

# AM1101 – Bypassable Amplifier

## 2 GHz to 26.5 GHz Bypassable Gain Block

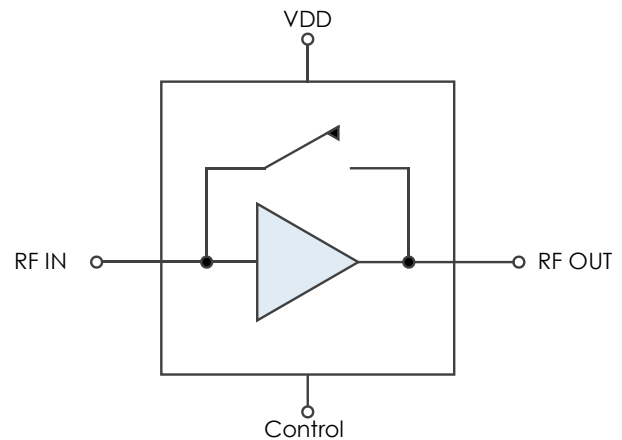
### Description

AM1101 is a wideband bypassable amplifier covering the 2 GHz to 26.5 GHz frequency range. The device exhibits low noise figure and low gain across the entire frequency range while drawing only 100 mW of power. Packaged in a 3mm QFN with an integrated amplifier bypass path and internal 50 Ω matching, the AM1101 represents a dramatic size reduction over a discrete implementation of a bypassable amplifier.

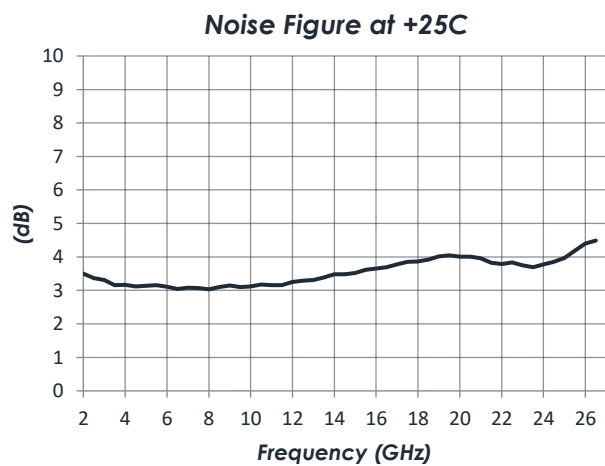
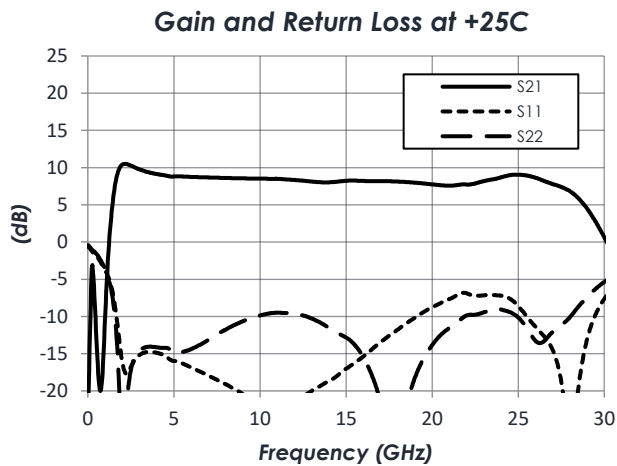
### Features

- 8 dB gain
- 3.5 dB Noise Figure
- +22 dBm OIP3
- +10 dBm P1dB
- 5 dB Insertion Loss Bypass Path
- +3.3V Supply
- 102 mW Power Consumption
- -40C to +85C Operation

### Functional Diagram



### Characteristic Performance



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## Revision History

Date	Revision Number	Notes
June 12, 2020	1	Initial Release

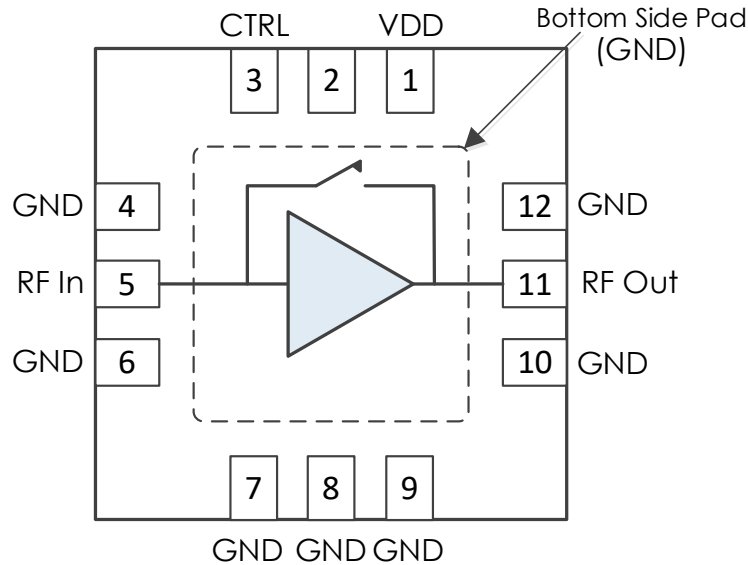
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## Pin Layout and Definitions

Note: All Un-Labeled Pins are NC or Ground



Pin Number	Pin Name	Pin Function
1	VDD	DC Power Input
2	NC	No connect
3	CTRL	Bypass/Amplifier Mode Control
4	GND	Ground – Common
5	RF In	RF Input – 50 Ohms – DC Coupled. External DC blocking capacitor required
6-10	GND	Ground – Common
11	RF Out	RF Output – 50 Ohms – DC Coupled. External DC blocking capacitor required
12	GND	Ground – Common

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### Specifications

#### Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+3.5 V
RF Input Power		+20 dBm
Operating Junction Temperature	-40 C	+150 C
Storage Temperature Range	-55 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		+3.3 V	
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 C

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### DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Supply Voltage			+3.3 V	
DC Supply Current	Amplifier Enabled		31 mA	
	Amplifier Bypassed		1 mA	
Power Dissipated	Amplifier Enabled		102 mW	
	Amplifier Bypassed		3 mW	

### RF Performance

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		2 GHz		26.5 GHz
Gain	f = 2 GHz		10 dB	
	f = 13 GHz		8 dB	
	f = 26.5 GHz		8 dB	
Return Loss	f = 13 GHz		-10 dB	
Output IP3	f = 2 GHz		+20 dBm	
	f = 13 GHz		+24 dBm	
	f = 26.5 GHz		+18 dBm	
Output P1dB	f = 2 GHz		+9 dBm	
	f = 13 GHz		+11 dBm	
	f = 26.5 GHz		+8 dBm	
Noise Figure	f = 13 GHz		3.5 dB	

### Timing Characteristics

Parameter	Minimum	Typical	Maximum
Switching Speed (Amp Bypass → Amp On)		70 ns	
Switching Speed (Amp On → Amp Bypass)		10 ns	

### State Table

CTL	Amplifier
Low	Bypassed
High	Enabled

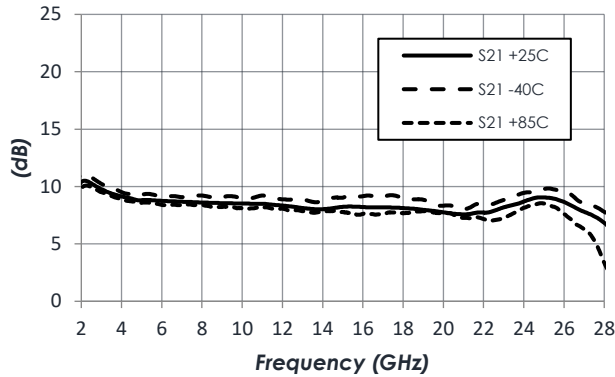
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## 2 GHz to 26.5 GHz Bypassable Gain Block

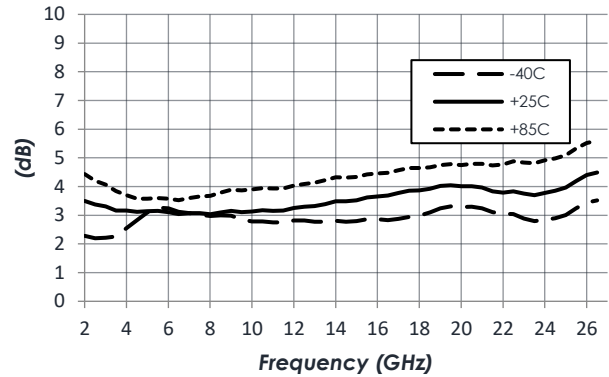
### Typical Performance

(VDD = +3.3 V, Amplifier Enabled)

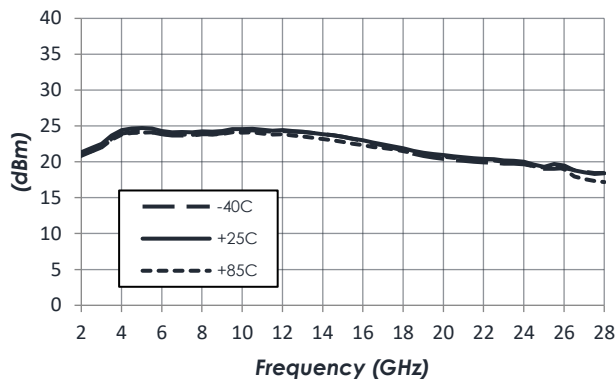
**Gain vs Temperature**



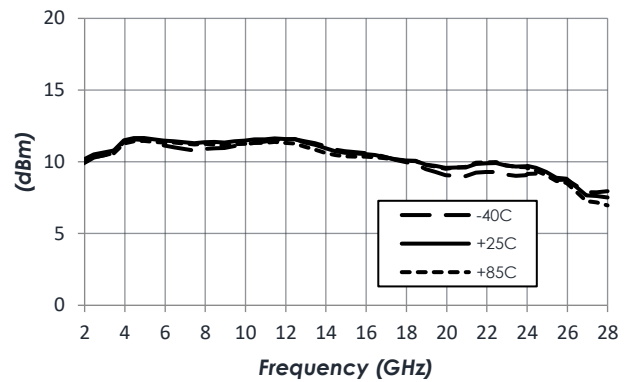
**Noise Figure vs Temperature**



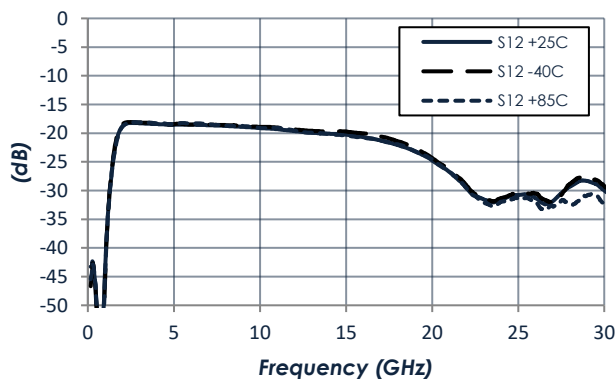
**Output IP3 vs Temperature**



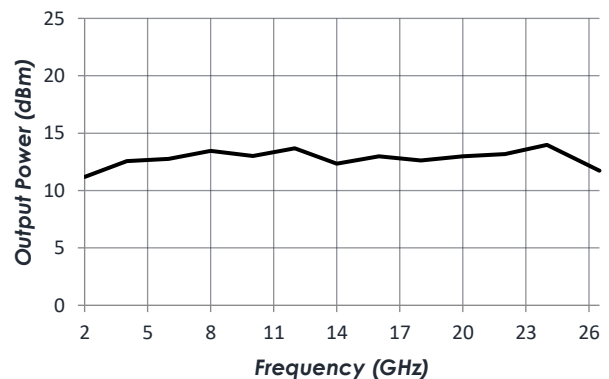
**P1dB vs Temperature**



**Reverse Isolation vs Temperature**



**P\_Sat at +25C**

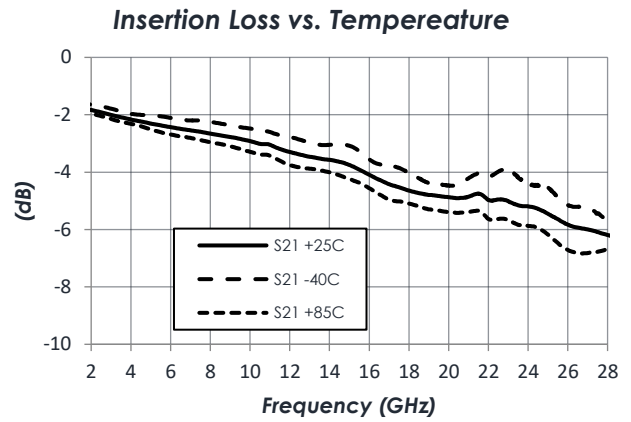
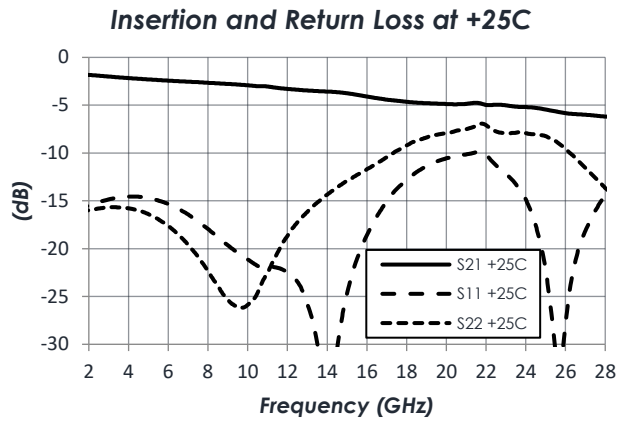


# AM1101 – Bypassable Amplifier

## 2 GHz to 26.5 GHz Bypassable Gain Block

### Typical Performance (continued)

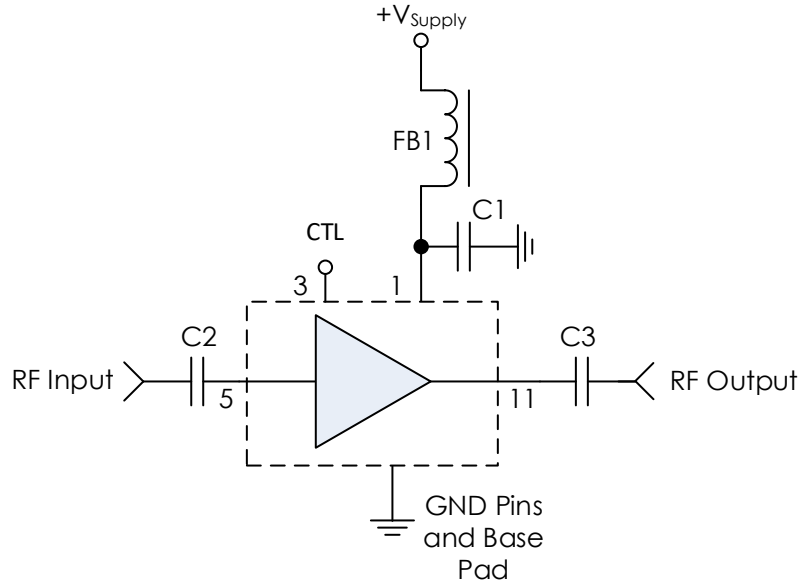
(VDD= +3.3 V, Amplifier Bypassed)



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## Typical Application



### Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1	0.1 $\mu$ F	C1005X7R1H104K05BB	TDK
C2, C3	0.1 $\mu$ F	0201BB104KW160	Passives Plus
FB1	-	MMZ1005A222E	TDK

### Notes:

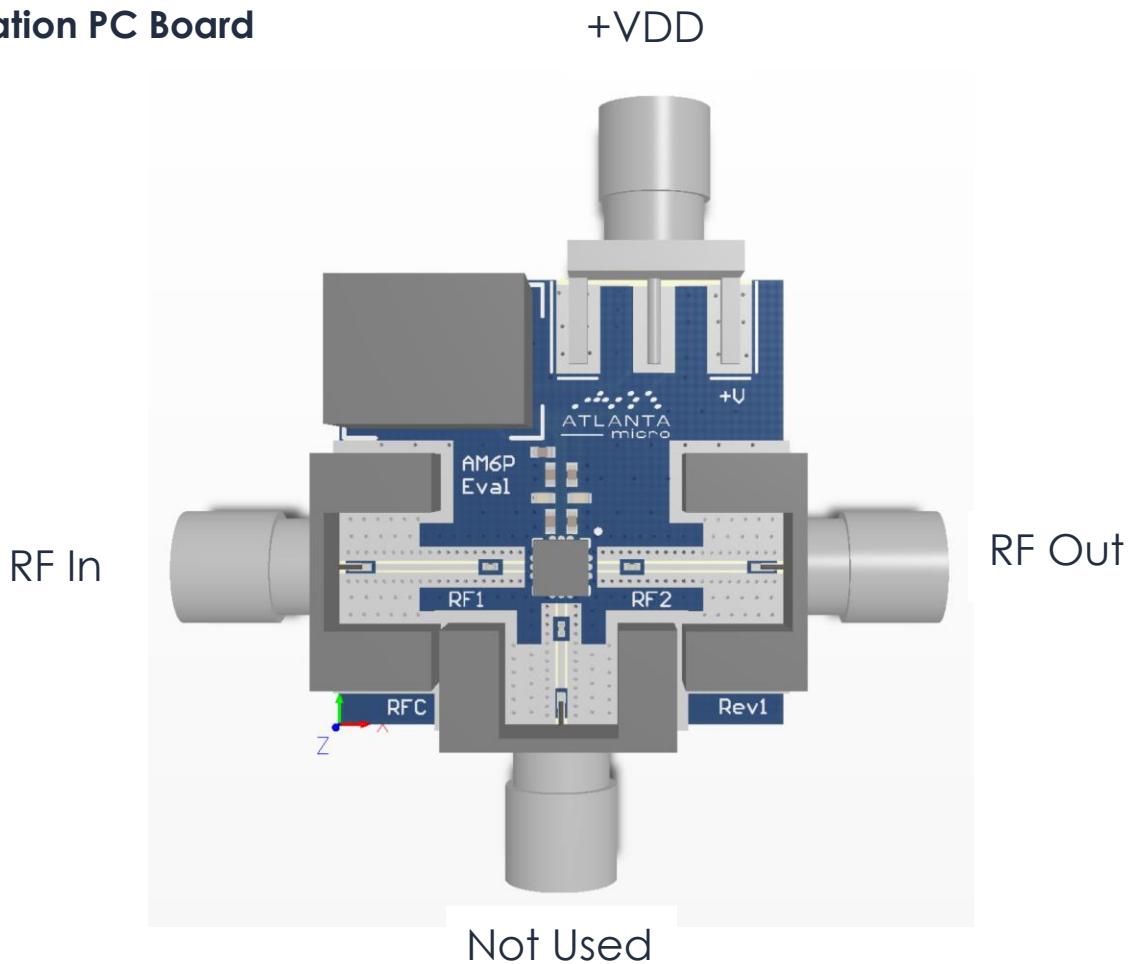
1. DC blocking capacitors should be high performance, low-loss, broadband capacitors for optimum performance.
2. Control line filtered internally providing high frequency isolation.



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## Evaluation PC Board



**Note:** Some items shown in the image above may not be installed on the evaluation board

## Related Parts

Part Number	Description
AM1067	5 GHz to 20 GHz Bypassable Amplifier
AM1075	5 GHz to 26.5 GHz Bypassable Amplifier
AM1100	2 GHz to 26.5 GHz Low Noise Amplifier
AM1102	DC to 21 GHz Low Noise Amplifier

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### 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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