

DATASHEET

ERZ-LNA-0100-0310-32-0.9-NS

ERZIA



NEW SPACE Low Noise Amplifier

1 to 3.1 GHz

Noise Figure 0.9 dB, Gain 32 dB

Description:

The ERZ-LNA-0100-0310-32-0.9-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: 1 to 3.1 GHz.
- Typical values: Noise Figure 0.9 dB, Gain 32 dB
- RF connectors (I/O): SMA Female
- Micro-D Sub-9 for control and DC connection

Electrical Performance

Parameter	Value			Units
	Min	Typ	Max	
Frequency	1.0	-	3.1	GHz
Output Power (P1dB)	17	19	21	dBm
Small Signal Gain	30	32	35	dB
Gain Flatness	-	±1	-	dB
Noise Figure	-	0.9	1.2	dB
VSWR input	-	1.5:1	2.2:1	-
VSWR output	-	1.4:1	1.8:1	-
DC Voltage	9	12	15	V
Power Consumption	-	2	-	W
RF Connectors	SMA Female IN/OUT			-
Weight (±10%)	-	110	-	g

Specifications at case temperature 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).

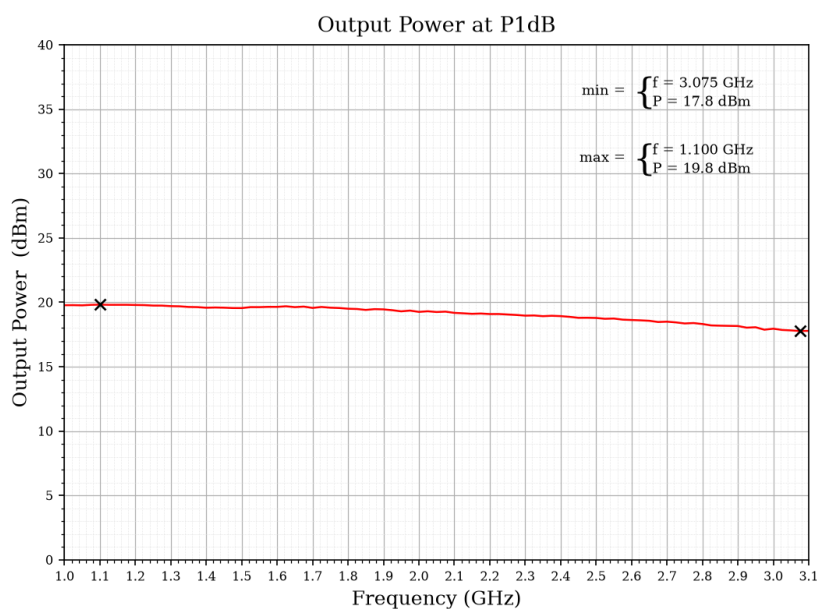


Figure 1: ERZ-LNA-0100-0310-32-0.9-NS P1dB

Small Signal Gain

Figure 2 shows the small signal gain measurement as a function of frequency at different temperatures.

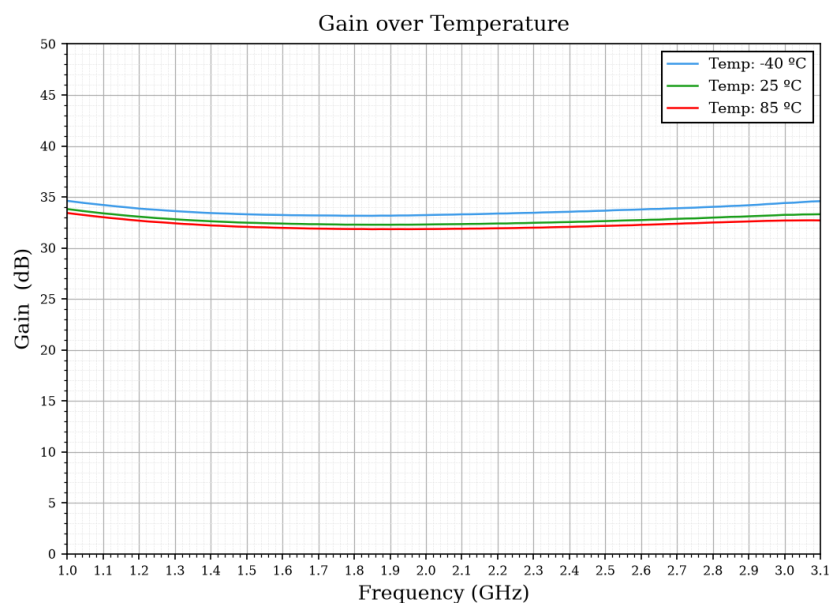


Figure 2: ERZ-LNA-0100-0310-32-0.9-NS Small Signal Gain

Input and Output Matching

Figure 3 shows input (S11) and output (S22) VSWR as a function of frequency at room temperature (25°C).

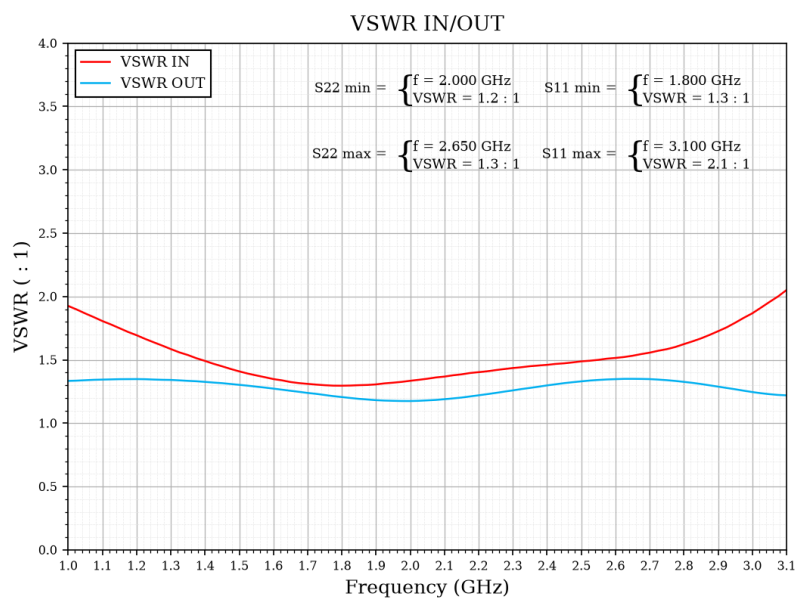


Figure 3: ERZ-LNA-0100-0310-32-0.9-NS Input&Output Matching

Noise Figure

Figure 4 shows the noise figure measurement as a function of frequency at room temperature (25°C).

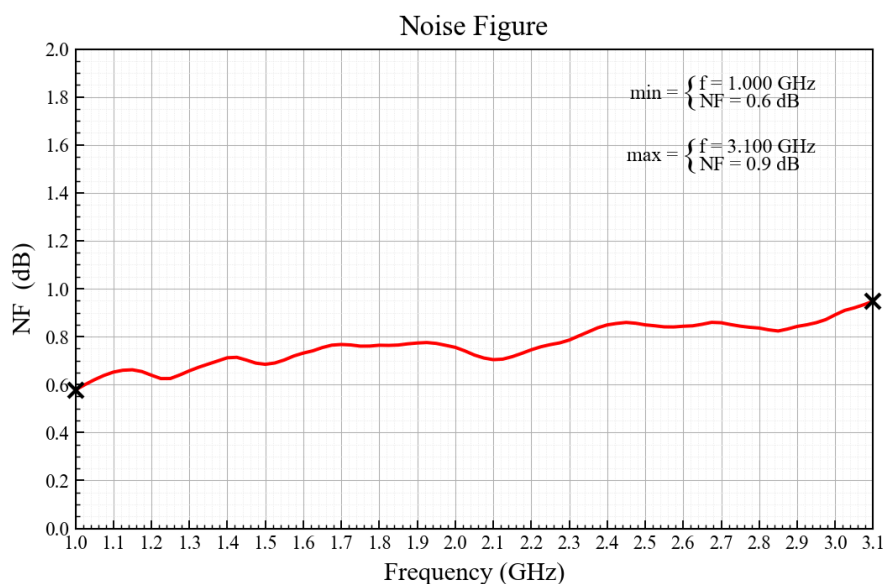


Figure 4: ERZ-LNA-0100-0310-32-0.9-NS Noise Figure

Absolute Maximum Ratings

Condition	Value
DC Voltage	15 VDC
Maximum Input Power (CW)	10 dBm
Operation temperature (at case)	-45 to 85 °C
Storage temperature	-55 to 125 °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

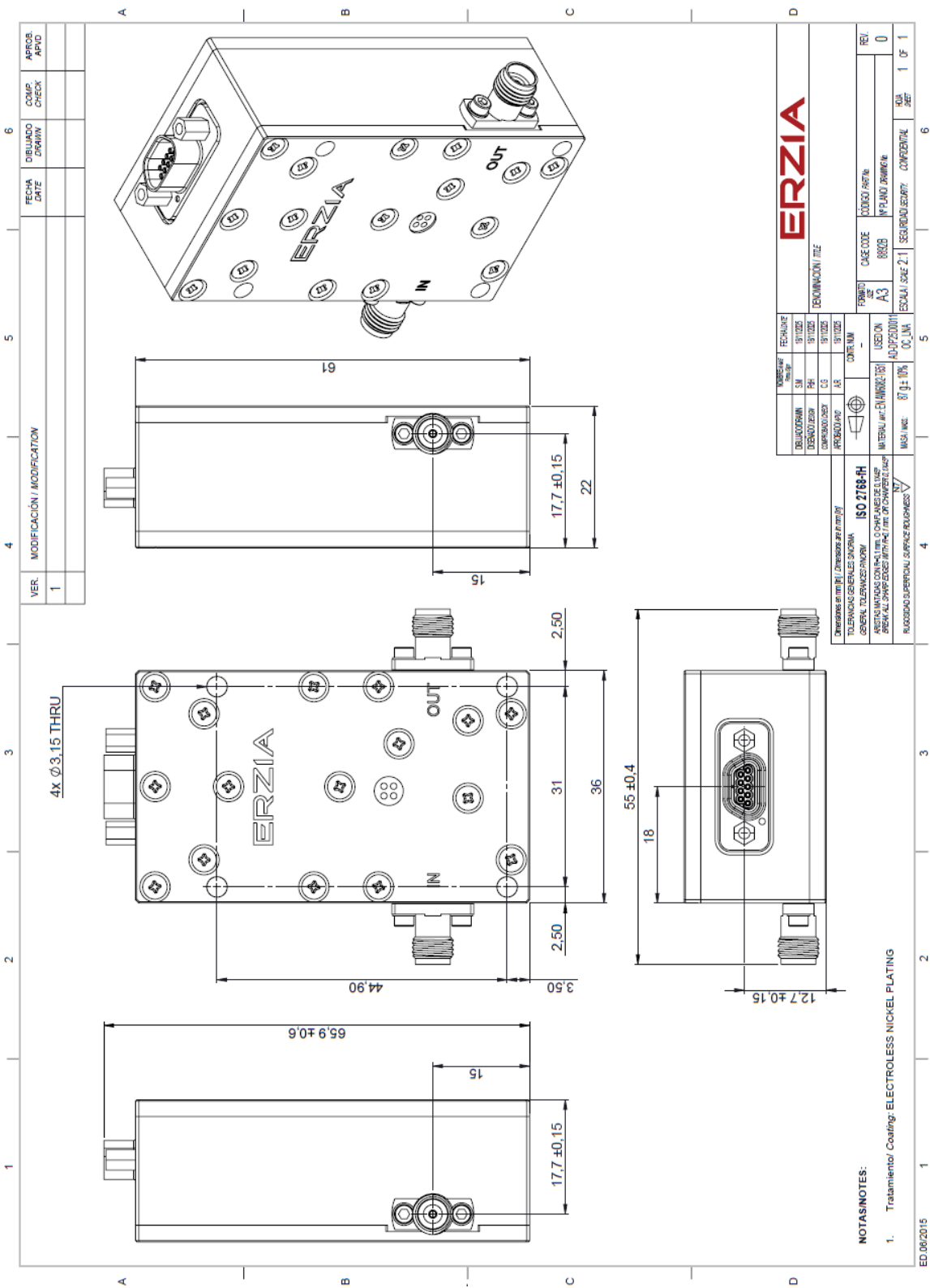
Environmental Specifications (-NS)

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.

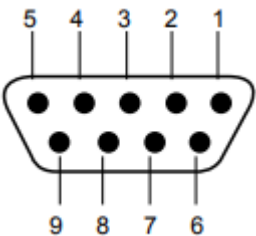
(2) Acceptance test performed by default to every unit is thermal cycling. Additional tests can be done on request.

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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