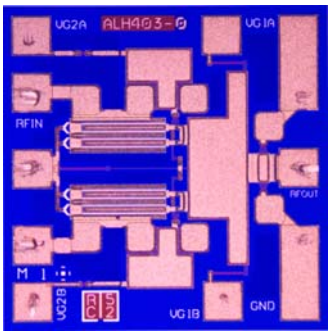
NORTHROP GRUMMAN

Velocium Products

ALH403
0.5 – 2 GHz Low Noise Amplifier

Product Datasheet **Discontinued 06/16/2006**

Revision: June 2006



X=900µm Y=900µm

Applications

- Base Station

Features

- Bandwidth: 0.5 to 2.0 GHz
- Linear Gain: 27 dB Typ.
- P1dB: 24 dBm
- Noise Figure: 1.5 dB
- Output IP3: 39 dBm
- Die Size: 0.81 sq. mm.
- DC Power: 5 VDC @ 0.180A

Product Description

The ALH403 monolithic HEMT is a narrow band, low noise device, designed for use in commercial digital microwave radios and wireless LANs. The small die size allows for extremely compact packaging. To ensure rugged and reliable operation, HEMT devices are fully passivated. Both bond pad and backside metallization are Ti/Au, which is compatible with conventional die attach, thermocompression and thermosonic wire bonding assembly techniques.

Performance Characteristics (Ta = 25°C)

Specification	Min	Typ	Max	Unit
3dB Bandw idth		2		GHz
Linear Gain		27		dB
P1dB		24		dBm
Noise Figure		1.5		dB
OIP3 (@ 1GHz)		39		dBm
Input Return Loss (@ 1 GHz)		-13		dB
Output Return Loss (@ 1 GHz)		-15		dB
Vd1		5		V
Vg1	-1		-0.3	V
Vg2		1.5		V
Id1		180		mA

Absolute Maximum Ratings (Ta = 25°C)

Parameter	Min	Max	Unit
Vd1		6	V
Id1		200	mA
Vg1	-2		V
Vg2		2	V
Input drive level		10	dBm
Operating Temperature	-40	85	deg. C
Storage Temperature	-65	150	deg. C
Assy. Temperature (60 seconds)		300	deg. C

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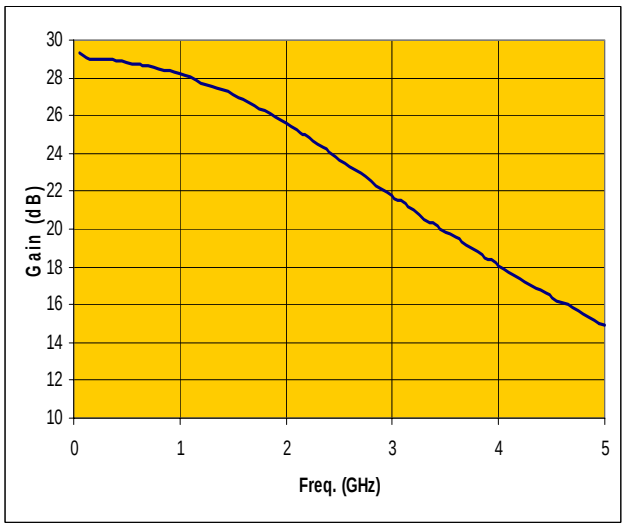
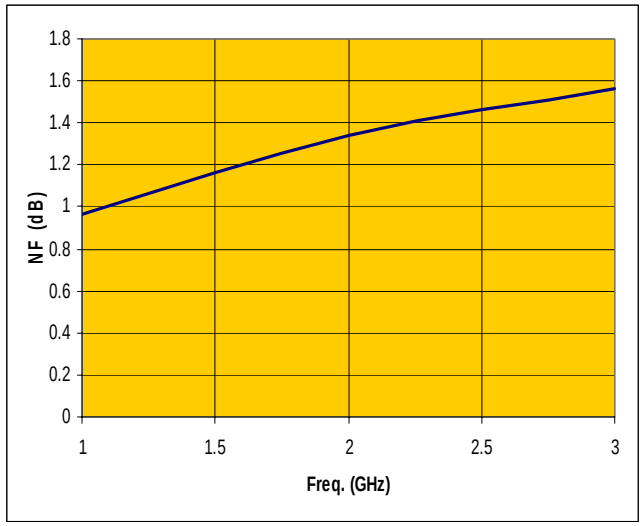
Measured Performance Characteristics (Typical Performance at 25°C)
Vd1 = 5V, Id = 180mA, VG2=1.5V, all data taken on wafer

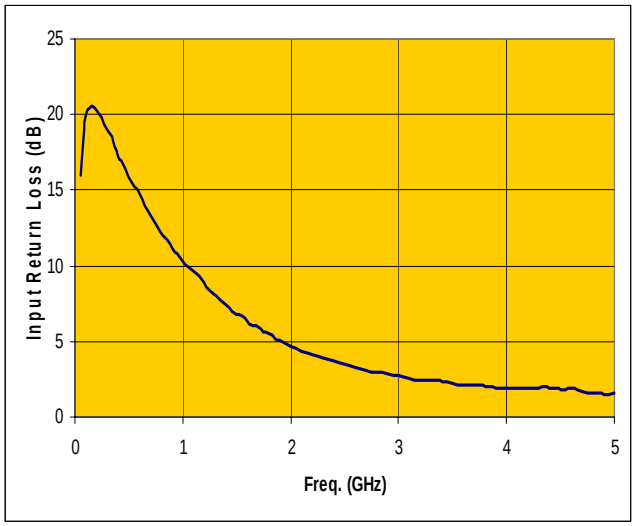
Linear Gain Versus Frequency



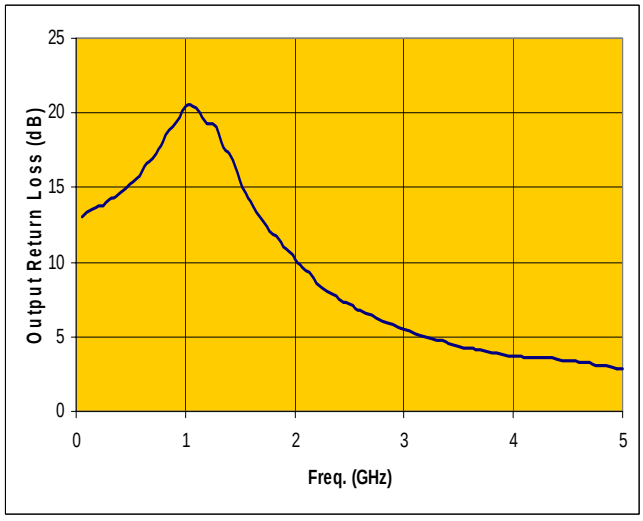
Noise Figure Versus Frequency



Input Return Loss Versus Frequency



Output Return Loss Versus Frequency



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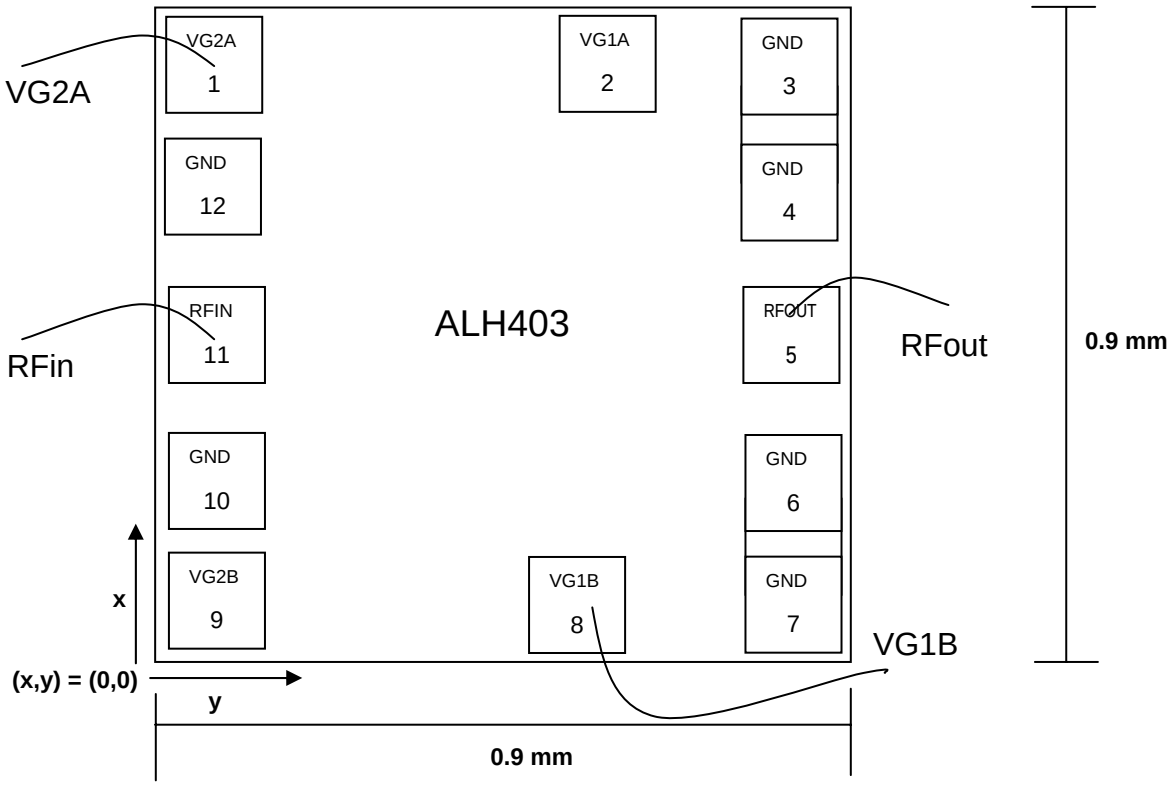
Pad Outline of ALH403



Pad Locations

Pad #	Coordinate (X, Y)	Description	Value
1	0.102 x 0.798	VG2A	1.0 V or 1.5V
2	0.598 x 0.798	VG1A	No Connection
3	0.798 x 0.798	GND	No Connection
4	0.798 x 0.652	GND	No Connection
5	0.798 x 0.450	RFOUT	
6	0.798 x 0.247	GND	No Connection
7	0.798 x 0.102	GND	No Connection
8	0.598 x 0.102	VG1B	–1 V DC to –0.3 V DC

(Continued on next page)

Pad Locations (Continued)

Pad #	Coordinate (X, Y)	Description	Value
9	0.102 x 0.102	VG2B	No Connection
10	0.102 x 0.250	GND	No Connection
11	0.102 x 0.450	RFIN	
12	0.102 x 0.650	GND	No Connection

Pad Size: 100µm x 100µm
Die Size: 0.9mm x 0.9mm
Die Thickness: 101.6µm

• Die is functional as long as one VG1 (either VG1A or VG1B) and one VG2 (either VG2A or VG2B) is biased and the others are not connected. This enables biasing the die on the most convenient sides for the application.

• All ground pads are grounded through vias to the backside metal, therefore no connection to the GND pad is required.

Recommended Chip Biasing

- Attach 470 pF DC blocking capacitor in series with RF input signal pad.
- Attach bias T network to RF output signal pad.
- The drain supply voltage, as measured on the RFout pad, should be set at 5V DC.
- It is important to install 100 pF shunt capacitors on both VG1A and VG2A gates, followed by 100 ohm series resistors, and 10,000 pF shunt chip capacitors. The 100 pF single layer ceramic capacitors should be installed as close as possible to the gates.

Device Operation

These devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

Device Power Up Instructions

1. Ground the device
2. Bring VG1 to -1V DC
3. Bring VG2 to +1.5V DC
4. Bring VD to +5V DC
5. Slowly increase VG1 until drain supply current reaches approximately 150 mA (VG1 voltage should not exceed -0.3V DC)

Device Power Down Instructions

1. Reverse the sequence identified above in steps 1 through 5.