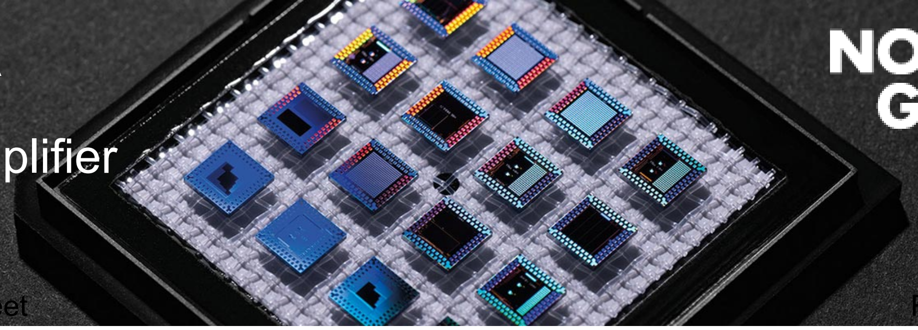
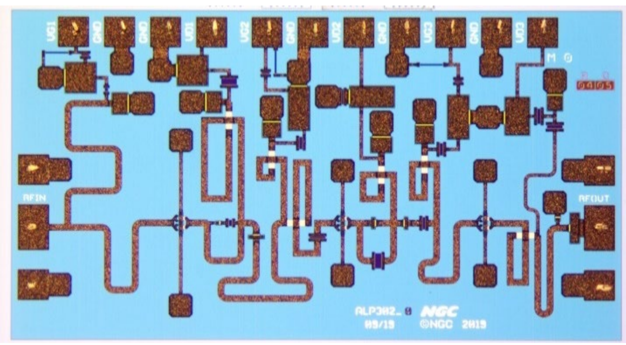
# ALP302_A
## 17- 21 GHz
## Low Noise Amplifier



Product Datasheet

Revision: May 2014



**X = 2.05mm  Y = 1.15mm**

## Product Features

- RF frequency:  17.2 – 21.2 GHz
- Linear gain:  32.5 dB, typical
- Noise Figure: 0.8 - 1 dB, typical
- 0.1 um InP HEMT Process
- 3 mil substrate
- DC Power: ~ 50.4 mW
- Die Size: 2.35 sq.mm

## Applications

- Point-to-Point Digital Radios
- Point-to-Multipoint Digital Radios
- SatCom Terminals

## Product Description

The ALP302 is a K-band low noise amplifier MMIC fabricated in 0.1um InP HEMT. This part is ideally suited for satellite communications. The MMIC operates from 17.2 to 21.2 GHz and provides 31.5 dB of gain with a noise figure of 0.8 dB. 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)**

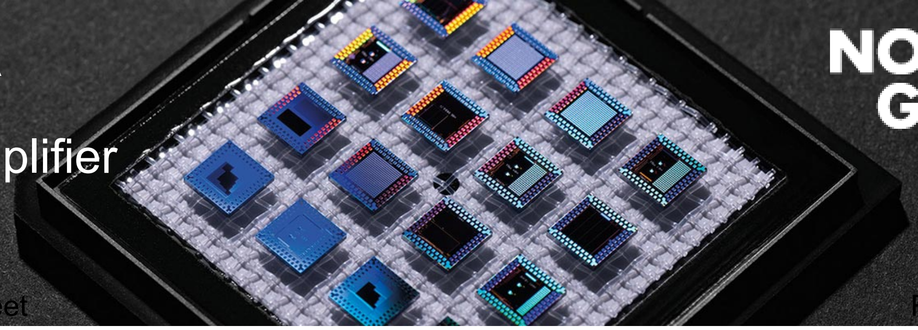
| Specification | Min | Typ | Max | Unit |
|---|---|---|---|---|
| Frequency | 17 | | 21.2 | GHz |
| Linear Gain | 31 | 32.5 | 34 | dB |
| Input Return Loss | -8.5 | | -2 | dB |
| Output Return Loss | -33 | | -13 | dB |
| Noise Figure | | 0.8 | 1 | dB |
| Noise Figure (Ave) | | | 1 | dB |
| Vd1, Vd2, Vd3 | | 1.4 | | V |
| Vg1, Vg2,Vg3 | | -0.5 | | V |
| Id1, Id2, Id3 | | 12 | | mA |

**Export Information**
ECCN: **5A991.h**
HTS (Schedule B) code: **8542.33.0001**



Web: http://www.as.northropgrumman.com/mps

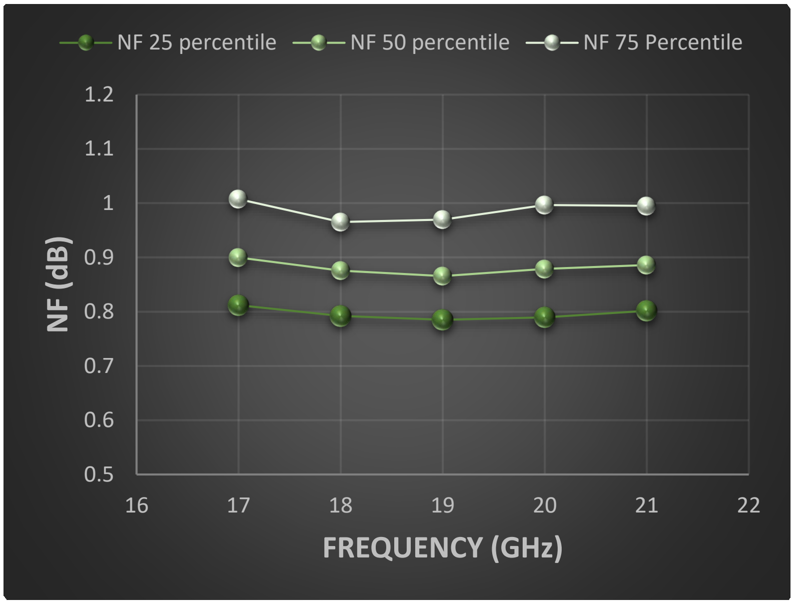
Phone: (310) 814-5000 • Fax: (310) 812-7011 • E-mail: as-mps.sales@ngc.com



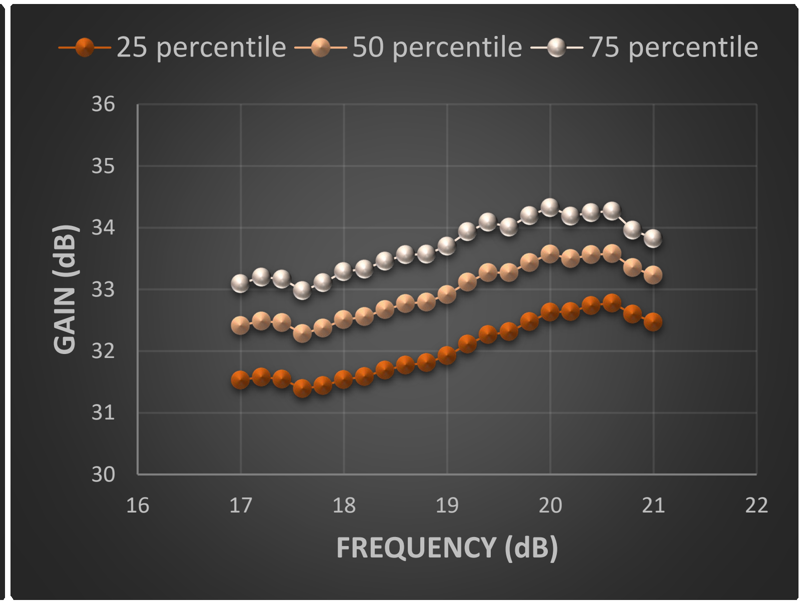


## Measured Performance Characteristics (Typical Performance at 25°C)
## Vd1, Vd2 = 1.4 V, Id1 = 12 mA, Id2 = 12 mA*

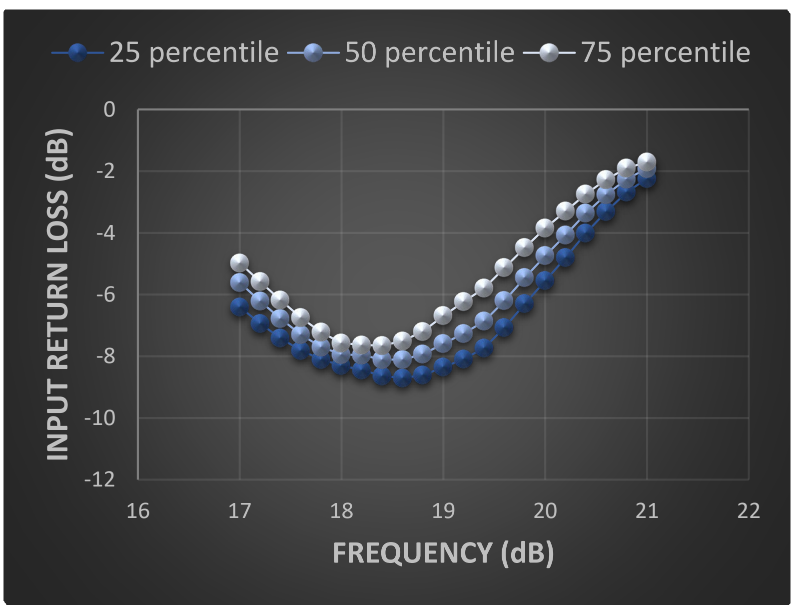
Noise Figure vs. Frequency



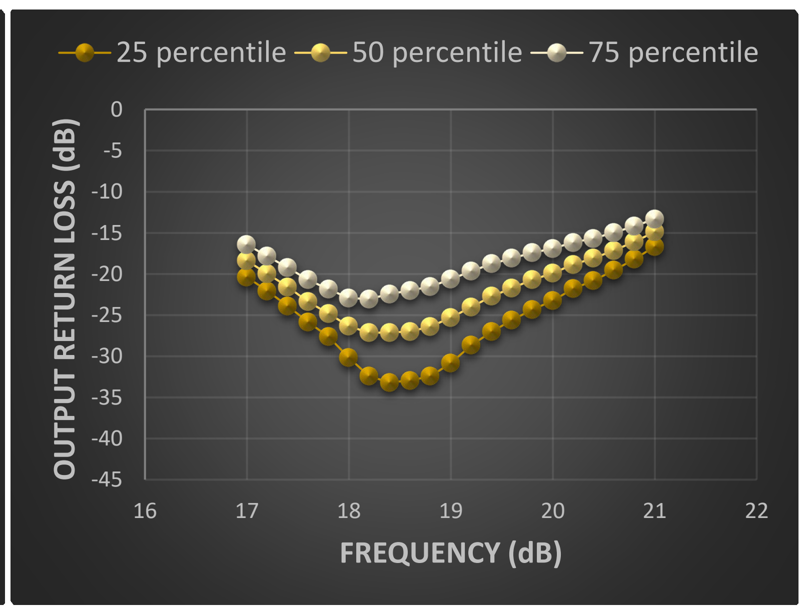

Linear Gain vs. Frequency




Input Return Loss vs. Frequency




Output Return Loss vs. Frequency




Data on wafer



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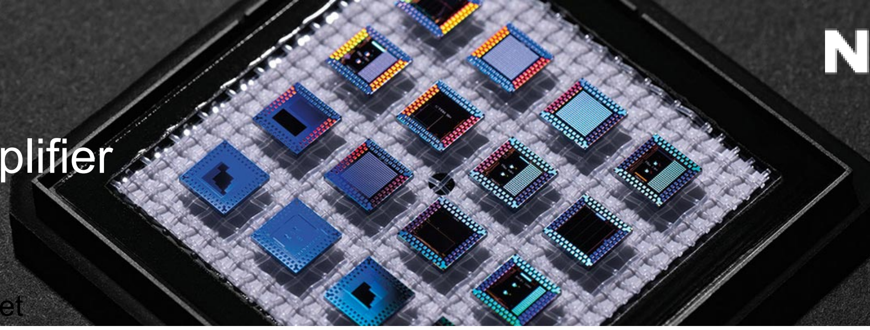
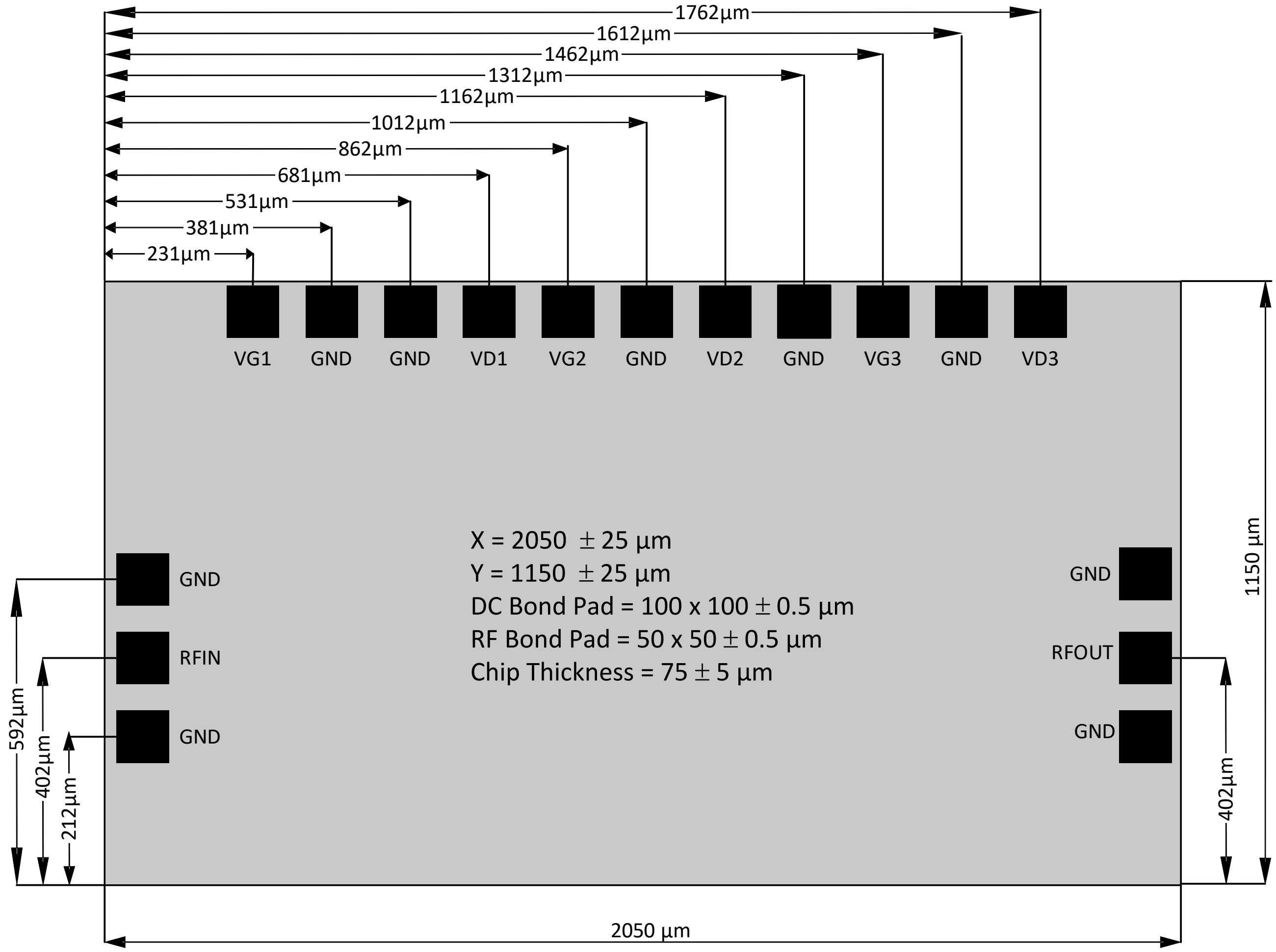




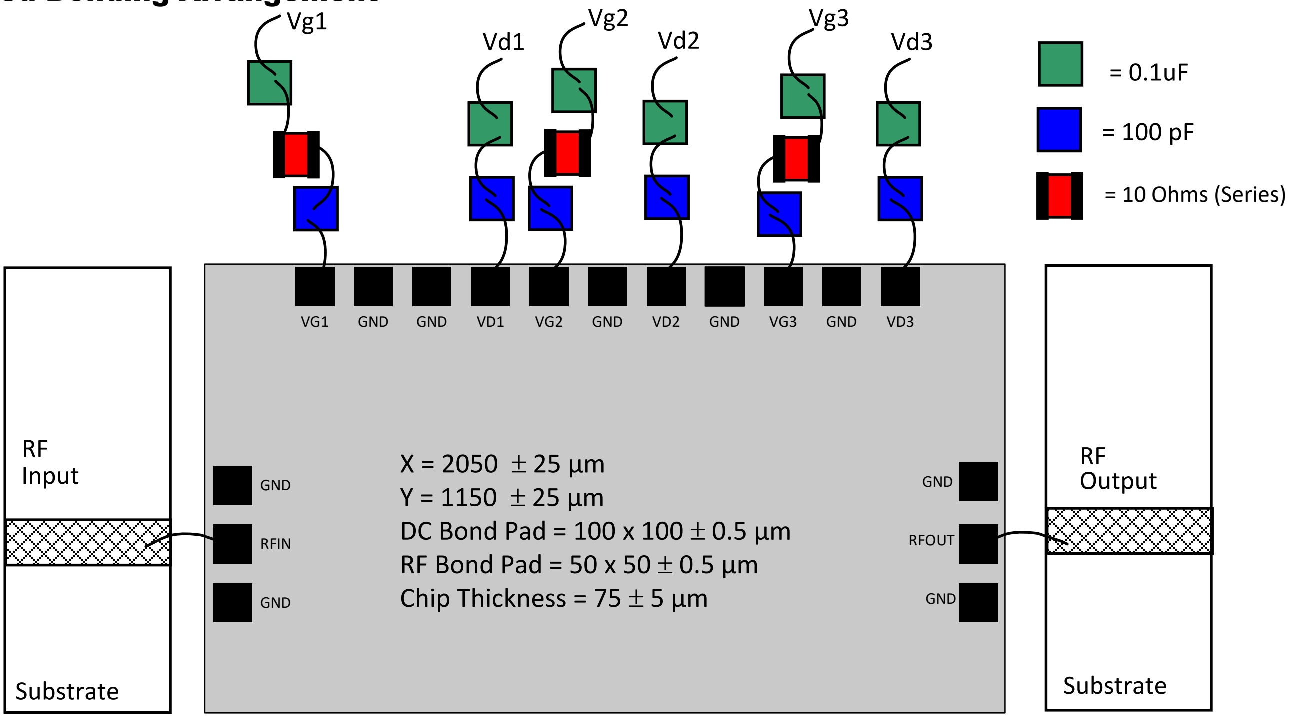
## Die Size and Bond Pad Locations (Not to Scale)




## Recommended Assembly Notes

1. Bypass caps should be 100 pF (approximately) ceramic (single-layer) placed no farther than 30 mils from the amplifier.
2. Best performance obtained from use of <6 mil (long) by 1.5 by 0.5 mil ribbons on input and output.

**Suggested Bonding Arrangement**




**Biasing/De-Biasing Details:**

Bias up sequence:

Set Vd1 & Vd2 & Vd3 = 0V
Set Vg1=Vg2 = Vg3 a to -0.3V and check to make sure there is no gate current. High gate current indicates leaky devices.
Increase Vd1 to +0.4V and check to make sure there are no oscillations.
If no oscillations are evident, increase Vd1 voltage to recommended value (1.4V).
Adjust Vg1 to realize the desired Id (12mA)
Repeat same steps for Vd2 & Vd3.
Set Vg2 to -0.3V and check to make sure there is no gate current .
Increase Vd2 to +0.4V and check to make sure there are no oscillations.
If no oscillations are evident, increase Vd2 voltage to recommended value (1.4V).
Adjust Vg2 to realize the desired Id (12mA)

Bias down sequence:

Reduce Vg2 down to -0.6V
Reduce Vg1=Vg1a down to -0.6V
Lower Vd2 to 0V
Lower Vd1 to 0V
Lower Vg1 and Vg2 to 0V