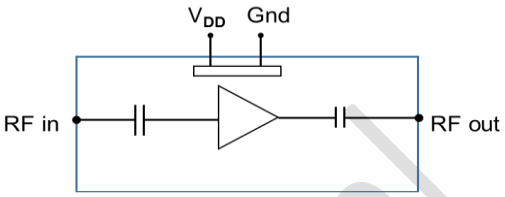
Low Noise Amplifier (LNA) MMIC

12 GHz to 29 GHz

Description

The INMLA1G2A015D Low Noise Amplifier is a broadband self-bias LNA with an operating frequency range of 12 to 29 GHz. No external parts for the match are required.

Block Diagram



Applications

- Ku/K band LEO/SATCOM ground terminals
- Covering civil and military frequencies
- 5G FR2 receiver LNA

Key Features

Parameter	Value	Unit
Frequency	12-29	GHz
Vdd	3	V
Signal Gain	>20	dB
S11/S22	<-10	dB
Noise Figure	<2	dB
Die size	2.7 x 0.9	mm^2

Absolute Maximum Ratings

Parameter	Symbol	Value			Unit
		Min	Typ.	Max	
Drain Voltage	V_{DD}		3.5		V
Gate Voltage	V_{GG}		NA		V
RF Input Power	P_{in}		+20		dBm
Channel Temperature	Tch		120		°C
Power Dissipation	P_D		300		mW
Thermal Resistance	θ_{JC}		150		°C/W
Operating Temperature	Ta	-40		80	°C
Storage Temperature	Ts	-50		120	°C

Operation of this device outside the parameter ranges given above may cause permanent damage. These are stress ratings only, and functional operation of the device at these conditions is not implied.

Recommended Operating Parameters:

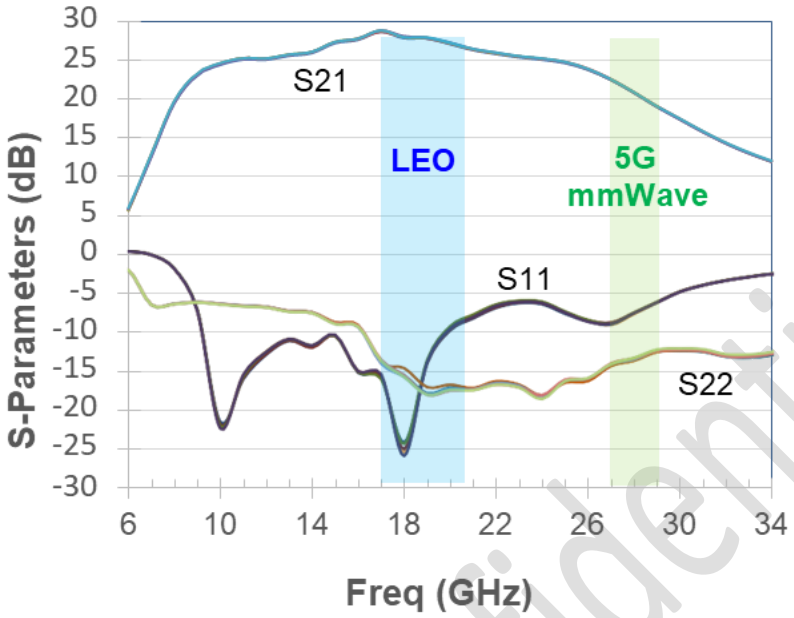
Parameter	Min	Typ	Max	Units
Drain Voltage (V_{DD})	2.2	2.6	3.0	V
Drain Current (I_{DD})	55	58	60	mA
Gate Current (I_{GG}) (self-bias)	NA			mA
Gate Voltage (V_{GG}) (self-bias)	NA			V

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

Electrical Characteristic (T_A = 25 °C, V_{DD} = 2.6 V, V_{GG}= NA)

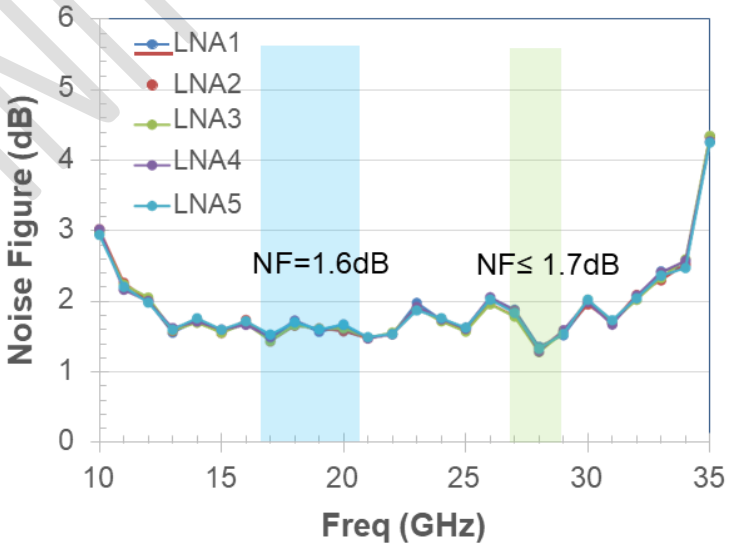
Parameter	Min	Typical	Max	Units
Frequency Range		12.0 – 29.0		GHz
Gain	24.9	25	26.15	dB
Noise Figure	1.40	1.59	1.64	dB
Input Return Loss	-12.60	-10.84	-7.81	dB
Output Return Loss	-18.11	-16.57	-9.66	dB
Output P1dB		10		dBm
Output IP3		22 (est)		dBm
Supply Current	55	58	62	mA
Gain Temperature Coefficient				dB/°C
Noise Figure Temperature Coefficient				dB/°C

Gain & Return loss

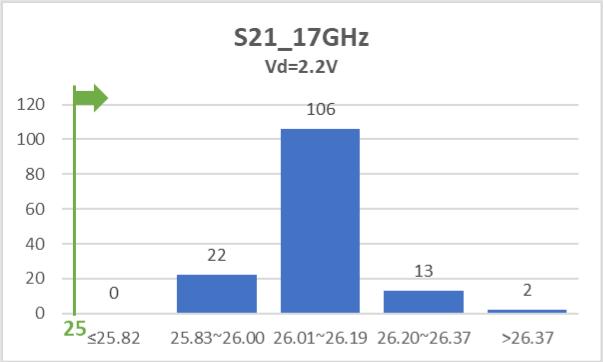


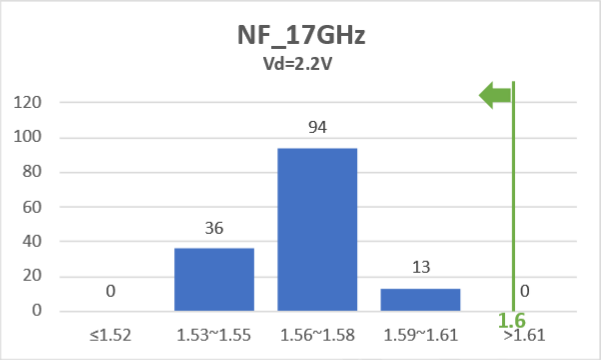
S-parameter	Frequency	S21	S11	S22	Units
Ku/K band	12-29GHz	>20	<-6	<-6	dB
LEO	17-21GHz	>27	<-10	<-15	dB
5G mmWave	28GHz	20	<-6	<-13	dB

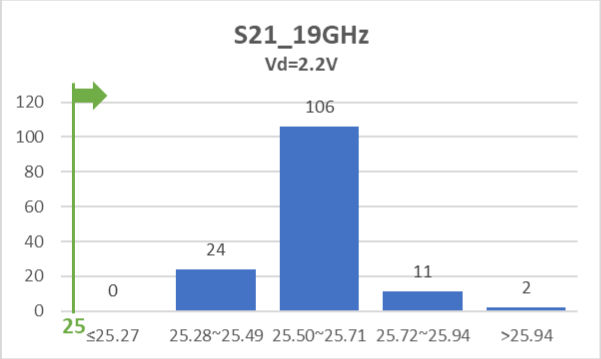
Noise Figure Performance

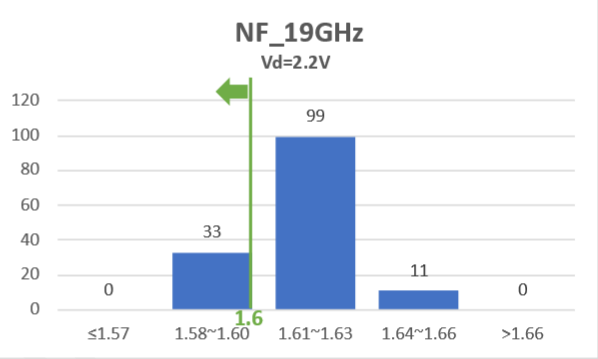


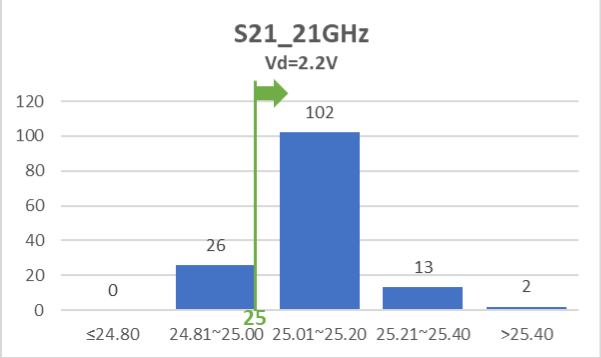
Yield Analysis

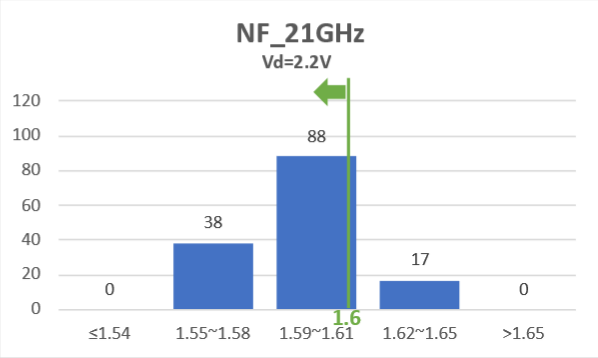












Linearity Performance – Estimated OIP3 vs. VDD