



500-1000 MHz LOW NOISE AMPLIFIER WBA0510 SERIES¹

WBA0510 series LNA are the super low noise figure, wideband, and high linearity amplifiers with unconditional stable design. The amplifier offers typical noise figure of 0.40 to 0.50 dB and minimum output IP3 of 30 dBm at the frequency range from 500 MHz to 1000 MHz. WBA0510 series LNA are 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.

WBA0510 series LNA can be configured with built-in bias-T for remote 5 V DC power supply.



Key Features:

Unconditional Stability:	k>1
Low Noise:	0.50+/-0.05 dB, WBA0510A 0.45+/-0.05 dB, WBA0510AN 0.40+/-0.05 dB, WBA0510AS
Output IP3:	30 dBm minimum
Gain:	38 dB
P1dB:	15 dBm minimum
Current Consumption:	100 mA @ +5V, option: built-in bias-T for remote power supply
Frequency Range:	500 ~ 1000 MHz
Operating Temperature:	-40 ~ +85 °C
Return Losses:	>16 dB

Specifications:

a) Table 1 Summary of the electrical specifications WBA0510 at room temperature

Index	Testing Item	Symbol	Test Constraints	Unit	Nom (RT)	Min	Max	Unit
1	Gain	S21	500 - 1000	MHz	38	36	40	dB
2	Gain Variation	ΔG	20 MHz Bandwidth	MHz	0.10		0.25	dB
3	Input Return Loss	S11	500 - 1000	MHz	20	16		dB
4	Output Return Loss	S22	500 - 1000	MHz	18	16		dB
5	Reverse Isolation	S12	500 - 1000	MHz	60	50		dB
6	Noise Figure	NF	500 - 1000	MHz				
			WBA0510A		0.50	0.45	0.63	dB
			WBA0510AN		0.45	0.40	0.53	dB
			WBA0510AS		0.40	0.35	0.47	dB
7	Output compression P1dB	P1dB	500 - 1000	MHz	16	15		dBm
8	Output-Third-Order Interception point	TOIP3	Two-Tone, +0 dBm each, 1 MHz separation	MHz	32	30		dBm
10	Current Consumption	I _{dd}	V _{dd} = +5	V	100			mA
11	Power Supply Voltage	V _{dd}			+5	+4.5	+5.5	V

¹ Specifications are subject to change without notice.



b) Passband Frequency Response

As shown in **Figure 1**, the typical gain of the WBA0510AN is 37 dB across 500 MHz to 1000MHz. The input and output return losses are typical to be 20 dB.

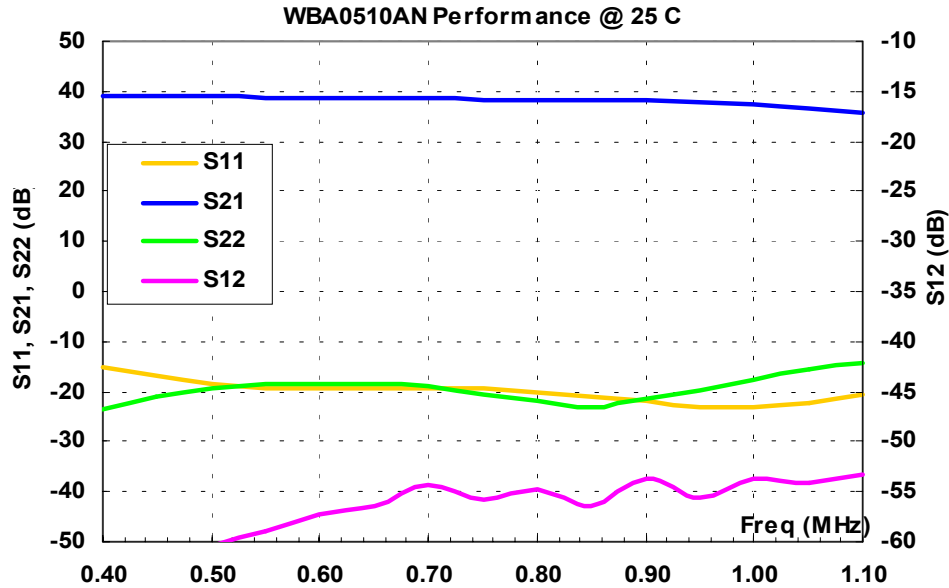


FIG. 1 Typical small signal performance of WBA0510AN

c) Output Power

Figure 2 shows the output power vs. input power of WBA0510AN.

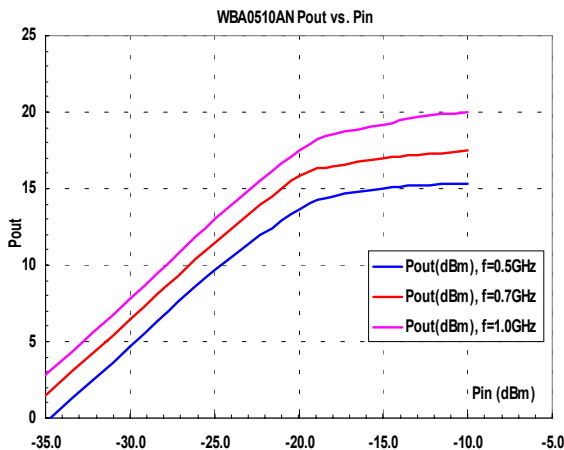


FIG. 2 Typical output power at room temperature.

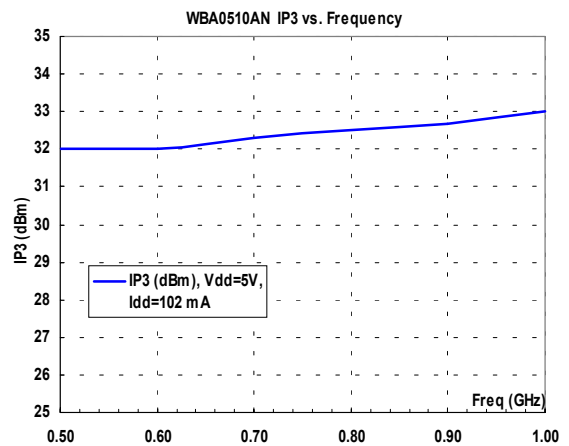


FIG. 3 Output IP3 of WBA0510AN.



d) Output IP3

Figure 3 demonstrate the output IP3 performance of WBA0510AN. The typical IP3 is better than 32 dBm.

e) Noise Figure

The noise figure of WBA0510AN is as low as 0.45 dB at room temperature and increase to 0.65 dB at +85 °C.

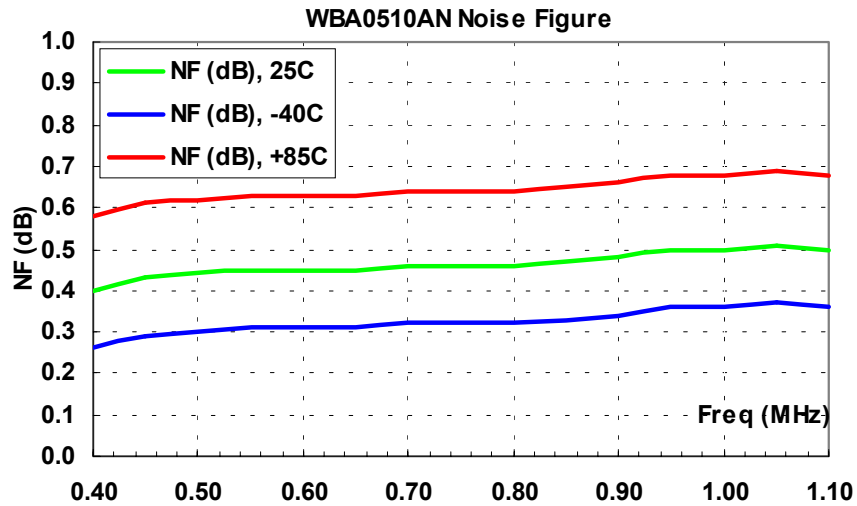


FIG. 4 WBA0510AN noise figure performance at full temperature

f) WBA0510AN Mechanical Outline: WP-5

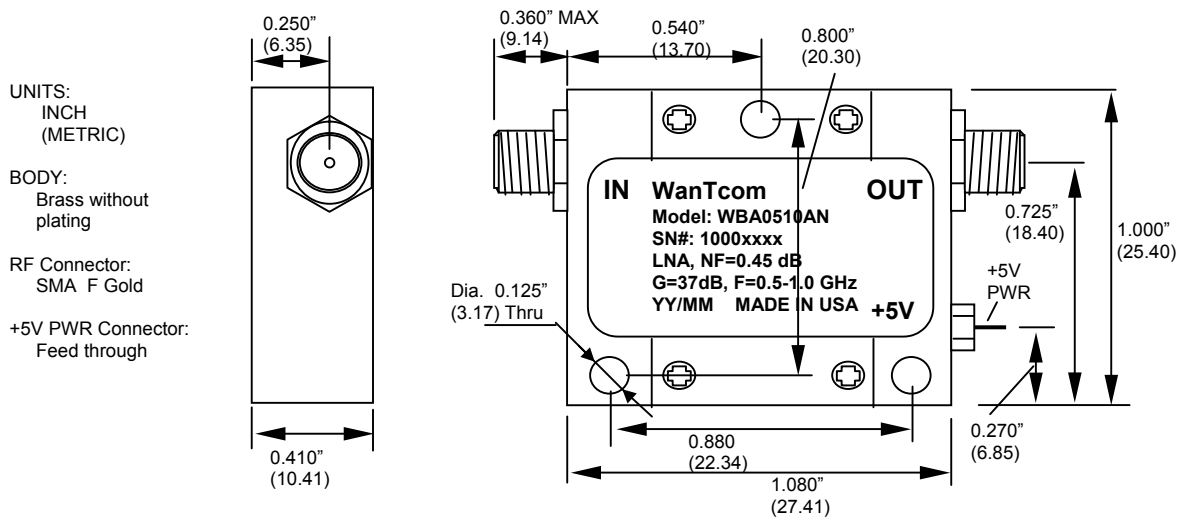


FIG. 5 WP-5 Outline



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g) Ordering Information

NF (dB)	0.50	0.45	0.40	Built-In Bias-T
Model Number:	WBA0510A	WBA0510AN	WBA0510AS	No
	WBA0510ABT	WBA0510ANBT	WBA0510ASBT	Yes

h) Small Signal S-Parameters:

IWBA0510AN

Is-parameters at Vds=5V, Id=102mA. Last updated 9/11/02.

GHz s MA R 50

IF(GHz) MAG S11 ANG S11 MAG S21 ANG S21 MAG S12 ANG S12 MAG S22 ANG S22

0.05	0.02	60.5	2.59	-137.2	0.00023	122.6	0.68	172.5
0.1	0.39	50.3	19.26	175.9	0.00016	86.8	0.49	124.3
0.2	0.61	-39.4	76.49	71.0	0.00049	161.1	0.22	61.5
0.3	0.32	-77.2	85.12	9.9	0.00033	151.3	0.05	-1.3
0.4	0.18	-85.8	88.60	-27.5	0.00063	125.7	0.07	-122.3
0.5	0.12	-75.9	87.96	-58.5	0.00095	80.3	0.11	-174.4
0.6	0.11	-66.2	85.57	-85.1	0.00138	87.8	0.12	150.2
0.7	0.11	-68.8	83.87	-109.7	0.00192	85.3	0.11	114.7
0.8	0.10	-74.8	83.14	-133.9	0.00184	88.8	0.08	57.8
0.9	0.08	-77.6	79.78	-159.6	0.00209	70.1	0.09	-22.7
1	0.07	-58.2	72.64	174.3	0.00208	56.6	0.13	-87.1
1.1	0.09	-49.3	61.60	150.5	0.00219	48.3	0.19	-125.7
1.2	0.13	-59.0	50.84	131.3	0.00235	51.3	0.22	-155.4
1.3	0.14	-75.7	43.90	116.4	0.00256	46.8	0.21	-177.1
1.4	0.14	-90.0	39.51	101.8	0.00320	40.0	0.20	178.9
1.5	0.14	-103.6	35.09	84.3	0.00358	23.5	0.23	175.8
1.6	0.15	-118.3	30.53	66.6	0.00427	22.8	0.28	168.0
1.7	0.14	-135.7	28.79	55.2	0.00491	15.8	0.29	156.6
1.8	0.14	-149.4	26.08	40.4	0.00566	3.5	0.33	147.2
1.9	0.14	-169.2	22.96	24.8	0.00535	-3.7	0.35	137.0
2	0.15	171.2	20.95	10.7	0.00616	-13.7	0.38	126.7
2.1	0.17	150.9	19.51	-2.9	0.00611	-22.7	0.40	116.6
2.2	0.19	128.9	18.18	-16.4	0.00688	-33.2	0.41	106.2
2.3	0.22	107.5	17.66	-30.8	0.00716	-40.5	0.41	96.9
2.4	0.26	87.2	16.94	-44.8	0.00699	-53.3	0.42	88.0
2.5	0.32	67.9	15.38	-60.0	0.00805	-68.1	0.42	80.5
2.6	0.38	48.1	14.19	-79.6	0.00858	-80.3	0.41	73.7
2.7	0.46	28.5	14.01	-100.1	0.00892	-96.6	0.41	68.9
2.8	0.54	8.4	13.64	-117.8	0.00943	-115.5	0.42	64.7
2.9	0.62	-11.7	12.33	-136.0	0.00989	-127.2	0.44	61.5
3	0.68	-32.5	10.64	-158.4	0.00987	-148.7	0.49	56.1
3.5	0.60	-112.5	3.19	99.4	0.00342	100.3	0.68	6.6
4	0.54	-150.3	0.49	29.5	0.00303	-1.6	0.73	-42.4
4.5	0.61	166.0	0.11	121.8	0.00234	-67.6	0.74	-85.9
5	0.52	122.2	0.07	83.2	0.00221	-94.6	0.76	-127.2
5.5	0.33	73.3	0.09	165.2	0.00222	-114.6	0.79	-166.0
6	0.08	158.9	0.23	128.9	0.00311	-134.8	0.82	157.1