



WHM06AE

0.5- 4.0 GHz LOW NOISE WIDE BAND AMPLIFIER

REV B
September 2007

Key Features



- 0.1 ~ 4.0 GHz
- 1.2 dB noise figure
- 24.0 dBm output IP₃
- 12 -15 dB Gain
- +/-1.2 dB Gain Flatness
- 11.0 dBm P_{1dB}
- 1.5:1 VSWR
- Single Power Supply
- >100 Years MTBF
- RoHS Compliant
- MLS-1 Moisture Sensitivity Level

Product Description

WHM06AE integrates 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 +2.0V~+3.0V DC operation, the amplifier has optimal input and output matching in the specified frequency range at 50-Ohm impedance system. The amplifier has standard 0.12" x 0.12" x 0.06" surface mount package.

Applications

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



Specifications

Summary of the key electrical specifications in 0.5 – 4.0 GHz test fixture at room temperature

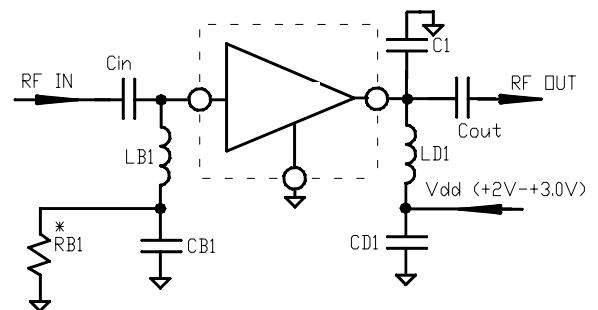
Index	Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
1	Gain	S ₂₁	0.5 – 3.8 GHz	11	14	17	dB
2	Gain Variation	ΔG	0.5 – 3.8 GHz		+/-1.2		dB
3	Input VSWR	SWR ₁	0.5 – 3.8 GHz		1.3:1	2:1	Ratio
4	Output VSWR	SWR ₂	0.5 – 3.8 GHz		1.3:1	2:1	Ratio
5	Reverse Isolation	S ₁₂	0.5 – 3.8 GHz	15	22		dB
6	Noise Figure	NF	0.5 – 3.8 GHz		1.2		dB
7	Output Power 1dB Compression Point	P _{1dB}	0.5 – 3.8 GHz	10	12		dBm
8	Output-Third-Order Interception point	IP ₃	I _{dd} = 25 mA		24		dBm
			I _{dd} = 30 mA		26		dBm
9	Current Consumption	I _{dd}	V _{dd} = +3.0 V		25	35	mA
10	Power Supply Voltage	V _{dd}		+2	+2.5	+3	V
11	Thermal Resistance	R _{th,c}	Junction to case			215	°C/W
12	Operating Temperature	T _o		-55		+100	°C
13	Maximum Average RF Input Power	P _{IN,MAX}	DC – 6.0 GHz			10	dBm

Absolute Maximum Ratings

Parameters	Units	Ratings
DC Power Supply Voltage	V	5.0
Drain Current	mA	60
Total Power Dissipation	mW	200
RF Input Power	dBm	10
Channel Temperature	°C	150
Storage Temperature	°C	-65 ~ 150
Operating Temperature	°C	-55 ~ +100
Thermal Resistance	°C/W	215

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

Application Schematic



Ordering Information

Model Number	WHM06AE
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Waffle pack with the capacity of 100 pieces (10 x 10) is used for the packing. Contact factory for tape and reel packing option for higher volume order. Contact factory for tape and reel packing option.

Specifications and information are subject to change without notice.

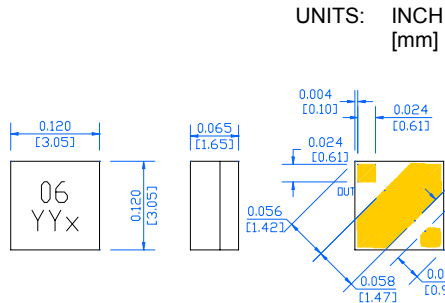


WHM06AE

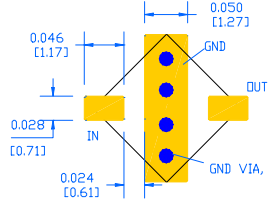
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Outline

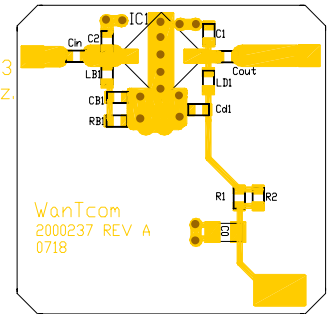


Foot Print

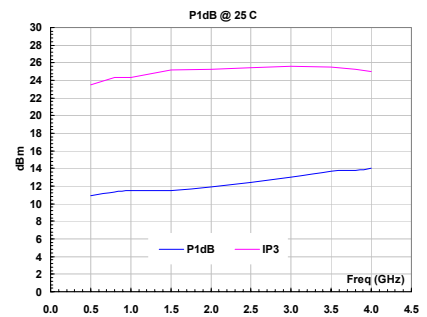
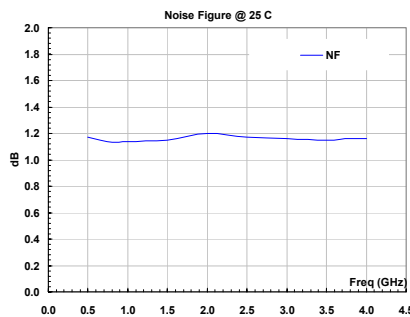
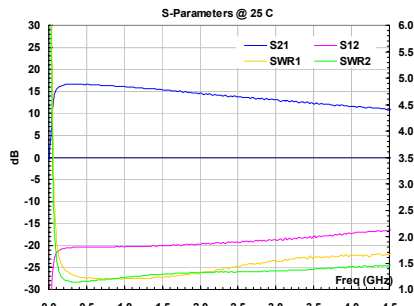


Material: RD4003
h=0.020", 1/2 oz.

Test Board



Typical Data:



Typical Application:

With proper setting L_{B1} and L_{D1} for the RF chokes in the DC bias paths, DC block capacitors C_{in} and C_{out} , and C_1 , a wideband high frequency low noise amplifier can be formed simply using WHM03AE. C_{B1} and C_{D1} are the de-coupling capacitors. R_{B1} is used to set the bias current. The higher R_{B1} value is, the larger the DC bias current will be. R_{B1} value is in the range of 130 ~ 220 Ohm depending on the drain voltage and the drain current.

For +5.0V DC power supply instead of 2.0V to 3.0V operation, a voltage drop resistor, R_D ($R_1//R_2$), can be in series between the +5.0V and the amplifier. This configuration will help to reduce the sensitivity of the DC bias current to R_{B1} value and environmental temperature variation. Different R_D values can be calculated for different drain DC bias current and voltage settings. For 3.0V drain voltage and 25 mA bias current with +5.0V power supply, the total voltage drop on R_D is 2.0V and R_D value is thus 80 Ohm. Two 160 Ohm resistors, R_1 and R_2 are in parallel to form the 80 Ohm resistor, R_D .

Table 1 BOM of 0.5 GHz – 3.8 GHz LNA with +5.0V DC operation.

Site	QTY	Description	Pkg	Mfgr Part No.	Mfgr
$C_{in}, C_{out}, C_{B1}, C_{D1}$	4	CAP, 0.01uF 50 V 5% X7R	0402	GRM155R71H103KA88D	Murata
C_1, C_2	2	EMPTY	--	--	--
LB_1, LD_1	2	IND, 100 nH 2%	0603	ELJ-RFR10JF	Panasonic
* RB_1	1	RES, 169 OHM 1% 1/16W	0402	ERJ-2RKF1690X	Panasonic
R_1, R_2	2	RES, 160 OHM 1% 1/16W	0402	ERJ-2RKF1600X	Panasonic
IC_1	1	LNA	M3	WHM06AE	WanTcom
PCB	1	WHM06AE MB	--	2000237 REV A	WanTcom

* Adjust RB_1 value for the predetermined DC bias current.

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