HRL LABORATORIES

G84-PA

GaN 80-86 GHz PA

Preliminary Datasheet

Product Features

- Frequency Range: 80-86 GHz
- Psat: 0.5 W
- Gain: 15 dB
- PAE: 15%
- Bias: Vd=12V, Id=210 mA
- Chip dimensions: 3.4 x 1.35 x 0.05 mm

Primary Applications

- E-band high data rate wireless links
- Sensors and Radars

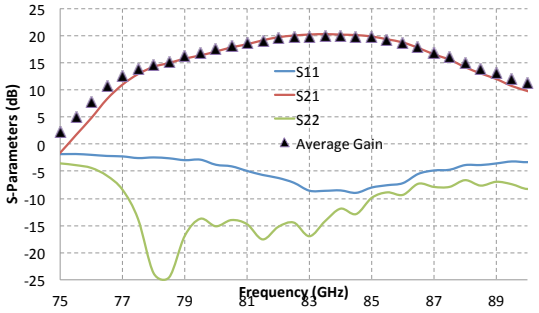
Product Description

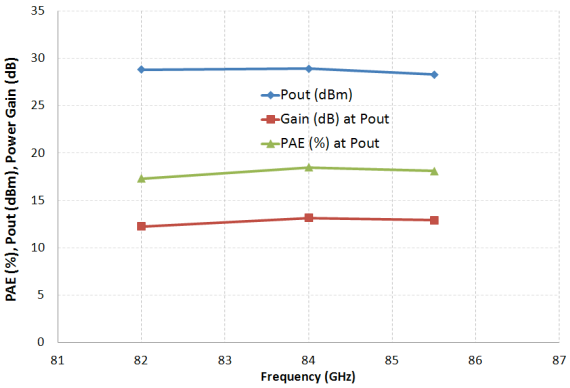
The HRL G84-PA is a three stage power amplifier fabricated using HRL's T-gate GaN HEMT process (GaN-on-SiC). The amplifier has independent gate and drain bias for each stage. Front-side bond pads (RF and DC) and backside metallization are Ti/Au, which is compatible with conventional wire and ribbon bonding techniques, and die attach processes.

The G84-PA is estimated to provide 0.5 W output power with 17 dB small signal gain and a PAE of 15% at 84 GHz.

Typical Measured Performance

Vd=12V, Id1=30mA, Id2=60mA, Id3=120mA





Pout at 6 dB compression

Electrical Specifications

Vd=12V, Id1=36mA, Id2=70mA, Id3=144mA

Specification	Min	Typ	Max	Unit
Frequency	80		86	GHz
Linear Gain		15		dB
Input Return Loss		5		dB
Output Return Loss		8		dB
Estimated Psat		27		dBm

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Absolute Maximum Ratings

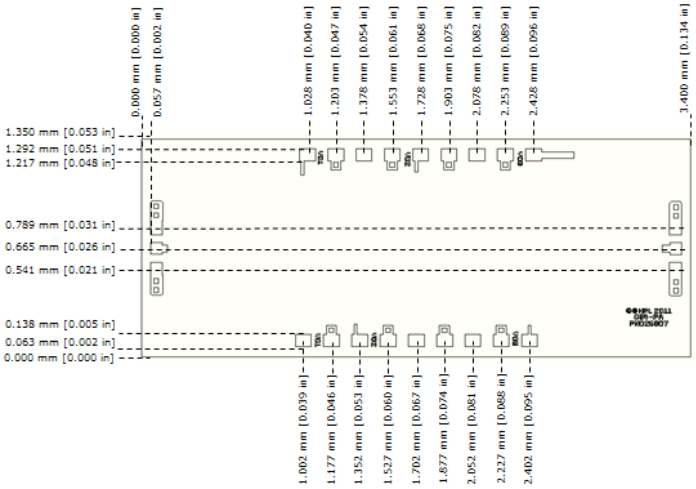
CW Operation

Parameter	Rating	Unit
Input Power (Pin)	20	dBm
Drain Voltage (Vd)	12	V
Gate Voltage Range (Vg)	-1 to -3.5	V
Drain Current (Id)	300	mA
Die Attach Temperature (30 sec)	290	°C

Exceeding any one or combination of the Absolute Maximum Ratings may result in permanent damage to the device. Application of Absolute Maximum Ratings on the device for an extended period of time may negatively affect the reliability of the device.

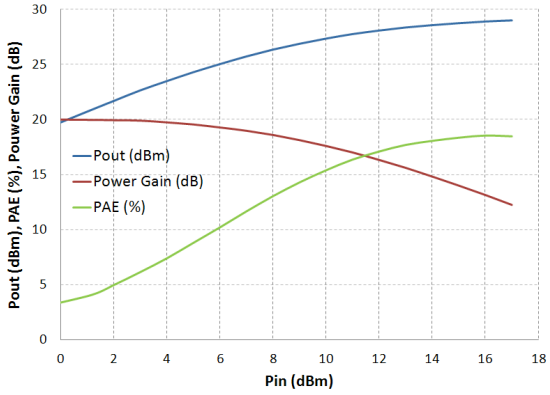
Caution: ESD sensitive device.

Outline Drawing

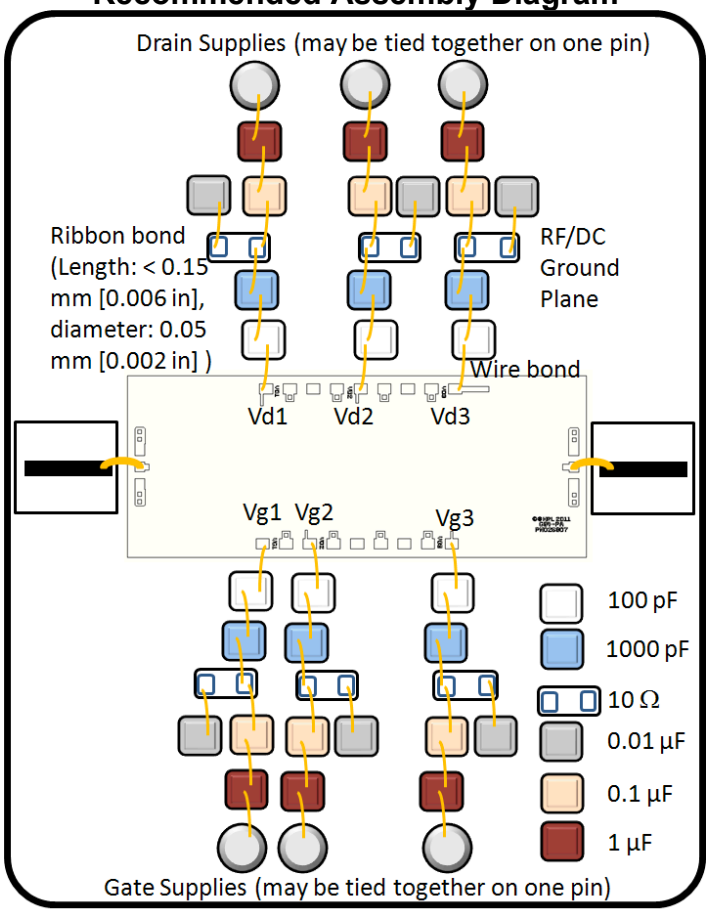


DC Bond Pads are 0.1mm^2; Bond pad locations shown from die etch to pad center.

Pout, PAE and Gain vs. Pin at 84 GHz



Recommended Assembly Diagram



Biasing Procedure

Turn on

1) Vg1 = Vg2 = Vg3 = - 6 V
2) Vd1 = Vd2 = Vd3 = 12 V
3) Adjust Vg1 to obtain Id1 = 30 mA
4) Adjust Vg2 to obtain Id2 = 60 mA
5) Adjust Vg3 to obtain Id3 = 120 mA

Turn off

1) Vd1 = Vd2 = Vd3= 0V
2) Vg1 = Vg2 = Vg3= 0V

HRL recommends mounting the die on CuW heat spreader using AuSn eutectic solder.