



# WBA0520P

## 0.5- 2.1 GHz LOW NOISE WIDE BAND AMPLIFIER

REV A  
April 2008

### Key Features



- 0.5 ~ 2.1 GHz
- 1.80 dB noise figure
- 30.0 dBm output IP<sub>3</sub>
- 25.0 dB Gain
- 18.0 dBm P1dB
- -60 dBc Harmonics
- Single power supply
- >34 years MTBF
- Unconditional stable
- RoHS compliant

### Product Description

WBA0520P integrates WanTcom proprietary low noise amplifier technology, high frequency micro electronic assembly techniques, and high reliability design to realize optimum low noise figure, wideband, high linearity, and unconditional stable performances together. With single DC voltage operation, the amplifier has push-pull configuration for the best harmonics performance. The amplifier has standard SMA connectorized WP-6 gold plated housing.

The amplifier is designed to meet the rugged standard of MIL-STD-202.

### Applications

- Mobile Infrastructures
- GPS
- CATV/DBS
- Defense
- Security System
- Measurement
- Fixed Wireless



Preliminary

### Specifications

Summary of the electrical specifications WBA0520P at room temperature

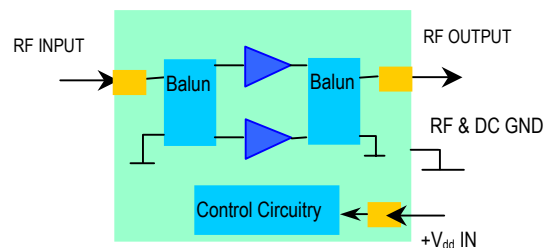
Index	Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
1	Gain	S <sub>21</sub>	0.5 – 2.1 GHz		25		dB
2	Gain Variation	ΔG	0.5 – 2.1 GHz		+/- 1.0	+/-1.25	dB
3	Input VSWR	SWR <sub>1</sub>	0.5 – 2.1 GHz			2:1	Ratio
4	Output VSWR	SWR <sub>2</sub>	0.5 – 2.1 GHz			2:1	Ratio
5	Reverse Isolation	S <sub>12</sub>	0.5 – 2.1 GHz	40	50		dB
6	Noise figure	NF	0.5 – 2.1 GHz		1.8	2.3	dB
7	Output Power 1dB compression Point	P <sub>1dB</sub>	0.5 – 2.1 GHz		18		dBm
8	Output-Third-Order Interception point	IP <sub>3</sub>	Two-Tone, P <sub>out</sub> +0 dBm each, 1 MHz separation		30		dBm
9	Harmonics	HMCS	Po = 2.0 dBm, single tone, f <sub>0</sub> = 0.5 ~ 2.1 GHz	-50	-60		dBc
10	Current Consumption	I <sub>dd</sub>	V <sub>dd</sub>		120		mA
11	Power Supply Voltage	V <sub>dd</sub>	WBA0520PA	+4.7	+5	+5.3	V
			WBA0520P	+9.0		+12	
12	Thermal Resistance	R <sub>th,c</sub>	Junction to case, last stage transistor, Vd = 3.0V, Id = 30 mA (90 mW).			220	°C/W
13	Operating Temperature	T <sub>o</sub>		-40		+85	°C
14	Maximum Average RF Input Power	P <sub>IN, MAX</sub>	DC – 13 GHz			10	dBm

### Absolute Maximum Ratings

Parameters	Units	Ratings
DC Power Supply Voltage	V	+15 (+6V for WBA0520PA)
Drain Current	mA	150
Total Power Dissipation	W	1.5
RF Input Power	dBm	10
Channel Temperature	°C	150
Storage Temperature	°C	-55 ~ 125
Operating Temperature	°C	-40 ~ 85

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

### Functional Block Diagram



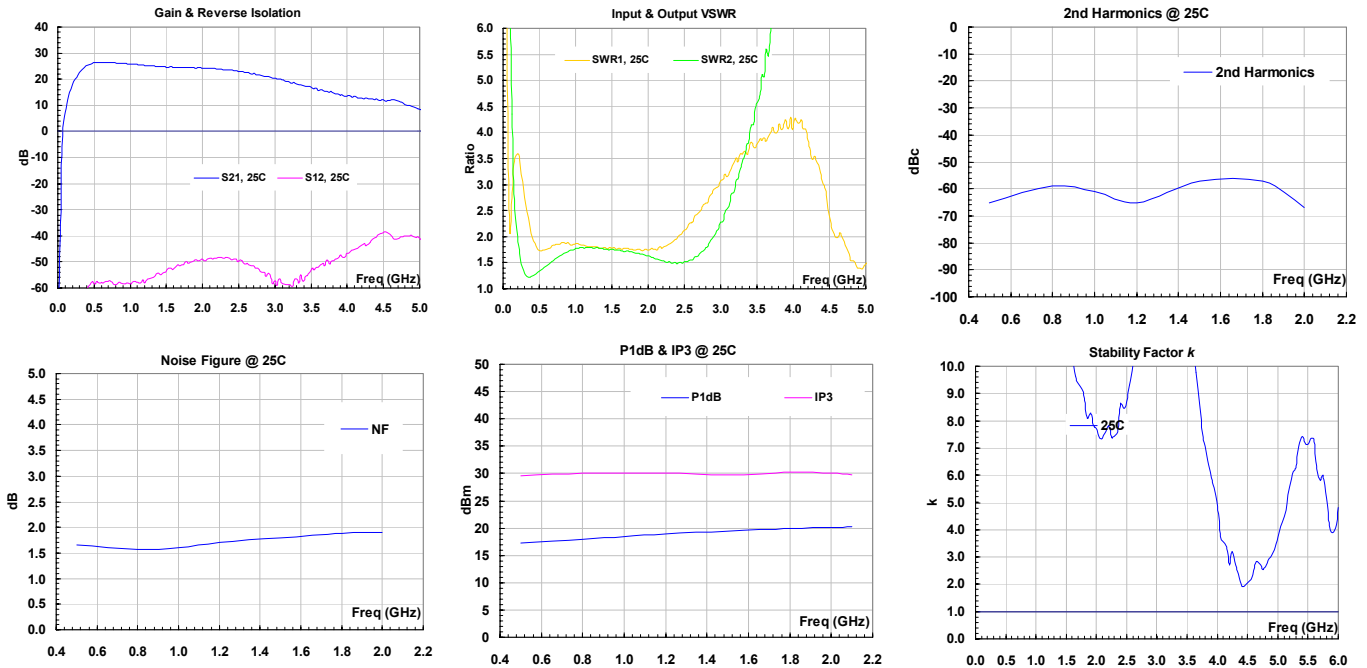
### Ordering Information

Model Number	Feature
WBA0520P	V <sub>dd</sub> = +9.0 ~ +12 V
WBA0520PA	V <sub>dd</sub> = +5.0V

Specifications and information are subject to change without notice.

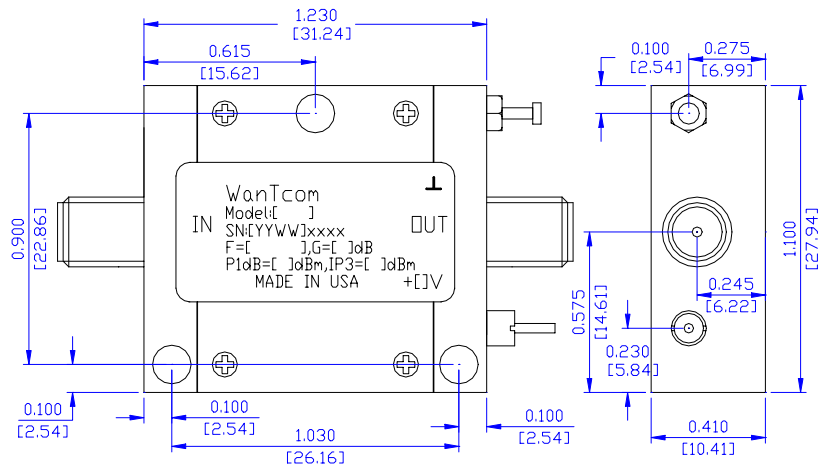


### Typical Data



### Outline, WP-6 Housing

UNITS: INCH  
 BODY: Brass  
 Finish: Gold Plating  
 RF Connector: SMA F Gold  
 V<sub>dd</sub> PWR: Feed through



### Application Notes:

#### A. Harmonics Measurement

A regular signal generator only has around -30 ~ -40 dBc harmonics performance, especially the 2<sup>nd</sup> harmonics. Thus, in order to accurately measure the 2<sup>nd</sup> harmonics performance of the wide band amplifier, certain low pass filters are required to filter out the 2<sup>nd</sup> harmonics generated by the signal generator itself.

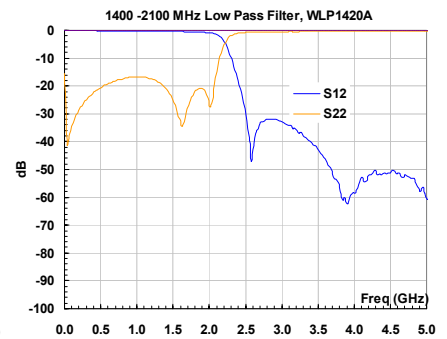
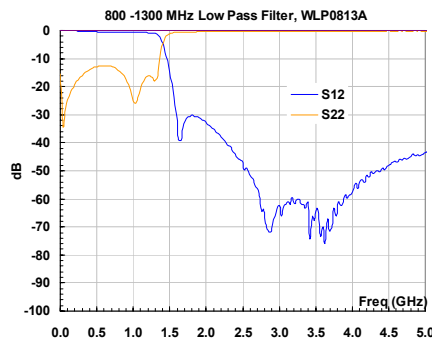
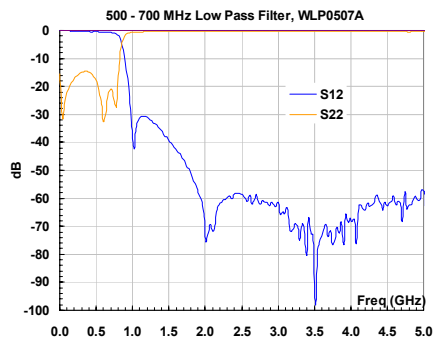
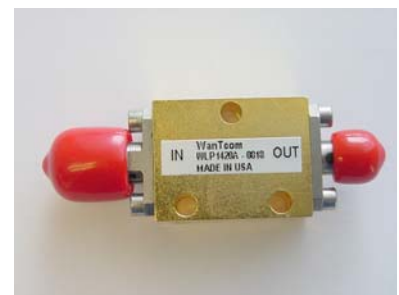
In order to suppress signal source 2<sup>nd</sup> harmonics from 0.50 GHz to 2.1 GHz band, three low pass filters are required, Band 1, Band2, and Band 3. Band 1, WLP0507A, low pass filter passes the 0.50 ~ 0.70 GHz base band signal and suppresses 1.0

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GHz and up harmonics. Band 2, WLP0813A, low pass filter passes the 0.80 ~ 1.30 GHz base band signal and suppresses 1.6 GHz and up harmonics. Band 3, WLP1420A, low pass filter passes the 1.40 ~ 2.1 GHz base band signal and suppresses 2.8 GHz and up harmonics. The following pictures show the filters and their performance. These low pass filters have at least 30 dB attenuation on the harmonics.

The low pass filters are connected at the output of the signal generator to filter out the harmonics generated by the signal generator.



### B. SMA Torque Wrench Selection

Always use a torque wrench with 5 ~ 6 inch-lb coupling torque setting for mating the SMA cables to the amplifier. Never use torque more than 8 inch-lb wrench for tightening the mating cable to the connector. Otherwise, the permanent damage will occur to the SMA connectors of the amplifier. 8710-1582 (5 inch-lb) is one of the good torque wrench choice from Agilent Technology.

### C. DC Power Line Connection

Strip the insulation layer at the end of DC power supply wire. The stripped distance should be in the range of 0.100" to 0.200". The 24 ~ 26 American Wire Gauge wire is suitable. Wound the stripped terminal wire about 1 to 2 turns on the DC feed thru center pin. Solder the wounded wire and the center pin together. Clean the soldering area by Q-tip with alcohol to remove the flux and residue.

Repeat the process to solder the DC return wire on the ground turret.

### D. Mounting the Amplifier

Use three pieces of #4-40 with longer than 9/16" screws for mounting the amplifier on a metal-based chase. Flat and spring washers are needed to prevent the screw loosening during the shock and vibration. Always use the appropriate torque setting of the power screwdriver to mount them.

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