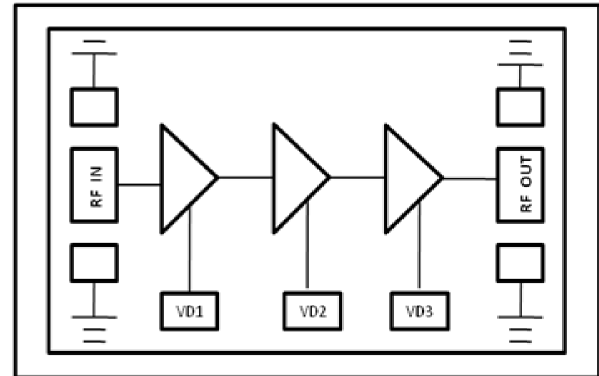
9-10 GHz LOW NOISE AMPLIFIER

Features

- Frequency Range 9 -10GHz
- Low Noise Figure < 1.38 dB
- High Gain 28 ± 0.4dB
- Input Return Loss > 10dB.
- Output Return Loss > 13dB.
- 10 dBm is Nominal P1dB
- 20 dBm OIP3
- No External Matching required.
- 0.15 µm InGaAs pHEMT Technology.
- Chip Size: 2.8mm x 1.6 mm x 0.1 mm.

Functional diagram



Typical Applications

- Radar
- Military
- Test Equipment and Sensors.

Description

AMT 2142072 is an Ultra Low Noise three stage MMIC Amplifier having high gain and less noise figure for Receiver Front End applications. It features 1.38 dB Noise Figure in 9-10 GHz band with good I/O return Losses with typical gain of 28dB. Input/output matching networks and bypass capacitors are provided on-chip for simplification of assembly operation. The die is fabricated using reliable Low noise 0.15um InGaAs pHEMT process. The Circuit grounds are provided through vias to the backside metallization. The die is suitable in applications where high gain, very low noise and excellent linearity are desired.

Absolute Maximum Ratings[1]

Parameter	Absolute Maximum	Units
Positive DC voltage	+6	v
RF input power	+23	dBm
Operating Temperature	-55 to +90	ºC
Storage Temperature	-65 to +150	ºC

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

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Electrical Specifications @ T_A = 25 °C , Z_o =50Ω.

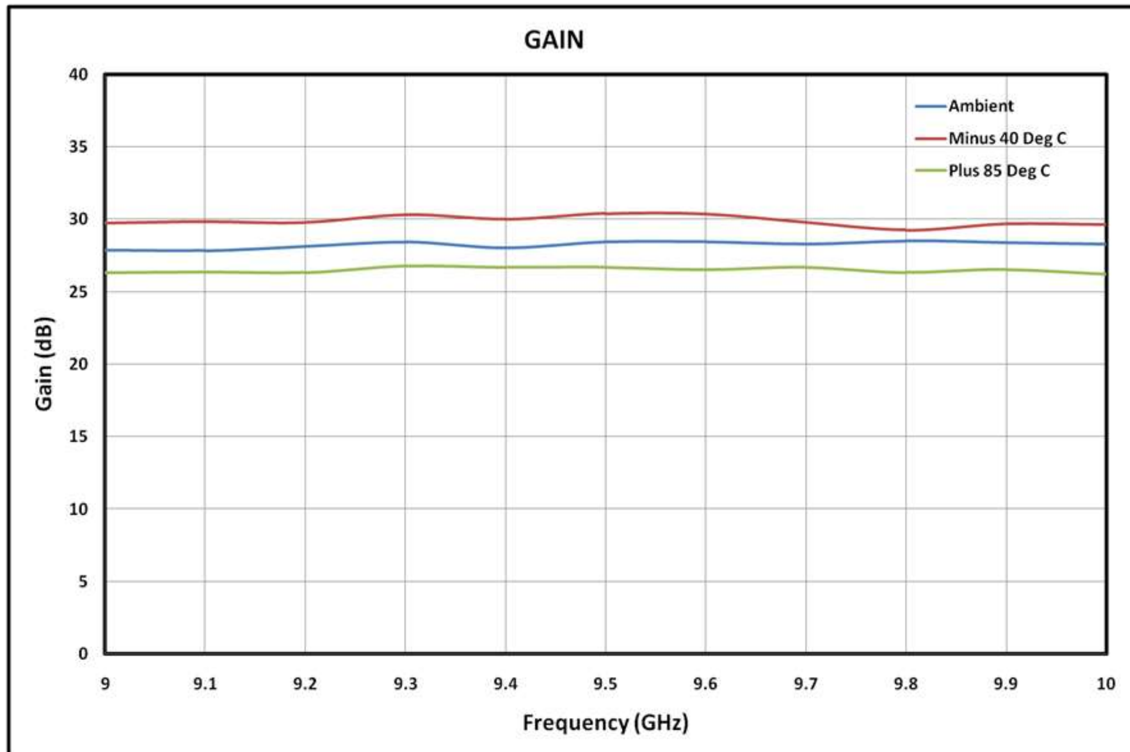
Parameter	Achieved (Typ.)	Units
Frequency	9-10	GHz
Gain	28	dB
Gain Flatness	+/-0.4	dB
Noise Figure	1.38	dB
Reverse Isolation	50	dB
Input Return loss	10	dB
Output Return loss	13	dB
Output Power at 1db compression	10	dBm
OIP3	20	dBm
Voltage (Vd1,Vd2,Vd3)	2	V
Current (Id)	65-90	mA

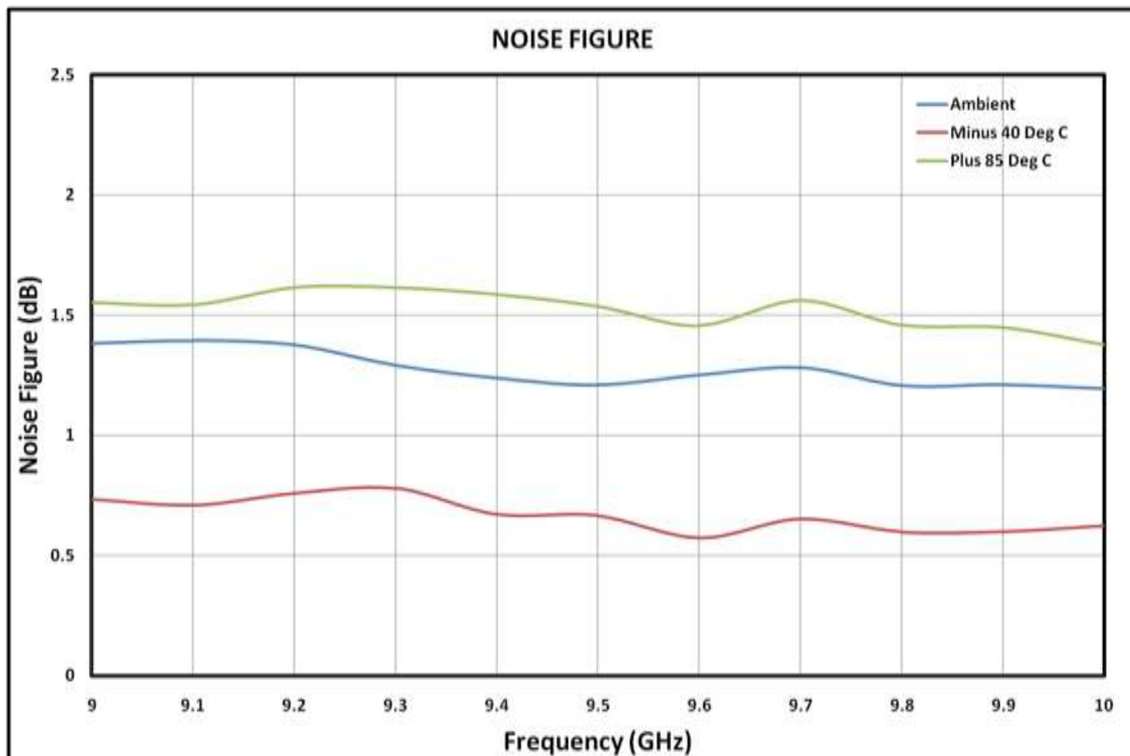
Note:

1. Electrical specifications as measured in a test fixture.
2. This is High Performance Device. Damage can be caused due to inappropriate handling.

Test fixture data

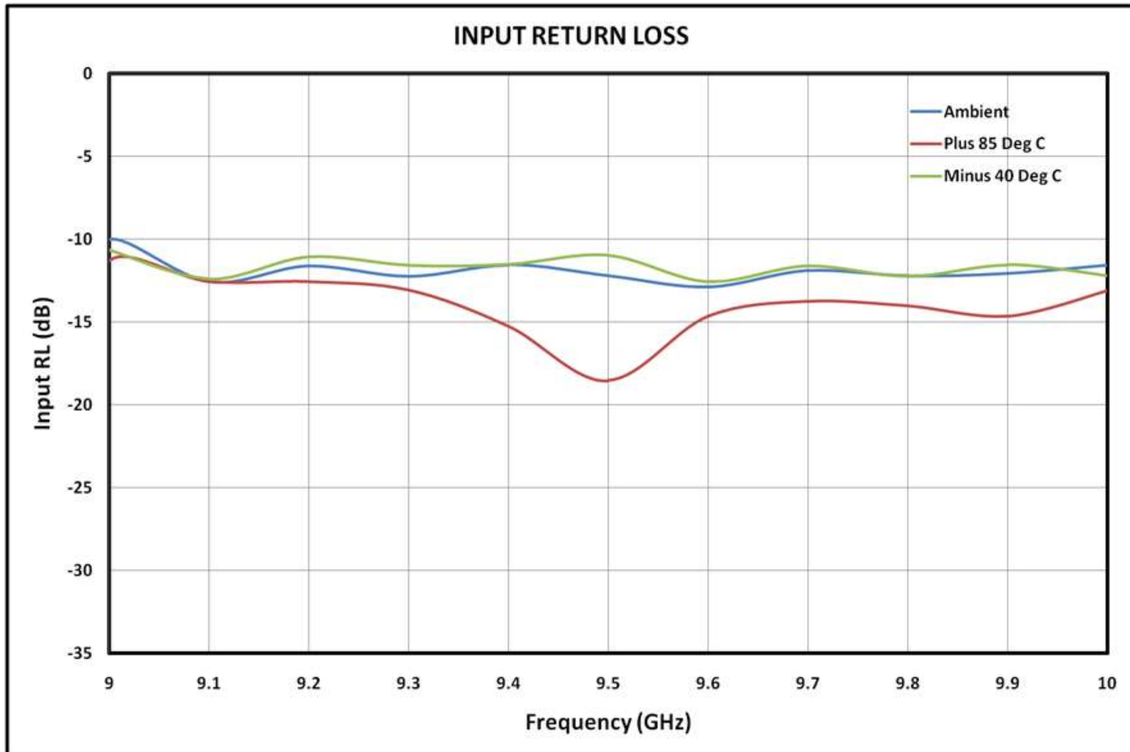
Vd1=2 V, Vd2=2 V, Vd3=2 V Total Current =90mA

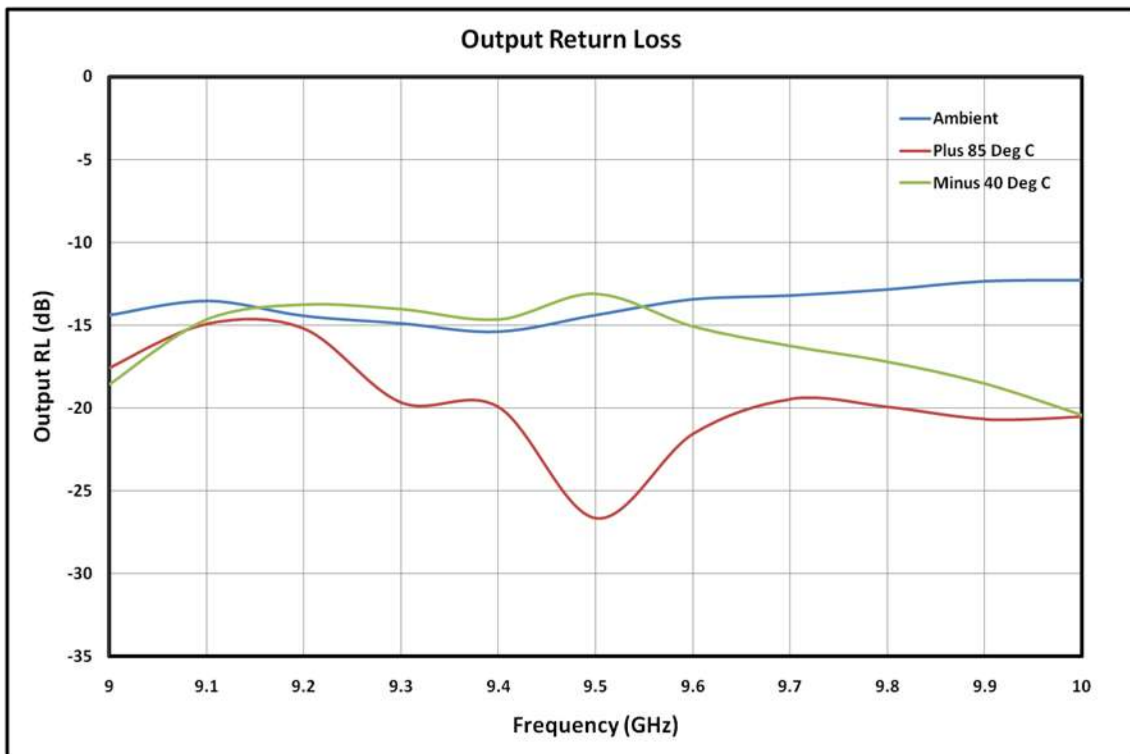




Test fixture data

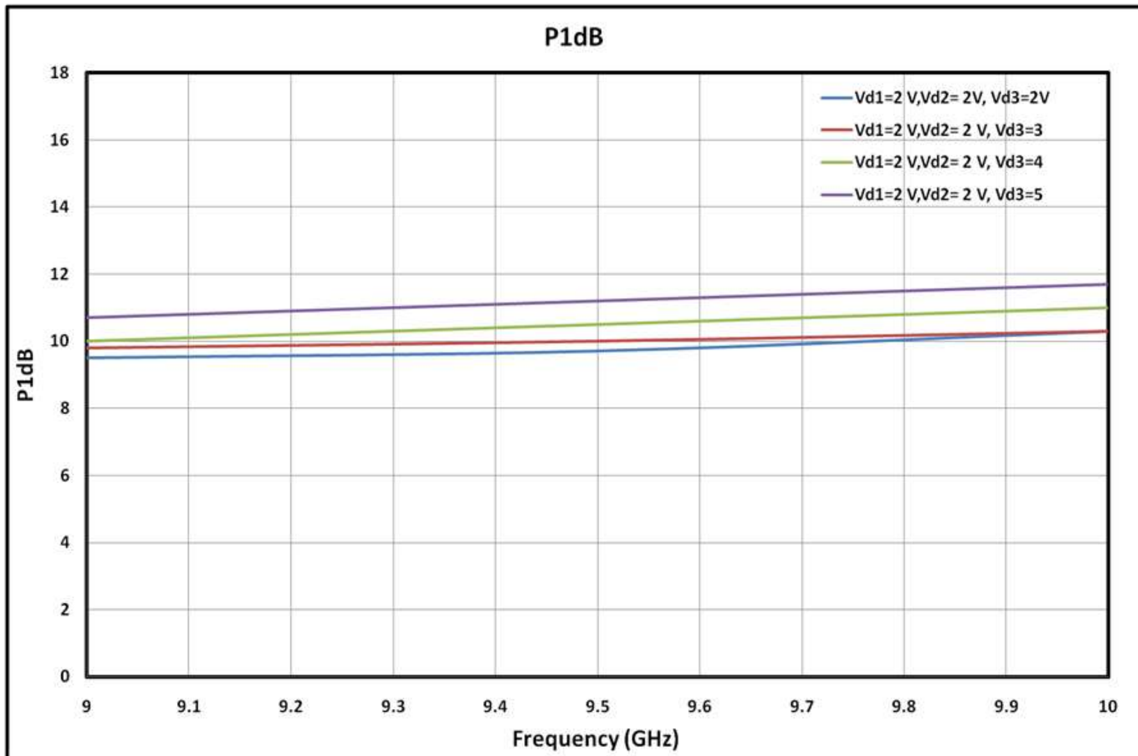
Vd1=2 V, Vd2=2V, Vd3=2 V Total Current =90mA

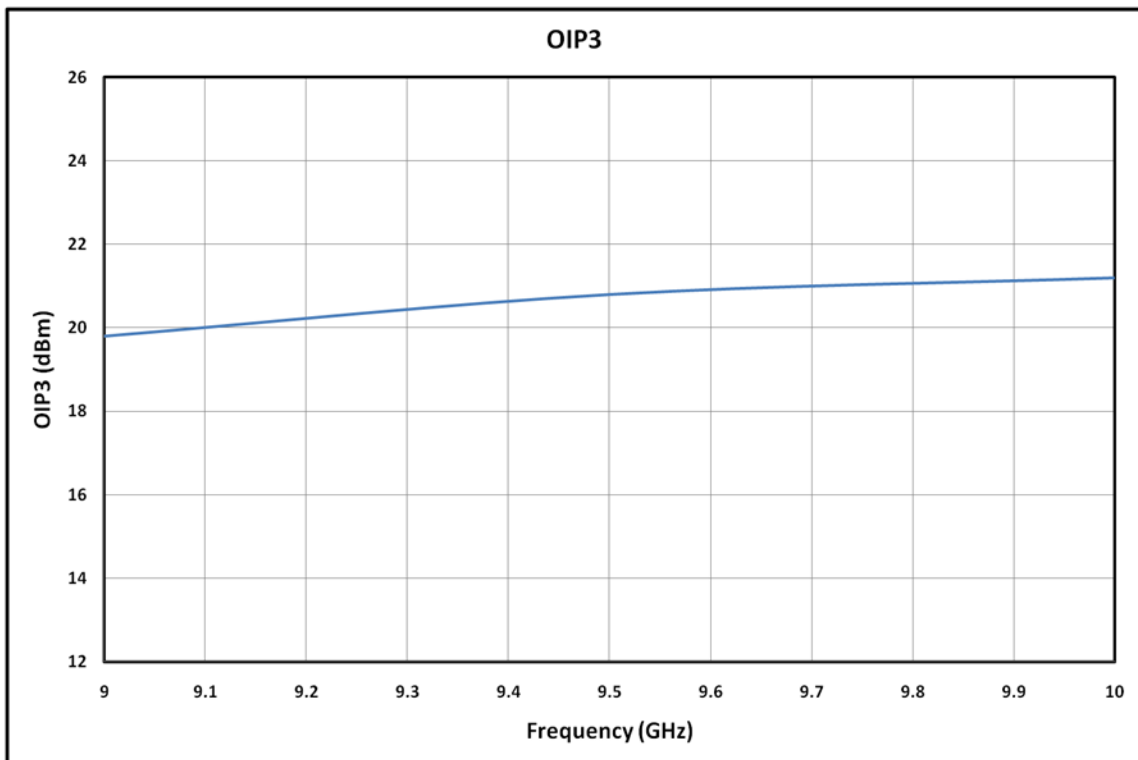




Test fixture data

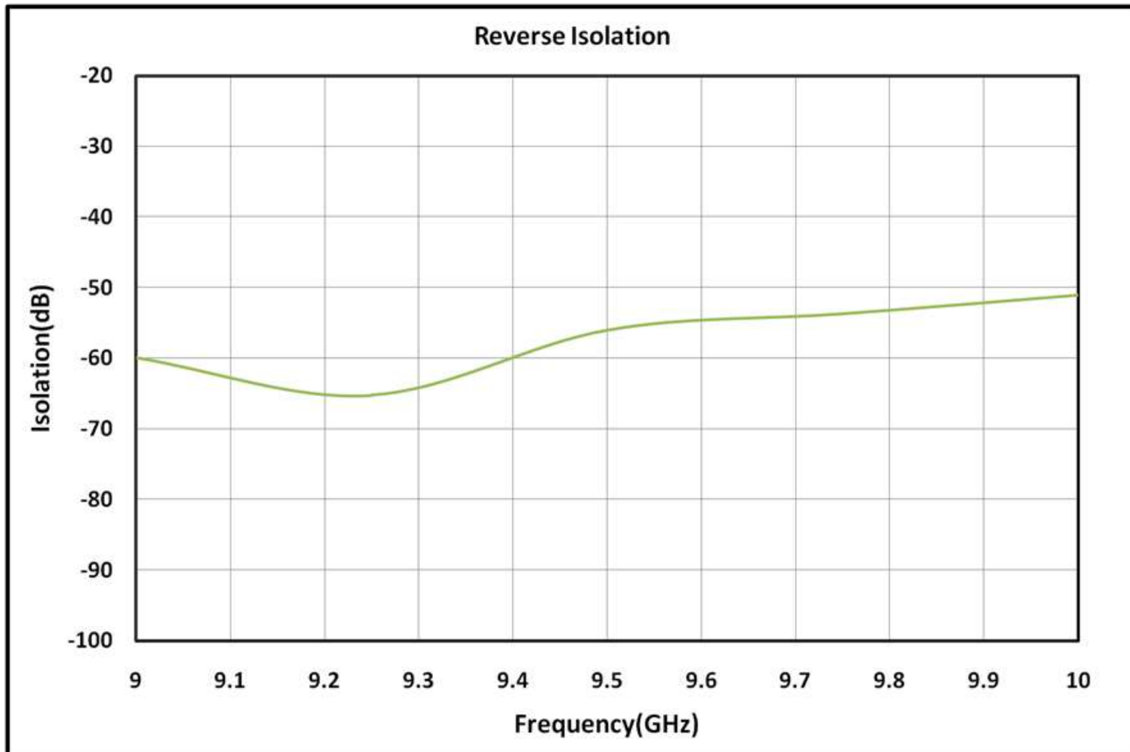
Total Current =90mA, $T_A = 25\,^oC$



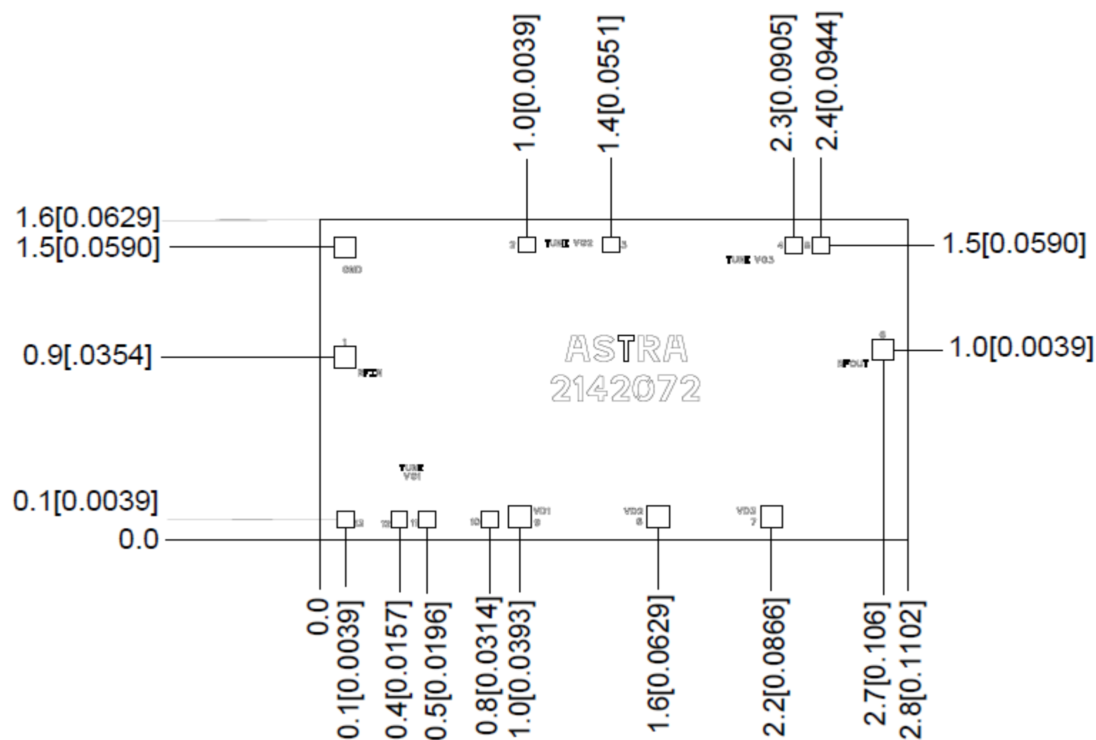


Test fixture data

Total Current =90mA, $T_A = 25\,^oC$



Mechanical Characteristics



Units: millimeters (inches)

All RF and DC bond pads are 100µm x 100µm unless specified

Note:

1. **Pad no. 1 : RF IN**
2. **Pad no. 2 & 3 : Tune Vg2 (Optional)**
3. **Pad no. 4 & 5 : Tune Vg3 (Optional)**
4. **Pad no. 6 : RF OUT**
5. **Pad no. 7 : VD3**
6. **Pad no. 8 : VD2**
7. **Pad no. 9 : VD1**
8. **Pad no. 10, 11& 12 : Tune Vg1 (Optional)**
9. **Pad no. 13 : GND**

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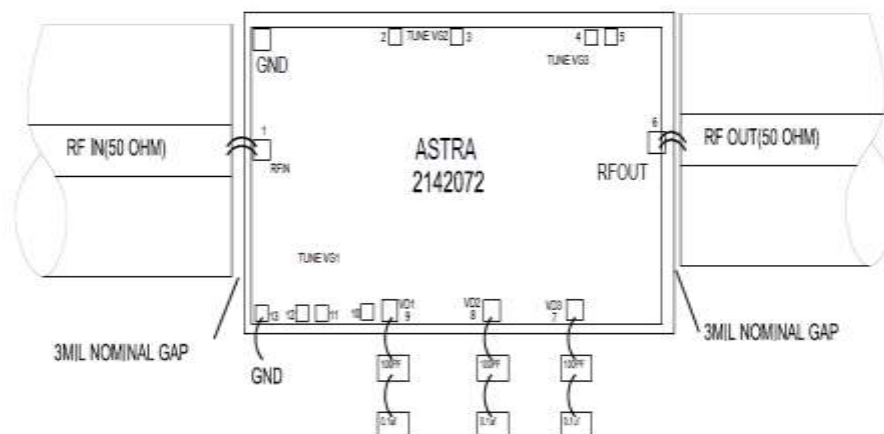
Recommended Assembly Diagram



Note:

1. *Pad No.: 13 need to be grounded.*
2. *All RF and DC pads are 100 X 100µm*
3. *Off Chip Components 100 pf for Vd1,Vd2,Vd3*
4. *Off chip components 0.1µf for Vd1,Vd2,Vd3*
5. Double 1 mil (0.0254 mm) bond wire of length 250um should be used for RF Input.
6. Double 1 mil (0.0254 mm) bond wire of length 250um should be used for RF Output.
7. Single 1 mil (0.0254 mm) bond wires of length 250um should be used for DC bias at VD1, VD2, and VD3.

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. Ball bonds are also acceptable.

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