AM1073 – Amplifier

DC to 8 GHz Bidirectional/Bypassable

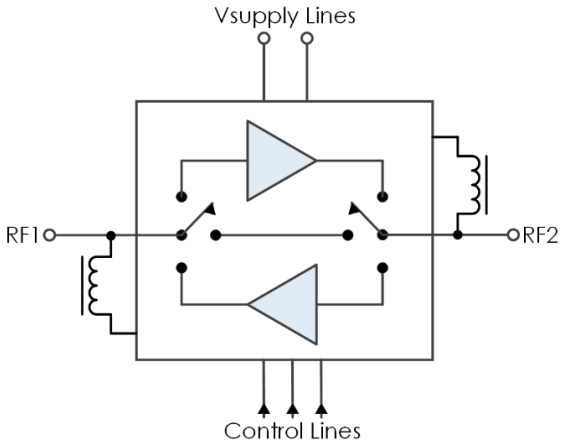
Description

The AM1073 is a high dynamic range bidirectional and bypassable DC-coupled amplifier with a bandwidth of 8 GHz. The device is unconditionally stable and exhibits a low bypass mode insertion loss. The AM1073 performs well down to DC, and its low frequency performance is limited only by the frequency response of the input and output bias tees present in the application circuit. With internal 50 Ω matching and packaged in a 4 mm QFN, the AM1073 represents a dramatic size reduction over an equivalent discrete implementation.

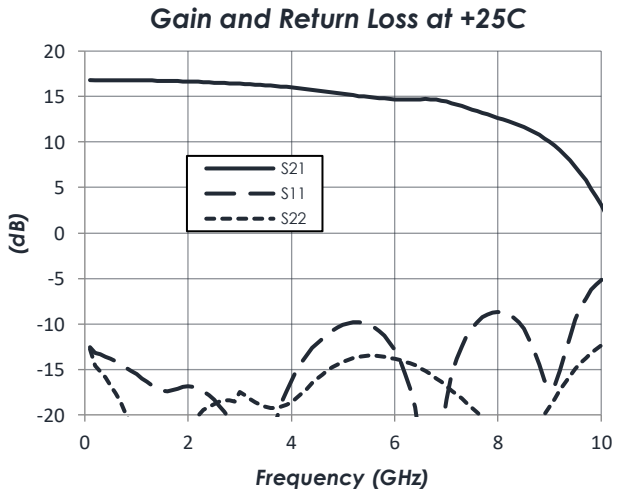
Features

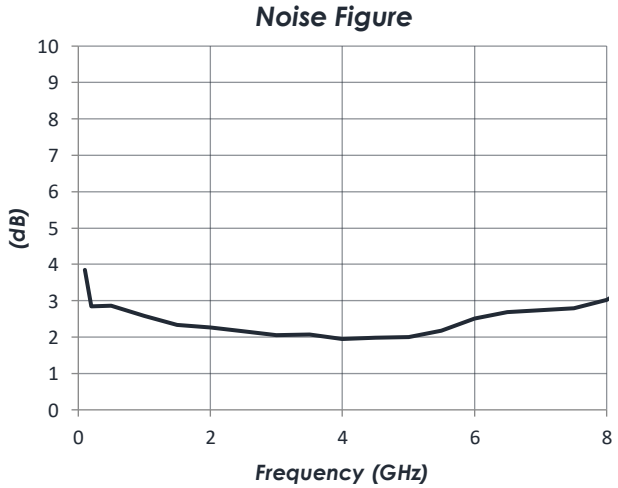
- 15 dB Gain
- 2.5 dB Noise Figure
- +27 dBm OIP3
- +14 dBm P1dB
- 1.5 dB Bypass Insertion Loss
- +3.3V, 55/1 mA (Gain/Bypass)
- 4mm QFN package
- -40C to +85C Operation

Functional Diagram



Characteristic Performance





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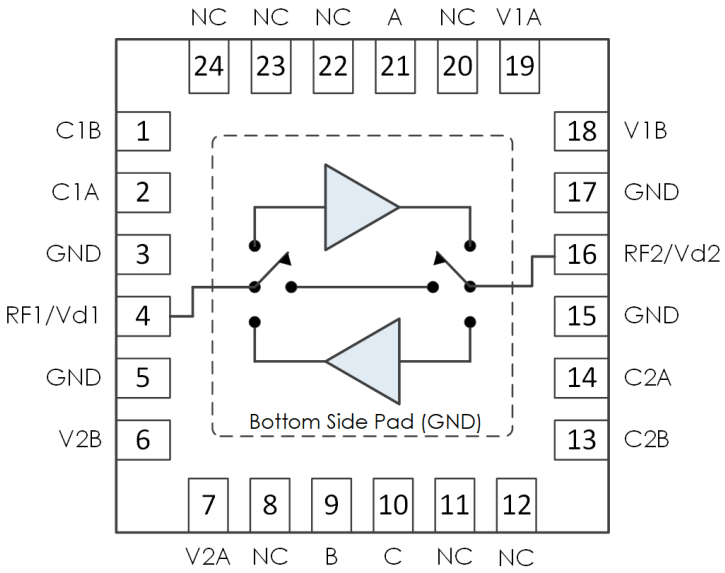
Table of Contents

Revision History

Date	Revision Number	Notes
April 2, 2021	4	Max RF Input Power changed
June 16, 2023	5	Updated to latest datasheet format. More Comprehensive part data added.

Pin Layout and Definitions



Pin Number	Pin Name	Pin Function
1	C1B	C1 Connection B
2	C1A	C1 Connection A
3	GND	Ground – Common
4	RF1/Vd1	RF Port and DC Power Input – 50 ohms – DC Coupled, External DC Block and Bias Tee Required
5	GND	Ground – Common
6	V2B	DC Power Input
7	V2A	DC Power Input
8	NC	Not Connected
9	B	Control Line B
10	C	Control Line C
11, 12	NC	Not Connected
13	C2B	C2 Connection B
14	C2A	C2 Connection A
15	GND	Ground – Common
16	RF2/Vd2	RF Port and DC Power Input – 50 ohms – DC Coupled, External DC Block and Bias Tee Required
17	GND	Ground – Common
18	V1B	DC Power Input
19	V1A	DC Power Input
20	NC	Not Connected
21	A	Control Line A
22-24	NC	Not Connected

*NC pins may be grounded or left open

Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	0.0 V	+3.5 V
RF Input Power		+20 dBm
Storage Temperature Range	-50C	+125 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 1	

Atlanta Micro products are electrostatic sensitive.
Follow safe handling practices to avoid damage

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	2.7 V	3.3 V	3.5 V
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 C

Thermal Information

Junction to Case Thermal Resistance (θ_{JC})	227 C / W
Nominal Junction Temperature at +85C Ambient	126 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 Device Voltage	Vsupply = 3.3 V		+2.7 V	
DC Device Current	Vsupply = 3.3 V	40 mA	55 mA	70 mA
Power Dissipated	Vsupply = 3.3 V	132 mW	182 mW	231 mW
Logic Level Low		-0.1 V		+0.4 V
Logic Level High		+2.2 V		+5.0 V

RF Performance

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		DC		8 GHz
Gain	Vd1, Vd2 = 2.7 V		15 dB	
Return Loss	Vd1, Vd2 = 2.7 V		16 dB	
Bypass Insertion Loss	Vd1, Vd2 = 2.7 V		1.5 dB	
Output IP3	Vd1, Vd2 = 2.7 V		+27 dBm	
Output P1dB	Vd1, Vd2 = 2.7 V		+14 dBm	
Noise Figure	Vd1, Vd2 = 2.7 V		2.5 dB	

Amplifier Control

A	B	C	Amplifier
0	0	0	Isolation
1	0	0	Forward
0	1	0	Reverse
0	0	1	Bypass

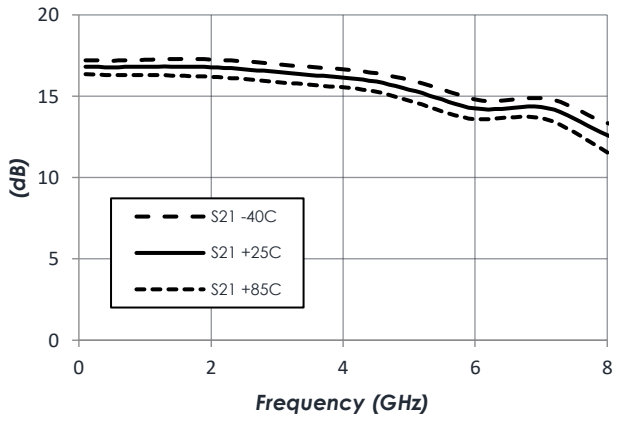
Notes:

1. No more than one control line should be set high at any time.

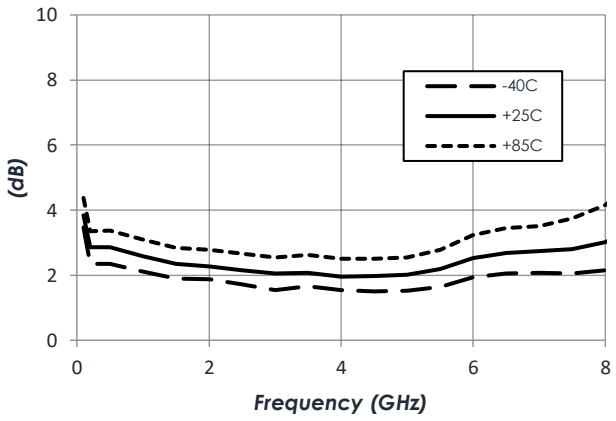
Typical Performance

(Forward or Reverse Gain Mode, Vd = 2.7 V, Id = 55 mA)

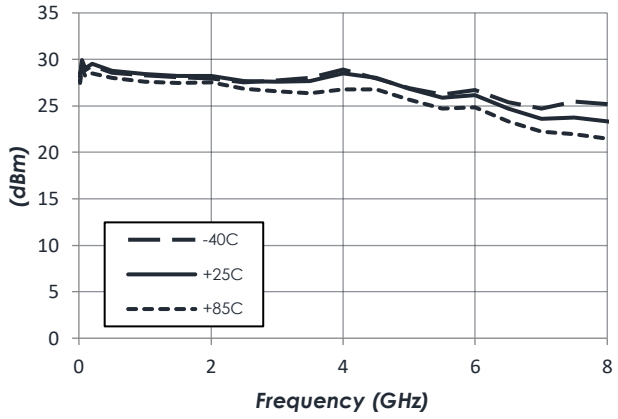
Gain vs Temperature



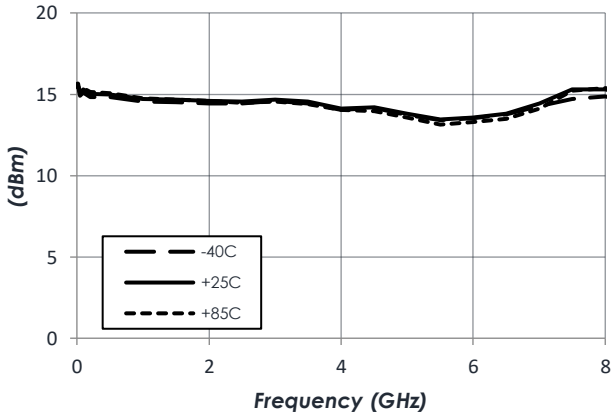
Noise Figure vs Temperature



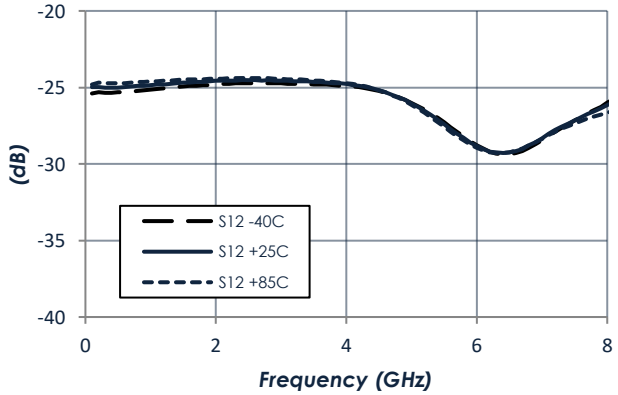
Output IP3 vs Temperature



P1dB vs Temperature



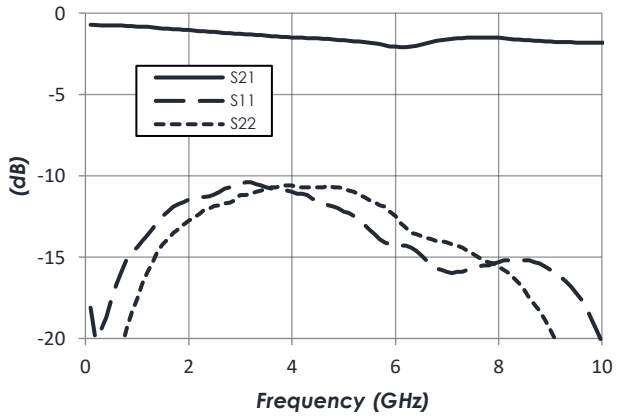
Reverse Isolation vs Temperature



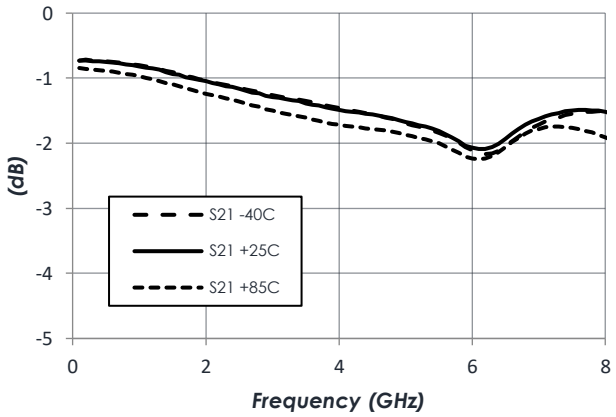
Typical Performance (continued)

(Bypass Mode, Vd = 2.7 V, Id = 55 mA)

Insertion and Return Loss at +25C

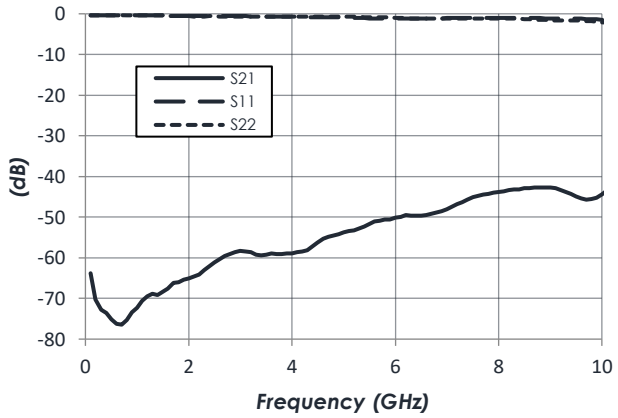


Insertion Loss vs Temperature

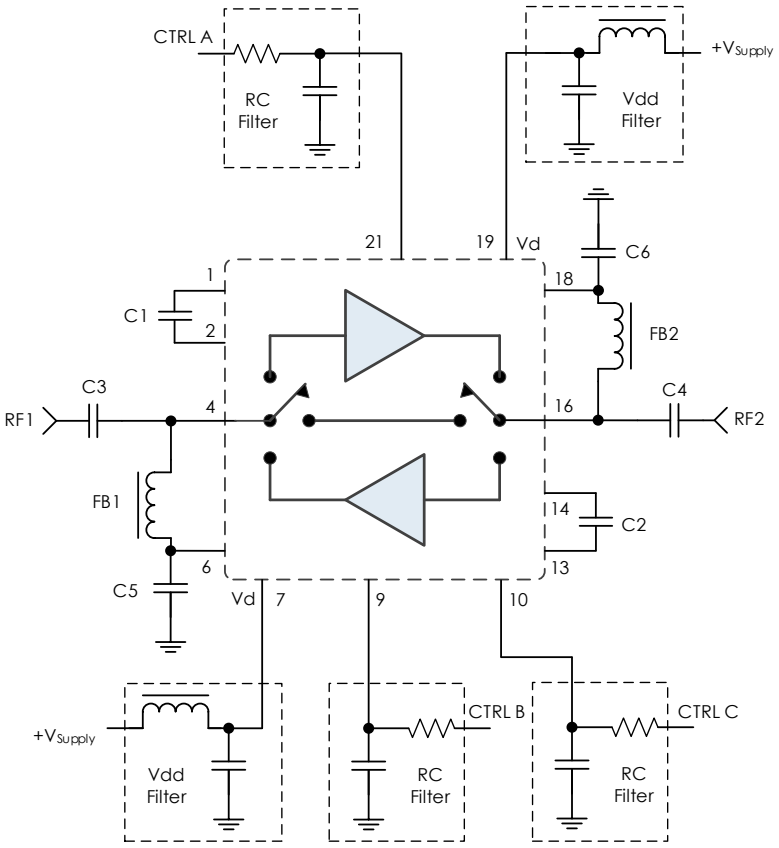


(Isolation Mode, Vd = 2.7 V, Id = 1 mA)

Isolation and Return Loss at +25C



Typical Application



Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1, C2	0.1 µF	0201BB104KW250	Passives Plus
C3, C4	0.1 µF	0402BB104KW500	Passives Plus
C5, C6	0.1 µF	GRM155R71C104KA88	Murata
FB1, FB2	-	MMZ1005A222E	TDK

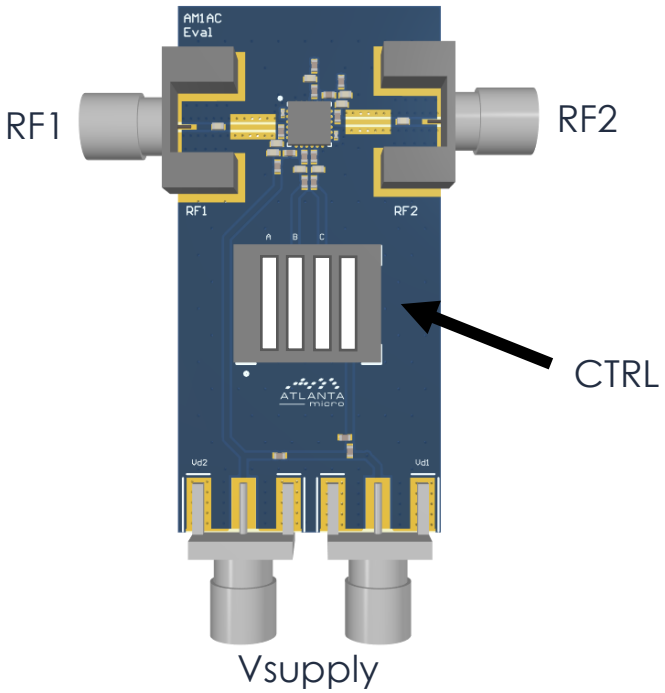
Notes:

1. Select control line RC filter values based on desired logic source decoupling and switching speed.
2. C3 and C4 should be placed as close to the AM1073 as possible to minimize PCB trace lengths. A 0201 package size is recommended to minimize stray PCB pad capacitance to ground.

Part Ordering Details

Description	Part Number
4mm 24 Lead QFN	AM1073
AM1073 Evaluation Board	AM1073 Eval

Evaluation PC Board



Related Parts

Part Number				Description
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
AM1075	5 GHz	to	26.5 GHz	Bypassable Gain Block
AM1077	5 GHz	to	20 GHz	Bypassable Gain Block w/ Isolation State
AM1081	DC	to	8 GHz	Bypassable Gain Block (Higher IP3)

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-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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