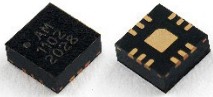


AM1157 – Amplifier

6 to 26.5 GHz Driver Amplifier



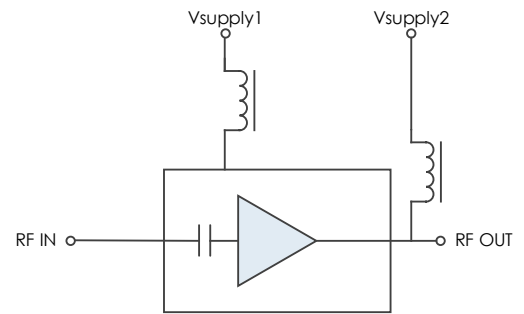
NOTE: Image is of a similar part.

AM1157 is a wideband, cascadable amplifier servicing the 6 to 26.5 GHz frequency range. The device exhibits high gain and high P1dB over a wide frequency range which makes the AM1157 a useful component for many broadband applications. Packaged in a 3mm QFN with internal 50Ω matching, the AM1157 represents a compact total PCB footprint.

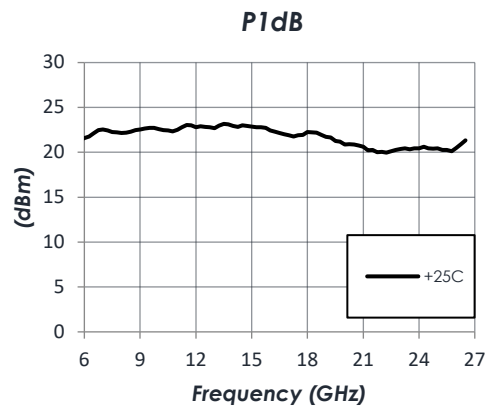
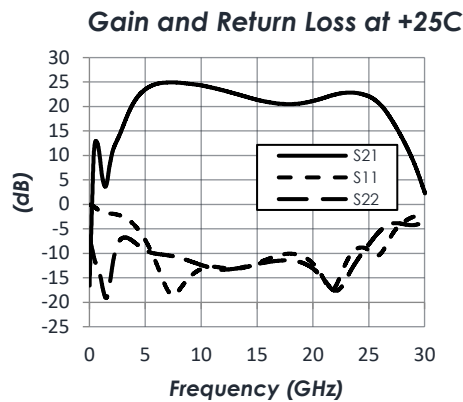
FEATURES

- 22 dB Gain
- +22 dBm P1dB
- +30 dBm OIP3
- 3.0 dB NF
- +5.0V and +4.0V Supplies
- 0.75 W Power Consumption
- 3mm QFN Package
- -40C to +85C Operation
- Unconditionally Stable

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



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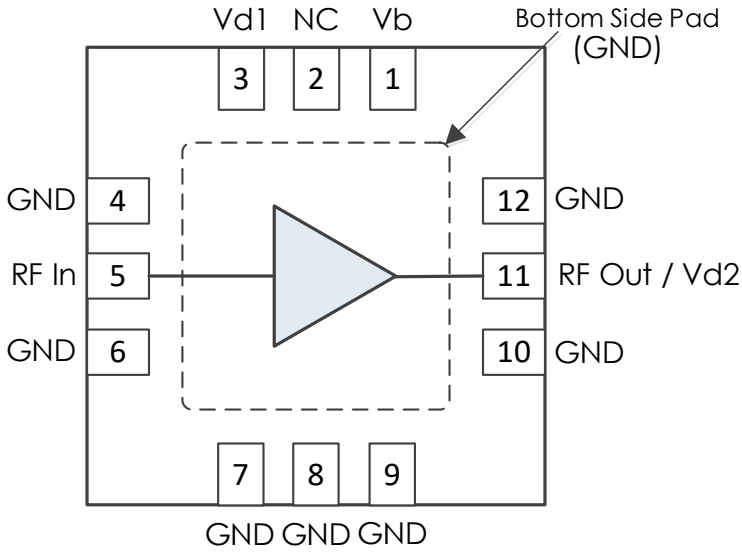
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REVISION HISTORY

Date	Revision	Notes
December 25, 2022	1	Initial Release
September 14, 2023	2	Fixed inconsistencies for VD1 and VD2 voltages.
February 13, 2025	3	Changed to Mercury branding. No content changes.

PIN LAYOUT AND DEFINITIONS

Note: All Un-Labeled Pins are NC or Ground



Pin	Name	Function
1	Vb	Bias Pin – External 2k ohm resistor to ground
2	NC	Not Connected
3	Vd1	DC Supply Voltage 1
4	GND	Ground - Common
5	RF In	RF Input – 50 Ohms – AC Coupled
6-10	GND	Ground - Common
11	RF Out / Vd2	RF Output – 50 Ohms – DC Coupled. VD2 – DC Supply Voltage 2. External Bias Tee Required
12	GND	Ground - Common

* NC pins may be grounded or left floating.

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage 1 (VD1)	-0.3 V	+5.8 V
Supply Voltage 1 (VD2)	-0.3 V	+5.2 V
RF Input Power		+20 dBm
Operating Junction Temperature	-40C	+200 C
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	+4.0 V	+5.0 V	
Operating Case Temperature	-40 C		+85 C

Thermal Information

Junction to Case Thermal Resistance (θ_{JC})	104 C/W
Nominal Junction Temperature at +85C Ambient	+163 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 1, VD1		+4.8 V	5.0 V	+5.2 V
DC Supply Current 1, VD1	VD1 = +5.0V		96 mA	
DC Supply Voltage 2, VD2		+3.8 V	+4.0V	+4.3 V
DC Supply Current 1, VD2	VD2 = +4.0V		65 mA	
Power Dissipated	VD1 = +5.0V, VD2 = +4.0V		0.75 W	

RF Performance

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		6 MHz		26.5 GHz
Gain ²	f = 6 GHz		24 dB	
	f = 15 GHz		21 dB	
	f = 26.5 GHz		20 dB	
Return Loss	f = 6 GHz		10 dB	
	f = 15 GHz		10 dB	
	f = 26.5 GHz		7 dB	
Output IP3	f = 15 GHz		32 dBm	
Output P1dB	f = 15 GHz		22 dBm	
Noise Figure	f = 15 GHz		2.8 dB	

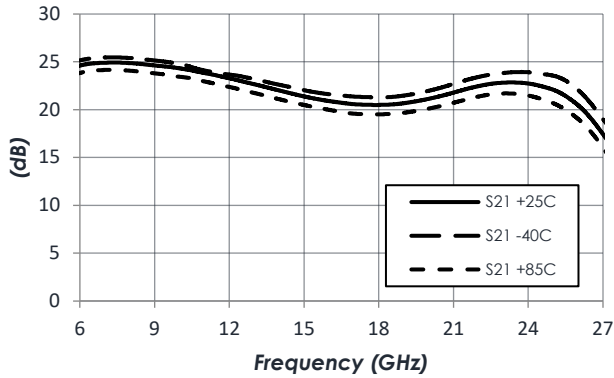
***Notes:**

- OIP3 measured with two -15 dBm input tones at 10MHz tone spacing.
- Performance is for typical application A.

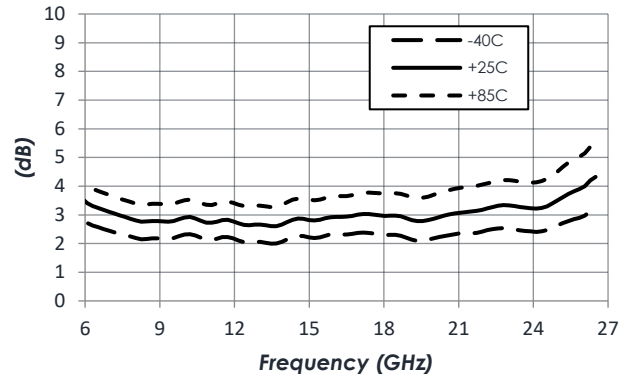
TYPICAL PERFORMANCE

(VD1 +5.0V, VD2 = +4.0V, T = 25°C unless otherwise specified)

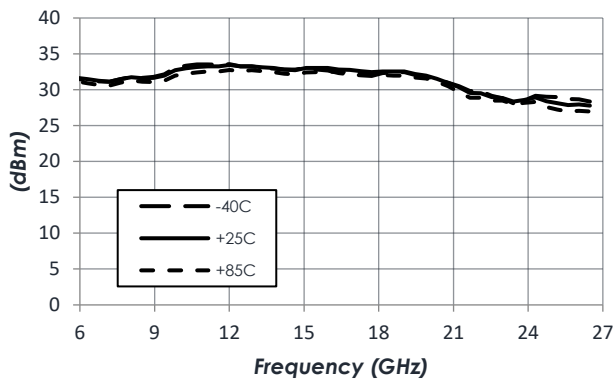
Gain vs Temperature



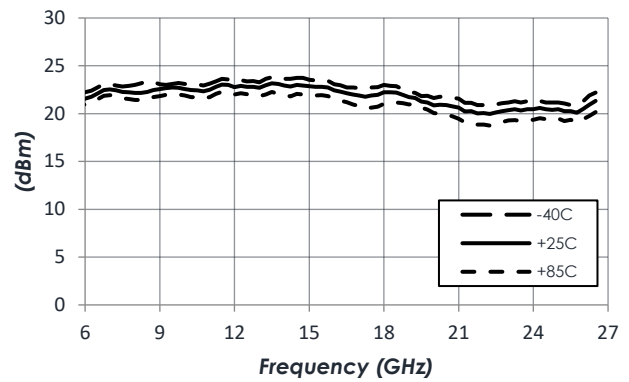
Noise Figure vs Temperature



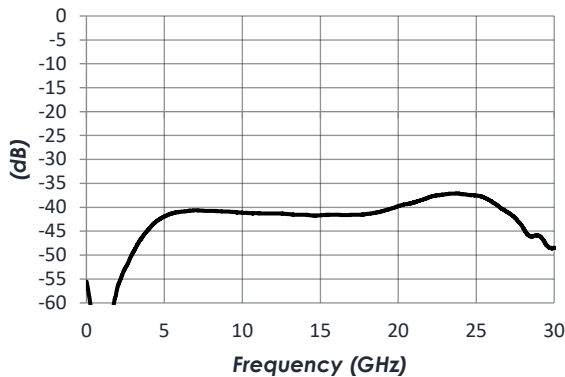
Output IP3 vs Temperature



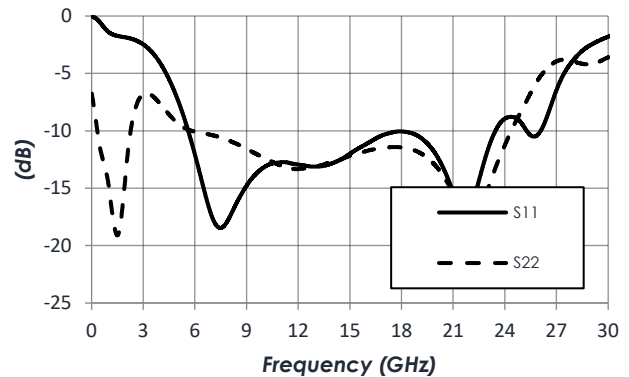
P1dB vs Temperature



Reverse Isolation



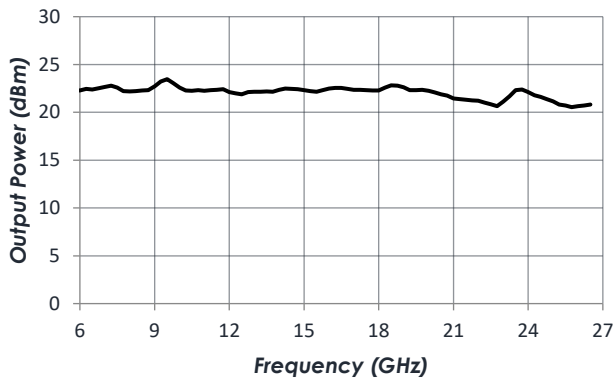
Return Loss



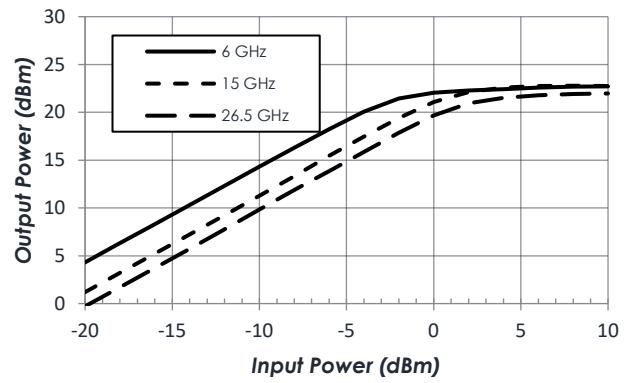
TYPICAL PERFORMANCE (CONTINUED)

(VD1 +5.0V, VD2 = +4.0V, T = 25°C unless otherwise specified)

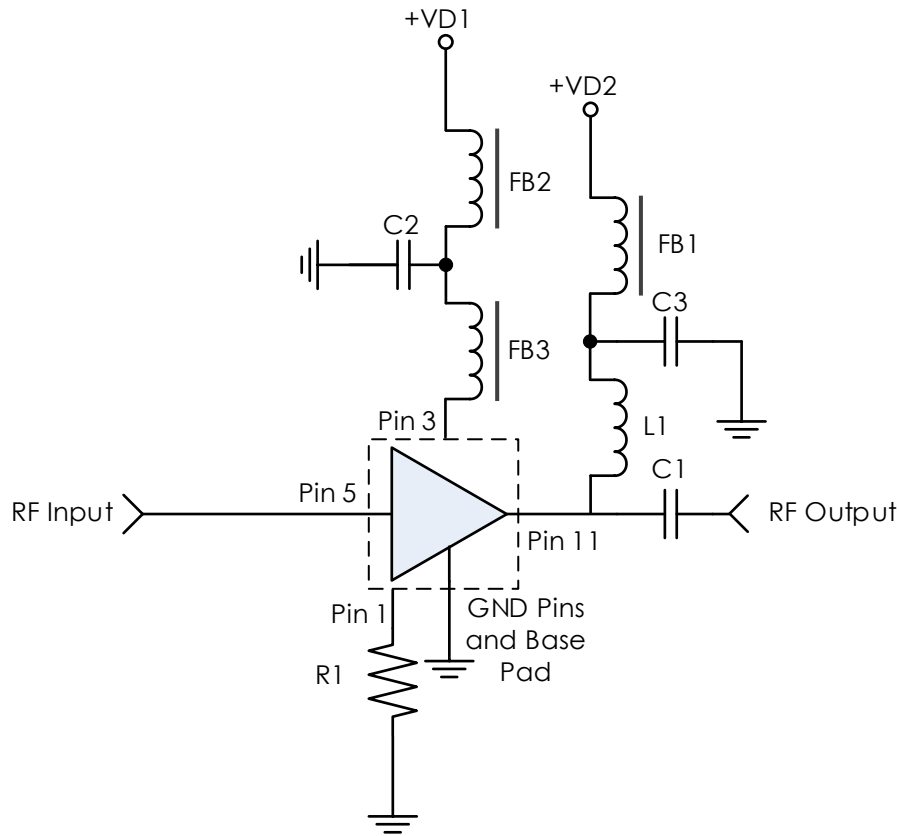
Saturated Output Power



Pin vs. Pout at +25C



TYPICAL APPLICATION A - SEPARATE SUPPLIES



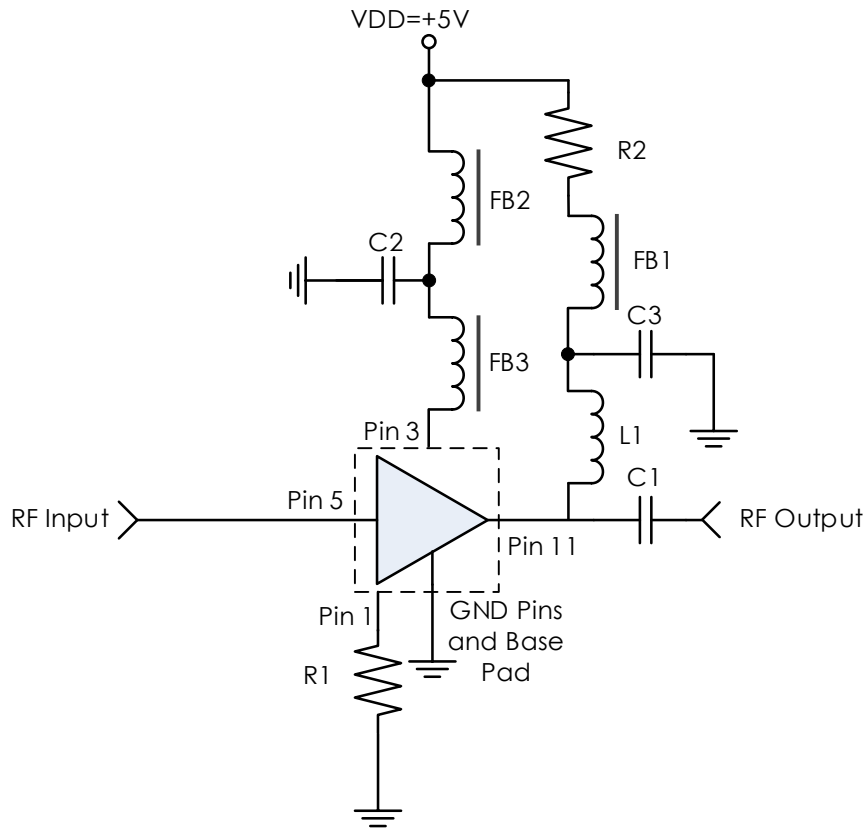
Recommended Component List (or Equivalent)

Part	Value	Part Number	Manufacturer
C1	0.1 μ F	0201BB104KW160	Passives Plus
C2, C3	0.1 μ F	GRM155R71C104KA88	Murata
FB1-FB3	-	MMZ1005A222E	TDK
L1	0.25 μ H	CC25T47K240G5-C	Piconics
R1	2000 Ω	-	-

Notes:

1. NC pins may be grounded or left open.
2. RF Input (pin 5) is internally DC blocked.
3. Leaving pin 1 not connected will cause the amplifier to use more current.
4. L1 may be a ferrite bead or inductor; a conical inductor will offer best P1dB.

TYPICAL APPLICATION B - SHARED +5V SUPPLY



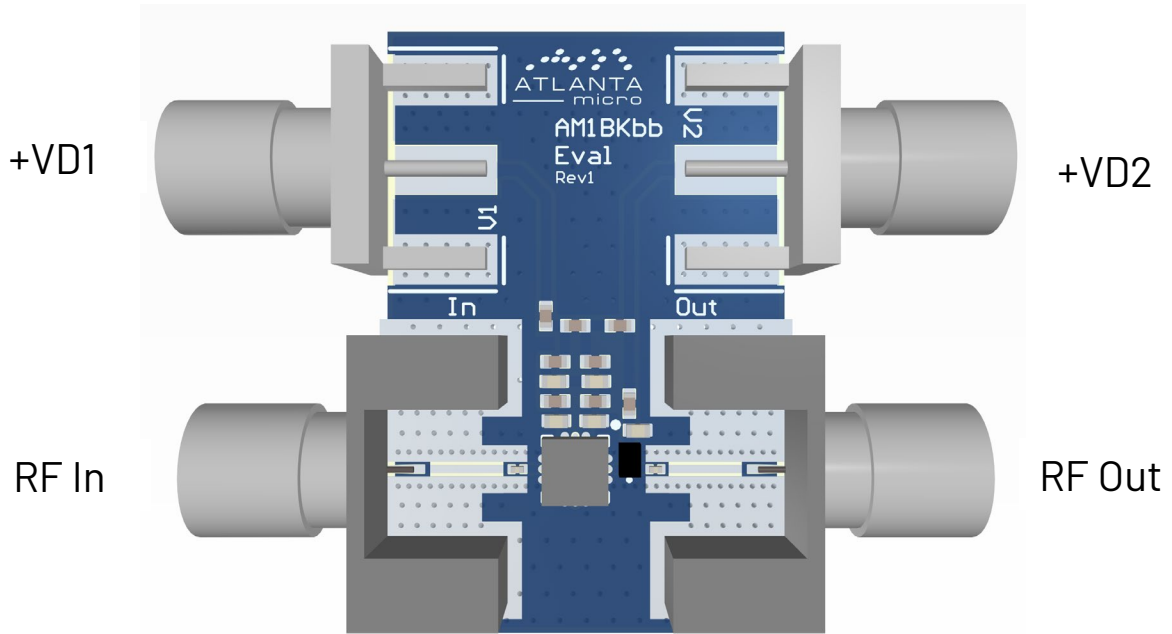
Recommended Component List (or Equivalent)

Part	Value	Part Number	Manufacturer
C1	0.1 μ F	0201BB104KW160	Passives Plus
C2, C3	0.1 μ F	GRM155R71C104KA88	Murata
FB1-FB3	-	MMZ1005A222E	TDK
L1	0.25 μ H	CC25T47K240G5-C	Piconics
R1	2000 Ω	-	-
R2	15 Ω		

Notes:

1. Maximum output power will be lower than the separate supply configuration A.
2. NC pins may be grounded or left open.
3. RF Input (pin 5) is internally DC blocked.
4. Leaving pin 1 not connected will cause the amplifier to use more current.
5. L1 may be a ferrite bead or inductor; a conical inductor will offer best P1dB.

EVALUATION PC BOARD



Note: Not all components shown may be installed.

RELATED PARTS

Part Number		Description
AM1053	5 GHz to 20 GHz	Gain Block
AM1134	6 GHz to 26.5 GHz	Low Noise Amplifier
AM1095	6 GHz to 22.25 GHz	Driver Amplifier

COMPONENT COMPLIANCE INFORMATION

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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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