WMA03B

3.0 MHz LOW NOISE PRE-AMPLIFIER

REV A
April 2021

Key Features

- 3.0 MHz
- 4.5 Ohm Input Impedance
- 10.0 dBm Output P_{1dB}
- 28.0 dB Gain, Z_s = 75 Ω
- 22.0 dBm Output IP_3
- 1.22:1 Output VSWR
- Contains Ferrite Components
- >68 years MTBF
- RoHS compliant
- Meet MIL-STD-202g

Product Description

CAUTION: ELECTROSTATIC DISCHARGE SENSITIVE

WMA03B integrates WanTcom proprietary power 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 4.5 Ω low input impedance and excellent low noise at 75 Ω source impedance, Z_s. The amplifier has standard SMA connectorized WP-11 Gold plated housing.

Applications

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

Preliminary

Specifications

Summary of the electrical specifications WMA03B at room temperature

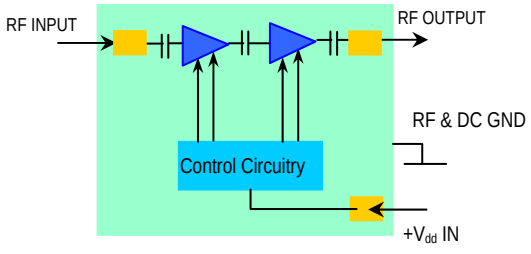
Index	Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
1	Gain	S_{21}	3.0 MHz, Z_s = 75 Ω, Z_L = 50 Ω	27	28	29	dB
2	Gain Variation	ΔG	3.0 +/ 0.1 MHz, Z_s = 75 Ω, Z_L = 50 Ω		+/- 0.1	+/-0.3	dB
3	Noise Figure, **Estimated**	NF	3.0 MHz, Z_s = 75 Ω, Z_L = 50 Ω		2.0		dB
4	Input Impedance	RE[Zin]	3.0 MHz, Z_s = 75 Ω, Z_L = 50 Ω	**3.0**	**4.5**	**6.0**	Ohm
		IM[Zin]	3.0 MHz, Z_s = 75 Ω, Z_L = 50 Ω	-3.0	0	3.0	
5	Output VSWR	SWR_2	3.0 MHz, Z_L = 50 Ω		1.15:1	1.22:1	Ratio
6	Reverse Isolation	S_{12}	0.1 – 300 MHz, Z_s = 75 Ω, Z_L = 50 Ω	50	56		dB
7	Output Power 1dB Compression Point	P_{1dB}	3.0 MHz, Z_s = 75 Ω, Z_L = 50 Ω	7	10		dBm
8	Output-Third-Order Interception Point	IP_3	Two-Tone, 0 dBm each, 0.5 MHz separation	18	22		dBm
10	Current Consumption	I_{dd}	V_{dd}= +5.0 V		16	20	mA
11	DC Power Supply Operating Voltage	V_{dd}		+4.7	+5	+8.0	V
12	Thermal Resistance	$R_{th,c}$	Junction to case			220	°C/W
13	Operating Temperature	T_o		+10		+60	°C
14	Maximum RF Input Power	$P_{IN, MAX}$	3.0 MHz, 10% Duty Cycle, Z_s = 75 Ω			25	dBm
15	Saturate Recover Time	t_{sr}	10% to 90% from 20 dBm Pin		TBD		mS
16	ESD Protection, None Contact	V_{ESDN}	Input and Output Ports			16	kV
17	ESD Protection, Direct Contact	V_{ESD}	Input and Output Ports			6	kV

Absolute Maximum Ratings

Parameters	Units	Ratings
DC Power Supply Voltage	V	-0.5, +9V
Drain Current	mA	25
Total Power Dissipation	mW	250
Maximum RF Input Power, 3.0 MHz, 10% Duty Cycle, Z_s = 50 Ω	dBm	25
Channel Temperature	°C	150
Storage Temperature	°C	-55 ~ 125
Operating Temperature	°C	-40 ~ 85
Thermal Resistance	°C/W	220

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

Functional Block Diagram



Ordering Information

Model Number	WMA03B

Specifications and information are subject to change without notice.

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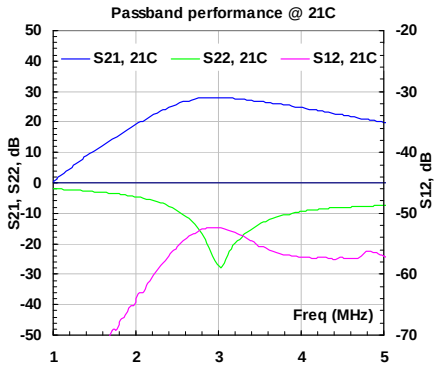
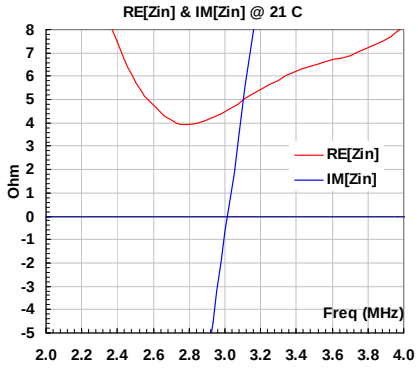
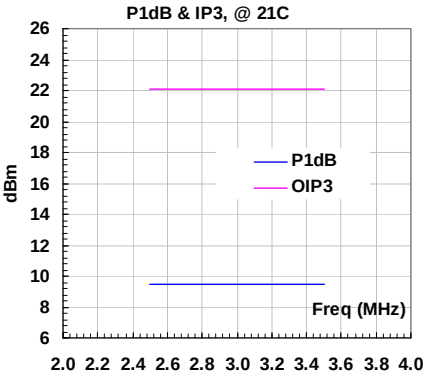
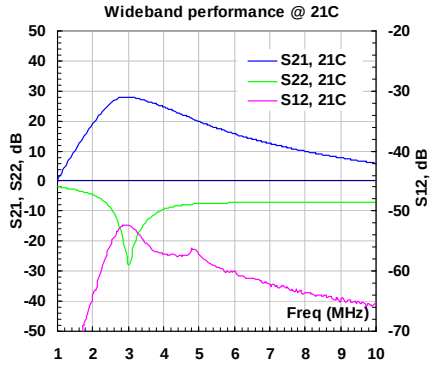
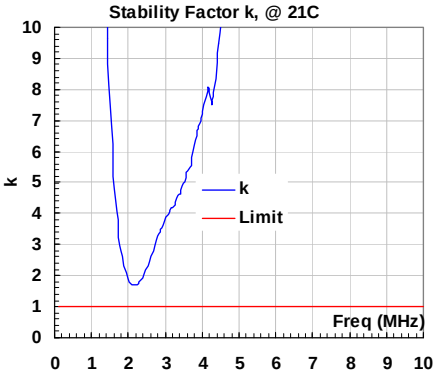
Typical Data:





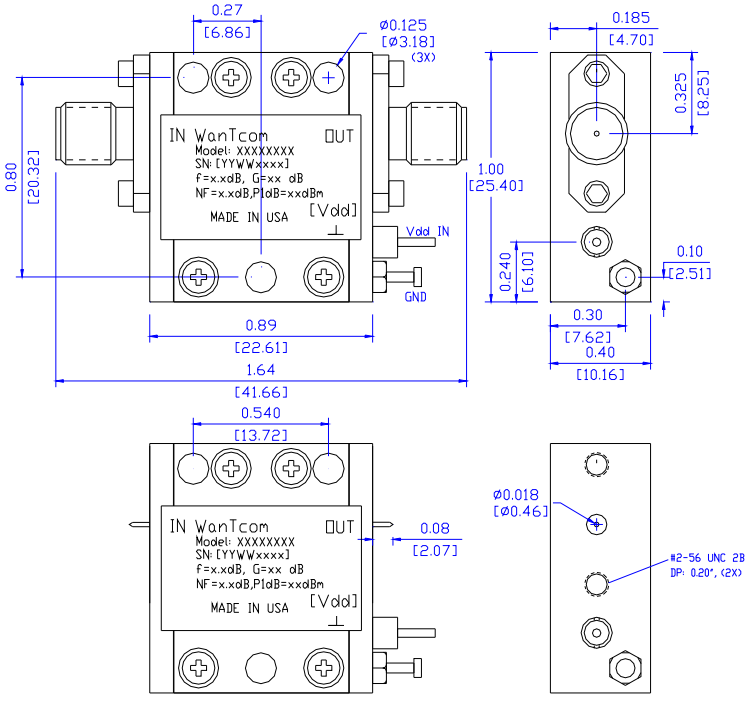






Outline, WP-11 Housing

UNITS:	INCH [mm]
BODY:	Brass
Finish:	Gold Plating
RF Connector:	SMA F Gold Field Replaceable
V_{dd} 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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