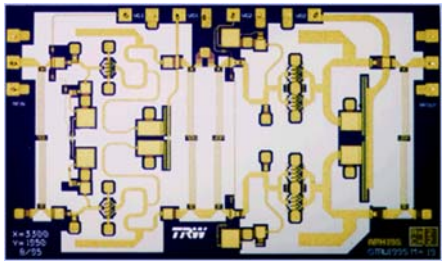
APH196
17 – 30 GHz Medium Power Amplifier

Product Datasheet

Revision: May 2007



X=3330 µm Y=1950 µm

Applications

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

Product Features

- RF Frequency: 17 to 30 GHz
- Linear gain: 16 dB, typical
- P1dB: 22 dBm, typical
- IP3: 31 dBm, typical
- Unconditionally stable
- Excellent input and output VSWR
- DC Power: 4.5 Vdc at 400 mA

Product Description

The APH196 monolithic HEMT amplifier, a broadband, two-stage power device, is designed for use in commercial digital radios and wireless LANs. The balanced designed 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 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	20		30	GHz
Linear Gain		20		dB
P1dB		22		dBm
IP3		31		dbm
Input Return Loss		17		dB
Output Return Loss		18		dB
Frequency	17		24	GHz
Linear Gain	15	18		dB
P1dB	20	22		dBm
Frequency	24.1		27	GHz
Linear Gain	14	17		dB
P1dB	20	22		dBm
Frequency	27.1		29.5	GHz
Linear Gain	11	16		dB
P1dB	20	22		dBm
Vd1, Vd2		4.5		V
Id1 (Stage 1)		114		mA
Id2 (Stage 2)		286		mA
Vg1, Vg2		-0.5		V

Absolute Maximum Ratings (Ta = 25°C)

Parameter	Min	Max	Unit
Vd1, Vd2		6	V
Id1 (Stage 1)		176	mA
Id2 (Stage 2)		440	mA
Vg1, Vg2	-1	0.3	V
Input drive level		10	dBm
Assy. Temperature (60 seconds)		300	deg. C

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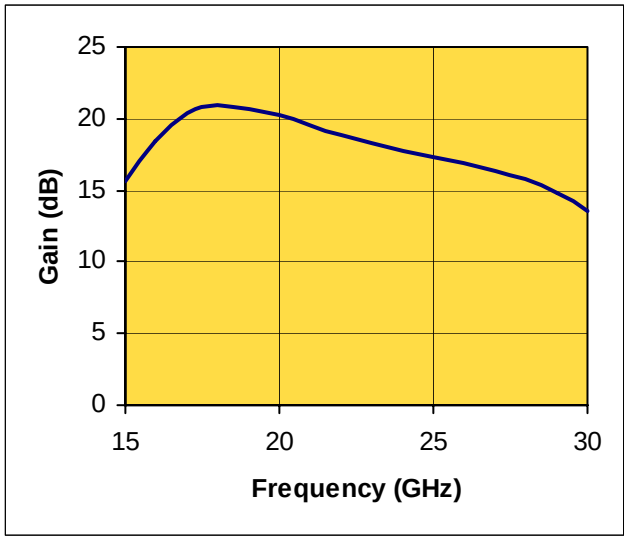
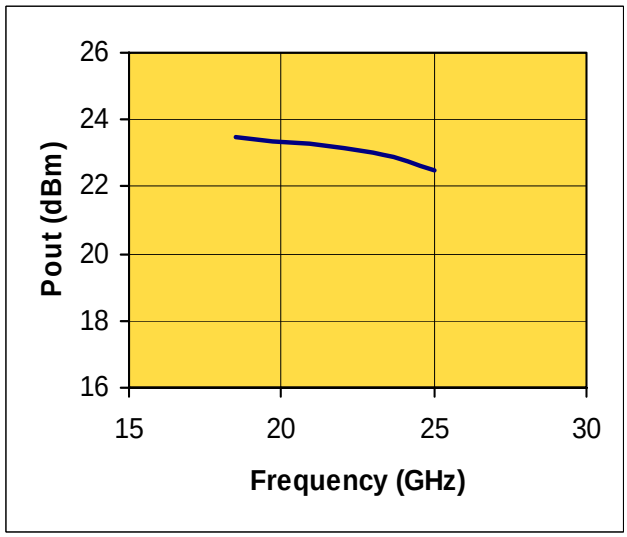
Revision: May 2007

Measured Performance Characteristics (Typical Performance at 25°C)
Vd = 4.5 V, Id = 400 mA

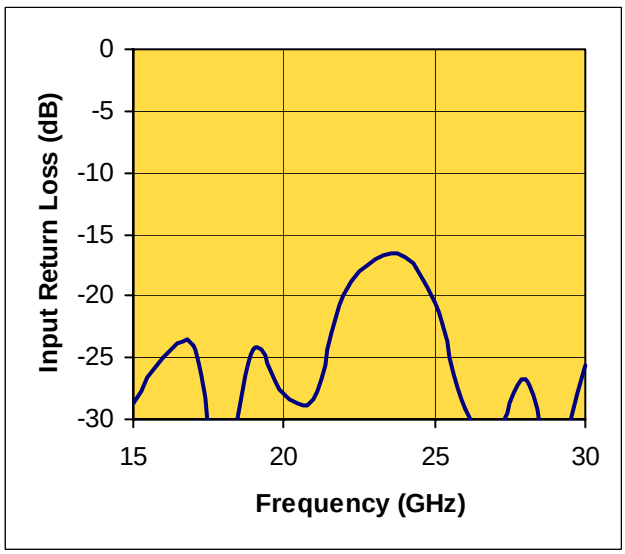
Pulsed Gain Versus Frequency



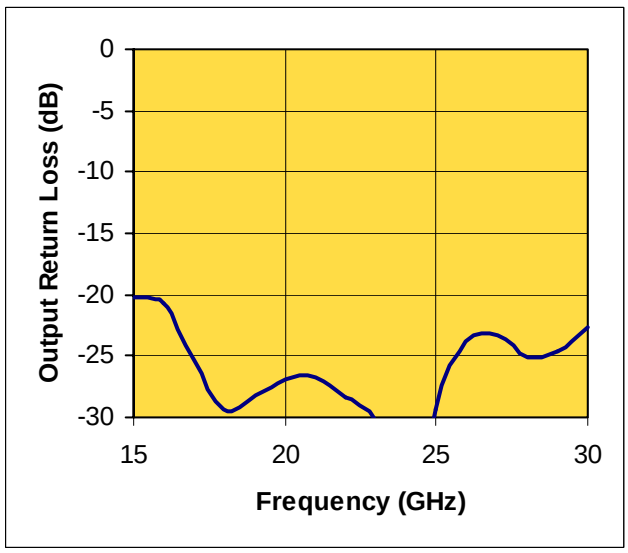
Pulsed P1dB Versus Frequency



Input Return Loss Versus Frequency



Output Return Loss Versus Frequency



Measured Performance Characteristics (Typical Performance at 25°C)
Vd = 4.5 V, Id = 400 mA

Freq GHz	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
15.0	0.04	-55.50	6.07	-163.78	0.01	-17.36	0.10	131.04
16.0	0.06	162.71	8.34	139.11	0.00	30.88	0.09	125.37
17.0	0.06	101.87	10.45	78.18	0.01	-21.85	0.05	107.27
18.0	0.02	150.71	11.22	15.89	0.01	-89.33	0.03	161.69
19.0	0.06	131.28	10.76	-40.74	0.01	-145.57	0.04	155.85
20.0	0.04	80.10	10.27	-93.55	0.01	165.36	0.05	163.98
21.0	0.04	-85.45	9.46	-141.77	0.01	120.00	0.05	160.70
22.0	0.10	-145.99	8.78	172.57	0.01	78.56	0.04	148.80
23.0	0.14	172.64	8.17	128.78	0.01	38.14	0.03	127.87
24.0	0.14	133.73	7.70	85.18	0.01	-1.61	0.00	147.65
25.0	0.09	94.32	7.31	40.27	0.01	-38.13	0.03	-104.49
26.0	0.04	47.52	7.02	-4.64	0.01	-81.63	0.06	-120.68
27.0	0.03	-138.65	6.57	-50.32	0.01	-126.80	0.07	-142.09
28.0	0.05	-177.71	6.12	-96.63	0.01	-157.80	0.06	-144.82
29.0	0.02	-179.67	5.47	-144.54	0.01	148.76	0.06	-138.60
30.0	0.05	-129.18	4.73	166.48	0.01	112.23	0.07	-149.02

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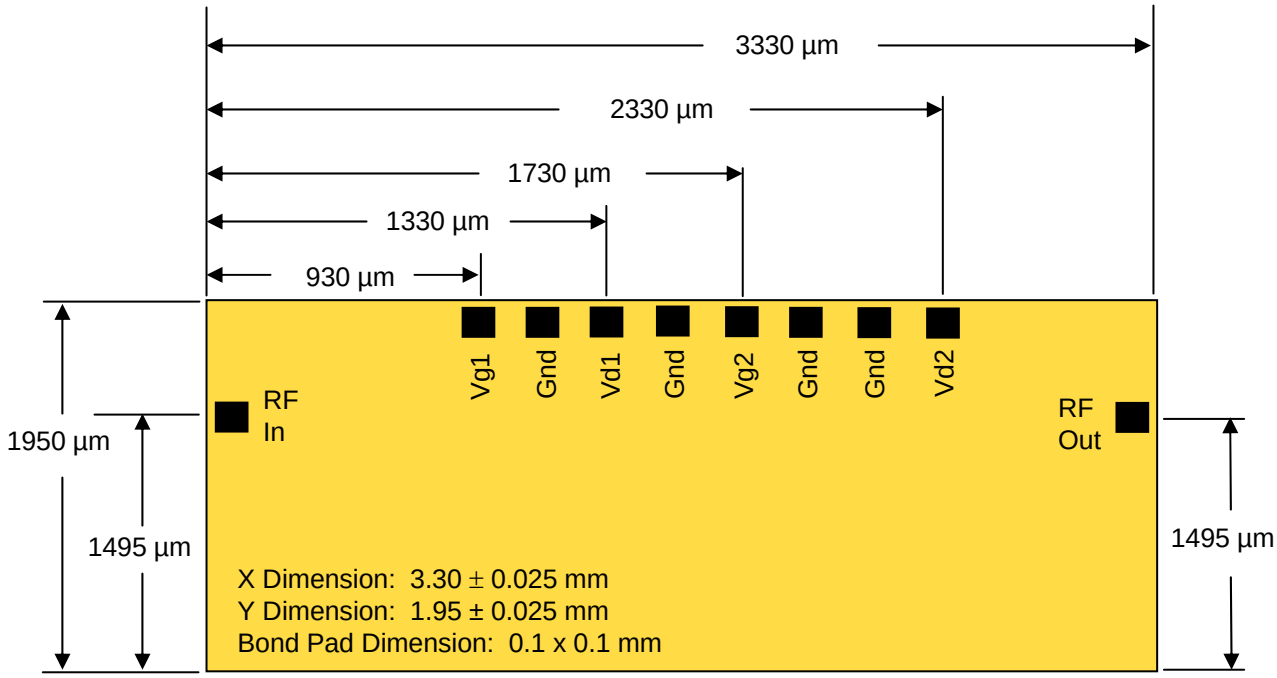
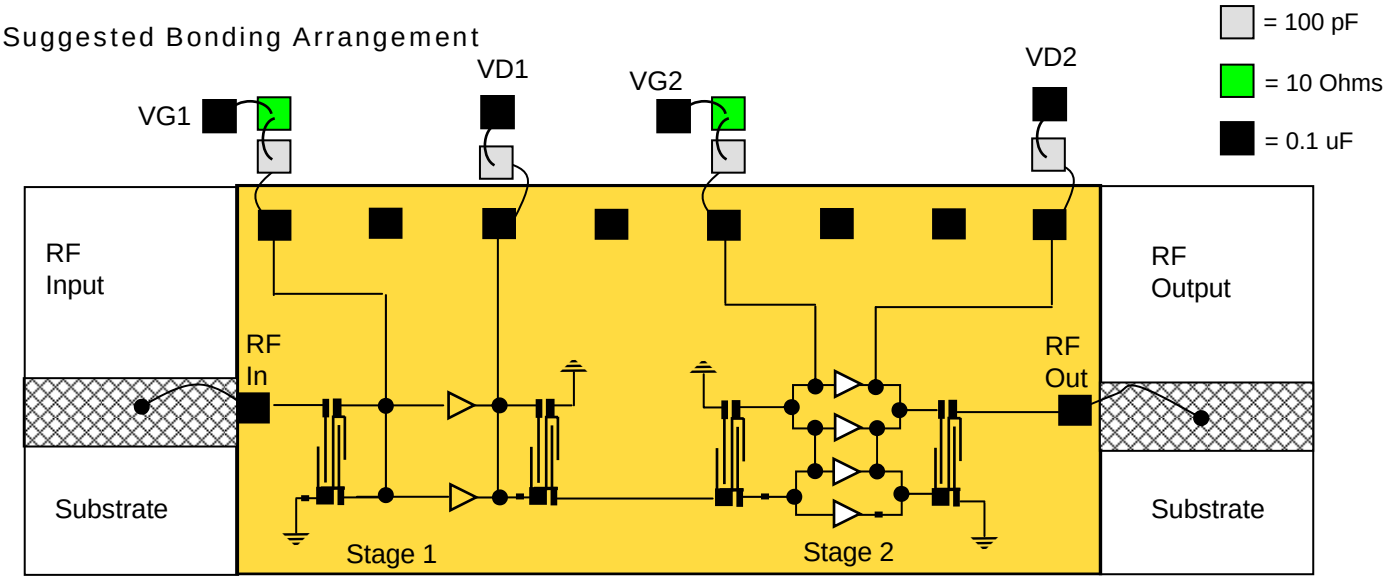
Revision: May 2007

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.