WBPA0540A

0.45- 3.8 GHz LOW NOISE WIDE BAND AMPLIFIER

REV A
June 2008

Key Features

- 0.45 ~ 3.8 GHz
- 1.20 dB noise figure
- 40.0 dBm output IP_3
- 45.0 dB Gain
- 24.0 dBm P_{1dB}
- 1.5:1 VSWR
- Single Sower Supply
- >34 Years MTBF
- Unconditional Stable
- RoHS Compliant

Product Description

WBPA0540A 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 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-202.

Applications

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

Specifications

Summary of the electrical specifications WBPA0540A at room temperature

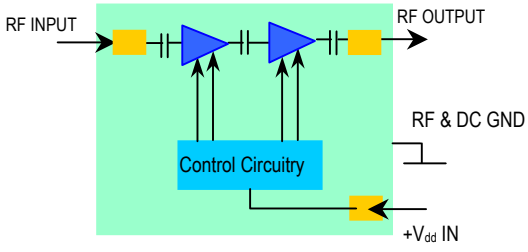
Index	Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
1	Gain	S_{21}	WBPA0540A, 0.45 – 3.8 GHz	43	45	47	dB
			WBPA0540B, 0.45 – 3.8 GHz	50	52	54	
2	Gain Variation	ΔG	0.45 – 3.8 GHz		+/- 1.0	+/-1.3	dB
3	Input VSWR	SWR_1	0.45 – 3.8 GHz		1.5:1	1.8:1	Ratio
4	Output VSWR	SWR_2	0.45 – 3.8 GHz		1.5:1	1.8:1	Ratio
5	Reverse Isolation	S_{12}	0.45 – 3.8 GHz	65	70		dB
6	Noise figure	NF	0.45 – 3.8 GHz		1.20	1.50	dB
7	Output Power 1dB compression Point	P_{1dB}	0.45 – 3.8 GHz	22	24		dBm
8	Output-Third-Order Interception point	IP_3	Two-Tone, P_{out} +10 dBm each, 1 MHz separation	36	40		dBm
9	Output-Second-Order Interception point	IP_2	Two-Tone, P_{out} +10 dBm each, 1 MHz separation	45	47		dBm
10	Current Consumption	I_{dd}	V_{dd}= +11.0 ~ +15.0 V		230		mA
11	Power Supply Voltage	V_{dd}		+11		+15	V
12	Thermal Resistance	$R_{th,c}$	Junction to case, last stage transistor			100	°C/W
13	Operating Temperature	T_o		-40		+85	°C
14	Maximum Average RF Input Power	$P_{IN, MAX}$	0.45 – 3.8 GHz			5	dBm

Absolute Maximum Ratings

Parameters	Units	Ratings
DC Power Supply Voltage	V	16
Drain Current	mA	250
Total Power Dissipation	W	3.75
RF Input Power	dBm	5
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	Gain
WBPA0540A	45 dB

Specifications and information are subject to change without notice.

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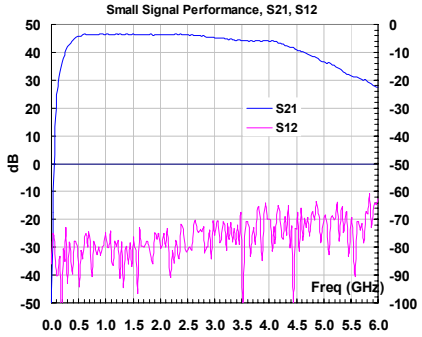
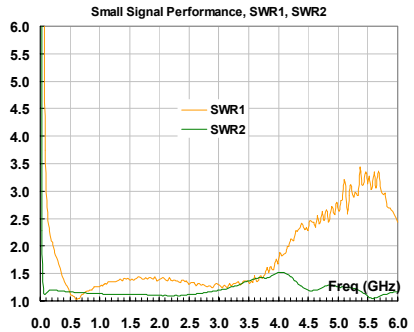
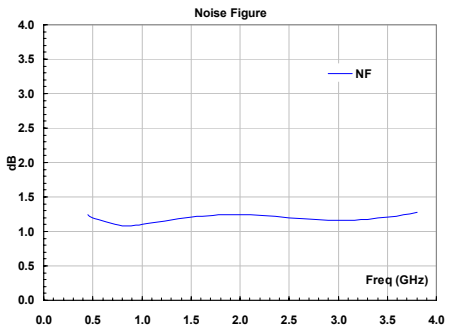
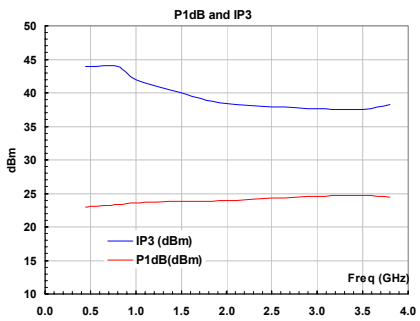
WBPA0540B	52 dB

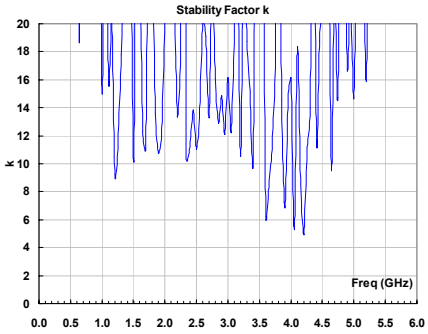
Typical Data

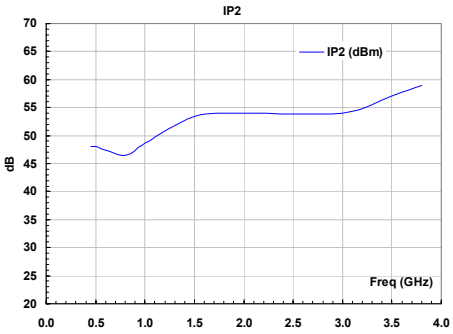






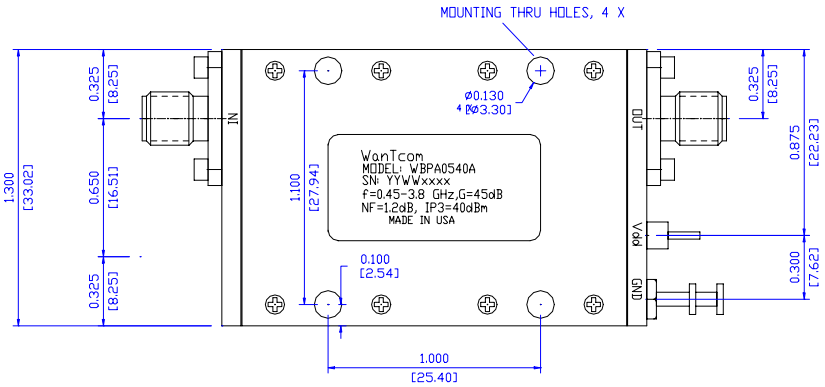


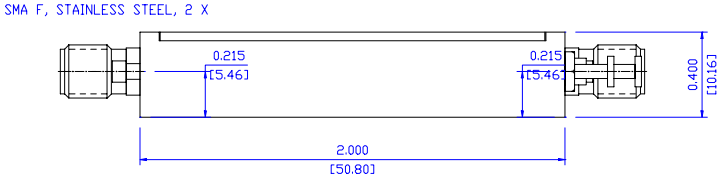




Outline, WP-9 Housing

UNITS:	INCH [mm]
BODY:	Brass
Finish:	Gold Plating
RF Connector:	SMA F Stainless Steel
V_{dd} PWR:	Feed through





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Small Signal S-Parameters:

! WBPA0540A, +25C, S-parameters at V_{dd}=+12V, I_{dd}=230mA. Last updated 6/23/08.
GHZ s MA R 50

!Freq(GHz)	MAGS11	ANGS11	MAGS21	ANGS21	MAGS12	ANGS12	MAGS22	ANGS22
0.05	0.862	-113.8	1.751	43.2	0.000087	-77.6	0.184	-85.1
0.1	0.543	133.6	18.138	-78.2	0.000071	-135.7	0.064	-24.4
0.3	0.258	-63.1	122.871	68.3	0.000054	-46.2	0.085	-60.7
0.4	0.165	-107.3	163.969	15.4	0.000087	-101.4	0.08	-78.7
0.5	0.07	-137.4	192.578	-31.3	0.000076	-130.1	0.077	-97.7
0.7	0.048	-61.2	208.273	-107.7	0.000022	-137.6	0.068	-141.7
0.8	0.087	-82.5	211.423	-142.8	0.000088	-51.8	0.066	-168.4
0.9	0.108	-99.4	213.044	-171.7	0.000079	125.6	0.063	163.2
1	0.119	-114.3	209.487	159.3	0.000157	91.0	0.062	133.3
1.2	0.149	-153.5	212.834	103.5	0.000250	-30.6	0.059	78.9
1.5	0.164	152.3	208.67	24.7	0.000224	-0.5	0.057	13.1
1.8	0.171	100.0	208.042	-53.5	0.000090	-110.7	0.054	-52.2
2	0.161	59.4	207.577	-104.5	0.000114	-94.2	0.049	-97.7
2.2	0.151	31.6	207.914	-155.4	0.000175	76.6	0.046	-146.9
2.5	0.14	-39.1	206.233	126.5	0.000215	-31.6	0.055	139.5
2.7	0.124	-73.4	199.898	73.7	0.000184	-12.2	0.069	101.2
3	0.122	-144.5	182.514	-2.2	0.000166	83.9	0.091	58.1
3.3	0.14	168.9	173.805	-78.5	0.000148	-74.6	0.125	22.3
3.5	0.131	144.0	161.838	-127.3	0.000133	-113.7	0.158	-4.1
3.8	0.213	107.8	159.818	155.4	0.000074	-65.6	0.178	-46.8
4	0.267	84.2	156.545	101.1	0.000177	-93.9	0.205	-74.9
4.5	0.425	-2.4	110.08	-40.9	0.000167	112.1	0.088	-138.5
5	0.469	-72.7	67.323	-176.1	0.000391	-154.9	0.117	-172.7
5.5	0.518	-144.3	38.552	54.8	0.000244	-34.9	0.044	102.8
6	0.407	121.9	23.192	-87.9	0.000485	-152.6	0.08	41.6

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 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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