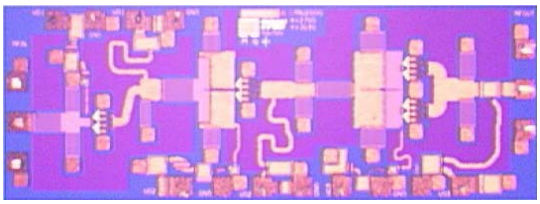
APH403
37 – 45 GHz Medium Power Amplifier

Product Datasheet

Revision: May 2006



X=2760 µm Y=1030 µm

Applications

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

Product Features

- RF Frequency: 37 to 45 GHz
- Linear gain: 21 dB, typical
- P1dB: 23 dBm, typical
- IP3: 32 dBm, typical
- Unconditionally stable
- DC Power: 5.0 Vdc at 475 mA
- Die size: 2.9 sq. mm

Product Description

The APH403 monolithic HEMT amplifier, a broadband, three-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	37		45	GHz
Linear Gain	19	21		dB
P1dB	22	23		dBm
IP3		32		dBm
Input Return Loss		5		dB
Output Return Loss		5		dB
Vd1, Vd2, Vd3		5		V
Vg1, Vg2, Vg3		-0.5		V
Id1		75		mA
Id2		135		mA
Id3		265		mA

Absolute Maximum Ratings (Ta = 25°C)

Parameter	Min	Max	Unit
Vd1, Vd2, Vd3		5.5	V
Id1		85	mA
Id2		150	mA
Id3		300	mA
Vg1, Vg2, Vg3	-1	+0.3	V
Input drive level		10	dBm
Assy. Temperature (60 seconds)		300	deg. C

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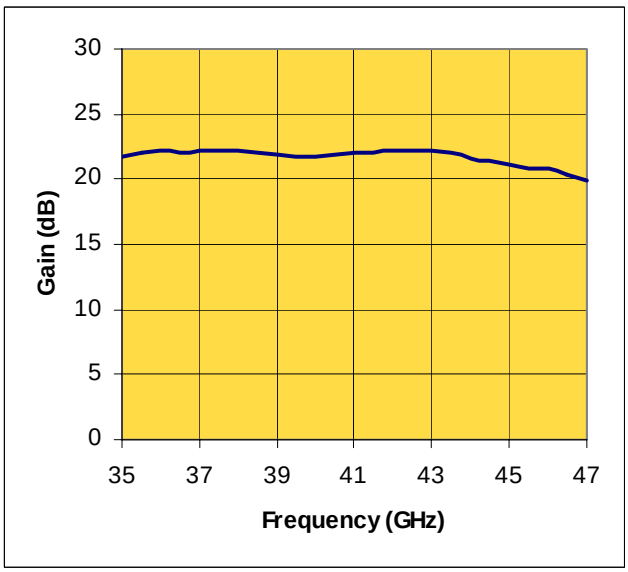
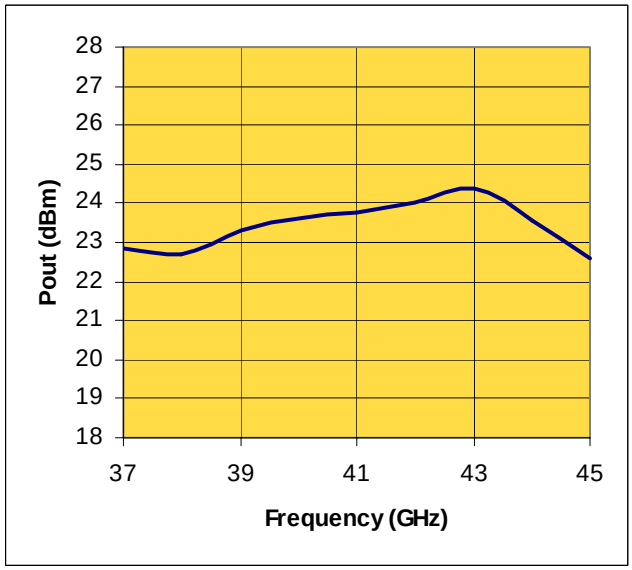
Measured Performance Characteristics (Typical Performance at 25°C)
Vd = 5 V, Id = 475 mA

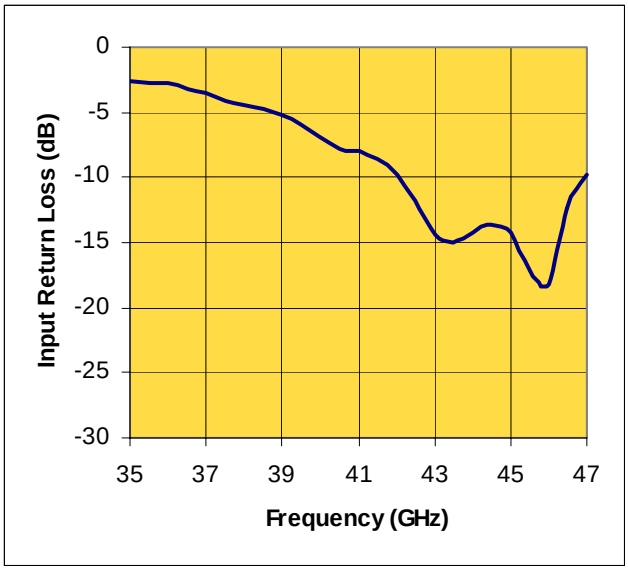
Pulsed Gain Versus Frequency



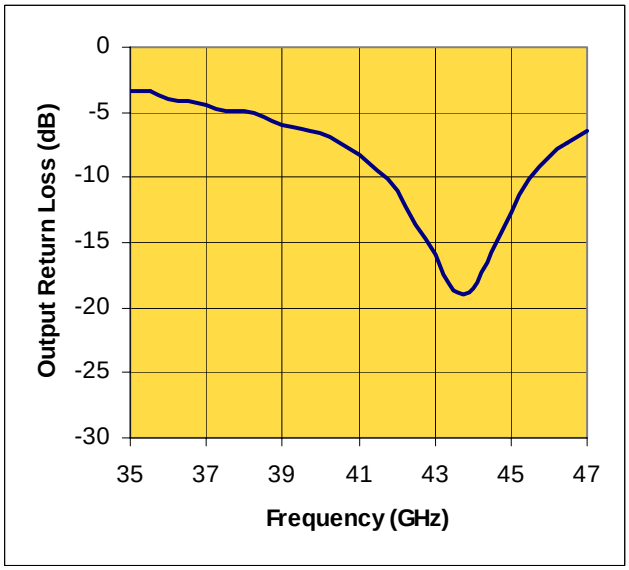
Fixtured P1dB Versus Frequency



Input Return Loss Versus Frequency



Output Return Loss Versus Frequency



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Measured Performance Characteristics (Typical Performance at 25°C)
Vd = 5 V, Id = 475 mA

Freq GHz	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
30.0	0.76	-83.46	5.29	154.89	0.00	50.15	0.67	169.99
31.0	0.77	-86.66	6.82	127.72	0.00	69.44	0.67	169.00
32.0	0.79	-91.46	8.58	95.35	0.00	77.96	0.69	166.41
33.0	0.80	-99.35	10.66	60.13	0.00	-0.95	0.69	163.13
34.0	0.78	-108.20	11.46	23.56	0.00	-106.70	0.68	160.15
35.0	0.71	-116.79	12.01	-12.31	0.00	-159.38	0.68	156.26
36.0	0.65	-123.49	11.87	-45.81	0.00	176.04	0.65	151.79
37.0	0.59	-128.70	12.11	-78.95	0.00	146.21	0.61	148.79
38.0	0.54	-137.59	11.67	-110.23	0.00	128.37	0.57	146.36
39.0	0.49	-145.44	11.54	-140.27	0.00	112.94	0.55	142.32
40.0	0.42	-155.66	11.97	-170.74	0.00	112.91	0.51	136.45
41.0	0.37	-168.41	12.07	156.87	0.00	91.24	0.45	129.39
42.0	0.28	178.72	12.39	123.62	0.01	106.08	0.36	120.80
43.0	0.22	166.31	12.48	90.23	0.01	77.78	0.26	117.63
44.0	0.18	149.14	12.65	54.68	0.00	39.57	0.14	115.34
45.0	0.18	126.11	13.06	15.63	0.00	-4.15	0.04	148.96
46.0	0.25	101.76	12.89	-27.56	0.00	-78.92	0.10	-107.17
47.0	0.42	74.21	11.99	-75.84	0.01	132.16	0.24	-110.15
48.0	0.60	38.86	9.58	-127.94	0.00	110.02	0.38	-119.01
49.0	0.69	9.47	6.15	-177.79	0.00	35.42	0.47	-129.73
50.0	0.66	-15.45	3.49	144.56	0.00	89.40	0.56	-136.60

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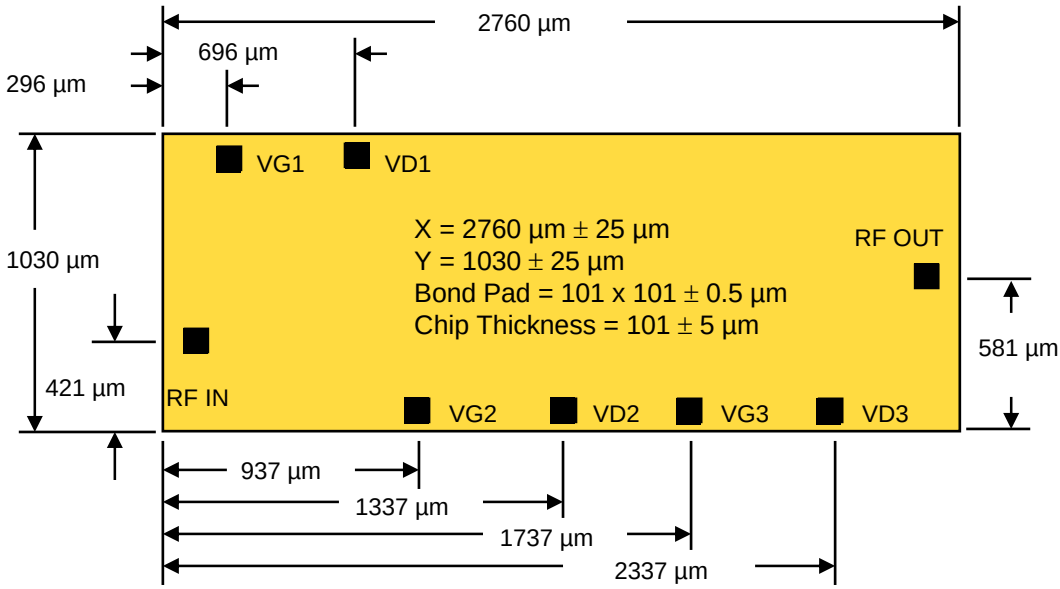
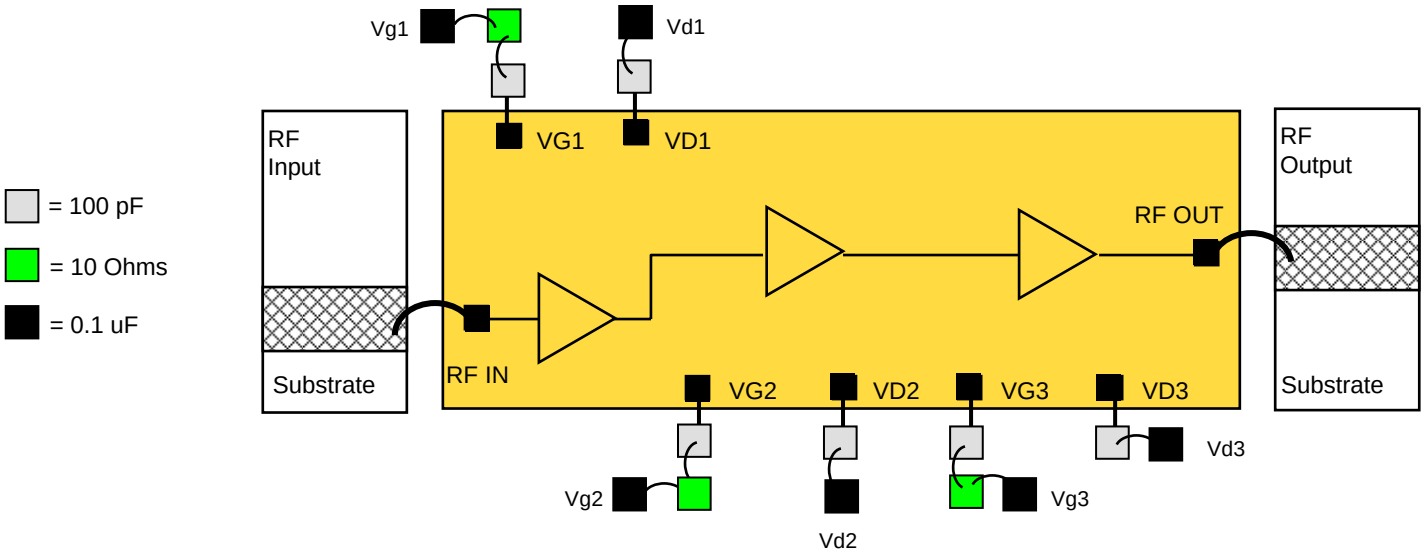
Die Size and Bond Pad Locations



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.