WBPA0060A

20 MH – 6.0 GHz 3-Watt LOW NOISE POWER AMPLIFIER

REV A
December 2024

Key Features

- 50 Ohm Impedance
- 20 MHz – 6.0 GHz
- 3.0 dB Noise Figure
- 35.0 dB Small Signal Gain
- +/-1.5 dB gain Flatness
- 35.0 dBm P_{sat}
- 1.5:1 VSWR
- Single DC Power Supply
- >68 Years MTBF
- Unconditional Stable
- RoHS Compliant

Product Description

WBPA0060A 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 DC of +28V 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-9 Gold plated housing.

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

Applications

- Mobile Infrastructures
- VHF, UHF, GPS, 3G
- L, S, C, WiMax Bands
- Defense
- Security System
- Measurement
- Fixed Wireless

Specifications

Summary of the electrical specifications WBPA0060A at room temperature

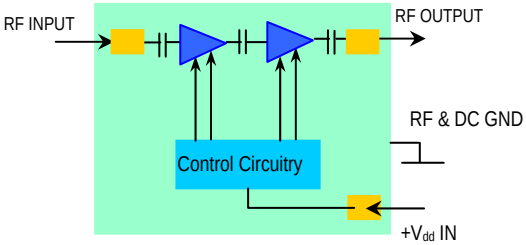
Index	Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
1	Small Signal Gain	S_{21}	20 MHz – 5.8 GHz		35		dB
2	Gain Variation	ΔG	20 MHz – 5.8 GHz		+/- 1.5		dB
3	Input VSWR	SWR_1	20 MHz – 5.8 GHz		1.5:1	2.4:1	Ratio
4	Output VSWR	SWR_2	20 MHz – 5.8 GHz		1.5:1	2.4:1	Ratio
5	Reverse Isolation	S_{12}	20 MHz – 5.8 GHz	40			dB
6	Noise Figure	NF	20 MHz – 5.8 GHz		3.0	4.5	dB
7	Output Saturate Power	P_{sat}	20 MHz – 5.8 GHz		35		dBm
8	Output-Third-Order Interception Point	IP_3	Two-Tone, P_{out} +27 dBm each, 1 MHz separation		45		dBm
9	Power Added Efficiency	η	@ P_{sat}		20		%
10	DC Current Consumption	I_{dd}	V_{dd}= +28V		250	650	mA
11	Power Supply Voltage	V_{dd}		+26	+28V	+30	V
12	Thermal Resistance	$R_{th,c}$	Junction to case, output transistor, Id2 = 125 mA			4.5	°C/W
13	Operating Temperature	T_o		-40		+85	°C
14	Maximum Input CW RF Power	$P_{IN, MAX}$	DC – 6 GHz			15	dBm

Absolute Maximum Ratings

Parameters	Units	Ratings
DC Power Supply Voltage	V	-0.5, 30
Drain Current	mA	700
Input CW RF Power	dBm	10
Junction Temperature	°C	180
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	WBPA0060A

Specifications and information are subject to change without notice.

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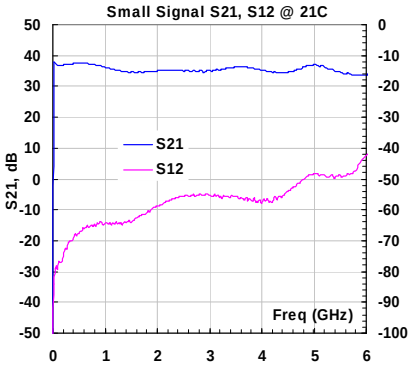
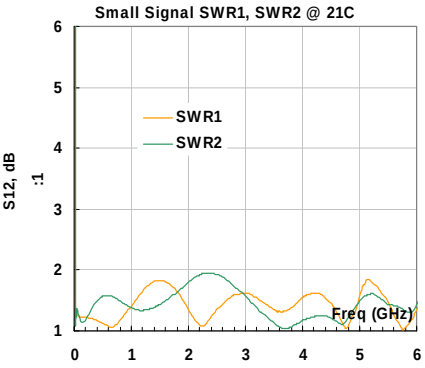
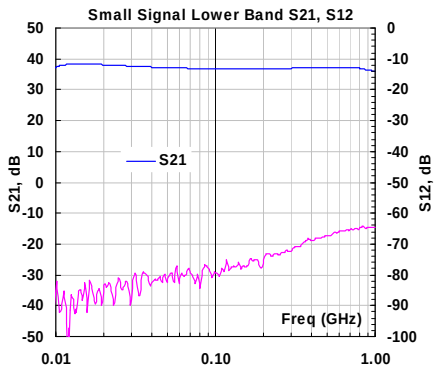
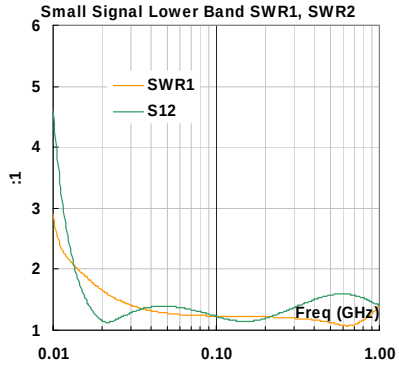
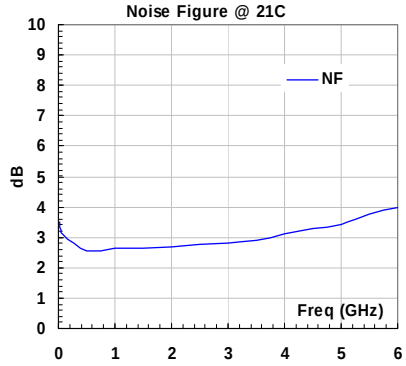
Typical Data

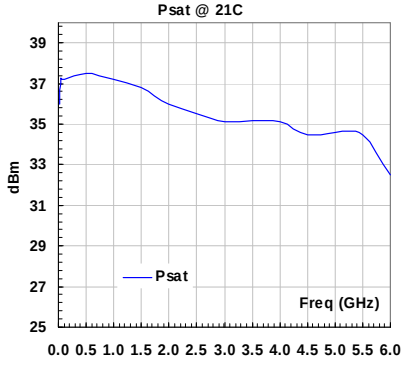


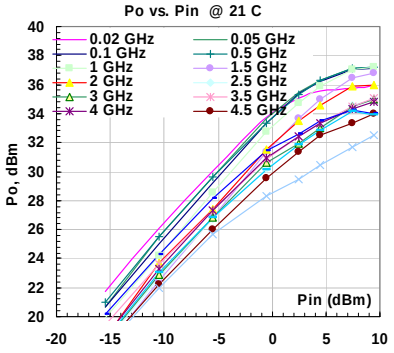


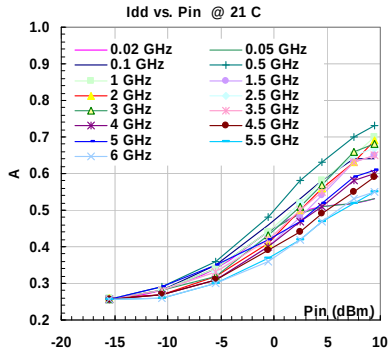


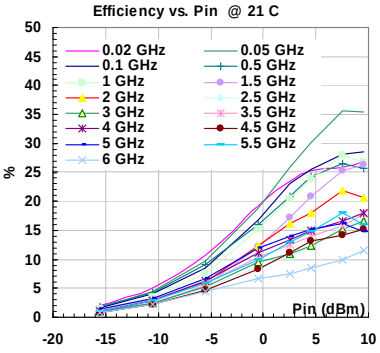


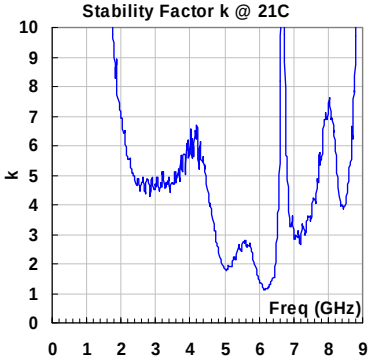






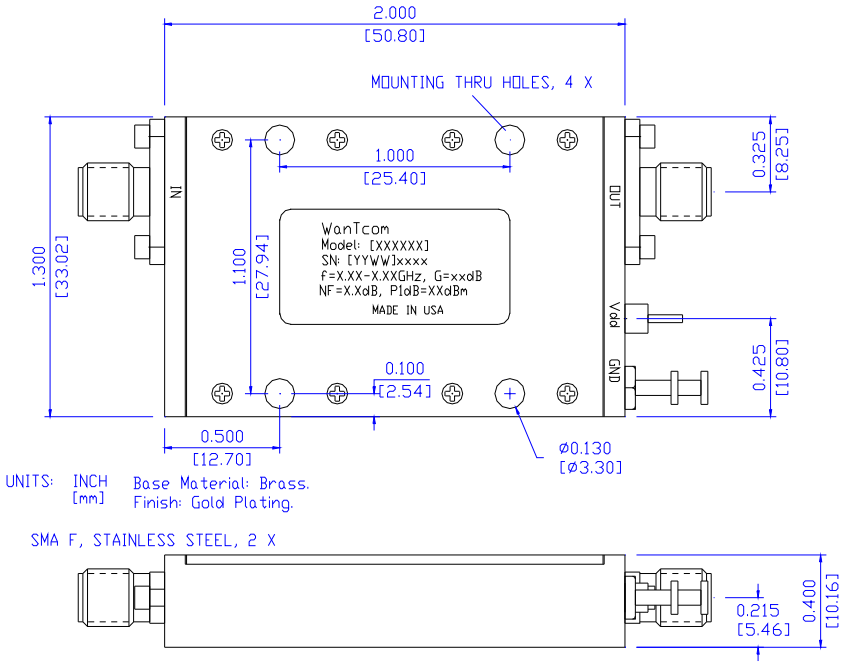






Outline, WP-9 Housing

UNITS:	INCH
	[mm]
BODY:	Brass
Finish:	Gold Plating
RF Connector:	SMA F Stainless Steel
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 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.

B. 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.

C. Mounting the Amplifier

Use four 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.

D. Heat Sink

A heat sink with the maximum case to ambient thermal resistance of 2.7 ^{0}C/W is required for the continuous operation. Refers to WanTcom AN-155, https://www.wantcominc.com/Application_Notes/AN-155.pdf, for the proper heat sink design. A T-gon thermal film is required between the bottom of the PA and the heat sink for the effective thermal dissipation.

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