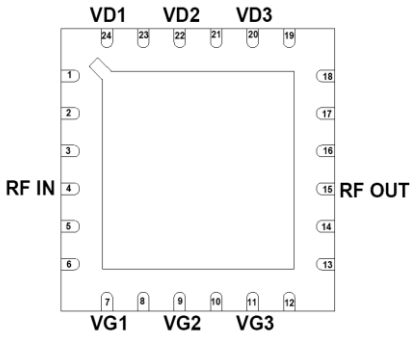
9 – 11 GHz Medium Power Amplifier

Features

- **Frequency Range : 9 – 11GHz**
- **20 dBm output P1dB**
- **28 dB Gain**
- **30% PAE**
- **High IP3**
- **Input Return Loss > 8 dB**
- **Output Return Loss > 8 dB**
- **Dual bias operation**
- **No external matching required**
- **DC decoupled input and output**
- **0.5 µm InGaAs pHEMT Technology**
- **Open cavity QFN Package**

Functional Diagram



Typical Applications

- **RADAR**
- **Military & space**
- **LMDS, VSAT**

Description

The ASL4028P6 is a X-band Medium Power Amplifier with 20dBm output P1dB. The PA uses two stages of amplification and operates in 9 – 11 GHz frequency range. The PA features 28 dB of gain with input and output return loss 8dB respectively. The PA has a high IP3 of 31dBm and 30% PAE. This feature enables it to be used in the applications requiring efficiency along with linearity. The chip operates with dual bias supply voltage.The die is fabricated using a reliable 0.5µm InGaAs pHEMT technology.

The package used is a SMD open cavity QFN Package with base metal made up of copper composite.

Absolute Maximum Ratings (1)

Parameter	Absolute Maximum	Units
Drain bias voltage (Vd)	+9	volts
Drain current (Id)	0.13	A
RF input power (RFin at Vd=8V)	22	dBm
Operating temperature	-50 to +85	^{o}C
Storage Temperature	-65 to +150	^{o}C

1. Operation beyond these limits may cause permanent damage to the component

Electrical Specifications (1) @ T_A = 25 °C, V_d = 8V, V_g = -1V, Z_o =50 Ω

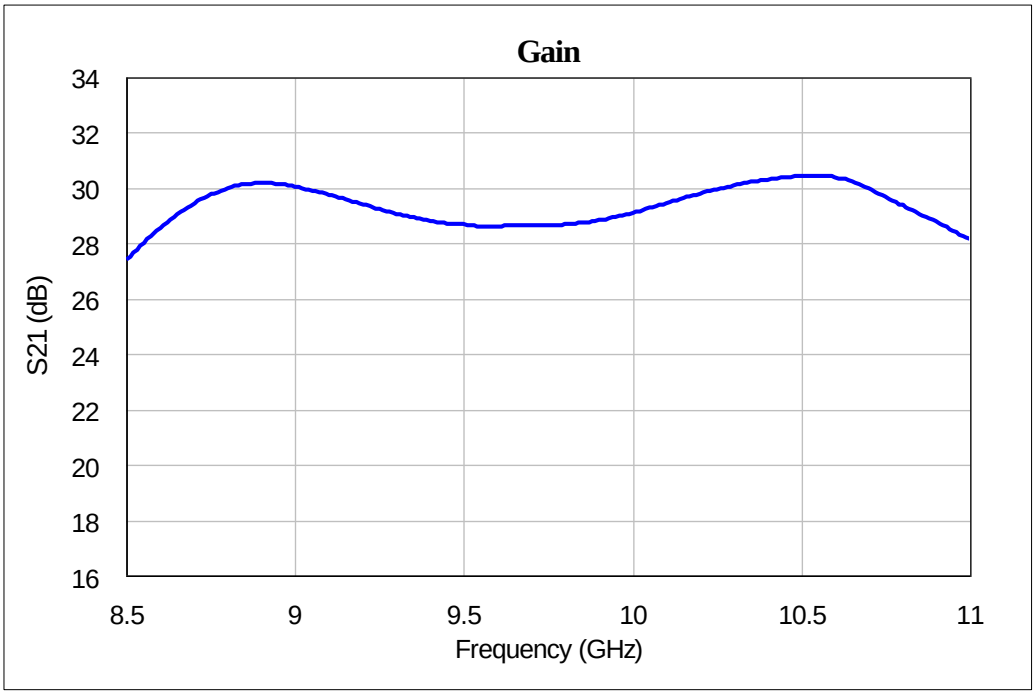
Parameter	Typ.	Units
Frequency Range	9 – 11	GHz
Gain	28	dB
Gain Flatness	+/-1	dB
Output Power (P1 dB)	20	dBm
Input Return Loss	8	dB
Output Return Loss	8	dB
Saturated output power (Psat)	22	dBm
Output Third Order Intercept (IP3)	31	dBm
Power Added Efficiency (PAE)	30%	--
Supply Current (I_{dq})	75	mA

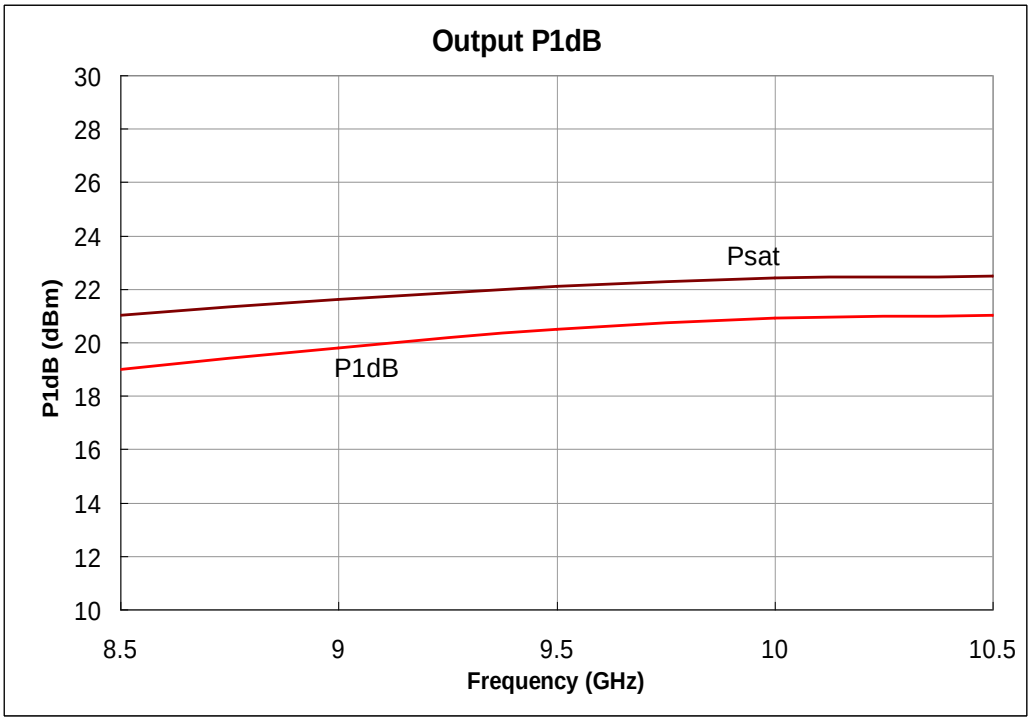
Note:

1. Electrical specifications as measured in test fixture.

Test fixture data

V_d = 8V, V_g = -1V, Total Current = 75mA, T_A = 25 °C





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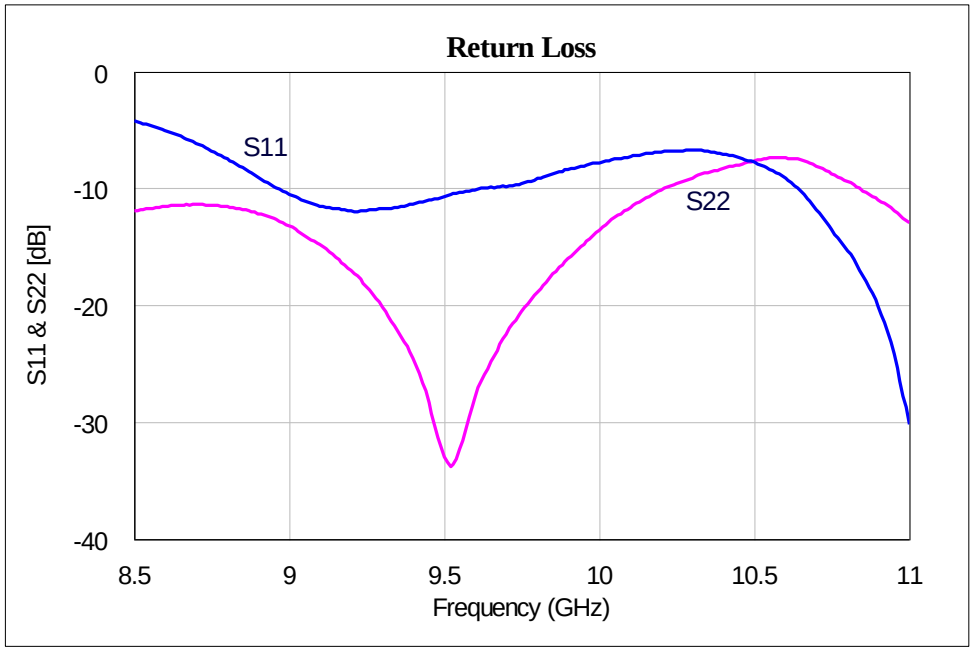
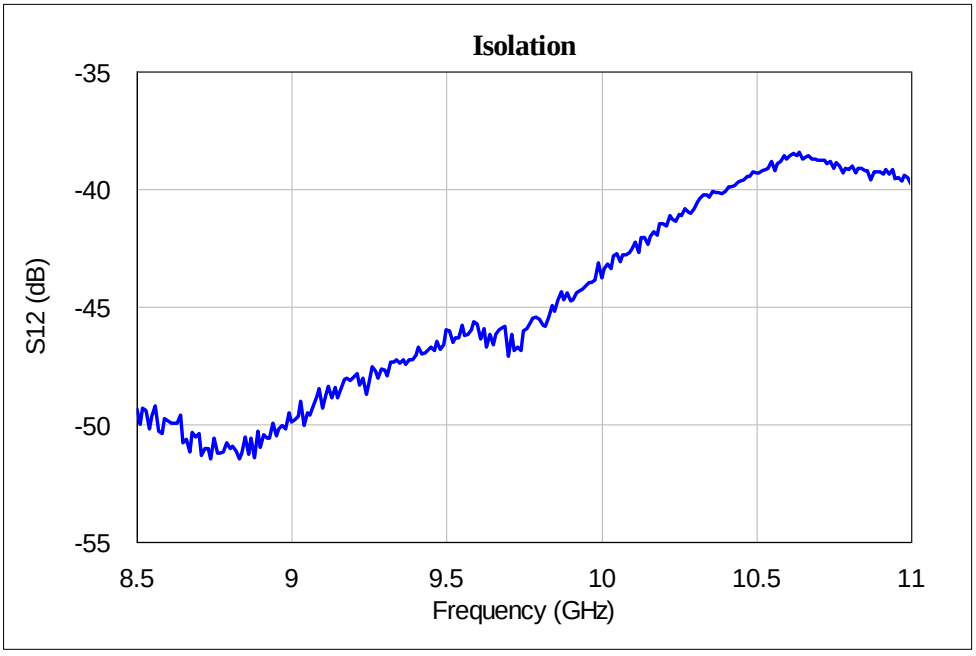
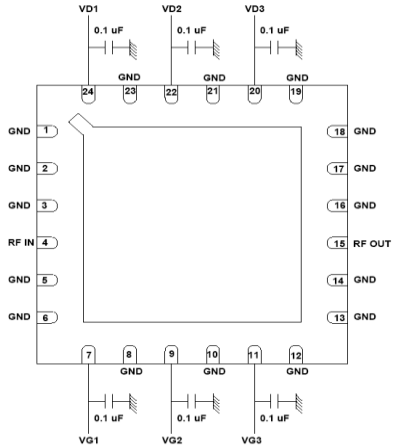




Pin details



Top View

Note:

1. All RF and DC bond pads are 100µm x 100µm
2. Pad no. 4 : RF IN
3. Pad no. 7,9,11 : Vg1, Vg2, Vg3
4. Pad no. 24,23,20 : Vd1, Vd2, Vd3
5. Pad no. 15 : RF OUT

Recommended Assembly Diagram

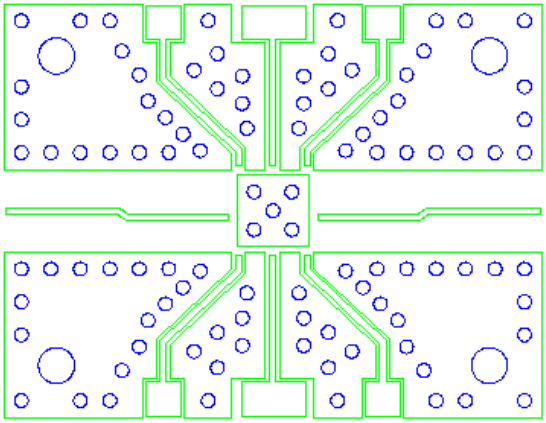


Fig: PCB Drawing

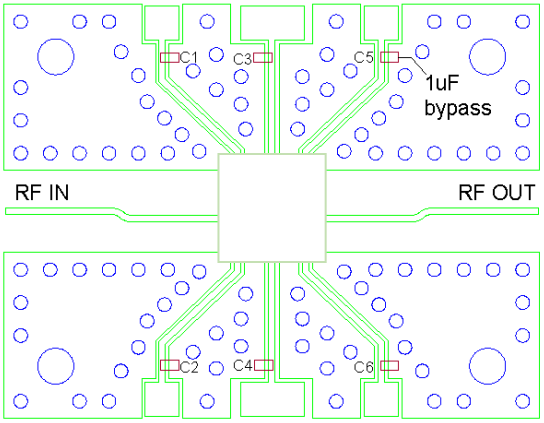


Fig: Package assembled on PCB

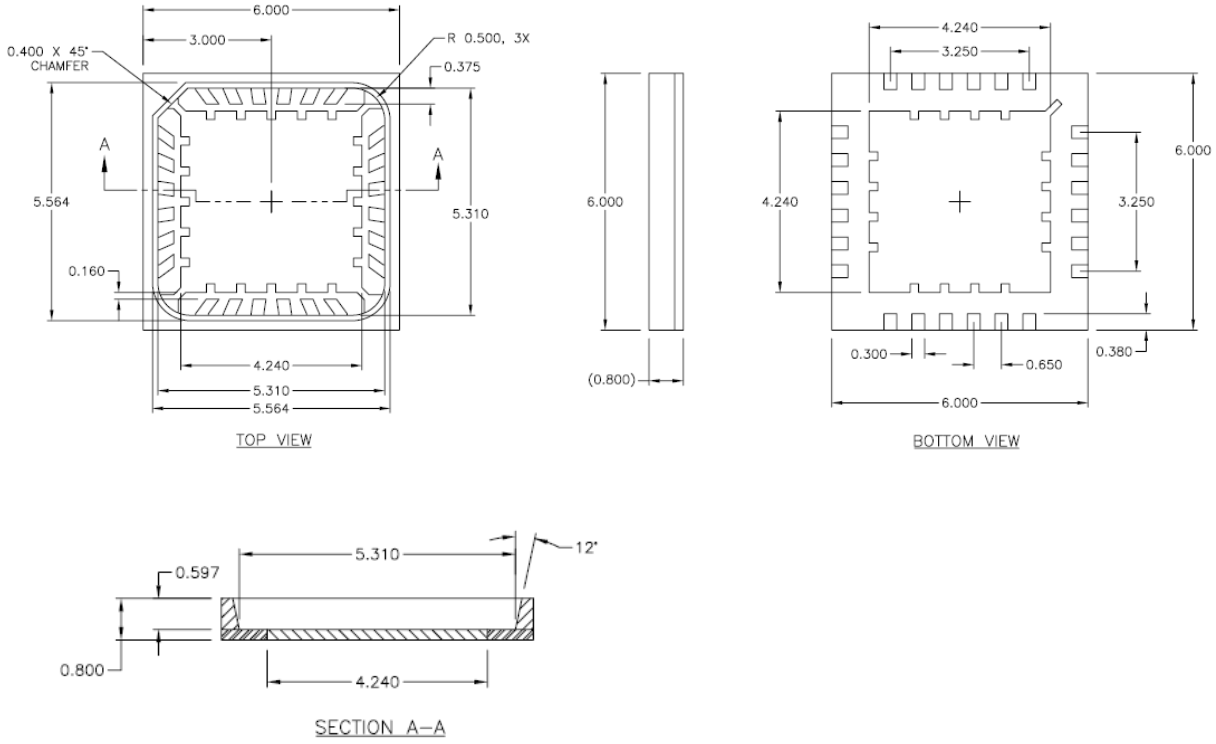
Note :

1. Input and output 50 ohm lines are on 5 mil RT Duroid substrate
2. 0.1 µF and 1µF capacitors may be additionally used as a second level of bypass for reliable operation
3. The RF input & output ports are DC decoupled on-chip.
4. Proper heat sink like Alluminium or copper to be used for better reliability of package

Die attach: For Epoxy attachment, use of a two-component conductive epoxy is recommended. An epoxy fillet should be visible around the total die periphery. If Eutectic attachment is preferred, use of fluxless AuSn (80/20) 1-2 mil thick preform solder is recommended. Use of AuGe preform should be strictly avoided.

Wire bonding: For DC pad connections use either ball or wedge bonds. For best RF performance, use of 150 - 200µm length of wedge bonds is advised. Single Ball bonds of 250-300µm though acceptable, may cause a deviation in RF performance.

Package outline drawing



GaAs MMIC devices are susceptible to Electrostatic discharge. Proper precautions should be observed during handling, assembly & testing

All information and Specifications are subject to change without prior notice