

## **AGB3309**

50Ω High Linearity Low Noise Internally Biased Wideband Gain Block PRELIMINARY DATA SHEET - Rev 1.0

## **FEATURES**

- On-chip Active Bias
- · DC-3500 MHz Operation Bandwidth
- +35 dBm Output IP3
- 5 dB Noise Figure at 850 MHz
- · 15 dB Gain at 850 MHz
- +18 dBm P1dB
- SOT-89 Package
- Single +5 V Supply
- Case Temperature: -40 to +85 °C

## **APPLICATIONS**

- Cellular Base Stations for W-CDMA, CDMA, TDMA, GSM, PCS and CDPD systems
- Fixed Wireless
- MMDS/WLL
- WLAN

# PRODUCT DESCRIPTION

The AGB3309 is one of a series of high performance InGaP HBT amplifiers designed for use in applications requiring high linearity, low noise, and low distortion. Active bias circuits on-chip eliminate the need for external resistive feedback, and no external matching components are needed for insertion into a  $50\Omega$  system. With a high output IP3,



low noise figure, and wide band operation, the AGB3309 is ideal for wireless infrastructure applications such as Cellular Base Stations, MMDS, and WLL. Offered in a low cost SOT-89 surface mount package, the AGB3309 requires a single +5 V supply, and typically consumes 0.325 Watts of power.

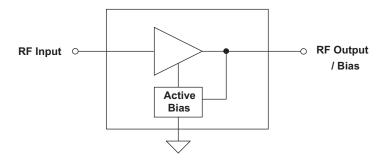


Figure 1: Block Diagram

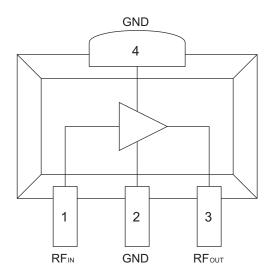


Figure 2: Pinout (X-ray Top View)

**Table 1: Pin Description** 

PIN	NAME	DESCRIPTION	
1	RFℕ	RF Input	
2	GND	Ground	
3	RFout	RF Output / Bias	
4	GND	Ground	

## **ELECTRICAL CHARACTERISTICS**

**Table 2: Absolute Minimum and Maximum Ratings** 

PARAMETER	MIN	MAX	UNIT
Device Voltage (Vcc)	0	+6	VDC
RF Input Power (P <sub>N</sub> )	-	+10	dBm
Storage Temperature (Tstg)	-40	+150	°C
Junction Temperature	-	+200	°C

Stresses in excess of the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.

**Table 3: Operating Ranges** 

PARAMETER	MIN	TYP	MAX	UNIT
Operating Frequency (f) (1)	-	1	3500	MHz
Supply Voltage (VSUPPLY)	-	+5	-	VDC
Case Temperature (Tc)	-40	-	+85	°C

The device may be operated safely over these conditions; however, parametric performance is guaranteed only over the conditions defined in the electrical specifications.

#### Notes:

(1) Operating frequency is defined by the output return loss (S22) having a VSWR less than 2:1.



## Table 4: Electrical Specifications (T<sub>A</sub> = +25 °C, $V_{SUPPLY}$ = +5 VDC, $50\Omega$ system)

PARAMETER	MIN	TYP	MAX	UNIT
Gain (S <sub>21</sub> )				
850 MHz	-	15.5	-	
1950 MHz	-	14.5	-	dB
2140 MHz	-	14.5	-	ub
2450 MHz	-	14	-	
Output IP3 (1)				
850 MHz	-	+35	-	
1950 MHz	-	+35	-	dBm
2140 MHz	-	+35	-	ubiii
2450 MHz	-	+35	-	
Output 1dB Compression (P1dB)				
850 MHz	-	+18	-	dBm
Noise Figure				
850 MHz	-	5.2	-	dB
Thermal Resistance ( θյc)	-	172	-	°C/W
Supply Current (Icc)	-	65	-	mA

#### Notes:

- (1) OIP3 is measured with two tones at 1 MHz spacing at 0 dBm output power per tone.
- 2. Performance as measured on ANADIGICS test fixture (see Figure 3).

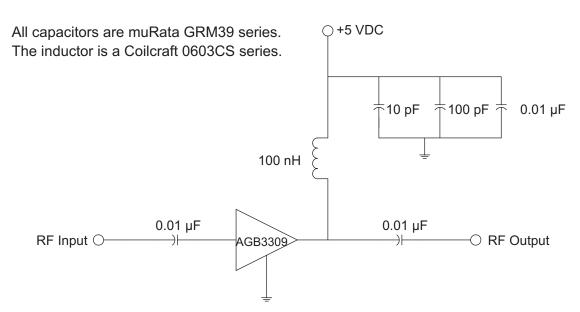


Figure 3: Application Circuit (50 Ω Terminations)

#### **PERFORMANCE DATA**

Figure 4: Gain vs. Frequency
De-embedded 50Ω S-parameter
(T<sub>2</sub> = +25 °C, V<sub>SURRI</sub> × = +5 V, I<sub>CC</sub> = 65 m

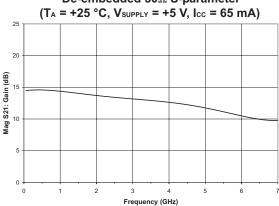


Figure 5: Isolation vs. Frequency
De-embedded 50Ω S-parameter

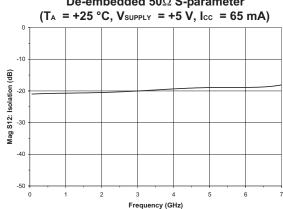


Figure 6: Input Return Loss vs. Frequency De-embedded 50 $\Omega$  S-parameter

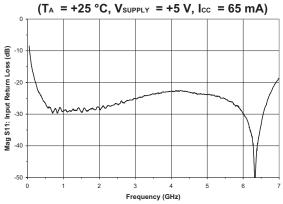
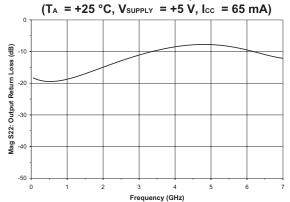
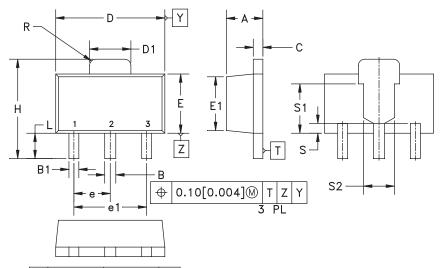


Figure 7: Output Return Loss vs. Frequency De-embedded 50 $\Omega$  S-parameter



## **PACKAGE OUTLINE**



S <sub>YM</sub> BOL	MILLIMETERS		INCHES		NOTE
0	MIN.	MAX.	MIN.	MAX.	
Α	1.40	1.60	0.055	0.063	-
В	0.44	0.56	0.017	0.022	-
Bı	0.36	0.48	0.014	0.019	3
С	0.35	0.44	0.014	0.017	-
D	4.40	4.60	0.173	0.181	-
D1	1.62	1.83	0.064	0.072	-
E	2.29	2.60	0.090	0.102	-
Εı	2.13	2.29	0.084	0.090	4
е	1.50 BSC		0.059 BSC		-
e 1	3.00 BSC		0.118 BSC		-
Н	3.94	4.25	0.155	0.167	-
L	0.89	1.20	0.035	0.047	ı
R	-	0.25	_	0.010	-
S	0.40 NOM.		0.016	NOM.	4
S <sub>1</sub>	2.03	NOM.	0.080	NOM.	4
S2	1.27	NOM.	0.050	NOM.	4

#### NOTES:

- 1. CONTROLLING DIMENSIONS: MILLIMETERS.
- 2. DIMENSIONS DO NOT INCLUDE END FLASH, MOLD FLASH OR MATERIAL PROTRUSIONS.
- 3. DIMENSION B1, 2 PLACES.
- 4. DIMENSIONS E1, S, S1 & S2 REFERENCE ONLY.
- 5. REFERENCE JEDEC TO-243 (AA).

Figure 8: S24 Package Outline - SOT-89

#### TOP BRAND



#### NOTES:

- 1. ANADIGICS LOGO SIZE: x=0.040±0.010 Y=0.048±0.010
- 2. PART NUMBER: FOUR NUMERIC CHARACTERS
- 3. WAFER LOT NUMBER: LLLL= FOUR NUMERIC CHARACTERS NN= TWO ALPHABETIC CHARACTERS

4. TYPE : ELITE SIZE : 2-POINT COLOR : LASER

Figure 9: Branding Specification

**NOTES** 



#### ORDERING INFORMATION

PART NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AGB3309S24Q1	-40 to +85°C	SOT-89 Package	1,000 piece Tape and Reel



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