

ALH244C

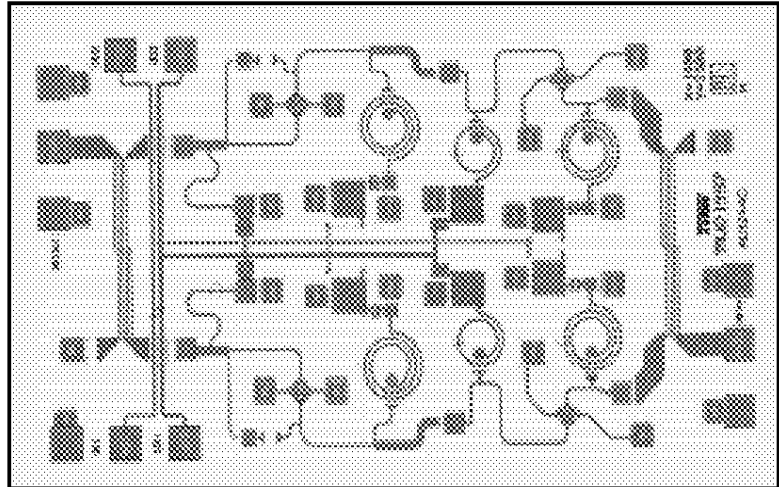
Ka-Band HEMT Low-Noise Amplifier



GaAs Telecom Products

Features

- RF frequency: 24 to 41 GHz
- Linear gain: 12 dB
- NF: 4 dB
- Unconditionally stable
- Balanced design provides excellent input and output VSWR
- Biasable from either side of chip
- P1dB: 15 dBm
- DC power: 4 Vdc at 75 mA



Description and Applications

The ALH244C monolithic HEMT amplifier is a broadband, two-stage, low-noise device designed for use in commercial digital microwave radios, wireless LANs, and military high-reliability applications. The LNAs balanced design provides unconditional stability as well as excellent input and output VSWR. To ensure rugged and reliable operation, HEMT devices are fully passivated. Both bond pad and back-side metalization are Ti/Au, which is compatible with eutectic die attach, thermocompression and thermosonic wire bonding assembly techniques.

Absolute Maximum Ratings (Ta = 25°C)

Parameter	Minimum	Maximum	Unit
Drain voltage (Vds)		6.5	V
Gate voltage (Vgs)	-2	+0.5	V
Drain-gate voltage (Vdg)		6	V
Drain current		100	mA
Input drive level		14	dBm

Performance Characteristics (Ta = 25°C)

Specification	Minimum	Typical	Maximum	Unit
Frequency	24		40	GHz
Gain	10	11.5		dB
Noise figure		4.0		dB
Input VSWR			1.95	
Output VSWR			1.76	
Frequency	24		27	GHz
Gain	10	12		dB
Noise figure		4.0		dB
Input VSWR		1.6	1.95	
Output VSWR		1.4	1.7	
Frequency	27		30	GHz
Gain	10	12		dB
Noise figure		4.0		dB
Input VSWR		1.3	1.70	
Output VSWR		1.3	1.51	
Frequency	37		40	GHz
Gain	10	11.5		dB
Noise figure		4.0	5.5	dB
Input VSWR		1.20	1.50	
Output VSWR		1.40	1.50	
P1dB		15		dBm
Vd		+4		V
Vg	-1	-0.2	+0.3	V
Id1		75		mA
Thermal resistance		195		°C/W

Status: In first production run.
First samples available 10/97.

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Rev. 2 08/97 ALH244C
9701455-S-J1

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Measured S-Parameters Vd = 4 V, Id = 50

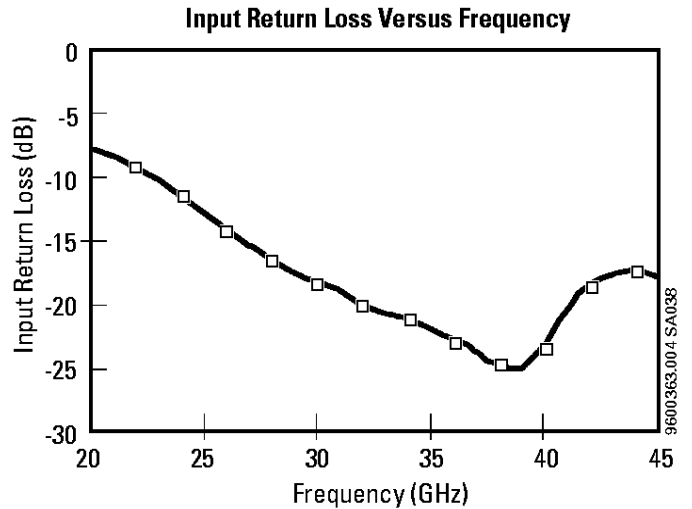
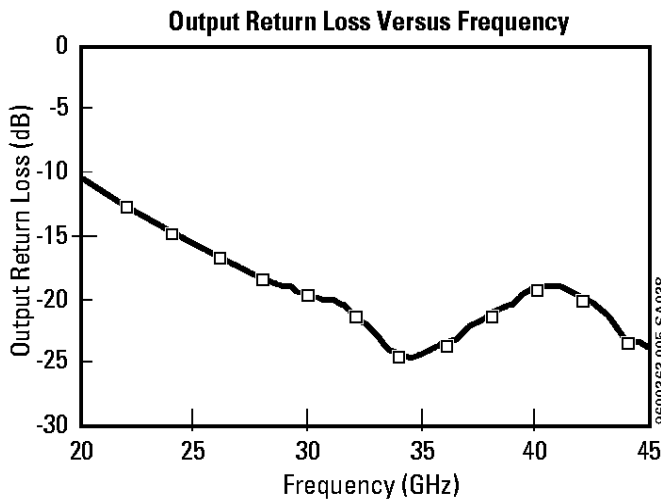
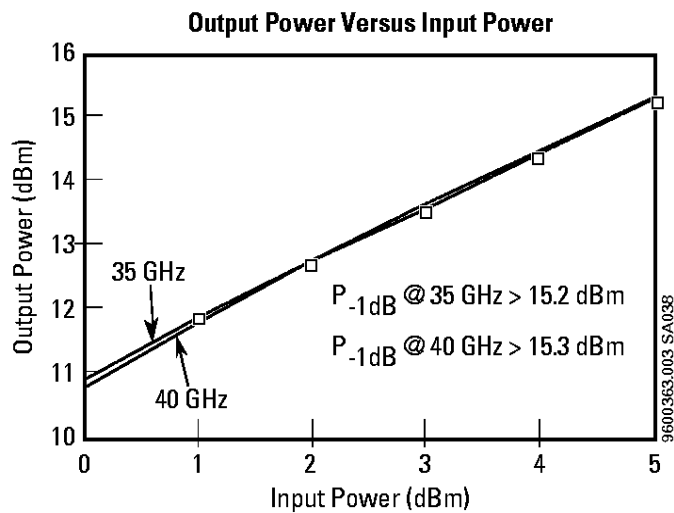
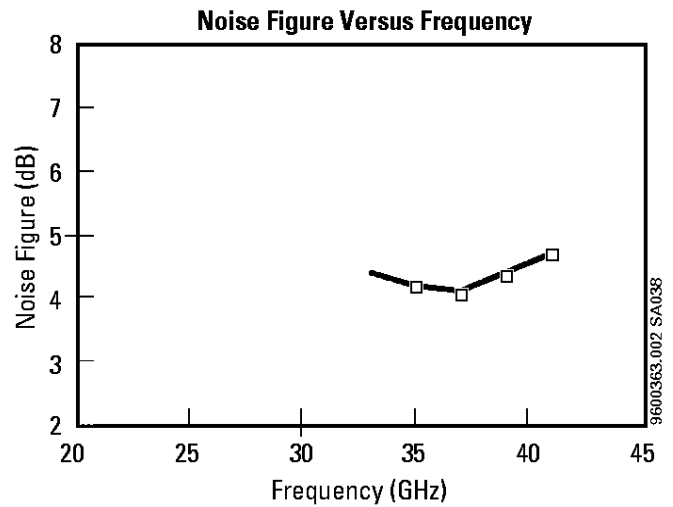
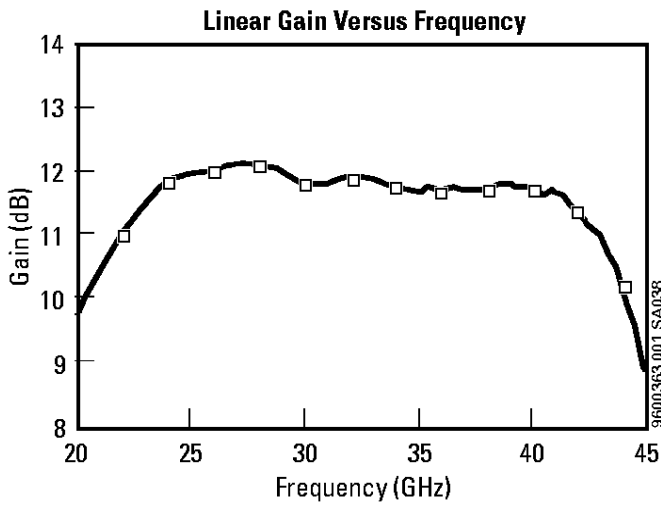
Freq GHz	S11		S21		S12		S22	
	Magnitude	Angle°	Magnitude	Angle°	Magnitude	Angle°	Magnitude	Angle°
20.0	0.421	70.3	3.058	107.2	0.020	-72.6	0.307	-25.0
20.5	0.405	59.7	3.196	94.5	0.021	-84.3	0.286	-30.6
21.0	0.388	49.2	3.327	81.6	0.021	-95.7	0.267	-35.5
21.5	0.371	38.7	3.440	68.6	0.022	-108.4	0.249	-40.0
22.0	0.351	28.5	3.544	55.9	0.022	-119.8	0.233	-44.1
22.5	0.333	18.5	3.647	43.0	0.022	-130.8	0.219	-47.6
23.0	0.312	8.7	3.744	30.3	0.023	-141.4	0.207	-51.7
23.5	0.292	-0.7	3.842	17.3	0.023	-152.2	0.194	-55.0
24.0	0.272	-9.3	3.897	4.2	0.023	-162.8	0.184	-58.0
24.5	0.251	-17.4	3.929	-8.7	0.023	-172.9	0.175	-61.4
25.0	0.231	-24.5	3.947	-21.2	0.023	-175.9	0.164	-64.5
25.5	0.215	-31.4	3.955	-33.6	0.023	-165.4	0.156	-66.5
26.0	0.197	-37.1	3.985	-45.4	0.023	-155.1	0.148	-68.9
26.5	0.185	-41.8	3.999	-57.6	0.023	-144.3	0.138	-70.7
27.0	0.174	-46.7	4.014	-69.6	0.023	-134.1	0.132	-72.4
27.5	0.162	-51.6	4.034	-81.9	0.022	-126.0	0.124	-73.1
28.0	0.152	-55.1	4.018	-94.3	0.021	-116.5	0.121	-74.5
28.5	0.143	-59.3	3.993	-106.4	0.021	-108.2	0.116	-76.3
29.0	0.135	-63.8	3.971	-117.9	0.021	-100.2	0.112	-78.3
29.5	0.128	-66.9	3.916	-129.2	0.021	-92.1	0.108	-80.1
30.0	0.125	-69.6	3.882	-140.4	0.021	-83.9	0.105	-81.3
30.5	0.122	-72.3	3.889	-151.5	0.021	-76.8	0.101	-81.9
31.0	0.115	-75.2	3.871	-161.9	0.020	-69.1	0.099	-83.9
31.5	0.108	-76.3	3.911	-173.4	0.019	-61.8	0.095	-86.4
32.0	0.103	-76.6	3.928	-175.4	0.020	-55.1	0.086	-88.1
32.5	0.098	-78.8	3.935	-163.8	0.021	-47.9	0.080	-88.2
33.0	0.093	-79.7	3.921	-151.8	0.021	-39.9	0.072	-89.3
33.5	0.092	-82.1	3.878	-140.7	0.020	-33.1	0.063	-86.0
34.0	0.090	-83.7	3.858	-129.5	0.021	-25.2	0.060	-81.6
34.5	0.086	-85.4	3.833	-118.6	0.021	-18.7	0.058	-76.3
35.0	0.081	-85.1	3.821	-107.5	0.022	-13.5	0.060	-71.0
35.5	0.078	-86.6	3.868	-96.7	0.021	-4.5	0.063	-66.0
36.0	0.074	-88.0	3.825	-85.3	0.022	-3.1	0.067	-62.1
36.5	0.072	-87.7	3.864	-73.7	0.023	-10.6	0.069	-59.2
37.0	0.067	-87.5	3.844	-62.2	0.023	-17.3	0.077	-56.1
37.5	0.062	-83.4	3.842	-50.4	0.024	-26.5	0.080	-59.2
38.0	0.060	-78.7	3.843	-38.7	0.024	-34.3	0.086	-59.7
38.5	0.057	-73.1	3.870	-26.7	0.024	-44.7	0.090	-58.3
39.0	0.058	-65.2	3.868	-14.5	0.024	-52.9	0.095	-60.0
39.5	0.062	-61.9	3.848	-2.6	0.024	-59.2	0.104	-62.7
40.0	0.070	-55.2	3.852	-10.5	0.025	-68.1	0.110	-66.2
40.5	0.082	-53.9	3.808	-23.3	0.025	-77.2	0.112	-71.2
41.0	0.096	-53.9	3.831	-36.3	0.024	-88.2	0.111	-78.2
41.5	0.111	-58.7	3.782	-50.0	0.025	-93.8	0.107	-81.4
42.0	0.121	-64.0	3.710	-63.4	0.024	-102.7	0.101	-87.6
42.5	0.129	-70.5	3.595	-77.3	0.024	-109.9	0.097	-90.7
43.0	0.133	-77.1	3.546	-91.1	0.024	-119.0	0.090	-92.7
43.5	0.138	-82.1	3.408	-106.2	0.026	-130.1	0.078	-92.1
44.0	0.139	-86.9	3.231	-120.9	0.025	-134.2	0.067	-86.8
44.5	0.134	-91.6	2.999	-135.0	0.027	-146.3	0.068	-79.1
45.0	0.131	-94.9	2.771	-149.7	0.026	-156.9	0.063	-70.3
45.5	0.122	-96.1	2.516	-163.0	0.023	-173.7	0.066	-63.4
46.0	0.118	-98.5	2.257	-175.4	0.025	-179.9	0.071	-63.6
46.5	0.119	-102.5	2.025	-172.8	0.025	-168.8	0.074	-65.8
47.0	0.119	-104.3	1.829	-161.6	0.023	-170.4	0.079	-62.0
47.5	0.119	-105.6	1.659	-150.9	0.022	-150.0	0.086	-63.8
48.0	0.115	-105.2	1.518	-140.6	0.021	-142.7	0.093	-59.0
48.5	0.109	-106.6	1.368	-130.5	0.019	-134.6	0.107	-60.5
49.0	0.110	-106.6	1.251	-120.0	0.019	-123.2	0.103	-59.9
49.5	0.109	-107.3	1.124	-109.7	0.018	-110.8	0.104	-64.3
50.0	0.106	-111.5	1.028	-99.9	0.019	-111.0	0.102	-68.5

Characteristic data and other specifications are subject to change without notice.

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Measured Performance Characteristics (Typical Performance at 25°C)

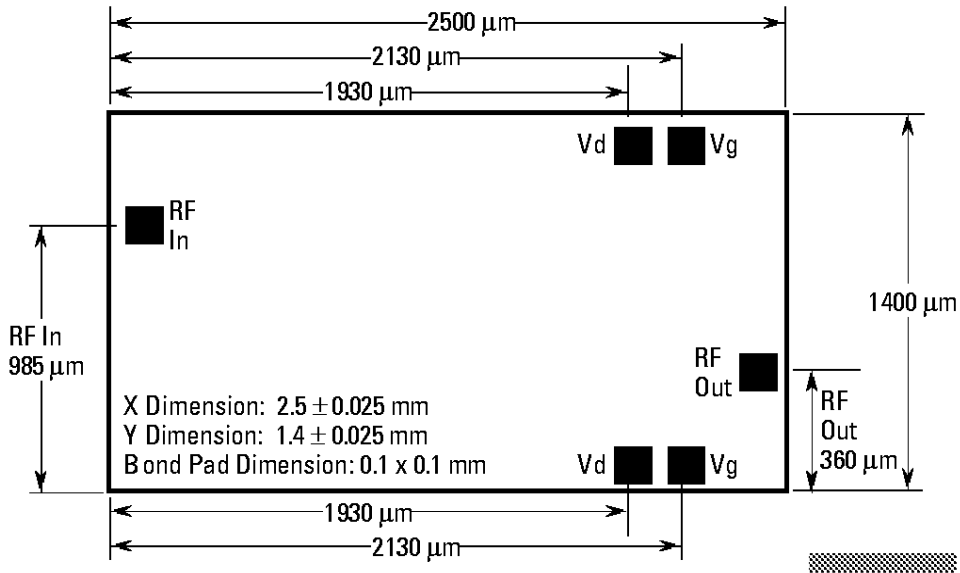


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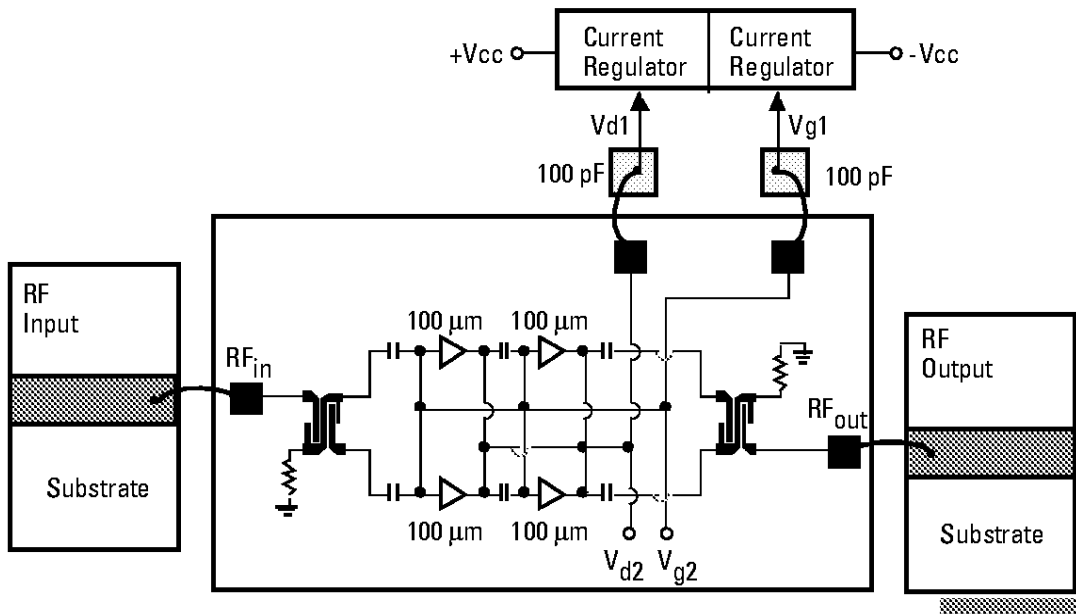
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Die Size and Bond Pad Locations



Suggested Bonding Arrangement



Recommended Assembly Notes

1. Bypass caps should be 100 pF (approximately) ceramic (single-layer) placed no farther than 30 mils from the amplifier.
2. Best performance obtained from use of <10 mil (long) by 3 by 0.5 mil ribbons on input and output.
3. Part should be operated with a current regulation circuit to provide gate bias.

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