



1700- 3000 MHz LOW NOISE AMPLIFIER WBA1730-40A¹

WBA1730-40A LNA is a low noise figure, wideband, and high linearity amplifier with unconditional stable design. The amplifier offers 0.80 dB typical noise figure, 40 dB gain, and 26 dBm output IP₃ at the frequency range from 1700 MHz to 3000 MHz.

WBA1730-40A is most suitable for cellular base stations, wireless data communications, tower top receiver amplifiers, cellular micro-cells, last-mile wireless communication systems, MMDS, WLL, and wireless measurement applications.

WBA1730-40A is designed to meet the rugged standards of MIL-STD-202 and RoHS compliant.



Key Features:

Impedance:	50 Ohm
Low Noise:	0.80 dB
Output IP ₃ :	26 dBm typical
Gain:	40 dB
Input Return Loss:	14 minimum
Output Return Loss:	16 dB minimum
P _{1dB} :	16.0 dBm typical
Single Power Supply:	100 mA, @ +5V
Frequency Range:	1700 ~ 3000 MHz
Operating Temperature:	-40 ~ +85 °C
Small size:	SMA Female, 1.00" x 1.08" x 0.41" (25.4 mm x 27.4 mm x 10.4 mm) gold plated housing.
Built-in Functions:	DC blocks at input and output, temperature compensation circuits, and auto DC biases.

Absolute Maximum Ratings²:

Symbol	Parameters	Units	Absolute Maximum
V _{dd}	DC Power Supply Voltage	V	5.5
I _{dd}	Drain Current	mA	120
P _{diss}	Total Power Dissipation	mW	600
P _{In,Max}	RF Input Power	dBm	10
T _{ch}	Channel Temperature	°C	150
T _{STG}	Storage Temperature	°C	-65 ~ 150
T _{O,MAX}	Maximum Operating Temperature	°C	-55 ~ 100
R _{th,c}	Thermal Resistance	°C/W	220

¹ Specifications are subject to change without notice.

² Operation of this device above any one of these parameters may cause permanent damage.



Specifications:

Table 1 Summary of the electrical specifications of WBA1730-40A at room temperature

Index	Testing Item	Symbol	Test Constraints	Nom (RT)	Min	Max	Unit
1	Gain	S_{21}	1700 - 3000 MHz	40	39	42	dB
2	Gain Variation	ΔG	1700 - 3000 MHz	+/- 0.75		+/- 1.5	dB
3	Input Return Loss	S_{11}	1700 - 3000 MHz		14		dB
4	Output Return Loss	S_{22}	1700 - 3000 MHz		16		dB
5	Reverse Isolation	S_{12}	1700 - 3000 MHz	55	50		dB
6	Noise figure	NF	1700 - 3000 MHz	0.8		1.10	dB
7	Output P_{1dB} compression	P_{1dB}	1700 - 3000 MHz	16	15		dBm
8	Output-Third-Order Interception point	$TOIP_3$	Two-Tone, P_{out} +0 dBm each, 1 MHz separation	26	25		dBm
9	Current Consumption	I_{dd}	$V_{dd} = +5$ V	100			mA
10	Power Supply Voltage	V_{dd}		+5	+4.9	+5.1	V
11	Maximum Input RF Average Power	$P_{IN,MAX}$	1700 - 3000 MHz			10.0	dBm
12	Operating Temperature	T_o			-40	+85	°C

As shown in **Figure 1**, the typical gain of the WBA1730-40A is 40 dB across 1700 MHz to 3000MHz. The input and output return losses are better than 14 dB and 16 dB, respectively. The stability factor k is always greater than 1 at any frequencies, as shown in **Figure 2**.

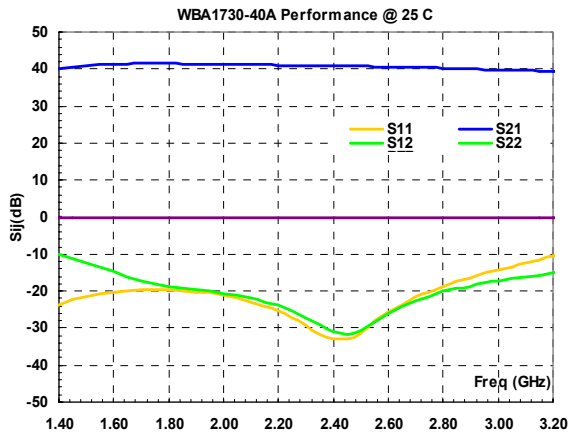


FIG. 1 Typical small signal performance

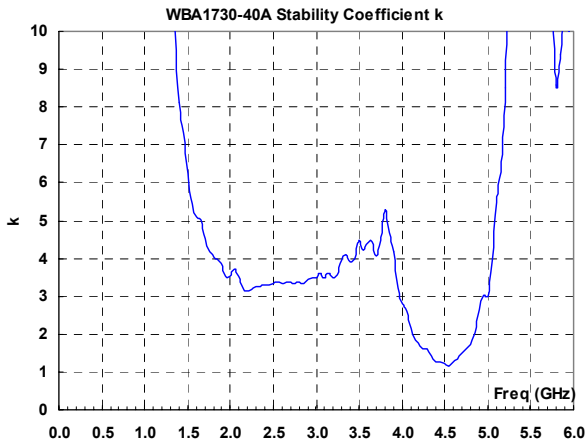


FIG. 2 The stability factor k of WBA1730-40A

The noise figure, as shown in **Figure 3**, of WBA1730-40A is 0.80 dB at room temperature and only increase 0.30 dB at +85 °C.

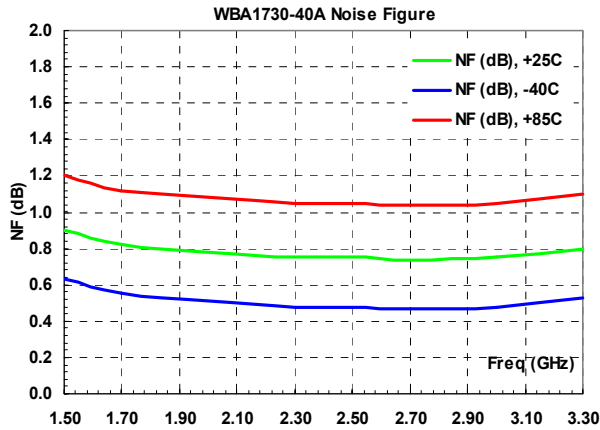


FIG. 3 WBA1730-40A noise figure performance at full temperature

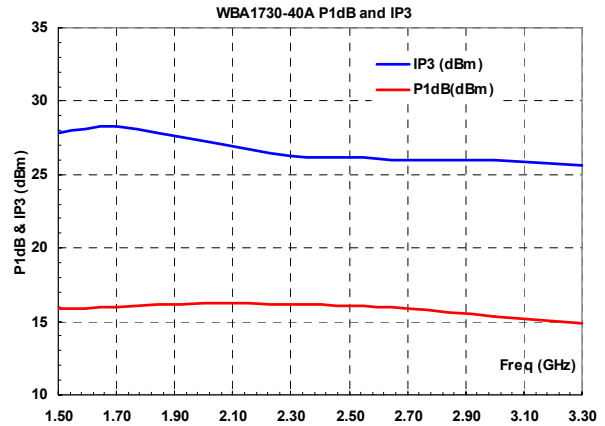


Fig. 4 The output 1-dB compression point and IP₃ of WBA1730-40A

The output 1-dB compression point and IP₃ are shown in **Figure 4**. WBA1730-40A offers typical 16.0 dBm of P_{1dB} and 26.0 dBm of IP₃.

The standard miniature housing, WP-5 is employed for the WBA0510 series amplifiers. There are three (3) mounting through holes, with the diameter of 0.125", for installing the amplifier on a chaste. The housing is made of bare brass based material with gold plating, which serves as the DC and RF ground. The +5.0V DC power supply is fed through a feedthru as shown in **Figure 5**. No external component is required for the operation of the amplifiers. The input and output connectors are SMA female. A standard 8-inch/lb SMA wrench should be used to connect cables to the amplifiers. Failing to do so may result permanent damage of the connectors.

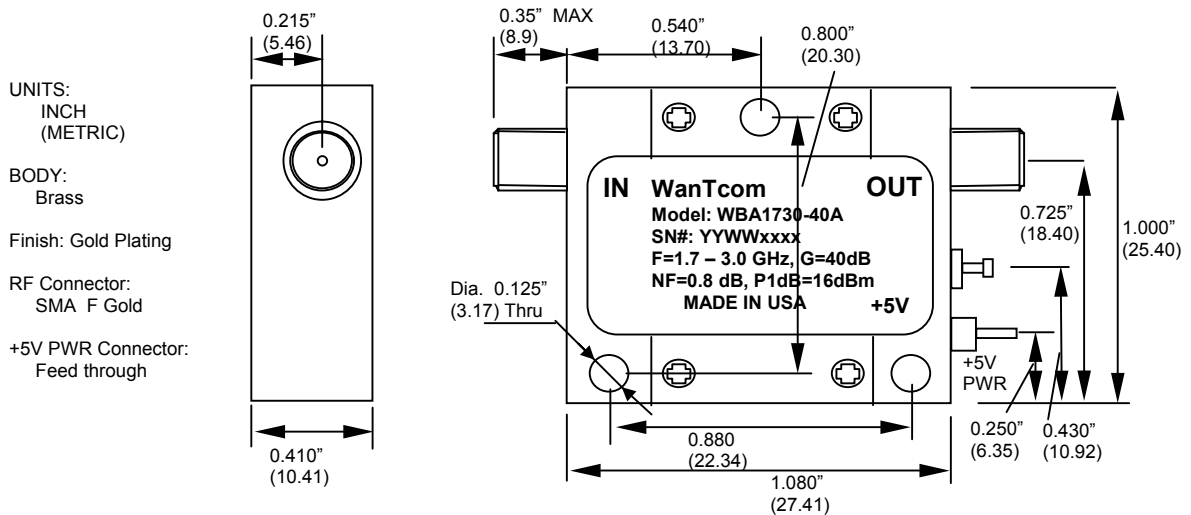


FIG. 5 WP-5 outline



Ordering Information

Model Number:	WBA1730-40A
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Small Signal S-Parameters:

IWBA1730-40A. S-parameters at Vdd=+5.0V, Id=100mA. Last updated 01/03/04.

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	0.979	-35.1	0.014	-56.8	0.00003	-131.2	0.986	-25.6
0.1	0.961	-58.1	0.014	-75.3	0.00002	153.3	0.959	-42.3
0.2	0.959	-111.9	0.147	-109.3	0.00005	-133.1	0.902	-81.0
0.3	0.956	-162.2	1.543	-163.9	0.00016	151.7	0.830	-115.1
0.4	0.945	145.7	8.055	129.9	0.00017	105.3	0.744	-144.0
0.5	0.818	86.8	22.100	56.6	0.00027	58.0	0.661	-166.7
0.6	0.513	26.4	36.672	-9.4	0.00016	32.6	0.617	174.8
0.7	0.270	-25.4	45.129	-62.1	0.00004	-4.3	0.600	156.8
0.8	0.147	-73.0	50.795	-101.6	0.00005	48.2	0.583	138.1
0.9	0.094	-117.9	57.028	-133.3	0.00007	118.7	0.558	118.8
1	0.072	-155.8	64.449	-161.1	0.00007	120.3	0.528	98.9
1.1	0.059	-177.7	73.073	172.3	0.00018	141.3	0.487	77.7
1.2	0.051	176.3	83.056	146.2	0.00031	134.4	0.439	55.1
1.3	0.049	177.8	93.610	120.3	0.00034	117.2	0.381	30.1
1.4	0.064	178.6	103.131	94.1	0.00054	99.8	0.310	2.0
1.5	0.083	168.4	110.879	67.7	0.00068	97.8	0.241	-29.1
1.6	0.097	153.4	115.751	41.5	0.00082	84.7	0.181	-63.7
1.7	0.105	134.7	118.122	16.3	0.00092	71.2	0.138	-102.3
1.8	0.105	118.8	118.199	-7.5	0.00104	56.8	0.115	-141.2
1.9	0.098	104.6	117.202	-30.1	0.00110	41.2	0.103	-175.0
2	0.088	90.7	115.780	-51.7	0.00122	32.5	0.094	156.8
2.1	0.071	80.5	114.203	-72.3	0.00126	23.0	0.081	136.2
2.2	0.053	72.6	112.760	-92.6	0.00145	16.1	0.066	117.6
2.3	0.035	69.5	111.491	-112.7	0.00141	1.9	0.045	111.9
2.4	0.023	92.8	110.214	-132.2	0.00141	-3.6	0.028	125.3
2.5	0.027	144.5	108.657	-151.5	0.00141	-12.6	0.029	171.9
2.6	0.053	151.8	106.569	-170.7	0.00143	-26.3	0.050	-176.5
2.7	0.084	142.2	104.431	170.2	0.00144	-34.5	0.073	179.9
2.8	0.114	133.2	102.322	151.2	0.00145	-44.8	0.098	172.0
2.9	0.152	121.9	99.967	132.3	0.00143	-53.0	0.117	164.1
3	0.195	109.1	97.592	113.2	0.00143	-71.1	0.137	156.1
3.1	0.243	92.6	95.693	94.4	0.00141	-79.6	0.157	147.8
3.2	0.294	76.8	93.250	75.7	0.00140	-94.0	0.176	140.5
3.3	0.348	60.5	90.660	56.7	0.00121	-106.5	0.194	133.6
3.4	0.409	43.7	88.496	37.6	0.00117	-123.4	0.220	126.7
3.5	0.473	25.8	86.483	18.3	0.00095	-138.4	0.249	118.1
3.6	0.535	7.9	83.541	-1.2	0.00090	-156.7	0.281	109.4
3.7	0.603	-10.8	80.004	-20.9	0.00087	-179.6	0.315	98.5
3.8	0.664	-29.4	76.097	-41.0	0.00060	155.5	0.348	86.7
3.9	0.720	-47.2	71.939	-60.6	0.00065	114.7	0.380	72.8
4	0.768	-65.7	67.808	-80.2	0.00082	78.2	0.400	58.5
4.1	0.802	-83.3	63.538	-99.3	0.00095	57.0	0.414	42.6
4.2	0.834	-100.0	58.739	-117.6	0.00108	33.9	0.419	25.3
4.3	0.855	-116.0	53.889	-135.7	0.00108	11.8	0.407	7.1
4.4	0.862	-131.3	50.096	-153.7	0.00140	-7.0	0.390	-12.5
4.5	0.874	-145.6	47.189	-172.3	0.00145	-27.7	0.366	-35.3
5	0.836	150.9	28.915	87.8	0.00125	-114.7	0.453	157.1
5.5	0.761	103.0	11.717	-10.0	0.00051	-11.9	0.794	40.6
6	0.721	62.1	5.204	-81.4	0.00128	-54.1	0.849	-25.8
