WEA107

0.6- 2.5 GHz LOW NOISE WIDE BAND AMPLIFIER

REV A
January 2008

Key Features

- 0.6 ~ 2.5 GHz
- 1.0 dB Noise Figure
- 26.0 DBm Output IP_3
- 30.0 dB Gain
- +/-0.50 dB Gain Flatness
- 14.0 dBm P_{1dB}
- 1.5:1 VSWR
- Single Power Supply
- >34 Years MTBF
- Unconditional Stable
- RoHS Compliant

Product Description

WEA107 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 +5.0V DC operation, the amplifier has optimal input and output matching in the specified frequency range at 50-Ohm impedance system. The amplifier has standard SMA connectorized WP-10E gold plated housing.

The amplifier is designed to meet the rugged standard of MIL-STD-202.

Applications

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

Specifications

Summary of the electrical specifications WEA107 at room temperature

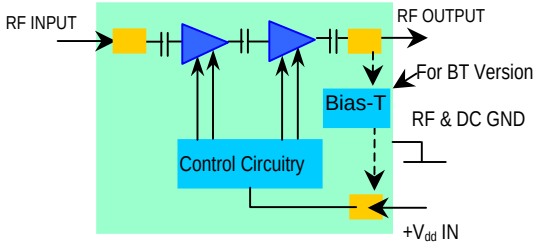
Index	Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
1	Gain	S_{21}	0.6 – 2.5 GHz	29		35	dB
2	Gain Variation	ΔG	Every 100 MHz bandwidth		+/- 0.2	+/-0.3	dB
3	Input VSWR	SWR_1	0.6 – 2.5 GHz		1.4:1	1.5:1	Ratio
4	Output VSWR	SWR_2	0.6 – 2.5 GHz		1.4:1	1.5:1	Ratio
5	Reverse Isolation	S_{12}	0.6 – 2.5 GHz	40			dB
6	Noise figure	NF	0.6 – 2.5 GHz		1.0	1.2	dB
7	Output Power 1dB compression Point	P_{1dB}	0.6 – 2.5 GHz	12	14		dBm
8	Output-Third-Order Interception point	IP_3	Two-Tone, P_{out} +0 dBm each, 1 MHz separation	24	26		dBm
9	Current Consumption	I_{dd}	V_{dd}= +5 V		50		mA
10	Power Supply Voltage	V_{dd}		+4.7	+5	+5.3	V
11	Thermal Resistance	$R_{th,c}$	Junction to case			220	$^oC/W$
12	Operating Temperature	T_o		-40		+85	^oC
13	Maximum Average RF Input Power	$P_{IN, MAX}$	0.6 – 2.5 GHz			5	dBm

Absolute Maximum Ratings

Parameters	Units	Ratings
DC Power Supply Voltage	V	6.0
Drain Current	mA	70
Total Power Dissipation	mW	400
RF Input Power	dBm	5
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	Feature
WEA107	Without Bias-T at Output
WEA107BT	With Bias-T at Output

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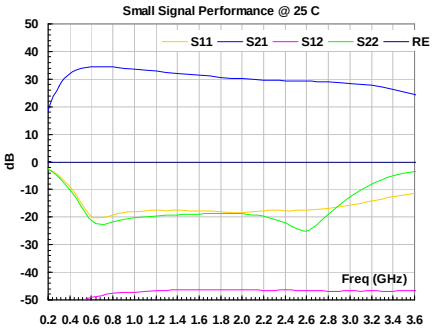
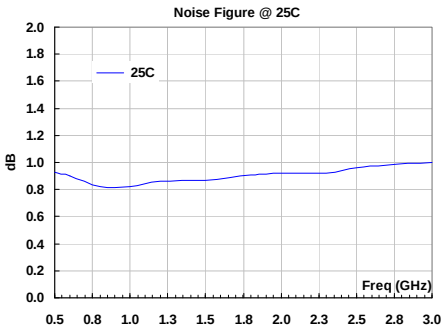
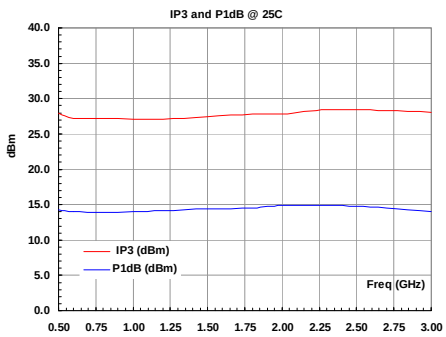
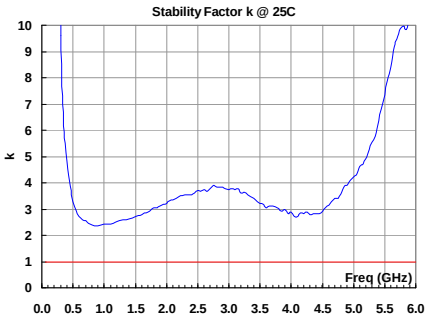
Typical Data



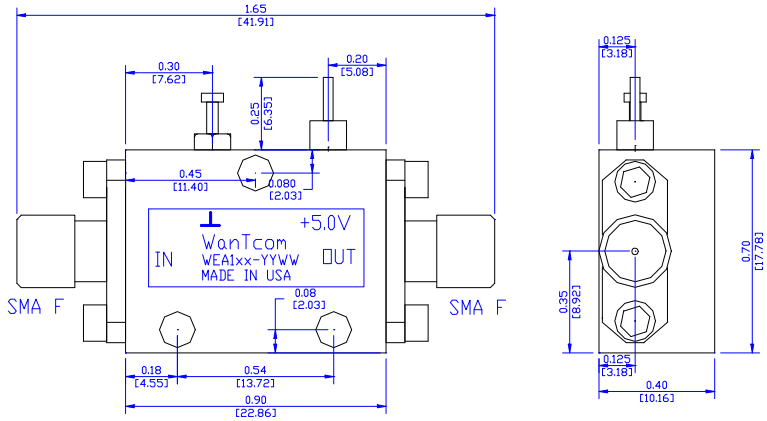






Outline, WP-10E Housing

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



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Small Signal S-Parameters:

!WEA107, +25C, S-parameters at V_{dd}=5V, I_{dd}=50mA. Last updated 2/24/04.
GHZ s MA R 50

!Freq(GHz)	MAGS11	ANGS11	MAGS21	ANGS21	MAGS12	ANGS12	MAGS22	ANGS22
0.1	0.808	116.2	1.358	-89.6	0.0000	162.2	0.919	-42.4
0.2	0.731	29.4	8.601	-159.0	0.0002	-97.3	0.741	-83.0
0.3	0.561	-43.1	23.732	138.4	0.0011	-165.2	0.522	-119.7
0.4	0.350	-108.8	39.837	82.8	0.0021	150.0	0.312	-150.6
0.5	0.185	-171.9	49.841	36.3	0.0030	117.4	0.160	-167.5
0.6	0.106	116.1	53.334	-1.6	0.0035	91.7	0.087	-161.1
0.8	0.109	10.1	52.207	-59.3	0.0041	57.5	0.083	-136.7
0.9	0.119	-17.6	50.265	-82.6	0.0043	45.7	0.092	-140.7
1	0.126	-41.1	48.091	-103.9	0.0044	34.7	0.097	-150.1
1.2	0.132	-78.9	43.852	-141.5	0.0046	16.8	0.104	-169.1
1.4	0.133	-111.2	40.033	-175.0	0.0048	0.0	0.109	169.4
1.5	0.131	-125.8	38.459	169.1	0.0048	-6.7	0.111	158.6
1.6	0.131	-140.8	36.972	153.9	0.0049	-14.5	0.114	147.9
1.8	0.125	-171.0	34.228	123.9	0.0048	-27.9	0.117	123.3
2	0.121	162.9	32.039	95.2	0.0049	-42.8	0.115	95.9
2.2	0.128	136.0	30.394	67.3	0.0047	-55.1	0.104	64.4
2.3	0.132	121.3	29.987	53.2	0.0047	-63.2	0.091	46.6
2.5	0.135	92.8	29.159	24.0	0.0046	-77.3	0.062	-8.0
2.7	0.139	67.2	28.491	-6.7	0.0046	-93.6	0.075	-102.1
3	0.163	29.2	26.675	-56.0	0.0046	-122.6	0.235	169.9
3.5	0.249	-41.9	18.714	-143.3	0.0046	171.1	0.622	72.0
4	0.331	-110.4	9.070	140.9	0.0054	103.9	0.812	-5.5
4.5	0.449	-172.9	4.199	77.6	0.0070	49.0	0.870	-65.2
5	0.563	127.1	1.866	13.1	0.0081	6.4	0.890	-116.5
5.5	0.653	68.3	0.849	-58.1	0.0087	-31.9	0.892	-162.3
6	0.720	10.9	0.496	-119.7	0.0084	-58.4	0.899	154.9

Application Notes:

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.

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.

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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