



WEA115

0.5- 4.0 GHz LOW NOISE WIDE BAND AMPLIFIER

REV A
March 2008

Key Features



- 0.5 ~ 4.0 GHz
- 1.20 dB noise figure
- 26.0 dBm output IP₃
- 26.0 dB Gain
- +/-1.0 dB Gain Flatness
- 14.0 dBm P_{1dB}
- 1.5:1 VSWR
- Single Power Supply
- >34 Years MTBF
- Unconditional stable
- RoHS compliant

Product Description

WEA115 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-5 gold plated housing.

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

Applications

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



Specifications

Summary of the electrical specifications WEA115 at room temperature

Index	Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
1	Gain	S ₂₁	0.5 – 4.0 GHz	24	26	28	dB
2	Gain Variation	ΔG	0.5 – 4.0 GHz		+/- 1.0	+/-1.3	dB
3	Input VSWR	SWR ₁	0.5 – 4.0 GHz		1.5:1	1.6:1	Ratio
4	Output VSWR	SWR ₂	0.5 – 4.0 GHz		1.35:1	1.6:1	Ratio
5	Reverse Isolation	S ₁₂	0.5 – 4.0 GHz	45	50		dB
6	Noise figure	NF	0.5 – 4.0 GHz		1.20	1.40	dB
7	Output Power 1dB compression Point	P _{1dB}	0.5 – 4.0 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	Harmonics	HPI	Single Tone, P _{out} +0 dBm	-45	-50		dBc
10	Current Consumption	I _{dd}	V _{dd} = +5 V		65		mA
11	Power Supply Voltage	V _{dd}	WEA115	+4.7	+5	+5.3	V
			WEA115B	+8.0		+15	
12	Thermal Resistance	R _{th,c}	Junction to case			220	°C/W
13	Operating Temperature	T _o		-40		+85	°C
14	Maximum Average RF Input Power	P _{IN, MAX}	DC – 12 GHz			10	dBm

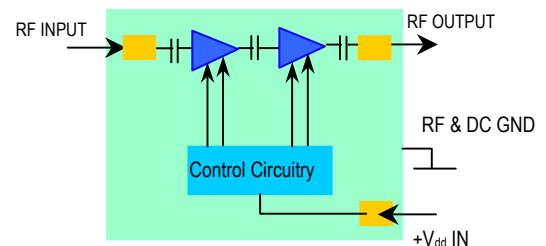
Absolute Maximum Ratings

Parameters	Units	Ratings
DC Power Supply Voltage	V	6.0 (+16V for WEA115B)
Drain Current	mA	80
Total Power Dissipation	mW	400
RF Input Power	dBm	10
Channel Temperature	°C	150
Storage Temperature	°C	-55 ~ 125
Operating Temperature	°C	-40 ~ 85
Thermal Resistance	°C/W	220 ¹

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

¹ Last stage transistor has the highest junction temperature. The transistor is biased at 35 mA at 3.0 V. The junction temperature arise 105 mW x 220 °C/W = 23 °C.

Functional Block Diagram



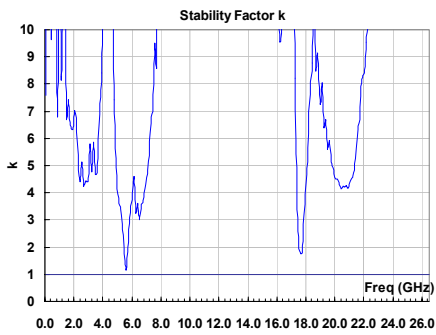
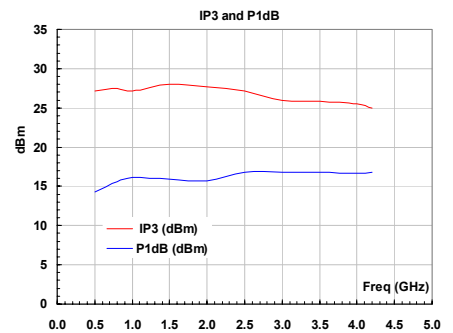
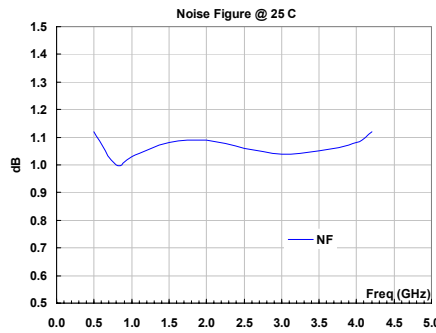
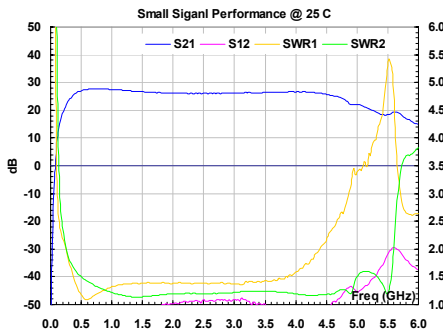
Ordering Information

Model Number	Feature
WEA115	V _{dd} = +5.0V
WEA115B	V _{dd} = +7.0 ~ +16.0V

Specifications and information are subject to change without notice.

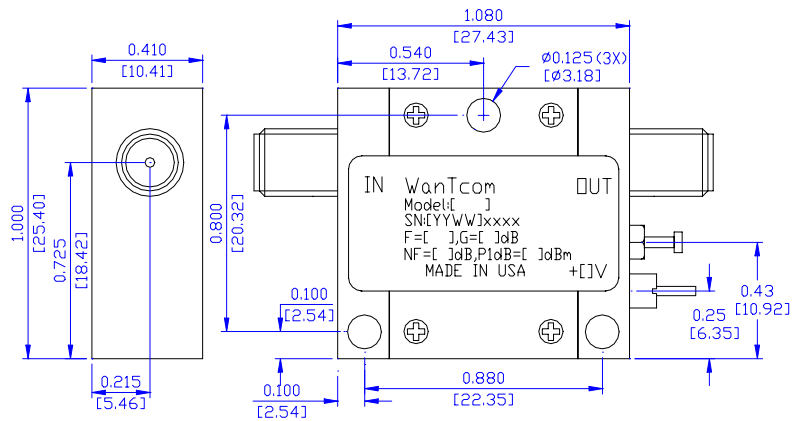


Typical Data



Outline, WP-5 Housing

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



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Small Signal S-Parameters:

IWEA115, +25C, S-parameters at $V_{dd}=5V$, $I_{dd}=50mA$. Last updated 12/16/05.
GHZ s MA R 50

!Freq(GHz)	MAGS11	ANGS11	MAGS21	ANGS21	MAGS12	ANGS12	MAGS22	ANGS22
0.05	0.488	129.1	21.699	90	0.003172	99.6	0.09	99.3
0.1	0.286	46.5	27.831	28	0.003938	40.9	0.096	20.4
0.2	0.276	4.4	28.301	-2.5	0.003989	18.7	0.106	-21.4
0.3	0.268	-15.7	28.364	-20	0.004173	10.3	0.112	-47.3
0.5	0.247	-44.5	28.385	-45.7	0.004341	4.7	0.124	-88
0.8	0.214	-78.4	28.55	-79.5	0.004621	-2.4	0.146	-135.4
1	0.183	-96.4	29.161	-101.9	0.005075	-7.5	0.166	-165.1
1.2	0.164	-108.7	29.616	-125.1	0.005491	-14.3	0.183	164.1
1.5	0.155	-125.7	30.538	-159.5	0.006128	-23.9	0.18	118.8
1.8	0.161	-142.1	29.551	166.6	0.006831	-38.9	0.162	73.8
2	0.175	-158.5	28.908	141.9	0.007174	-46.2	0.133	37.4
2.2	0.196	-175.3	28.175	120.1	0.007483	-53.2	0.087	-3.9
2.5	0.204	154	27.985	86.4	0.007681	-70.7	0.056	-94.8
2.7	0.197	140.1	27.848	65.4	0.008253	-79	0.074	-157
3	0.198	111.9	27.56	32.5	0.00806	-95	0.152	144.6
3.2	0.187	94.6	27.905	9.5	0.007904	-104.2	0.186	106.8
3.5	0.16	65.8	28.028	-28.4	0.008048	-122.9	0.192	61.8
3.7	0.141	41.5	28.918	-54.9	0.00753	-132.5	0.194	23.3
4	0.053	32.3	29.422	-95.6	0.00773	-147.7	0.139	-62.5
4.2	0.026	68.9	28.882	-127.8	0.00755	-162	0.171	-148.4
4.5	0.083	80	22.414	-177.9	0.006306	176.4	0.344	119.2
5	0.118	31	11.925	120.1	0.004211	152.8	0.524	28.9
5.5	0.128	-33.5	6.752	65.3	0.002896	135.1	0.651	-36.4
6	0.134	-98.5	3.98	18.5	0.002494	117.2	0.744	-92.5

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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