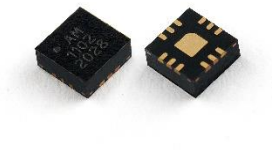
AM1157 – Amplifier

6 to 26.5 GHz Driver Amplifier

Description

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.

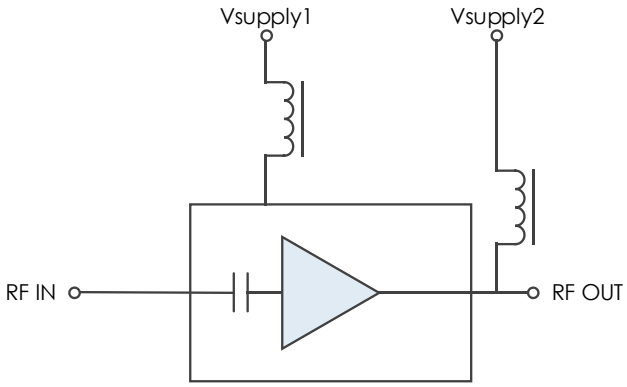


Note: Image is of similar part

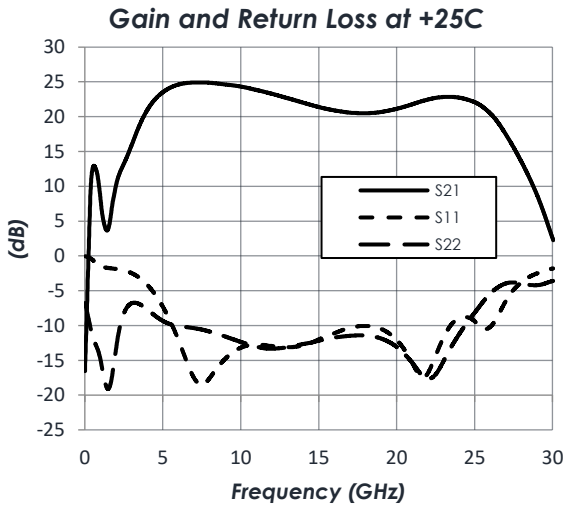
Features

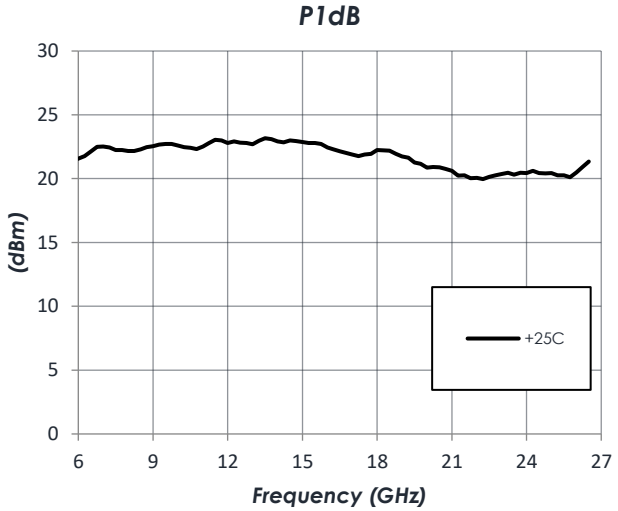
- 22 dB Gain
- +22 dBm P1dB
- +30 dBm OIP3
- 3.0 dB NF
- +5.0V and +4.0V Supplies
- 0.75 W Power Consumption
- 3mm QFN Package
- -40C to +85C Operation
- Unconditionally Stable

Functional Diagram



Characteristic Performance





To obtain price, delivery, or to place an order contact sales@atlantamicro.com
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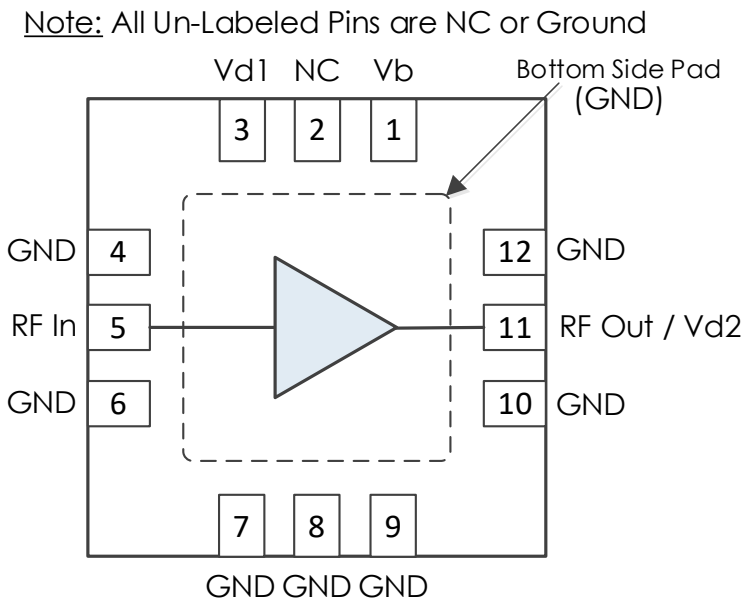
Table of Contents

Revision History

Date	Revision Number	Notes
December 25, 2022	1	Initial Release
September 14, 2023	2	Updated Eval Board Number

Pin Layout and Definitions



Pin Number	Pin Name	Pin 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

Note: NC pins may be grounded or left open

Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage 1 (VD1)	-0.3 V	+5.8 V
Supply Voltage 2 (VD2)	-0.3 V	+5.2 V
RF Input Power		+20 dBm
Operating Junction Temperature	-40 C	+200 C
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	

Atlanta Micro 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)

Parameter	Testing Conditions	Minimum	Typical	Maximum
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)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		6 GHz		26.5 GHz
Gain	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	

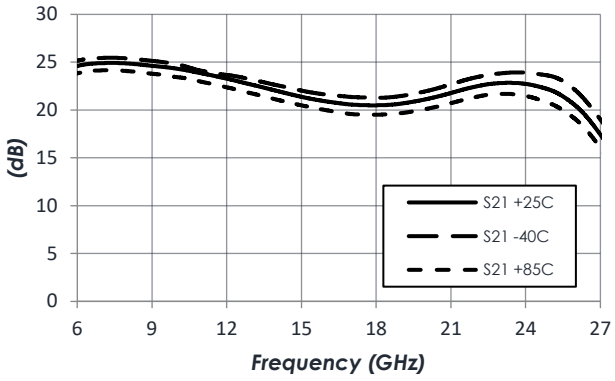
Notes:

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

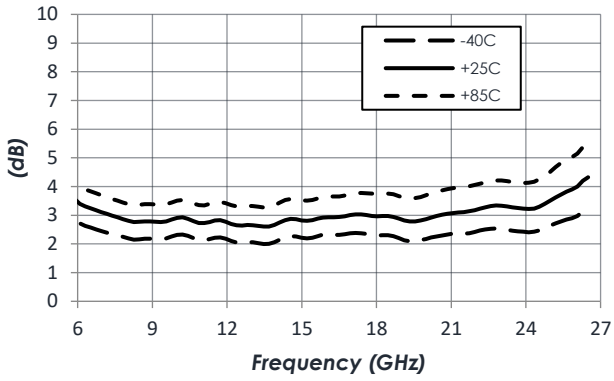
Typical Performance

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

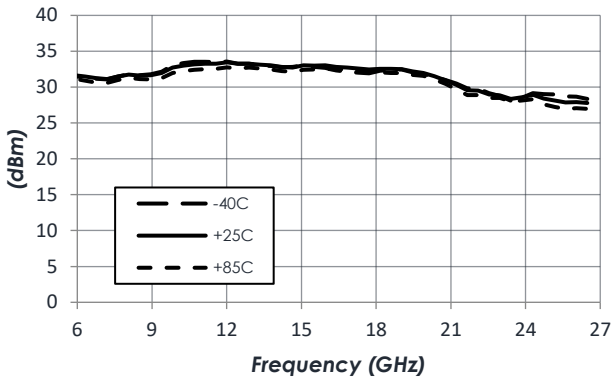
Gain vs Temperature



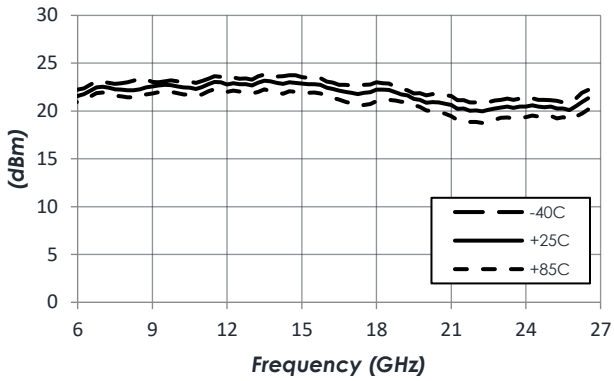
Noise Figure vs Temperature



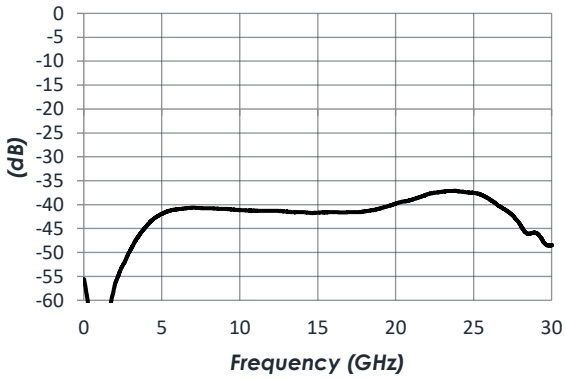
Output IP3 vs Temperature



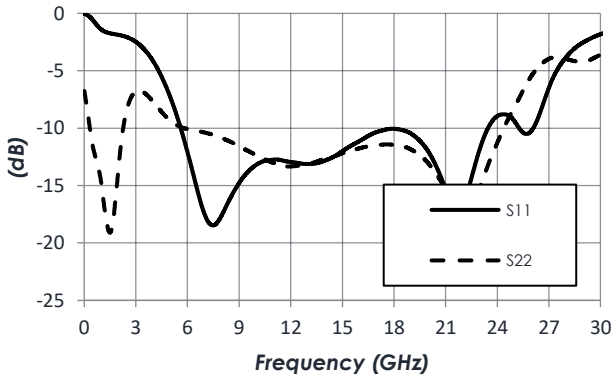
P1dB vs Temperature



Reverse Isolation



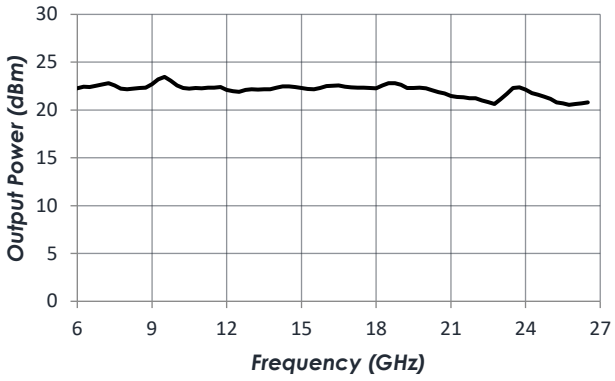
Return Loss



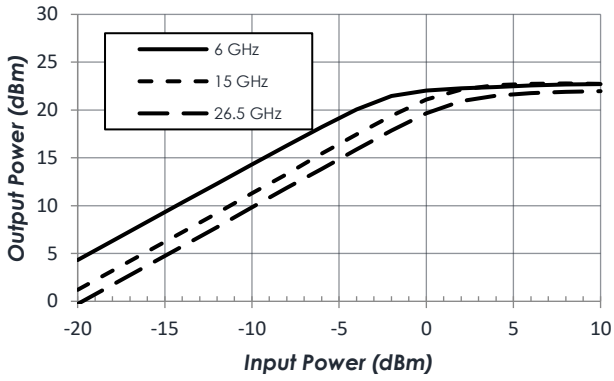
Typical Performance (continued)

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

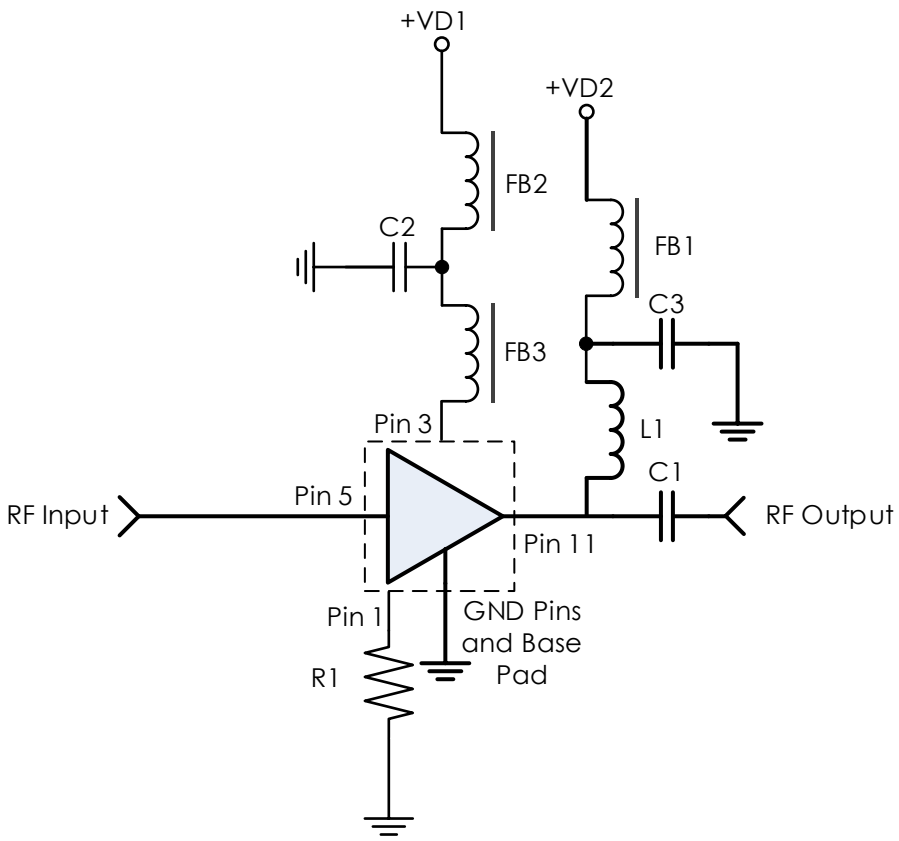
Saturated Output Power



Pin vs. Pout at +25C



Typical Application A – Separate Supplies



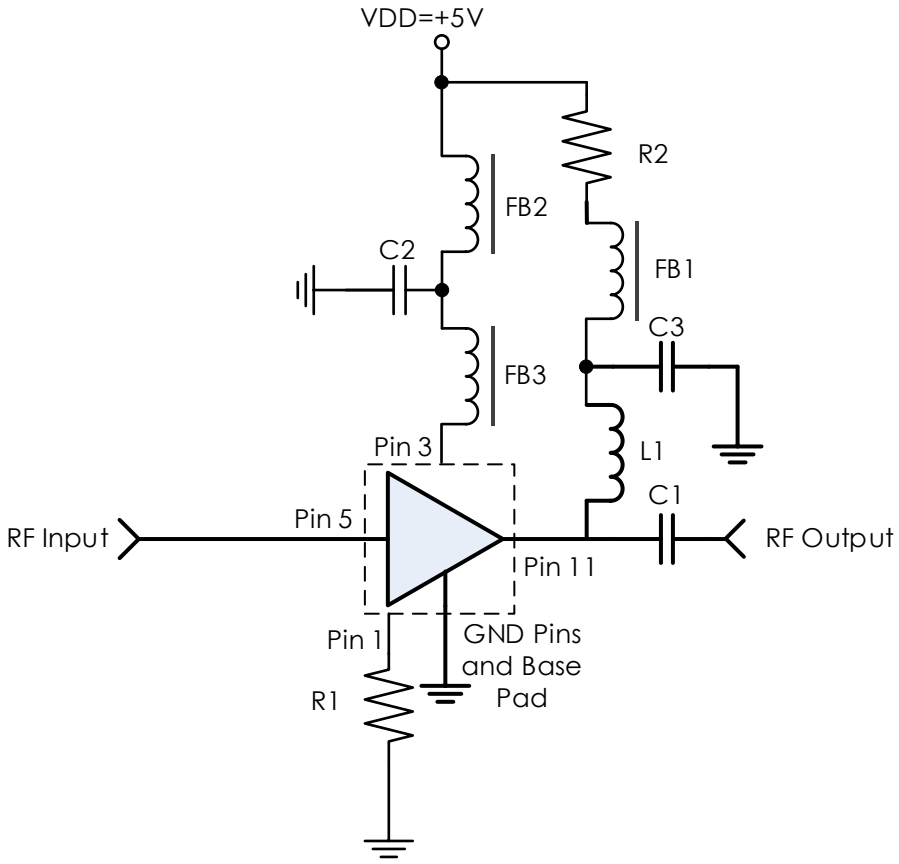
Recommended Component List (or equivalent)

Part	Value	Part Number	Manufacturer
C1	0.1 uF	0201BB104KW160	Passives Plus
C2, C3	0.1 uF	GRM155R71C104KA88	Murata
FB1-FB3	-	MMZ1005A222E	TDK
L1	0.25 uH	CC25T47K240G5	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 amplifer 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



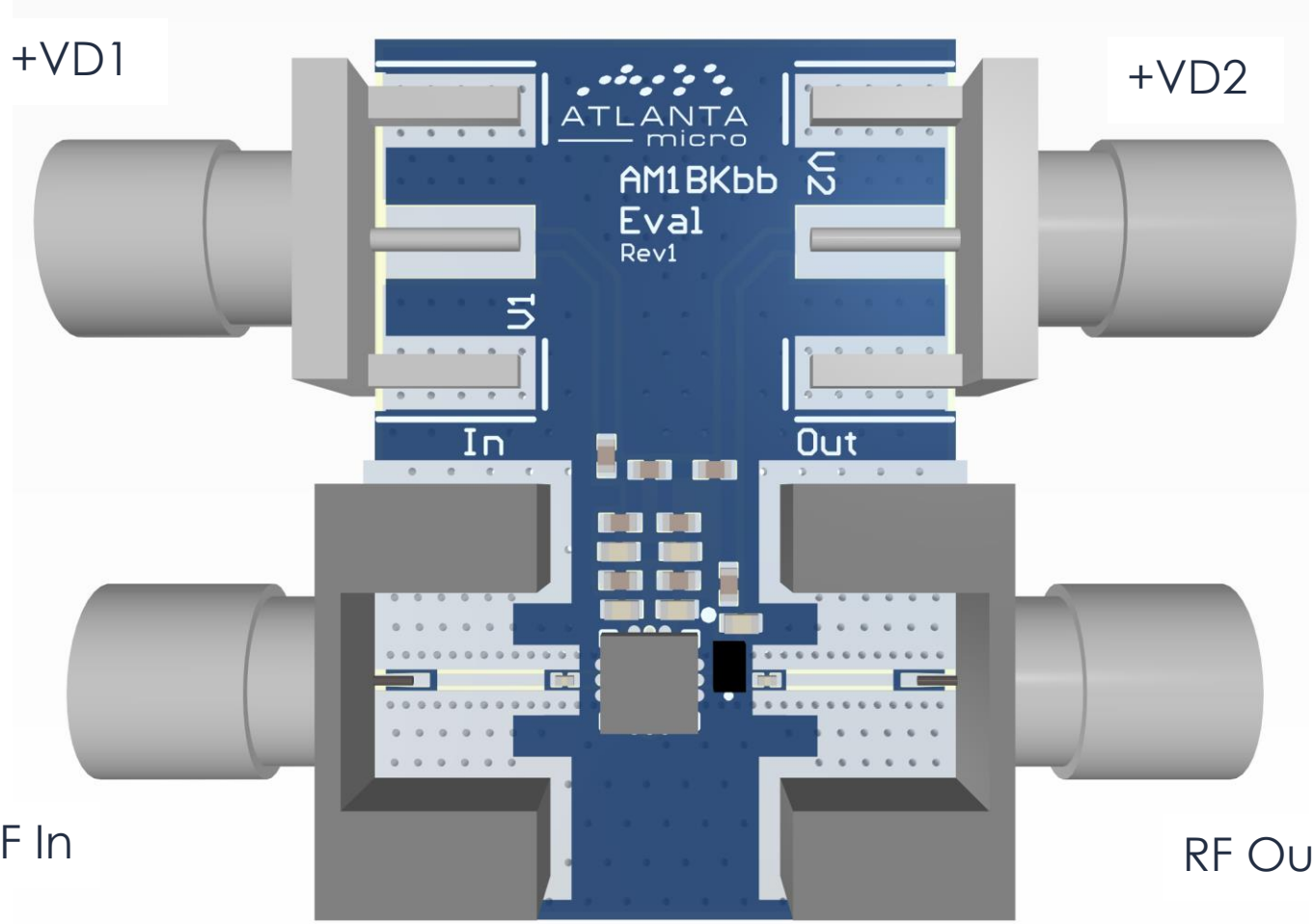
Recommended Component List (or equivalent)

Part	Value	Part Number	Manufacturer
C1	0.1 uF	0201BB104KW160	Passives Plus
C2, C3	0.1 uF	GRM155R71C104KA88	Murata
FB1-FB3	-	MMZ1005A222E	TDK
L1	0.25 uH	CC25T47K240G5	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 amplifer 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 Gain Block
AM1095	6 GHz	to	22.25 GHz	Driver Amplifier

Component Compliance Information

RoHS: Atlanta Micro, 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 Atlanta Micro 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)

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Atlanta Micro 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.