

GaN Wideband PA

Product Features

- Frequency Range: 0.1-40 GHz
- 10 GHz characteristics
 - Gain: 10 dB
 - Psat: 29 dBm
 - P1dB: 24 dBm
 - PAE: 14%
 - NF: 3 dB
- Quiescent Bias:
 - Vds = 14V, Id = 50 mA
- Chip dimensions:
 - 2.7 x 1.5 x 0.05 mm

Primary Applications

- Instrumentation and test equipment
- Commercial communication systems

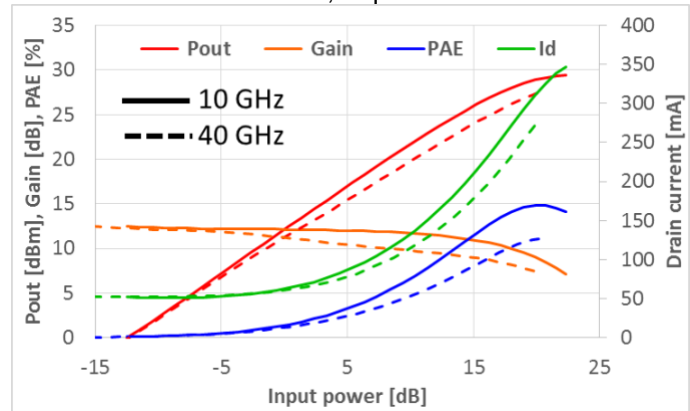
Product Description

The HRL GaN-TWA is a broadband power amplifier fabricated using HRL's T-gate GaN HEMT process (GaN-on-SiC). 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.

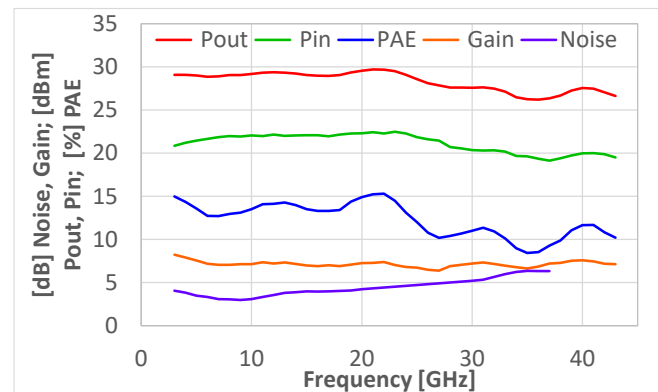
The GaN-TWA typically provides 29 dBm output power with 8 dB associated gain and a PAE of 14% at 10 GHz. At 40 GHz the corresponding values are 27 dBm, 7 dB and 10% respectively.

Measured Performance

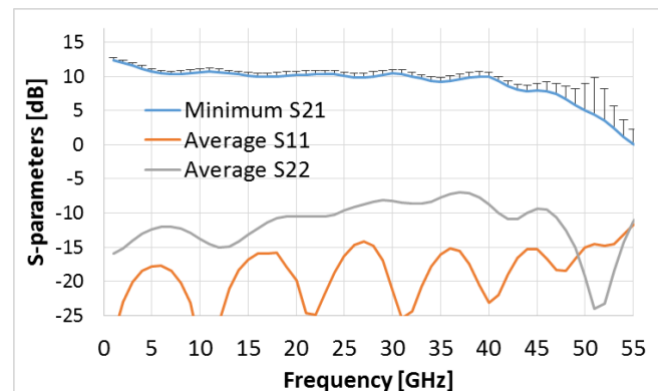
Vd=14V, Idq=50 mA



Gain compression data at 10 & 40 GHz



5 dB gain compressed & noise data



Small signal data at Vds = 14 & Id = 50 mA

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Electrical Specifications

$V_d=14V$, $I_d=50\text{ mA}$

Specification	Min	Typ	Max	Unit
Frequency	0.1		40	GHz
Linear Gain		10		dB
Input Return Loss		14		dB
Output Return Loss		7		dB
Saturated output power (10 GHz)		29		dBm
Noise figure (10 GHz)		3		dB

Absolute Maximum Ratings

CW Operation

Parameter	Rating	Unit
Input Power [Pin]	23	dBm
Drain Voltage [Vd]	14	V
Gate Voltage Range [Vg]	-15 to -5	V
Quiescent Drain Current [Id]	50	mA
Operation Drain Current [Id]	370	mA
Baseplate temperature ¹	50	°C
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.

Biasing Procedure

Turn on

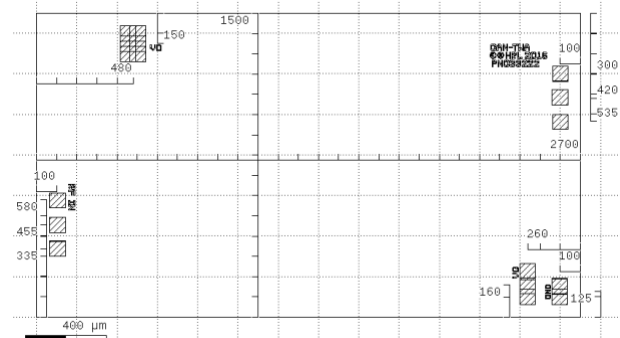
- 1) $V_{gs} = -15\text{ V}$
- 2) $V_{ds} = 14\text{ V}$
- 3) Adjust V_{gs} to obtain $I_d = 50\text{ mA}$

Turn off

- 1) $V_{ds} = 0\text{ V}$
- 2) $V_{gs} = 0\text{ V}$

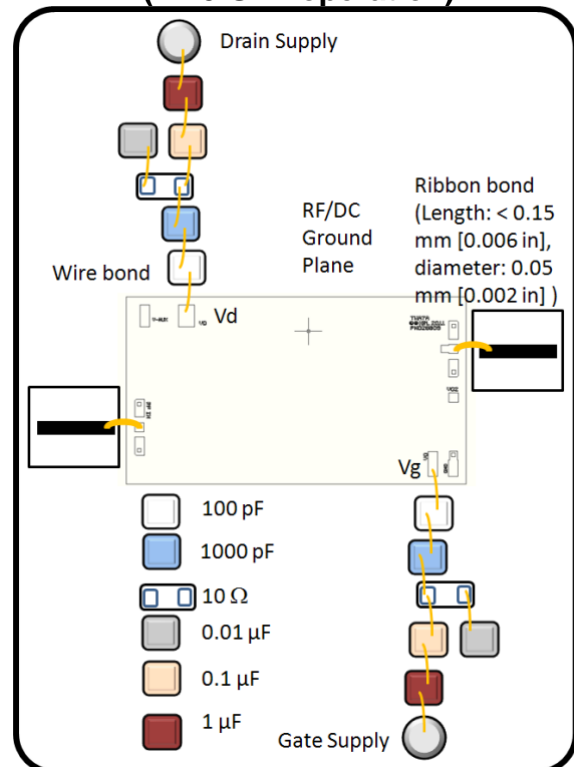
¹HRL recommends mounting the die on CuW heat spreader using AuSn eutectic solder. Maximum baseplate temperature is based on this recommendation.

Outline Drawing



DC Bond Pads are $0.2 \times 0.075\text{ mm}$; Bond pad locations shown from die edge to pad center.

Recommended Assembly Diagram (2-40 GHz operation)



Caution: ESD sensitive device.

Note: Circuit is DC-coupled for low frequency application, and may require DC blocking capacitors at the RF input & output.

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