

DATASHEET

ERZ-LNA-2000-3100-31-1.5-NS

ERZIA



NEW SPACE Low Noise Amplifier

20 to 31 GHz

Noise Figure 1.5 dB, Gain 31 dB

Description:

The ERZ-LNA-2000-3100-31-1.5-NS is a microwave low noise amplifier based in GaAs, specially prepared for New Space applications. It is based on its commercial grade equivalent, maintaining electrical performance and including key features ideal for new space applications, including radiation tolerance, performance in vacuum and outgassing compatibility, among others. See table next page.

Key Technical Features:

- Frequency Range: 20 to 31 GHz.
- Typical values: Noise Figure 1.5 dB, Gain 31 dB
- RF connectors (I/O): 2.92 mm Female
- Sub-D for control and DC connection

Electrical Performance

Parameter	Value			Units
	Min	Typ	Max	
Frequency	20	-	31	GHz
Output Power (P1dB)	8	10	15	dBm
Small Signal Gain	28	31	35	dB
Gain Flatness	-	±1	-	dB
Noise Figure		1.6	2.7 (at band edge)	dB
VSWR input	1.2:1	1.5:1	2.5:1	-
VSWR output	1.2:1	1.8:1	2.2:1	-
DC Voltage	9	12	15	V
Power Consumption	-	0.8	-	W
RF Connectors	2.92 mm Female IN/OUT			-
Weight (±10%)	-	110	-	g

Specifications at case temperatura of 25°C.

New Space (-NS) versions

Feature	COTS	NEW Space (-NS)
Operating Temperature range -45 to +85 °C (MIL-STD-810F, method 520.2)	x	x*
Random Vibration 8g RMS (MIL-STD-810F, method 514.5)	x	x*
Mechanical Shock 20g, 11ms SawTooth (MIL-STD-810F, method 516.5)	x	x*
Acceleration 15g (MIL-STD-810F, method 513.5)	x	x*
Thermal cycling (Based in MIL-HDBK-2164 Rev. A)	x	x
Simplified power interface Single DC supply line	x	x
ATP at three temperatures CoC & CoO supplied	x	x
RF section radiation tolerance (TID) Technology intrinsically tolerant to 300 krad (TID)	x	x
RF section radiation SEE tolerance: SEE-aware RF design and filtering	-	x
DC section radiation tolerance (TID) Radiation Tolerant to 30 krad (TID) plus housing shielding.	-	x
DC section radiation SEE tolerance: Passive SEE mitigation plus rad-tolerant (43 MeV-cm ² /mg) in key components	-	x
Vacuum-optimized mechanics (venting, joints) (ECSS-Q-ST-70-02)	-	x
Low-outgassing materials (ECSS-Q-ST-70 / NASA-ASTM-E595 compliant)	-	x
Pure-tin mitigation (whisker control / alternative finishes) (GEIA-STD-0005-2 guidelines)	-	x
Prepared for LEO (atomic-oxygen mitigation techniques)	-	x
Screening /of RF active devices / Complete burn in	-	Optional
Additional documentation & analyses (FMECA, Worst-Case, etc.) — NDA required	-	Optional
Environmental testing on demand (TVAC, vibration, ...)	-	Optional

* -NS extended specifications: see "Environmental Specifications (-NS)" section.

Output Power

Figure 1 shows output power at 1dB compression measurement as a function of frequency at room temperature (25°C).

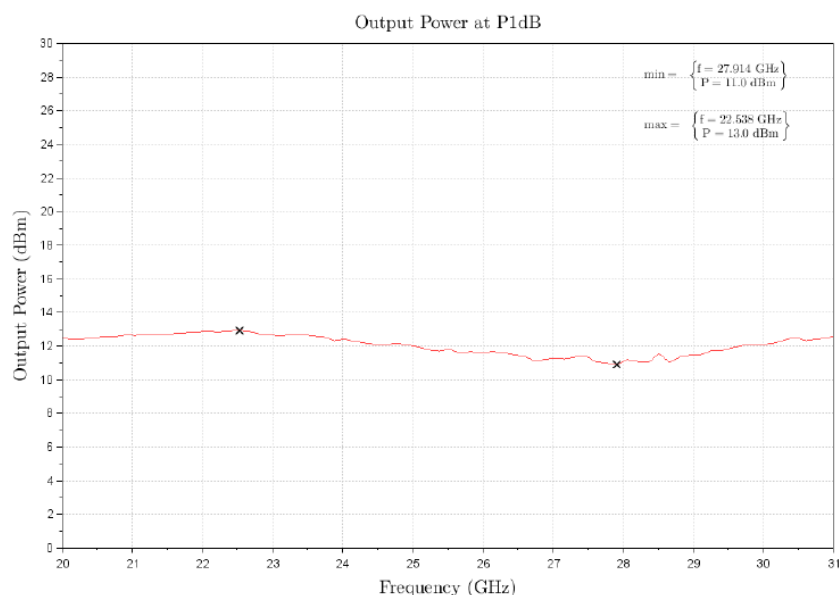


Figure 1: ERZ-LNA-2000-3100-31-1.5-NS P1dB

Small Signal Gain

Figure 2 shows the small signal gain measurement as a function of frequency at room temperature (25°C).

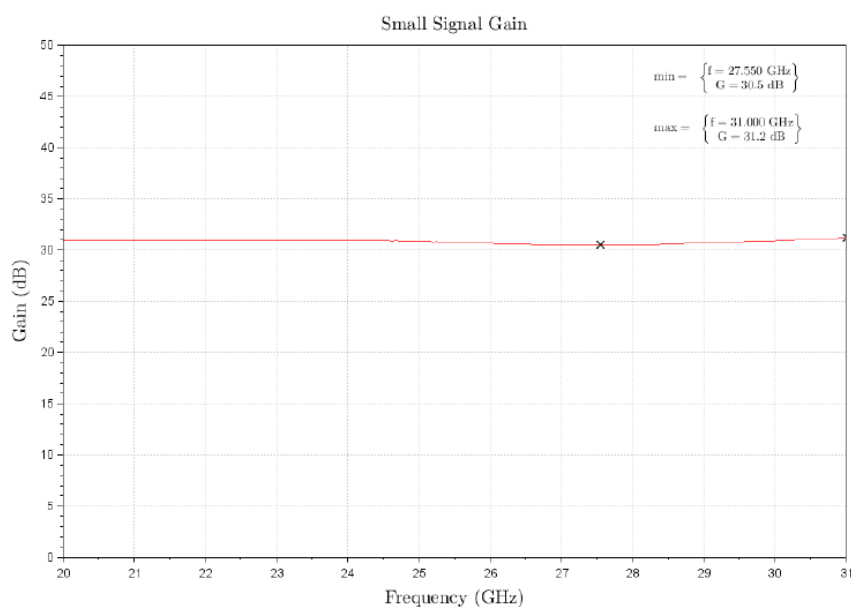


Figure 2: ERZ-LNA-2000-3100-31-1.5-NS Small Signal Gain

Small Signal Gain (Temperature)

Figure 3 shows the small signal gain measurement as a function of frequency at different temperatures.

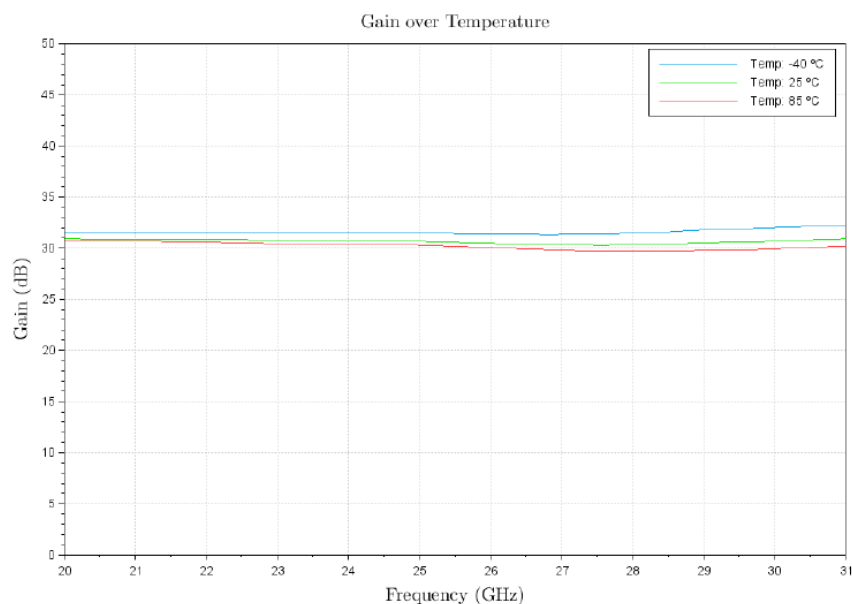


Figure 3: ERZ-LNA-2000-3100-31-1.5-NS Small Signal Gain

Noise Figure

Figure 4 shows the small signal gain measurement as a function of frequency at room temperature (25°C).

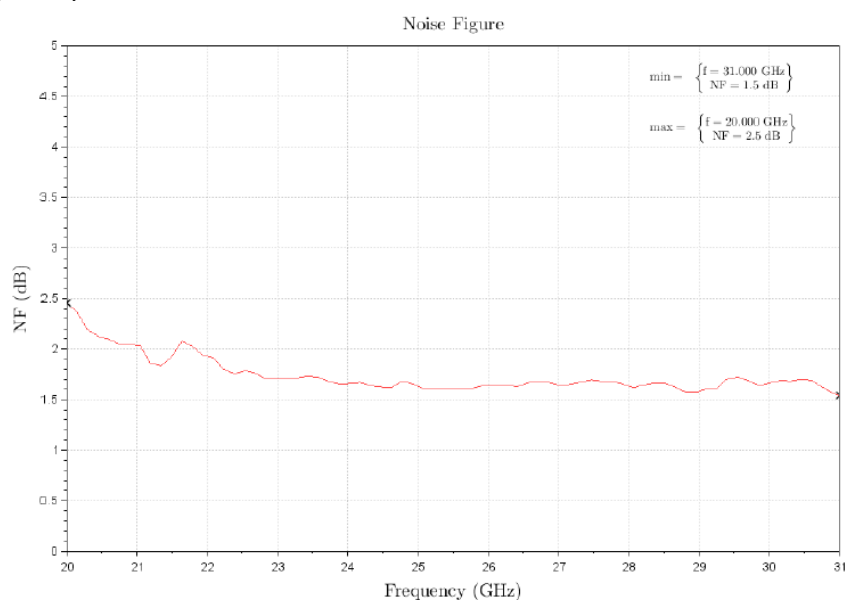


Figure 4: ERZ-LNA-2000-3100-31-1.5-NS Noise Figure

Input/Output Matching

Figure 5 shows input (S11) and output (S22) VSWR as a function of frequency at room temperature (25°C).

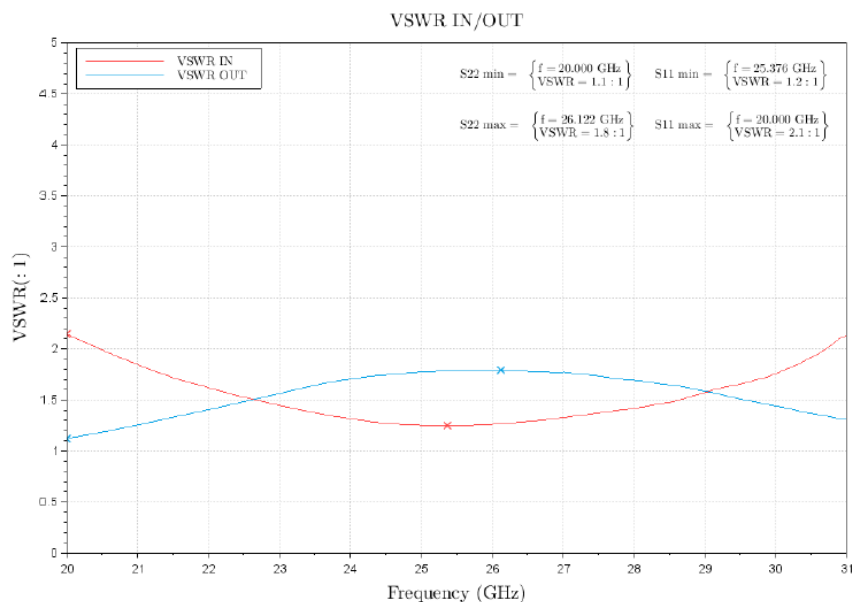


Figure 5: ERZ-LNA-2000-3100-31-1.5-NS Input/Output Matching

Absolute Maximum Ratings

Condition	Value
DC Voltage	15 VDC
Maximum Input Power (CW)	17 dBm
Operation temperature (at case)	-40 to 85 °C
Storage temperature	-40 to 85 °C

- Stress above these ratings may cause permanent damage to the device.
- It is final user responsibility to maintain the amplifier within the specified ranges.

Measurements Conditions

All measurements provided in this report were performed at the following conditions:

Condition	Value
Temperature (DUT ON)	25 °C ± 1°C
Humidity	44% ± 10%
DUT Warm up time	30 min
DUT minimum operation time	24 hours
Test equipment warm up time	2 hours
Additional temperature cycles in climatic chamber (DUT OFF)	-40°C to 85°C

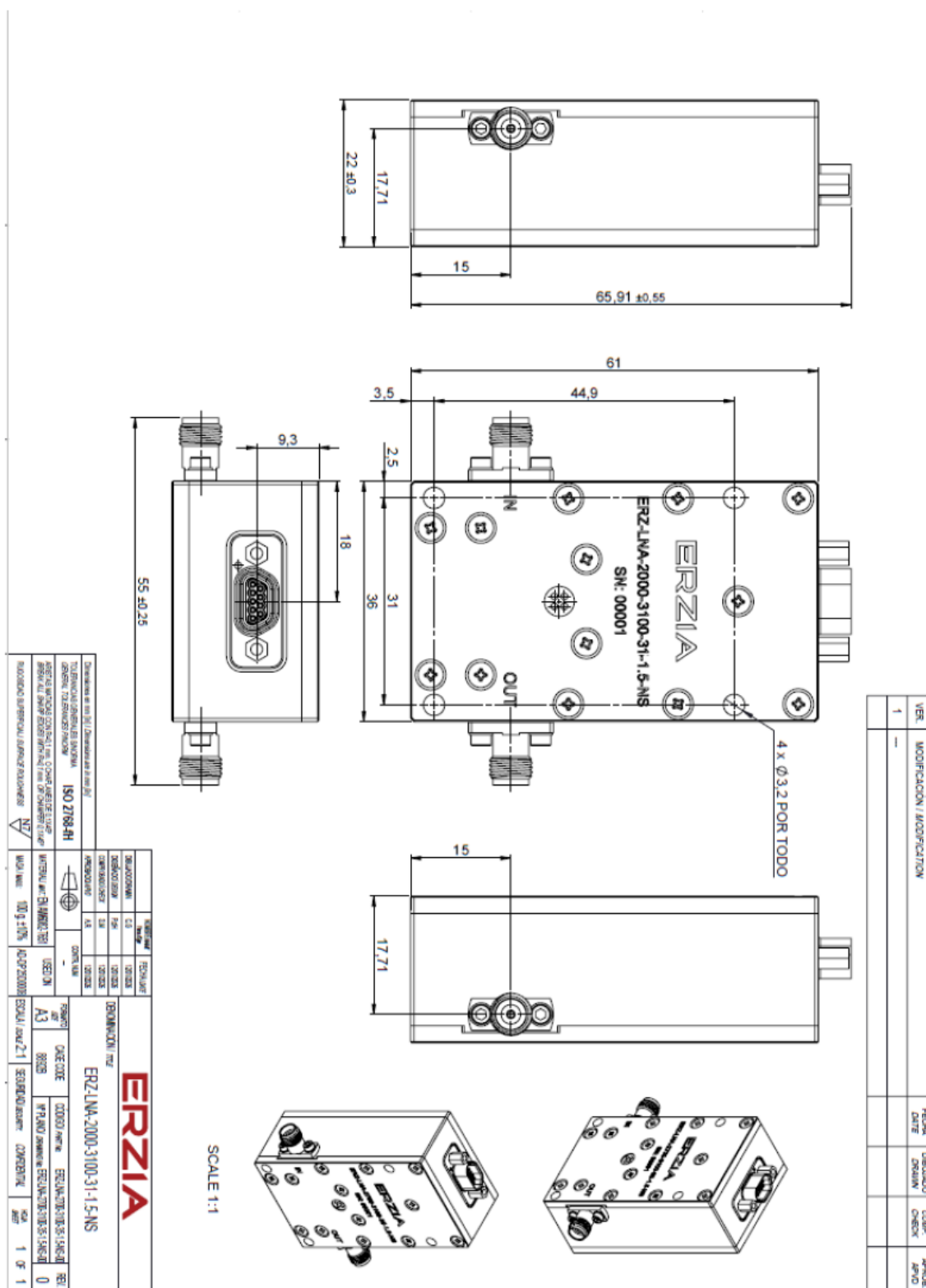
Environmental Specifications (-NS)

Environment	Level (1)
Operating temperature	-40 to +85 °C
Thermal vacuum cycling ECSS-E-ST-10-03C	10 cycles, -40 / +85 °C, dwell ≥ 2 h, $< 1 \times 10^{-5}$ mbar, unit operating, functional tests at plateaus
Thermal cycling, ambient pressure (2) MIL-HDBK-2164A (ESS)	4 cycles, -40 / +85 °C, 30 min dwell, non-operating + ATP at three temperatures (-40 / +25 / +85 °C)
Non-operating / storage temperature	-55 to +125 °C
Random vibration, 3 axes ECSS-E-ST-10-03C / GSFC-STD-7000B	23.5 g RMS, 3 min/axis 20 Hz 0.32 · 50–400 Hz 0.80 · 2000 Hz 0.032 g ² /Hz
Sine vibration, 3 axes ECSS-E-ST-10-03C	5–15 Hz ± 10 mm · 25–100 Hz 25 g, 2 oct/min
Quasi-static acceleration	25 g
Shock (SRS, Q = 10), 3 axes ECSS-E-ST-10-03C	100 Hz 56.6 g $\rightarrow$ 1–10 kHz 1414 g
Operating pressure	Sea level to 1×10^{-5} mbar (thermal vacuum)
Radiation, TID – DC section ECSS-Q-ST-60-15C	30 krad(Si) behind housing
Radiation, TID – RF section ECSS-Q-ST-60-15C	> 300 krad(Si)
Radiation, SEE ECSS-Q-ST-60-15C	SEL-immune or SEL-protected LET ≥ 43 MeV·cm ² /mg in key components LET ≥ 37 MeV·cm ² /mg in the rest

(1) Levels shown here are qualification levels demonstrated by test or dedicated data for the whole -NS family.

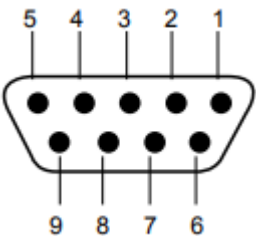
(2) Acceptance test performed by default to every unit is thermal cycling. Additional tests can be done on request.

Mechanics and Housing



DC and Control Connector

Micro-D Sub-9 female connector (M83513/02-AN or similar)



Pin No	Function	Description
1	+12 V Power Source	+(9...15) VDC
2	+12 V Power Source	+(9...15) VDC
3	NA	-
4	NA	-
5	NA	-
6	Power Ground	GND
7	Power Ground	GND
8	NA	-
9	NA	-

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