

## Product Features

- 60 – 3000 MHz
- 14 dB Gain
- 2.4 dB Noise Figure
- +32 dBm OIP3
- Single +3.3 or +4.5 Supply
- Internally matched to 50 Ω
- Lead-free/Green/RoHS-compliant SOT-89 Package
- MTTF > 10,000 years

## Applications

- Mobile Infrastructure
- CATV / DBS
- W-LAN / ISM
- RFID
- Defense / Homeland Security
- Fixed Wireless

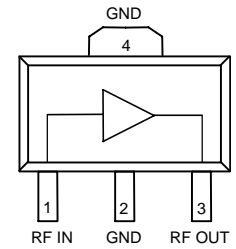
## Product Description

The AG101 is a general-purpose gain block that offers good dynamic range and low noise figure in a low-cost surface-mount package. The combination of near-constant OIP3 and low noise figure performance over frequency makes it attractive for both narrowband and broadband applications. The device combines dependable performance with superb quality to maintain MTTF values exceeding 10,000 years at mounting temperatures of +85 °C and is available in the environmentally-friendly lead-free/green /RoHS-compliant SOT-89 package.

The AG101 uses a high reliability GaAs MMIC technology and only requires DC-blocking and bypass capacitors, and an inductive RF choke for operation. Internal matching provides a 50 ohm input / output impedance minimizing the number of required external components.

The broadband MMIC amplifier is well suited for various current and next generation wireless technologies such as GPRS, GSM, CDMA, and W-CDMA. In addition, the AG101 will work for other applications within the 60 to 3000 MHz frequency range such as fixed wireless.

## Functional Diagram



Function	Pin No.
Input	1
Output/Bias	3
Ground	2, 4

## Specifications <sup>(1)</sup>

Parameter	Units	Min	Typ	Max
Operational Bandwidth	MHz	60		3000
Test Frequency	MHz		800	
Gain	dB	13	14	16
Input Return Loss <sup>(5)</sup>	dB		8.5	
Output Return Loss	dB		20	
Output P1dB	dBm		+15	
Output IP3 <sup>(2)</sup>	dBm	+28	+32	
Noise Figure <sup>(3)</sup>	dB		2.4	
Operating Current Range	mA	40	50	75
Supply Voltage	V		4.5	

1. Test conditions unless otherwise noted: T = 25 °C, 50 Ω system.
2. 3OIP measured with two tones at an output power of +2.5 dBm/tone separated by 10 MHz. The suppression on the largest IM3 product is used to calculate the 3OIP using a 2:1 rule.
3. Noise figure can be optimized by matching the input for optimal return loss.
4. A supply voltage between 3 to 4.5V can be used for the devices.

## Typical Performance <sup>(4)</sup>

Parameter	Units	Typical			
Frequency	MHz	900	1900	900	1900
S21	dB	14	12.8	14	12.5
S11 <sup>(5)</sup>	dB	-10	-9	-10	-9
S22	dB	-27	-22	-28	-19
Output P1dB	dBm	+15	+15	+14	+14
Output IP3	dBm	+32.5	+33.1	+32	+32.5
Noise Figure	dB	2.4	2.6	2.2	2.4
Supply Voltage	V	+4.5		+3.3	
Device Current	mA	50		48	

4. Parameters reflect performance in an AG101-PCB application circuit, as shown on page 4.
5. Input return loss can be dramatically improved (<-20 dB) for narrowband applications as shown on page 5 of this datasheet.

## Absolute Maximum Rating

Parameter	Rating
Storage Temperature	-55 to +150 °C
DC Voltage	+5.5 V
RF Input Power (continuous)	+4 dBm
Junction Temperature	+160 °C
Thermal Resistance	88 °C / W

Operation of this device above any of these parameters may cause permanent damage.

## Ordering Information

Part No.	Description
AG101-G	GaAs MMIC Gain Block (lead-free/green/RoHS-compliant SOT-89 Pkg)
AG101-PCB	0.8 – 2.6 GHz Fully Assembled Application Circuit

Standard T/R size = 3000 pieces on a 13" reel.

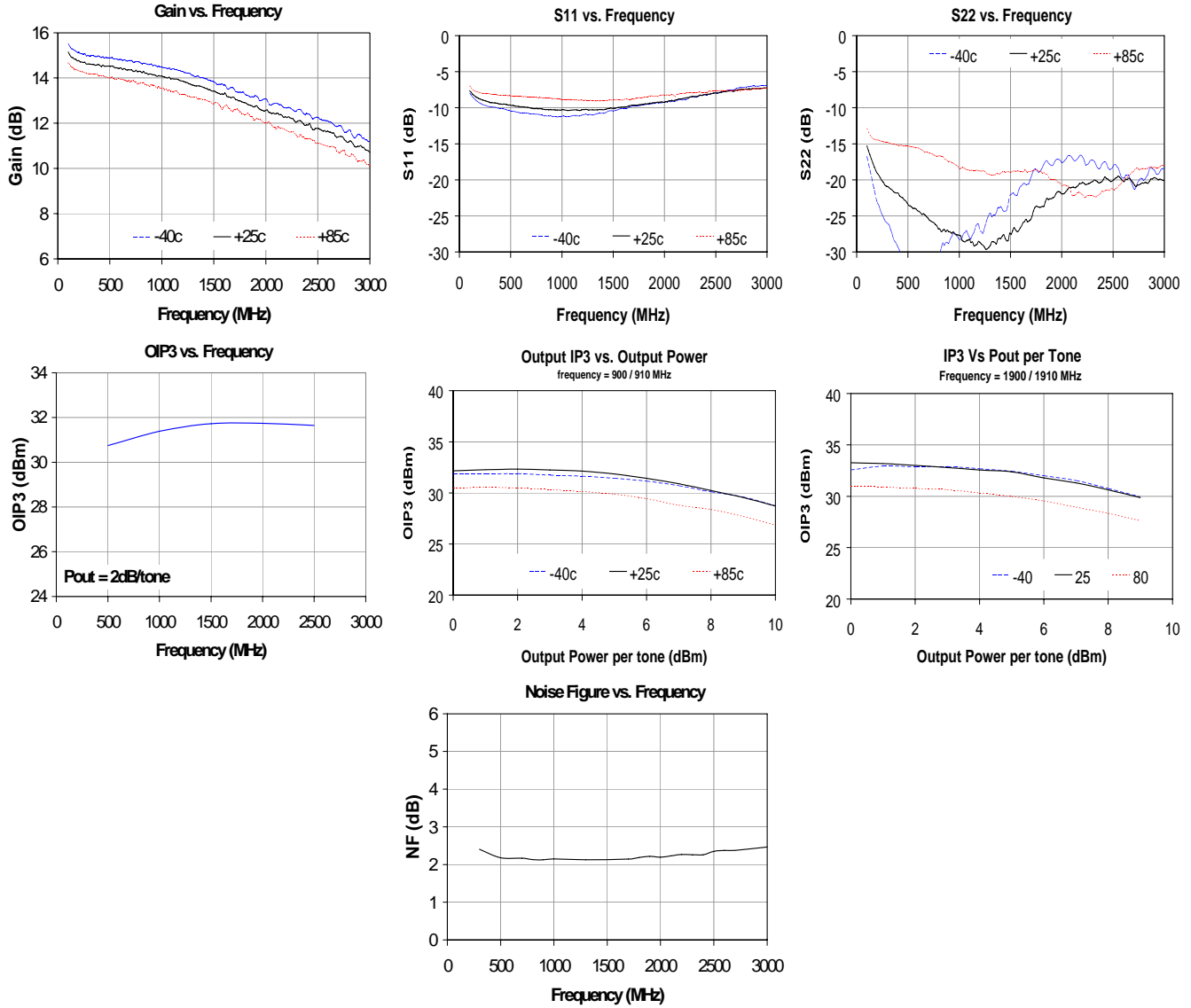
Specifications and information are subject to change without notice.



## Typical Device Data

S-Parameters ( $V_{DS} = +4.5\text{ V}$ ,  $I_{DS} = 50\text{ mA}$ ,  $T = 25\text{ }^\circ\text{C}$ , 50 ohm system)

Input return loss can be improved with the appropriate input matching network shown later in this datasheet.



S-Parameters ( $V_D = +4.5\text{ V}$ ,  $I_D = 50\text{ mA}$ ,  $T = 25\text{ }^\circ\text{C}$ , calibrated to device leads)

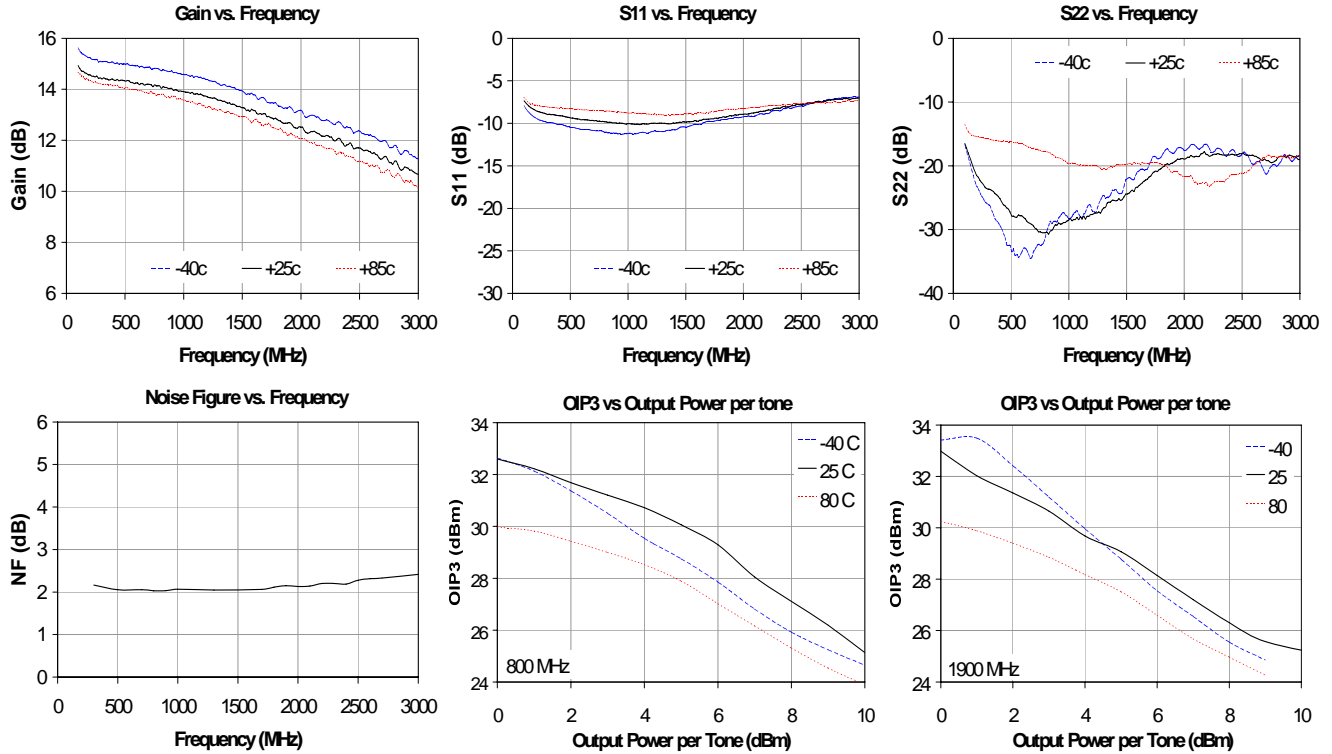
Freq (MHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (dB)	S22 (ang)
50	-4.72	-30.88	15.44	164.91	-21.66	30.26	-9.38	-40.39
250	-8.67	-27.48	13.93	165.39	-20.26	3.92	-16.70	-32.88
500	-8.96	-37.68	13.75	157.18	-20.14	-2.25	-17.56	-31.25
750	-9.06	-51.15	13.60	148.11	-20.02	-7.65	-18.25	-35.67
1000	-9.04	-66.87	13.47	137.91	-19.92	-10.63	-19.05	-43.62
1250	-9.00	-82.11	13.39	128.62	-19.85	-15.19	-20.28	-51.49
1500	-8.89	-97.31	13.13	118.57	-19.73	-18.74	-21.30	-61.37
1750	-8.74	-112.48	12.91	109.09	-19.56	-23.00	-22.57	-73.75
2000	-8.65	-128.51	12.68	99.48	-19.71	-28.33	-25.15	-85.19
2250	-8.40	-142.86	12.48	89.94	-19.53	-33.37	-27.03	-103.19
2500	-7.99	-157.26	12.22	80.41	-19.40	-37.91	-28.58	-135.19
2750	-7.93	-171.48	11.88	71.42	-19.33	-42.30	-28.56	-177.83
3000	-7.47	175.92	11.53	62.05	-19.58	-47.37	-28.48	153.84



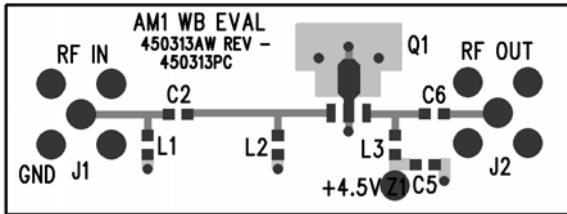
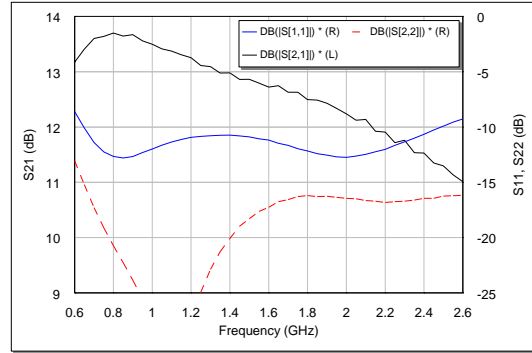
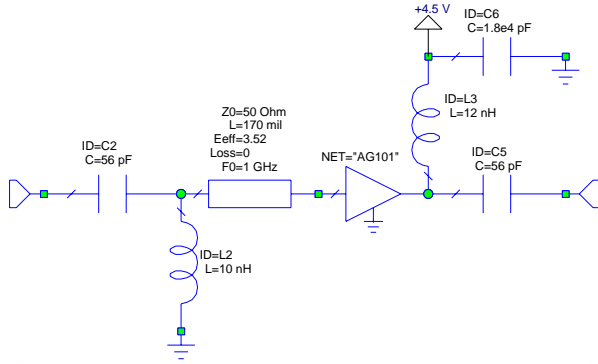
## Typical Device Data

S-Parameters ( $V_{DS} = +3.3\text{ V}$ ,  $I_{DS} = 50\text{ mA}$ ,  $T = 25\text{ }^\circ\text{C}$ , 50 ohm system)

Input return loss can be improved with the appropriate input matching network shown later in this datasheet.

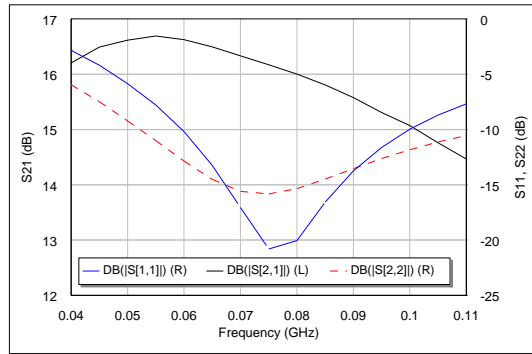
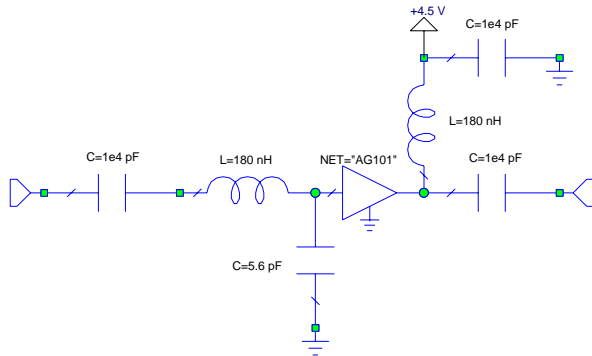


**Application Circuit: 800 – 2600 MHz (AG101-PCB)**

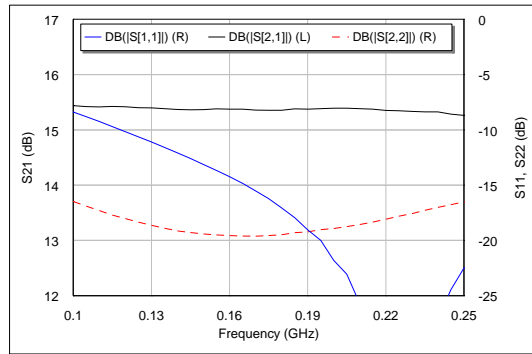
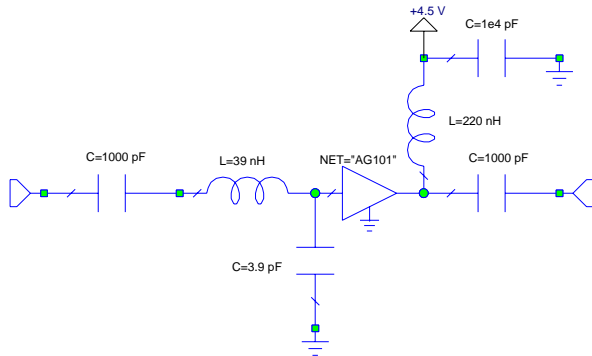


Circuit Board Material: .014" FR-4, 4 layers, .062" total thickness

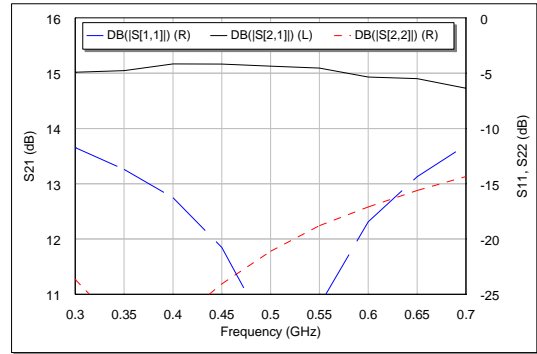
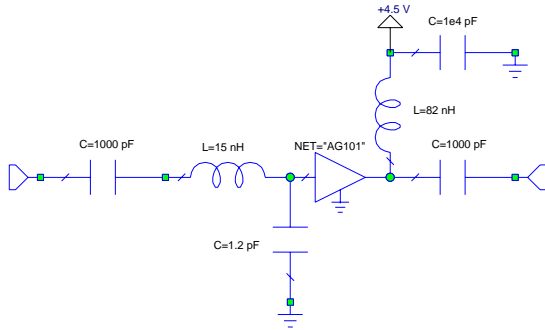
**Reference Design: 70 MHz**



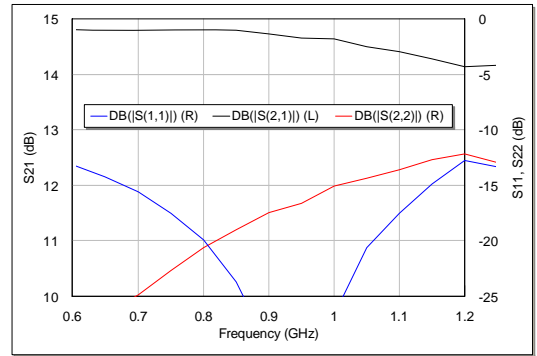
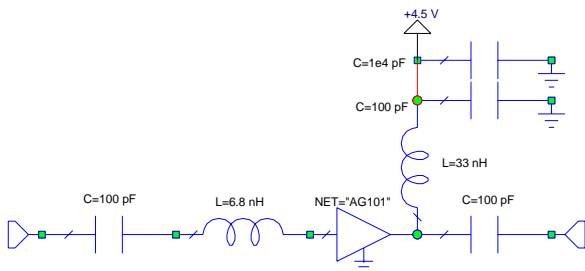
**Reference Design: 170 MHz**



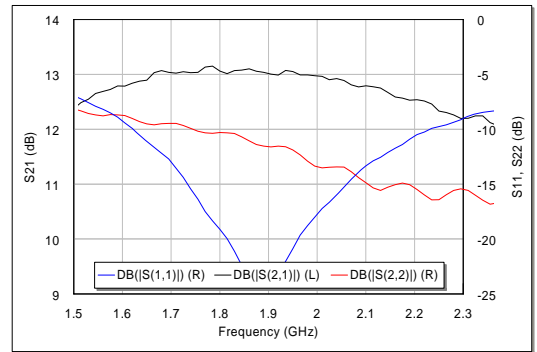
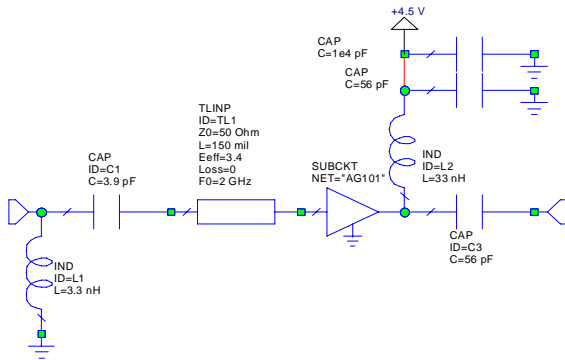
**Reference Design: 450 MHz**



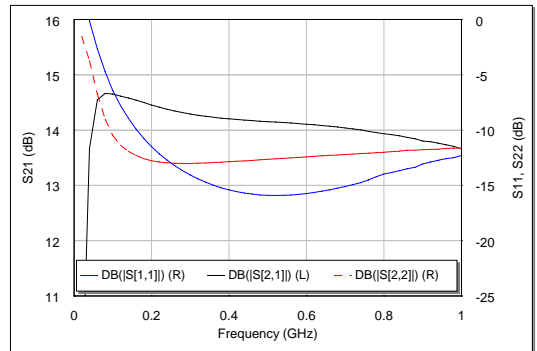
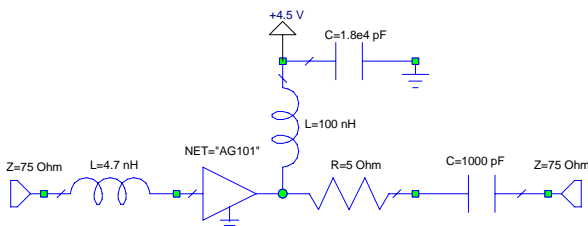
**Reference Design: 800 MHz**



**Reference Design: 1900 / 2140 MHz**



**Reference Design: CATV Single-ended Operation**



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