1.70 - 2.30 GHz LOW NOISE AMPLIFIER WLA19-3030A[1]

WLA19-3030A is a low noise figure, wideband, and high linear amplifier. The amplifier offers typical 0.70 dB noise figure and 32 dBm output IP_3 at the frequency range from 1.70 GHz to 2.30 GHz of DCS, PCS, and 3G bands.

WLA19-3030A is most suitable for cellular base stations, wireless data communications, tower top receiver amplifiers, last-mile wireless communication systems, and wireless measurement applications. WLA19-3030A can be configured with built-in bias-T for remote 5 V DC power supply.

WLA19-3030A is designed to meet the rugged standards of MIL-STD-202.

Key Features:

Impedance:	50 Ohm
MTBF[2]:	>300,000 hrs (34Years)
Unconditional Stable:	k>1
Low Noise:	0.70 dB
Output IP_3:	32.0 dBm
Gain:	30.0 dB
P_{1dB}:	16.0 dBm minimum
Single power supply:	100 mA @ +5V
Frequency Range:	1.70 ~ 2.30 GHz
Operating Temperature:	-40 ~ +85 ºC
Return Losses:	20.0 dB
Small size:	SMA Female, 0.90" x 0.70" x 0.4" (41.9 mm x 17.8 mm x 10.2 mm) gold plated housing.
Built-in Functions:	DC blocks at input and output, temperature compensation circuits, and auto DC biases.

Absolute Maximum Ratings[3]:

Symbol	Parameters	Units	Absolute Maximum
V_{dd}	DC Power Supply Voltage	V	5.5
I_{dd}	Drain Current	mA	120
P_{diss}	Total Power Dissipation	mW	600
$P_{In,Max}$	RF Input Power	dBm	10
T_{ch}	Channel Temperature	°C	150
T_{STG}	Storage Temperature	°C	-65 ~ 150
$T_{O,MAX}$	Maximum Operating Temperature	°C	-55 ~ 100
$R_{th,c}$	Thermal Resistance	°C/W	220

[1] Specifications are subject to change without notice.
[2] MTBF: Mean Time Between Failure, Per TR-NWT-000332, ISSUE 3, SEPTEMBER, 1990, T=40℃
[3] Operation of this device above any one of these parameters may cause permanent damage.

Specifications:

a) Table 1 Summary of the electrical specifications WLA19-3030A at room temperature

Index	Testing Item	Symbol	Test Constraints	Nom (RT)	Min	Max	Unit
1	Gain	S_{21}	1.70 – 2.30 GHz	30	26		dB
2	Gain Variation	ΔG	20 MHz Bandwidth	0.20		0.30	dB
3	Input Return Loss	S_{11}	1.70 – 2.30 GHz	20	16		dB
4	Output Return Loss	S_{22}	1.70 – 2.30 GHz	20	16		dB
5	Reverse Isolation	S_{12}	1.70 – 2.30 GHz	45	40		dB
6	Noise figure	NF	1.70 – 2.30 GHz	0.70		0.80	dB
7	Output Power 1dB compression Point	P_{1dB}	1.70 – 2.30 GHz	18	16		dBm
8	Output-Third-Order Interception point	IP_3	Two-Tone, P_{out} +0 dBm each, 1 MHz separation	32	30		dBm
9	Current Consumption	I_{dd}	V_{dd}= +5 V	100			mA
10	Power Supply Voltage	V_{dd}		+5	+4.7	+5.3	V
11	Thermal Resistance	$R_{th,c}$	Junction to case			215	°C/W
12	Operating Temperature	T_o			-40	+85	°C
13	Maximum Average RF Input Power	$P_{IN, MAX}$	1.70 – 2.30 GHz			10	dBm

b) Passband Frequency Response

As shown in **Figure 1**, the typical gain of the WLA19-3030A is 30.0 dB across 1.70 GHz to 2.30 GHz frequency range. The typical input and output return losses are 20 dB across 1.70 GHz to 2.30 GHz frequency range.

Figure 2 shows P_{1dB} and IP_3 of the WLA19-3030A. The typical P_{1dB} and IP_3 are 18.0 dBm and 32.0 dBm in the frequency range of 1.70 GHz to 2.30 GHz, respectively.

Figure 3 illustrates the noise figure performance. The noise figure is 0.70 dB across the frequency range of 1.70 GHz to 2.30 GHz. At 85 ^{0}C, WLA19-3030A only has 0.25 dB noise increases. At –40 ^{0}C, WLA19-3030A offers approximately 0.20 dB less noise figure than that at room temperature.

Figure 4 is the plot of the stability factor *k* of WLA19-3030A. The amplifier is unconditional stable at room temperature due to *k* is great than 1 at all frequency ranges.

Figure 5 is the internal block diagram of WLA19-3030A.

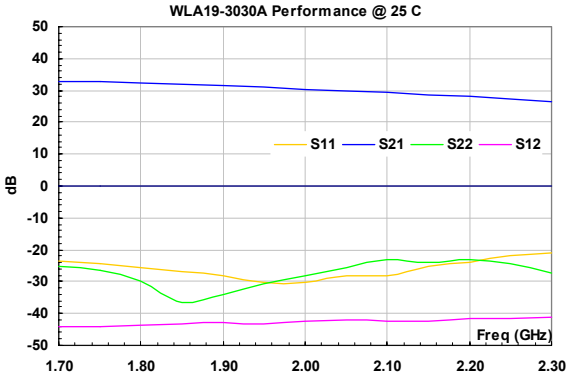

FIG. 1 Typical small signal performance.

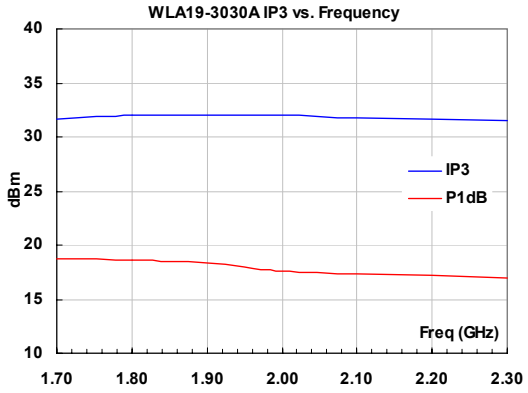

FIG. 2 Typical P_{1dB} and IP_3 at room temperature.

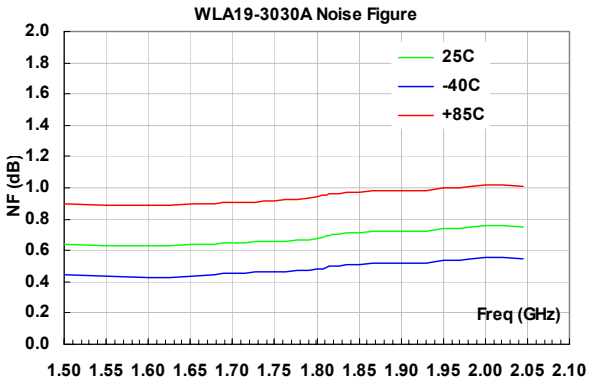

FIG. 3 Noise figure performance

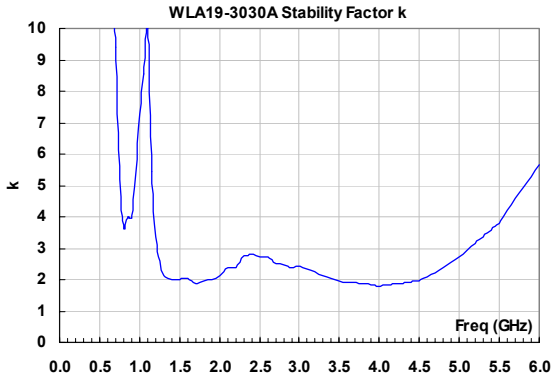

FIG. 4 Stability factor *k* of WLA19-3030A

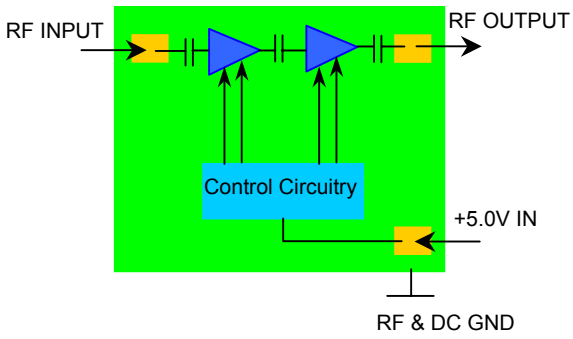

FIG. 5 Block diagram of WLA19-3030A

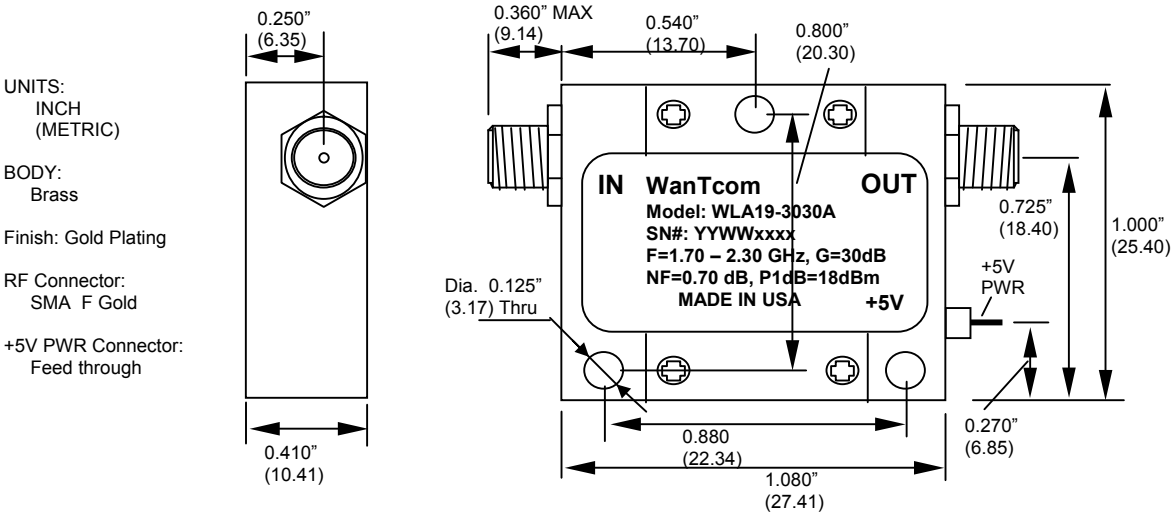

FIG. 6 WLA19-3030A outline

WLA19-3030A Mechanical Outline, WP-5:

Figure 6 shows the mechanical outline of WLA19-3030A. It is a WanTcom's standard WP-5 housing with gold plating. Both RF input and output ports are equipped with SMA female connectors and the DC port connector is an EMI filtered feed thru pin.

Ordering Information

Model Number	WLA19-3030A

Small Signal S-Parameters:

!WLA19-3030A
!s-parameters at Vdd=5V, Idd=100mA. Last updated 9/07/02.

GHZ s MA R 50

!F(GHz)	MAG S11	ANG S11	MAG S21	ANG S21	MAG S12	ANG S12	MAG S22	ANG S22
0.05	0.84	-37.0	0.02	-131.1	0.00059	35.6	0.61	156.9
0.1	0.73	-62.0	0.15	-168.1	0.00028	10.2	0.53	155.9
0.2	0.63	-114.1	0.45	161.9	0.00030	-155.9	0.49	148.2
0.3	0.64	-176.3	1.15	-177.0	0.00037	-3.1	0.48	137.8
0.4	0.72	117.8	4.16	169.5	0.00037	69.2	0.46	126.4
0.5	0.81	59.4	9.71	135.1	0.00021	70.2	0.45	113.6
0.6	0.86	11.6	17.09	98.9	0.00045	-45.9	0.43	99.6
0.7	0.85	-31.4	26.53	62.2	0.00048	-126.2	0.39	83.8
0.8	0.77	-74.8	37.94	23.3	0.00138	-170.7	0.34	68.8
0.9	0.49	-120.3	41.49	-23.5	0.00223	157.6	0.29	59.2
1	0.22	-101.4	26.10	-61.1	0.00231	128.9	0.29	48.0
1.1	0.43	-111.1	22.54	-43.3	0.00167	142.3	0.30	18.0
1.2	0.50	-152.7	37.85	-59.5	0.00286	151.2	0.22	-22.8
1.3	0.45	162.9	45.59	-90.1	0.00421	126.5	0.12	-71.5
1.4	0.31	120.2	48.29	-117.7	0.00493	103.7	0.05	-148.3
1.5	0.18	89.1	48.71	-143.8	0.00535	92.3	0.05	145.6
1.6	0.11	67.1	47.13	-168.5	0.00542	74.2	0.04	92.0
1.7	0.07	60.0	44.57	168.3	0.00638	70.7	0.06	59.7
1.8	0.05	58.2	41.13	146.4	0.00659	54.2	0.03	39.5
1.9	0.04	56.4	37.28	125.8	0.00716	47.3	0.02	-70.3
2	0.03	65.1	33.21	106.9	0.00751	37.4	0.04	-139.9
2.1	0.04	90.9	29.39	89.2	0.00746	32.3	0.07	-171.9
2.2	0.06	91.7	25.46	72.7	0.00852	22.1	0.07	161.1
2.3	0.09	83.6	21.54	59.1	0.00864	11.0	0.04	127.5
2.4	0.13	72.9	19.01	49.7	0.00953	10.0	0.05	-136.4
2.5	0.18	60.1	18.35	38.0	0.00986	-0.3	0.15	-163.5
2.6	0.22	45.4	17.63	23.6	0.01000	-7.1	0.19	175.1
2.7	0.27	31.8	16.92	11.3	0.01100	-16.8	0.21	157.8
2.8	0.31	17.8	15.48	-0.8	0.01200	-26.1	0.24	144.8
2.9	0.37	4.1	14.09	-13.9	0.01300	-33.1	0.25	135.1
3	0.42	-9.9	13.03	-27.3	0.01300	-42.3	0.28	123.2
3.5	0.65	-72.1	9.05	-89.3	0.01700	-88.5	0.35	88.8
4	0.80	-130.5	5.52	-145.4	0.01800	-132.3	0.48	52.3
4.5	0.84	176.1	3.59	162.1	0.01800	-165.4	0.61	11.5
5	0.80	129.2	2.41	117.2	0.01700	155.1	0.72	-31.7
5.5	0.69	82.3	1.64	72.2	0.01700	118.7	0.81	-72.9
6	0.46	31.6	1.00	27.0	0.01700	78.3	0.88	-112.4

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