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Advance Information

CGY2222UH/C2

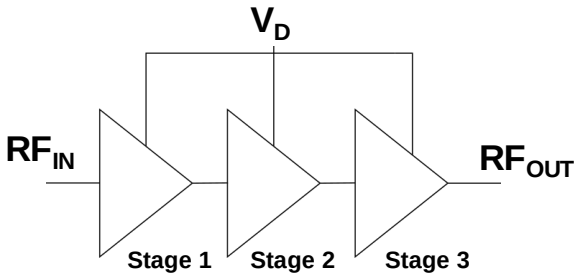
6 – 12.5 GHz 1.5 dB NF Low Noise Amplifier

Description

This X-Band LNA is a high-performance GaN Low Noise Amplifier MMIC designed to operate in the X-band.

The X-Band LNA has 1.5 dB of noise figure and 20 dB of output forward gain.

The performances of the X-Band LNA make it well suited to be used in Radar, Military and Space applications.
This technology is being evaluated for space applications.



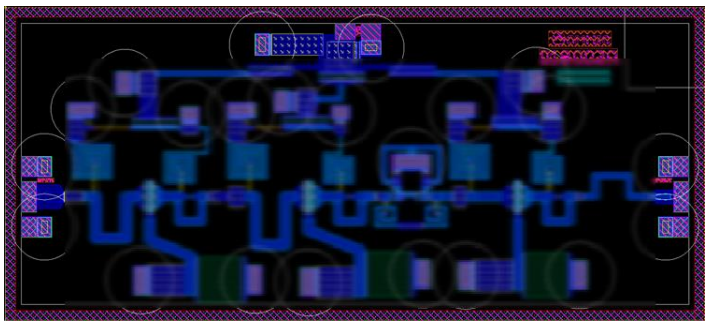
X-Band LNA Power Amplifier block diagram

Application

- Radar
- Spatial
- Military

Features

- Operating Range: 6 GHz to 12.5 GHz
- Gain: 20 dB
- Flatness: +/- 0.6 dB
- NF < 1.5 dB
- Pin_{max} > 27/40 dBm (CW/pulsed)
- Power Consumption:
  - V_D = 8 V
  - I_{Qtot} = 160 mA
- Chip size = 1.56 x 3.5 mm²
- 50 Ohms input and output matched



X-Band LNA die view

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MAXIMUM VALUES

Symbol	Parameter	Conditions	MIN.	MAX.	UNIT
V_G	Gate Voltage				V
V_D	Drain Voltage				V
I_D	Drain Current				mA
P_{IN}	RF Input Power			+ 40 (pulsed)	dBm
T_{amb}	Ambient temperature				° C
T_j	Junction temperature				° C
T_{stg}	Storage temperature				° C

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	UNIT
Rth_{amb}	Thermal Resistance at ambient temperature (+ 20 °C)	35.26	° C/W
$Rth_{60°C}$	Thermal Resistance at 85 °C	46.54	° C/W

ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	MIN.	TYP.	MAX.	UNIT
RF_{IN}	Input Frequency		6		12.5	GHz
V_D	Drain Supply Voltage			8		V
I_D	Total supply current @Psat	Drain Voltage 8 V		160		mA
G	Gain			20		dB
NF	Noise Figure				1.5	dB
OIP3	Output Third Order Intercept Point			TBD		dBm
S_{11}	Input Reflexion Coefficient	50 Ohms		- 11		dB
S_{22}	Output Reflexion Coefficient	50 Ohms		- 16		dB

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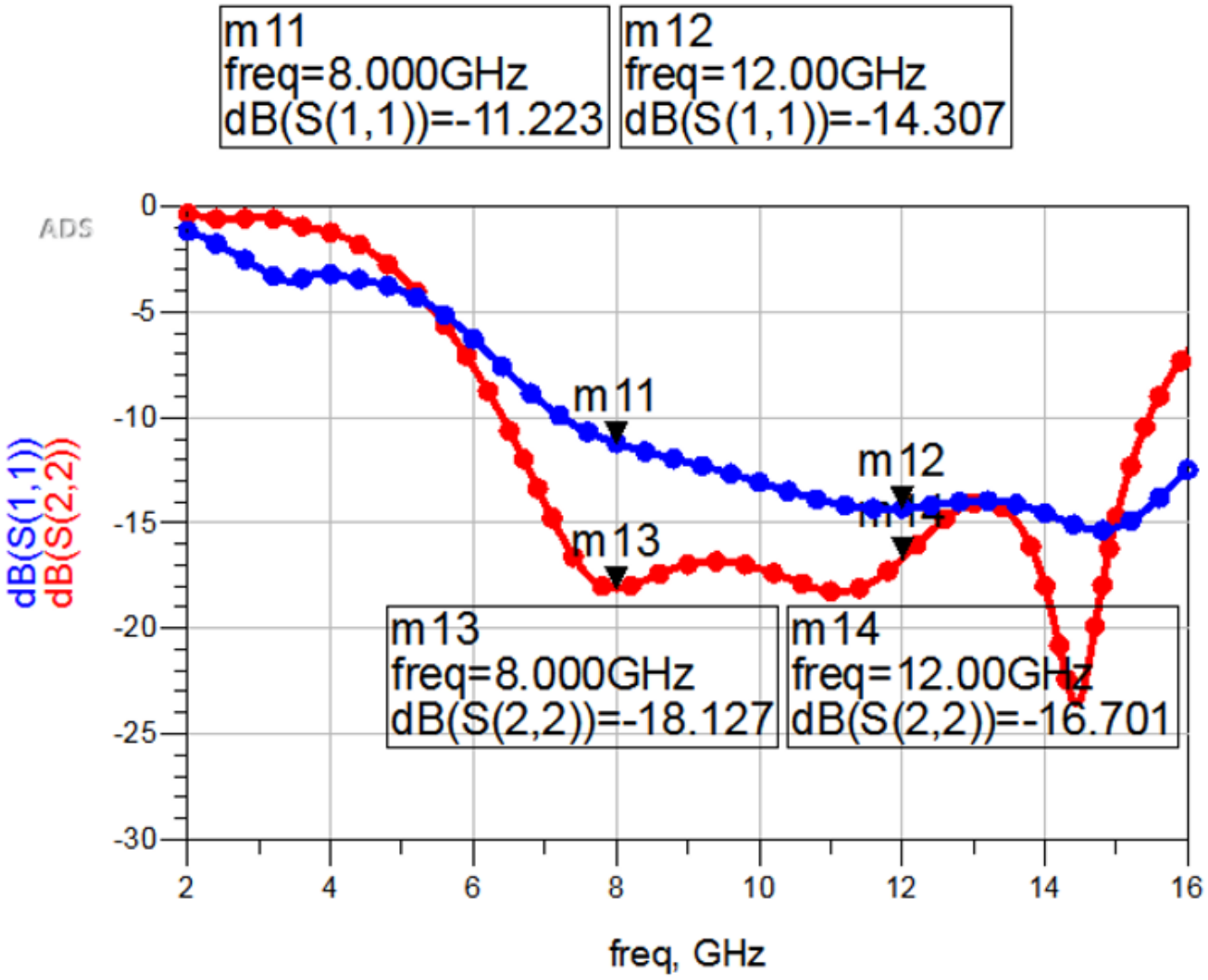
SIMULATIONS

Conditions: T_{amb} = + 25°C.
$V_{D1} = V_{D2} = V_{D3}$ = 12 V; I_{D1} = 250 mA; I_{D2} = 500 mA; I_{D3} = 1000 mA

- **S-PARAMETERS**



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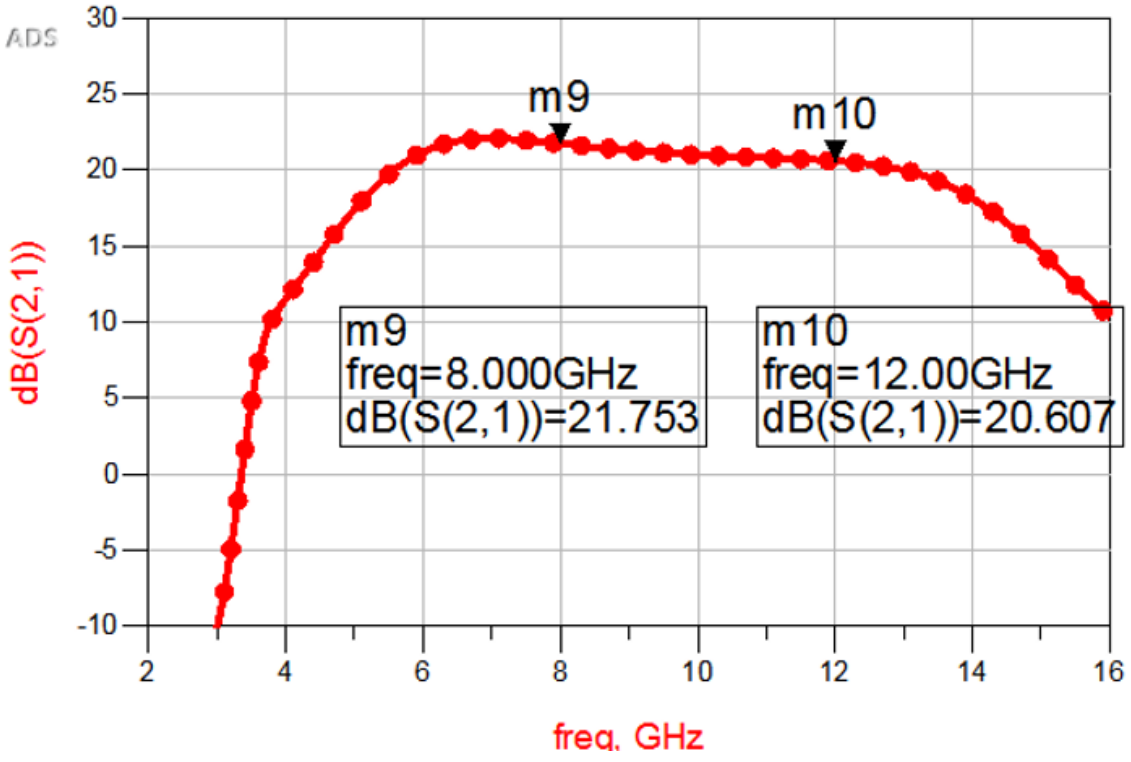
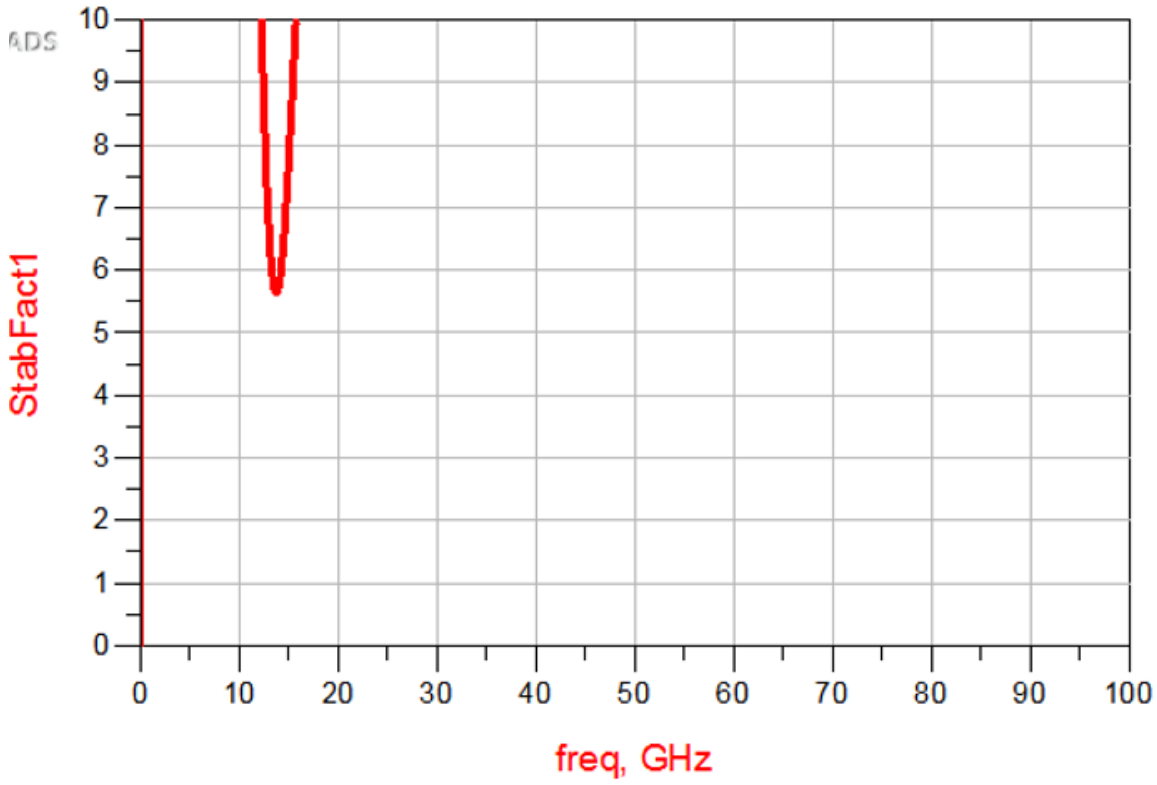
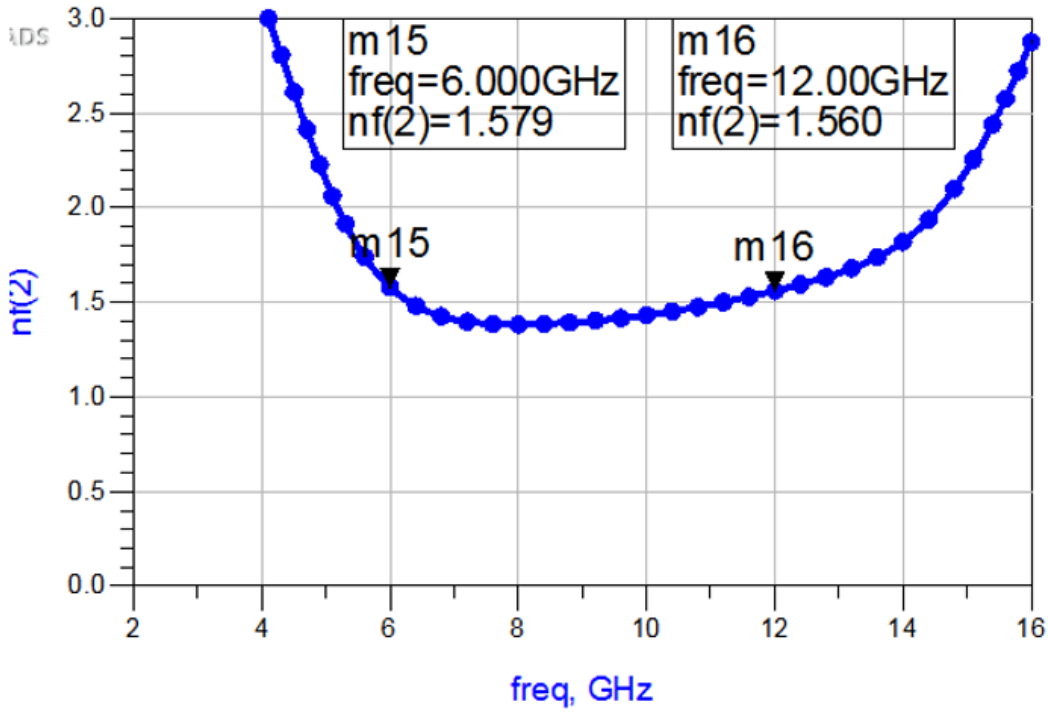
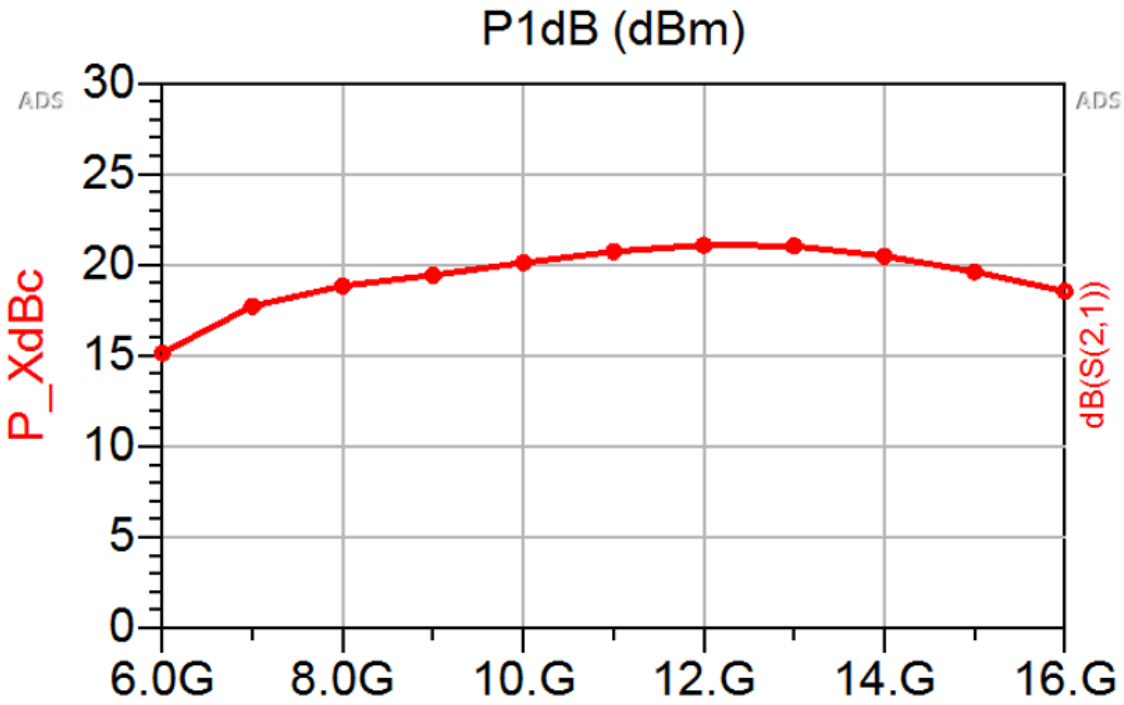

ADS
m9
m10
m9
freq=8.000GHz
dB(S(2,1))=21.753
m10
freq=12.00GHz
dB(S(2,1))=20.607
dB(S(2,1))
freq, GHz


ADS
StabFact1
freq, GHz



- **Power (P1dB)**



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APPLICATION SCHEMATIC

Decoupling scheme depends on customer implementation, in order to prevent unstability it is hightly recommended to place a 47pF RF decoupling chip capacitor at each DC terminal with the shortest possible bonding wires. Additionnaly, a 10nF chip capacitor can be added on the drain.

The decoupling network depends on supply, on grounding environement, on form factor, on all parasitics added by the customer environement. According to this, the appropriate network sometimes need to be fine-tuned in accordance with rules applyable in the high frequency domain.

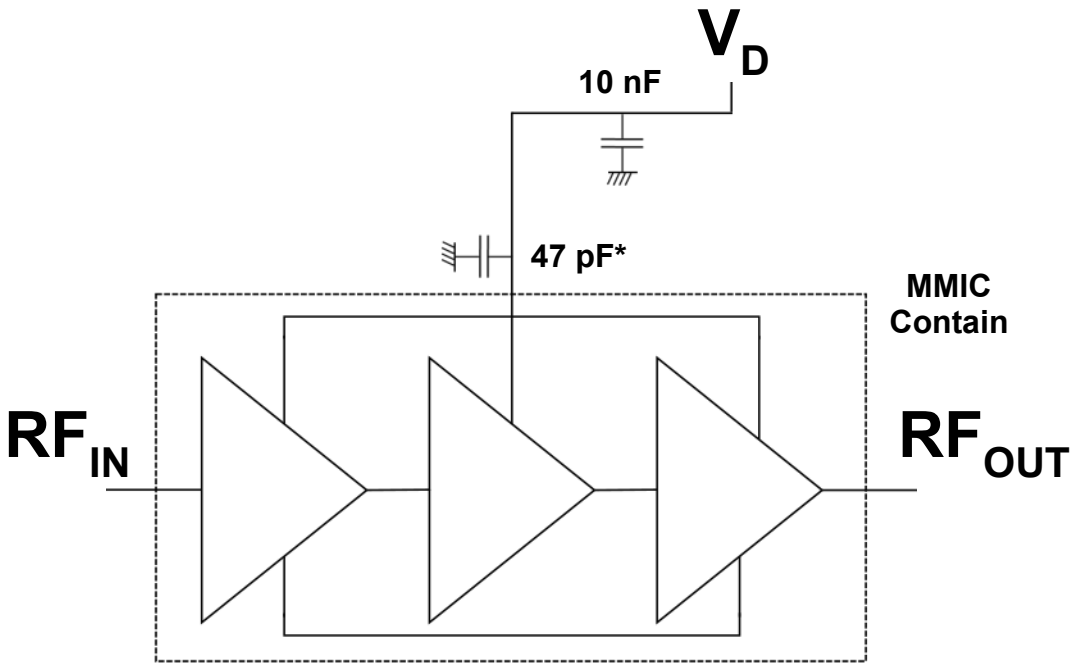

Figure 1 : X-Band LNA Application Schematic

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PAD LAYOUT

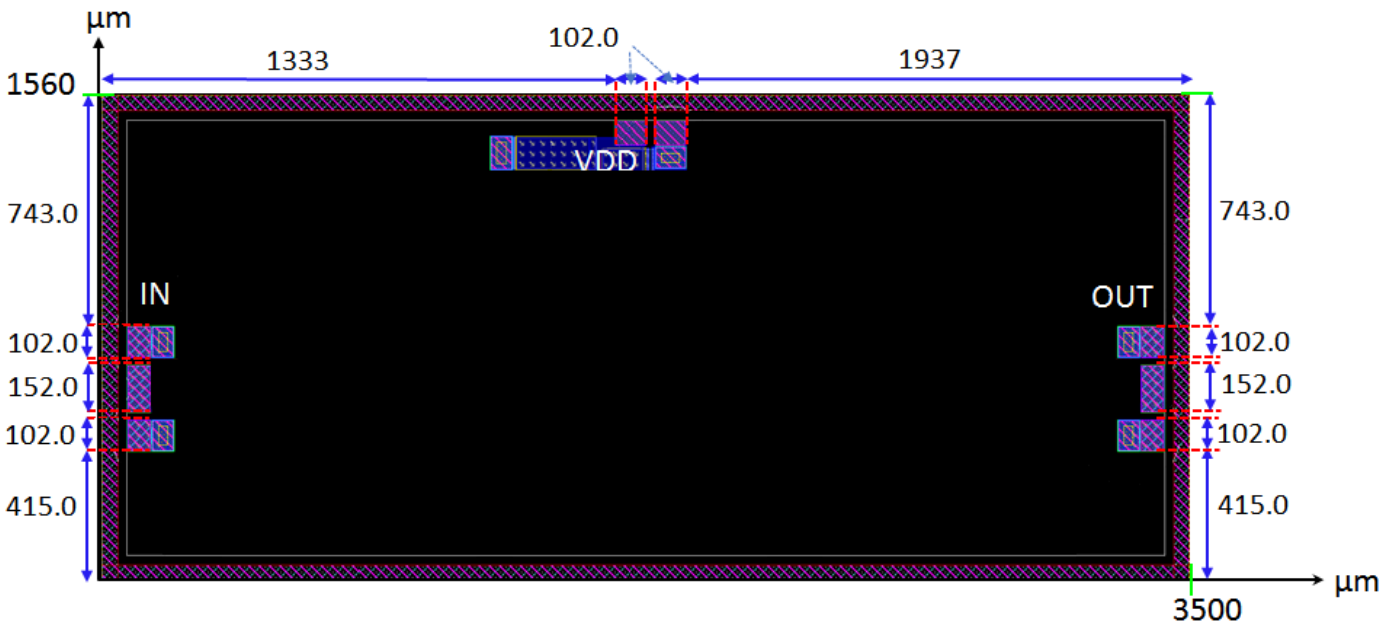

Figure 2: X-Band GaN LNA Pad allocation

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DEFINITIONS

Limiting values definition
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

Application information
Applications that are described herein for any of these products are for illustrative purposes only. OMMIC makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

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Life support applications
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