LOW NOISE, HIGH GAIN

High-Frequency Amplifier ZVA-71863LNX+

50Ω 71 to 86 GHz 1.0 mm Female

THE BIG DEAL

- High Gain, 37 dB Typ.
- Excellent Gain Flatness, ±1.75 dB Typ.
- Low Noise Figure, 4.5 dB Typ. From 71 to 81 GHz
- Adjustable Single Supply Voltage, +10 to +15 V

Generic photo used for illustration purposes only

Model No.	ZVA-71863LNX+
Case Style	WC3071-5
Connectors	1.0 mm female

+RoHS Compliant
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

APPLICATIONS

- Automotive Test
- Radar/Sensing
- 5G FR2+ Bands (E-Band)
- SATCOM E-Band
- Wireless Infrastructure

PRODUCT OVERVIEW

Mini-Circuits' ZVA-71863LNX+ is a coaxial, low noise high frequency amplifier, operating from 71 to 86 GHz. This model operates over a single positive supply range of +10 to +15 V, allowing users to choose their desired operating voltage. Internal DC-DC conversion circuitry maintains constant efficiency over the full input voltage range. The amplifier incorporates several DC-protection features, such as over-voltage, reverse voltage and in-rush current, that protect the amplifier from damage if mishandled during operation. The high frequency operation combined with high gain and low noise figure makes this amplifier an ideal choice for automotive, radar/sensing applications, and 5G testing in E-band frequency ranges.

KEY FEATURES

Feature	Advantages
High Frequency Amplifier, 71 to 86 GHz	E-band LNA covering 5G, Automotive Radar (77 to 81 GHz) and SATCOM E-band (71 to 76 GHz, 81 to 86 GHz).
High Gain Low VSWR Medium Output Power	The combination of low noise figure (4.5 dB typ.) and high gain (37 dB typ.) provides significant amplification with very little signal integrity degradation.
Adjustable DC Supply Voltage	The device is capable of operating on a single supply voltage from +10 to +15 V with consistent DC power consumption, providing ease and flexibility for incorporation into test setups and systems.
DC Protection – Over-Voltage Reverse Voltage In-Rush Current	The internal DC circuitry protects the amplifier from external mishandling that could lead to catastrophic failures in the field.

REV. OR
ECO-011973
ZVA-71863LNX+
MCL NY
260303

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ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE

Parameter	Condition (MHz)	ZVA-71863LNX+			Units
		Min.	Typ.	Max.	
Frequency Range		71000		86000	MHz
Noise Figure	71000-81000 81000-86000		4.5 5.5		dB
Gain	71000-86000	32.0	37.0		dB
Gain Flatness	71000-86000		±1.75		dB
Output Power at 1 dB Compression	71000-86000	+9	+13.5		dBm
Input VSWR	71000-86000		1.6	2.5	:1
Output VSWR[1]	71000-86000		1.6	2.5	:1
Operating DC Voltage		+10		+15	V
Device Operating Current at +10 V[2]			180	220	mA

1. Open and short-circuit loads are not recommended at the amplifier output. Ensure proper 50Ω load before turning the amplifier "ON".
2. Max Device Operating Current is specified when amplifier is in saturation.

ABSOLUTE MAXIMUM RATINGS[3]

Parameter	Rating
Operating Temperature	-40 °C to +50 °C Ambient -40 °C to +60 °C Baseplate
Storage Temperature	-40 °C to +85 °C
Total Power Dissipation	2.5 W
RF Input Power[4] (CW)	0 dBm
DC Operating Voltage	+16 V

3. Continuous operation is not recommended at these extremes. Permanent damage may occur if any of these limits are exceeded.
4. Specified under matched load to 50Ω.

DETERMINING MAXIMUM THERMAL RESISTANCE OF USERS' EXTERNAL HEATSINK

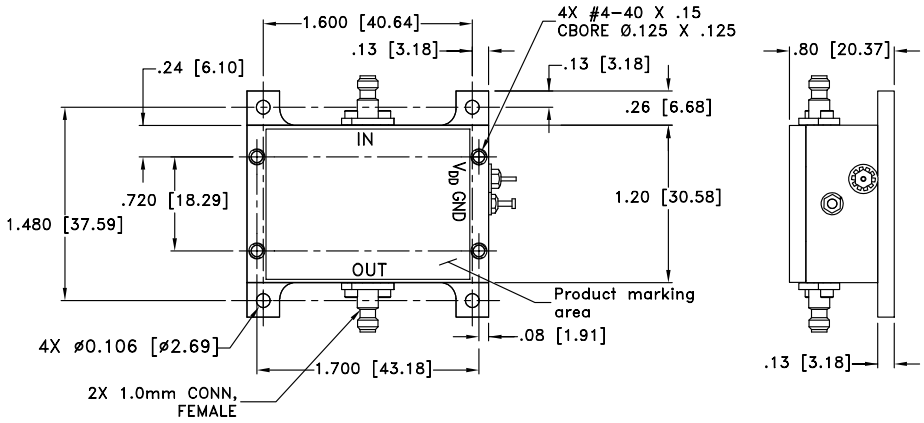
$$\text{MAXIMUM THERMAL RESISTANCE} = \frac{\text{MAXIMUM OPERATING CASE TEMP} - \text{MAXIMUM USER AMBIENT TEMP}}{\text{POWER DISSIPATION}}$$

Example:	MAXIMUM OPERATING CASE TEMP = +50 °C (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE) MAXIMUM USER AMBIENT TEMP = +30 °C (USER DEFINED) POWER DISSIPATION = 10 WATTS (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE) THEN MAXIMUM ALLOWABLE THERMAL RESISTANCE = 2 °C/W

High-Frequency Amplifier ZVA-71863LNX+

50Ω 71 to 86 GHz 1.0 mm Female

OUTLINE DRAWING



Weight: 60 grams
Dimensions are in inches [mm]. Tolerances: 2 Pl.±.03; 3 Pl. ±.015

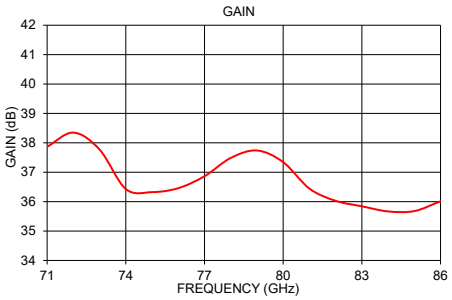
LOW NOISE, HIGH GAIN

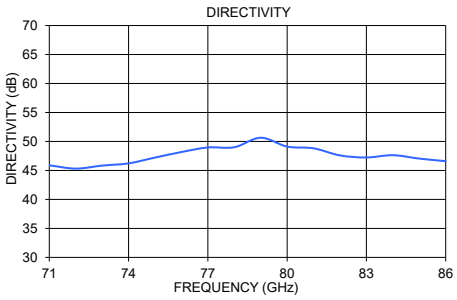
High-Frequency Amplifier ZVA-71863LNX+

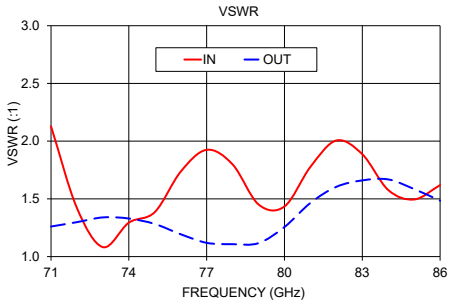
50Ω 71 to 86 GHz 1.0 mm Female

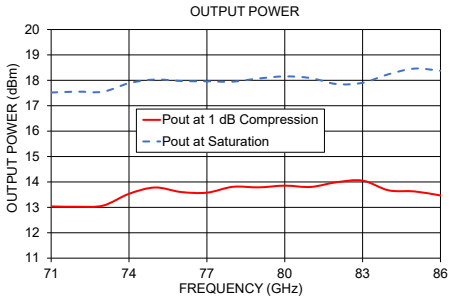
TYPICAL PERFORMANCE DATA

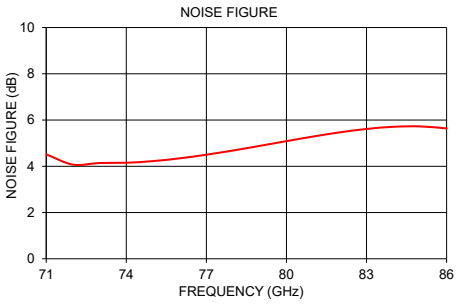
Frequency (GHz)	Gain (dB)	Directivity (dB)	VSWR (:1)		P_{OUT} at 1 dB Compression (dBm)	P_{OUT} at Saturation (dBm)	Noise Figure (dB)
	+10 V	+10 V	IN	OUT	+10 V	+10 V	+10 V
71	37.87	45.89	2.13	1.26	13.04	17.52	4.52
72	38.35	45.32	1.42	1.30	13.02	17.56	4.07
73	37.77	45.84	1.08	1.34	13.07	17.55	4.14
74	36.43	46.22	1.29	1.33	13.53	17.89	4.15
75	36.32	47.22	1.39	1.28	13.78	18.03	4.22
76	36.46	48.18	1.74	1.19	13.60	17.97	4.34
77	36.86	48.97	1.92	1.12	13.58	17.96	4.50
78	37.49	49.01	1.80	1.11	13.81	17.95	4.68
79	37.74	50.64	1.45	1.12	13.79	18.07	4.88
80	37.34	49.12	1.43	1.26	13.85	18.15	5.09
81	36.44	48.82	1.78	1.46	13.80	18.09	5.29
82	36.03	47.59	2.01	1.60	13.99	17.85	5.47
83	35.84	47.24	1.89	1.66	14.05	17.90	5.61
84	35.67	47.63	1.58	1.67	13.67	18.24	5.71
85	35.68	47.05	1.49	1.58	13.63	18.46	5.72
86	36.01	46.60	1.62	1.48	13.47	18.38	5.64











NOTES

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html

Coaxial Amplifier ZVA-71863LNX+

Typical Performance Data

FREQUENCY (GHz)	GAIN (dB) 10V	DIRECTIVITY (dB) 10V	VSWR (:1) IN 10V	VSWR (:1) OUT 10V	Pout @ 1 dB COMPRESSION (dBm) 10V	Pout @ SATURATION (dBm) 10V
71.0	37.87	45.89	2.13	1.26	13.04	17.52
71.5	38.17	45.65	1.75	1.27	13.03	17.43
72.0	38.35	45.32	1.42	1.30	13.02	17.56
72.5	38.23	45.63	1.14	1.32	13.04	17.62
73.0	37.77	45.84	1.08	1.34	13.07	17.55
73.5	37.04	46.10	1.25	1.34	13.33	17.74
74.0	36.43	46.22	1.29	1.33	13.53	17.89
74.5	36.27	46.86	1.29	1.31	13.72	17.99
75.0	36.32	47.22	1.39	1.28	13.78	18.03
75.5	36.34	48.05	1.56	1.24	13.81	17.89
76.0	36.46	48.18	1.74	1.19	13.60	17.97
76.5	36.59	48.55	1.87	1.15	13.63	17.95
77.0	36.86	48.97	1.92	1.12	13.58	17.96
77.5	37.15	49.23	1.89	1.11	13.52	18.04
78.0	37.49	49.01	1.80	1.11	13.81	17.95
78.5	37.73	50.26	1.63	1.11	13.77	18.02
79.0	37.74	50.64	1.45	1.12	13.79	18.07
79.5	37.70	50.38	1.38	1.16	13.91	18.25
80.0	37.34	49.12	1.43	1.26	13.85	18.15
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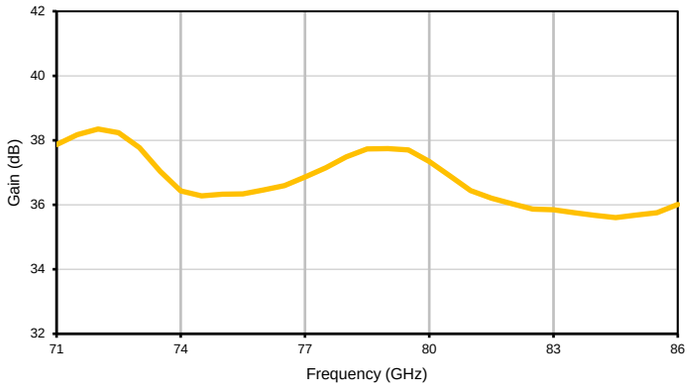
84.0	35.67	47.63	1.58	1.67	13.67	18.24
84.5	35.60	47.31	1.51	1.64	13.90	18.24
85.0	35.68	47.05	1.49	1.58	13.63	18.46
85.5	35.76	46.84	1.55	1.52	13.80	18.43
86.0	36.01	46.60	1.62	1.48	13.47	18.38

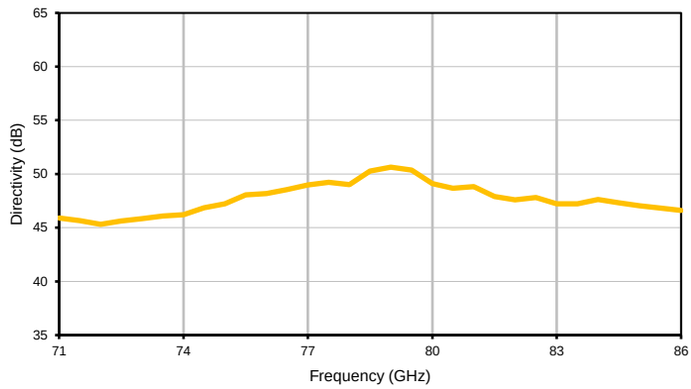
FREQUENCY (GHz)	NOISE FIGURE (dB) 10V
71.0	4.52
72.0	4.07
73.0	4.14
74.0	4.15
75.0	4.22
76.0	4.34
77.0	4.50
78.0	4.68
79.0	4.88
80.0	5.09
81.0	5.29
82.0	5.47
83.0	5.61
84.0	5.71
85.0	5.72
86.0	5.6

Typical Performance Curves

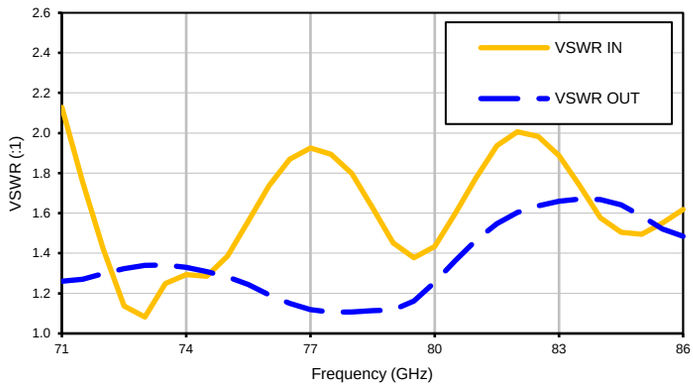
Gain @ 10V



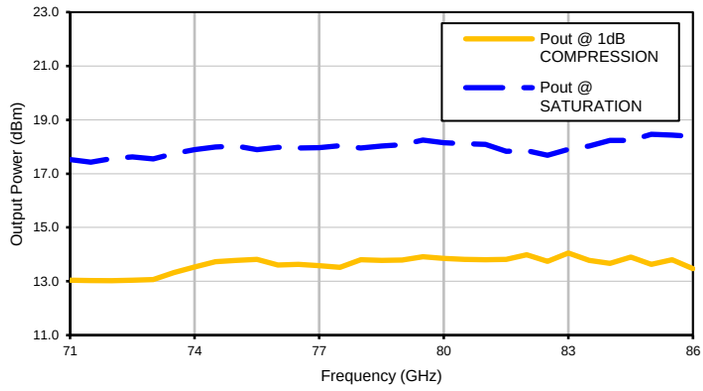
Directivity @ 10V



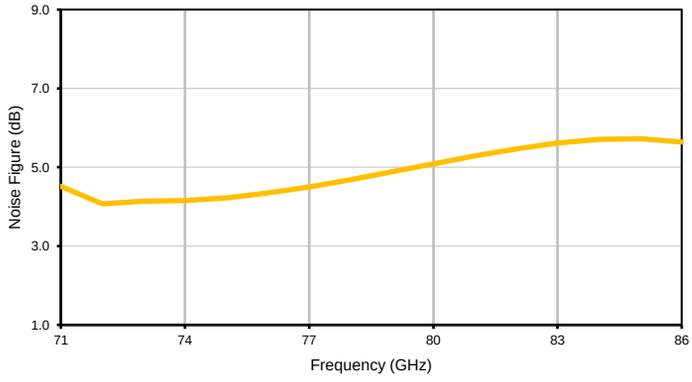
VSWR @ 10V



Output Power @ 10V



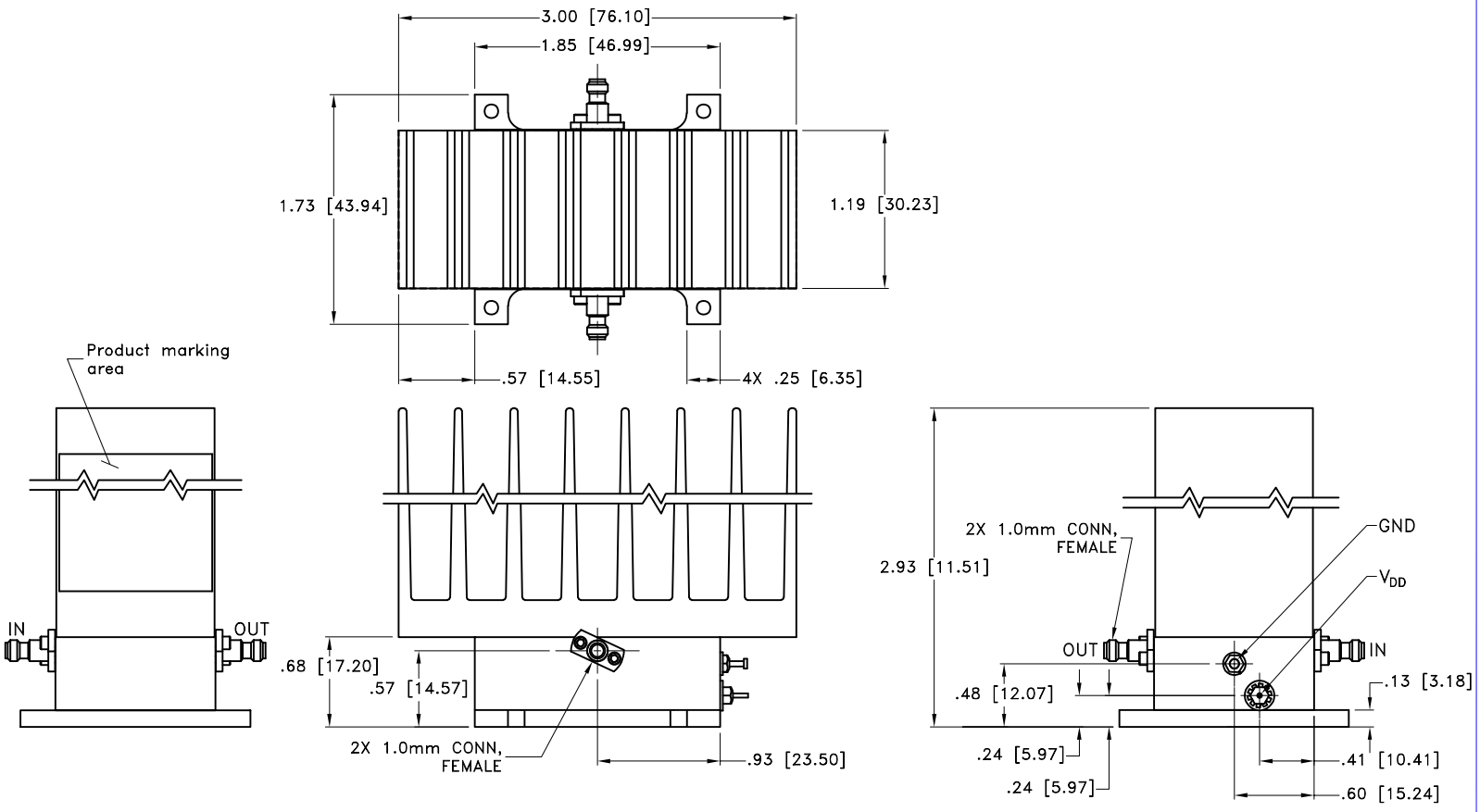
Noise Figure @ 10V



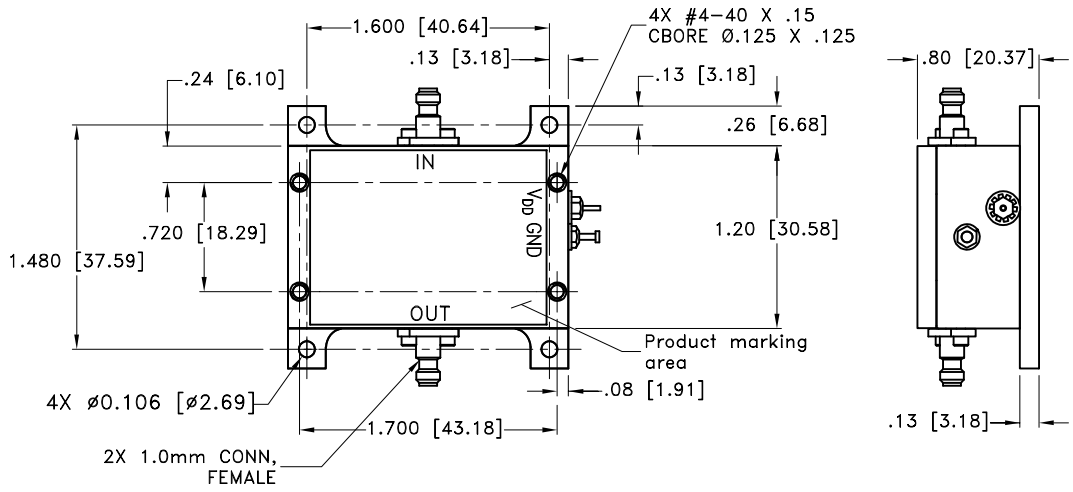
Case Style WC

Outline Dimensions

WC3071-5



MOUNTING INFORMATION OF MODEL WITHOUT HEATSINK



WT. WT. GRAMS 160 grams; WITHOUT HEATSINK GRAMS 60 grams

Dimensions are in inches [mm]. Tolerances: 2 Pl.±.03; 3 Pl. ±.015 Inches

Notes:

1. Case material: Aluminum.
2. Case finish: Gold plating;
3. Heat sink finish: Black anodize.
4. Refer to the individual model data sheet for the type of connectors available.
5. Shape of connector flange may vary.

Mini-Circuits

Environmental Specifications ENV130

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to +60° C Baseplate Temp	Individual Model Data Sheet
Storage Temperature	-40° to +85° C Ambient Environment	Individual Model Data Sheet
Burn-in	(DC on) 72 hours at 25°C	----
Thermal Shock	-40° C to +85°C, 100 cycles	Transition time = 5 mins, Dwell time = 30 mins
Vibration	Random Vibration (non-operating)	MIL-STD-883K, Method 2025, Cond. 1A