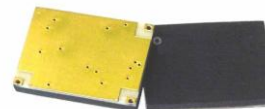


500 ~ 1000 MHz Super Low Noise Amplifier¹



RLAS0510A is an ultra low noise figure, wideband, and unconditionally stable SMT packaged amplifier with exceptionally low input and output VSWR. The amplifier offers a typical 0.40 dB noise figure, 20 dB input and output return losses, 38.0 dB gain, 19 dBm output P_{1dB} and 30 dBm OIP3 over the UHF, Cellular and GSM frequency bands from 500 MHz to 1000 MHz. It is most suitable for receivers, wireless data communications, and other measurement applications.



RLAS0510A is designed to meet the rugged standards of MIL-STD-202 and MIL-STD-883.

RLAS0510A is **RoHS** compliant. A connectorized version is also available.

Key Features:

Wide frequency range: 500 ~ 1000 MHz
 Ultra low noise: 0.40 dB
 High OIP3: 30.0 dBm
 Very low VSWR: 1.22:1
 Impedance: 50 Ohm
 Unconditional stable: $k > 1$
 Single DC Supply: 100 mA @ +5.0V
 MTBF²: >600,000 hrs (68 Years)
 Small Size: 0.50"x0.35"x0.08" (SMT package)
 Built-In Functions: DC blocks at input and output ports, temperature compensation circuitry

Absolute Maximum Ratings³:

Parameters	Symbol	Value	Units
DC Power Supply Voltage	V_{dd}	7	V
Drain Current	I_{dd}	150	mA
Total Power Dissipation	P_{diss}	1000	mW
RF Input Power	$P_{In,Max}$	10	dBm
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{STG}	-65 ~ 150	°C
Maximum Operating Temperature	$T_{O,MAX}$	-55 ~ 100	°C

Electrical Specifications: (at room temperature)

Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
Gain	S_{21}	500 ~ 1000 MHz	36	38	40	dB
Gain Variation	ΔG	500 ~ 1000 MHz		+/- 1.2	+/- 1.5	dB
Input VSWR	$VSWR_1$	500 ~ 1000 MHz		1.22	1.30	
Output VSWR	$VSWR_2$	500 ~ 1000 MHz		1.22	1.30	
Reverse Isolation	S_{12}	500 ~ 1000 MHz	40	45		dB
Noise Figure	NF	500 ~ 1000 MHz		0.40	0.55	dB
Output Power @ 1dB Gain Comp. Point	P_{1dB}	500 ~ 1000 MHz		19		dBm
Output IP3	OIP ₃	2-Tone, Pout 0 dBm each, 1 MHz separation		30		dBm
Current Consumption	I_{dd}	$V_{dd} = +5.0$ V		100		mA
Power Supply Voltage	V_{dd}		+4.8 ⁴	+5.0	+5.2	V
Thermal Resistance	$R_{th,c}$	Junction to case			215	°C/W
Operating Temperature	T_o		-40		+85	°C
Maximum Average RF Input Power	$P_{IN,MAX}$	500 ~ 1000 MHz			10	dBm

¹ Specifications are subject to change without notice.

² MTBF: Mean Time Between Failure, Per TR-NWT-000332, ISSUE 3, SEPTEMBER, 1990, T=40 °C

³ Operation of this device above any one of these parameters may cause permanent damage.

⁴ The lower DC supply voltage reduces the LNA performance.

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Internal Richardson Document #	Origination Date: November 2004	Rev: V2 Date: April 2011	Page 1/5
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Frequency Response

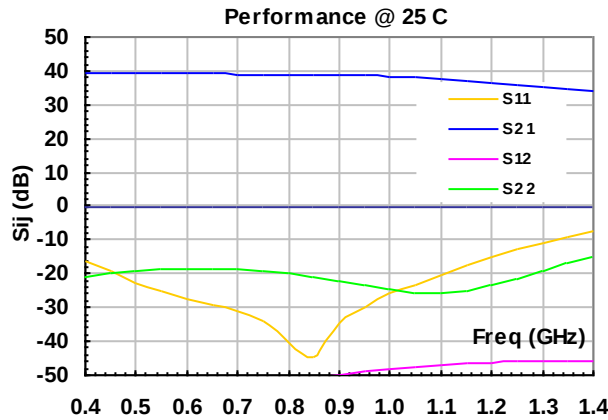


FIG. 1 Small signal performance

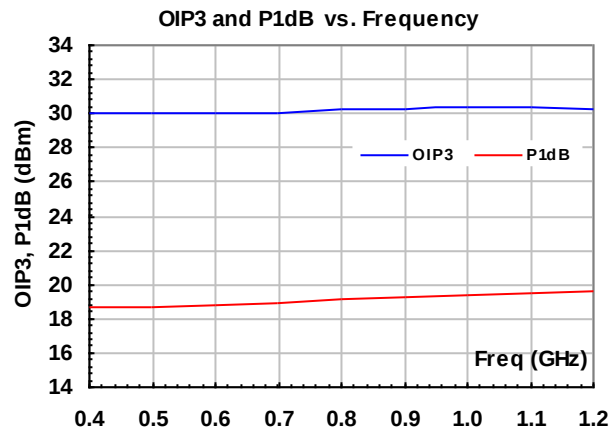


FIG. 2 P_{1dB} and OIP3 at room temperature

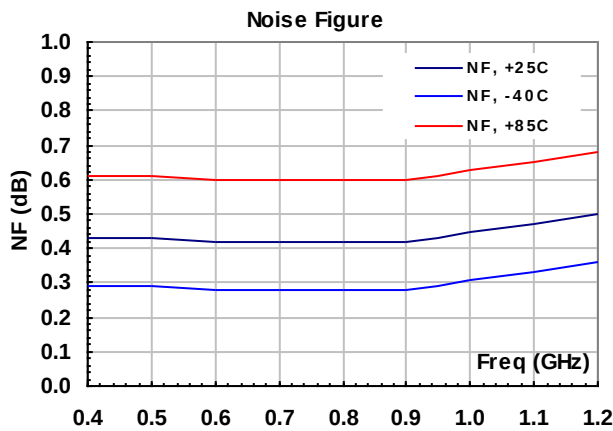


FIG. 3 Noise figure performance at full temperature

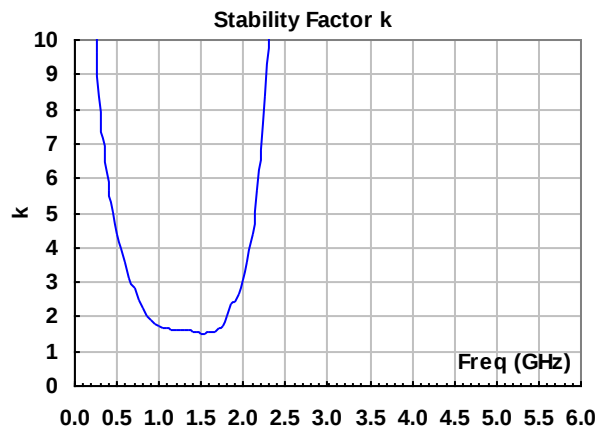


FIG. 4 Stability factor k

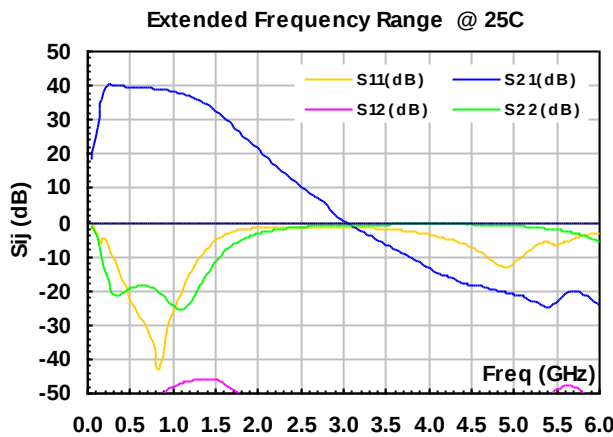


FIG. 5 Frequency response in extended frequency

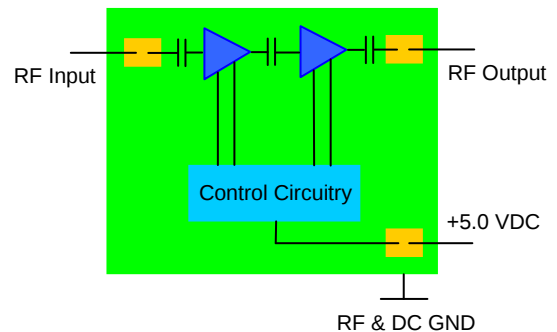


FIG. 6 Block diagram

Mechanical Outline: (2:1 ratio)

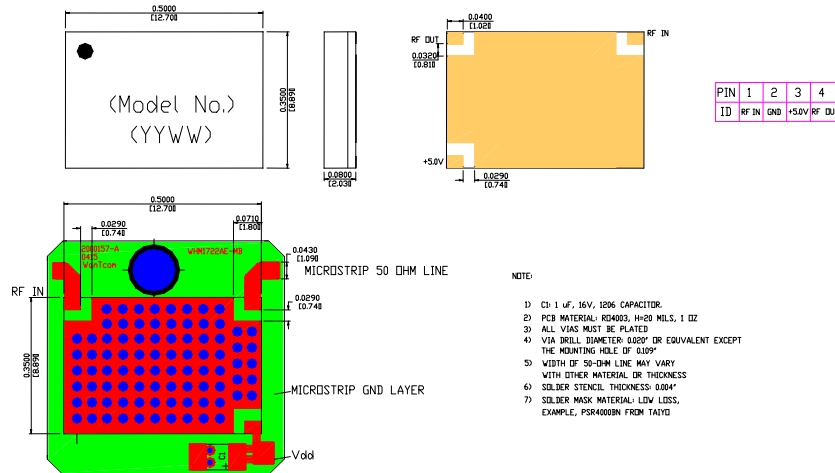


FIG. 7 Outline of standard package and recommended PCB layout.

Ordering Information

Model Number	RLAS0510A
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Small Signal S-Parameters:

RLAS0510A
 S-parameters at Vds=5V, Id=100mA, including test fixture. Last updated 07/07/04.

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	0.961	-40.3	10.030	137.5	0.000017	136.1	0.860	-52.6
0.1	0.578	-71.3	27.300	117.2	0.000044	139.3	0.637	-82.7
0.2	0.544	-77.4	71.124	43.9	0.000288	175.4	0.223	-134.7
0.3	0.305	-137.9	97.031	-14.4	0.000608	133.2	0.090	-128.0
0.4	0.153	-177.9	95.521	-55.1	0.000895	109.1	0.091	-114.5
0.5	0.073	136.6	92.297	-86.8	0.001227	95.6	0.108	-129.1
0.6	0.043	78.2	90.374	-115.1	0.001552	83.3	0.117	-155.0
0.7	0.028	28.6	89.593	-142.5	0.002019	70.3	0.116	174.5
0.8	0.009	-0.6	88.628	-170.2	0.002597	56.7	0.103	139.2
0.9	0.018	131.6	86.269	161.4	0.003257	39.5	0.080	99.3
1	0.050	125.9	81.568	132.6	0.003833	22.1	0.059	53.5
1.1	0.098	121.0	75.131	104.0	0.004406	5.0	0.052	6.9
1.2	0.179	107.0	67.663	75.6	0.004842	-14.6	0.066	-29.1
1.3	0.289	88.8	59.560	47.3	0.005137	-34.9	0.106	-55.2
1.4	0.418	66.8	51.096	19.0	0.005218	-55.2	0.177	-80.7
1.5	0.543	44.3	42.183	-8.4	0.004982	-75.5	0.268	-107.7
1.6	0.649	22.4	33.454	-35.1	0.004393	-94.2	0.368	-134.6
1.7	0.727	1.8	25.864	-60.1	0.003663	-115.8	0.465	-160.2
1.8	0.767	-17.6	19.566	-81.3	0.003014	-129.7	0.551	175.5
1.9	0.789	-32.7	15.555	-100.5	0.002588	-143.0	0.614	154.4
2	0.825	-48.5	12.025	-120.9	0.001959	-160.6	0.683	134.8
2.1	0.833	-62.7	9.148	-137.9	0.001554	-169.7	0.734	116.2
2.2	0.842	-75.5	7.088	-152.9	0.001087	-179.4	0.777	98.8
2.3	0.860	-88.5	5.517	-167.0	0.000742	173.9	0.808	82.6
2.4	0.867	-100.6	4.306	178.9	0.000449	160.3	0.835	67.3
2.5	0.867	-112.6	3.485	165.3	0.000189	175.3	0.854	53.2
2.6	0.864	-124.1	2.838	153.2	0.000148	-173.9	0.872	39.6
2.7	0.861	-135.6	2.294	142.0	0.000142	-157.0	0.885	26.5
2.8	0.845	-146.3	1.741	128.0	0.000051	-111.3	0.897	14.3
2.9	0.832	-155.0	1.217	116.9	0.000295	-59.1	0.904	2.3
3	0.852	-165.4	0.919	112.8	0.000433	-81.8	0.912	-9.0
3.1	0.847	-176.6	0.758	103.3	0.000442	-105.5	0.917	-20.0
3.2	0.839	173.2	0.582	90.1	0.000357	-88.3	0.923	-30.7
3.3	0.829	162.8	0.452	75.1	0.000238	-99.0	0.926	-41.4
3.4	0.814	153.2	0.335	59.9	0.000292	-110.9	0.929	-51.5
3.5	0.798	142.9	0.241	34.3	0.000343	-65.5	0.933	-61.4
3.6	0.775	132.3	0.209	3.6	0.000222	-46.7	0.935	-71.2
3.7	0.751	122.6	0.212	-27.7	0.000540	-65.8	0.937	-80.9
3.8	0.725	113.1	0.239	-54.5	0.000685	-50.5	0.940	-90.2
3.9	0.692	103.4	0.274	-76.6	0.000977	-52.3	0.940	-99.5
4	0.655	93.6	0.313	-92.6	0.001175	-59.8	0.942	-108.8
4.1	0.613	84.2	0.343	-105.6	0.001325	-75.6	0.940	-117.9
4.2	0.575	75.5	0.367	-118.2	0.001688	-93.6	0.941	-126.9
4.3	0.529	67.2	0.368	-130.5	0.001778	-106.0	0.940	-135.9
4.4	0.484	58.1	0.348	-141.0	0.001796	-123.2	0.939	-144.9
4.5	0.425	50.2	0.323	-149.7	0.001881	-133.5	0.937	-154.0
5	0.251	68.2	0.164	-151.5	0.001655	175.3	0.897	161.0
5.5	0.475	31.2	0.158	-143.5	0.003652	151.4	0.776	115.7
6	0.683	-9.0	0.206	-116.7	0.002599	85.4	0.512	72.8

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Internal Richardson Document #	Origination Date: November 2004	Rev: V2 Date: April 2011	Page 5/5
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