



# WMA50A-2A WMA50A2B

## 4.7T & 7T DUAL BAND LOW NOISE PRE-AMPLIFIER

REV B  
April 2015

### Key Features



- 50 Ohm Impedance
- 4.7T & 7T Dual Band
- 0.40 dB Noise Figure
- 70 dB Reverse Isolation,  $S_{12}$
- 22.0 dBm Output  $IP_3$
- 27.0 dB Gain
- 10.0 dBm  $P_{1dB}$
- 1.22:1 Output VSWR
- Unconditional Stable,  $k > 1$
- Single Power Supply
- None Magnetic (-00 only)

### Product Description

WMA50A-2A/B is integrated with WanTcom proprietary low noise amplifier technologies, high frequency micro electronic assembly techniques, and high reliability designs to realize optimum low noise figure, wideband, and high performances together. With single DC operation, the amplifier has 50 Ohm input impedance and unconditional stable condition. The amplifier has standard SMA connectorized WP-5 Gold plated housing that is magnetic.

Contact Factory for non-magnetic version, -00.

**Other frequencies and impedance available!**

CAUTION:



ELECTROSTATIC DISCHARGE SENSITIVE

### Applications

- Magnetic Resonance Imaging
- RF Measurement
- Medical
- Current Sensor



### Specifications

Summary of the key electrical specifications at room temperature.

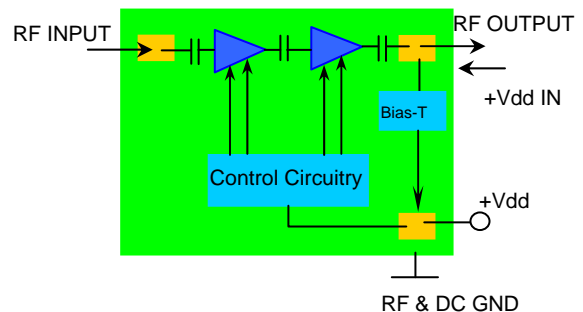
Index	Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
1	Gain	$S_{21}$	198 - 202 MHz, 298 - 302 MHz	25.0	26.5	28.0	dB
2	Gain Variation	$\Delta G$	+/- 1 MHz, 198 - 202 MHz, 298 - 302 MHz		+/-0.05	+/- 0.10	dB
3	Input & Output Impedance	$Z_0$	198 - 202 MHz, 298 - 302 MHz		50		Ohm
4	Input VSWR	$SWR_1$	198 - 202 MHz, 298 - 302 MHz		1.22	1.4	:1
5	Output VSWR	$SWR_2$	198 - 202 MHz, 298 - 302 MHz		1.30	1.5	:1
6	Reverse Isolation	$S_{12}$	198 - 202 MHz, 298 - 302 MHz	65	70		dB
7	Noise Figure	NF	198 - 202 MHz, 298 - 302 MHz		0.40	0.50	dB
8	Output 1dB Gain Compression Point	$P_{1dB}$	198 - 202 MHz, 298 - 302 MHz	8	10		dBm
9	Output-Third-Order Interception Point	$IP_3$	Two-Tone, $P_{out} = 0$ dBm each, 1 MHz separation	16	22		dBm
10	Current Consumption	$I_{dd}$	WMA50A-2A		25		mA
			WMA50A-2B		45		
11	DC Power Supply Operating Voltage	$V_{dd}$	WMA50A-2A	+7		+16	V
			WMA50A-2B	+4.7	+5.0	+5.3	
12	Thermal Resistance	$R_{th,c}$	Junction to case			220	$^{\circ}C/W$
13	Operating Temperature	$T_o$		0		+60	$^{\circ}C$
14	Maximum RF Input Power	$P_{IN,MAX}$	DC - 6.0 GHz, 10% Duty Cycle, 50 Ohm Source			13	dBm
15	Saturate Recover Time	$t_{sr}$	10% to 90% from 30 dBm Pin		8	10	$\mu S$
16	ESD Protection, None Contact	$V_{ESDN}$	Output Ports			16	kV
17	ESD Protection, Direct Contact	$V_{ESD}$	Output Ports			6	kV

### Absolute Maximum Ratings

Parameters	Units	Ratings
DC Power Supply Voltage	V	16/6, WMA50A-2A/B
Drain Current	mA	50
Total Power Dissipation	mW	700
RF Input Power, 10% Duty Cycle	dBm	13
Channel Temperature	$^{\circ}C$	150
Storage Temperature	$^{\circ}C$	-55 ~ 125
Operating Temperature	$^{\circ}C$	0 ~ +60
Thermal Resistance <sup>1</sup>	$^{\circ}C/W$	215

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

### Functional Block Diagram



<sup>1</sup> The last stage transistor dominates the heat dissipation. The drain bias voltage is +4V and the drain current is 20 mA. The total power dissipation of the last stage transistor is thus 80 mW. The junction temperature arise  $0.08 \times 215 = 17 (^{\circ}C)$ .

Specifications and information are subject to change without notice.



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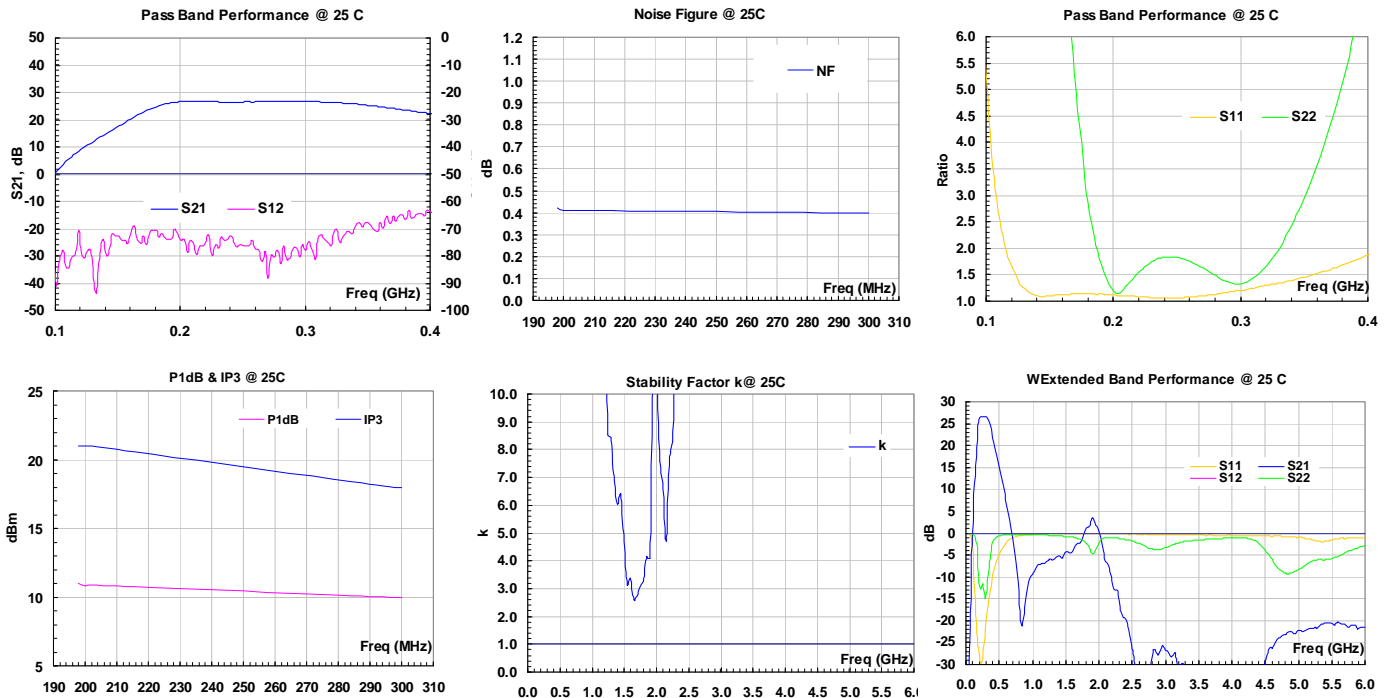
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### Ordering Information

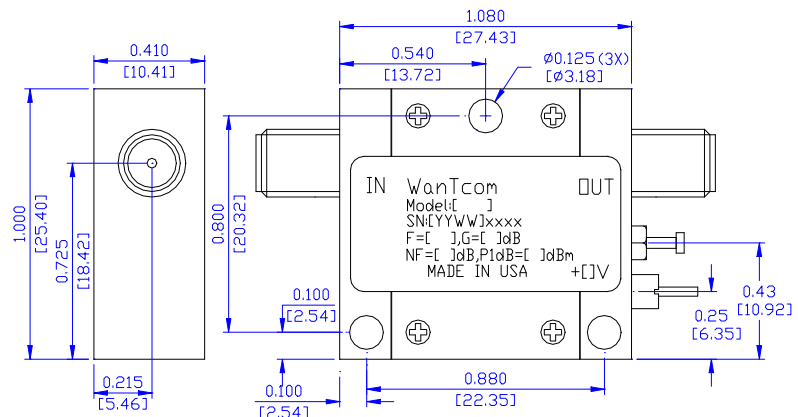
Model Number	WMA50A-2A	WMA50A-2B	WMA50A-2ABT	WMA50A-2BBT
Feature	V <sub>dd</sub> = +7.0 ~ +16.0V, No Output Bias-T	V <sub>dd</sub> = +5V, No Output Bias-T	V <sub>dd</sub> = +7.0 ~ +16.0V, With Output Bias-T	V <sub>dd</sub> = +5V, With Output Bias-T

### Typical Data



### Outline, WP-5 Housing

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



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## **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 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 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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