

### FEATURES

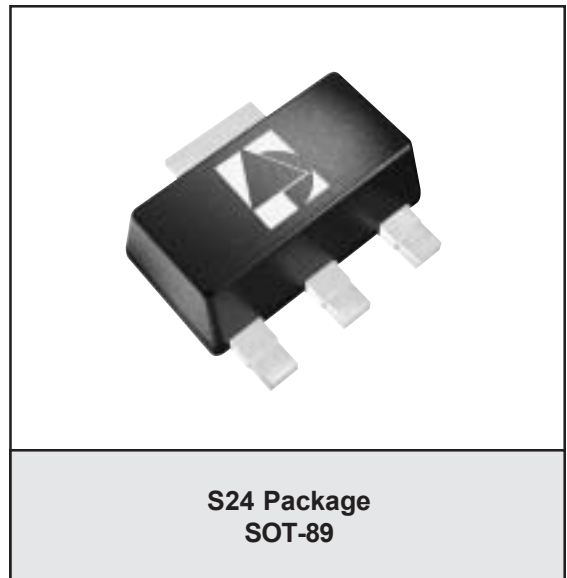
- On-chip Active Bias
- DC-3500 MHz Operation Bandwidth
- +35 dBm Output IP3
- 5 dB Noise Figure at 850 MHz
- 15 dB Gain at 850 MHz
- +18 dBm P1dB
- SOT-89 Package
- Single +5 V Supply
- Case Temperature: -40 to +85 °C

### APPLICATIONS

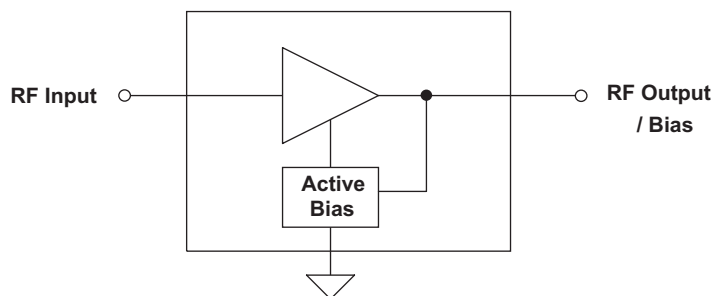
- Cellular Base Stations for W-CDMA, CDMA, TDMA, GSM, PCS and CDPD systems
- Fixed Wireless
- MMDS/WLL
- WLAN

### PRODUCT DESCRIPTION

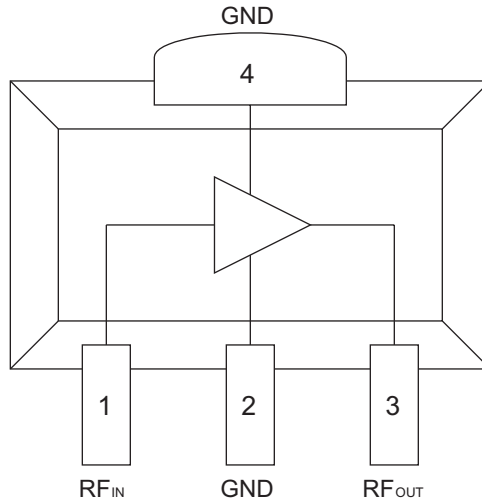
The AGB3309 is one of a series of high performance InGaP HBT amplifiers designed for use in applications requiring high linearity, low noise, and low distortion. Active bias circuits on-chip eliminate the need for external resistive feedback, and no external matching components are needed for insertion into a 50Ω 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	RF <sub>IN</sub>	RF Input
2	GND	Ground
3	RF <sub>OUT</sub>	RF Output / Bias
4	GND	Ground

## ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
Device Voltage ( $V_{CC}$ )	0	+6	VDC
RF Input Power ( $P_{IN}$ )	-	+10	dBm
Storage Temperature ( $T_{STG}$ )	-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) <sup>(1)</sup>	-	-	3500	MHz
Supply Voltage ( $V_{SUPPLY}$ )	-	+5	-	VDC
Case Temperature ( $T_C$ )	-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.

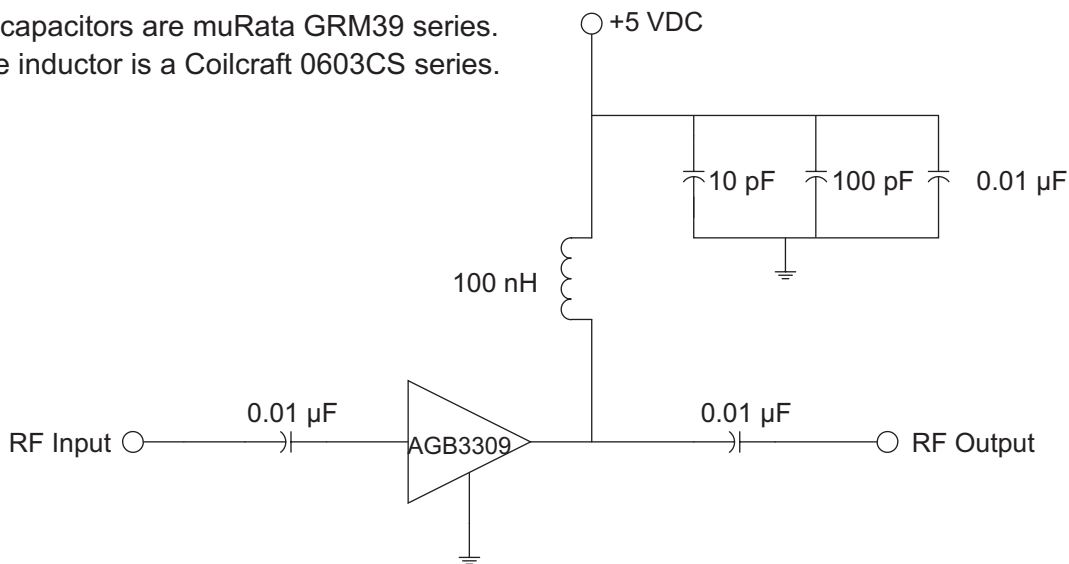
**Table 4: Electrical Specifications**  
 (T<sub>A</sub> = +25 °C, V<sub>SUPPLY</sub> = +5 VDC, 50Ω system)

PARAMETER	MIN	TYP	MAX	UNIT
Gain (S <sub>21</sub> )	850 MHz	-	15.5	-
	1950 MHz	-	14.5	-
	2140 MHz	-	14.5	-
	2450 MHz	-	14	-
Output IP3 <sup>(1)</sup>	850 MHz	-	+35	-
	1950 MHz	-	+35	-
	2140 MHz	-	+35	-
	2450 MHz	-	+35	-
Output 1dB Compression (P1dB)				
850 MHz	-	+18	-	dBm
Noise Figure				
850 MHz	-	5.2	-	dB
Thermal Resistance ( θ <sub>Jc</sub> )	-	172	-	°C/W
Supply Current (I <sub>cc</sub> )	-	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).

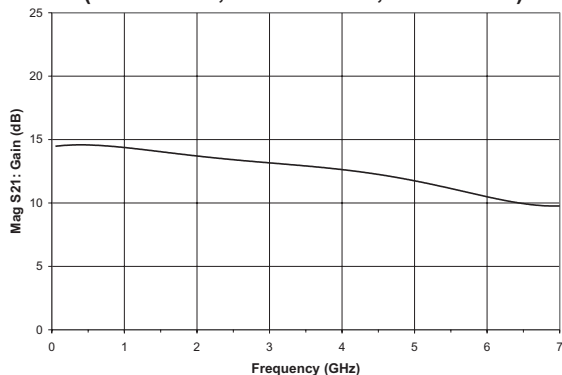
All capacitors are muRata GRM39 series.  
 The inductor is a Coilcraft 0603CS series.



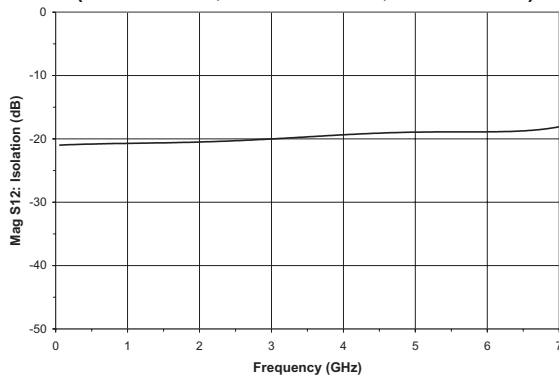
**Figure 3: Application Circuit (50 Ω Terminations)**

PERFORMANCE DATA

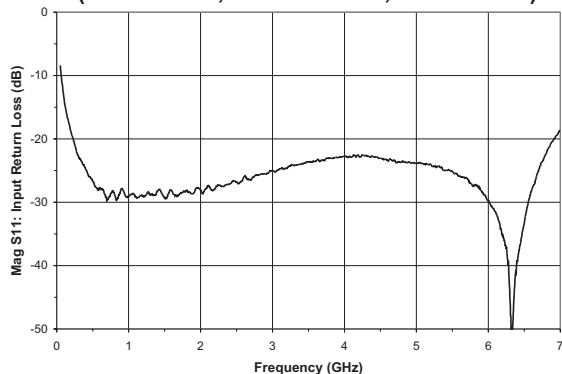
**Figure 4: Gain vs. Frequency**  
**De-embedded 50Ω S-parameter**  
 (T<sub>A</sub> = +25 °C, V<sub>SUPPLY</sub> = +5 V, I<sub>CC</sub> = 65 mA)



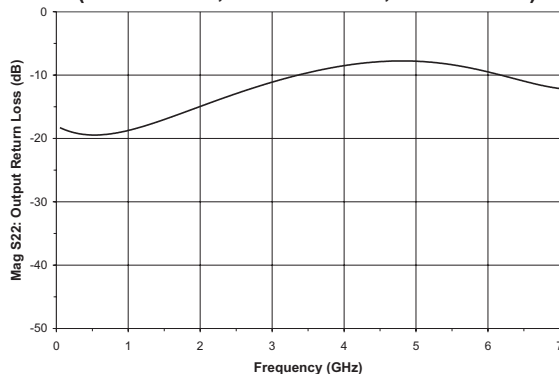
**Figure 5: Isolation vs. Frequency**  
**De-embedded 50Ω S-parameter**  
 (T<sub>A</sub> = +25 °C, V<sub>SUPPLY</sub> = +5 V, I<sub>CC</sub> = 65 mA)



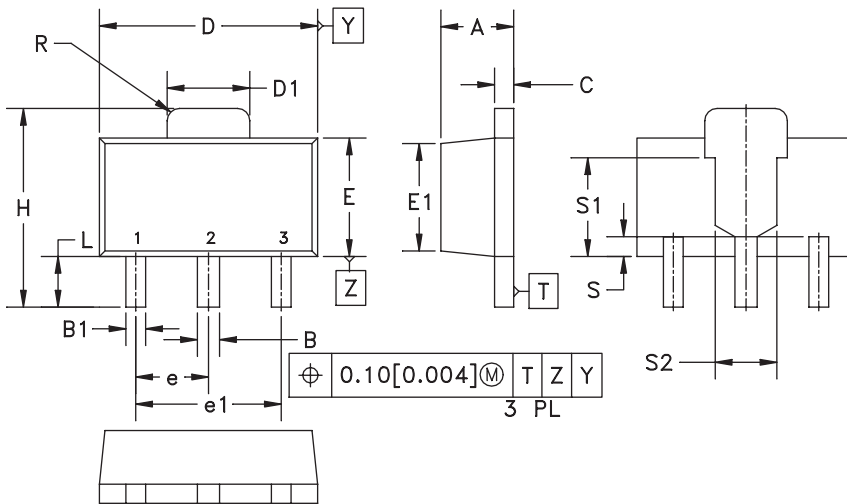
**Figure 6: Input Return Loss vs. Frequency**  
**De-embedded 50Ω S-parameter**  
 (T<sub>A</sub> = +25 °C, V<sub>SUPPLY</sub> = +5 V, I<sub>CC</sub> = 65 mA)



**Figure 7: Output Return Loss vs. Frequency**  
**De-embedded 50Ω S-parameter**  
 (T<sub>A</sub> = +25 °C, V<sub>SUPPLY</sub> = +5 V, I<sub>CC</sub> = 65 mA)



PACKAGE OUTLINE



SYMBOL	MILLIMETERS		INCHES		NOTE
	MIN.	MAX.	MIN.	MAX.	
A	1.40	1.60	0.055	0.063	—
B	0.44	0.56	0.017	0.022	—
B1	0.36	0.48	0.014	0.019	3
C	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	—
E1	2.13	2.29	0.084	0.090	4
e	1.50	BSC	0.059	BSC	—
e1	3.00	BSC	0.118	BSC	—
H	3.94	4.25	0.155	0.167	—
L	0.89	1.20	0.035	0.047	—
R	—	0.25	—	0.010	—
S	0.40	NOM.	0.016	NOM.	4
S1	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:  $x=0.040\pm 0.010$   $y=0.048\pm 0.010$
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

**ANADIGICS, Inc.**

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