

AM1063 – Amplifier

DC to 10 GHz Gain Block

Description

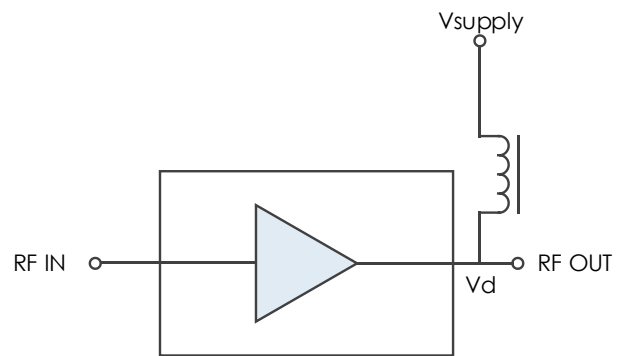
The AM1063 is a high dynamic range DC-coupled amplifier covering up to 10 GHz. The device exhibits a moderate positive gain-slope, providing frequency equalization useful in many broadband applications. With internal 50Ω matching and packaged in either a 3mm QFN or a 1.3 by 2.0mm DFN, the AM1063 represents a compact total PCB footprint.



Features

- 15 dB Gain
- 2.5 dB Noise Figure
- +30 dBm OIP3
- +18 dBm P1dB
- +3.3V or +5.0V Operation
- 3mm QFN or 1.3 x 2.0mm DFN
- -40C to +85C Operation

Functional Diagram



Characteristic Performance

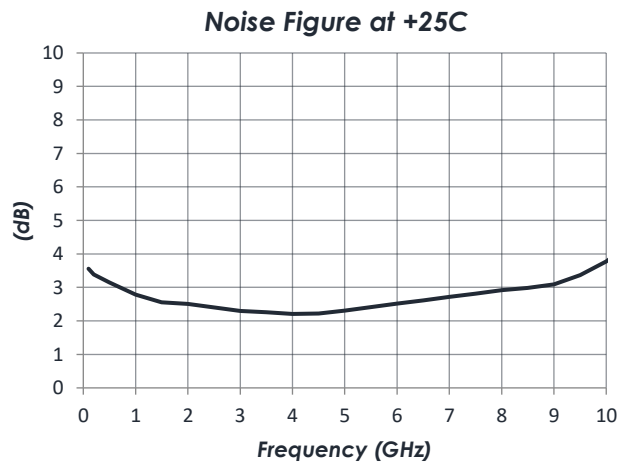
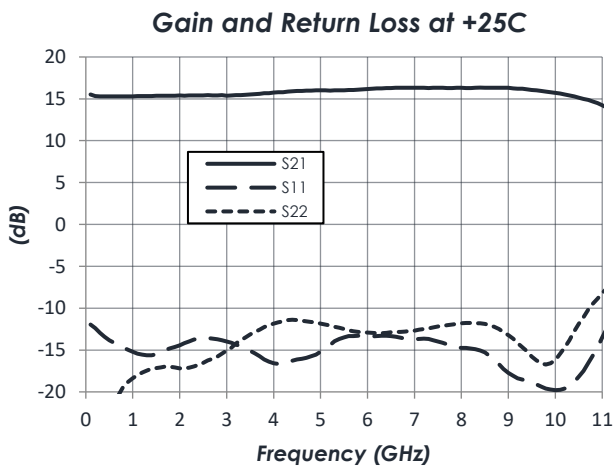


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Revision History

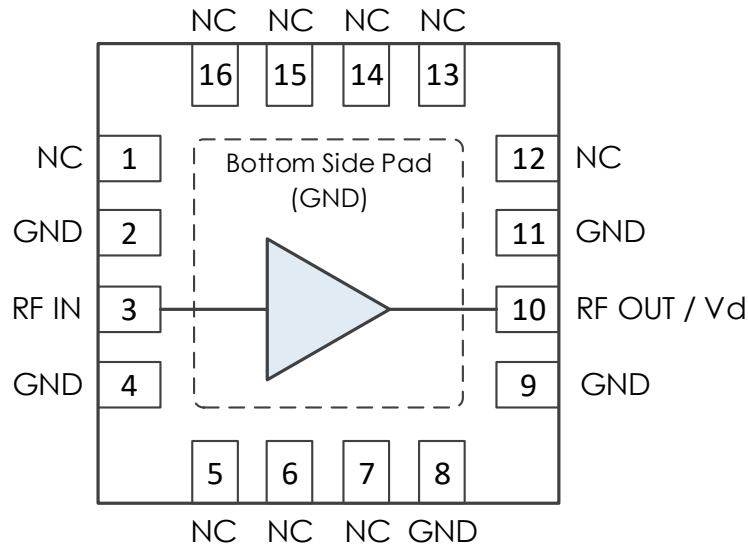
Date	Revision Number	Notes
December 12, 2018	9	Input Power Spec Updated
March 28, 2019	10	Updated to new datasheet format. More comprehensive part data included.

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Pin Layout and Definitions

AM1063-1: 3mm QFN



Pin Number	Pin Name	Pin Function
1	NC	Do Not Connect*
2	GND	Ground - Common
3	RF In	RF Input – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required
4	GND	Ground - Common
5-7	NC	Do Not Connect*
8,9	GND	Ground - Common
10	RF Out / Vd	RF Output and DC Power Input – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required
11	GND	Ground - Common
12-16	NC	Do Not Connect*
Case GND	GND	Ground - Common

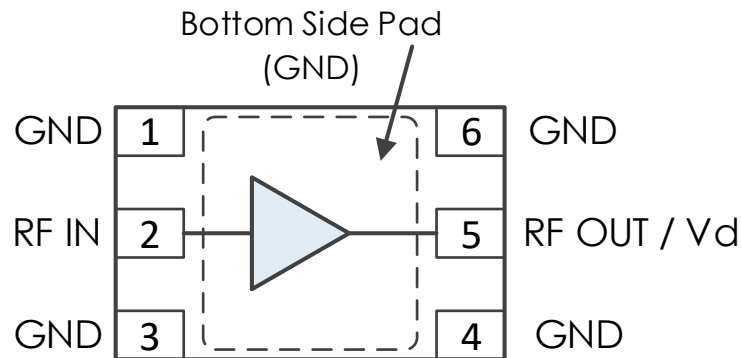
*NC pins may be grounded or left open

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Pin Layout and Definitions (Continued)

AM1063-2: 1.3mm x 2mm DFN



Pin Number	Pin Name	Pin Function
1	GND	Ground - Common
2	RF In	RF Input – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required
3,4	GND	Ground - Common
5	RF Out, Vd	RF Output and DC Power Input – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required
6	GND	Ground - Common
Case GND	GND	Ground - Common

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Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+8.0 V
RF Input Power		+20 dBm
Operating Junction Temperature	-40 C	+150 C
Storage Temperature Range	-50 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
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	+2.7 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})	88

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DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Device Voltage (Vd)		+3.0 V	+4.7 V	+5.0 V
DC Supply Current	Vd = 4.7 V		74 mA	
	Vd = 3.1 V		37 mA	
Power Dissipated	Vd = 4.7 V		0.35 W	
	Vd = 3.1 V		0.11 W	

RF Performance

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		DC		10 GHz
Gain	f = 0.05 GHz		16.0 dB	
	f = 5.0 GHz		16.0 dB	
	f = 10.0 GHz		15.7 dB	
Return Loss	f = 0.05 GHz		11.9 dB	
	f = 5.0 GHz		15.2 dB	
	f = 10.0 GHz		19.8 dB	
Output IP3			+30 dBm	
Output P1dB			+18 dBm	
Noise Figure			2.5 dB	

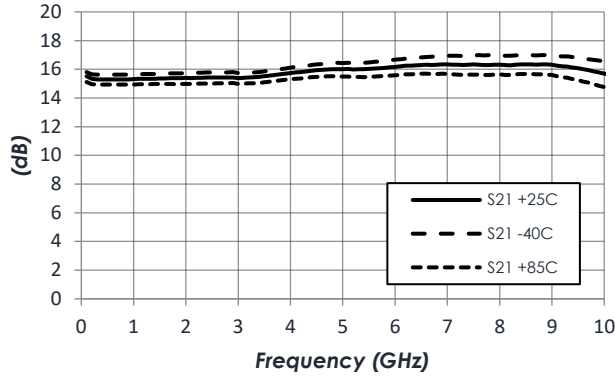
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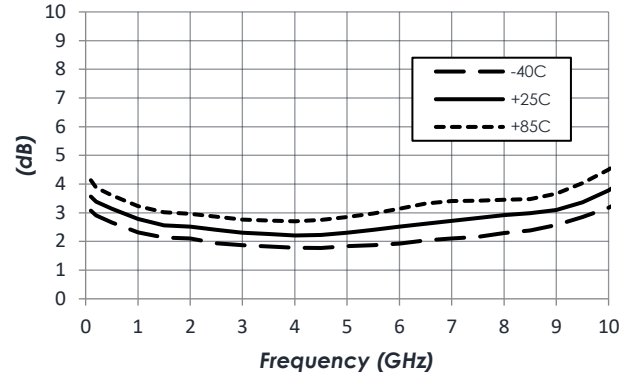
Typical Performance

(Vd = +4.7 V, Id = 74 mA)

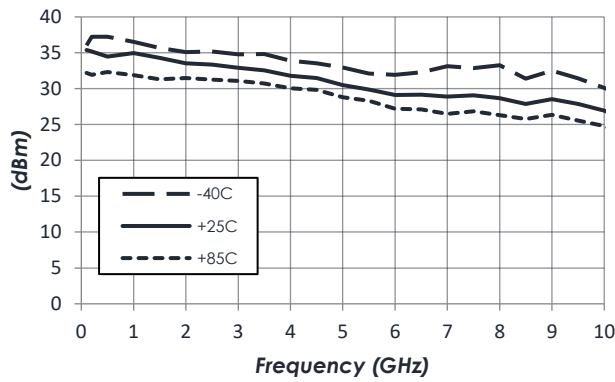
Gain vs Temperature



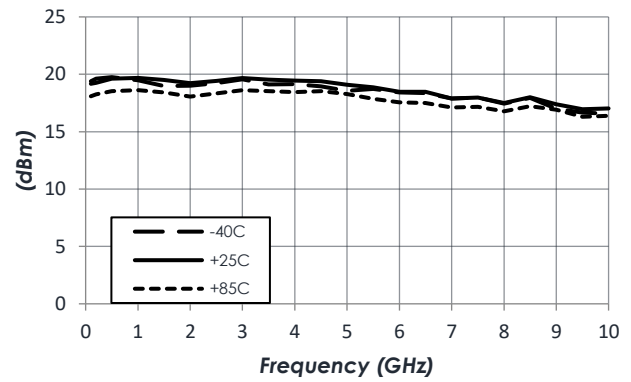
Noise Figure vs Temperature



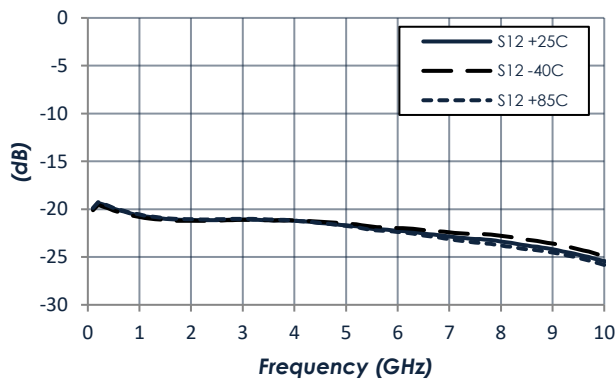
Output IP3 vs Temperature



P1dB vs Temperature



Reverse Isolation vs Temperature

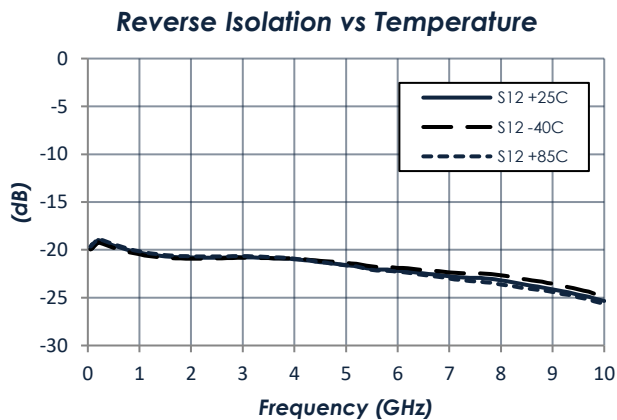
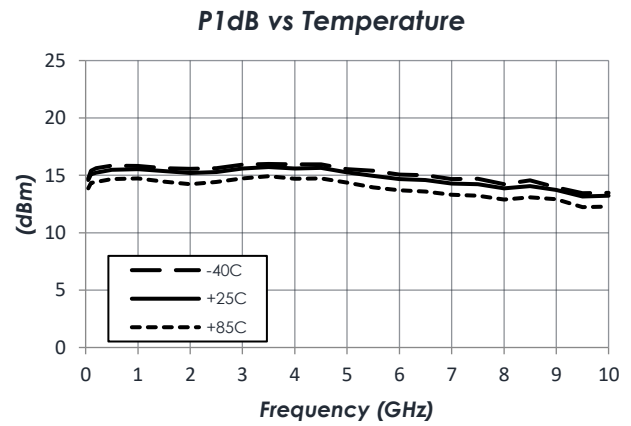
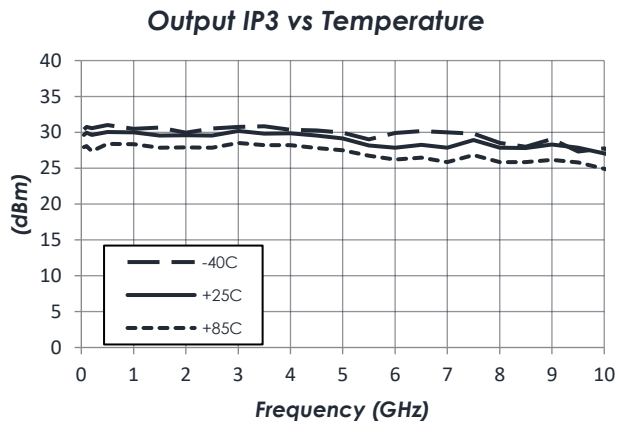
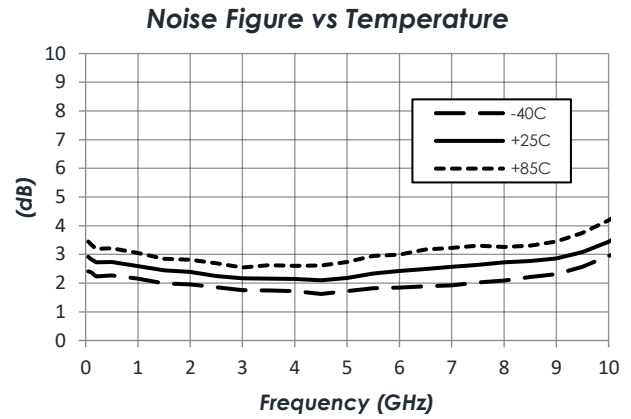
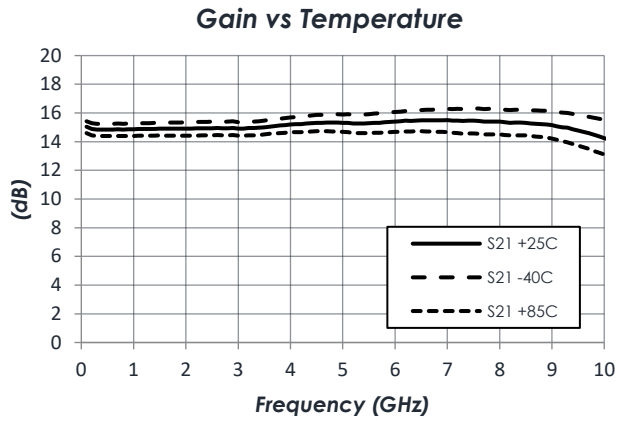


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Typical Performance (continued)

(Vd = +3.1 V, Id = 37 mA)

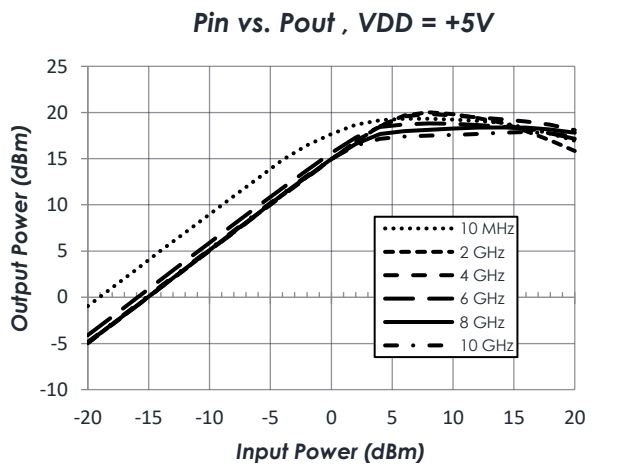
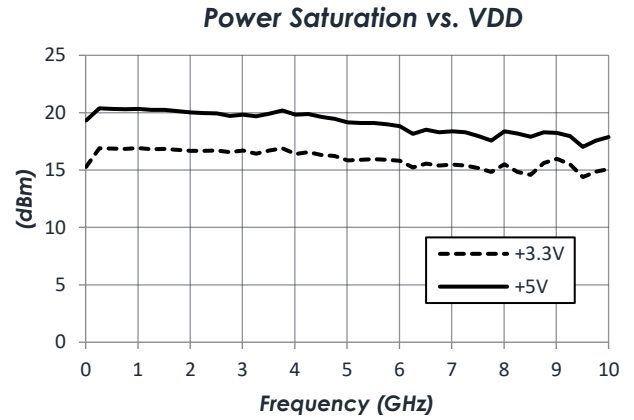
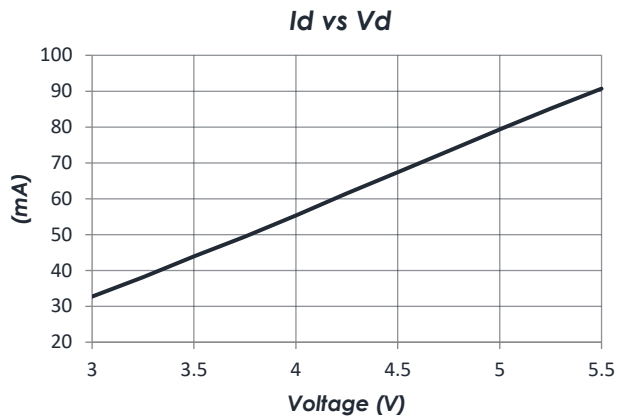
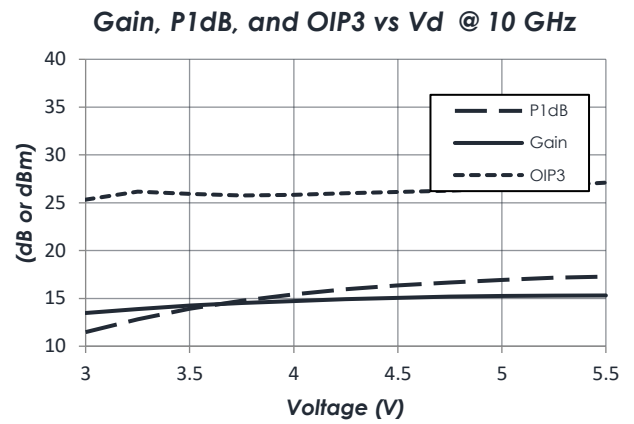
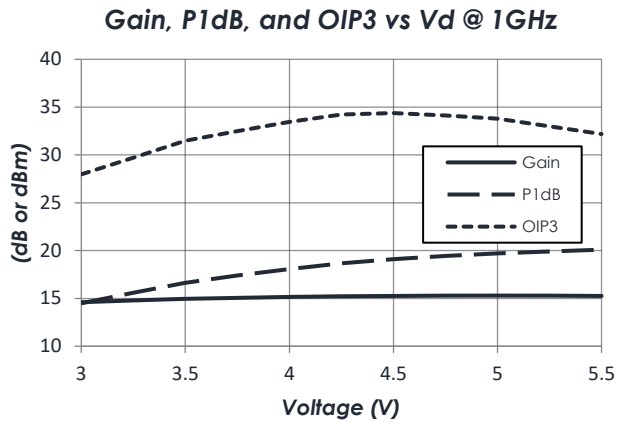


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Typical Performance (continued)

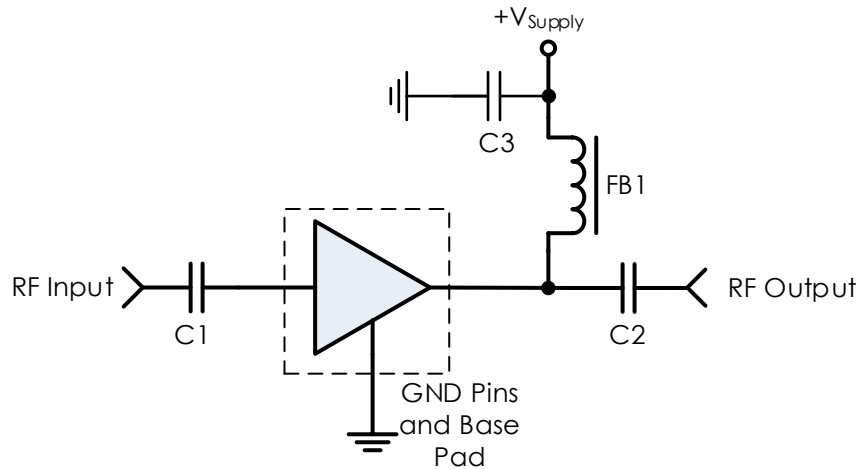
(T = 25 °C unless otherwise specified)



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Typical Application



Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1, C2	0.1 μ F	0402BB104KW160	Passives Plus
C3	0.1 μ F	GRM155R71C104KA88	Murata
FB1	-	MMz1005A222E	TDK

Notes:

1. NC pins may be grounded or left open
2. RF blocking capacitors should be high performance, low-loss, broadband capacitors for optimum performance

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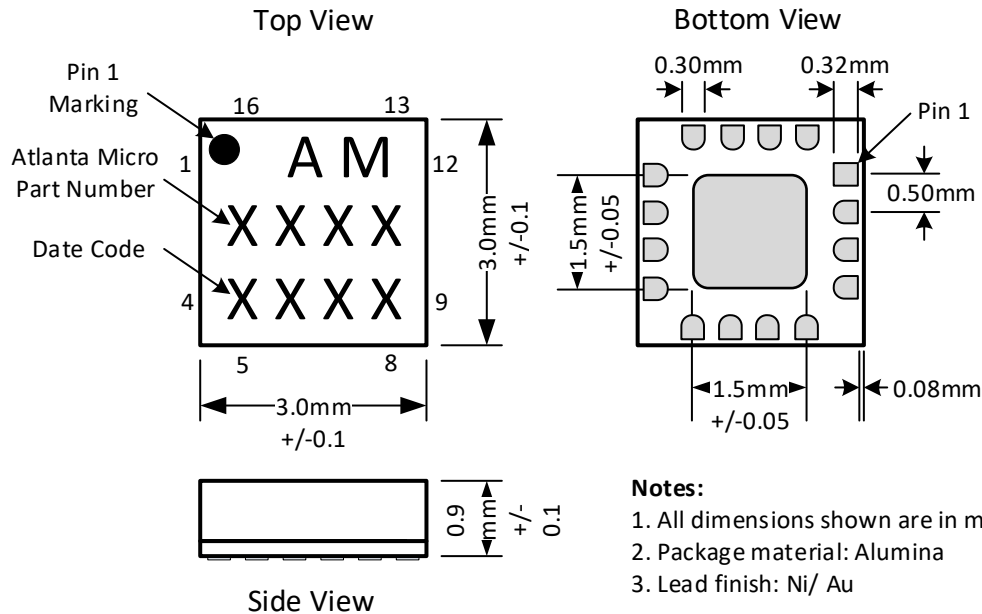
DC to 10 GHz Gain Block



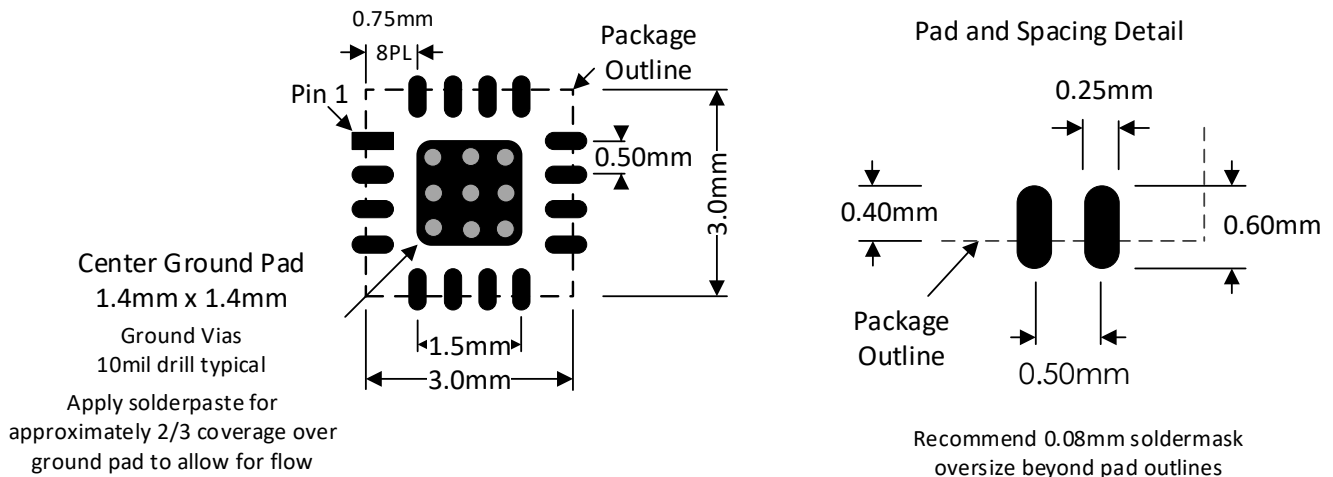
Package Details

AM1063-1:

Package Drawing



Recommended Footprint



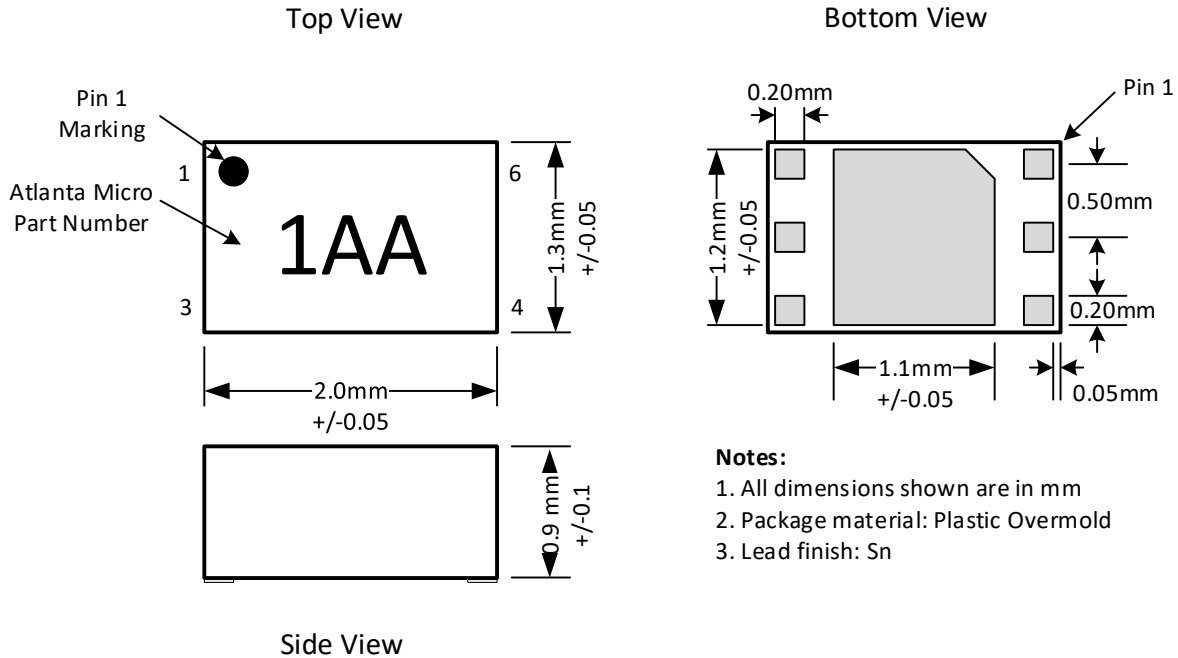
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Package Details

AM1063-2:

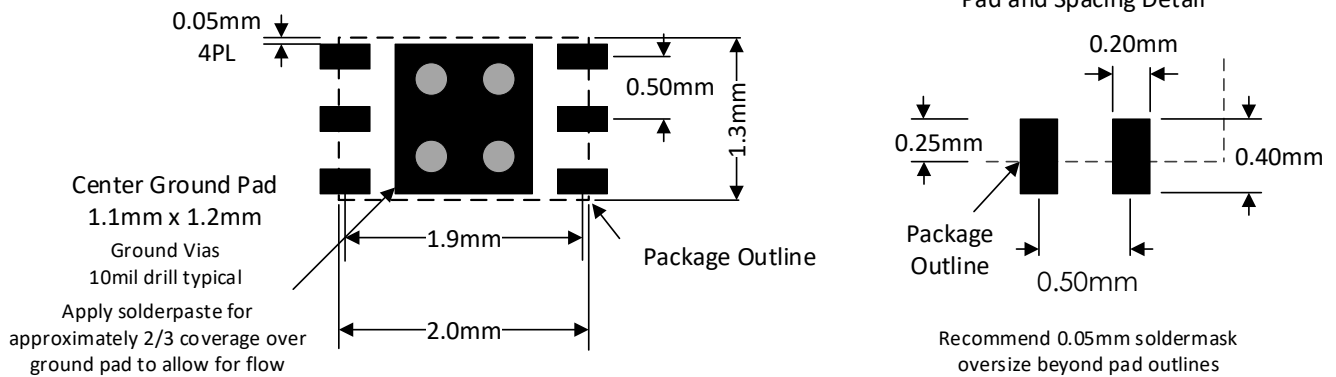
Package Drawing



Notes:

1. All dimensions shown are in mm
2. Package material: Plastic Overmold
3. Lead finish: Sn

Recommended Footprint

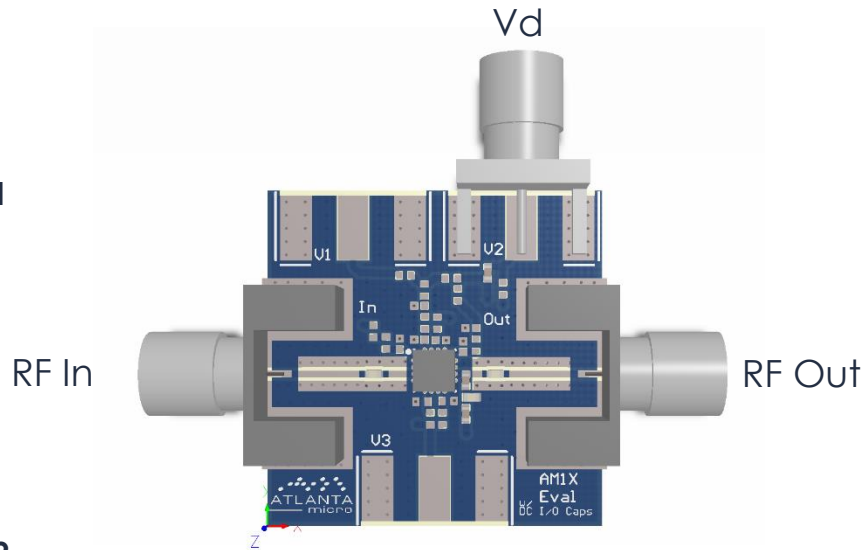


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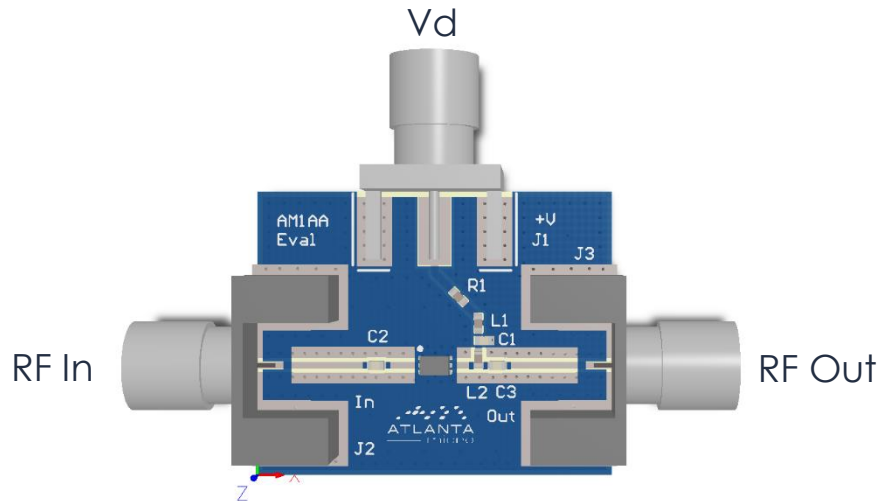
DC to 10 GHz Gain Block

Evaluation PC Board

AM1063-1



AM1063-2



Related Parts

Part Number	Description
AM1018C	20 MHz to 6 GHz RF Gain Block
AM1031C	20 MHz to 8 GHz RF Gain Block
AM1053	5 GHz to 20 GHz RF Gain Block
AM1064	DC to 8 GHz RF Gain Block
AM1065	DC to 8 GHz RF Bypassable Gain Block
AM1067	5 GHz to 20 GHz RF Bypassable Gain Block
AM1070	DC to 18 GHz RF Gain Block
AM1073	DC to 8 GHz RF Bi-directional Bypassable Gain Block

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)

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