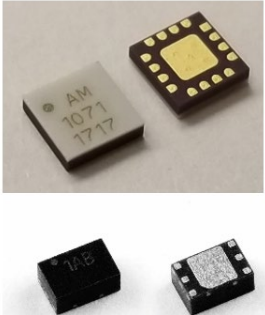


AM1071 – Amplifier

DC to 18 GHz Gain Block



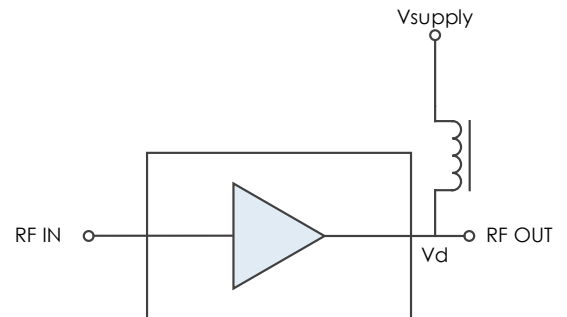
The AM1071 is a DC-coupled broadband gain block covering up to 18 GHz.

The device exhibits high third order intercept performance, excellent gain stability over the operating temperature range, and a gain flatness within ± 1 dB of nominal gain useful in many broadband applications. With internal 50Ω matching and packaged in either a 3mm QFN or a 1.3mm x 2mm DFN, the AM1071 represents a compact total PCB footprint.

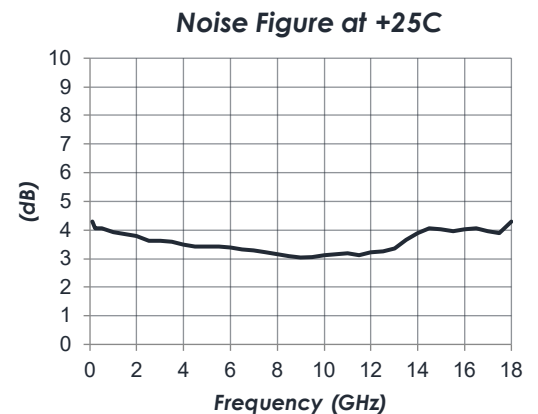
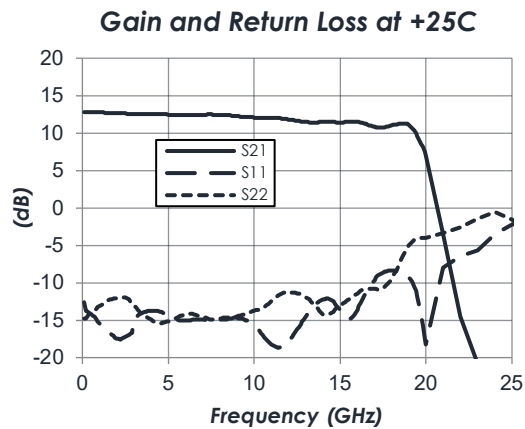
FEATURES

- 12 dB Gain
- 3.5 dB Noise Figure
- +30 dBm OIP3
- +16 dBm P1dB
- +5V, 70 mA Supply
- 3mm QFN or 1.3mm x 2mm DFN
- -40°C to $+85^\circ\text{C}$ Operation

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



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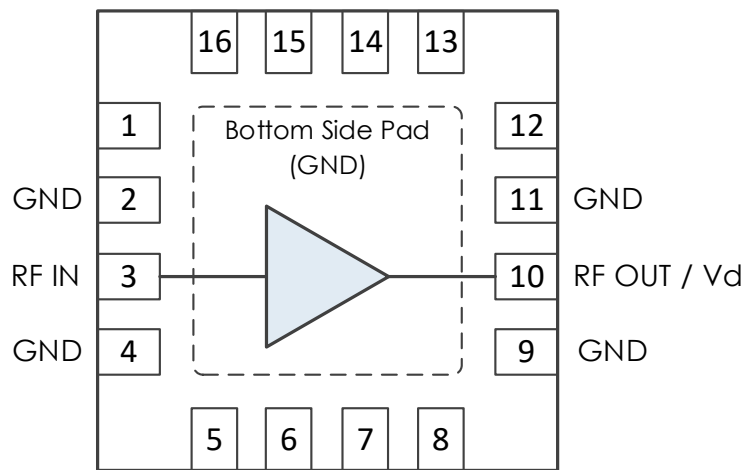
REVISION HISTORY

Date	Revision	Notes
August 26, 2020	3	Updated to latest datasheet format. More comprehensive data added.
December 4, 2020	4	Added pinout and evaluation board image for AM1071-2.
December 7, 2022	5	Increased maximum allowable RF input power.
June 17, 2024	6	Changed to Mercury branding. No content changes.

PIN LAYOUT AND DEFINITIONS

3mm QFN

NOTE: All Non-Named Pins Are NC or GND

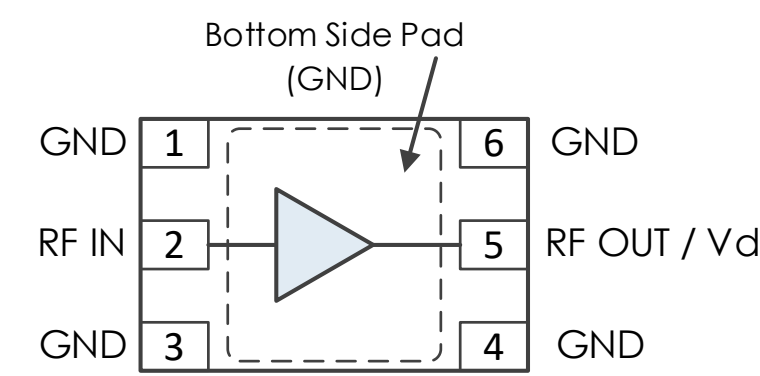


Pin	Name	Function
1	NC	Not Connected *
2	GND	Ground - Common
3	RF IN	RF Input - 50 ohms - DC Coupled, External DC Block Required
4	GND	Ground - Common
5-8	NC	Not Connected *
9	GND	Ground - Common
10	RF Out / Vd	RF Output and DC Power Input - 50 Ohms - DC Coupled. External DC Blocking Capacitor Required.
11	GND	Ground - Common
12-16	NC	Not Connected *
Bottom Pad	GND	Ground - Common

* NC pins may be grounded or left open. Grounding these pins is recommended.

TYPICAL PERFORMANCE (CONTINUED)

1.3mm x 2mm DFN



Pin	Name	Function
1	GND	Ground - Common
2	RF IN	RF Input - 50 ohms - DC Coupled, External DC Block Required
3	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

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+6.0 V
RF Input Power		+22 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. Devices subjected to conditions outside of what is recommended for extended periods may affect device reliability.

Handling Information

	Minimum	Maximum
Storage Temperature Range (Recommended)	-50 C	+125 C
Moisture Sensitivity Level	AM1071-1	MSL 1
	AM1071-2	MSL 3



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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+4.5 V	+5.0 V	+5.7 V
Device Voltage, Vd	+4.3 V	+4.8 V	+5.5 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})	112

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
DC Supply Voltage		+4.5 V	+5.0 V	+5.7 V
DC Supply Voltage, Vd		+4.3 V	+4.8 V	+5.5 V
DC Supply Current, Id	Vd = +4.8 V	54 mA	70 mA	79 mA
Power Dissipated	Vd = +4.8 V	0.26 W	0.34 W	0.38 W

RF Performance

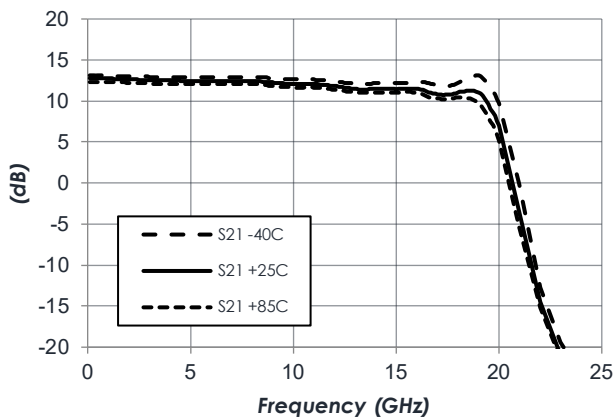
(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		DC		18 GHz
Gain			12 dB	
Return Loss			15 dB	
Output IP3			+30 dBm	
Output P1dB			+16 dBm	
Noise Figure			3.5 dB	

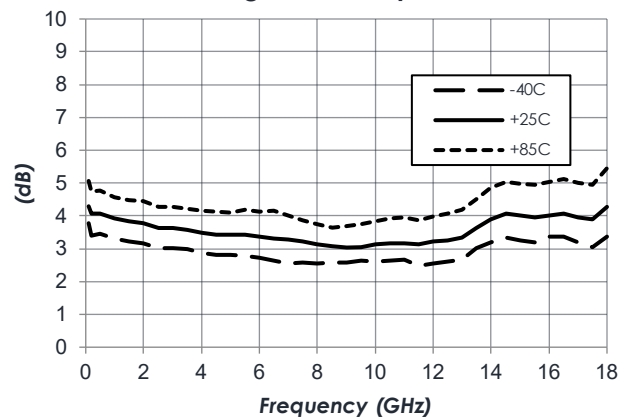
TYPICAL PERFORMANCE

($V_d = 4.8V$, $I_d = 70mA$, $T = 25^\circ C$ unless otherwise specified)

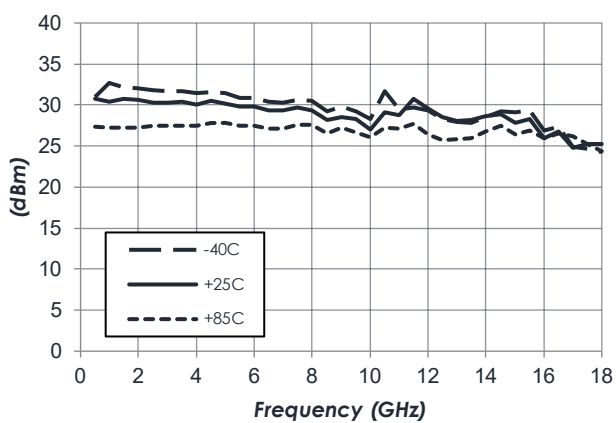
Gain vs Temperature



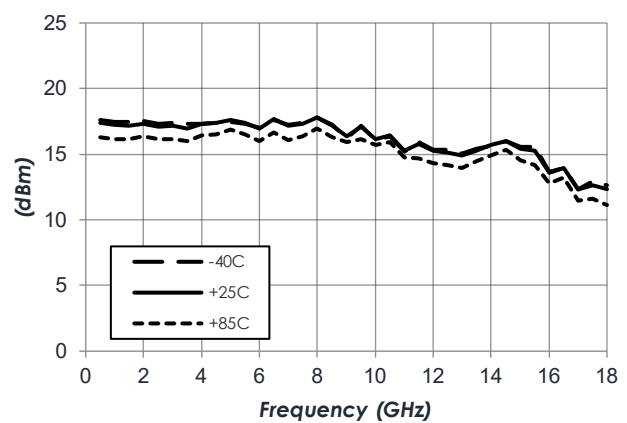
Noise Figure vs Temperature



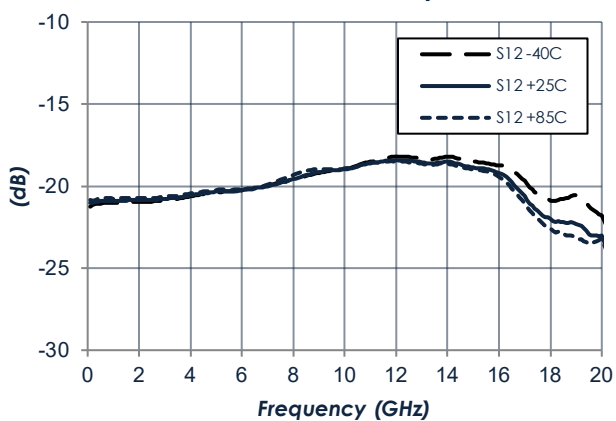
Output IP3 vs Temperature



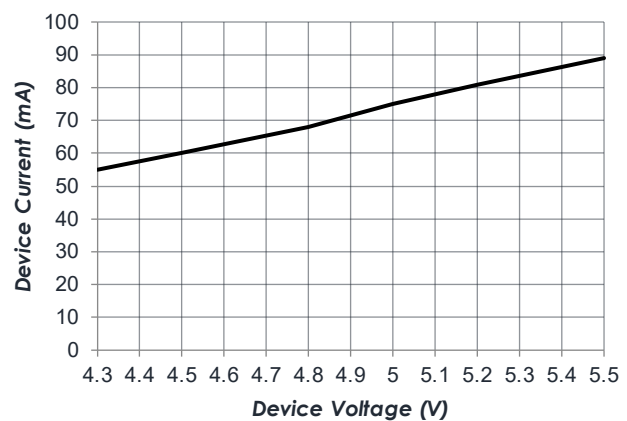
P1dB vs Temperature



Reverse Isolation vs Temperature

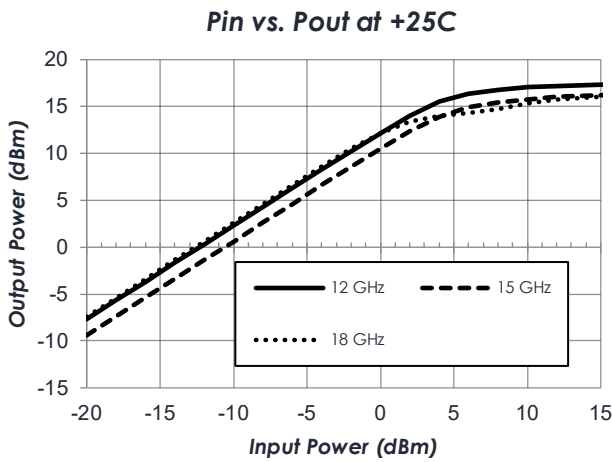
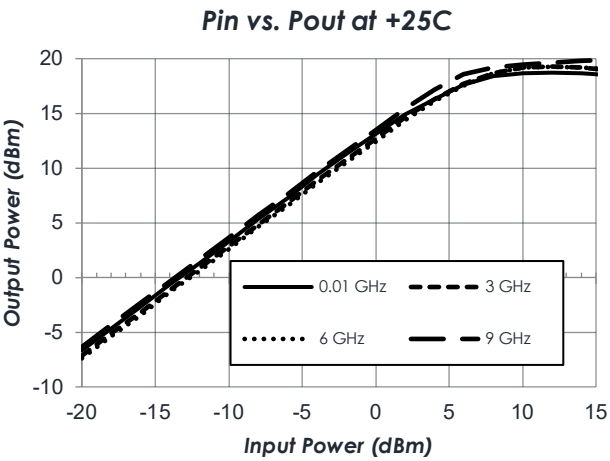
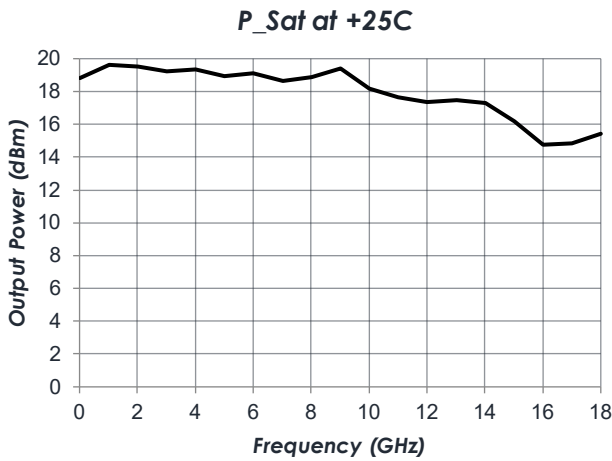


ID vs. VD

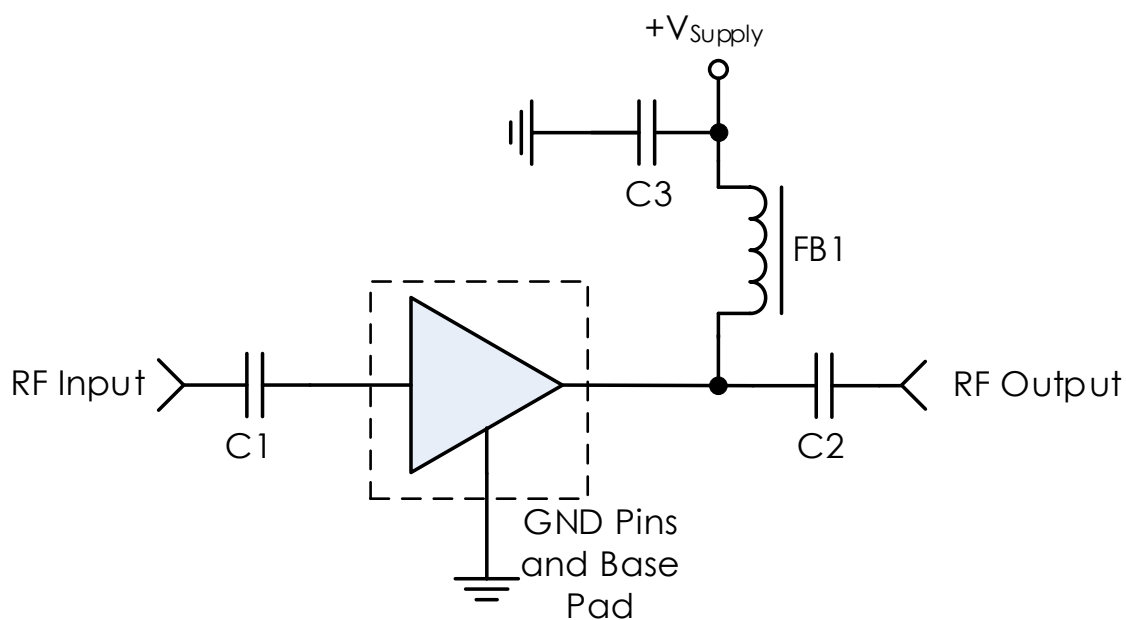


TYPICAL PERFORMANCE (CONTINUED)

(Vd = 4.8V, Id = 70mA, T=25C unless otherwise specified)



TYPICAL APPLICATION



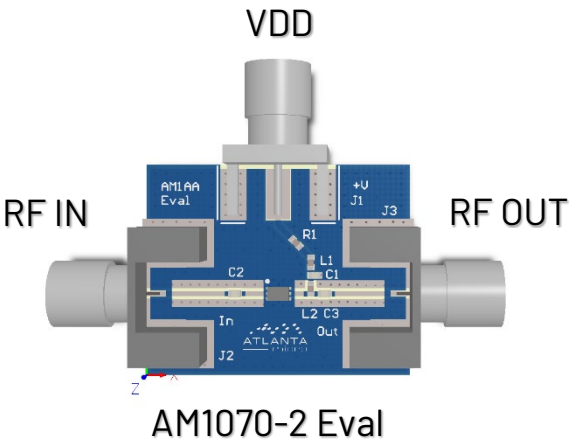
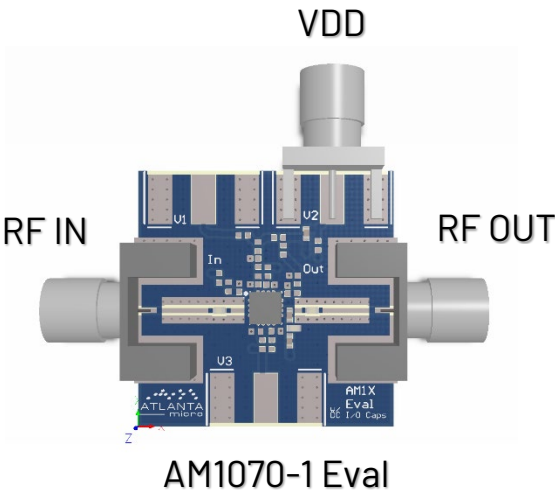
Recommended Component List (or Equivalent)

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

Notes:

1. NC pins may be floating or grounded. Grounding these pins is recommended.
2. DC blocking capacitors should be high-performance, low-loss capacitors for optimum performance.

EVALUATION PC BOARD



PART ORDERING DETAILS

Part Number		Description
AM1071-1	3mm 16 Lead QFN	
AM1071-2	1.3mm x 2mm 6 Lead DFN	
AM1071-1 Eval	AM1071-1 Evaluation Board	
AM1071-2 Eval	AM1071-2 Evaluation Board	

RELATED PARTS

Part Number		Description
AM1070	DC to 18 GHz	+3.3V Gain Block
AM1102	DC to 22 GHz	Broadband Low Noise Amplifier
AM1063-1	DC to 10 GHz	Gain Block
AM1063-2	DC to 10 GHz	Miniature Gain Block
AM1163-1	DC to 10 GHz	Low Noise Amplifier
AM1163-2	DC to 10 GHz	Miniature Low Noise Amplifier
AM1053	5 GHz to 20 GHz	Gain Block / Driver Amplifier
AM1082	5 GHz to 17 GHz	Gain Block / 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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