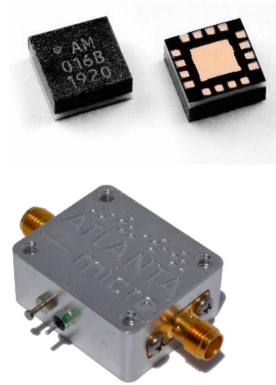


AM1016B – Amplifier

20 MHz to 6 GHz Gain Block

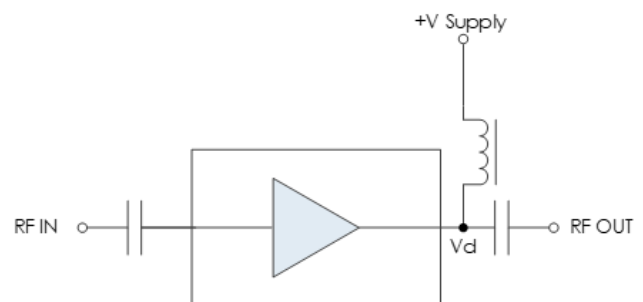


AM1016B is a high dynamic range cascadable gain block covering the 20 MHz to 6 GHz frequency range. The device exhibits flat gain, low noise figure and high third order intercept performance while also providing excellent gain stability over the operating temperature range. With internal 50Ω matching and packaged in a 3mm QFN or a shielded module, the AM1016B represents a compact total PCB footprint.

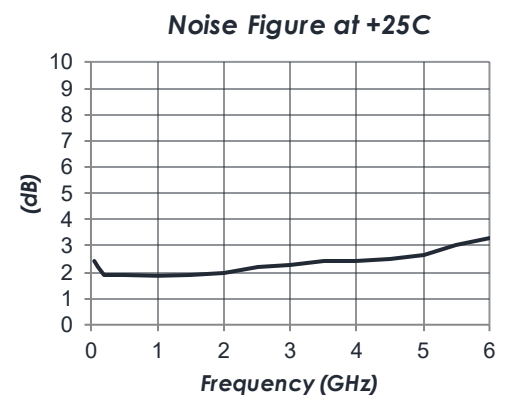
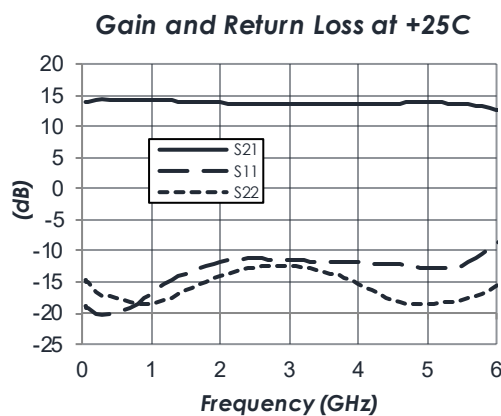
FEATURES

- 14 dB Gain
- 2.3 dB Noise Figure
- +33 dBm OIP3
- +17 dBm P1dB
- +3.3V, 55 mA
- 3mm QFN Package
- -40 C to +85C Operation
- -Unconditionally Stable

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



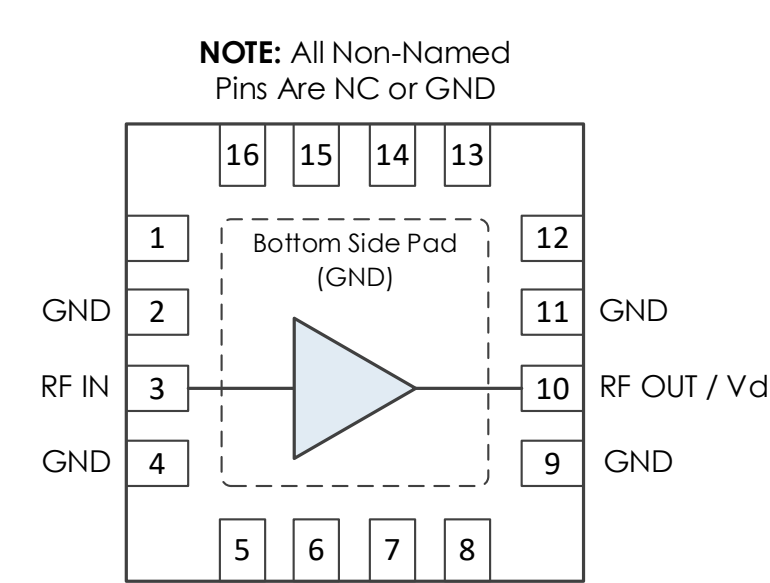
CONTENTS

REVISION HISTORY	2
PIN LAYOUT AND DEFINITIONS	3
SPECIFICATIONS	4
TYPICAL PERFORMANCE	6
TYPICAL APPLICATION	8
RECOMMENDED COMPONENT LIST (OR EQUIVALENT)	8
EVALUATION PC BOARD	9
RELATED PARTS	9
PARTS ORDERING DETAILS	9
COMPONENT COMPLIANCE INFORMATION	10

REVISION HISTORY

Date	Revision	Notes
May 14, 2018	0	Preliminary Release
May 24, 2018	1	Initial Release
July 20, 2018	2	Max RF Input Power Value Changed
April 9, 2019	3	Pinout Corrected, Functional Diagram Added, Plots Resized, Part Picture Added.
September 6, 2019	4	RF-Shielded Module Information Added. Part Ordering Details Added. Various Images Updated. Component Compliance Information Updated.
November 26, 2019	4A	Updated Description to include shielded module packaging
May 15, 2020	5	Package and module information moved to main product page
June 17, 2024	6	Changed to Mercury branding. No content changes

PIN LAYOUT AND DEFINITIONS



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 Block Required
11	GND	Ground - Common
12 - 16	NC	Not Connected*
Bottom Pad	GND	Ground - Common

*Note: NC pins may be grounded or left open

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Device Voltage, Vd	-0.3 V	+3.4 V
RF Input Power		+25 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	



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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage, Vsupply	+2.8 V	+3.3 V	+3.7 V
Device Voltage, Vd	+2.5 V	+3.0 V	+3.4 V
Operating Case Temperature	-40 C	+25 C	+85 C
Operating Junction Temperature	-40 C		+116 C

Thermal Information

Thermal Resistance (°C / W)	
Junction to Case Thermal Resistance (θ_{JC})	196.4

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max.
Device Voltage, Vd	Vsupply = +3.3 V	+2.5 V	+3.0 V	+3.4 V
DC Supply Current	Vsupply = +3.3 V	50 mA	53 mA	57 mA
Power Dissipated	Vsupply = +3.3 V		0.16 W	

RF Performance

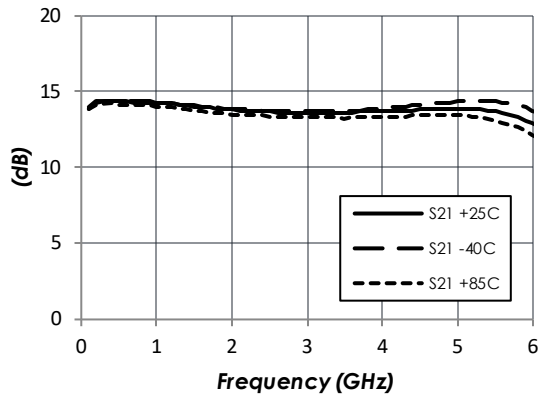
(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max.
Frequency Range		DC		6 GHz
Gain	f = 3 GHz		14 dB	
Output IP3	f = 3 GHz		+33 dB	
Output P1dB	f = 3 GHz		+17 dB	
Noise Figure	f = 3 GHz		2.3 dB	

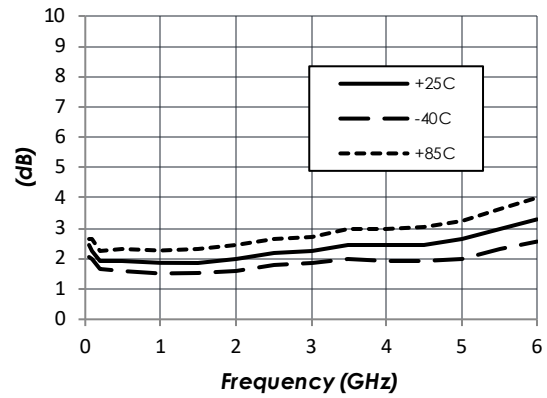
TYPICAL PERFORMANCE

(Vd = +3.0V, ID=53mA)

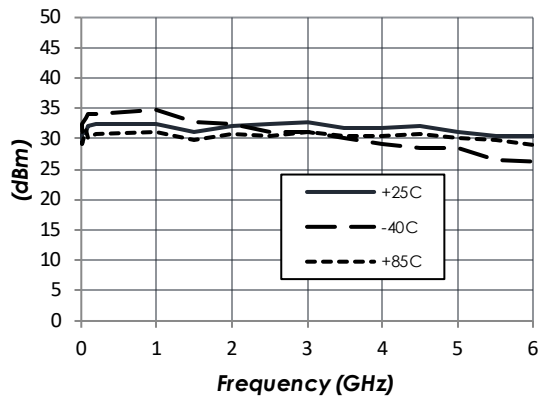
Gain vs Temperature



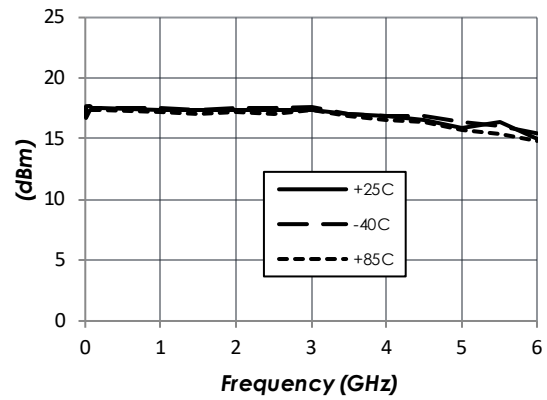
Noise Figure vs Temperature



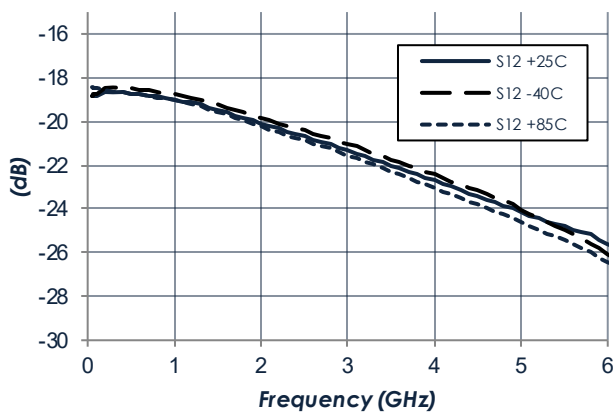
Output IP3 vs Temperature



P1dB vs Temperature



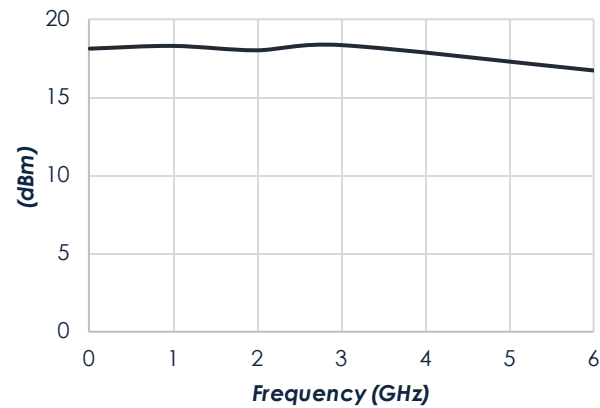
Reverse Isolation vs Temperature



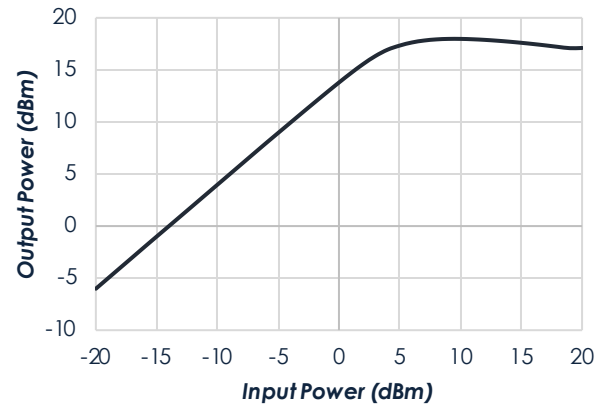
TYPICAL PERFORMANCE (continued)

(Vd = +3.0V, ID=53mA)

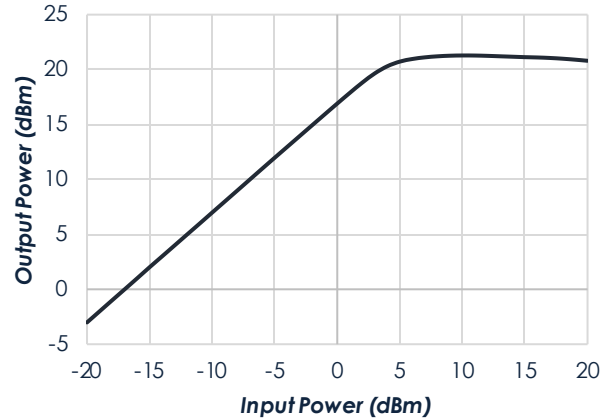
Saturated Output Power



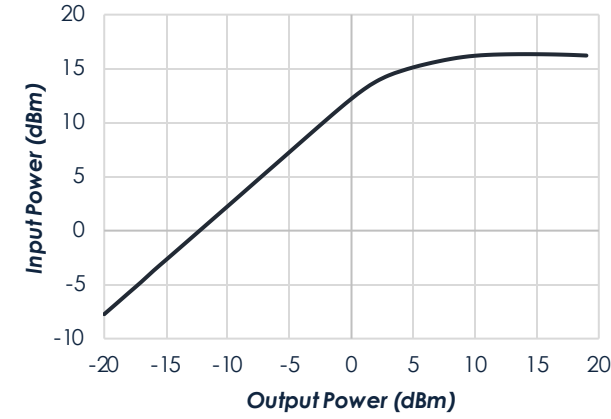
Pin vs Pout at 1GHz



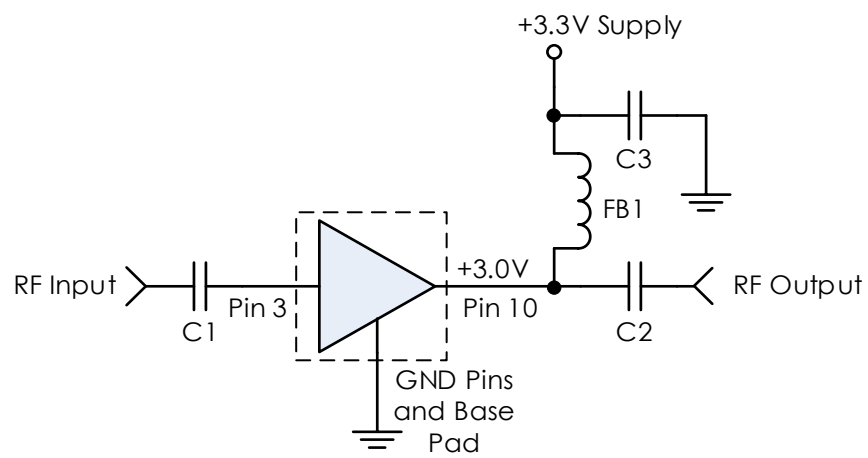
Pin vs Pout at 3GHz



Pin vs Pout at 6GHz



TYPICAL APPLICATION

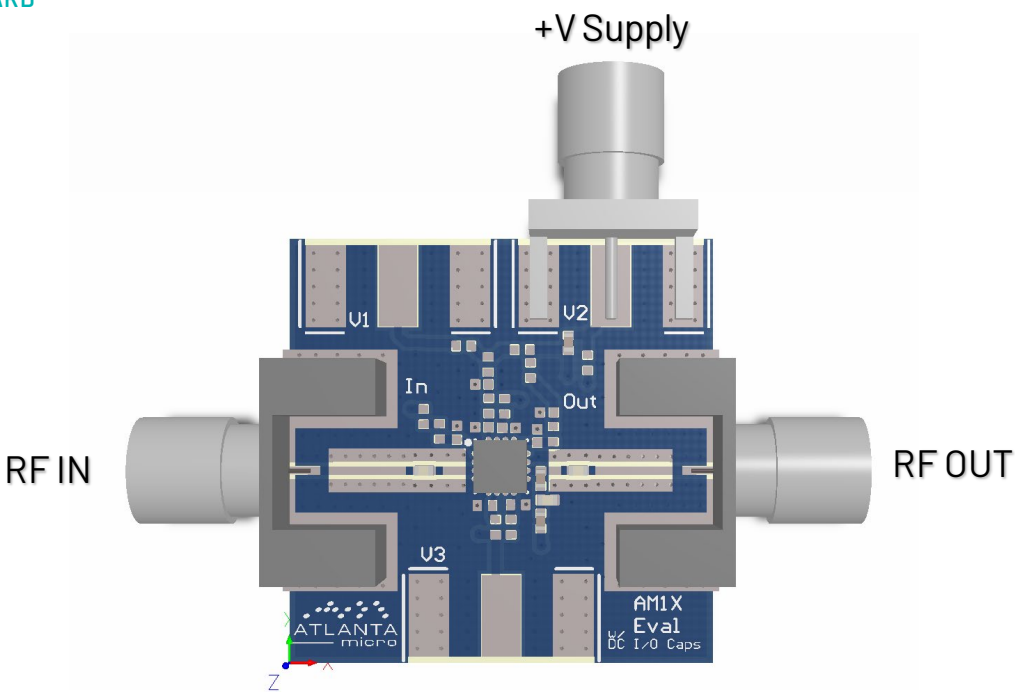


RECOMMENDED COMPONENT LIST (OR EQUIVALENT)

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

1.

EVALUATION PC BOARD



RELATED PARTS

Part Number		Description
AM1016A	20 MHz to 6 GHz	+3.3V Gain Block
AM1018A	20 MHz to 6 GHz	+3.3V Gain Block
AM1018B	20 MHz to 6 GHz	+5.0V Gain Block
AM1018C	20 MHz to 6 GHz	+5.0V Gain Block
AM1025B	20 MHz to 3 GHz	+8.0V Gain Block (High P1dB)
AM1031C	20 MHz to 8 GHz	+3.3V Gain Block
AM1063-1	DC to 10 GHz	Gain Block
AM1064-1	DC to 8 GHz	Gain Block
AM1085	DC to 6 GHz	+5.0V Gain Block
AM1090	DC to 6 GHz	+5.0V or +8.0V Gain Block (High P1dB)

PARTS ORDERING DETAILS

Description	Part Number
3mm 16 Lead QFN	AM1016B
AM1016B Evaluation Board	AM1016B Eval
AM1016B in 0.95" x 1.13" x 0.6" RF-Shielded Module with Integrated Bias Tee and Field Replaceable SMA Connectors	AM1016B-M

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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