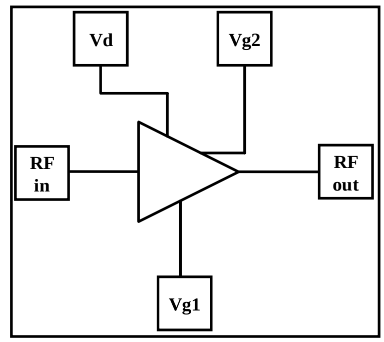
0.5-26 GHz Wideband Amplifier

Features

- **Frequency Range : 0.5 - 26.0GHz**
- **11dB Nominal gain**
- **Mid-band Noise Figure < 3dB**
- **Input Return Loss > 10 dB**
- **Output Return Loss > 13 dB**
- **DC decoupled input and output**
- **0.15 µm InGaAs pHEMT Technology**
- **Chip dimension: 3.0 x 1.2 x 0.1 mm**

Functional Diagram



Typical Applications

- **Wideband LNA/Gain block**
- **Electronic warfare**
- **Test Instrumentation**

Description

The AMT2175013 is a broadband pHEMT GaAs MMIC TWA designed to operate over 0.5 to 26 GHz frequency range. The design employs 4 cascode pHEMT cells in a distributed amplifier topology, to ensure larger bandwidth, flat gain and good return losses. The device offers a typical small signal gain of 11 dB over the operating frequency band and has a Noise figure less than 4.5 dB in 1-20GHz band. The Input & output are matched to 50Ω with a VSWR better than 1.7:1. The chip is unconditionally stable over the entire operating frequency range.

The AMT2175013 is suitable for a variety of wideband electronic warfare systems such as radar warning receivers, jammers and instrumentation. In addition, the chip may also be used as a gain block.

Absolute Maximum Ratings(1)

Parameter	Absolute Maximum	Units
Positive DC voltage	+8	V
RF input power	+16	dBm
Supply Current	150	mA
Storage Temperature	-55 to +150	^{o}C
Operating Temperature	-40 to +85	^{o}C

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

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Electrical Specifications [1] @ T_A = 25 °C, Zo =50Ω; Vd = 5.0V, Vg2 = 2.0V Vg1 =-0.28V

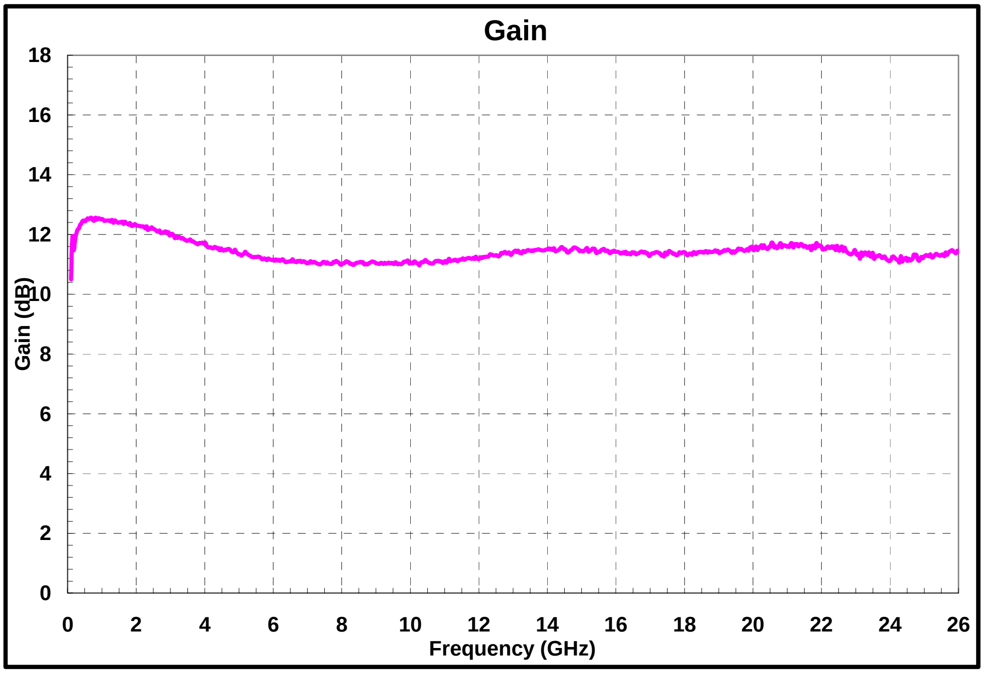
Parameter	Min.	Typ.	Max.	Units
Frequency Range	0.5	–	26.0	GHz
Gain	-	11	-	dB
Gain Flatness	–	± 0.75	–	dB
Noise Figure (mid-band)	-	2.5	-	dB
Input Return Loss	-	10	–	dB
Output Return Loss	-	12	–	dB
Output Power (P1 dB)	–	5	–	dBm
Third Order Intercept point	–	14	–	dBm
Supply Current[2]	–	46	65	mA

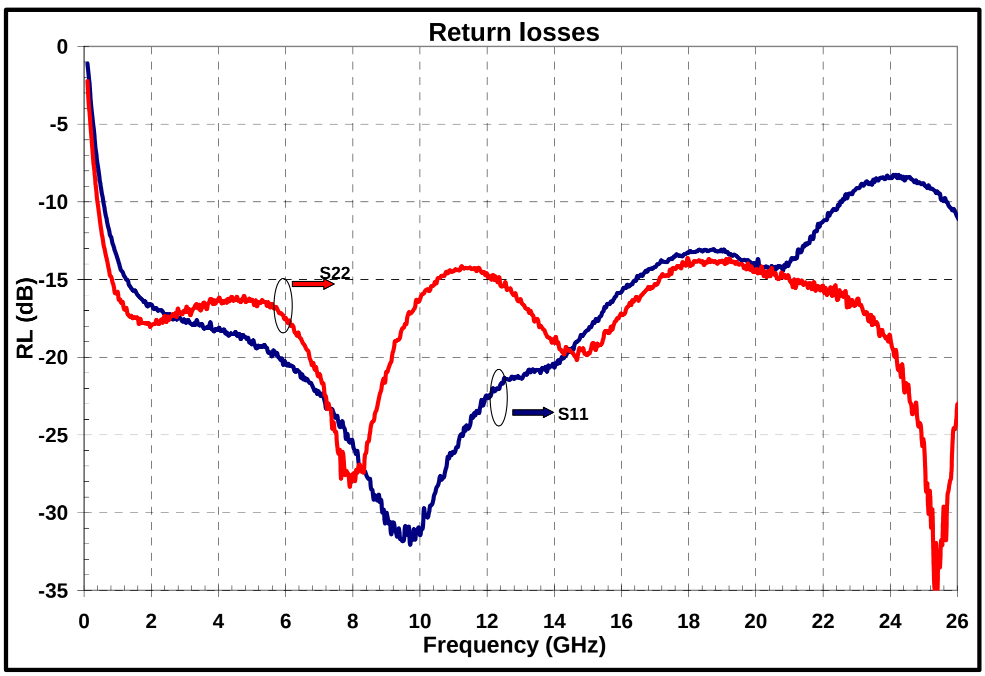
Note:

1. Electrical specifications mentioned above are measured in a test fixture.
2. For optimal performance, the gate voltage Vg1 should be tuned to achieve a drain current of 46 mA (typ.).
3. The negative gate supply (Vg1) can be tuned from 0V to -0.3V.
4. By varying the Vg1, the gain & current can be controlled to the user requirements.

Test fixture data

Vd= +5.0V, Vg2=+2.0V & Vg1 = -0.28V, Current =46 mA, $T_A = 25\,^{o}C$





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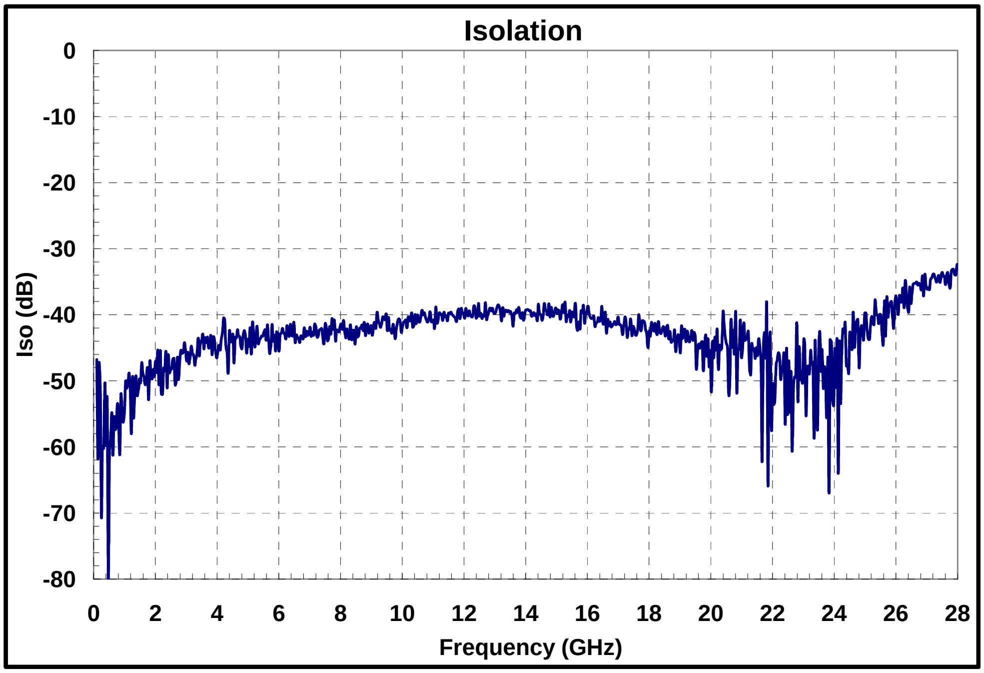

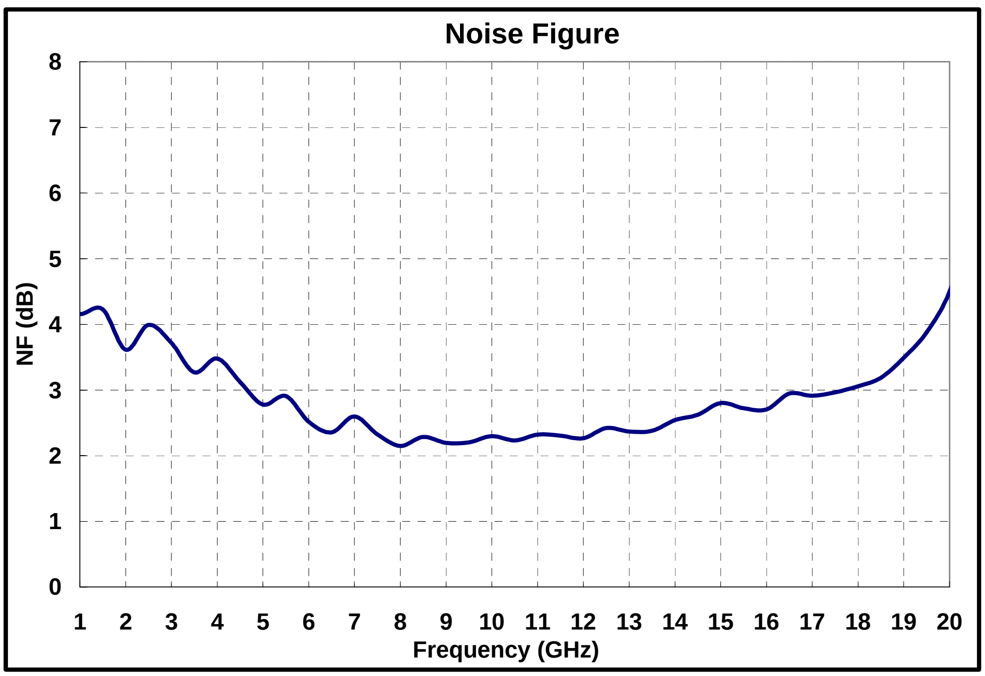

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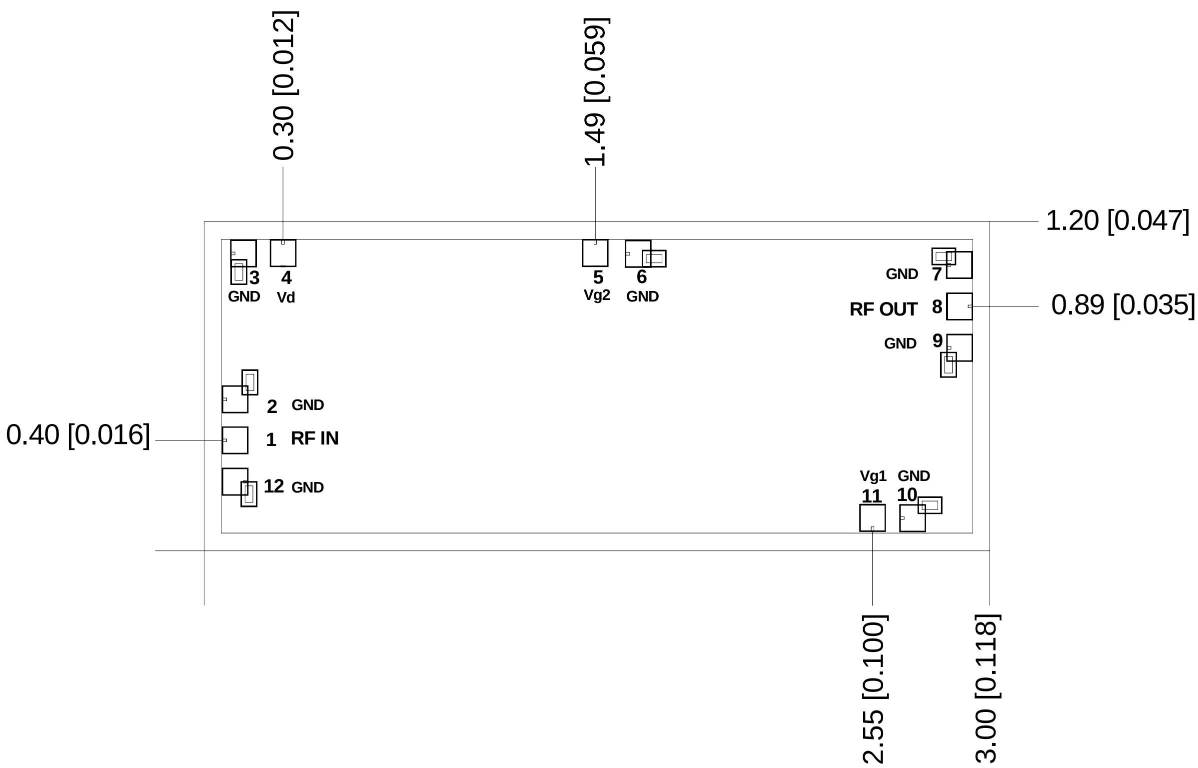
Mechanical Characteristics

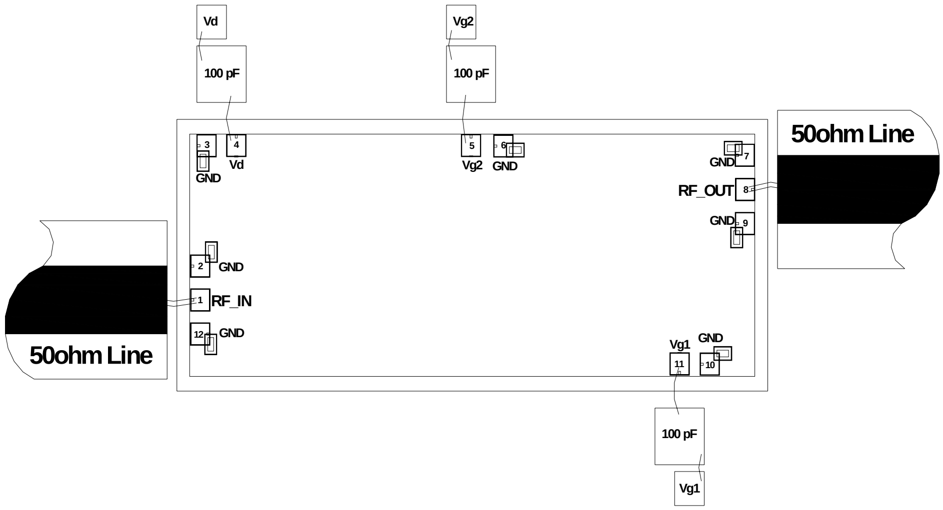


Units: millimeters (inches)

Note:

1. All RF and DC bond pads are 100µm x 100µm
2. Pad no. 1 : RF In
3. Pad no. 4 : Vd
4. Pad no. 5 : Vg2
5. Pad no. 8 : RF out
6. Pad no. 11 : Vg1

Recommended Assembly Diagram



Note:

1. Two 1 mil (0.0254mm) bond wires of minimum length should be used for RF input and output.
2. Input and output 50 ohm lines are on 5mil Alumina/RT Duroid substrate.
3. The supply voltages are Vd=5.0V, Vg2=+2.0V & Vg1=-0.28V.
4. 0.1 µF capacitors may be additionally used as a second level of bypass at the power supplies for reliable operation.

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

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