

DATASHEET

ERZ-HPA-0800-1100-43-NS

ERZIA



NEW SPACE
High Power Amplifiers
8 GHz to 11 GHz
Gain 43 dB, Psat 43 dBm

Description:

The ERZ-HPA-0800-1100-43-NS is a microwave power amplifier based in GaN, specially prepared for New Space applications. It is based on its COTS 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: 8 to 11 GHz.
- Typical values: Gain 42 dB, Psat 43.5 dBm
- RF connectors (I/O): SMA Female IN/OUT
- Micro-D sub-15 for control and DC connection

Electrical Performance

Parameter	Value			Units
	Min	Typ	Max	
Frequency	8	-	11	GHz
Output Power (Psat)	43	43.5	45	dBm
Small Signal Gain	38	42	46	dB
Gain Flatness	-	±3	-	dB
Noise Figure	-	8	9	dB
VSWR input	1.2:1	1.5:1	2.0:1	-
VSWR output	1.0:1	1.4:1	1.8:1	-
Coupling	28	29	30	dB
DC Voltage	27.5	28	28.5	V
Power Consumption	-	140	160	W
RF Connectors	SMA Female IN/OUT			-

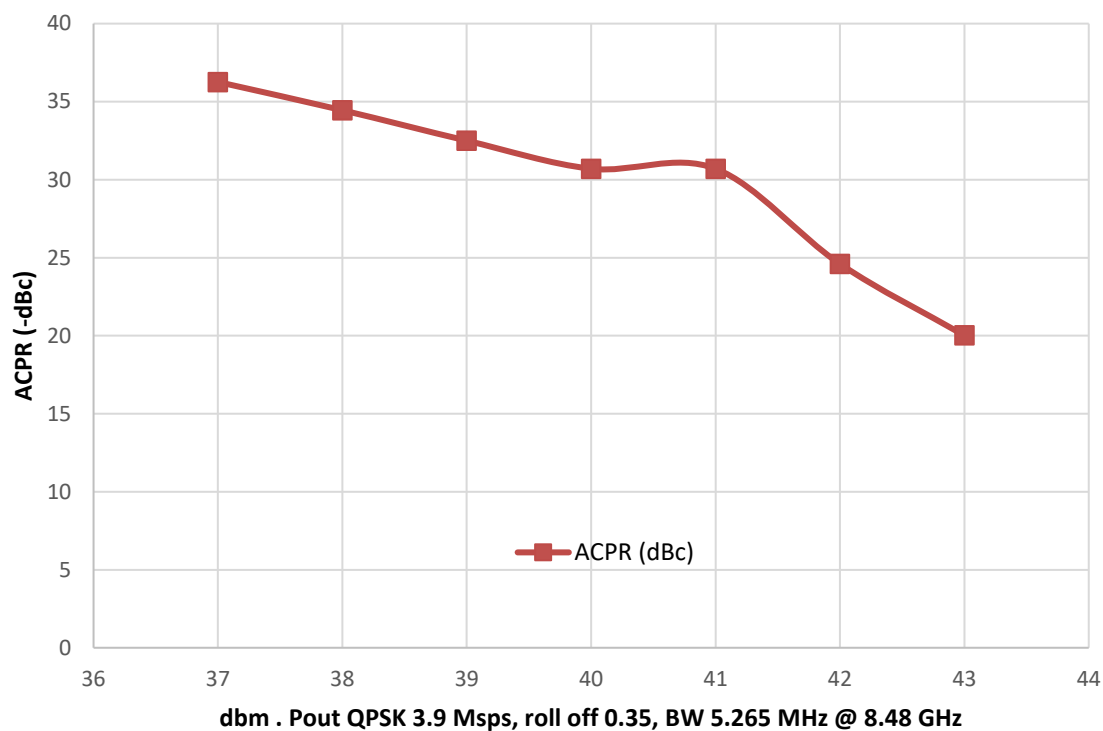
Specifications at a case temperature of 25°C

New Space (-NS) versions

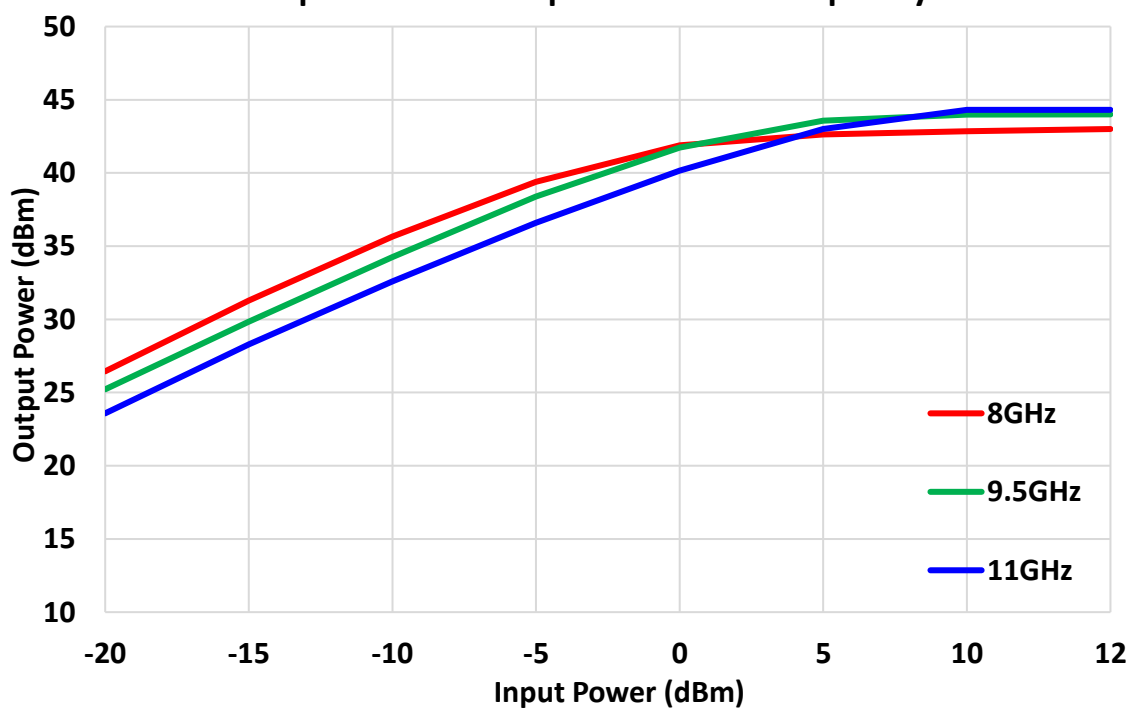
Feature	COTS	NEW Space (-NS)
Operating Temperature range -45 to +85 °C (MIL-STD-810F, method 520.2)	x	x*
Random Vibration 8g RMS (MIL-STD-810F, method 514.5)	x	x*
Mechanical Shock 20g, 11ms SawTooth (MIL-STD-810F, method 516.5)	x	x*
Acceleration 15g (MIL-STD-810F, method 513.5)	x	x*
Thermal cycling (Based 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.

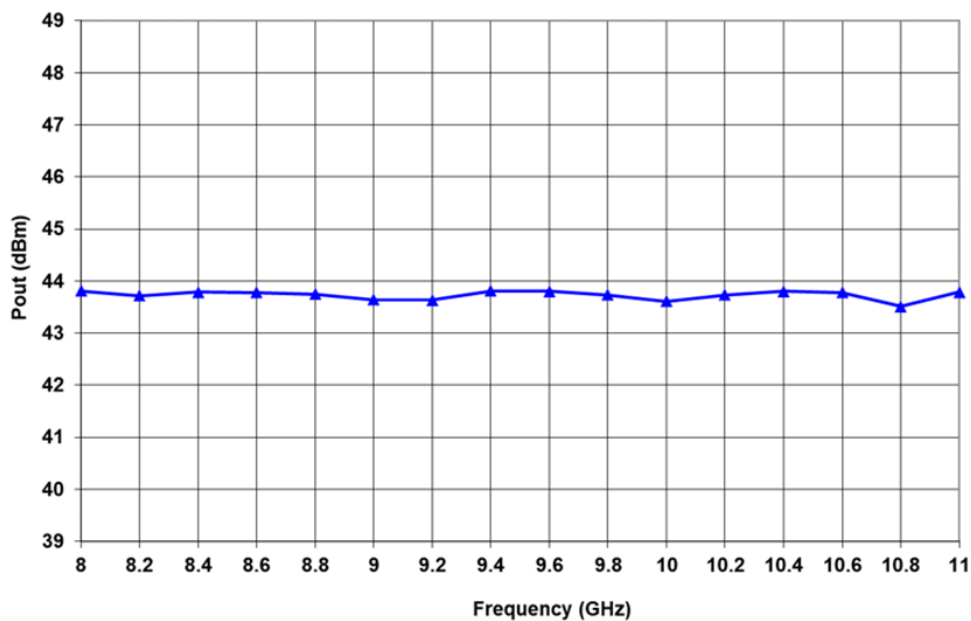
ACPR vs Output Power @8.48 GHz



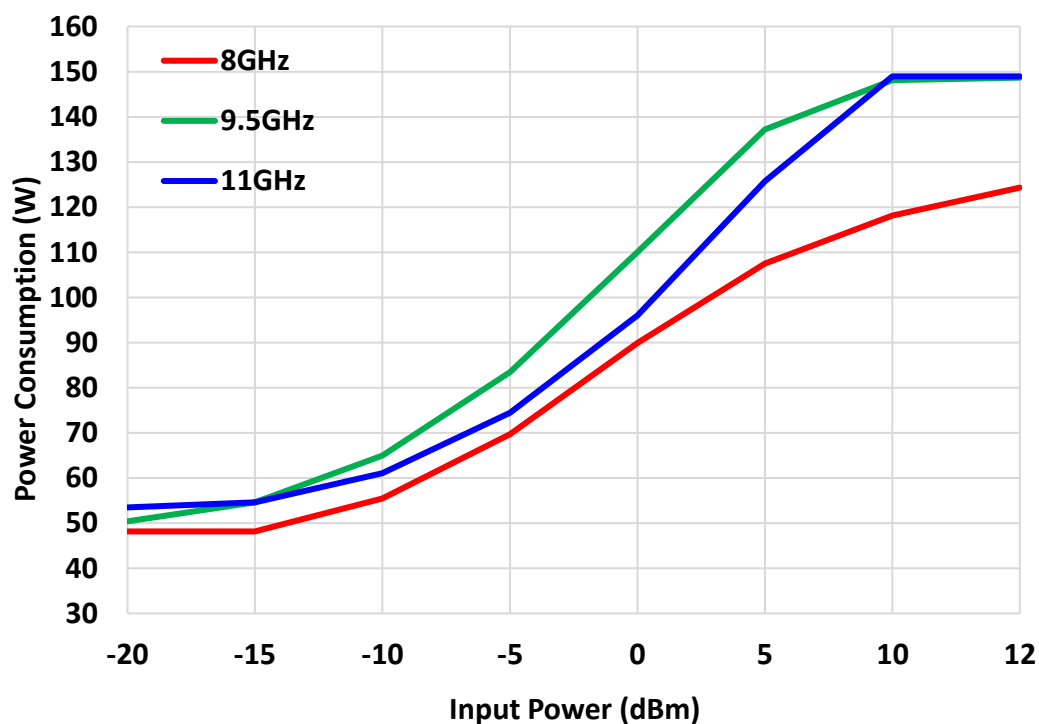
Output Power vs. Input Power vs. Frequency



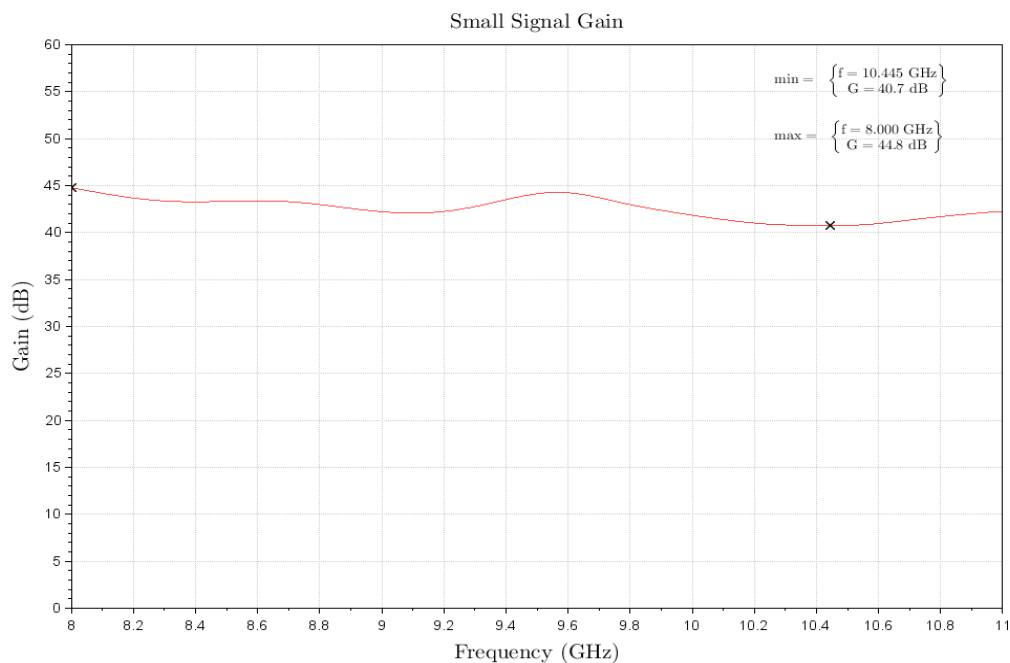
Output Power at saturation



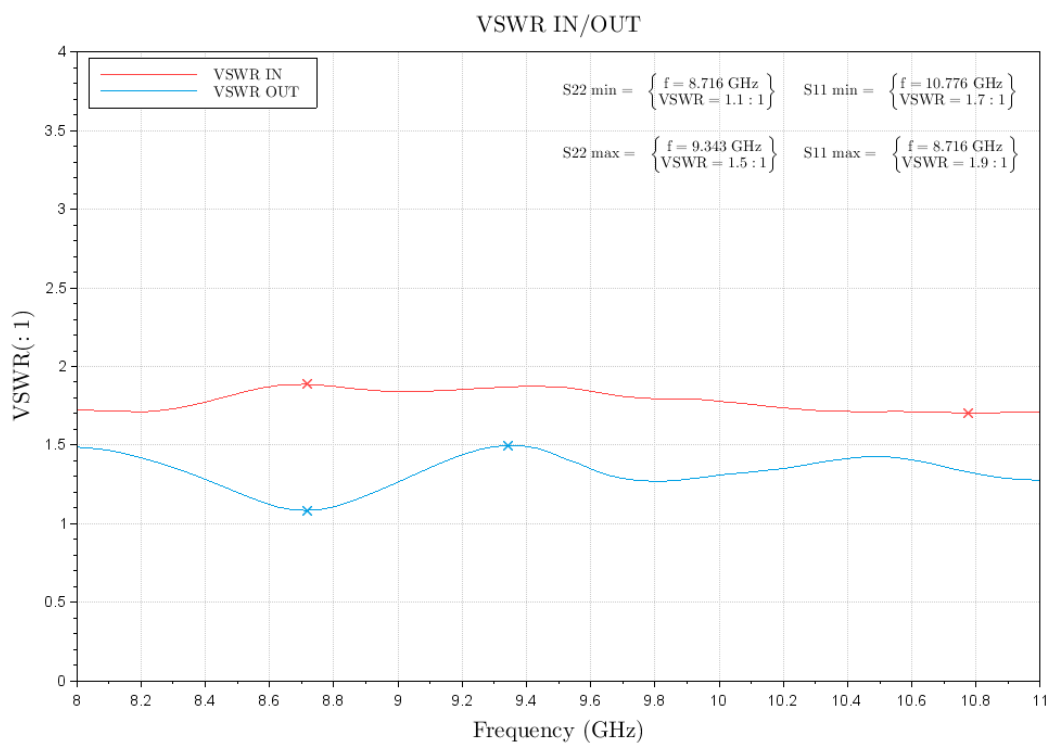
Power Consumption vs. Input Power vs. Frequency



Small Signal Gain



VSWR IN/OUT



Absolute Maximum Ratings

Condition	Value
DC Voltage	+32 VDC
Maximum Input Power (CW)	17 dBm
Operation temperature (at case)	-40 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

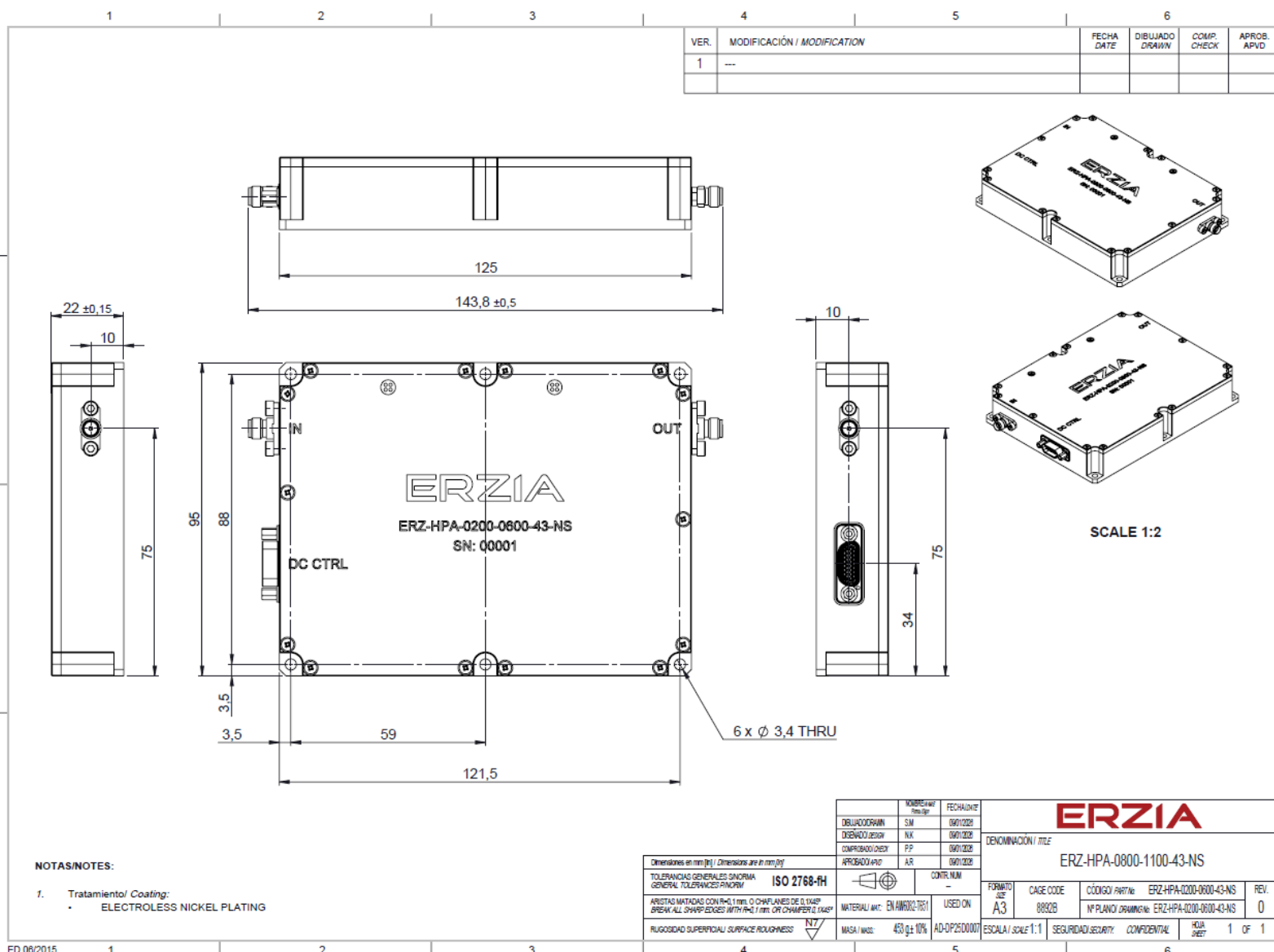
Environmental Specifications (-NS)

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 / +70 °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



Parameter	Value	Units
Dimensions	121x95x22 (LxWxH)	mm
RF Connectors	IN/OUT: SMA (F)	-
DC & Control Connector	MICRO-D-sub 15 female	-

DC and Control Connector

Micro-D Sub-15 female connector

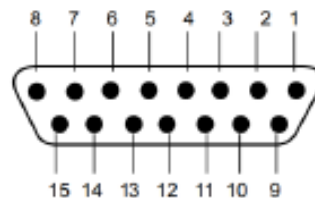


Figure 3-1: M83513/02-BN (female).

PIN	LABEL	SIGNAL	DESCRIPTION
1	VCC	+28VDC	
2	VCC	+28VDC	
3	PGND	Power Ground	Power Ground
4	PGND	Power Ground	
5	GND	Ground	Ground
6	I_SEN	Current Monitor	Vo = 0.1 V/A
7	NTC_P	Temperature Monitor	NTC 10K NTCG163JX103DTDS
8	NTC_N	Temperature Monitor Return	
9	VCC	+28VDC	
10	VCC	+28VDC	
11	PGND	Power Ground	Power Ground
12	PGND	Power Ground	
13	GND	Ground	Ground
14	EN	TTL Enable	OFF (0V to 0.8V); ON (2V to 5.5V)
15	MOD	TTL Modulation	OFF (0V to 0.8V); ON (2V to 5.5V)

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