# Ka-Band GaN LNA

26 – 34 GHz 1.6 dB NF Low Noise Amplifier

Description

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

The Ka-Band LNA has 1.6 dB of noise figure and 20 dB of output forward gain.

The performances of the Ka-Band LNA make it well suited to be used in Radar, Telecommunication and Space applications. This technology is being evaluated for space applications.
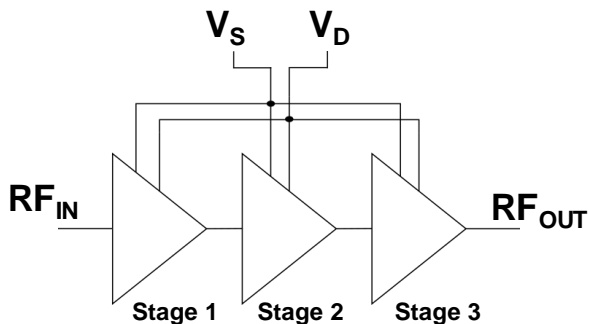
Ka-Band LNA Power Amplifier block diagram

Features

- Operating Range: 26 GHz to 34 GHz
- Gain: 20 dB
- NF < 1.6 dB
- Pin_{max} > 30 dBm (pulsed)
- Source Voltage: V_S = -3 V
- Power Consumption:
  - ◦ V_D = 8.5 V
  - ◦ I_{Qtot} = 90 mA
- Chip size = 1.26 x 3.65 mm²
- 50 Ohms input and output matched

Ka-Band LNA die view

Application

- Radar
- Spatial
- Telecommunication

Product data sheet

Disclaimer: Subject to change without notice

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MAXIMUM VALUES

Symbol	Parameter	Conditions	MIN.	MAX.	UNIT
V_S	Source Voltage				V
V_D	Drain Voltage				V
I_D	Drain Current				mA
P_{IN}	RF Input Power			> 30 (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		26		34	GHz
V_D	Drain Supply Voltage			8.5		V
V_S	Source Supply Voltage			- 3		V
I_D	Total supply current @Psat	Drain Voltage 8 V				mA
G	Gain			20		dB
NF	Noise Figure				1.6	dB
OIP3	Output Third Order Intercept Point			TBD		dBm
S_{11}	Input Reflexion Coefficient	50 Ohms		- 7		dB
S_{22}	Output Reflexion Coefficient	50 Ohms		- 15		dB

ON WAFER MEASUREMENTS

Conditions: T_{amb} = + 25°C.
V_D = 8.5 V; V_S = -3 V; I_D = 90 mA

▪ **S-PARAMETERS**

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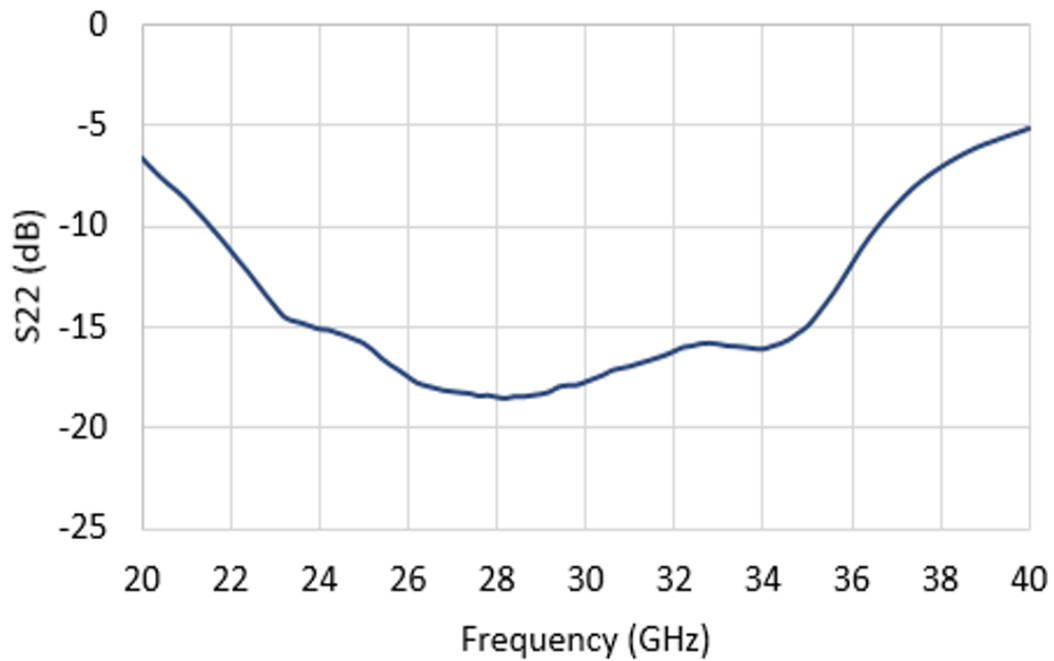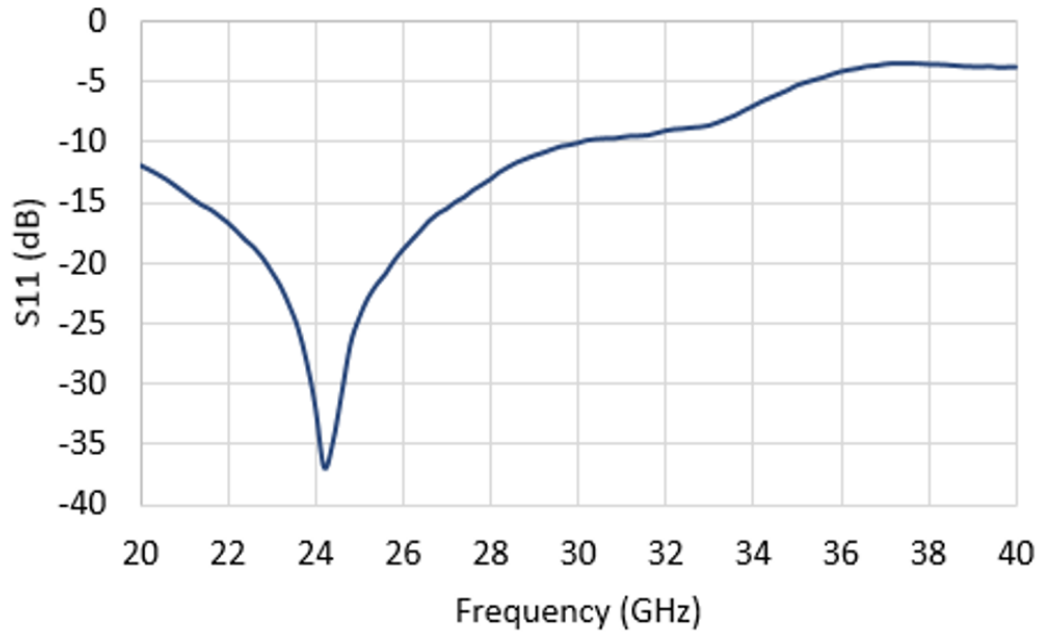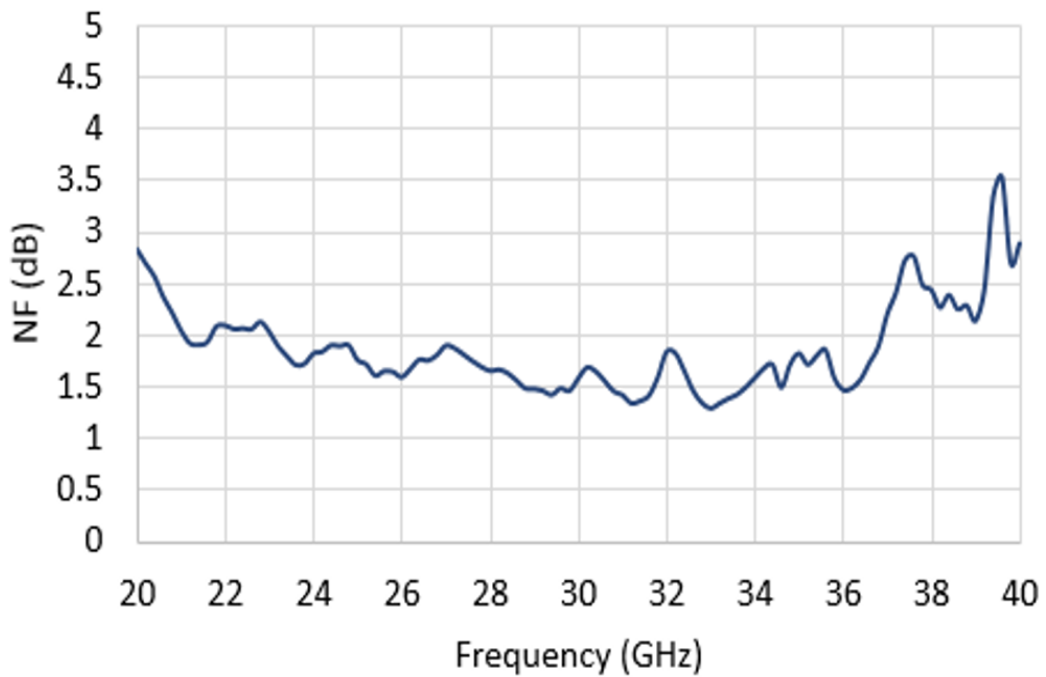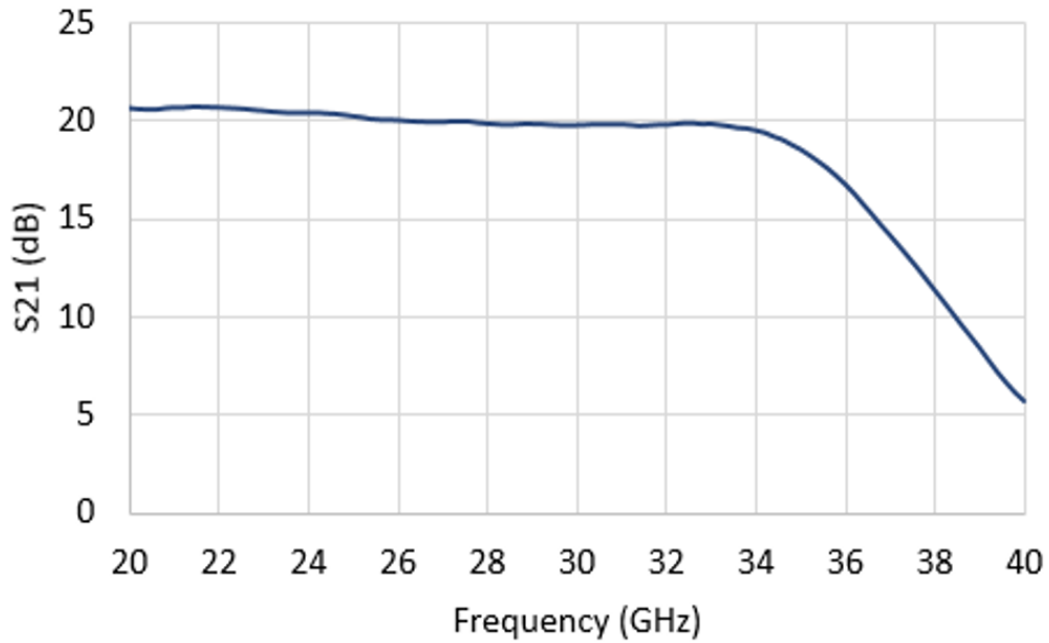
APPLICATION SCHEMATIC

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.
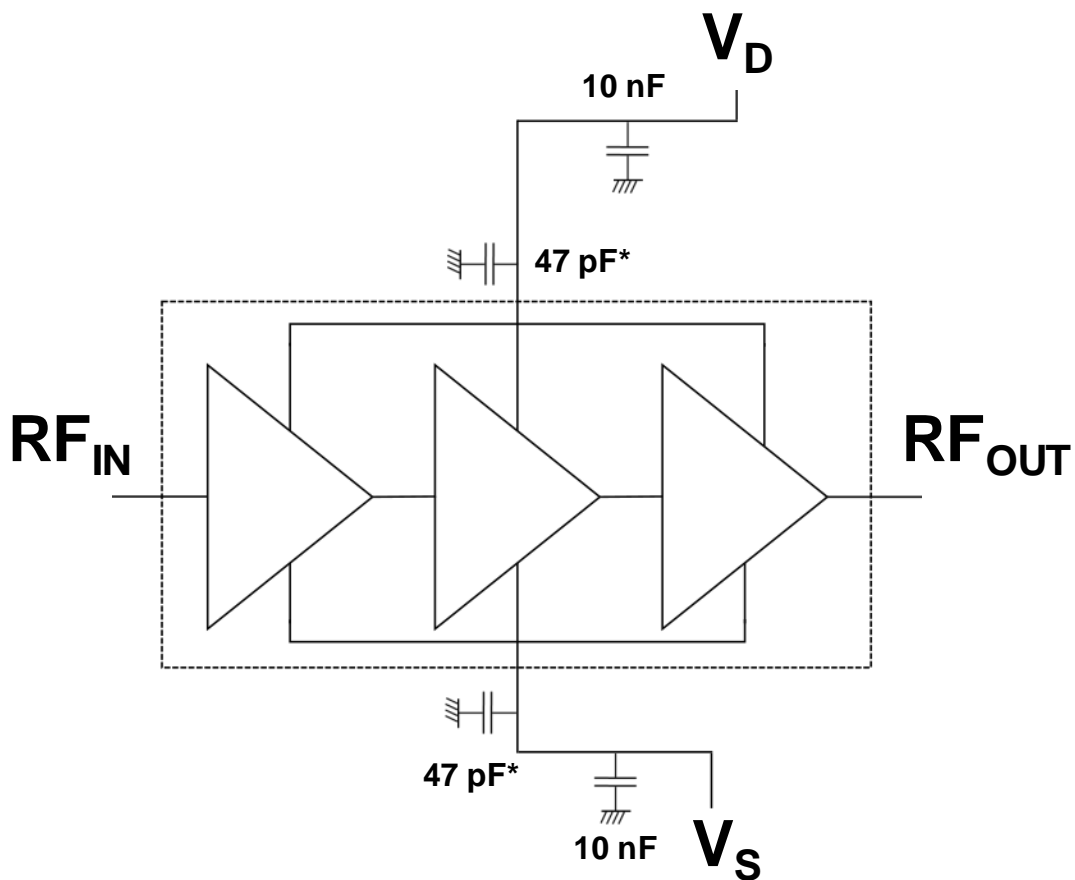

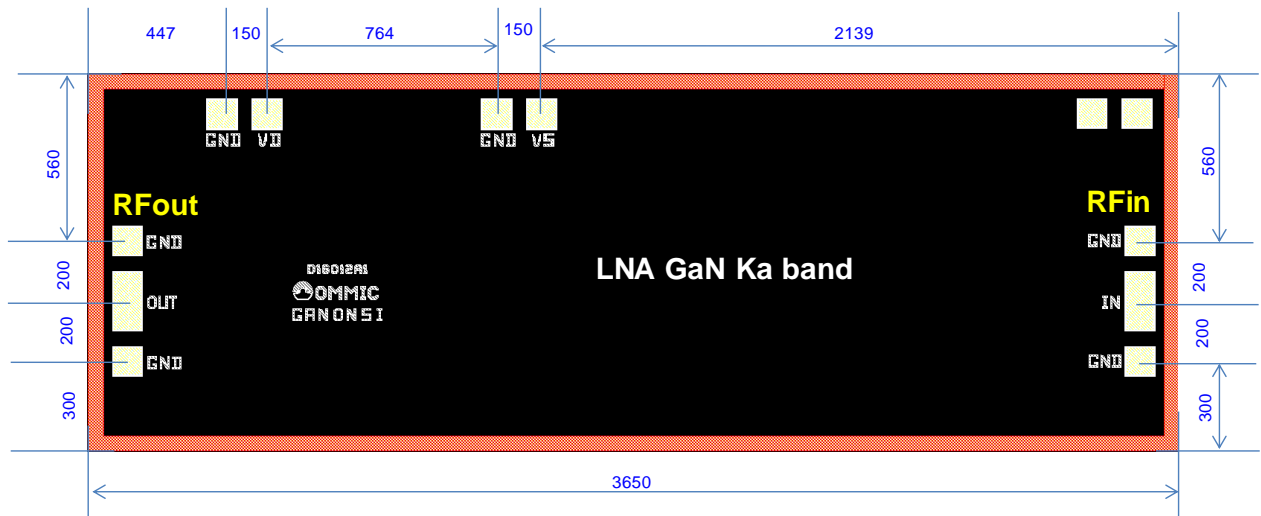**Figure 1 : Ka-Band LNA Application Schematic**

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PAD LAYOUT

Figure 2: Ka-Band GaN LNA Pad allocation (unit: µm)

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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.

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