f = 16 GHz		12 dBm	
Noise Figure	f = 16 GHz		3.2 dB	

**Note:** IP3 measured with 0dBm output power tones at 10MHz spacing.

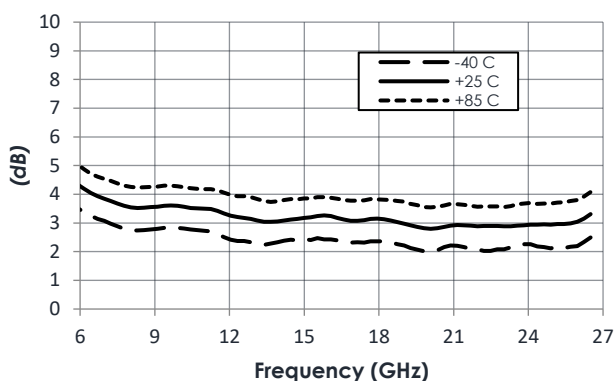
## TYPICAL PERFORMANCE

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

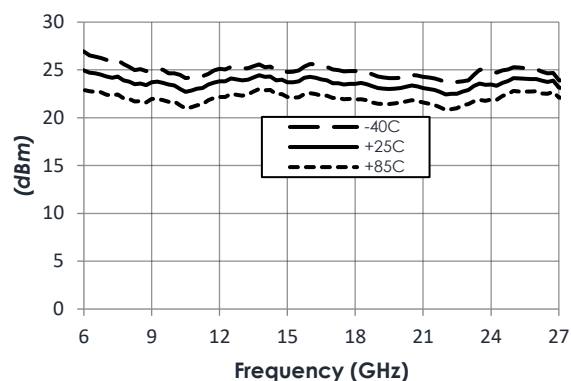
**Gain vs Temperature**



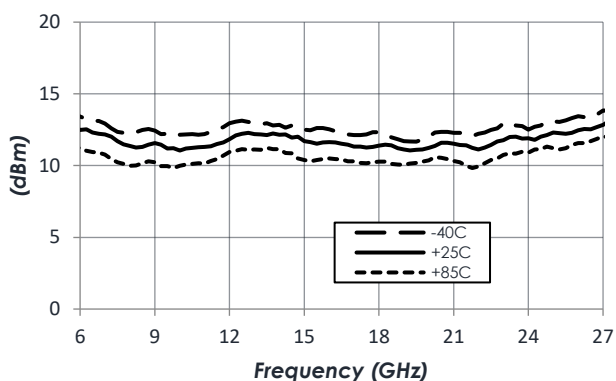
**Noise Figure vs Temperature**



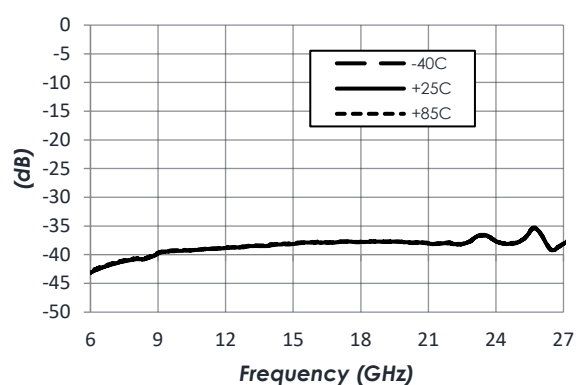
**Output IP3 vs Temperature**



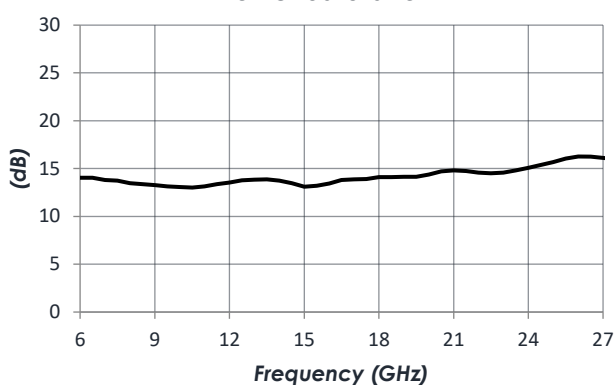
**P1dB vs Temperature**



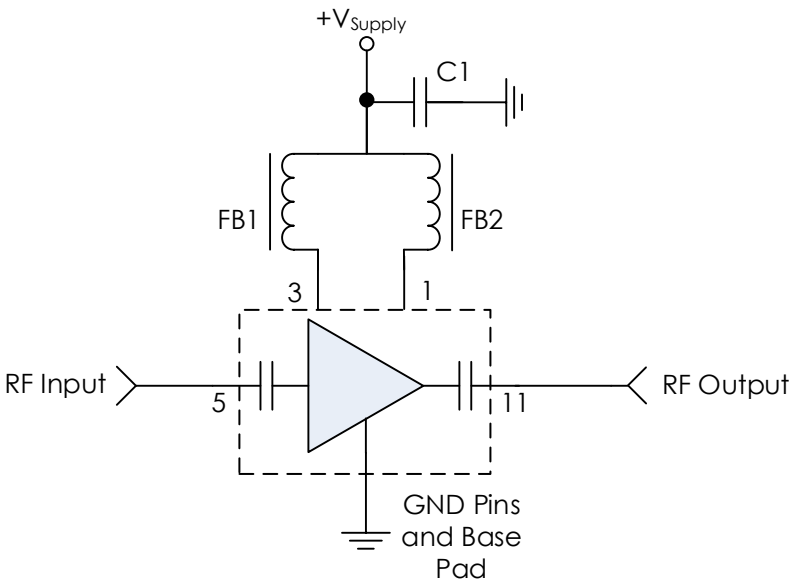
**Reverse Isolation vs Temperature**



**Power Saturation**



TYPICAL APPLICATION



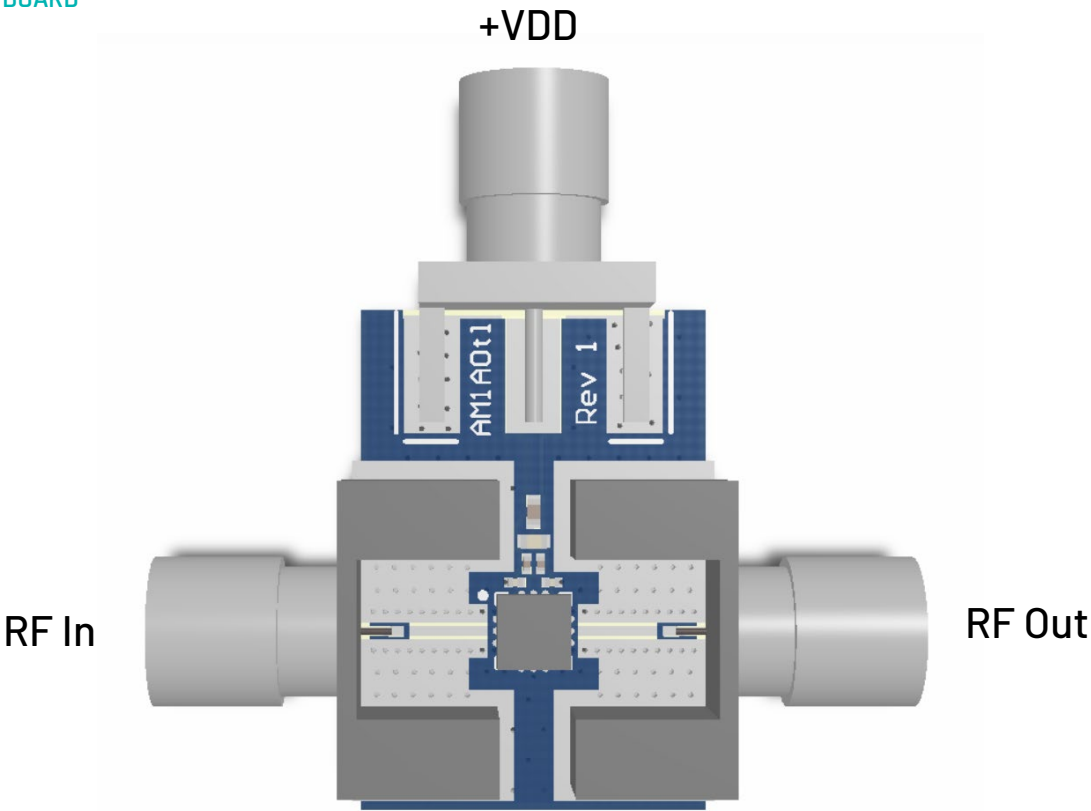
RECOMMENDED COMPONENT LIST (OR EQUIVALENT)

Part	Value	Part Number	Manufacturer
C1	0.1 $\mu$ F	C1005X7R1H104K05BB	TDK
FB1, FB2	-	MMZ1005A222E	TDK

Note:

- 1. AM1147 is AC coupled. No external DC blocking capacitors are required.

EVALUATION PC BOARD



RELATED PARTS

Part Number		Description
AM1101	2 GHz to 26.5 GHz	Bypassable Amplifier
AM1134	6 GHz to 26.5 GHz	Low Noise Amplifier
AM1148	6 GHz to 26.5 GHz	Gain Equalizing Amplifier
AM1149	6 GHz to 26.5 GHz	Gain Equalizing 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).

**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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