

100 ~ 4000 MHz Wideband Low Noise Amplifier¹

RLAC0140A is a wideband, low noise figure, and unconditionally stable amplifier. It is most suitable for broadband receivers, wireless data communications, test instrumentations and other measurement applications.

RLAC0140A is designed to meet the rugged standards of MIL-STD-202, and MIL-STD-883.



Key Features:

Wide frequency range	100 ~ 4000 MHz
High gain	29 dB
Low noise figure	1.2 dB
High OIP3	26.0 dBm
Low VSWR:	1.5:1
MTBF ²	>300,000 hrs (34 years)
Unconditionally stable	$k > 1$
Single DC Supply	50 mA @ +5V
Small Size:	1.08"x1.00"x0.41"
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}	+6	V
Drain Current	I_{dd}	70	mA
Total Power Dissipation	P_{diss}	400	mW
RF Input Power	$P_{In,Max}$	5	dBm
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{STG}	-55 ~ 125	°C
Maximum Operating Temperature	$T_{O,MAX}$	-40 ~ 85	°C

Electrical Specifications: (at +25°C)

Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
Frequency Range	BW		100		4000	MHz
Gain	S_{21}	100 ~ 4000 MHz	28	29		dB
Gain Variation	ΔG	100 ~ 4000 MHz		+/- 0.5	+/- 1.0	dB
Input VSWR	S_{11}	100 ~ 4000 MHz		1.5:1	1.8:1	
Output VSWR	S_{22}	100 ~ 4000 MHz		1.5:1	1.8:1	
Reverse Isolation	S_{12}	100 ~ 4000 MHz		42		dB
Noise Figure	NF	100 ~ 4000 MHz		1.2	1.4	dB
Output Power @ 1dB Compression	P_{1dB}	100 ~ 4000 MHz	12	14		dBm
Output IP3	OIP ₃	2-tone, +0 dBm per tone	24	26		dBm
Current Consumption	I_{dd}	$V_{dd} = +5 V$		50		mA
Power Supply Voltage	V_{dd}		+4.7	+5	+5.3	V
Thermal Resistance	$R_{th,c}$				220	°C/W

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.

Frequency Response

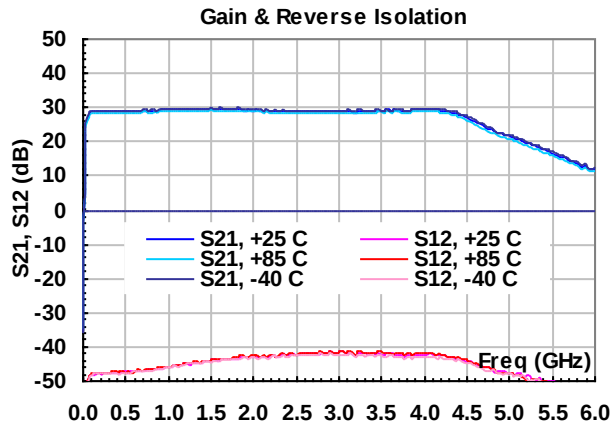


FIG. 1 Small gain and reverse isolation

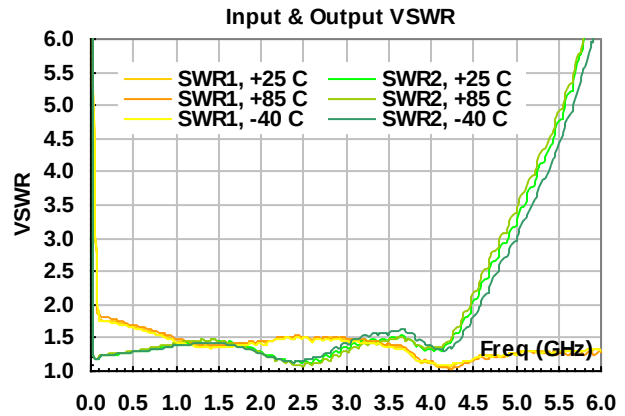


FIG. 2 Input and output VSWR

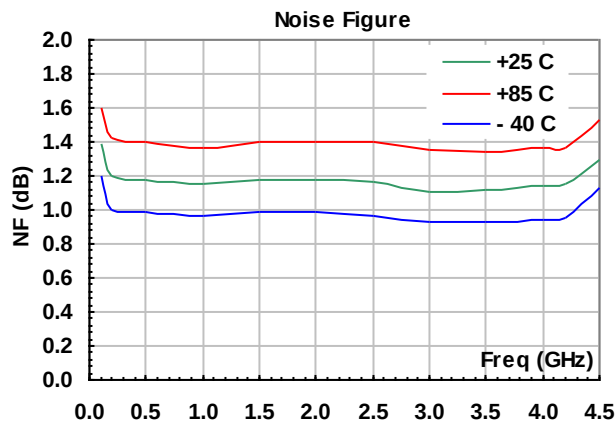


FIG. 3 Noise figure

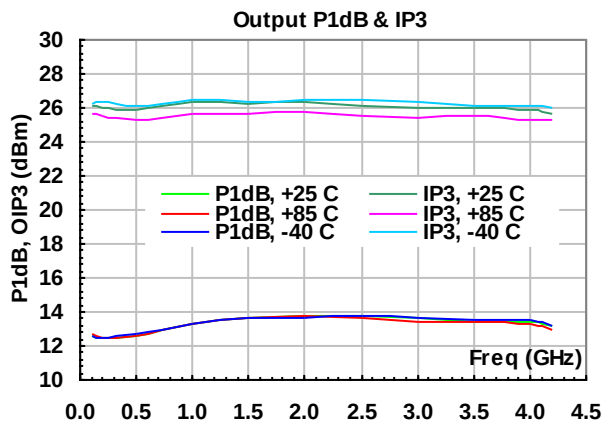


FIG. 4 Output P1dB and IP3

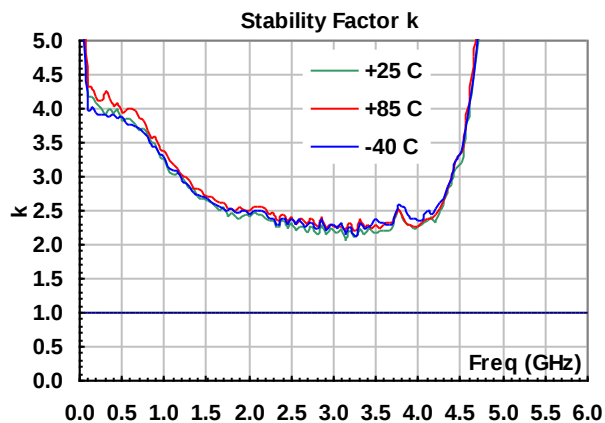


FIG. 5 Stability factor k

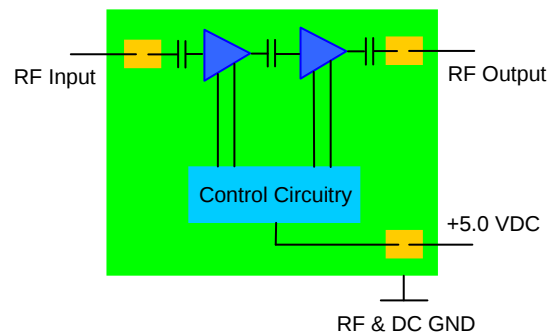


FIG. 6 Block diagram

Mechanical Outline:

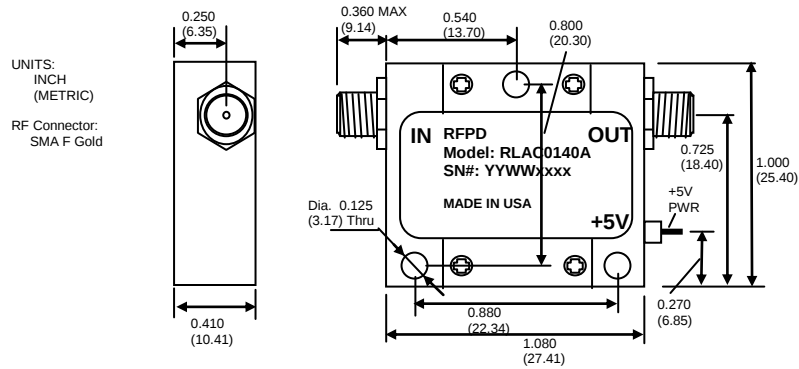


FIG. 7 RLAC0140A/B package outline

Ordering Information

Part Number	RLAC0140A
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Small Signal S-Parameters:

RLAC0140A, at +25C
 !s-parameters at Vdd=5V, Idd=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	0.003172	99.6	0.090	99.3
0.1	0.286	46.5	27.831	28.0	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	0.004173	10.3	0.112	-47.3
0.4	0.257	-31.2	28.372	-33.4	0.004211	6.3	0.117	-68.7
0.5	0.247	-44.5	28.385	-45.7	0.004341	4.7	0.124	-88.0
0.6	0.238	-56.2	28.333	-57.5	0.004341	1.9	0.130	-105.3
0.7	0.227	-67.5	28.463	-68.8	0.004529	1.0	0.137	-120.2
0.8	0.214	-78.4	28.550	-79.5	0.004621	-2.4	0.146	-135.4
0.9	0.203	-88.7	28.776	-90.2	0.004832	-4.0	0.157	-149.3
1	0.183	-96.4	29.161	-101.9	0.005075	-7.5	0.166	-165.1
1.1	0.174	-104.0	29.348	-113.4	0.005467	-11.0	0.175	179.3
1.2	0.164	-108.7	29.616	-125.1	0.005491	-14.3	0.183	164.1
1.3	0.156	-116.8	29.906	-136.5	0.005842	-16.7	0.184	148.6
1.4	0.151	-119.9	30.284	-148.3	0.006040	-20.0	0.185	134.3
1.5	0.155	-125.7	30.538	-159.5	0.006128	-23.9	0.180	118.8
1.6	0.157	-130.5	30.307	-170.8	0.006387	-29.1	0.176	104.8
1.7	0.163	-137.4	30.058	-177.6	0.006444	-34.0	0.169	89.0
1.8	0.161	-142.1	29.551	166.6	0.006831	-38.9	0.162	73.8
1.9	0.172	-151.9	29.146	154.1	0.007170	-43.3	0.152	56.3
2	0.175	-158.5	28.908	141.9	0.007174	-46.2	0.133	37.4
2.1	0.187	-165.9	28.186	130.5	0.007229	-48.3	0.111	15.7
2.2	0.196	-175.3	28.175	120.1	0.007483	-53.2	0.087	-3.9
2.3	0.204	174.5	28.259	109.1	0.007511	-57.9	0.073	-29.2
2.4	0.204	165.0	28.242	97.7	0.007506	-63.6	0.055	-61.8
2.5	0.204	154.0	27.985	86.4	0.007681	-70.7	0.056	-94.8
2.6	0.190	148.4	27.799	75.9	0.007941	-74.7	0.063	-131.4
2.7	0.197	140.1	27.848	65.4	0.008253	-79.0	0.074	-157.0
2.8	0.198	130.4	27.706	54.2	0.008379	-84.7	0.098	-178.7
2.9	0.201	120.9	27.900	43.0	0.008286	-89.4	0.123	161.7
3	0.198	111.9	27.560	32.5	0.008060	-95.0	0.152	144.6
3.1	0.193	103.4	27.592	21.0	0.007909	-100.0	0.174	125.7
3.2	0.187	94.6	27.905	9.5	0.007904	-104.2	0.186	106.8
3.3	0.179	87.3	27.921	-3.5	0.007857	-111.3	0.190	87.8
3.4	0.173	77.2	28.097	-16.1	0.007829	-115.8	0.188	73.8
3.5	0.160	65.8	28.028	-28.4	0.008048	-122.9	0.192	61.8
3.6	0.152	53.1	28.427	-41.3	0.007903	-127.8	0.197	43.1
3.7	0.141	41.5	28.918	-54.9	0.007530	-132.5	0.194	23.3
3.8	0.088	16.3	28.345	-66.9	0.007415	-133.6	0.170	-4.2
3.9	0.060	28.9	29.205	-80.6	0.007698	-140.6	0.147	-28.4
4	0.053	32.3	29.422	-95.6	0.007730	-147.7	0.139	-62.5
4.1	0.033	39.8	29.246	-111.0	0.007505	-155.9	0.138	-105.8
4.2	0.026	68.9	28.882	-127.8	0.007550	-162.0	0.171	-148.4
4.3	0.052	90.9	27.110	-145.1	0.007064	-170.7	0.221	174.2
4.4	0.068	93.5	25.040	-162.1	0.006574	-176.4	0.281	144.3
4.5	0.083	80.0	22.414	-177.9	0.006306	176.4	0.344	119.2
5	0.118	31.0	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	3.980	18.5	0.002494	117.2	0.744	-92.5

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