NORTHROP GRUMMAN

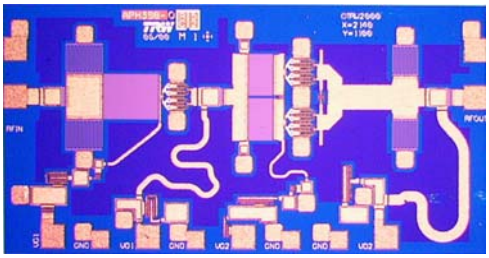
Velocium Products

APH398

24 – 27 GHz Medium Power Amplifier

Product Datasheet **Discontinued 6/12/2006**

Revision: June 2006



X=2140µm Y=1100µm

Applications

- Point-to-Point Digital Radios
- Point-to-Multipoint Digital Radios

Product Features

- RF Frequency: 24 to 27 GHz
- Linear gain: 20 dB, typical
- P1dB: 24-26 dBm
- IP3: 33 dBm, typical
- Unconditionally stable
- DC Power: 5.0 Vdc at 424 mA

Product Description

The APH398 monolithic HEMT amplifier, a broadband, two-stage power device, is designed for use in commercial digital radios and wireless LANs. To ensure rugged and reliable operation, HEMT devices are fully passivated. Both bond pad and backside metallization are Ti/Au, which is compatible with conventional die attach, thermocompression, and thermosonic wire bonding assembly techniques.

Performance Characteristics (Ta = 25°C)

Specification	Min	Typ	Max	Unit
Frequency	24		27	GHz
Linear Gain	15	20		dB
P1dB	23	24		dBm
IP3		33		dBm
Input Return Loss		5		dB
Output Return Loss		5		dB
Frequency	24		25	GHz
Linear Gain	18	20		dB
P1dB	23	24		dBm
Frequency	25.1		27	GHz
Linear Gain	20	22		dB
P1dB	23	26		dBm
Vd1, Vd2		5		V
Vg1, Vg2		-0.5		V
Id1		124		mA
Id2		300		mA

Absolute Maximum Ratings (Ta = 25°C)

Parameter	Min	Max	Unit
Vd1, Vd2		6	V
Id1		150	mA
Id2		360	mA
Vg1, Vg2	-1	+0.3	V
Input drive level		10	dBm
Assy. Temperature (60 seconds)		300	deg. C

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Measured Performance Characteristics (Typical Performance at 25°C)
Vd = 5 V, Id = 424 mA

Freq GHz	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
10.0	0.72	-144.45	6.73	-121.01	0.01	-173.35	0.71	-162.79
11.0	0.73	-151.70	6.19	-147.23	0.01	137.55	0.68	-169.03
12.0	0.74	-157.35	5.44	-166.52	0.01	122.03	0.66	-171.96
13.0	0.72	-165.20	4.72	-179.52	0.01	102.53	0.64	-174.45
14.0	0.65	-170.40	4.73	175.68	0.01	76.13	0.62	-176.90
15.0	0.57	-168.79	5.66	164.26	0.01	52.59	0.59	-178.13
16.0	0.59	-164.11	6.32	142.36	0.00	24.56	0.57	-178.95
17.0	0.65	-163.39	6.48	121.23	0.00	-64.15	0.58	-179.55
18.0	0.68	-167.90	6.44	102.12	0.00	-168.23	0.55	179.26
19.0	0.71	-172.17	6.59	84.54	0.01	156.88	0.53	179.76
20.0	0.70	-176.79	6.86	67.64	0.01	121.78	0.54	179.94
21.0	0.70	177.65	7.27	49.54	0.01	121.47	0.55	178.68
22.0	0.68	173.24	7.98	31.63	0.01	132.48	0.55	178.29
23.0	0.68	166.79	9.06	9.75	0.01	123.36	0.59	176.30
24.0	0.65	158.82	10.23	-13.95	0.01	120.04	0.64	167.71
25.0	0.62	144.07	11.32	-43.16	0.01	106.52	0.68	151.16
26.0	0.51	127.68	13.01	-77.86	0.01	124.00	0.65	125.62
27.0	0.35	105.78	15.13	-122.04	0.01	133.43	0.50	84.82
28.0	0.25	69.06	13.83	-172.86	0.01	123.86	0.41	21.82
29.0	0.32	-12.14	10.61	131.36	0.02	120.95	0.51	-49.88
30.0	0.52	-61.47	5.88	80.51	0.02	88.03	0.52	-88.90
31.0	0.68	-90.70	3.02	43.05	0.02	51.68	0.56	-102.58
32.0	0.81	-108.51	1.54	14.91	0.02	33.45	0.64	-112.40
33.0	0.88	-122.54	0.72	-8.93	0.00	19.86	0.71	-120.93
34.0	0.91	-132.84	0.32	-27.32	0.01	141.28	0.75	-128.48
35.0	0.92	-140.27	0.13	-37.80	0.01	128.57	0.79	-135.10
36.0	0.92	-146.68	0.03	-24.53	0.01	123.93	0.81	-140.17
37.0	0.93	-151.47	0.03	66.72	0.02	116.21	0.83	-144.66
38.0	0.92	-155.48	0.05	73.20	0.02	89.00	0.85	-149.34
39.0	0.92	-158.91	0.05	64.90	0.02	80.01	0.86	-152.67
40.0	0.92	-161.71	0.05	62.26	0.02	88.03	0.87	-156.74

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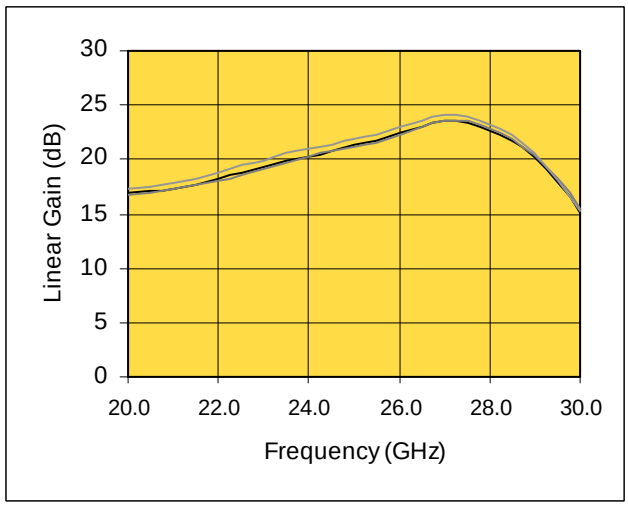
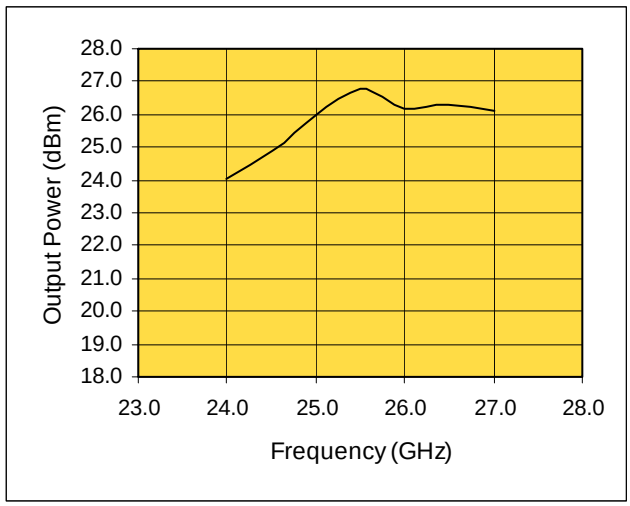
Vd = 5 V, Id = 424 mA

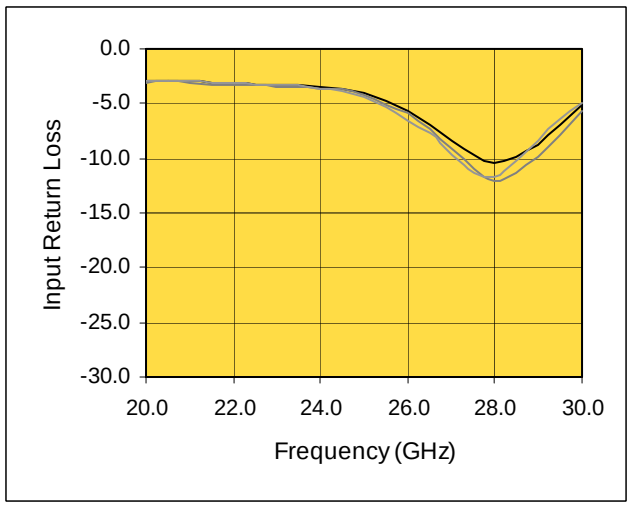
Pulsed Gain Versus Frequency



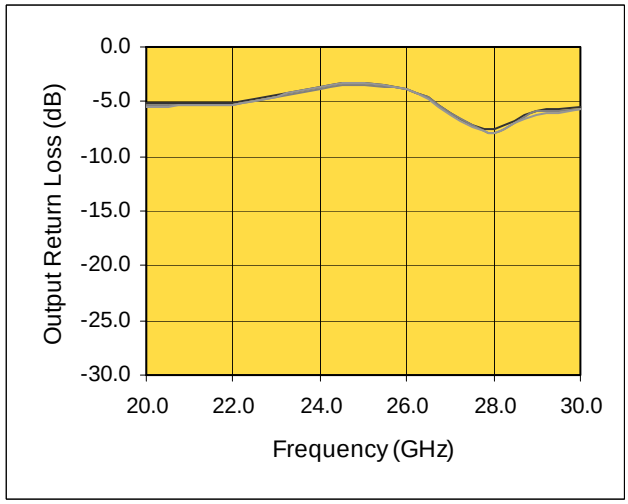
Fixtured P1dB Versus Frequency



Input Return Loss Versus Frequency



Output Return Loss Versus Frequency



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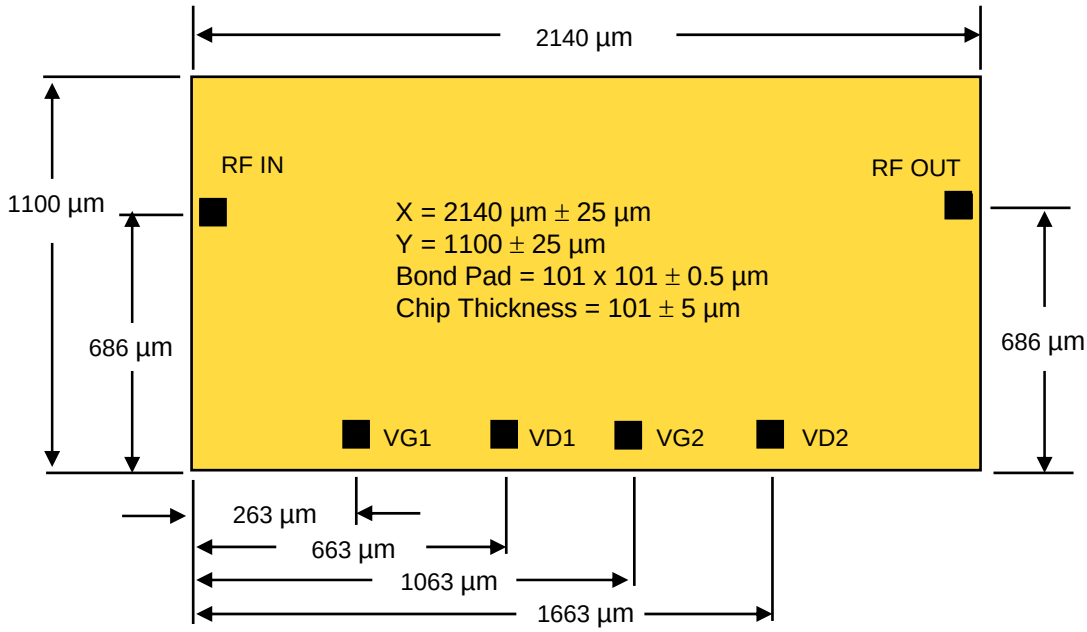
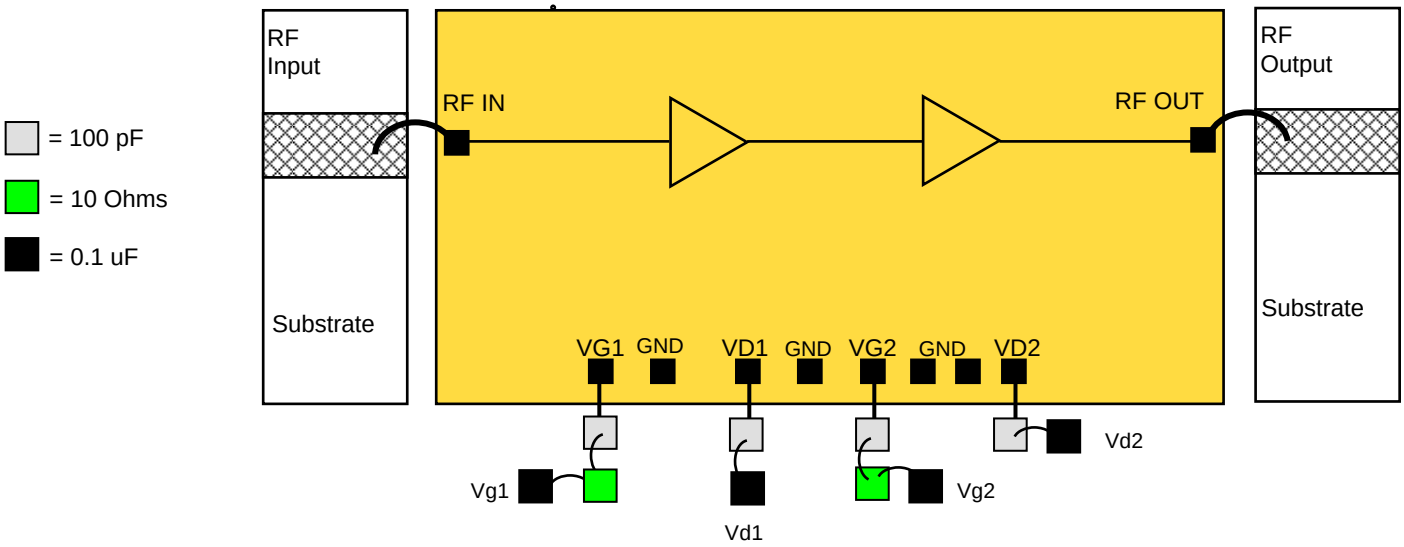
Die Size and Bond Pad Locations



Suggested Bonding Arrangement



Recommended Assembly Notes

1. Bypass caps should be 100 pF ceramic (single-layer) placed no further 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.