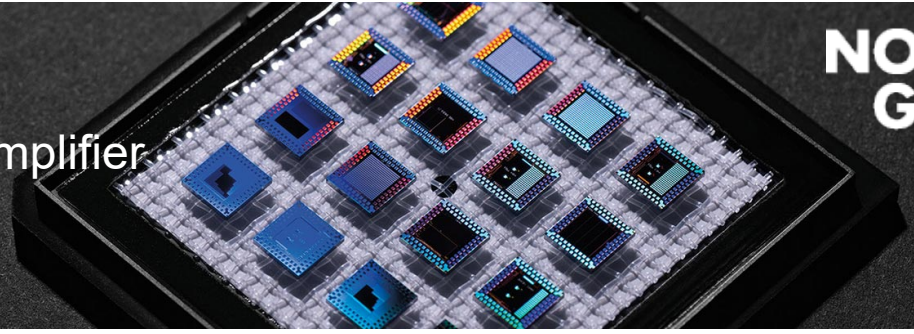
APH484
93-95 GHz
High Power Amplifier



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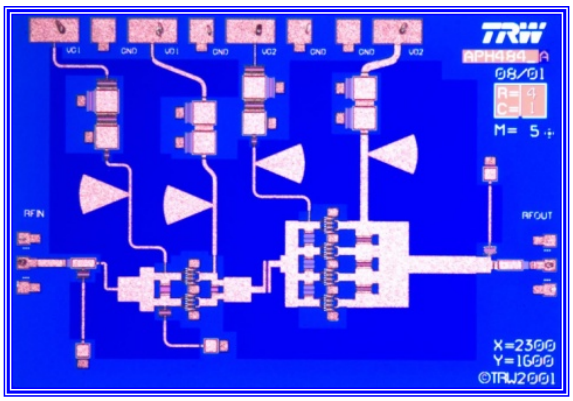

x=2.30 mm; y=1.60 mm

Applications

- Short Haul / High Capacity Links
- Sensors

Product Description

The APH484 monolithic HEMT amplifier is a broadband, two-stage power device, 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.

Product Features

- RF Frequency: 92 to 96 GHz
- Linear Gain: 10 dB typ.
- Psat: 23 dBm typ.
- Die Size: 3.7 sq. mm.
- 2 mil substrate
- DC Power: 4 VDC @ 240 mA

Performance Characteristics (Ta = 25°C)

Specification *	Min	Typ	Max	Unit
Frequency	93		95	GHz
Linear Gain		10		dB
Input Return Loss	6			dB
Output Return Loss	8			dB
Psat		23		dBm
Vd1, Vd2		4		V
Vg1		-0.2		V
Vg2		-0.1		V
Id1		80		mA
Id2		160		mA

* Pulsed-Power On-Wafer unless otherwise noted

Export Information
ECCN: **3A001.b.2.c**
HTS (Schedule B) code: **8542.33.0000**

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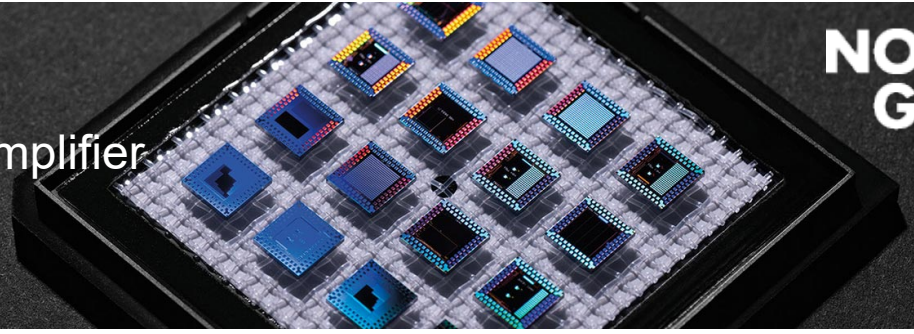

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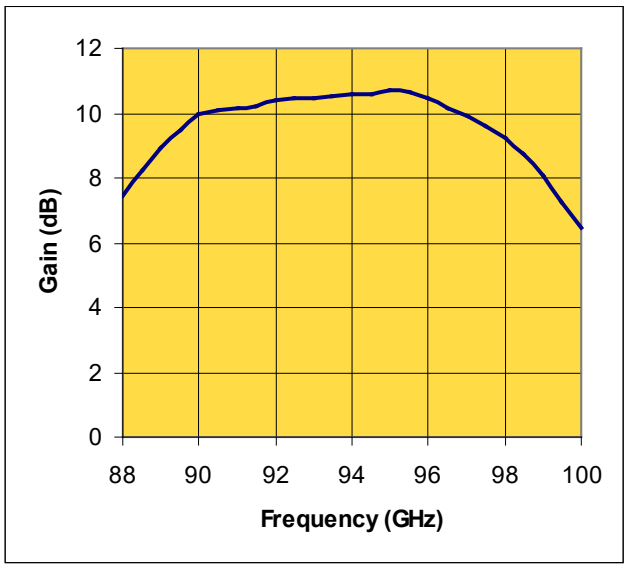
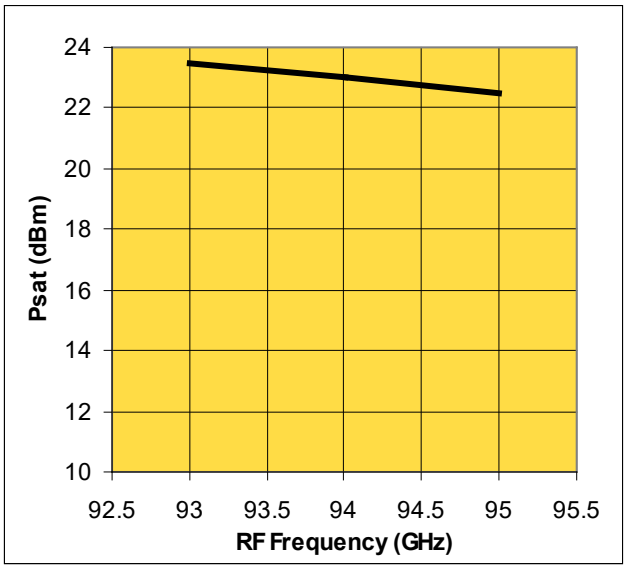
On wafer measured Performance Characteristics (Typical Performance at 25°C)
Vd = 4.0 V, Id1 = 80 mA, Id2 = 160 mA

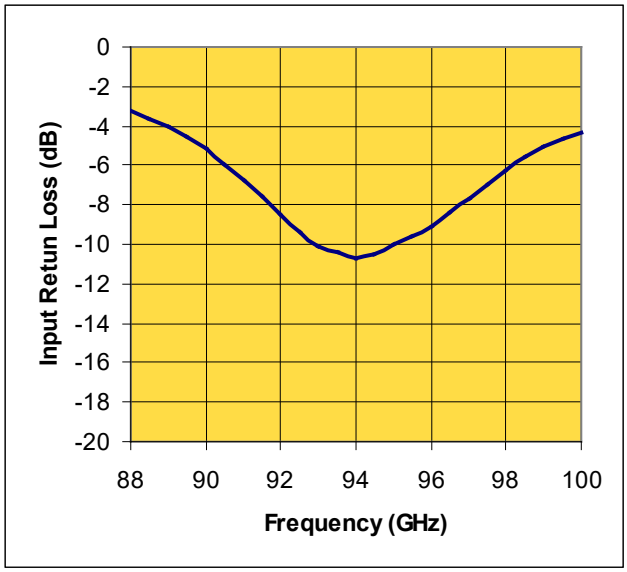
Linear Gain vs. Frequency



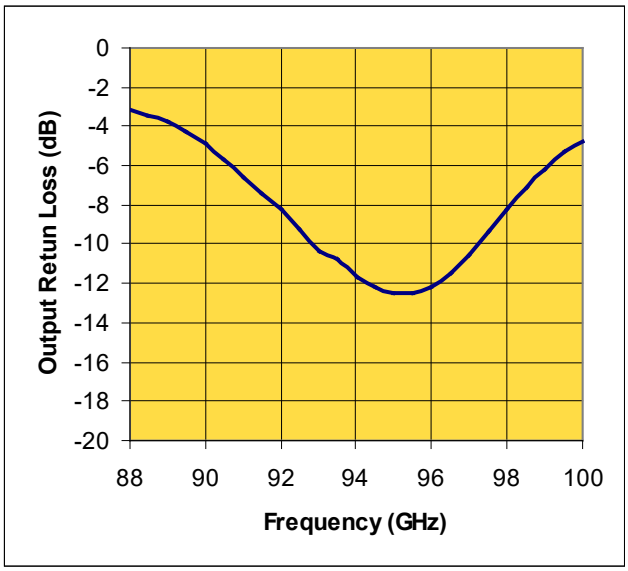
Psat vs. Pin



Input Return Loss vs. Frequency



Output Return Loss vs. Frequency



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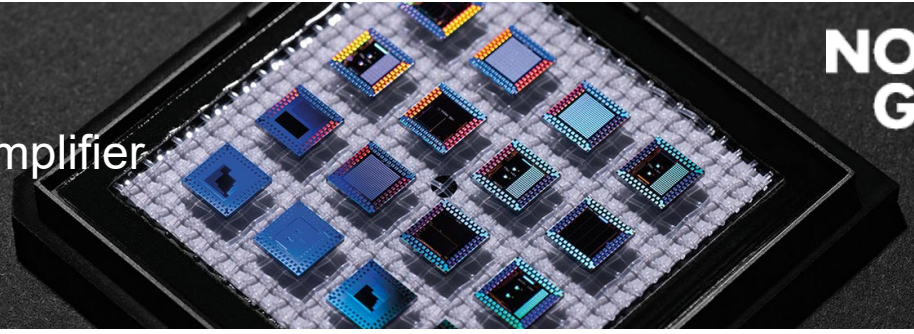

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On wafer measured Performance Characteristics (Typical Performance at 25°C)
Vd = 4.0 V, Id1 = 80 mA, Id2 = 160 mA

Freq GHz	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
88.0	0.69	-144.62	2.36	-28.66	0.02	-24.89	0.69	-166.70
88.5	0.66	-151.60	2.58	-38.67	0.02	-31.18	0.68	-173.47
89.0	0.63	-159.44	2.78	-50.38	0.03	-42.59	0.65	178.89
89.5	0.60	-168.04	2.97	-62.95	0.03	-53.41	0.61	171.18
90.0	0.55	-176.83	3.14	-76.05	0.03	-65.70	0.57	163.02
90.5	0.50	174.75	3.20	-89.36	0.03	-77.06	0.52	155.43
91.0	0.46	166.13	3.23	-101.26	0.03	-87.92	0.47	148.37
91.5	0.42	156.77	3.25	-113.07	0.03	-102.29	0.43	141.08
92.0	0.38	146.37	3.32	-124.41	0.03	-112.84	0.39	132.53
92.5	0.34	137.01	3.34	-136.37	0.03	-125.44	0.34	124.54
93.0	0.31	127.26	3.35	-148.18	0.03	-137.77	0.31	117.17
93.5	0.30	116.93	3.36	-159.17	0.03	-142.08	0.29	108.13
94.0	0.29	106.36	3.38	-170.86	0.03	-152.36	0.26	98.14
94.5	0.30	95.56	3.39	177.58	0.03	-162.32	0.25	88.27
95.0	0.32	82.82	3.42	165.21	0.03	-173.74	0.24	77.20
95.5	0.33	70.32	3.40	152.12	0.04	175.98	0.24	65.63
96.0	0.35	59.64	3.33	139.35	0.04	157.98	0.25	55.46
96.5	0.38	48.81	3.21	127.11	0.04	145.04	0.27	44.73
97.0	0.41	39.44	3.13	114.55	0.04	126.30	0.30	36.06
97.5	0.45	30.57	3.02	101.89	0.03	112.41	0.34	25.64
98.0	0.49	22.36	2.90	88.86	0.03	98.80	0.39	15.81
98.5	0.53	13.88	2.73	75.47	0.03	77.59	0.44	5.95
99.0	0.56	5.62	2.53	62.39	0.02	69.96	0.49	-3.76
99.5	0.58	-1.49	2.31	49.71	0.02	52.00	0.54	-13.92
100.0	0.61	-8.45	2.11	37.96	0.01	47.68	0.58	-22.85

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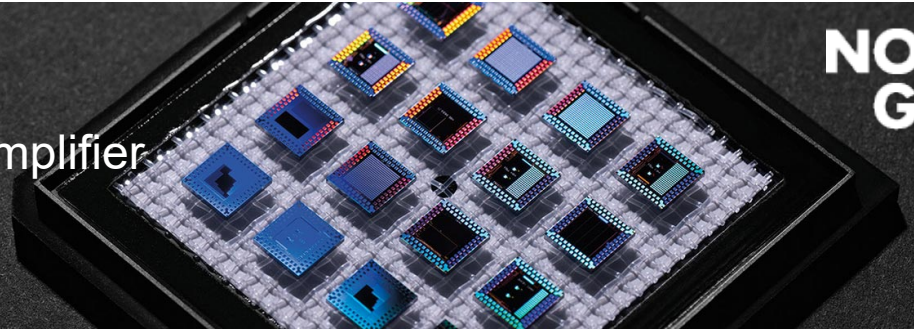

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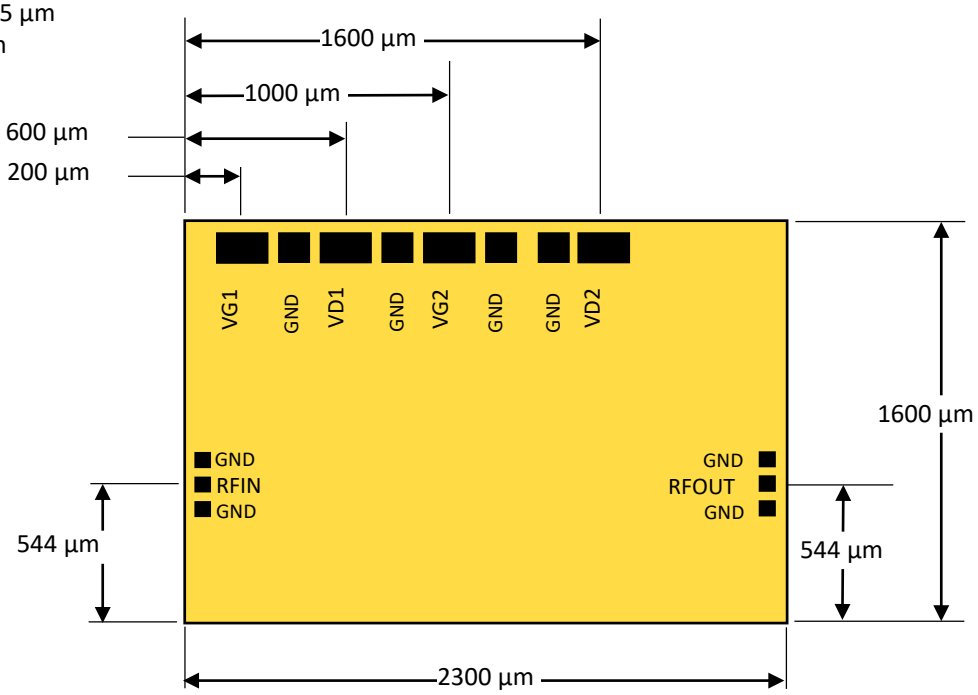
Die Size and Bond Pad Locations (Not to Scale)

X = 2300 µm ± 25 µm
Y = 1600 ± 25 µm
DC Bond Pad = 201 x 101 ± 0.5 µm
RF Bond Pad = 50 x 50 ± 0.5 µm
Chip Thickness = 50 ± 5 µm



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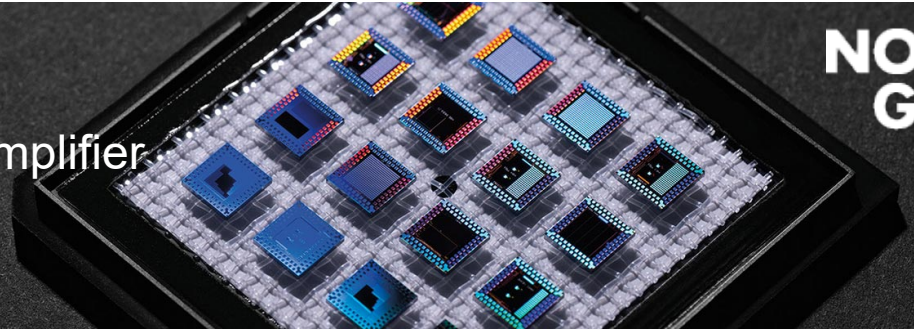

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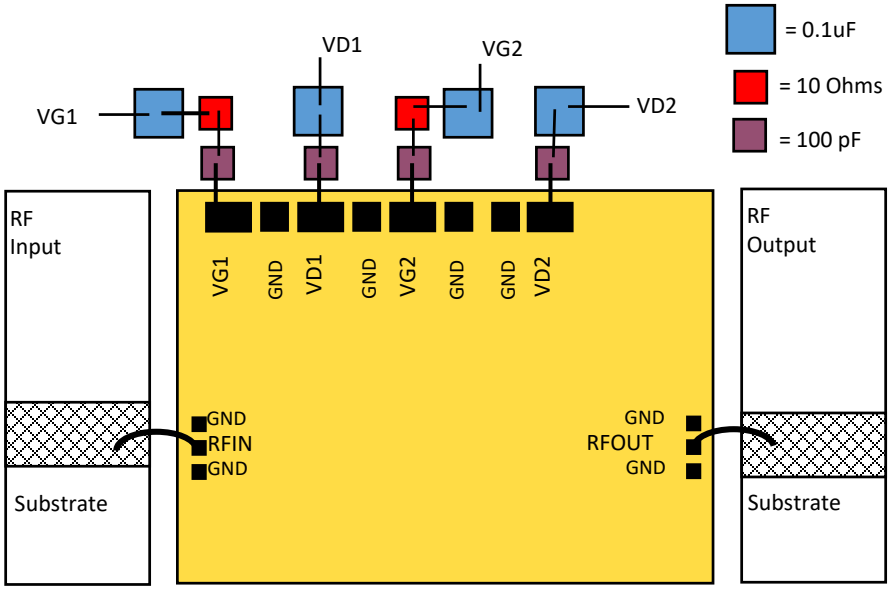
Suggested Bonding Arrangement



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 <6 mil (long) by 1.5 by 0.5 mil ribbons on input and output.

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