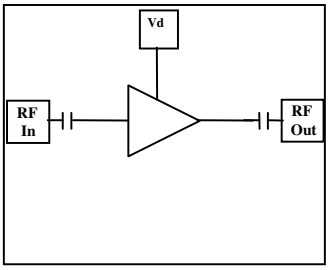
2 – 6 GHz 23dBm Medium Power Amplifier

Features

- **Frequency Range : 2 – 6GHz**
- **23 dBm output P1dB**
- **9.5 dB Power gain**
- **35% PAE**
- **High IP3**
- **Input Return Loss > 7dB**
- **Output Return Loss > 10dB**
- **Self bias operation**
- **No external matching required**
- **DC decoupled input and output**
- **0.5 µm InGaAs pHEMT Technology**
- **Chip dimension: 1.6 x 1.6 x 0.1 mm**

Functional Diagram



Typical Applications

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

Description

The AMT2123041 is a 2-6GHz medium power amplifier with 23dBm power output. The MPA operates in 2 – 6GHz frequency range and features 9.5dB of gain with input and output return losses of 7dB and 10dB respectively. The MPA has a high IP3 of 32dBm and 35% PAE. This feature enables it to be used in the applications requiring efficiency along with linearity. The chip operates with single bias supply voltage. The die is fabricated using a reliable 0.5µm InGaAs pHEMT technology. The Circuit grounds are provided through vias to the backside metallization.

Absolute Maximum Ratings (1)

Parameter	Absolute Maximum	Units
Drain bias voltage (Vd)	+10	volts
Drain current (Id)	140	mA
RF input power (RFin at Vd=9V)	23	dBm
Operating temperature	-50 to +85	°C
Storage Temperature	-65 to +150	°C

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

Electrical Specifications [1] @ T_A = 25 °C, V_d = 8V, Zo =50 Ω

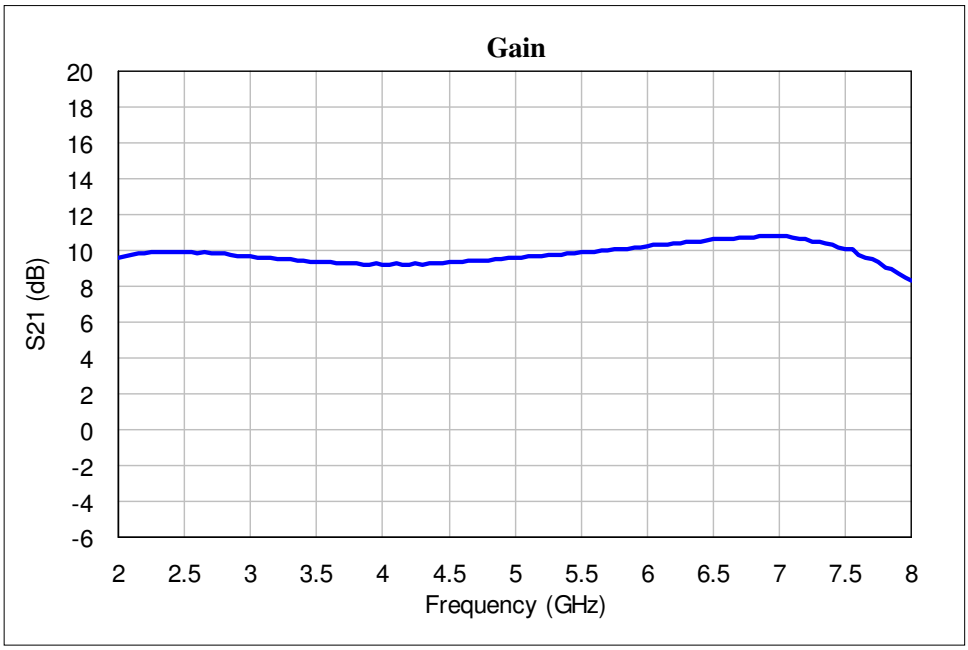
Parameter	Typ.	Units
Frequency Range	2 – 6	GHz
Gain	9.5	dB
Gain Flatness	+/-0.5	dB
Output Power (P1 dB)	23	dBm
Input Return Loss	7	dB
Output Return Loss	10	dB
Saturated output power (Psat)	25	dBm
Output Third Order Intercept (IP3)	32	dBm
Power Added Efficiency (PAE)	35%	--
Supply Current	90	mA

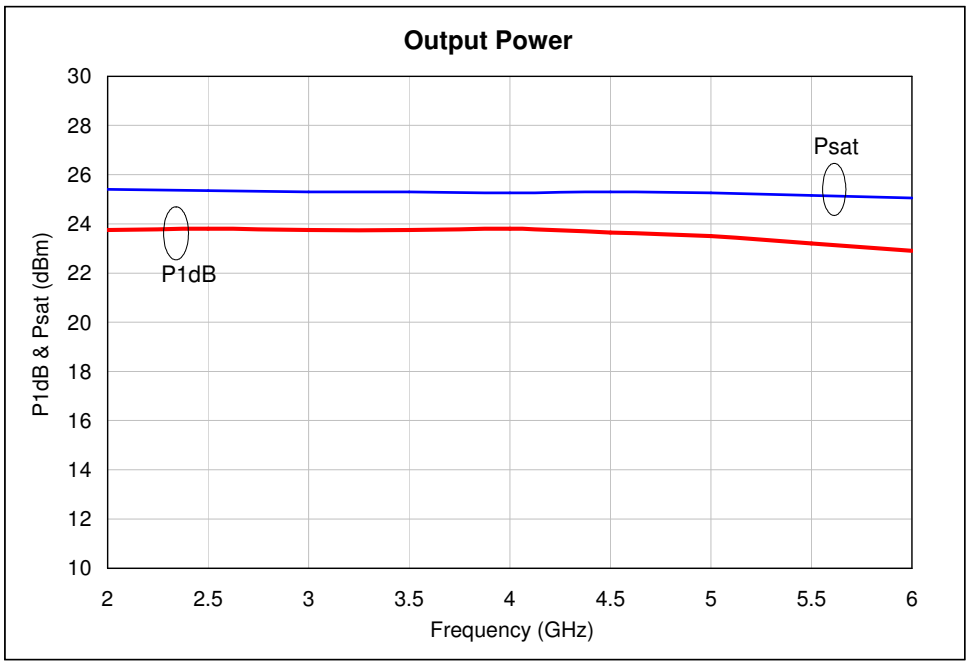
Note:

1. Electrical specifications as measured in test fixture.

Test fixture data

V_d = 8V, Total Current =90mA, T_A = 25 °C





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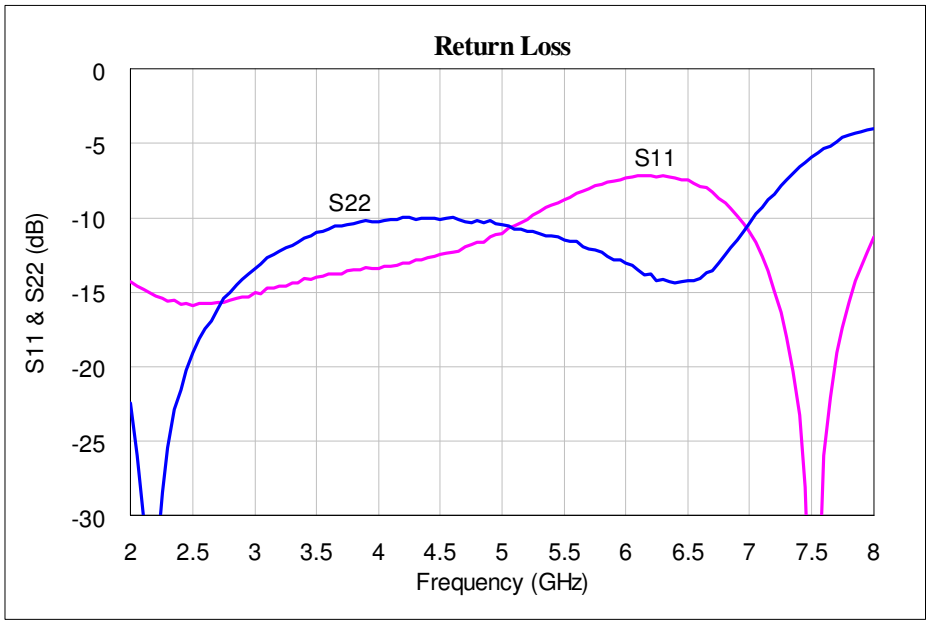
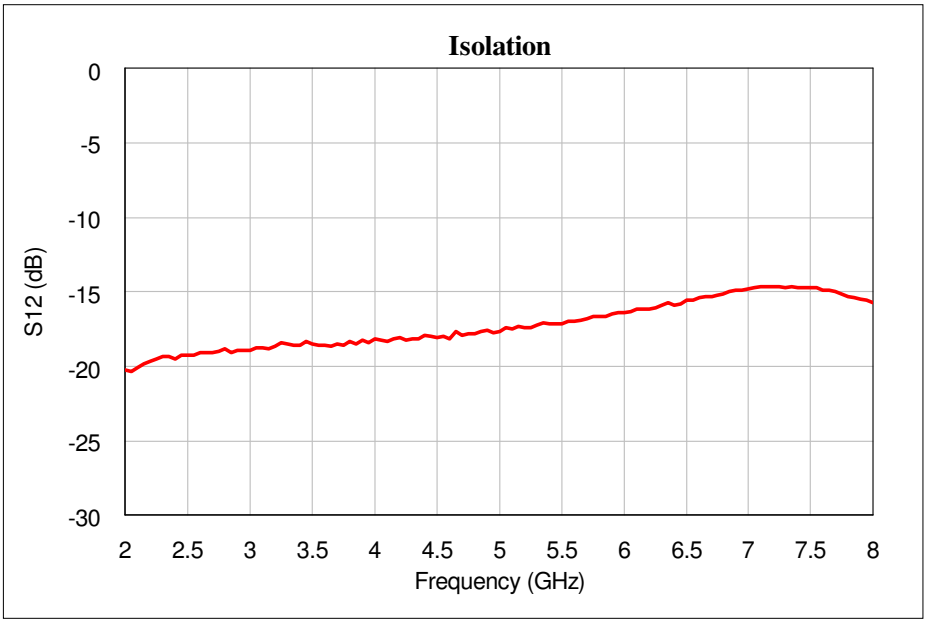
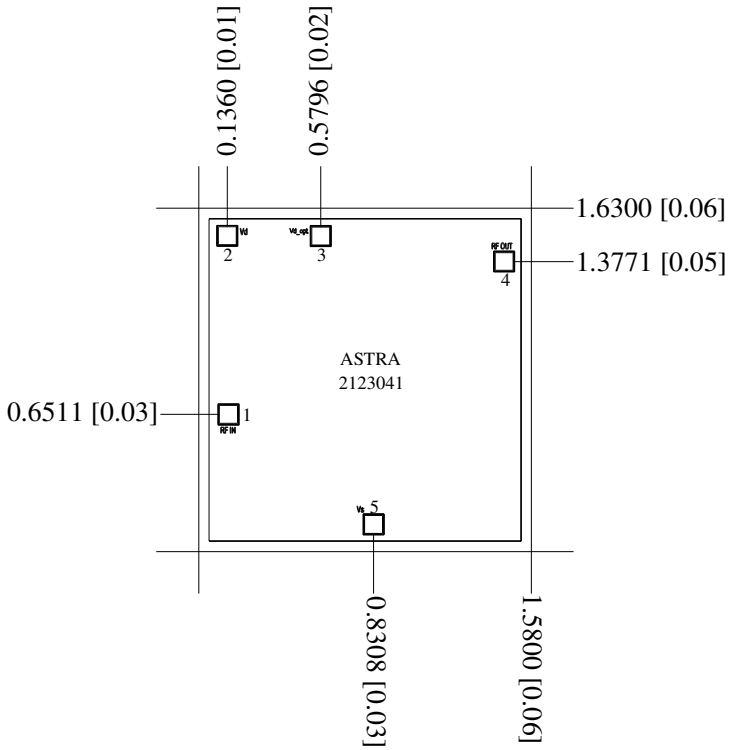




Bond Pad Locations

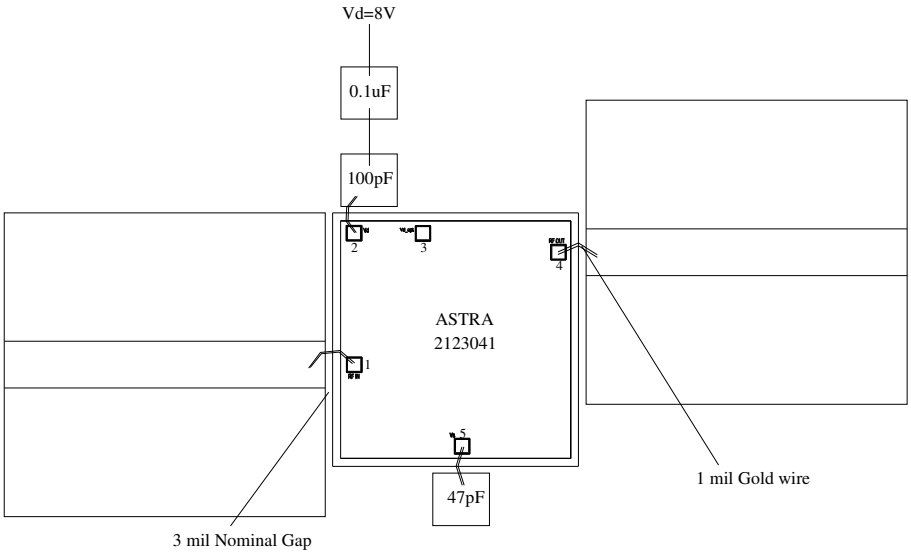


Units: millimeters

Note:

1. All RF and DC bond pads are 100µm x 100µm
2. Pad no. 1 : RF IN
3. Pad no. 2 : Drain voltage(V_d)
4. Pad no. 4 : RF Output
5. Pad no. 5 : Source bypass capacitor (47pF)

Recommended Assembly Diagram



Note:

1. Two 1 mil (0.0254mm) bond wires of minimum length should be used for RF input and output.
2. Two 1 mil (0.0254mm) bond wires of minimum length should be used from chip bond pad to 100pF capacitor.
3. Input and output 50 ohm lines are on 5 mil RT Duroid substrate
4. 0.1 µF capacitors may be additionally used as a second level of bypass for reliable operation
5. The RF input & output ports are DC decoupled on-chip.
6. Proper heat sink like Copper tungsten or copper molybdenum to be used for better reliability of chip

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.

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