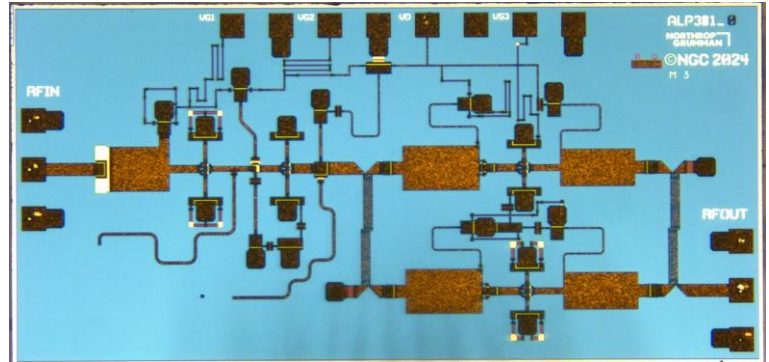


ALP381

40 – 60 GHz InP Low Noise Amplifier

PRODUCT DESCRIPTION

The ALP381 V-band InP HEMT Low Noise Amplifier is a 2-Stage, broadband, ultra low noise amplifier MMIC. It can be used in applications such as V-band microwave Links and SatCom terminals. The chip uses a self-biased architecture for single supply operation. 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.



X= 3.10 mm; Y= 1.50 mm

APPLICATIONS

- 5G Wireless
- Internet of Things (IoT)
- SatCom Terminals

PRODUCT FEATURES

- RF frequency: 40-60 GHz
- Broadband Operation
- Linear gain: 23.5 dB, typical
- Gain Flatness: 3 dB typical
- Noise Figure: 2 dB, typical
- PIdB : 6 dBm (Est.)
- Microstrip Topology MMIC, In-line Input & Output
- Die Size 4.65 sq. mm
- 0.1 um InP HEMT Process
- 3 mil substrate
- DC Power: < 35 mW



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ALP381

40 – 60 GHz

InP Low Noise Amplifier



ABSOLUTE MAXIMUM RATINGS

Parameter	Value	Unit
Drain Voltage	5	V
Drain Current	31	mA

RECOMMENDED OPERATING CONDITIONS

Parameter	Value	Unit
Drain Voltage Range	4.3	V
Vd Drain Current	26	mA

ELECTRICAL SPECIFICATIONS

Parameter	Min	Typical	Max	Unit
Operational Frequency	40		60	GHz
Small Signal S-Parameters				
Small Signal Linear Gain	22	23.5		dB
Gain Flatness		3		dB
Input Return Loss		-7	-3	dB
Output Return Loss		-15	-12	dB
Noise Figure				
Operational Frequency	40		60	GHz
Noise Figure		2	3	dB

ALP381

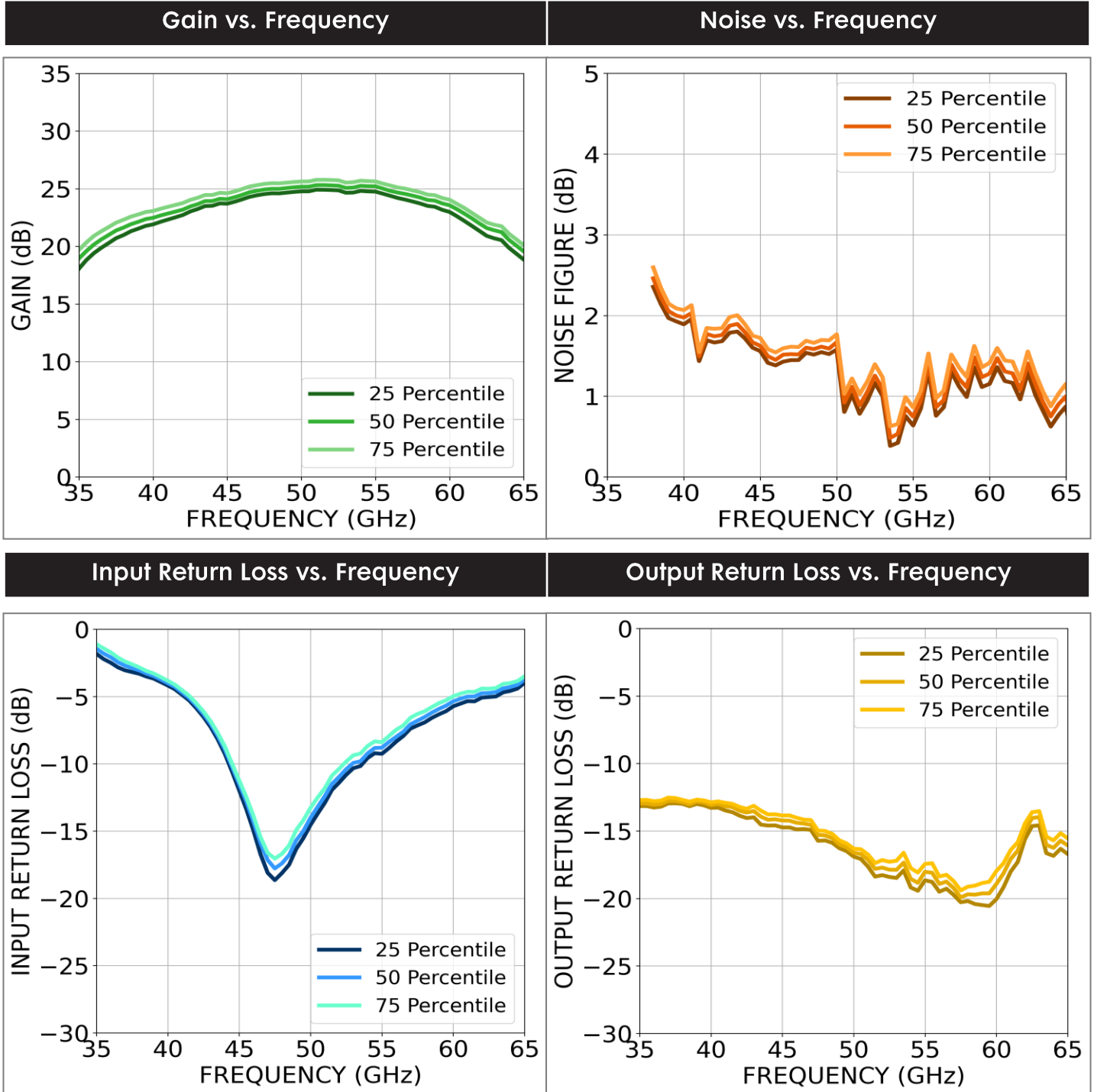
40 – 60 GHz

InP Low Noise Amplifier



Pulsed On wafer measured Performance Characteristics (Typical Performance at 25°C)

$V_d = 4.3 \text{ V}$, $I_d = \sim 26 \text{ mA}$



ALP381

40 – 60 GHz InP Low Noise Amplifier



DIE SIZE AND BOND PAD LOCATIONS

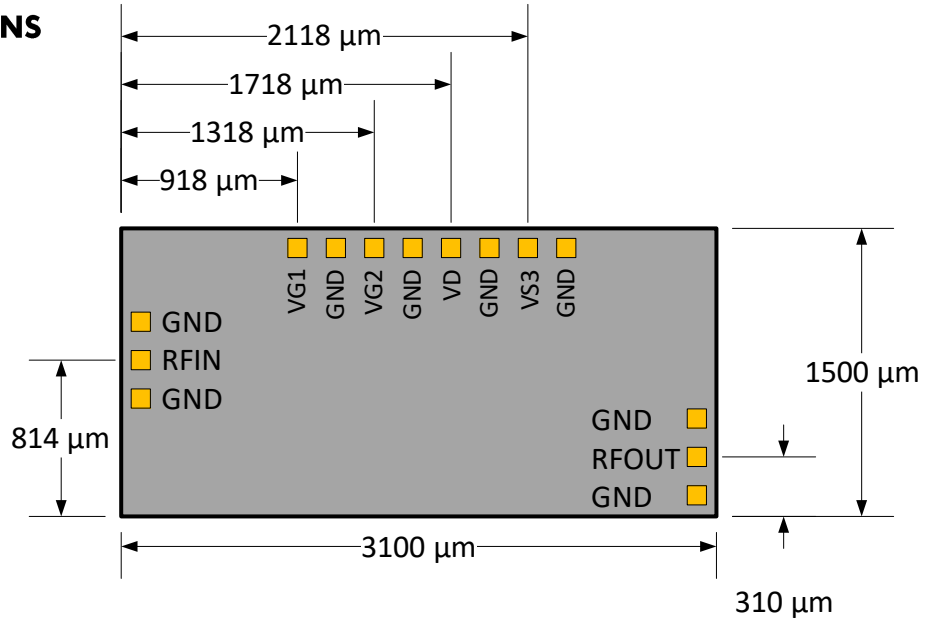
X = 3100 μm \pm 25 μm

Y = 1500 \pm 25 μm

DC Bond Pad = 100 x 100 \pm 0.5 μm

RF Bond Pad = 100 x 100 \pm 0.5 μm

Chip Thickness = 75 \pm 5 μm



BIASING/DE-BIASING DETAILS:

Bias up sequence:

- Set all drain voltages to 0V
- Increase VD to +0.4V and check to make sure there are no oscillations.
- If no oscillations are evident, increase VD voltage to recommended value (4.3V).

Bias down sequence:

- Set VD = 0 V

ALP381

40 – 60 GHz

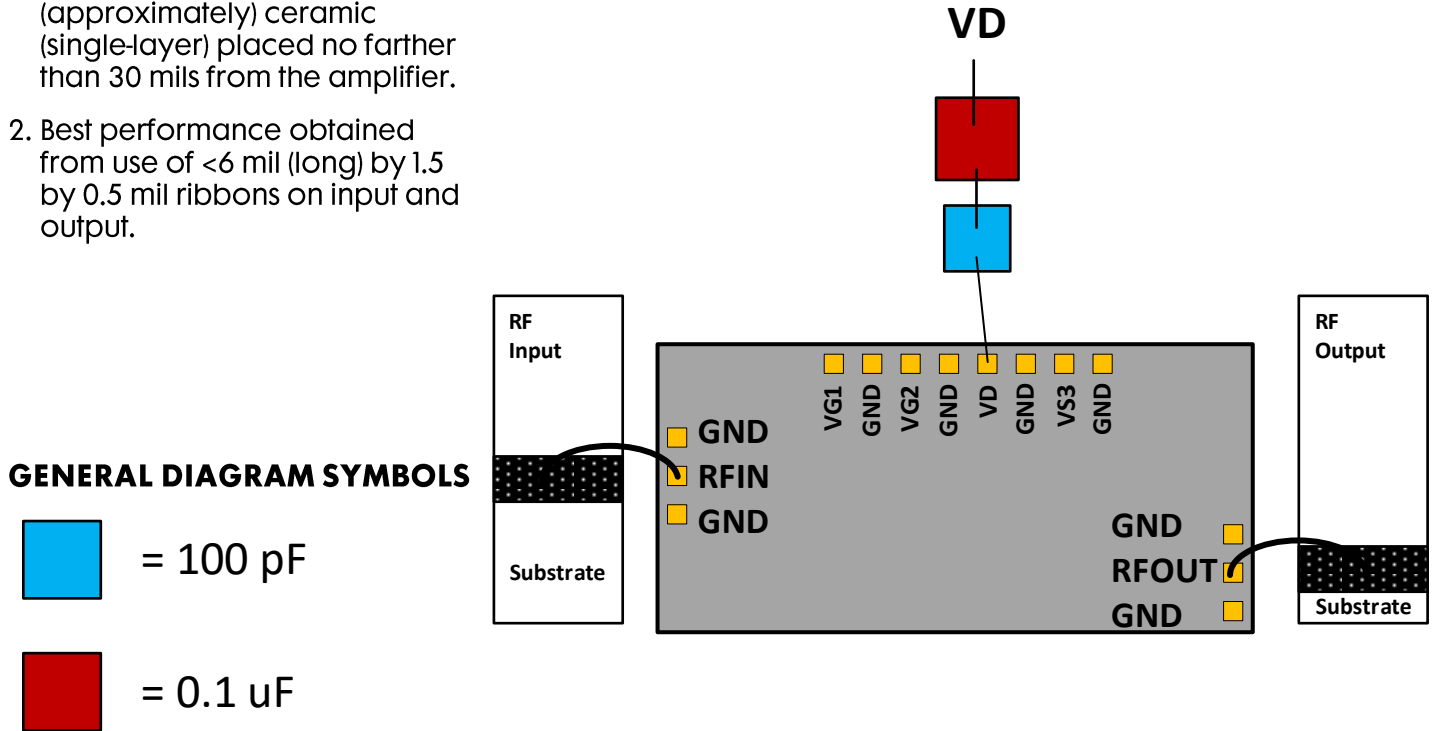
InP Low Noise Amplifier



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



MOUNTING PROCESSES

Most NG InP IC chips have a gold backing and can be mounted successfully using either a conductive epoxy or AuSn attachment. NG recommends the use of conductive epoxy due to the reduced mechanical strain placed on the chip. The two most important factors when mounting these MMICs are to provide a good thermal path and a good RF path to ground. This should be considered when determining the method for attachment.

Note: Many of the NG parts do incorporate airbridges, so caution should be used when determining the pick up tool.

CAUTION: THE IMPROPER USE OF AuSn ATTACHMENT CAN CATASTROPHICALLY DAMAGE InP CHIPS.

PLEASE ALSO REFER TO OUR "GaAs & InP Chip Handling Application Note" BEFORE HANDLING, ASSEMBLING OR BIASING THESE MMICs!

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