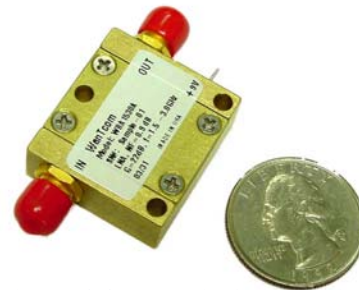




1400- 3000 MHz LOW NOISE POWER AMPLIFIER WBA1530A¹

WBA1530A LNA is a low noise figure, wideband, and high linearity power amplifiers with unconditional stable design. The amplifier offers typical noise figure of 1.0 dB, 22 dB gain, and output IP₃ of 42 dBm at the frequency range from 1400 MHz to 3000 MHz.

WBA1530A is most suitable for cellular base stations, wireless data communications, tower top amplifiers, cellular micro-cells, last-mile wireless communication systems, MMDS, WLL, and wireless measurement applications.



Additional heat sink required!

Key Features:

Impedance:	50 Ohm
MTBF ² :	>300,000 hrs (34 Years)
Unconditional Stable:	k>1
Low Noise:	1.0 dB
Output IP ₃ :	42 dBm typical
Gain:	22 dB
Input VSWR:	1.25
Output VSWR:	1.45 maximum
P _{1dB} :	26 dBm typical
Single Power Supply:	220 mA, @ +9V
Frequency Range:	1400 ~ 3000 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	10.0
I _{dd}	Drain Current	mA	250
P _{diss}	Total Power Dissipation	W	2.5
P _{In,Max}	RF Input Power	dBm	10
T _{ch}	Channel Temperature	°C	150
T _{STG}	Storage Temperature	°C	-55 ~ 125
T _{O,MAX}	Maximum Operating Temperature	°C	-40 ~ 85
R _{th,c}	Thermal Resistance	°C/W	30

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.



Specifications:

a) **Table 1** Summary of the electrical specifications of WBA1530A at room temperature

Index	Testing Item	Symbol	Test Constraints	Nom (RT)	Min	Max	Unit
1	Gain	S_{21}	1400 - 3000 MHz	22	21.5	24.5	dB
2	Gain Variation	ΔG	1400 - 3000 MHz	+/- 1.0		+/- 1.5	dB
3	Input Return Loss	S_{11}	1400 - 3000 MHz	20	16		dB
4	Output Return Loss	S_{22}	1400 - 3000 MHz	18	14		dB
5	Reverse Isolation	S_{12}	1400 - 3000 MHz	40	35		dB
6	Noise figure	NF	1400 - 3000 MHz	1.0		1.5	dB
7	Output P_{1dB} compression	P_{1dB}	1400 - 3000 MHz	26	24		dBm
8	Output-Third-Order Interception point	$TOIP_3$	Two-Tone, $P_{out} +10$ dBm each, 1 MHz separation	42	41		dBm
9	Maximum RF Input Power	$P_{IN,MAX}$	1400 - 3000 MHz			10	dBm
10	Current Consumption	I_{dd}	$V_{dd} = +9$ V	220		240	mA
11	Power Supply Voltage	V_{dd}		+9.0	+8.7	+9.3	V
12	Operating Temperature	T_o			-40	+85	$^{\circ}C$

b) Passband Frequency Response

As shown in **Figure 1**, the typical gain of the WBA1530A is 22.0 dB across 1.40 to 3.0 GHz. The typical input and output return losses are 20 dB and 16 dB across the frequency of 1.40 to 3.0 GHz.

Figure 2 shows the measured P_{1dB} and IP_3 of the WBA1530A. The typical P_{1dB} and IP_3 are 27.0 dBm and 42.0 dBm in the frequency range of 1.40 to 3.0 GHz, respectively.

Figure 3 illustrates the measured noise figure performance at full temperature. The noise figure is from 1.0 to 1.50 dB across the frequency range of 1.40 to 3.0 GHz at room temperature. At 85 $^{\circ}C$, WBA1530A only has 0.35 dB noise increases. At -40 $^{\circ}C$, WBA1530A offers approximately 0.25 dB less noise figure than that at room temperature.

Figure 4 demonstrates the stability factor k of the amplifier. It is greater than 1.0 in full frequency band and the amplifier is unconditional stable.

Figure 5 is the frequency response of WBA1530A in the extended frequencies. The amplifier works from 1.20 to 3.3 GHz.

Figure 6 shows the mechanical outline and recommended motherboard layout of WBA1530A. It is a standard WP-5 connectorized housing.

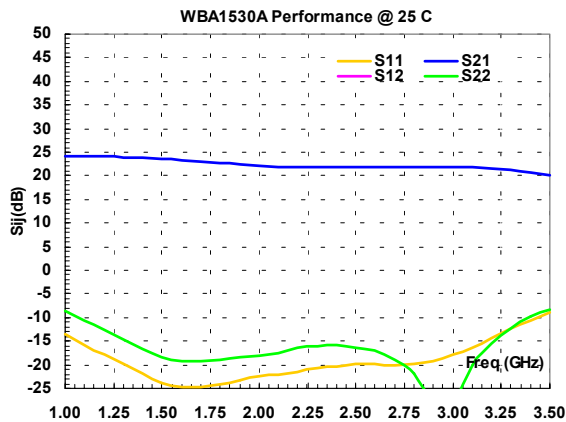


FIG. 1 Typical small signal performance.

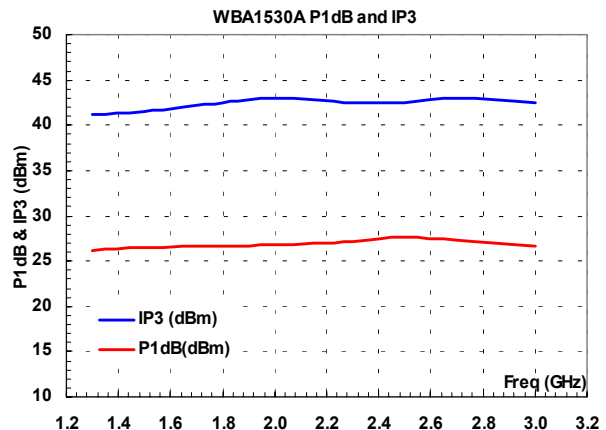


FIG. 2 Typical P_{1dB} and IP_3 at room temperature.

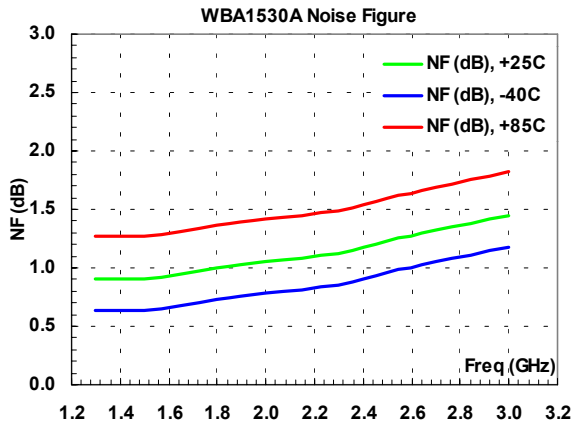


FIG. 3 Noise figure performance at full temperature

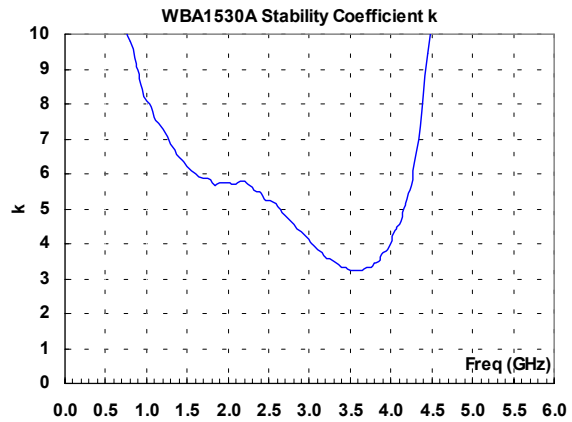


FIG. 4 Stability factor k

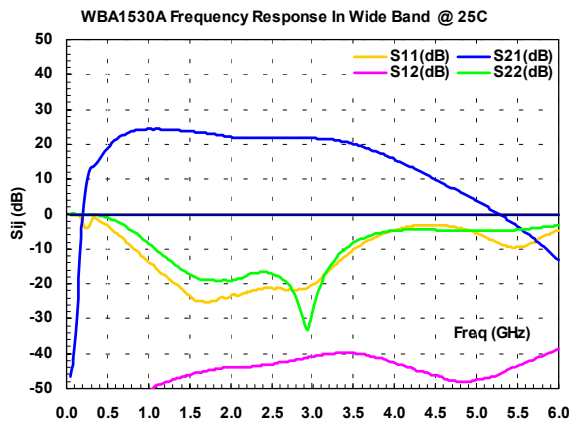


FIG. 5 Frequency response in the extended frequencies

WBA1530A Mechanical Outline: WP-5

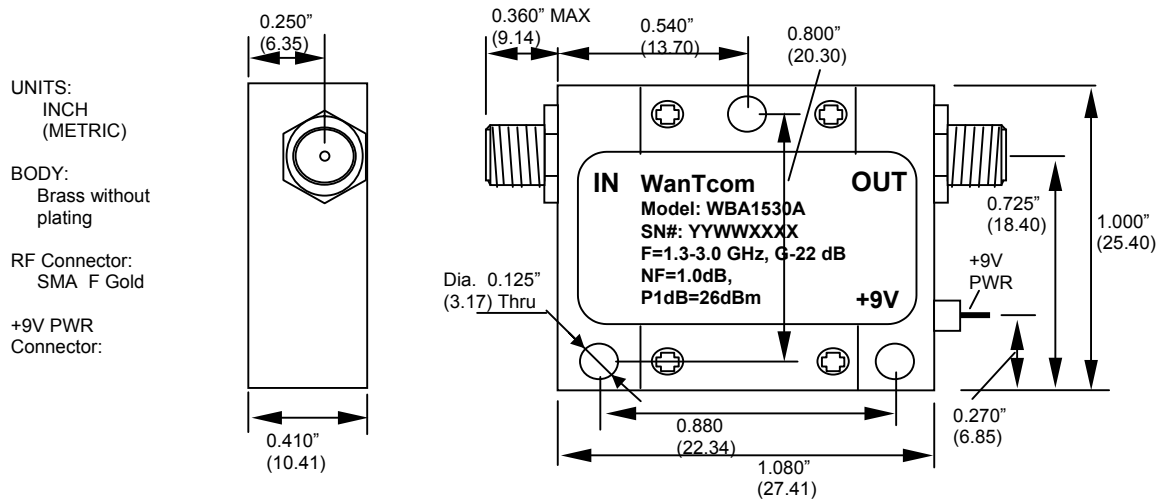


FIG. 4 WP-5 Outline



Ordering Information

Model Number:	WBA1530A
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Small Signal S-Parameters:

!WBA1530A

!s-parameters at Vdd=9V, Idd=210mA. Last updated 12/27/03.

GHZ s MA R 50

!F(GHz)	MAG S11	ANG S11	MAG S21	ANG S21	MAG S12	ANG S12	MAG S22	ANG S22
0.05	0.985	-16.0	0.002	111.2	0.00010	-95.4	0.998	-14.5
0.1	0.969	-27.8	0.047	62.1	0.00006	-89.4	0.992	-24.2
0.2	0.478	-81.9	1.562	-59.6	0.00007	40.1	0.985	-48.6
0.3	0.798	-32.8	3.039	-143.7	0.00009	-47.2	0.964	-72.7
0.4	0.812	-73.6	5.370	153.9	0.00029	-72.4	0.939	-97.4
0.5	0.680	-97.9	8.051	112.4	0.00060	-117.2	0.878	-122.3
0.6	0.556	-118.6	10.655	74.6	0.00108	-138.4	0.788	-146.2
0.7	0.444	-136.6	12.844	40.0	0.00163	-165.4	0.684	-168.2
0.8	0.347	-152.5	14.459	8.9	0.00213	171.9	0.574	171.8
0.9	0.269	-166.8	15.443	-18.8	0.00265	151.8	0.468	154.6
1	0.208	-179.6	15.898	-44.0	0.00323	133.1	0.376	140.1
1.1	0.163	167.8	15.976	-67.2	0.00367	116.8	0.296	128.3
1.2	0.130	155.9	15.902	-88.7	0.00404	103.9	0.233	120.1
1.3	0.102	139.8	15.672	-108.7	0.00446	89.8	0.184	114.7
1.4	0.080	122.1	15.385	-127.6	0.00490	79.1	0.147	114.1
1.5	0.065	97.8	15.106	-145.6	0.00526	67.0	0.122	116.7
1.6	0.058	70.3	14.737	-162.9	0.00559	56.6	0.110	121.4
1.7	0.058	38.6	14.306	-179.7	0.00588	46.1	0.109	125.6
1.8	0.062	8.7	13.769	164.0	0.00626	36.5	0.114	127.6
1.9	0.070	-18.8	13.206	148.5	0.00652	27.3	0.120	126.6
2	0.075	-41.4	12.648	134.2	0.00681	16.9	0.124	124.5
2.1	0.079	-58.6	12.281	121.2	0.00701	7.4	0.131	124.8
2.2	0.085	-72.6	12.185	108.0	0.00693	-0.6	0.149	118.2
2.3	0.092	-86.7	12.241	93.9	0.00706	-7.4	0.159	108.8
2.4	0.096	-101.6	12.326	79.3	0.00723	-14.5	0.162	97.0
2.5	0.101	-118.2	12.426	64.5	0.00749	-20.4	0.154	84.7
2.6	0.102	-139.3	12.462	49.7	0.00778	-27.4	0.140	71.2
2.7	0.100	-161.4	12.468	34.6	0.00821	-34.3	0.114	54.3
2.8	0.103	174.4	12.460	18.7	0.00881	-41.8	0.080	36.2
2.9	0.109	148.1	12.434	2.4	0.00925	-51.2	0.042	-3.6
3	0.127	119.0	12.357	-14.4	0.00997	-60.9	0.042	-102.2
3.1	0.154	88.9	12.206	-31.4	0.01000	-71.1	0.097	-148.7
3.2	0.190	62.7	11.915	-49.0	0.01100	-82.4	0.169	-172.9
3.3	0.243	39.4	11.449	-67.1	0.01100	-95.0	0.242	169.3
3.4	0.296	18.2	10.852	-85.0	0.01100	-108.9	0.320	151.2
3.5	0.357	-1.5	10.175	-102.7	0.01100	-122.6	0.387	134.4
3.6	0.415	-20.6	9.357	-120.2	0.01100	-135.0	0.447	119.1
3.7	0.475	-37.7	8.443	-137.4	0.00994	-149.7	0.492	104.1
3.8	0.534	-55.0	7.518	-154.5	0.00924	-162.3	0.530	90.3
3.9	0.585	-70.0	6.658	-170.5	0.00846	-176.0	0.557	76.7
4	0.627	-85.8	5.876	173.9	0.00807	170.6	0.571	64.5
4.1	0.659	-100.5	5.177	159.4	0.00734	157.7	0.584	52.9
4.2	0.691	-114.7	4.504	145.6	0.00666	143.8	0.591	41.9
4.3	0.709	-128.1	3.885	131.7	0.00600	130.4	0.590	31.7
4.4	0.711	-141.6	3.354	117.9	0.00555	115.5	0.591	22.1
4.5	0.706	-154.7	2.914	104.5	0.00504	101.2	0.588	13.0
5	0.531	151.9	1.411	38.6	0.00444	40.2	0.572	-26.3
5.5	0.330	150.3	0.634	-34.5	0.00701	-3.0	0.615	-59.4
6	0.617	139.2	0.278	-100.8	0.01200	-44.7	0.712	-92.6