# WBPA0510A

## 470- 960 MHz POWER AMPLIFIER MODULE

**REV C**
**March 2016**

## Key Features

- 50 Ohm Impedance
- 470 ~ 960 MHz
- 3.0 dB Noise Figure
- 49.0 dBm Output $IP_3$
- 31.0 dB Gain
- 35.0 dBm $P_{1dB}$
- 1.5:1 VSWR
- Single Power Supply
- >68 years MTBF
- Unconditional Stable
- RoHS Compliant

## Product Description

CAUTION: ELECTROSTATIC DISCHARGE SENSITIVE

WBPA0510A is integrated with 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 +10.0V DC operation, the amplifier has optimal input and output matching in the specified frequency range at 50-Ohm impedance system. The amplifier has standard SMA connectorized WP-6 Gold plated housing.

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

## Applications

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


## Specifications

Summary of the electrical specifications WBPA0510A at room temperature

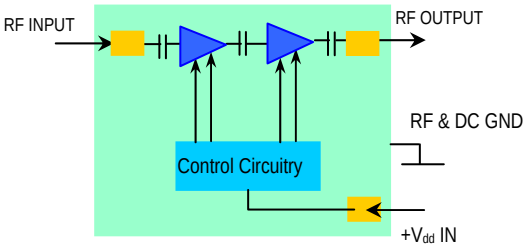
| Index | Testing Item | Symbol | Test Constraints | Min | Nom | Max | Unit |
|---|---|---|---|---|---|---|---|
| 1 | Gain | $S_{21}$ | 470 – 960 MHz | 29.5 | 31 | 32.5 | dB |
| 2 | Gain Variation | $\Delta G$ | 470 – 960 MHz | | +/- 0.5 | +/-0.75 | dB |
| 3 | Input Return Loss | $S_{11}$ | 470 – 960 MHz | 12 | 14 | | Ratio |
| 4 | Output Return Loss | $S_{22}$ | 470 – 960 MHz | 12 | 14 | | Ratio |
| 5 | Reverse Isolation | $S_{12}$ | 470 – 960 MHz | 43 | 48 | | dB |
| 6 | Noise Figure | NF | 470 – 960 MHz | | 3.0 | | dB |
| 7 | Output 1dB Gain Compression Point | $P_{1dB}$ | 470 – 960 MHz | 34.5 | 35 | | dBm |
| 8 | Output-Third-Order Interception point | $IP_3$ | Two-Tone, $P_{out}$ +0 dBm each, 1 MHz separation | 47 | 49 | | dBm |
| 9 | Current Consumption | $I_{dd}$ | $V_{dd}$= +10 V | | 0.95 | | A |
| 10 | Power Supply Voltage | $V_{dd}$ | WBPA0510A | +9 | +10 | | V |
| 11 | Thermal Resistance, Junction to case | $R_{th,c}$ | Last stage transistor, $V_{ds}$ = 9.5V, $I_{ds}$ = 820 mA | | | 9 | °C/W |
| 12 | Operating Temperature | $T_o$ | | -40 | | +85 | °C |
| 13 | Maximum Input CW RF Power | $P_{IN, MAX}$ | 470 – 960 MHz | | | 15 | dBm |

## Absolute Maximum Ratings

| Parameters | Units | Ratings |
|---|---|---|
| DC Power Supply Voltage | V | 11 |
| Drain Current | A | 1.10 |
| Total Power Dissipation | W | 12 |
| RF Input Power | dBm | 15 |
| Channel Temperature | °C | 170 |
| Storage Temperature | °C | -65 ~ 150 |
| Operating Temperature | °C | -20 ~ 85 |
| Thermal Resistance, Last Stage Transistor, $R_{th,c}$ | °C/W | 9 |

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

## Functional Block Diagram




## Ordering Information

| Model Number | WBPA0510A |
|---|---|

Specifications and information are subject to change without notice.



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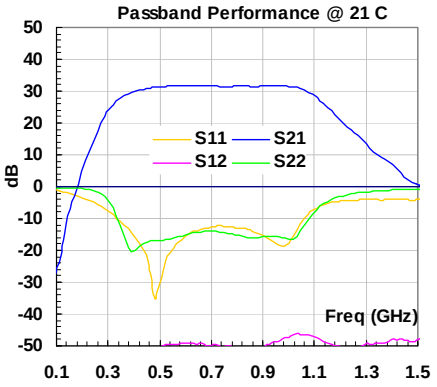
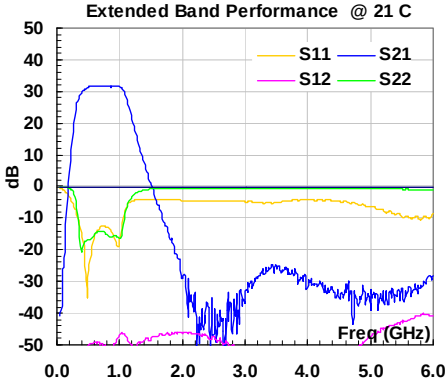
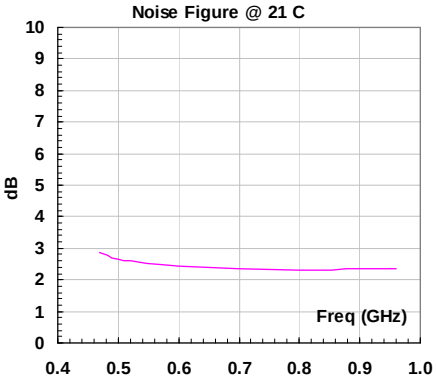
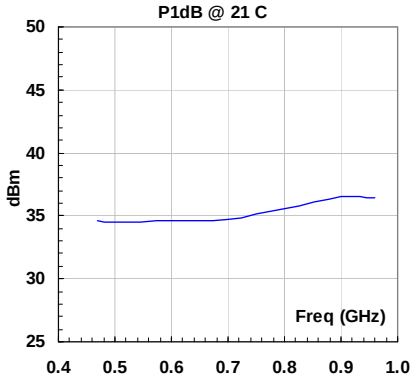
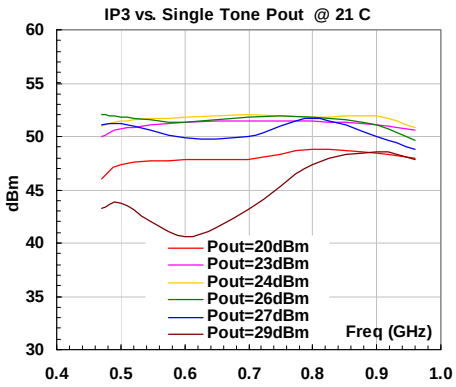
## Typical Data

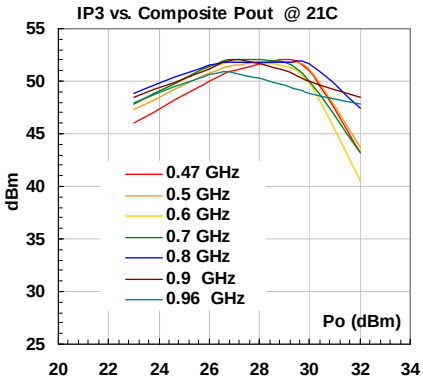


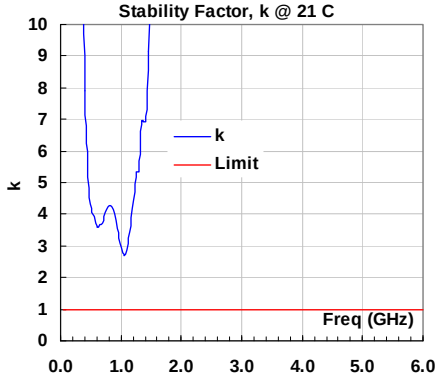



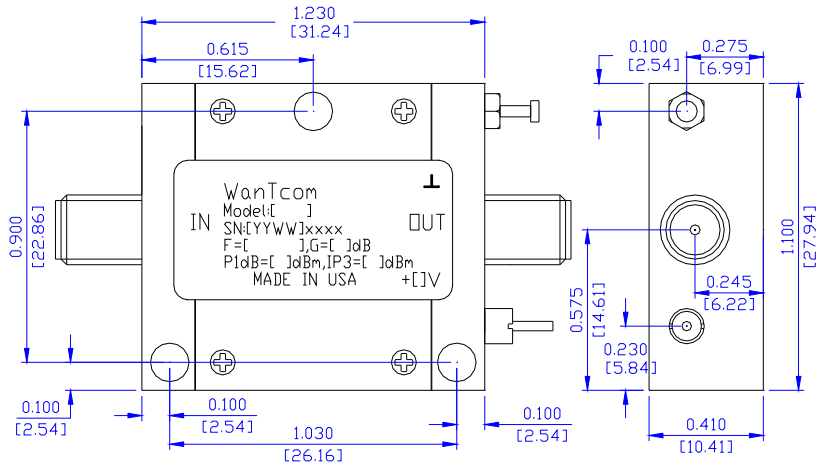




## Outline, WP-6 Housing




| | |
|---|---|
| UNITS: | INCH<br>[mm] |
| BODY: | Brass |
| Finish: | Gold Plating |
| RF Connector: | SMA F Gold |
| $V_{dd}$ PWR: | Feed through |

## Application Notes:

### A. 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 connectors. Otherwise, the permanent damage will occur to the SMA connectors of the amplifier. 8710-1582 (5 inch-lb) is one of the ideal torque wrench choice from Agilent Technology.

### B. DC Power Line Connection

Strip the insulation layer at the end of DC power supply wire. The stripped length should be around 0.100" to 0.200". The 24 ~ 26 American Wire Gauge wire is suitable. Wound the stripped wire about 3/4 to 1 turn on the DC feed thru center pin. Solder the wounded wire and the center pin together. Clean the soldering joint by a Q-tip with alcohol to remove the flux and residue.

Do not use large soldering iron tip with more than 750 degree Fahrenheit to solder the wire and feed thru pin. Damage may occur to the feed thru. 0.010" size tip with 750 degree Fahrenheit temperature setting is suitable for the soldering works.

Repeat the process to solder the DC return wire on the ground turret. Higher temperature and larger tip can be used for this ground soldering.

### C. 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.

High thermal conductivity thermal film such as T-gon is needed between the bottom of the PA and the heat sink surface. Refer to AN-155 for heat sink design, http://wantcominc.com/engineering_tools.htm .

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