



470- 960 MHz POWER AMPLIFIER MODULE WBPA0510A¹

WBPA0510A is a wideband, high power, and high linearity amplifier. The amplifier offers the exceptional +/- 0.50 dB gain flatness, 31.0 dB gain, 35.0 dBm P_{1dB} and output 49.0 dBm IP₃ at output composite power of 28 dBm at the frequency range from 470 MHz to 960 MHz.

WBPA0510A is most suitable for digital broadcast, cellular base stations, wireless data communications, tower top receiver amplifiers, cellular micro-cells, last-mile wireless communication systems, and wireless measurement applications of UHF and Cellular bands.

WBPA0510A has been designed to meet rugged standard of MIL-STD-202G and is RoHS complied product.



Additional heat sink required for the normal continuous operation!

Key Features:

Impedance:	50 Ohm
MTBF:	>150,000 hours
Output IP ₃ :	49.0 dBm
Gain:	31.0
Gain Flatness:	+/-0.5 dB
Input VSWR:	1.5:1 typical
Output VSWR:	1.5:1 typical
P _{1dB} :	35.0 dBm
Spurious:	< -70 dBc @ output of 28 dBm single tone.
Single Power Supply:	0.95, @ +10 V
Frequency Range:	470 ~ 960 MHz
Operating Temperature:	-40 ~ +85 °C
Built-in Functions:	DC-DC converter, sequencing DC bias, optimum wide band matching networks, and temperature compensations, etc.

Absolute Maximum Ratings²:

Symbol	Parameters	Units	Absolute Maximum
V _{dd}	DC Power Supply Voltage	V	11.0
I _{dd}	Drain Current	A	1.10
P _{diss}	Total Power Dissipation	W	12
P _{In,Max}	RF Input Power	dBm	15
T _{ch}	Channel Temperature	°C	175
T _{STG}	Storage Temperature	°C	-65 ~ 150
T _{O,MAX}	Maximum Operating Temperature	°C	-20 ~ +85
R _{th,c}	Thermal Resistance	°C/W	9

¹ Specifications are subject to change without notice.

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

**Specifications:**a) **Table 1** Summary of the electrical specifications of WBPA0510A at room temperature

Index	Testing Item	Symbol	Test Constraints	Nom (RT)	Min	Max	Unit
1	Gain	S_{21}	470 - 960 MHz	31	29.5	32.5	dB
2	Gain Variation	ΔG	470 - 960 MHz	+/- 0.5		+/- 0.75	dB
3	Input Return Loss	S_{11}	470 - 960 MHz	14	12		dB
4	Output Return Loss	S_{22}	470 - 960 MHz	14	12		dB
5	Reverse Isolation	S_{12}	470 - 960 MHz	48	43		dB
7	Output P_{1dB} compression	P_{1dB}	470 - 960 MHz	35	34.5		dBm
8	Output-Third-Order Interception point	IP_3	Two-Tone, P_{out} 25 dBm each, 1 MHz separation	49	47		dBm
9	Noise Figure	NF	470 - 960 MHz	3.0			dB
10	Spurious	SP	470 - 960 MHz, P_{out} = 28 dBm, single tone		70		dBc
11	Current Consumption	I_{dd}	V_{dd} = +10 V	0.95			A
12	Power Supply Voltage	V_{dd}		+10	+9	+10.5	V
13	Operating Temperature	T_o			-40	+85	°C
14	Maximum Average RF Input Power	$P_{IN, MAX}$	470 - 960 MHz			15	dBm

As shown in **Figure 1**, the typical gain of the WBPA0510A is 31.0 dB across 470 MHz to 960MHz. The typical input and output return losses are 14 dB and better than 12 dB, respectively.

The output 1-dB compression point and IP_3 are shown in **Figure 2**. WBPA0510A offers typical 35.0 dBm or higher P_{1dB} throughout the passband.

Figure 3 provides the output IP_3 performance vs. frequency at different output power level per tone of the two-tone intermodulation test. By slightly adjusting the V_{dd} voltage, the amplifier's IP_3 performance can be optimized for P_{out} of each tone at the range from 23 dBm to 26 dBm or the 26 dBm to 29 dBm composite output power. The IP_3 reaches 49.0 dBm or higher in this power range.

Figure 4 illustrates the IP_3 performance vs. output composite power at different frequencies at the optimized V_{dd} voltages. The IP_3 is over 49 dBm at the 28 dBm output total power level in most frequencies.

Figure 5 is the noise figure performance. The noise figure is below 3.0 dB at room temperature.

Figure 6 is the small signal performance of the amplifier at the extended frequencies. The amplifier has nice harmonics rejection.

Figure 7 demonstrates the stability factor k of the amplifier. k is great than 1 in any frequency and thus the amplifier is unconditional stable.

Figure 8 is the block diagram of internal circuit of WBPA0510A. It is a two-stage amplifier with the DC block capacitors at the input and output RF ports. All the RF matching networks, DC-DC converter, DC bias circuitries, and limited temperature compensation circuits are built in.

Figure 9 shows the mechanical outline of WBPA0510A. It is a WanTcom standard WP-6 housing. The additional heat sink for the thermal dissipation is required.

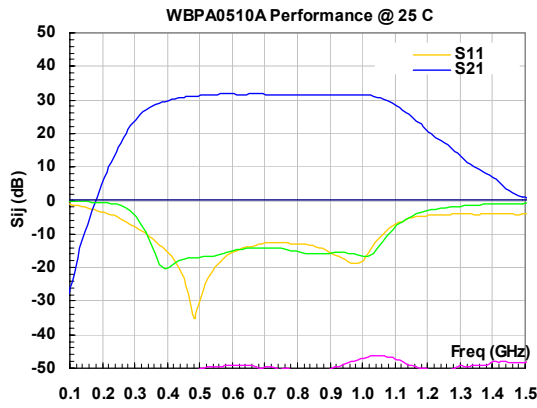


FIG. 1 Small signal performance of WPM0509AE

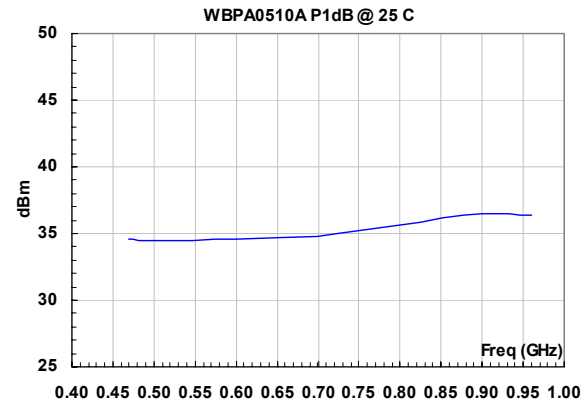


FIG. 2 Output 1-dB compression point

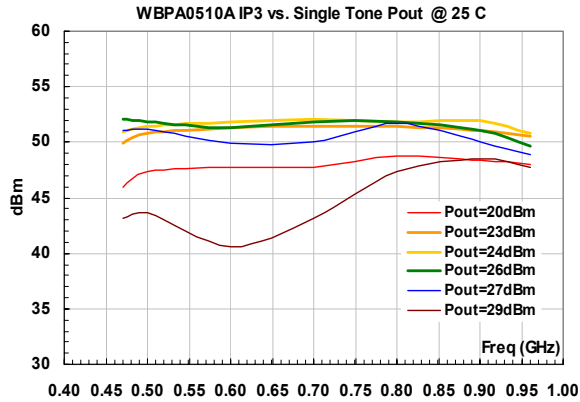


Fig. 3 Output IP₃ at different output power level

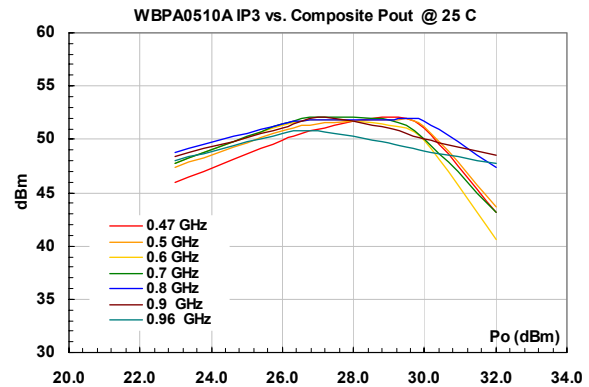


Fig. 4 Output IP₃ vs. output composite power

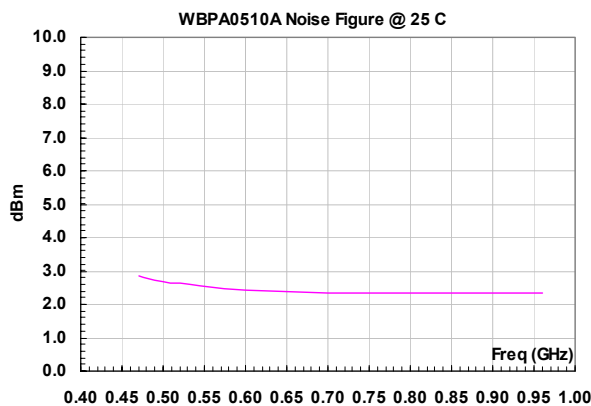


Fig. 5 Noise figure performance frequency.

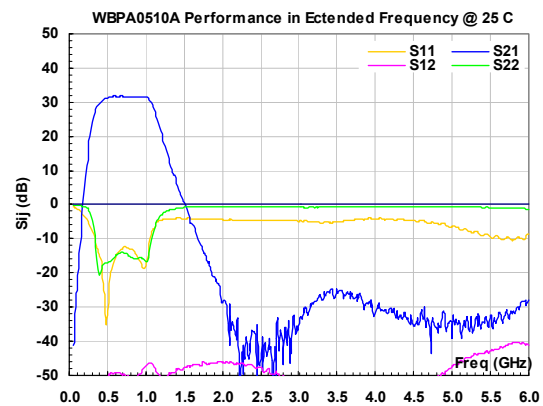


Fig. 6 Small signal performance at the extended frequency

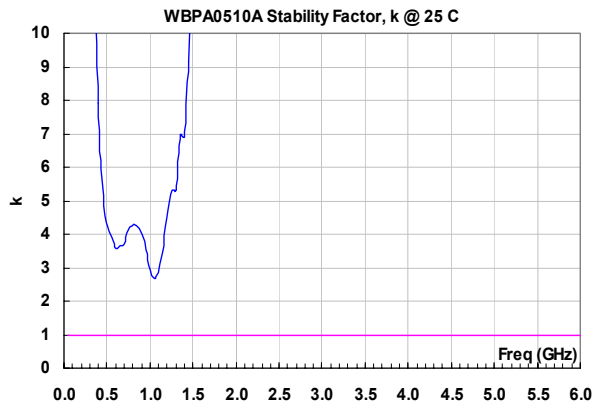


Fig. 7 Stability factor k

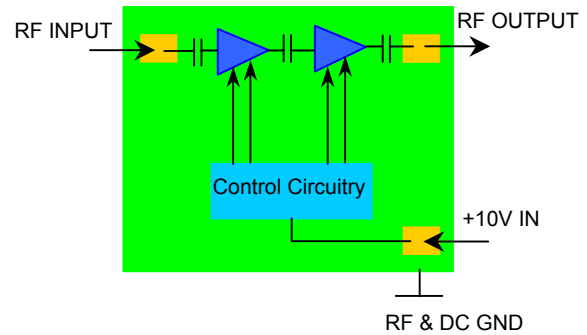


Fig. 8 Block diagram of BPA0510A

WBPA0510A MECHANICAL OUTLINE: WP-6

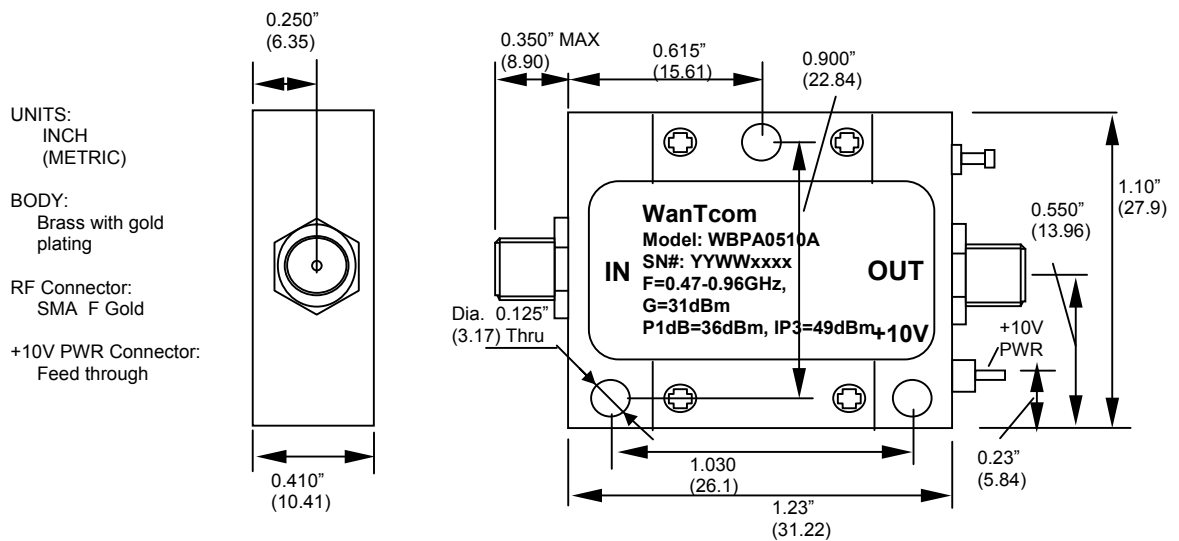


FIG. 9 WBPA0510A Outline

ORDERING INFORMATION

Function	Normal
Model Number:	WBPA0510A
