



WMA120C

3.0T LOW NOISE PRE-AMPLIFIER

REV A
January 2018

Key Features



- 3.0T Frequency of 120 MHz
- 1.0 Ohm Input Impedance
- 0.45 dB Noise Figure
- 30.0 dBm Max P_{IN}
- 18.0 dBm Output IP₃
- 28.0 dB Gain
- 7.0 dBm P_{1dB}
- 1.22:1 Output VSWR
- Unconditional Stable, k>1
- Single Power Supply
- Non Magnetic
- RoHS Compliance

Product Description

WMA120C 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, wide equal-noise circles, and high performances together. With single +10.0V DC operation, the amplifier has 1.0 Ohm input impedance and unconditional stable condition. The amplifier has 0.50" x 0.40" x 0.10" surface mount package.



Applications

- MRI
- RF Measurement
- Medical
- Current Sensor



Specifications

Summary of the key electrical specifications at room temperature

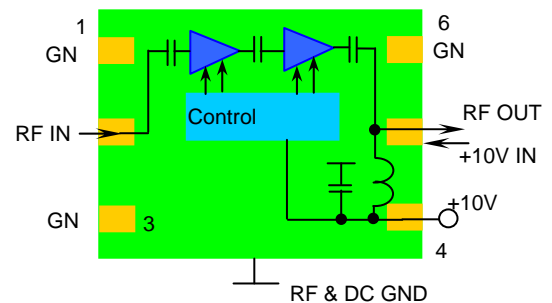
Index	Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
1	Gain	S ₂₁	120 MHz	27.0	28.0	29.0	dB
2	Gain Variation	ΔG	120 MHz +/- 0.5 MHz		+/-0.05	+/- 0.1	dB
3	Input Impedance	RE [Z _{in}]	120 MHz, with 80050 test fixture	0.7	1.0	1.3	Ohm
		IM [Z _{in}]	120 MHz, with 80050 test fixture	-3.0	0	3.0	Ohm
4	Output VSWR, 50 Ohm Impedance	SWR ₂	120 MHz			1.22:1	Ratio
5	Reverse Isolation	S ₁₂	120 MHz	60	70		dB
6	Noise Figure	NF	120 MHz		0.45	0.55	dB
7	Output Power 1dB Compression Point	P _{1dB}	120 MHz	5	7		dBm
8	Output-Third-Order Interception point	IP ₃	Two-Tone, P _{out} = 0 dBm each, 1 MHz separation	15	18		dBm
9	Current Consumption	I _{dd}	V _{dd} = +10.0 V		16		mA
10	Power Supply Operating Voltage	V _{dd}		+9	+10	+11	V
11	Thermal Resistance	R _{th,c}	Junction to case			220	°C/W
12	Operating Temperature	T _o		+10		+60	°C
13	Maximum RF Input Power	P _{IN, MAX}	DC – 6.0 GHz, 10% Duty Cycle, Z _s = 50 Ohm			30	dBm
14	Saturate Recover Time	t _{sr}	10% to 90% from 20 dBm Pin		8	10	uS
15	ESD Protection, None Contact	V _{ESDN}	RF Output Port			16	kV
16	ESD Protection, Direct Contact	V _{ESD}	RF Output Port			6	kV

Absolute Maximum Ratings

Parameters	Units	Ratings
DC Power Supply Voltage	V	12.0
Drain Current	mA	30
Total Power Dissipation	mW	350
RF Input Power, 10% Duty Cycle	dBm	30
Channel Temperature	°C	150
Storage Temperature	°C	-65 ~ 150
Operating Temperature	°C	0 ~ +70
Thermal Resistance ¹	°C/W	220

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

Functional Block Diagram



¹ The last stage transistor dominates the heat dissipation. The drain bias voltage is +3.5V and the drain current is 10.0 mA. The total power dissipation of the last stage transistor is thus 35 mW. The junction temperature arise 0.035 x 220 = 7.7 (°C).

Specifications and information are subject to change without notice.



Ordering Information

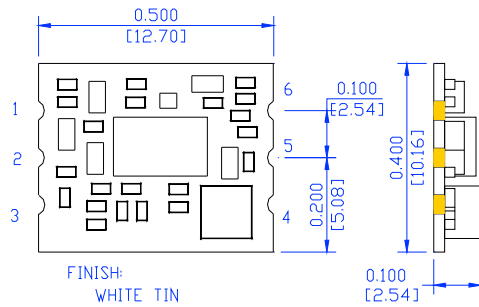
Model Number	WMA120C
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ESD tray is used for the packing. Contact factory for tape and reel packing option for higher volume order.

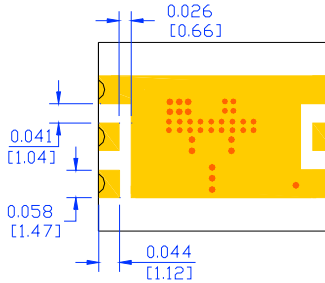
Typical Data

Outline

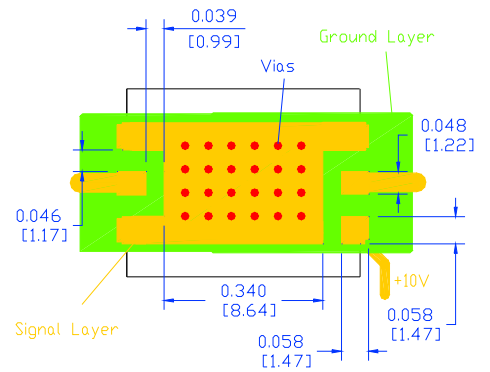
PIN	1	2	3	4	5	6	CNTR
FCTN	GND	IN	GND	NC/10V	OUT/10V	GND	GND



UNITS: INCH [mm]
 Tolerance: X.XXX +/- 0.010*
 X.XXXX +/- 0.005*



Foot Print/Mounting Layout



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Application Notes:

A. Motherboard Layout

The recommended motherboard layout is shown in diagram of [Foot Print/Mounting Layout](#). Sufficient numbers of ground vias on center ground pad are essential for the RF grounding. The width of the 50-Ohm microstrip lines at the input and output RF ports may be different for different property of the substrate. The ground plane on the backside of the substrate is needed to connect the center ground pad through the vias. The ground plane is also essential for the 50-Ohm microstrip line launches at the input and output ports.

The +10V DC voltage is applied at Pin 4 or at the output Pin 5. There is a built-in bias-T at the output port to separate the RF output signal and input +10V DC power supply.

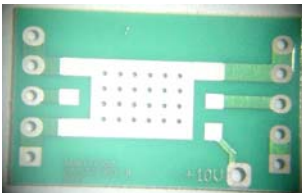


Fig. 1 Example of the motherboard

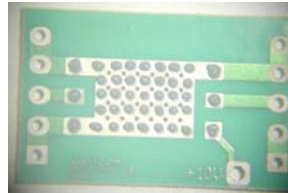


Fig. 2 Dispensed solder paste



Fig. 3 Assembled

B. Assembly

The regular low temperature and none clean solder paste such as SN60/Bi40 is recommended. The high temperature solder has been used internally for the WHM series amplifier assembly. The melting temperature point of the high temperature solder is around 217 ~ 220 °C. Thus, melting temperature of the assembly solder paste should be below 217 °C for assembling WHM series amplifier on the test board to reduce the possible damage. The temperature melting point of the SN60/Bi40 solder paste is around 170 °C and is suitable for the assembly purpose.

The regular solder paste with melting point of 218 °C is not recommended for the assembly of this pre-amp.

The solder paste can be dispensed by a needle manually or driven by a compressed air. **Figure 2** shows the example of the dispensed solder paste pattern. Each solder paste dot is in the diameter of 0.005" ~ 0.010" (0.125 ~ 0.250 mm).

For volume assembly, a stencil with 0.006" (0.15 mm) is recommended to print the solder paste on the circuit board.

For more detail assembly process, refer to AN-109 at www.wantcominc.com website.
