



0.2 – 1.2 GHz LOW NOISE AMPLIFIER WBA0212A¹

WBA0212A LNA is a low noise figure, wideband, and high linearity amplifier with unconditional stable design. The amplifier offers typical noise figure of 0.60 dB and minimum output IP3 of 32 dBm at the frequency range from 200 MHz to 1100 MHz. WBA0212A LNA is most suitable for cellular base stations, wireless data communications, tower top receiver amplifiers, cellular micro-cells, last-mile wireless communication systems, and wireless measurement applications.

WBA0212A LNA can be configured with built-in bias-T for remote DC power supply.



Key Features:

Impedance:	50 Ohm
MTBF ² :	>150,000 hrs (17 Years)
Low Noise:	0.60 dB
Output IP ₃ :	35 dBm typical
Gain:	33.0 dB
Input VSWR:	1.22:1
Output VSWR:	1.25:1
P _{1dB} :	18 dBm typical
Single Power Supply:	95 mA, @ +7 ~ +35 V
Frequency Range:	200 ~ 1100 MHz
Operating Temperature:	-40 ~ +85 °C
Built-In Functions:	DC blocks at input and output, DC-DC converter, sequencing biases, temperature compensation circuits, and auto DC biases.

Absolute Maximum Ratings³:

Symbol	Parameters	Units	Absolute Maximum
V _{dd}	DC Power Supply Voltage	V	+35 V ⁴
I _{dd}	Drain Current	mA	110
P _{diss}	Total Power Dissipation	W	3.0
P _{In,Max}	RF Input Power	dBm	10
T _{ch}	Channel Temperature	°C	160
T _{STG}	Storage Temperature	°C	-55 ~ 125
T _{O,MAX}	Maximum Operating Temperature	°C	-40 ~ 85

¹ Specifications are subject to change without notice.

² MTBF: Mean Time Between Failure, Per TR-NWT-000332, ISSUE 3, SEPTEMBER, 1990, T=40°C

³ Operation of this device above any one of these parameters may cause permanent damage.

⁴ Additional heat sink required.



Specifications:

a) **Table 1** Summary of the electrical specifications of WBA0212A at room temperature

Index	Testing Item	Symbol	Test Constraints	Nom (RT)	Min	Max	Unit
1	Gain	S_{21}	200 - 1100 MHz	33	32	36	dB
2	Gain Variation	ΔG	200 - 1100 MHz	+/- 1.50			dB
3	Input Return Loss	S_{11}	200 - 1100 MHz	20	18		dB
4	Output Return Loss	S_{22}	200 - 1100 MHz	20	18		dB
5	Reverse Isolation	S_{12}	200 - 1100 MHz	43	40		dB
6	Noise figure	NF	200 - 1100 MHz	0.60		0.75	dB
7	Output P_{1dB} compression	P_{1dB}	200 - 1100 MHz	18	16		dBm
8	Output-Third-Order Interception point	$TOIP_3$	Two-Tone, $P_{out} = 0$ dBm each, 1 MHz separation	35	32		dBm
9	Maximum RF Input Power	$P_{IN,MAX}$	200 - 1100 MHz			10	dBm
10	Current Consumption	I_{dd}	$V_{dd} = +7 \sim +25$ V	95			mA
11	Power Supply Voltage	V_{dd}			+7	+35	V
12	Operating Temperature	T_o			-40	+85	$^{\circ}C$

b) Passband Frequency Response

As shown in **Figure 1**, the typical gain of the WBA0212A is 33.0 dB across 200 MHz to 1100 MHz. The typical input and output return losses are 20 dB across the frequency from 200 MHz to 1100 MHz.

Figure 2 shows the measured P_{1dB} and IP_3 of the WBA0212A. The amplifier exhibits constant P_{1dB} and IP_3 performance across the several octave frequency bands. The typical P_{1dB} and IP_3 are 18.0 dBm and 35.0 dBm in the frequency range of 200 MHz to 1100 MHz, respectively.

Figure 3 illustrates the measured noise figure performance at full temperature. The noise figure is typically 0.60 dB across the frequency range of 200 MHz to 1100 MHz at room temperature. The noise figure increases 0.20 dB at +85 C° and decreases 0.15 dB at -40 C° .

Figure 4 demonstrates the stability factor k of the amplifier. k is greater than 1.0 in all frequencies and the amplifier is unconditional stable.

Figure 5 shows the frequency response of WBA0212A in the expanded frequency band.

Figure 7 shows the mechanical outline of WBA0212A. It is a standard WP-6 connectorized housing.

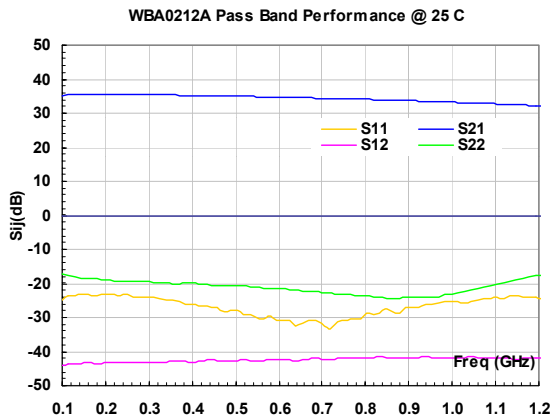


FIG. 1 Typical small signal performance.

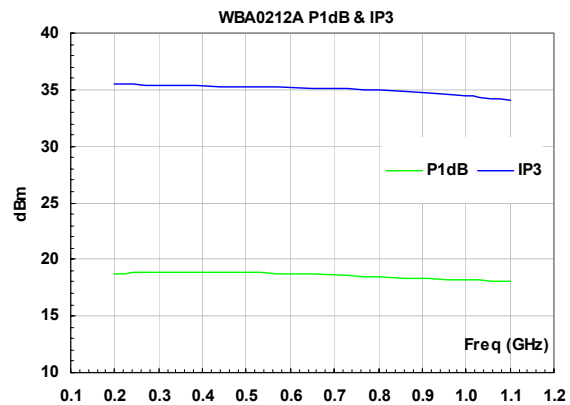


FIG. 2 Typical P_{1dB} and IP_3 at room temperature.

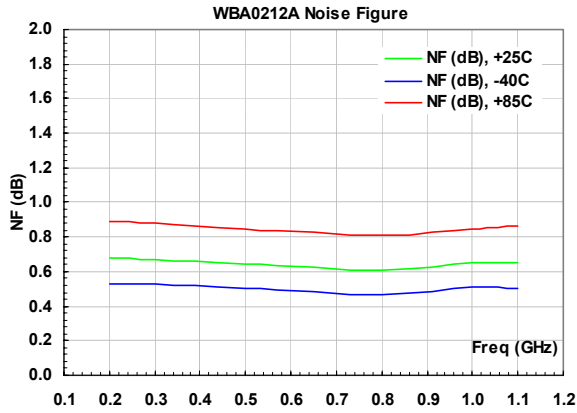


FIG. 3 Noise figure performance at full temperature

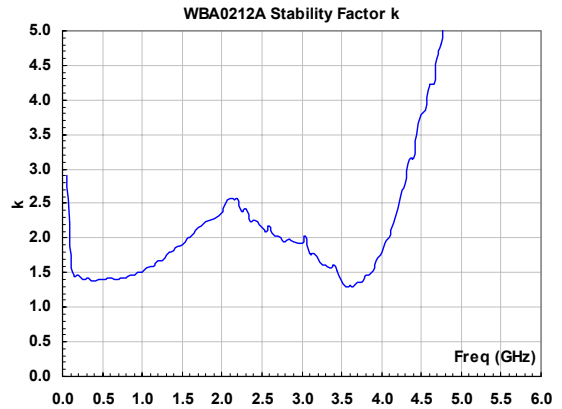


FIG. 4 Stability factor k

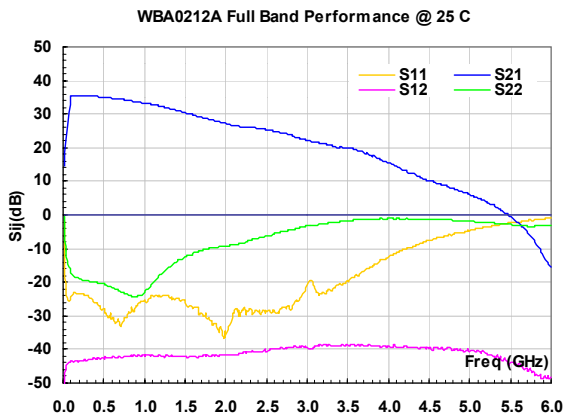


FIG. 5 Frequency response in the extended frequency band

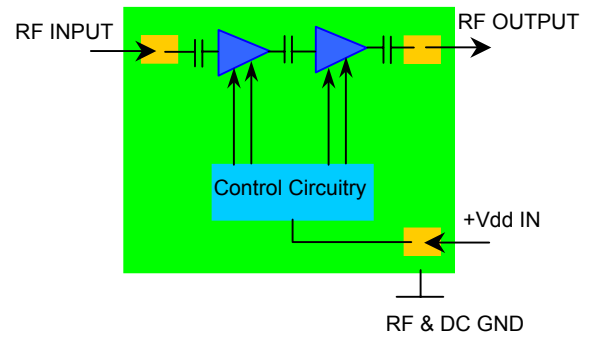


FIG. 6 The internal block diagram

WBA0212A Mechanical Outline: WP-6

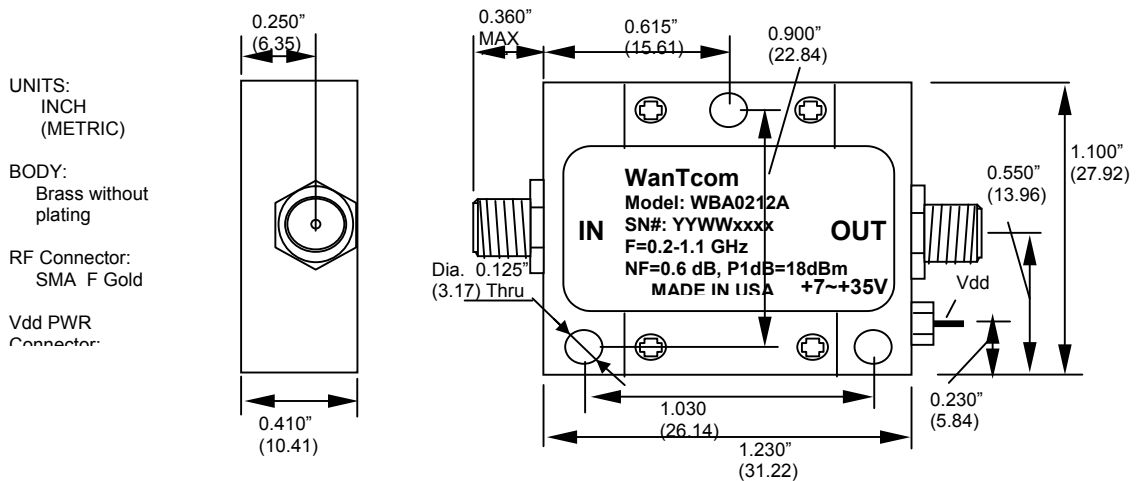


FIG. 6 WP-6 Outline



Ordering Information

Model Number	WBA0212A	WBA0212ABT
Built-In Bias-T	NO	Yes

Small Signal S-Parameters:

IWLA0212A

Is-parameters at Vds=+7 - +35V, Id=100mA. Last updated 3/31/05.

GHZ s MA R 50

IFreq (GHz)	MAGS11	ANGS11	MAGS21	ANGS21	MAGS12	ANGS12	MAGS22	ANGS22
0.05	0.063	138.1	29.240	55.1	0.0057	89.2	0.232	108.1
0.1	0.059	44.1	49.477	31.7	0.0066	39.2	0.137	51.0
0.2	0.068	0.0	58.798	-14.2	0.0066	12.6	0.115	-2.4
0.3	0.063	-27.4	58.603	-40.8	0.0069	0.6	0.106	-34.9
0.4	0.050	-40.6	57.474	-62.7	0.0073	-8.2	0.102	-60.8
0.5	0.039	-52.2	56.060	-83.2	0.0074	-15.9	0.095	-82.3
0.6	0.030	-52.6	54.278	-102.6	0.0075	-24.2	0.086	-99.4
0.7	0.029	-31.1	52.367	-121.3	0.0080	-30.8	0.076	-114.6
0.8	0.036	-27.1	50.374	-139.6	0.0080	-40.4	0.066	-121.2
0.9	0.044	-33.6	48.191	-157.8	0.0081	-49.4	0.064	-120.3
1	0.051	-38.6	45.874	-175.8	0.0082	-56.6	0.073	-117.8
1.1	0.061	-62.6	43.374	166.7	0.0080	-66.1	0.098	-122.8
1.2	0.061	-76.8	40.816	149.6	0.0079	-74.4	0.133	-134.3
1.3	0.063	-93.0	38.263	132.3	0.0079	-81.9	0.170	-152.0
1.4	0.055	-110.3	35.322	115.6	0.0080	-87.9	0.206	-171.1
1.5	0.050	-126.0	32.791	99.8	0.0081	-96.6	0.238	168.0
1.6	0.041	-146.8	30.444	83.9	0.0080	-103.8	0.268	147.2
1.7	0.031	-163.5	28.093	68.2	0.0079	-110.9	0.292	126.6
1.8	0.027	-171.7	25.922	53.7	0.0081	-120.8	0.313	106.6
1.9	0.019	153.6	24.323	39.6	0.0083	-130.9	0.331	85.8
2	0.013	167.1	22.766	24.7	0.0085	-138.6	0.344	65.8
2.1	0.033	163.6	21.142	11.0	0.0083	-145.6	0.351	48.1
2.2	0.036	129.2	20.059	-1.9	0.0085	-152.0	0.377	31.9
2.3	0.037	103.2	19.748	-15.6	0.0089	-163.1	0.418	12.1
2.4	0.035	83.5	19.136	-31.4	0.0095	-172.7	0.458	-7.4
2.5	0.034	58.6	18.325	-48.0	0.0100	175.4	0.492	-27.4
2.6	0.035	52.4	17.151	-63.2	0.0100	163.9	0.532	-48.6
2.7	0.040	27.7	16.750	-78.4	0.0100	152.6	0.571	-69.1
2.8	0.038	21.3	15.874	-95.7	0.0110	140.2	0.611	-89.3
2.9	0.056	15.7	14.095	-110.2	0.0110	127.4	0.649	-110.0
3	0.088	-2.1	13.205	-121.9	0.0110	117.3	0.693	-130.3
3.1	0.083	-41.9	12.658	-134.5	0.0120	110.9	0.717	-150.2
3.2	0.073	-43.4	11.948	-149.2	0.0120	96.3	0.750	-168.0
3.3	0.076	-39.4	11.012	-162.7	0.0120	82.8	0.781	173.6
3.4	0.096	-45.2	10.156	-174.8	0.0110	72.9	0.810	154.8
3.5	0.102	-50.3	10.111	171.3	0.0120	62.9	0.833	137.7
3.6	0.123	-52.9	9.455	152.8	0.0110	50.9	0.858	120.5
3.7	0.147	-64.8	8.420	135.9	0.0120	39.1	0.870	104.2
3.8	0.171	-76.4	7.451	121.1	0.0110	29.8	0.879	88.8
3.9	0.206	-88.5	6.583	105.4	0.0110	20.1	0.889	74.2
4	0.235	-101.4	5.783	91.4	0.0110	13.2	0.888	59.5
4.1	0.274	-114.9	4.975	75.6	0.0110	3.2	0.887	45.7
4.2	0.309	-130.5	4.200	62.9	0.0110	-3.6	0.884	32.7
4.3	0.329	-142.2	3.739	51.0	0.0110	-13.6	0.879	20.6
4.4	0.380	-152.0	3.268	34.8	0.0110	-19.4	0.877	7.5
4.5	0.418	-166.2	2.799	22.9	0.0110	-26.8	0.867	-4.2
5	0.592	132.9	1.980	-48.9	0.0097	-68.2	0.812	-59.8
5.5	0.764	73.7	1.316	-113.9	0.0069	-106.2	0.739	-111.0
6	0.905	18.9	0.571	-136.3	0.0037	-109.4	0.732	-151.4
