WAVEGUIDE HIGH FREQUENCY

Low Noise Amplifier

WVA-751103LNX+

75 to 110 GHz NF 3.5 dB WR10 UG-387/U

KEY FEATURES

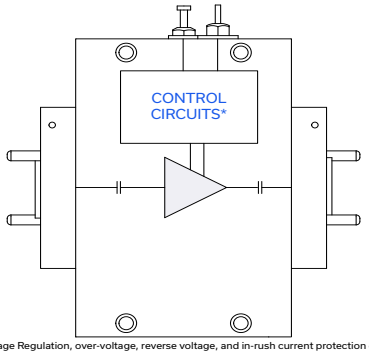
- Full WR10 Band Coverage
- Gain, 21 dB Typ.
- Gain Flatness, ±3 dB Typ.
- Excellent Noise Figure, 3.5 dB Typ.
- Wide DC Operating Voltage, +10 To +15 V
- Over Voltage and Reverse Voltage Protected

Generic photo used for illustration purposes only

APPLICATIONS

- Millimeter Wave Radar Targeting and Tracking
- Aerospace & Defense
- Test and Measurement
- W-Band Backhaul
- Satellite Communication
- Imaging
- 5G-FR2+ Millimeter Wave Testing

FUNCTIONAL DIAGRAM



*Voltage Regulation, over-voltage, reverse voltage, and in-rush current protection circuit

PRODUCT OVERVIEW

Mini-Circuits' WVA-751103LNX+ is a wideband low noise waveguide amplifier, covering the full 75 to 110 GHz WR10 band in a single device. The 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 consistent efficiency over the full input voltage range. The amplifier incorporates several DC-protection features such as over-voltage, reverse voltage, and in-rush current protection to protect from damage in case of unexpected spikes in voltage during operation. The high frequency and excellent low noise operation combined with good gain and gain flatness makes this amplifier an ideal choice for test and measurement, radar/ sensing applications, and wireless backhaul testing in millimeter wavebands.

ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Units
Frequency Range	-	75	-	110	GHz
Gain	75-100	-	23	-	dB
	100-110	-	19	-	
Gain Flatness	75-100	-	±2	-	dB
	100-110	-	±2	-	
Output Power at 1 dB Compression (P1dB)	75-110	-	-3	-	dBm
Saturated Output Power (P_{SAT})[2]	75-110	-	3	-	dBm
Noise Figure	75-110	-	3.5	-	dB
Input Return Loss	75-110	-	8	-	dB
Output Return Loss	75-110	-	8	-	dB
DC Supply Voltage (Vs)	-	+10	-	+15	V
DC Current at Vs=+10V	-	-	50	60[3]	mA

1. Open and short-circuit loads are not recommended at the amplifier output. Ensure proper WR10 load before turning the amplifier on.
2. At P_{SAT}, P_{OUT} changes less than 0.1 dB for a 1 dB change in P_{IN}.
3. Typical current measured under small signal condition. Max DC Current at P_{sat}. DC current increases as amplifier is driven into compression.

REV. A
ECO-020150
WVA-751103LNX+
MCL NY
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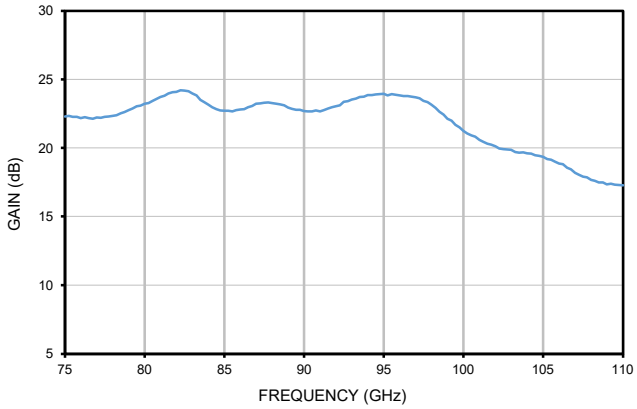
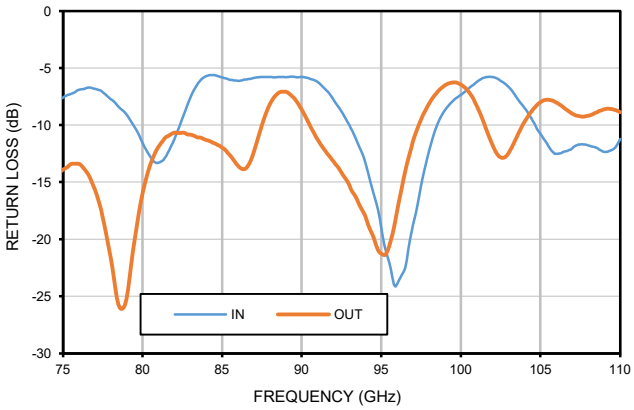
TYPICAL PERFORMANCE GRAPHS

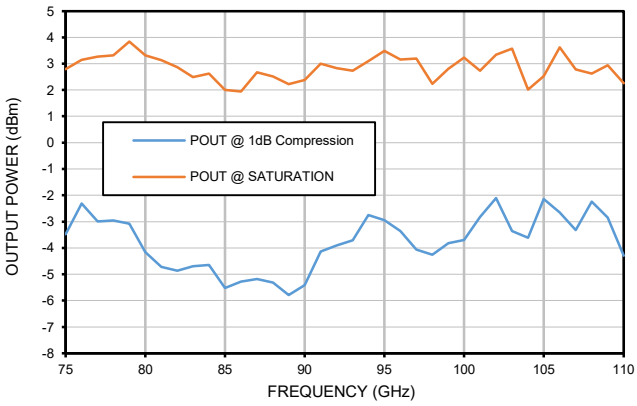
GAIN



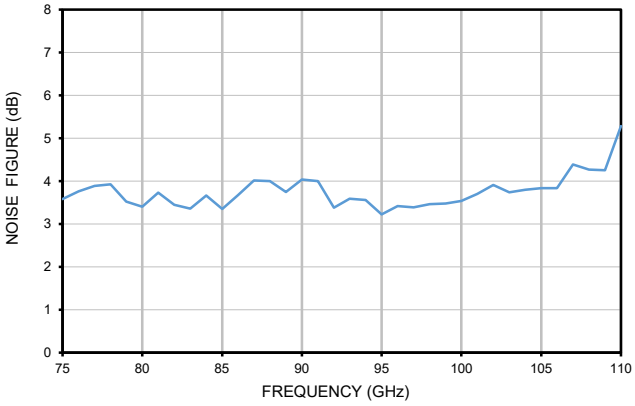
RETURN LOSS



OUTPUT POWER



NOISE FIGURE



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ABSOLUTE MAXIMUM RATINGS[4]

Parameter	Ratings
Operating Temperature	-40 °C to +60 °C Baseplate
Storage Temperature	-40 °C to +85 °C
Total Power Dissipation	0.8 W
RF Input Power[5] (CW)	+15 dBm
DC Operating Voltage (Vs)	+16 V

4. Continuous operation is not recommended at these extremes. Permanent damage may occur if any of these limits are exceeded.
5. Specified under matched WR10 load.

DETERMINING MAXIMUM THERMAL RESISTANCE OF USERS' EXTERNAL HEAT SINK

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

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

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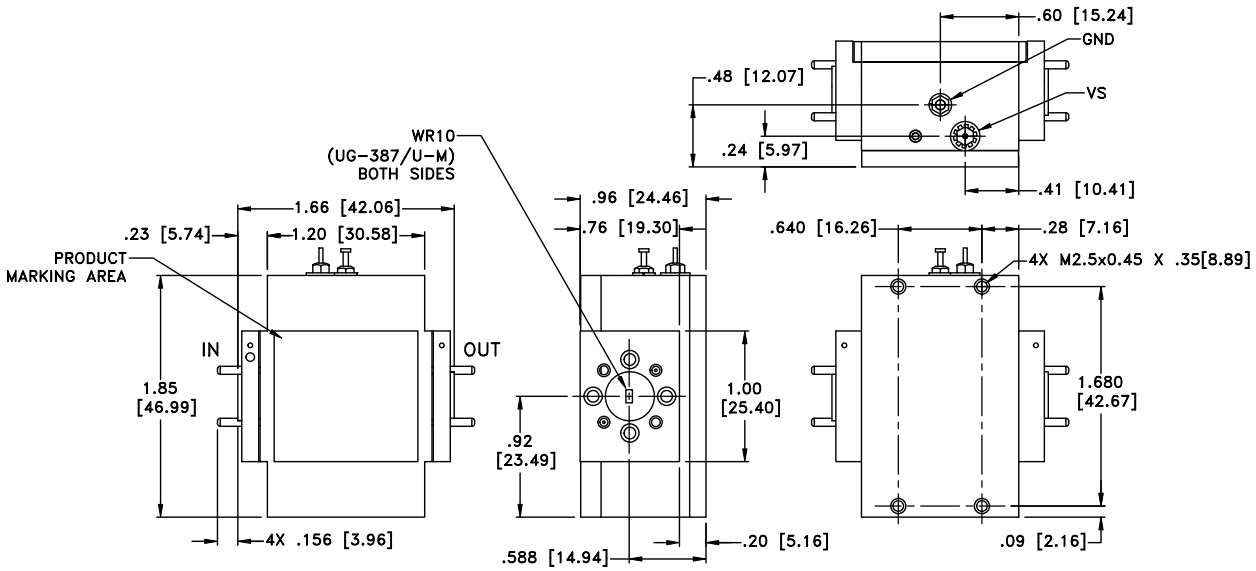
CASE STYLE DRAWING



Weight 200 grams; Without Heatsink 100 grams
Dimensions are in inches [mm]. Tolerances: 2 PL±.03; 3 PL ±.015 INCHES

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ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD.

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file)
RoHS Status	Compliant
Environmental Ratings	ENV130
Export Information	ECCN #3A001.B.4 This item will require an export license when shipped to certain countries

ORDERING INFORMATION

Model No. Links	WVA-751103LNX+
Product Marking	WVA-751103LNX+
Case Style	YS3541
Connector	WR10 UG-387/U

NOTES

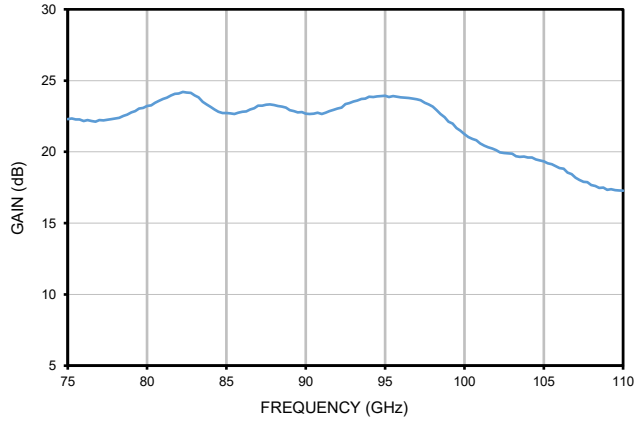
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

Typical Performance Data

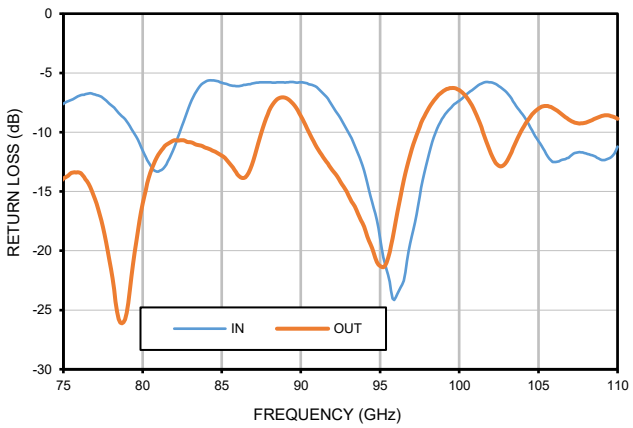
FREQUENCY (GHz)	GAIN (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB) IN	RETURN LOSS (dB) OUT	Pout @ 1 dB COMPRESSION (dBm)	Pout at SATURATION (dBm)
75.0	22.3	32.1	7.6	13.9	-3.5	2.8
76.0	22.2	33.6	6.9	13.4	-2.3	3.1
77.0	22.2	34.1	6.8	15.6	-3.0	3.3
78.0	22.3	34.3	7.7	21.5	-3.0	3.3
79.0	22.8	33.8	9.1	25.3	-3.1	3.8
80.0	23.2	33.5	11.5	16.0	-4.2	3.3
81.0	23.7	35.0	13.3	11.9	-4.7	3.1
82.0	24.1	36.7	11.3	10.7	-4.9	2.9
83.0	24.0	41.9	7.6	10.9	-4.7	2.5
84.0	23.2	57.2	5.7	11.3	-4.6	2.6
85.0	22.7	46.4	5.8	12.0	-5.5	2.0
86.0	22.8	43.4	6.1	13.6	-5.3	1.9
87.0	23.2	41.0	5.9	12.4	-5.2	2.7
88.0	23.3	37.7	5.8	8.2	-5.3	2.5
89.0	22.9	35.3	5.8	7.1	-5.8	2.2
90.0	22.7	34.9	5.8	8.6	-5.4	2.4
91.0	22.7	34.2	6.2	11.3	-4.1	3.0
92.0	23.0	35.7	7.8	13.2	-3.9	2.8
93.0	23.5	36.0	10.0	15.3	-3.7	2.7
94.0	23.9	35.2	13.2	18.0	-2.8	3.1
95.0	23.9	33.3	19.0	21.3	-2.9	3.5
96.0	23.8	31.9	23.9	17.5	-3.4	3.2
97.0	23.7	31.0	18.8	11.4	-4.1	3.2
98.0	23.2	30.4	12.3	8.2	-4.3	2.2
99.0	22.1	30.0	8.7	6.5	-3.8	2.8
100.0	21.2	29.6	7.4	6.4	-3.7	3.2
101.0	20.6	28.4	6.2	8.3	-2.8	2.7
102.0	20.1	27.1	5.8	11.8	-2.1	3.3
103.0	19.9	26.2	6.7	12.5	-3.4	3.6
104.0	19.6	25.3	8.5	9.7	-3.6	2.0
105.0	19.3	24.7	10.7	8.0	-2.1	2.5
106.0	18.9	23.7	12.5	8.0	-2.6	3.6
107.0	18.2	22.2	12.0	9.0	-3.3	2.8
108.0	17.7	20.4	11.8	9.2	-2.2	2.6
109.0	17.3	18.3	12.4	8.6	-2.8	2.9
110.0	17.3	15.8	11.2	8.9	-4.3	2.3

Typical Performance Curves

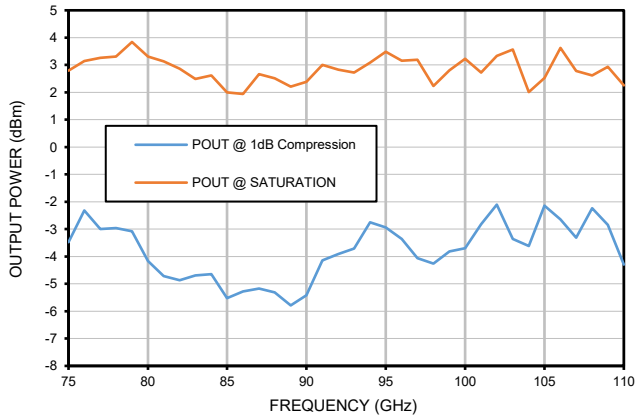
GAIN



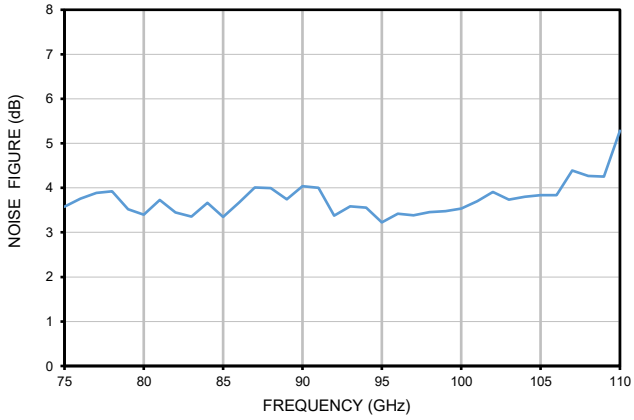
RETURN LOSS



OUTPUT POWER

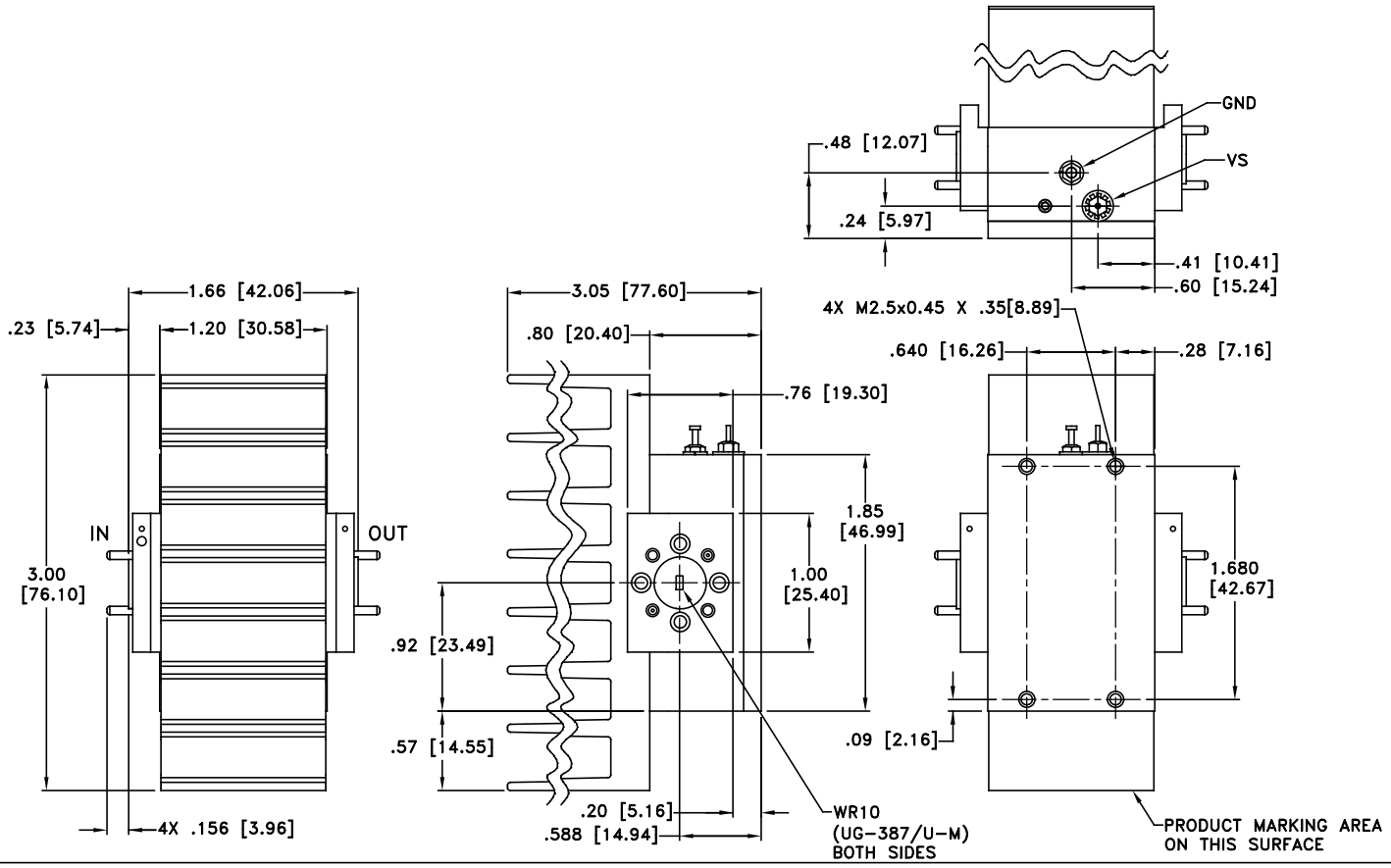


NOISE FIGURE

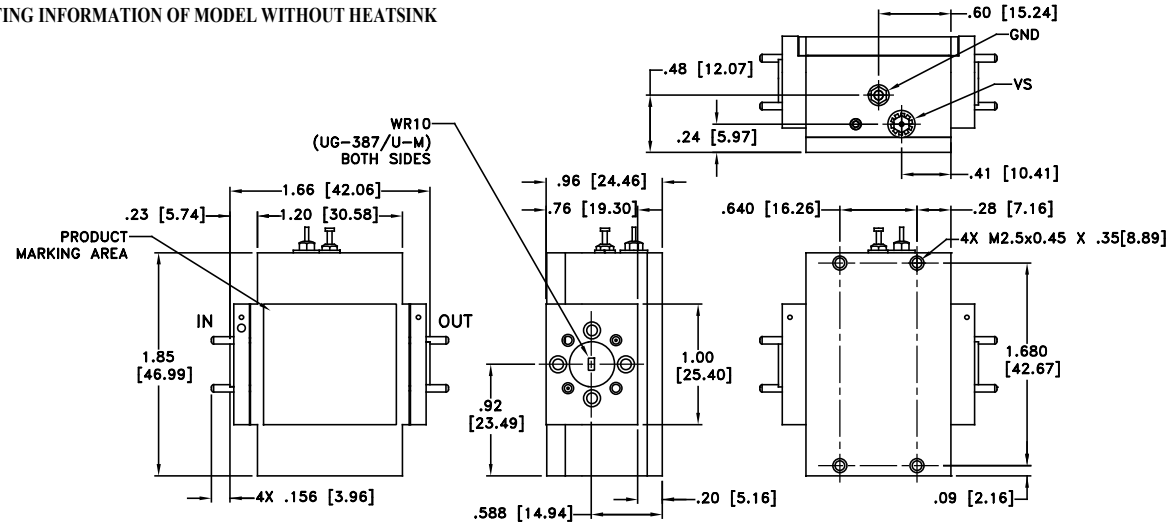


Case Style YS

Outline Dimensions YS3541



MOUNTING INFORMATION OF MODEL WITHOUT HEATSINK



Notes:
1. Case material: Aluminum
2. Case finish: Gold plating
3. Heat sink finish: Black anodize

Weight: 200 grams; Without Heatsink 100 grams

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

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