ADA1200
Linear Amplifier
PRELIMINARY DATA SHEET - Rev 1.4

FEATURES
- 12 dB Gain
- 50 to 1000 MHz Frequency Range
- Noise Figure: 2.3 dB
- Single +5 V Supply
- Small SOT-89 Package
- RoHS Compliant/Lead-free

APPLICATIONS
- Low Noise Amplifier for CATV Set-Top Boxes
- CATV Drop Amplifier

S24 Package
SOT-89

PRODUCT DESCRIPTION
The ADA1200 is a highly linear amplifier developed to meet the stringent requirements of CATV systems. Offered in a low cost SOT-89 package, this GaAs MESFET design offers low noise and low distortion over a wide frequency range. The device is ideally suited for applications as a Low Noise Amplifier in CATV Set-Top Boxes, and as a Drop Amplifier in CATV distribution systems. The ADA1200 requires a single +5 V supply, and typically consumes 400 mW of power.

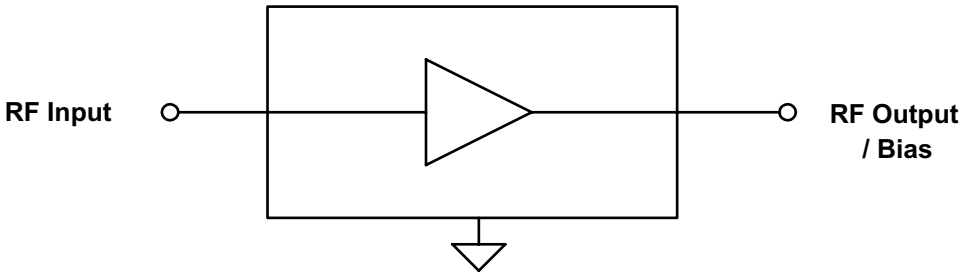


Figure 1: Block Diagram

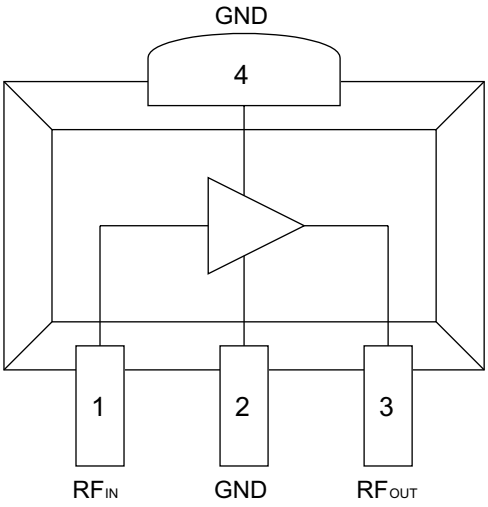


Figure 2: Pinout

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	RF_{IN}	RF INPUT
2	GND	Ground
3	RF_{OUT}	RF Output / Bias
4	GND	Ground

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
Device Voltage (V_{CC})	0	+9	VDC
RF Input Power (P_{IN})	-	+10	dBm
Storage Temperature (T_{STG})	-40	+150	°C
Channel Temperature	-	+150	°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
RF Input/Output Frequency (f)	50	-	1000	MHz
Supply Voltage (V_{DD})	-	+5	-	VDC
Case Temperature (T_C)	-40	-	+100	°C

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

Table 4: Electrical Specifications
(T_A = +25 °C, V_{DD} = +5 VDC, f = 50 to 860 MHz, 75 Ω system, ref. Figure 3)

PARAMETER	MIN	TYP	MAX	UNIT
Gain	10.5	12	13	dB
Noise Figure	-	2.3	3.5	dB
CSO (1) CH 5 & 6 (77.25 MHz & 83.25 MHz) CSO (1) all other channels	- -	- -	-57 -59	dBc
CTB (1)	-	-75	-64	dBc
XMOD (1)	-	-73	-63	dBc
P1dB	-	66	-	dBmV
OIP (2)	+101	-	-	dBmV
3-Tone OIP3 (3)	+81	-	-	dBmV
Input Return Loss	-	-25	-16	dB
Output Return Loss	-	-25	-16	dB
Thermal Resistance (θ_{JC})	-	-	50	°C/W
Supply Current	-	80	100	mA

Notes:
(1) 132 total channels, flat input; 110 analog channels @ +15 dBmV per channel; 22 digital channels (757.25 MHz to 871.25 MHz) @ 6 dB below analog channels; Standard NTSC channel plan (55.25 MHz to 871.25 MHz)
(2) Two tones, 38 dBmV per tone at input (439.25 MHz and 853.25 MHz); IMD2 measured at 414.00 MHZ.
(3) Three tones, 38 dBmV per tone at input (67.25, 439.25 MHz, 853.25 MHz); IMD3 measured at 481.25 MHz (note that the related 2-tone IP3 is 3 dB higher than the 3-tone IP3).

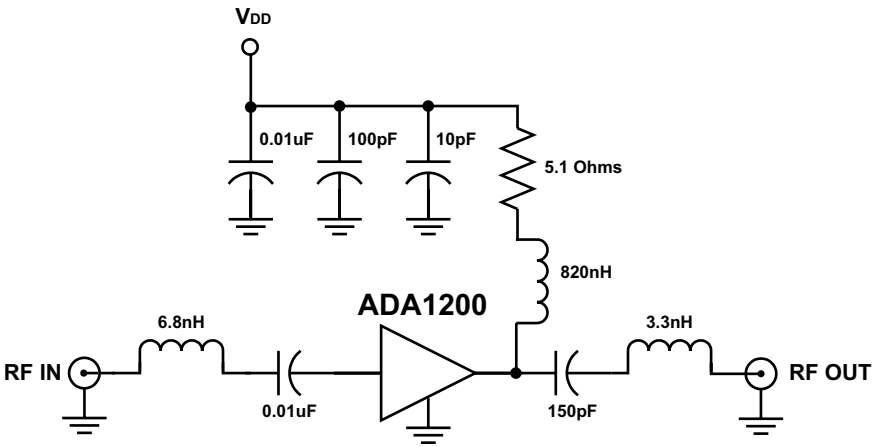


Figure 3: Test Circuit

PERFORMANCE DATA

Figure 4: Gain vs. Frequency (T_A = +25 °C, V_{DD} = +5 V, 75 Ω System)

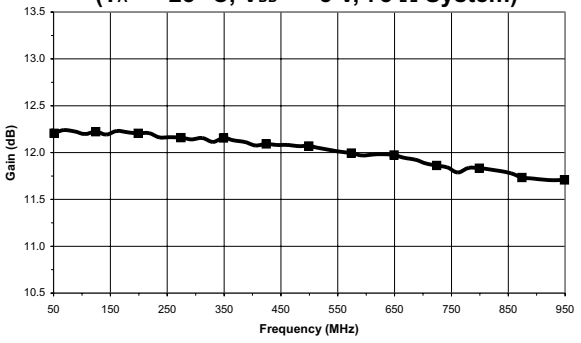


Figure 5: Noise Figure vs. Frequency (T_A = +25 °C, V_{DD} = +5 V, 75 Ω System)

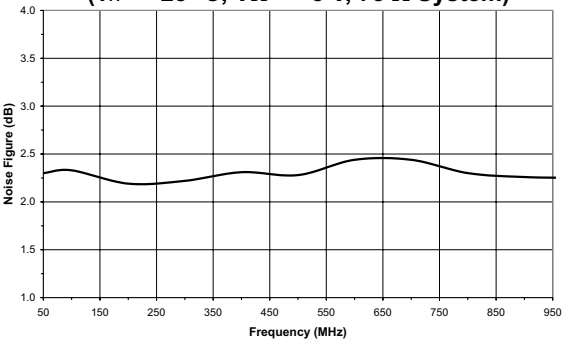


Figure 6: Input Return Loss vs. Frequency (T_A = +25 °C, V_{DD} = +5 V, 75 Ω System)

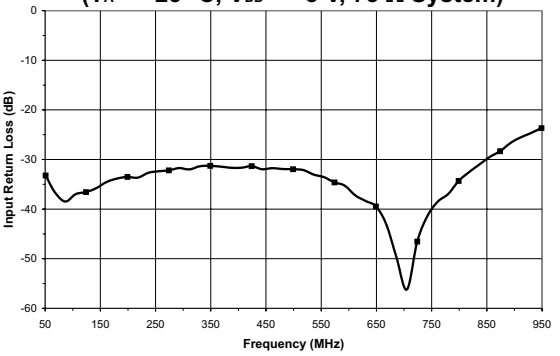


Figure 7: Output Return Loss vs. Frequency (T_A = +25 °C, V_{DD} = +5 V, 75 Ω System)

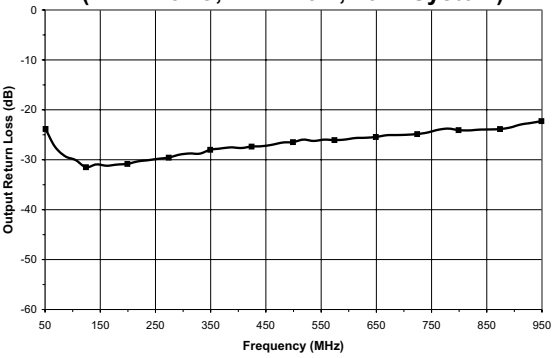


Figure 8: CTB vs. Frequency
(T_A = +25°C, V_{DD} = +5 V, 132 analog channels, +15 dBmV input power per channel)

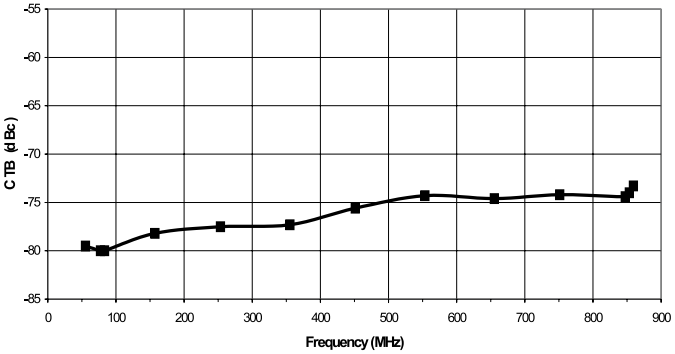


Figure 9: CSO vs. Frequency
(T_A = +25°C, V_{DD} = +5 V, 132 analog channels, +15 dBmV input power per channel)

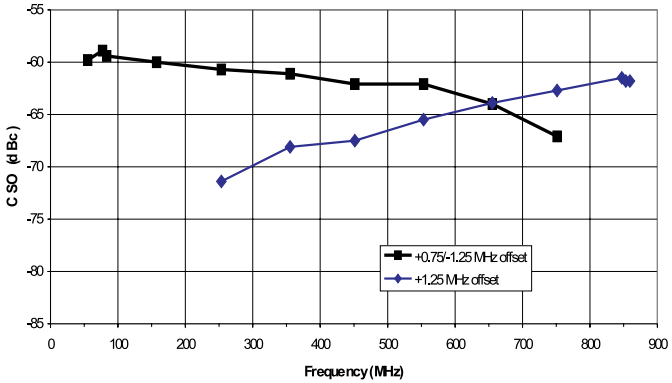
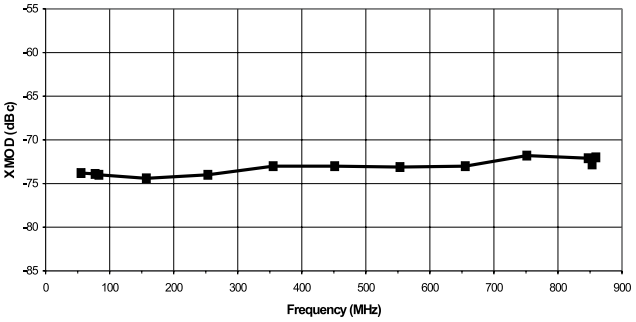
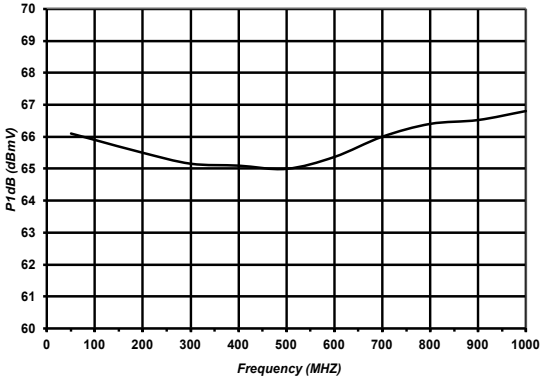


Figure 10: XMOD vs. Frequency
(T_A = +25°C, V_{DD} = +5 V, 132 analog channels, +15 dBmV input power per channel)



P1DB MEASUREMENTS

Figure 11: ADA1200 P1dB vs. Frequency



MER MEASUREMENTS

Figure 12: ADA1200 MER – 64 QAM @ 85 MHz

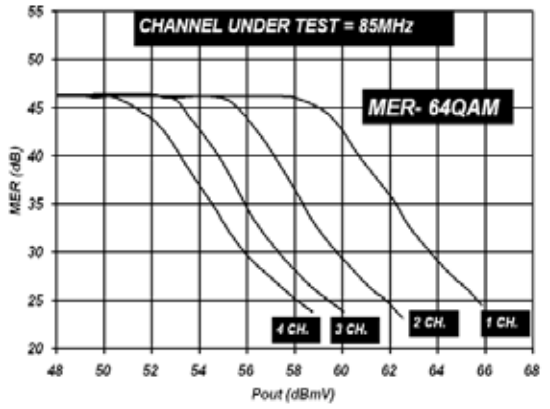


Figure 13: ADA1200 MER – 64 QAM @ 543 MHz

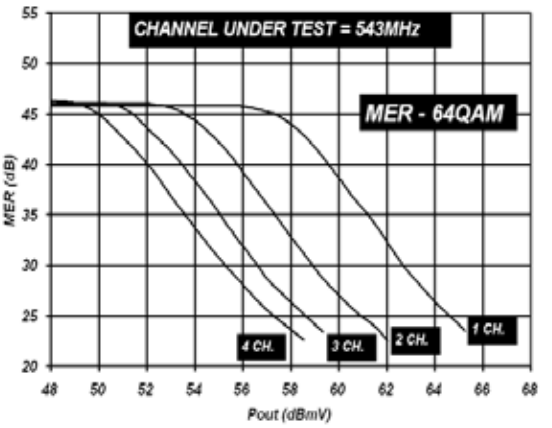


Figure 14: ADA1200 MER – 64 QAM @ 987 MHz

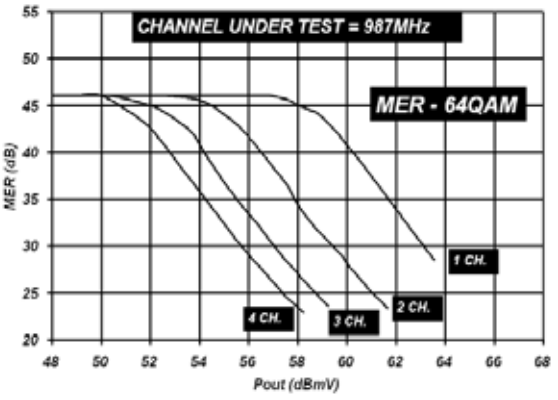


Figure 15: ADA1200 MER – 256 QAM @ 85 MHz

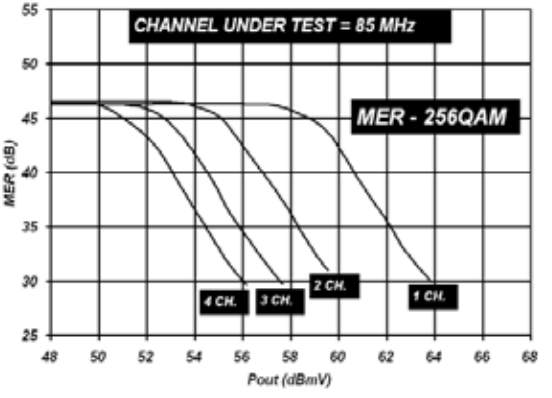


Figure 16: ADA1200 MER – 256 QAM @ 543 MHz

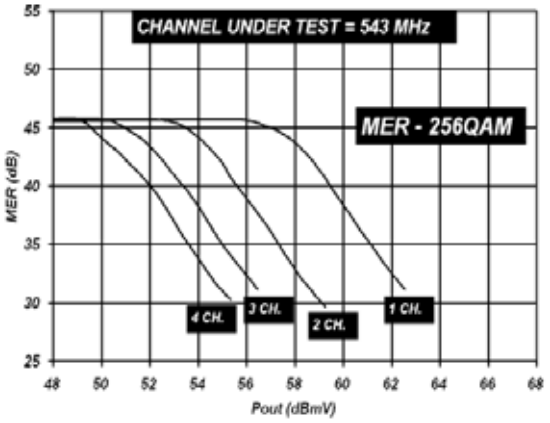
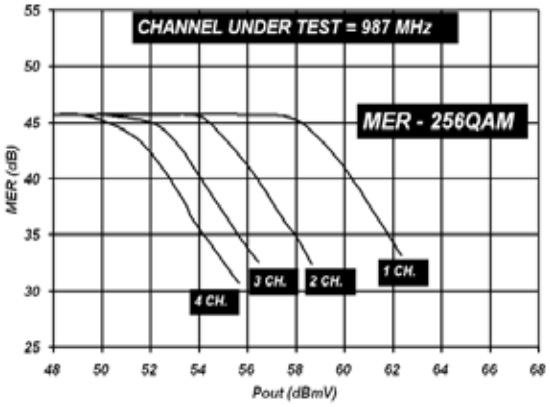


Figure 17: ADA1200 MER – 256 QAM @ 987 MHz

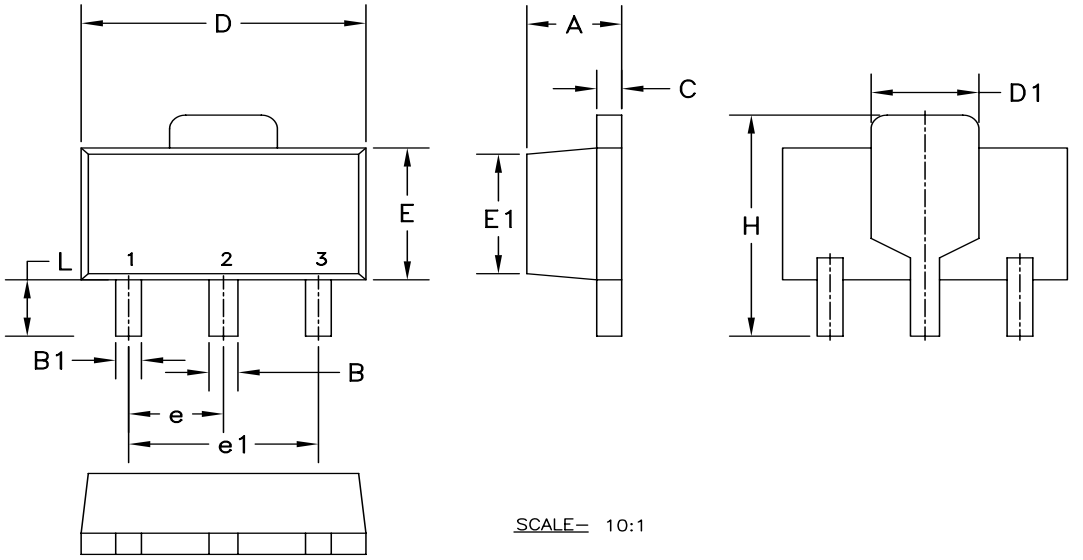


APPLICATION INFORMATION

Table 5: In Circuit S-Parameters
(T_A = +25 °C, V_{DD} = +5.0 VDC, 75 Ω system, ref. Figure 3)

FREQ	S11		S21		S12		S22		K Factor
MHz	DB	ANG	DB	ANG	DB	ANG	DB	ANG	
25	-17.8	-108.4	11.6	-140.4	-17.2	37.8	-13.0	-146.5	1.01
50	-31.1	-103.9	12.3	-171.3	-16.5	8.8	-23.9	-170.5	1.12
100	-37.9	-37.5	12.3	168.9	-16.5	-8.9	-30.2	-169.0	1.12
150	-35.8	-8.2	12.3	155.8	-16.5	-20.6	-31.0	-155.9	1.12
200	-35.2	-1.9	12.2	144.2	-16.6	-30.4	-30.6	-153.9	1.13
250	-33.6	-1.0	12.2	133.3	-16.6	-39.9	-30.1	-157.2	1.13
300	-32.7	-1.6	12.2	122.9	-16.7	-49.2	-29.1	-160.8	1.13
350	-31.9	-3.2	12.1	112.5	-16.7	-58.0	-28.0	-164.1	1.14
400	-32.0	-11.4	12.1	102.1	-16.7	-66.9	-27.4	-167.7	1.14
450	-32.8	-17.0	12.1	91.8	-16.8	-75.8	-27.0	-172.2	1.15
500	-33.2	-23.2	12.1	81.6	-16.8	-84.8	-26.3	-175.8	1.15
550	-35.9	-33.7	12.0	71.4	-16.9	-93.7	-26.3	-112.0	1.16
600	-40.1	-57.8	12.0	61.2	-17.0	-102.6	-25.7	124.4	1.16
650	-46.2	-113.4	12.0	50.8	-17.1	-111.6	-25.3	174.1	1.17
700	-38.1	145.8	11.9	40.5	-17.1	-121.3	-25.0	39.0	1.18
750	-31.0	127.6	11.8	30.0	-17.2	-129.9	-25.0	174.8	1.19
800	-28.2	117.1	11.8	20.1	-17.3	-138.1	-23.6	163.8	1.20
850	-25.0	107.3	11.7	9.6	-17.5	-147.6	-23.3	166.6	1.21
900	-22.4	97.7	11.7	-0.7	-17.5	-156.9	-23.2	167.7	1.22
950	-20.3	90.3	11.6	-11.4	-17.6	-166.0	-22.2	164.1	1.23
1000	-18.3	82.4	11.5	-22.1	-17.8	-175.6	-20.9	160.4	1.24

PACKAGE OUTLINE



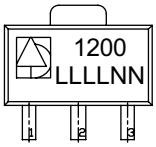
SYMBOL	INCHES	
	MIN.	MAX.
A	0.055	0.063
B	0.017	0.022
B1	0.014	0.019
C	0.014	0.017
D	0.173	0.181
D1	0.066	0.070
E	0.090	0.099
E1	0.084	0.086
e	0.059 BSC	
e1	0.118 BSC	
H	0.155	0.167
L	0.029	0.041

NOTES:

1. CONTROLLING DIMENSIONS: INCHES.
2. TOP PACKAGE ANGLE IS 9° =1°/—2° TOLERANCE. PACKAGE ANGLE IS 3° MAX.
3. PACKAGE CORNER RADIUS IS 5 MILS MAX ON ALL CORNERS.
4. SHINNY PACKAGE FINISH ON ALL SIDES EXCEPT TOP SIDE. FINISH MINIMUM MATTE OF 10—14VDI.

Figure 18: 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 19: Branding Specification

NOTES

ORDERING INFORMATION

PART NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
ADA1200GS24Q1	-40 to +100°C	SOT-89 Package	1,000 piece Tape and Reel

ANADIGICS, Inc.
141 Mount Bethel Road
Warren, New Jersey 07059, U.S.A.
Tel: +1 (908) 668-5000
Fax: +1 (908) 668-5132

URL: http://www.anadigics.com
E-mail: Mktg@anadigics.com