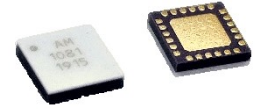


AM1081 – Amplifier

DC to 8 GHz Bypassable

Description

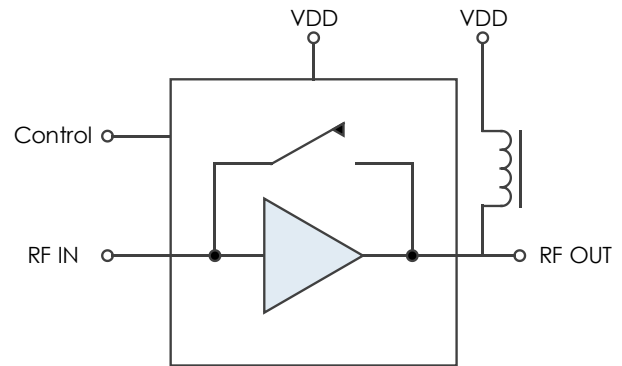
The AM1081 is a high dynamic range bypassable DC-coupled amplifier covering up to 8 GHz. The device exhibits low bypass insertion loss and a moderate positive gain-slope, providing frequency equalization useful in many broadband applications. Packaged in a 4mm QFN with internal 50Ω matching and requiring a single positive control voltage, the AM1081 represents a dramatic size reduction over a discrete implementation of a bypassable amplifier.



Features

- 17 dB Gain
- 2.5 dB Noise Figure
- +35 dBm OIP3
- +20 dBm P1dB
- +20 dBm PSat
- 1.25 dB Bypass Insertion Loss
- +5.0V, 83/1 mA (Gain/Bypass)
- +3.0V to +5.0V Supply Range
- +3.3V or +5V Logic Compatible
- 4mm QFN Package

Functional Diagram



Characteristic Performance

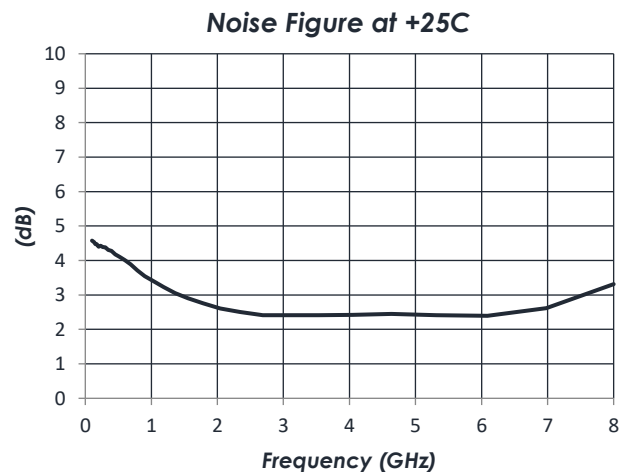
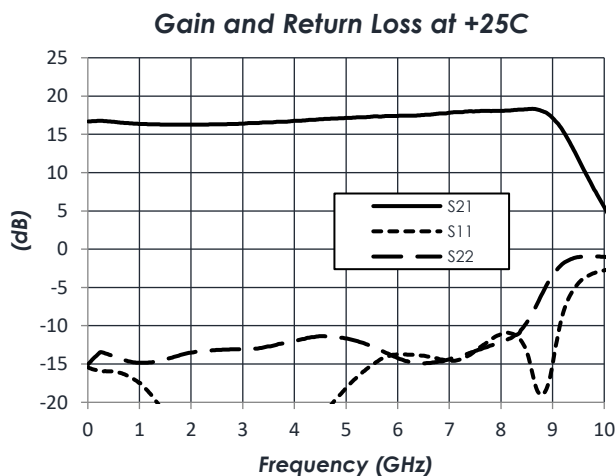


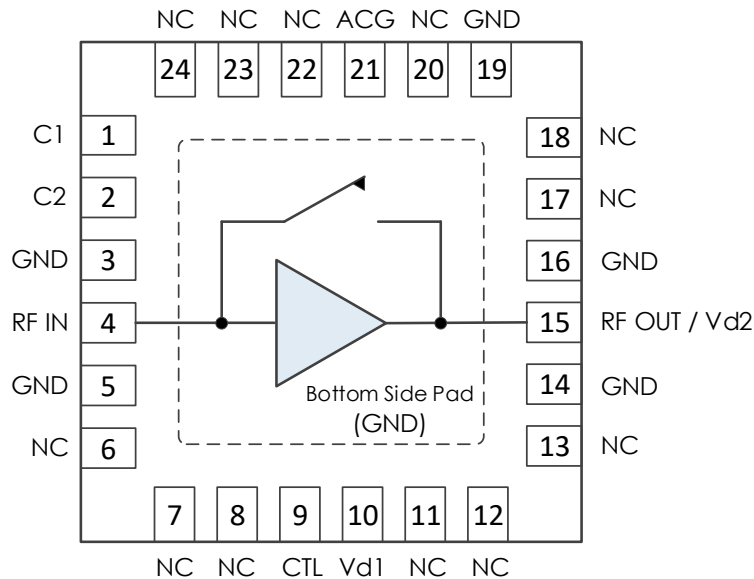
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Revision History

Date	Revision Number	Notes
May 8, 2019	1	Initial Release
June 6, 2019	1A	Component Compliance Information Updated

Pin Layout and Definitions



Pin Number	Pin Name	Pin Function
1	C1	External Capacitor Connection 1
2	C2	External Capacitor Connection 2
3	GND	Ground – Common
4	RF IN	RF Input – 50 ohms – DC Coupled, External DC Block Required
5	GND	Ground – Common
6-8	NC	Not Connected *
9	CTL	Bypass/Amplifier Mode Control
10	VD1	DC Power Input
11-13	NC	Not Connected *
14	GND	Ground – Common
15	RF OUT/VD2	RF Output and DC Power Input – 50 Ohms – DC Coupled, External DC Block Required.
16	GND	Ground – Common
17, 18	NC	Not Connected *
19	GND	Ground – Common
20	NC	Not Connected *
21	ACG	AC Ground
22-24	NC	Not Connected *
Case GND	GND	Ground – Common

*NC pins may be grounded or left open

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DC to 8 GHz Bypassable



Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	0.0 V	+6.0 V
RF Input Power		+20 dBm
Operating Junction Temperature	-40 C	+150 C
Storage Temperature Range	-50C	+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
Storage Temperature Range (Recommended)	-50 C	+125 C
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	+3.0 V	+5.0 V	+5.2 V
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 C

Thermal Information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θ_{JC})	49.5

AM1081 – Amplifier

DC to 8 GHz Bypassable

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Supply Voltage		+3.0 V	+5.0 V	+5.2 V
DC Supply Current	VDD = +5.0 V		83 mA	
	VDD = +3.3 V		52 mA	
Power Dissipated	VDD = +5.0 V		0.42 W	
	VDD = +3.3 V		0.17 W	
Logic Level Low		-0.1 V		+0.4 V
Logic Level High		+2.2 V		+5.0 V

RF Performance

(T = 25 °C, VDD = +5.0 V unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		DC		8 GHz
Gain	VDD = +5.0 V		17.0 dB	
	VDD = +3.3 V		16.5 dB	
Return Loss	VDD = +5.0 V		15 dB	
Bypass Insertion Loss	VDD = +5.0 V		1.25 dB	
Output IP3	VDD = +5.0 V		+35 dBm	
Output P1dB	VDD = +5.0 V		+20 dBm	
Noise Figure	VDD = +5.0 V		2.5 dB	

State Table

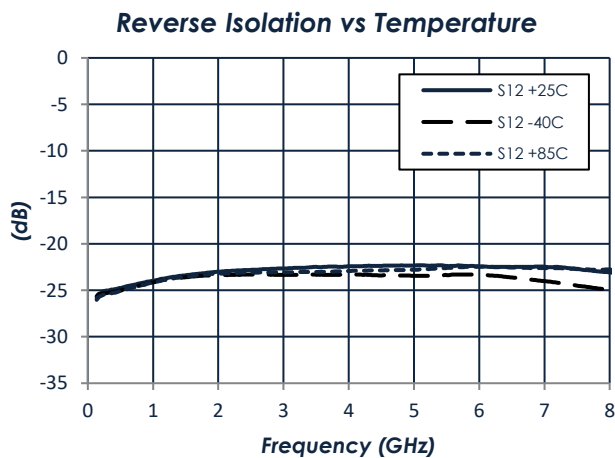
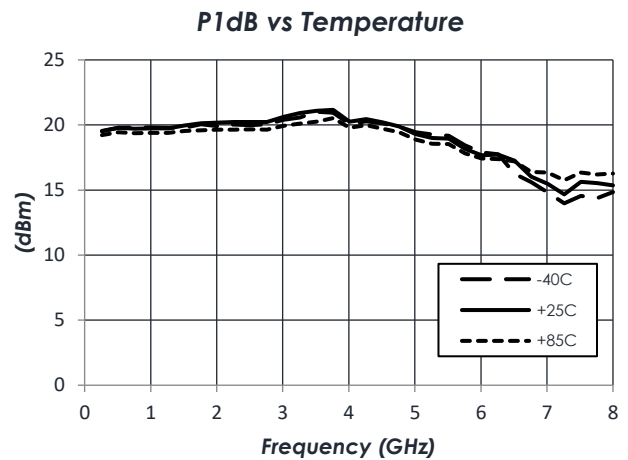
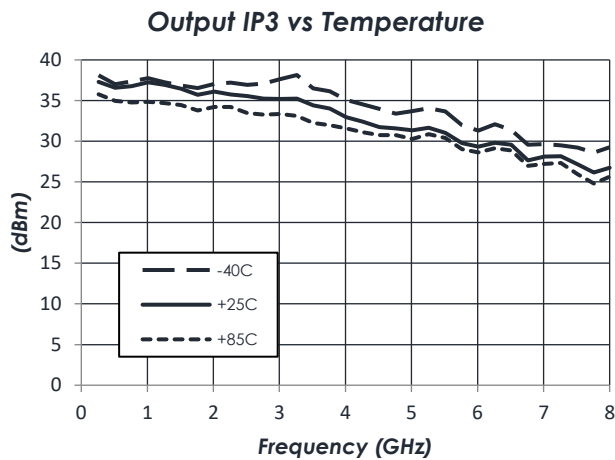
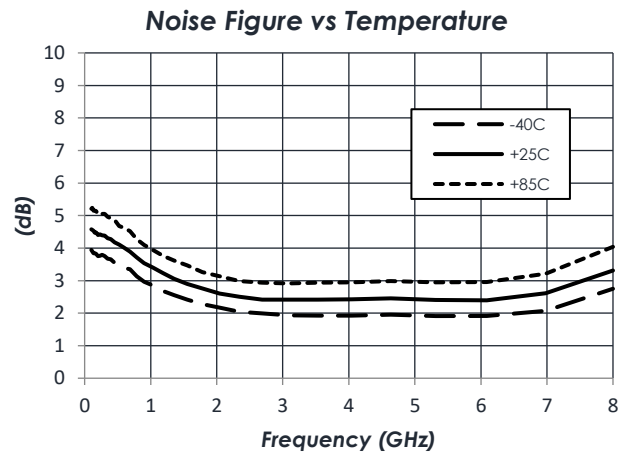
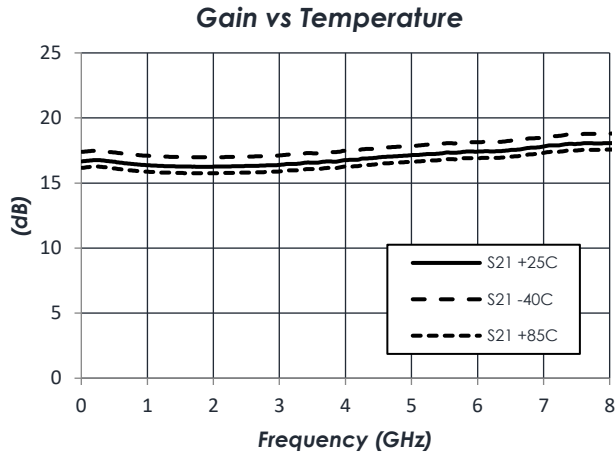
CTL	Amplifier
High	Enabled
Low	Bypassed

AM1081 – Amplifier

DC to 8 GHz Bypassable

Typical Performance

(Amplifier Enabled, VDD = +5.0 V, ID = 83 mA)



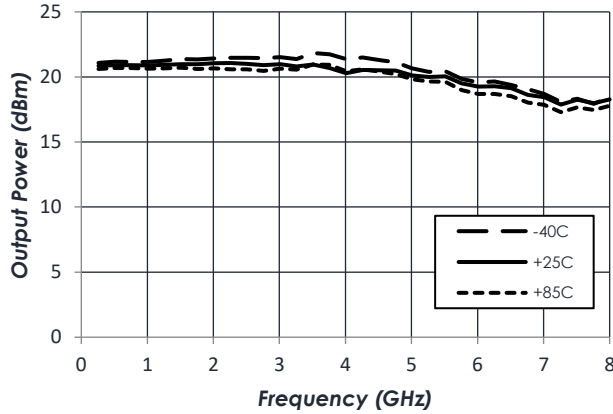
AM1081 – Amplifier

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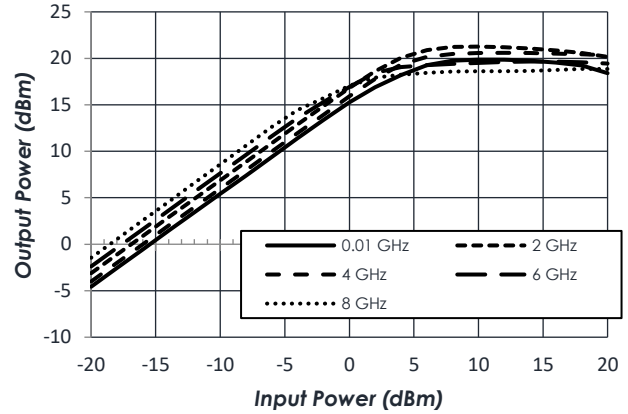
Typical Performance (continued)

(Amplifier Enabled, VDD = +5.0 V, ID = 83 mA)

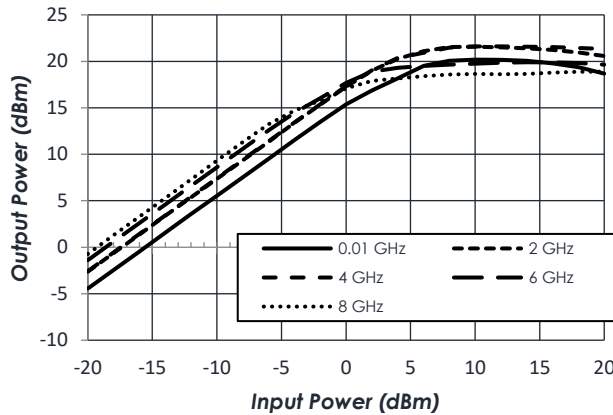
P_{Sat} vs Temperature



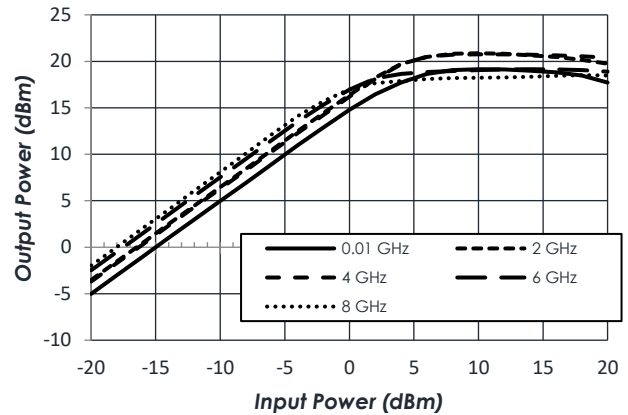
Pin vs. Pout at +25C



Pin vs. Pout at -40C

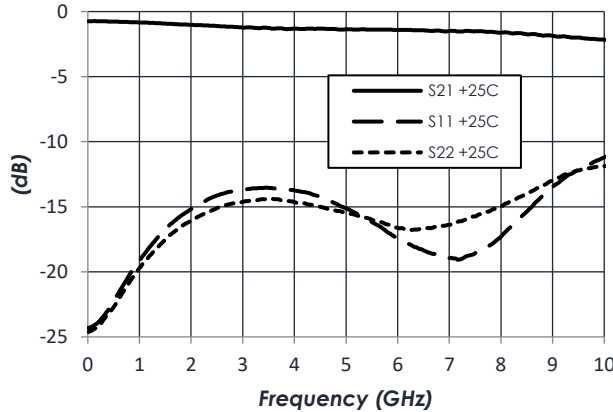


Pin vs. Pout at +85C

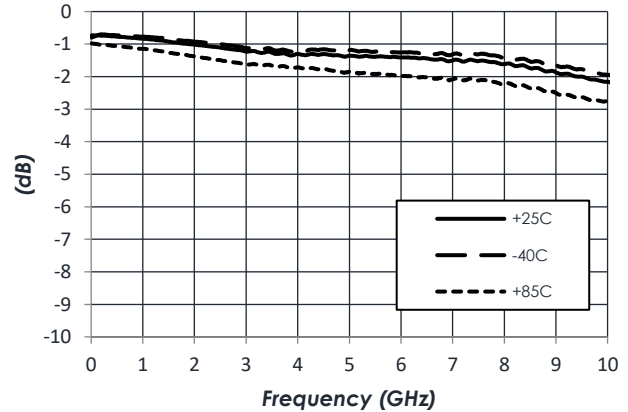


(Amplifier Bypass, VDD = +5.0 V, ID = 1mA)

Insertion and Return Loss at +25C



Insertion Loss vs Temperature

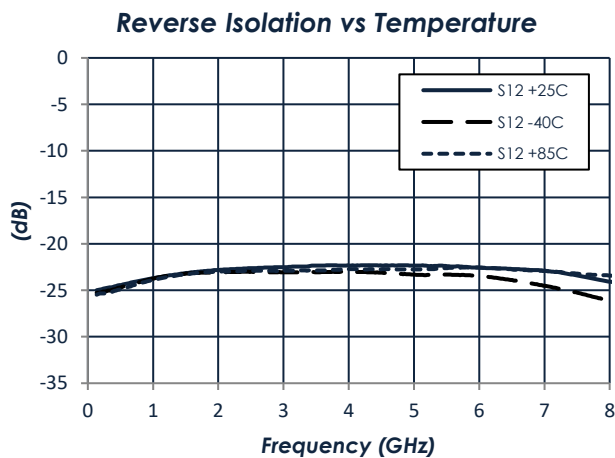
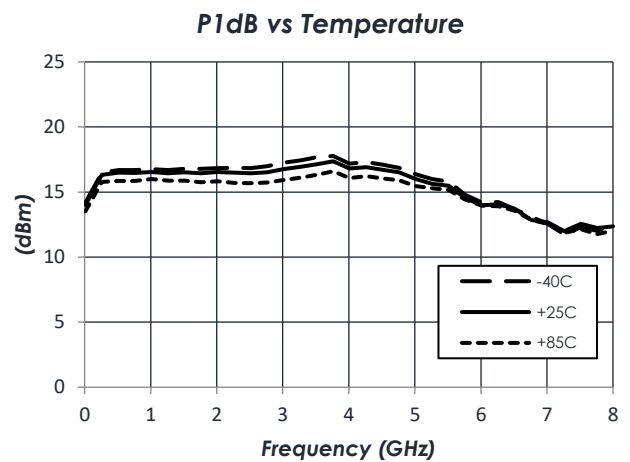
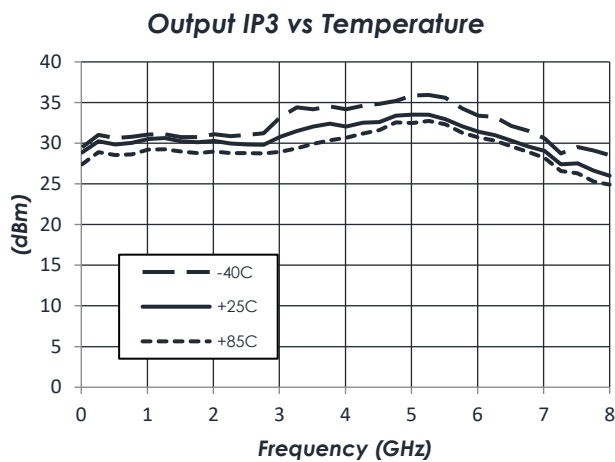
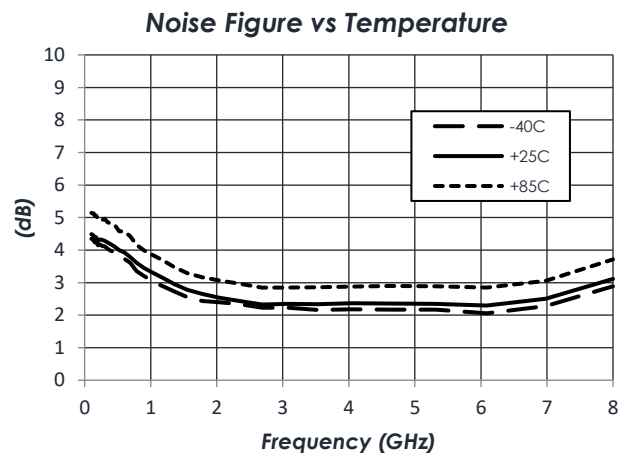
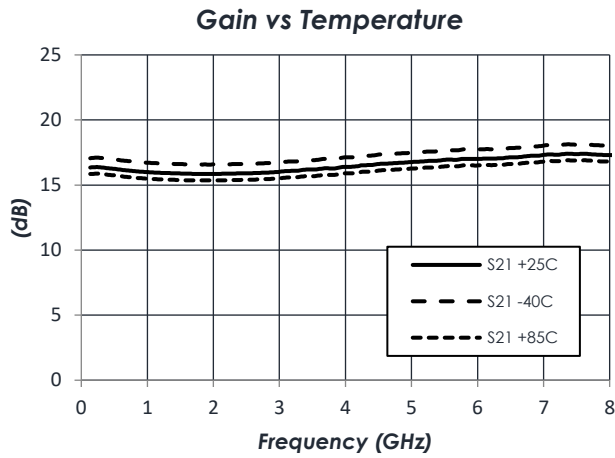


AM1081 – Amplifier

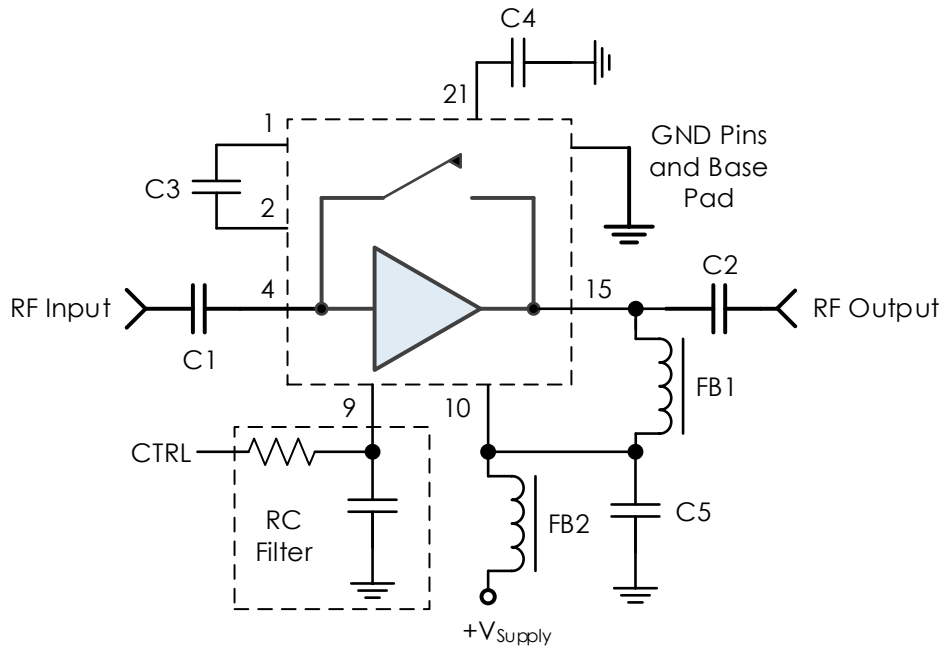
DC to 8 GHz Bypassable

Typical Performance (continued)

(Amplifier Enabled, VDD = +3.3 V, ID = 52 mA)



Typical Application



Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1, C2	0.1 μ F	0402BB104KW160	Passives Plus
C3, C4	0.1 μ F	0201BB104KW160	Passives Plus
C5	0.1 μ F	GRM155R71C104KA88	Murata
FB1, FB2	-	MMZ1005A222E	TDK

Notes:

1. RF blocking capacitors should be high performance, low-loss, broadband capacitors for optimum performance.
2. Select control line RC filter values based on desired logic source decoupling and switching speed.
3. C3 and C4 should be placed as close to the AM1081 as possible to minimize PCB trace lengths. A 0201 package size is recommended to minimize stray PCB pad capacitance to ground.

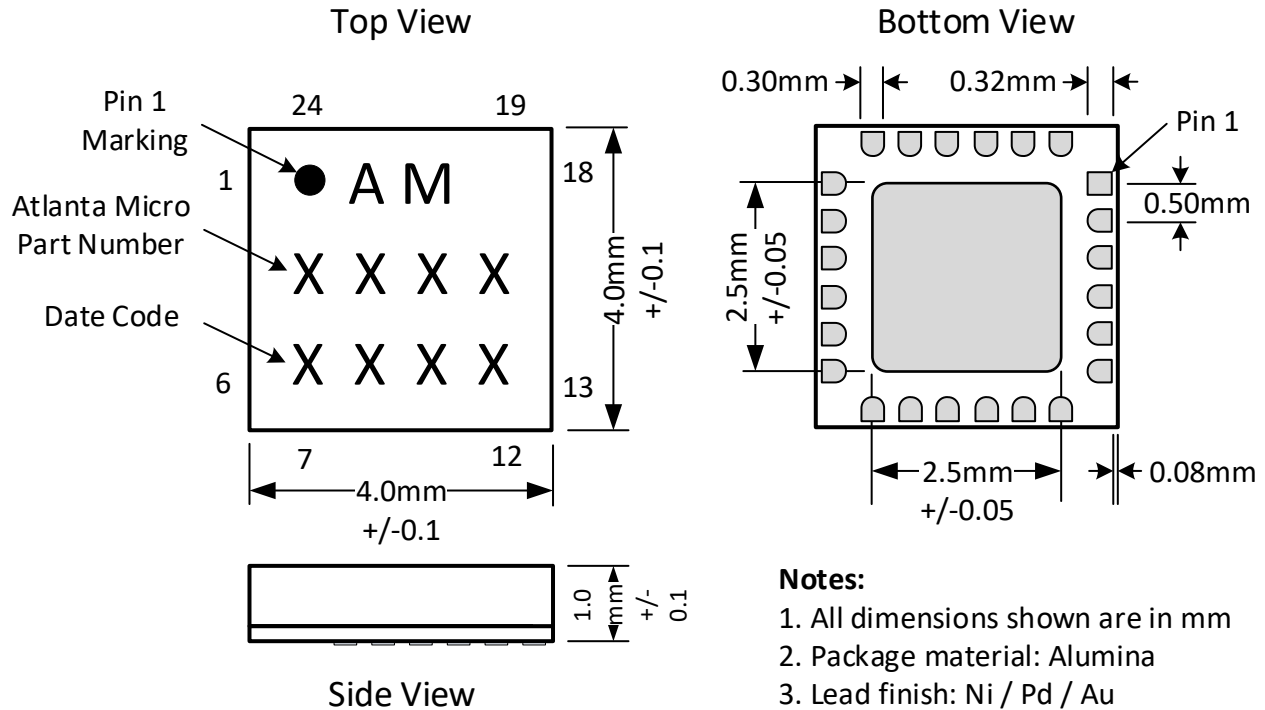
AM1081 – Amplifier

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Package Details

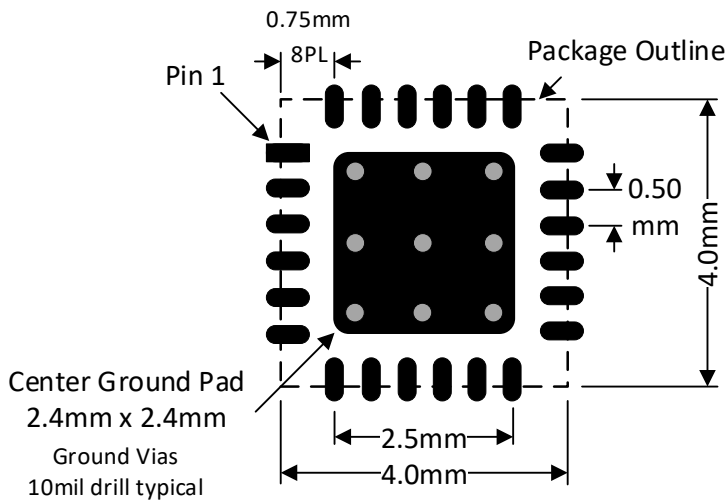
Package Drawing



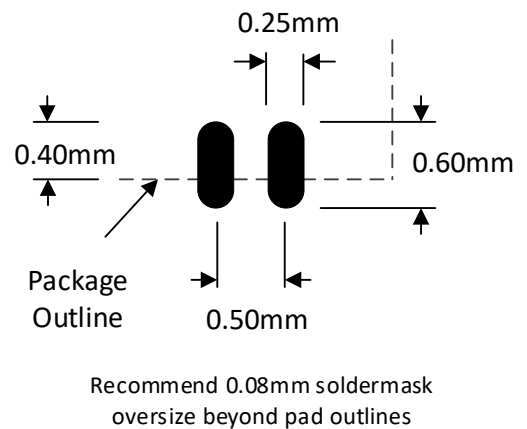
Notes:

1. All dimensions shown are in mm
2. Package material: Alumina
3. Lead finish: Ni / Pd / Au

Recommended Footprint



Pad and Spacing Detail

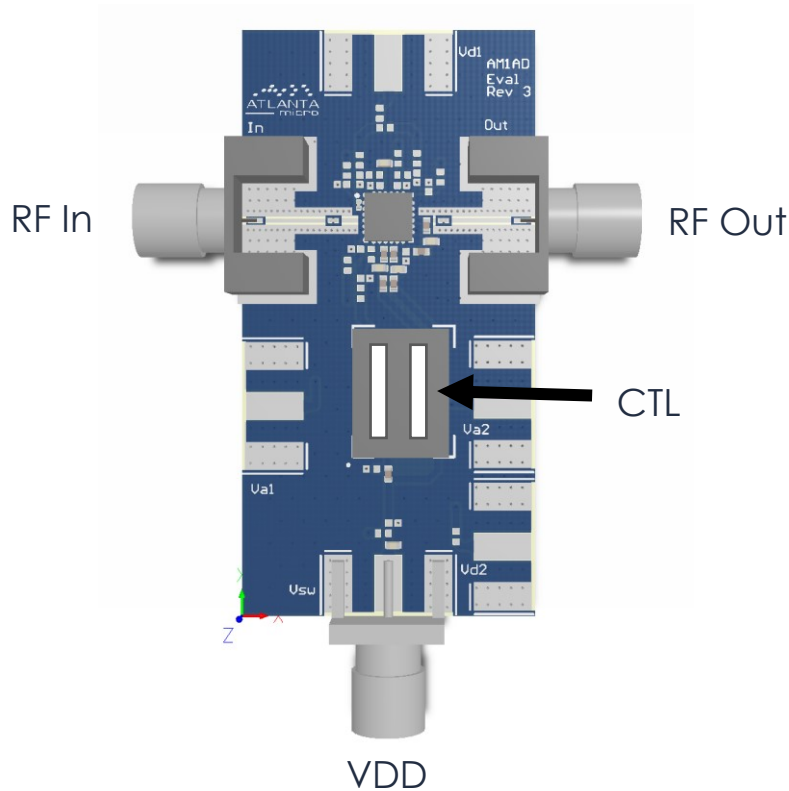


AM1081 – Amplifier

DC to 8 GHz Bypassable



Evaluation PC Board



Related Parts

Part Number				Description
AM1031C	20 MHz	to	8 GHz	+3.3V Gain Block
AM1063-1	DC	to	10 GHz	Gain Block
AM1063-2	DC	to	10 GHz	Miniature Gain Block
AM1064-1	DC	to	8 GHz	Gain Block
AM1064-2	DC	to	8 GHz	Miniature Gain Block
AM1065	DC	to	8 GHz	Bypassable Gain Block
AM1067	5 GHz	to	20 GHz	Bypassable Gain Block
AM1073	DC	to	8 GHz	Bidirectional / Bypassable Gain Block
AM1075	5 GHz	to	26.5 GHz	Bypassable Gain Block
AM1077	5 GHz	to	20 GHz	Bypassable Gain Block w/ Isolation State

To obtain price, delivery, or to place an order contact sales@atlantamicro.com
Atlanta Micro Inc., 3720 Davinci Ct, Suite 125, Norcross, GA 30092 • Phone: (470) 253-7640 • www.atlantamicro.com

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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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