AM1173 – Amplifier

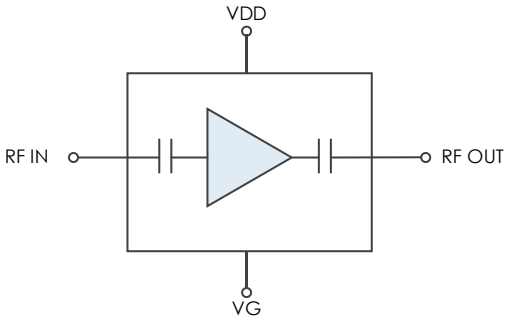
6 GHz to 18 GHz Medium Power Amplifier

AM1173 is a medium power amplifier covering the 6 to 18 GHz frequency range. The device exhibits high P1dB, achieves saturated output power greater than 1W, and has excellent power added efficiency above 31`% at saturation using a 9V supply rail. The AM1173 is packaged in a 5mm QFN with internal matching and DC blocking capacitors. With its high output power and efficiency, the AM1173 enables many high-performance applications with stringent power requirements.

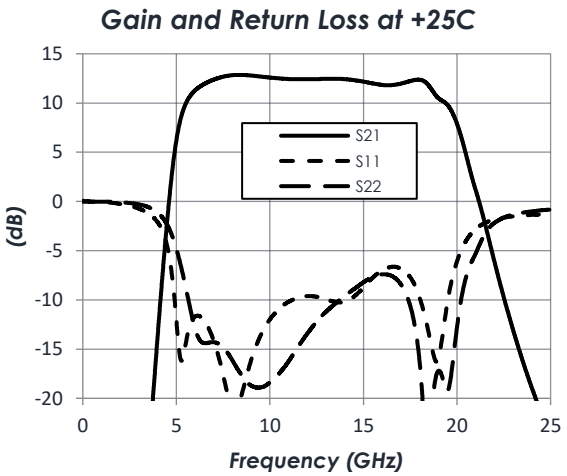
FEATURES

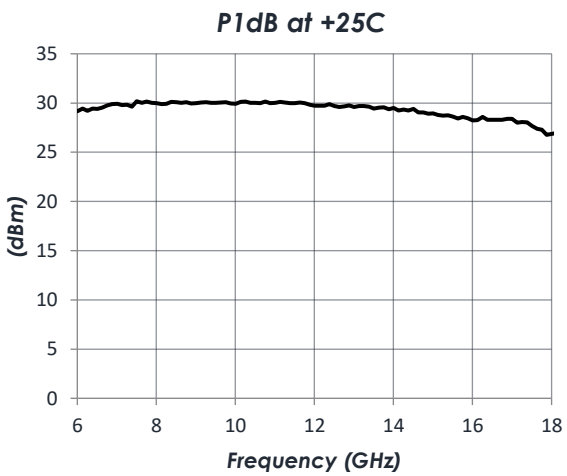
- 12 dB Gain
- +29.5 dBm P1dB
- +30.5 dBm Psat
- 31% PAE @ Psat
- +39 dBm OIP3
- +9V/275mA Operation
- 5mm QFN
- -40C to 85C

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE





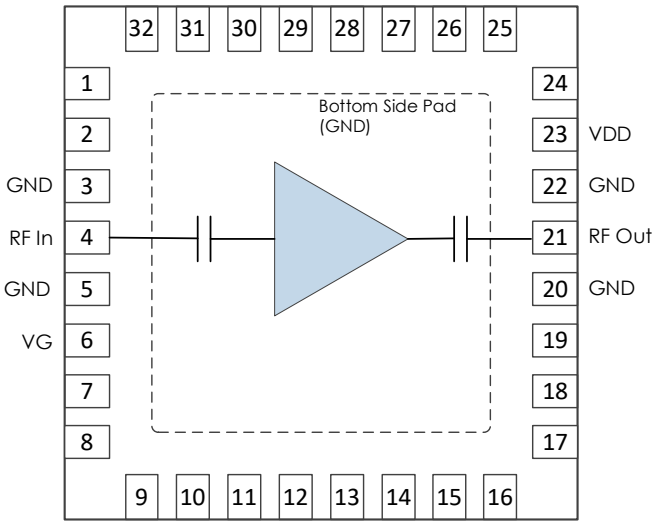
CONTENTS

REVISION HISTORY

Date	Revision	Notes
4/13/2025	1	Preliminary Release
4/25/2025	1.1	Added watermark. Changed bias instructions
9/30/2025	2	Production Release. Performance and Bias Changes

PIN LAYOUT AND DEFINITIONS

Note: All Non-Named Pins are GND



Pin	Name	Function
1-3	GND	Ground - Common
4	RF In	RF Input – 50 Ohms – AC Coupled
5	GND	Ground – Common
6	VG	Amplifier Gate Control – External bypass capacitors required
7-20	GND	Ground - Common
21	RF Out	RF Output – 50 Ohms – AC Coupled
22	GND	Ground - Common
23	VDD	DC Power Input
24-32	GND	Ground - Common

Note: All unnamed pins should be grounded.

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage		+10 V
RF Input Power		+27 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		+9.0 V	+10.0 V
Operating Case Temperature	-40C		+85C

Thermal Information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θ_{JC})	38 C/W
Nominal Junction Temperature at +85 C ambient	182 C

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
DC Supply Voltage			+9.0 V	
DC Supply Current	Note 1		275 mA	
Power Dissipated	VDD = +9.0 V		2.475 W	

Note:

1. Adjust VG between -2 V to 0 V to achieve 275 mA quiescent drain current

RF Performance

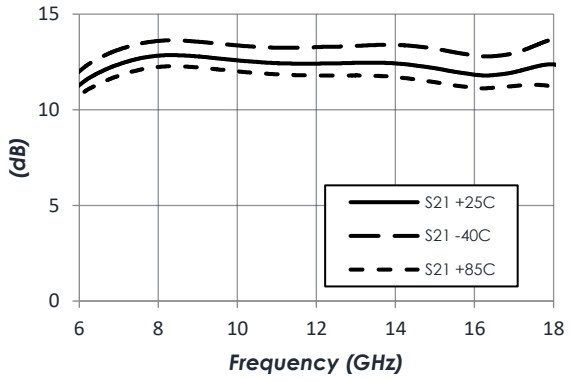
(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		6 GHz		18 GHz
Gain	f = 6 GHz		11.3 dB	
	f = 12 GHz		12.4 dB	
	f = 18 GHz		12.4 dB	
Return Loss	f = 6 GHz		-11.7 dB	
	f = 12 GHz		-9.6 dB	
	f = 18 GHz		-9.8 dB	
Output IP3	f = 12 GHz		39 dBm	
Output P1dB	f = 12 GHz		29.8 dBm	
Noise Figure	f = 12 GHz		3.2 dB	

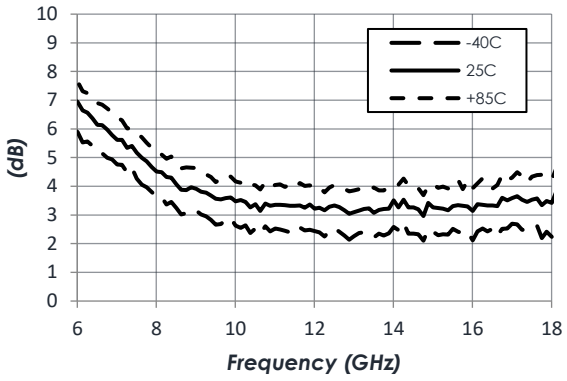
TYPICAL PERFORMANCE

(VDD = XXXX, T = 25°C unless otherwise specified)

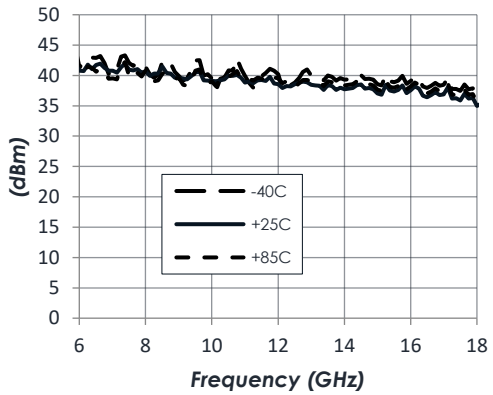
Gain vs Temperature



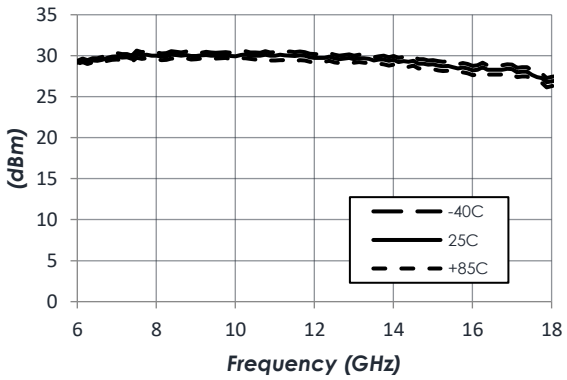
Noise Figure vs Temperature



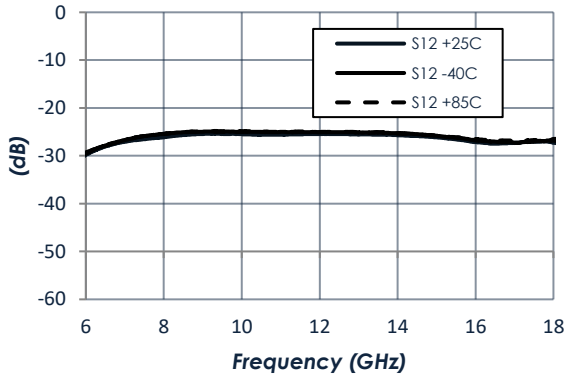
Output IP3 vs Temperature



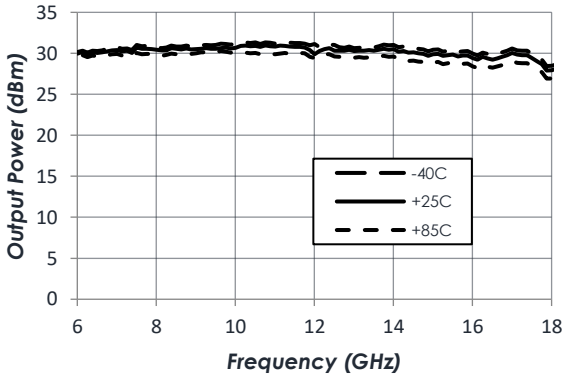
P1dB vs Temperature



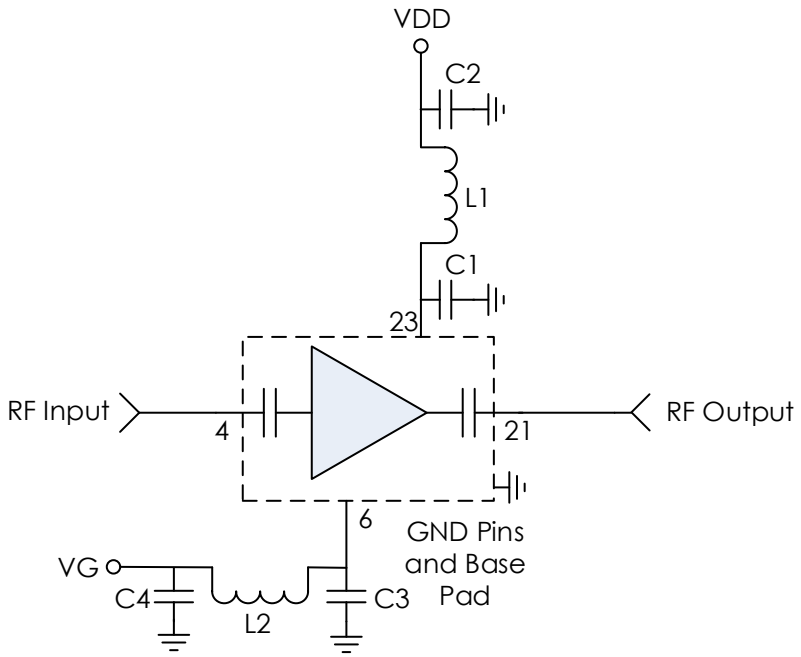
Reverse Isolation vs Temperature



P_Sat vs Temperature



TYPICAL APPLICATION



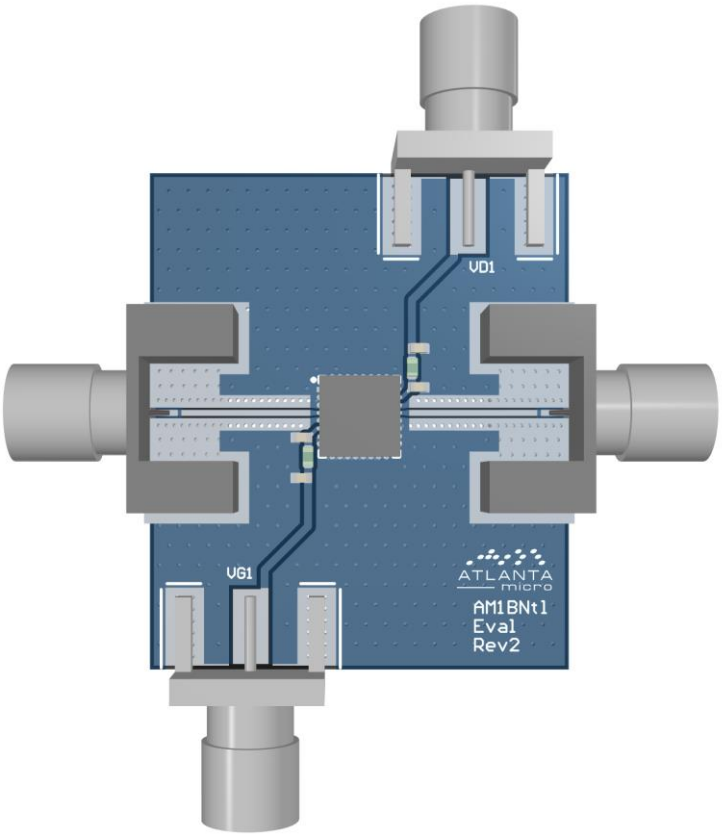
RECOMMENDED COMPONENT LIST (OR EQUIVALENT)

Part	Value	Part Number	Manufacturer
C1-C4	0.1 uF	GRM155R71C104KA88	Murata
L1, L2	1.0 nH	0402DC-1N0XJRW	Coilcraft

Note:

1. AM1173 is biased with a positive drain supply and negative gate supply. Biasing procedure is as follows:
    a. Turn on Procedure
        i. Apply -2V to the VG pin
        ii. Apply 9V to the VDD pin
        iii. Increase (towards zero) the VG voltage until the current draw from the 9V rail is 275mA. Nominally -0.44V
        iv. Apply RF signal
    b. Turn Off Procedure
        i. Remove RF signal
        ii. Reduce the VG voltage to -2V
        iii. Remove 9V from the VDD pin
        iv. Remove -2V from the VG pin
2. AM1173 is AC Coupled
3. C3 and C4 are required on pin 6 for proper operation

EVALUATION PC BOARD



RELATED PARTS

Part Number				Description
AM1175	6 GHz	to	18 GHz	Driver 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.

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