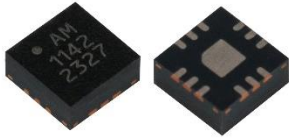


AM1142 – Amplifier

20 MHz to 18 GHz Gain Block

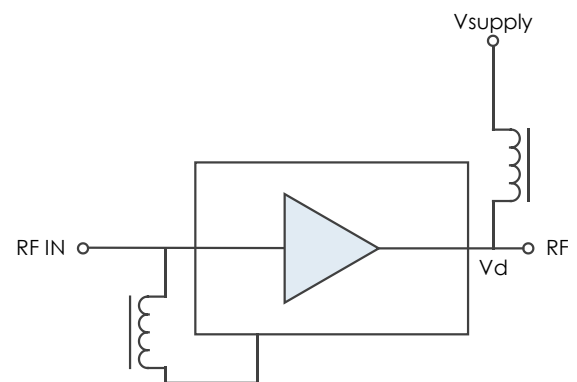


The AM1142 is a wideband, cascadable amplifier servicing the 20 MHz to 18 GHz frequency range. The device exhibits exceptional linearity and power handling capabilities across its bandwidth, while maintaining moderate gain and noise figure. With internal 50 Ω matching and packaged in a 3 mm QFN, the AM1142 represents a compact total PCB footprint

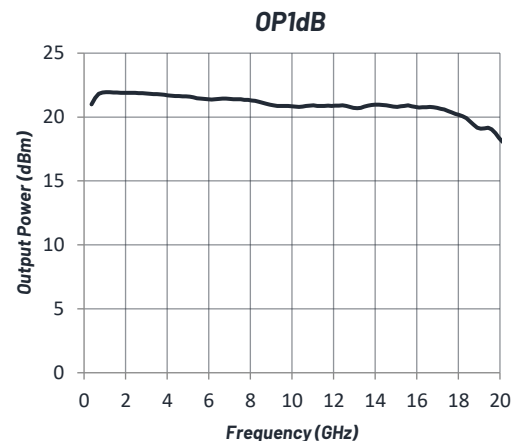
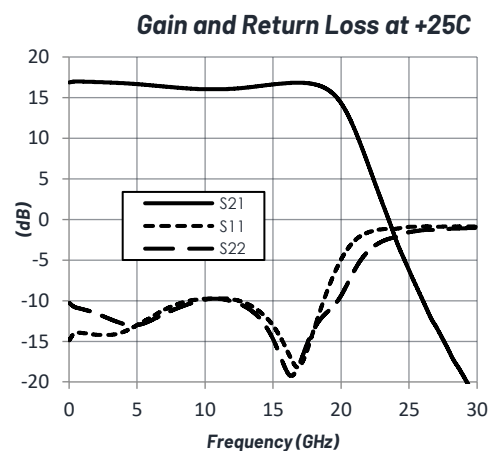
FEATURES

- 16 dB Gain
- +31 dBm OIP3
- +21 dBm OP1dB
- 2.4 dB Noise Figure
- +5.0V Operation
- 0.6W Power Consumption
- 3mm QFN Package
- -40 C to +85 C Operation

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



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REVISION HISTORY

Date	Revision	Notes
June 26, 2023	1	Initial Release
July 02, 2024	2	Changed to Mercury branding, slight tweaks to performance plots, and added part picture.

Pin	Name	Function
1-3	NC	Not Connected *
4	GND	Ground - Common
5	RF IN	RF Input - 50 ohms - DC Coupled, External DC Block Required
6	GND	Ground - Common
7	NC	Not Connected *
8	Bead	Connect to RF In through external ferrite bead or large inductor
9	NC	Not Connected *
10	GND	Ground - Common
11	RF OUT	RF Output and DC Power Input - 50 ohms - DC Coupled, External DC Block Required
12	GND	Ground - Common
Bottom Pad	GND	Ground - Common

* NC pins may be grounded or left open.

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+5.5 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. Devices subjected to conditions outside of what is recommended for extended periods may affect device reliability.

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		+5.0 V	
Operating Case Temperature	-40 C		+85 C

Thermal Information

Junction to Case Thermal Resistance (θ_{JC})	134 °C/W
Nominal Junction Temperature at +85 C ambient	+164 °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 (Vd)			+5.0 V	
DC Supply Current	Vd = +5.0 V		118 mA	
Power Dissipated	Vd = +5.0 V		0.59W	

RF Performance

(T = 25 °C, unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		20 MHz		18 GHz
Gain			16 dB	
Return Loss			12 dB	
Reverse Isolation	Vd = +5.0 V		22 dB	
Output IP3	Vd = +5.0 V		+31 dBm	
Output P1dB	Vd = +5.0 V		+21 dBm	
Output Power Saturation	Vd = +5.0 V		+22 dBm	
Noise Figure	Vd = +5.0 V		2.4 dB	

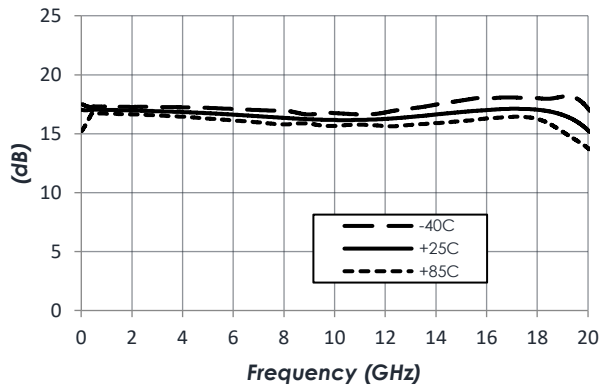
Notes:

1. OIP3 measured with 10 MHz tone spacing with Pout/tone = +0 dBm
2. Data measured directly at output of device. Output bias voltage supplied through equipment bias tee and is measured exclusive of bias tee effects. Expect slightly worst performance with bias tee involved in measurements.

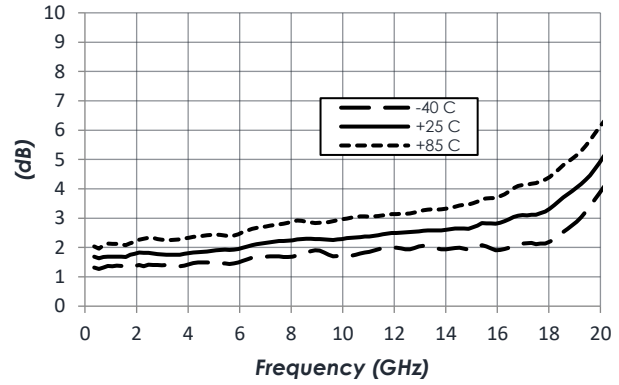
TYPICAL PERFORMANCE

(Vd = +5.0 V, T = 25 °C unless otherwise specified. Bias T de-embedded)

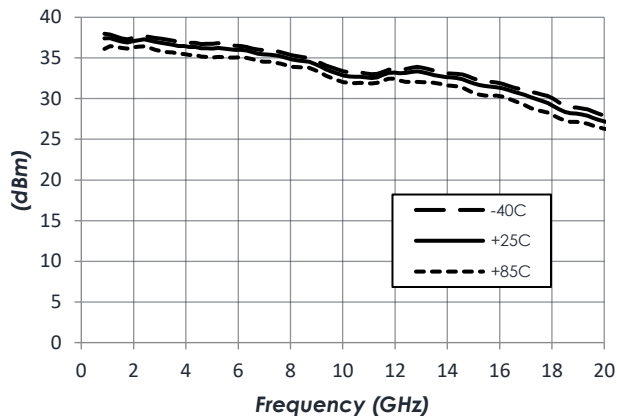
Gain vs Temperature



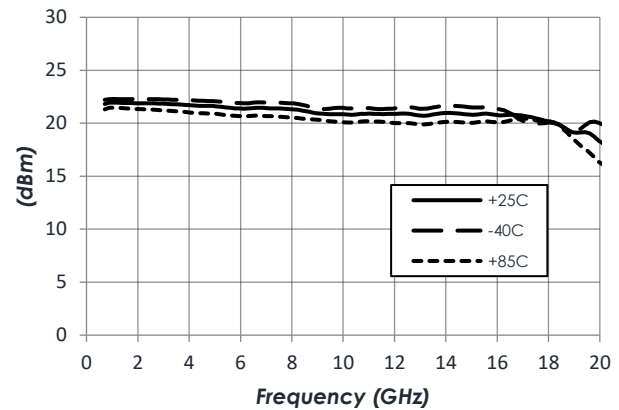
Noise Figure vs Temperature



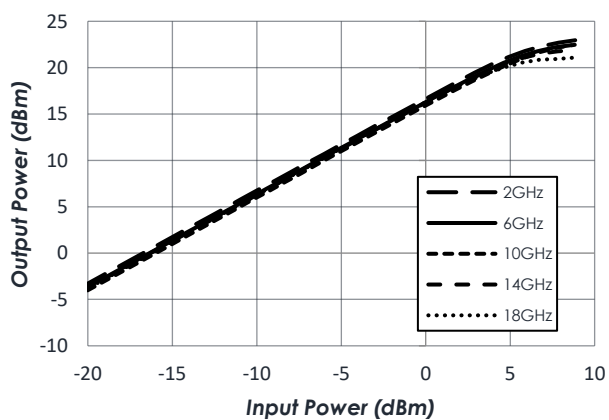
OIP3 vs Temperature



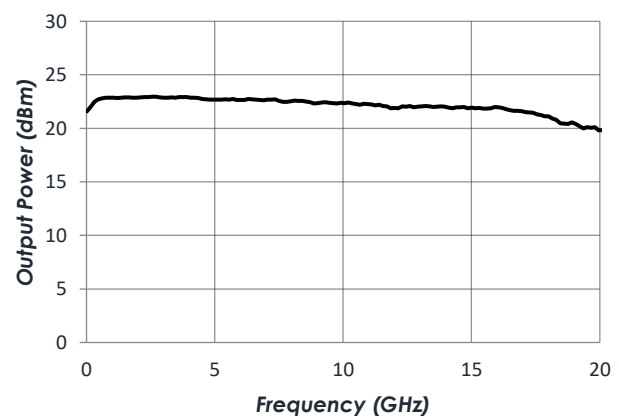
P1dB vs Temperature



Pin vs Pout

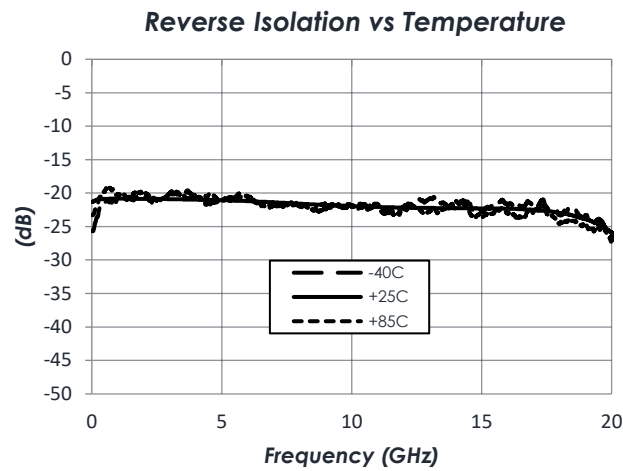


PSat

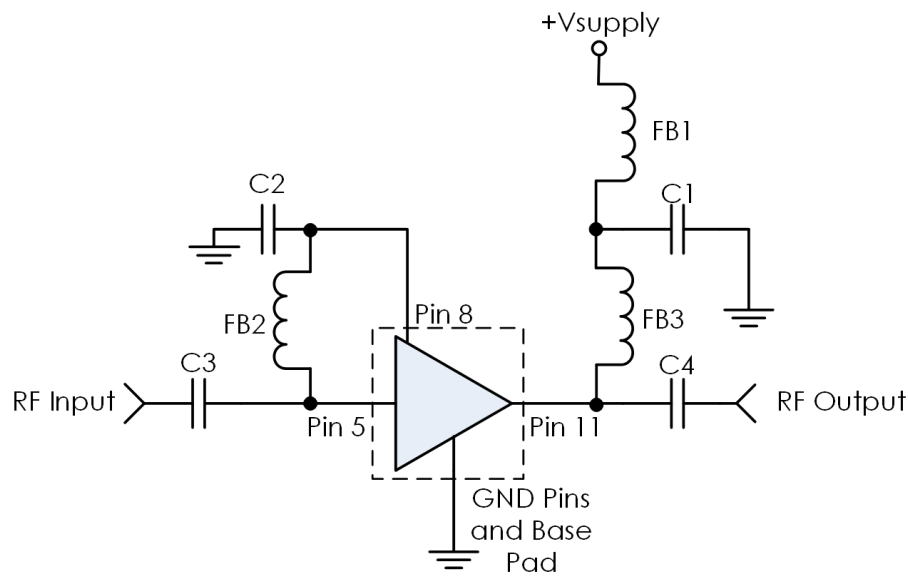


TYPICAL PERFORMANCE (CONTINUED)

(Vd = +5.0 V, T = 25 °C unless otherwise specified. Bias T de-embedded)



TYPICAL APPLICATION



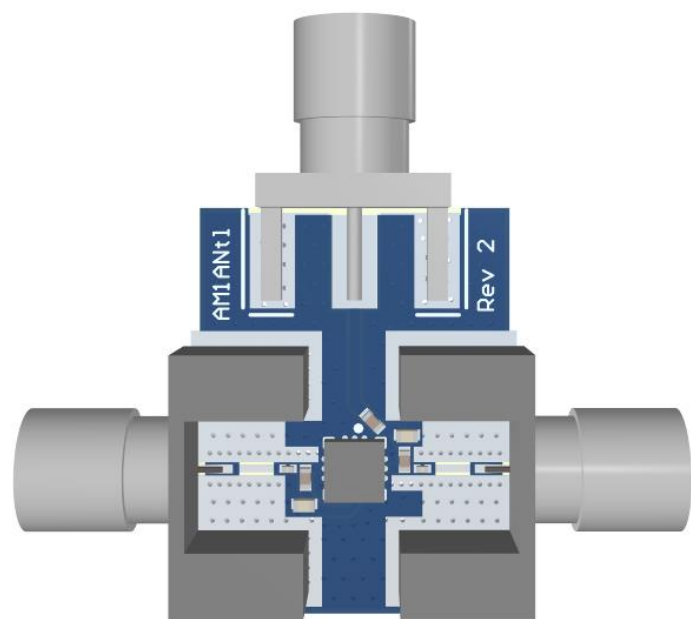
Recommended Component List (or Equivalent)

Part	Value	Part Number	Manufacturer
C1, C2	0.1 μ F	GRM155R71C104KA88	Murata
C3, C4	0.1 μ F	O201BB104KW160	Passive Plus
FB1 - FB3	-	MMZ1005A222E	TDK

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. Use RF circuit design techniques.
4. RF performance may be improved by replacing FB1, FB2, and/or FB3 with a different bead, inductor, or bias tee.

EVALUATION PC BOARD



RELATED PARTS

Part Number		Description
AM1053	5 to 20 GHz	Broadband Gain Block
AM1095	5 to 22 GHz	Driver Amplifier
AM1102	DC to 22 GHz	Low Noise Amplifier
AM1109	2 GHz to 20 GHz	Low Noise Amplifier
AM1111	2 to 18 GHz	Broadband 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 (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)

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