



MEDIUM POWER, HIGH GAIN

# Wideband Amplifier

**ZVA-02443HP+**  
**ZVA-02443HPX+**

50Ω 2 to 43.5 GHz

## THE BIG DEAL

- High Gain of 37 dB typ.
- Excellent gain flatness, ±2.0 dB typ.
- Saturated Output Power >=+20 dBm typ.
- Available with and without heatsink
- Operates with a single DC supply of +9 to +15 V
- Over-Voltage and Reverse Voltage protected



Generic photo used for illustration purposes only

## APPLICATIONS

- Wideband Test and Instrumentation
- 5G
- SATCOM
- EW

Model No.	ZVA-02443HP+	ZVA-02443HPX+▲
Case Style	T2704	
Connectors	2.92mm Female	

**+RoHS Compliant**  
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

## PRODUCT OVERVIEW

Mini-Circuits' ZVA-02443HP+ is a coaxial, medium power, wideband and high gain amplifier operating from 2 GHz to 43.5 GHz. The model operates over a single positive supply range of +9 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 protects the amplifier from damage if mishandled during operation. The Amplifier is capable of delivering about +20 dBm of saturated RF power over the entire band and has excellent Noise Figure performance of 3.5 dB, typ., up to 26.5 GHz. The wideband operation combined with a decent output power makes it an ideal choice for testing and instrumentation applications.

## KEY FEATURES

Feature	Advantages
Wide-band amplifier, 2 to 43.5 GHz	A single amplifier serves the need for applications including Test & instrumentation, 5G bands (24 to 39 GHz), SATCOM, etc.
<ul style="list-style-type: none"> <li>• High Gain</li> <li>• Wideband</li> <li>• Medium RF power</li> </ul>	The amplifier is capable of providing high gain of 37 dB typ. over the entire operating band with a good saturated RF power of +20 dBm typ.
Adjustable DC Supply voltage	The device is capable of operating from +9 to +15 V with constant DC power consumption with no effect on RF performance.
DC Protection <ul style="list-style-type: none"> <li>• Over-voltage</li> <li>• Reverse voltage</li> <li>• In-rush current</li> </ul>	The internal DC circuitry allows the amplifier to be protected from any external mishandling that could lead to catastrophic failures in the field.

REV.B  
ECO-008181  
ZVA-02443HP+  
AD/JM/CP/AM  
210610





## ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Condition (MHz)	ZVA-02443HP+ ZVA-02443HPX+▲			Units
		Min.	Typ.	Max.	
Frequency Range		2000		43500	MHz
Gain	2000 - 18000		39		dB
	18000 - 32000		37		
	32000 - 40000		36		
	40000 - 43500		35		
Input VSWR	2000 - 18000		1.5		:1
	18000 - 32000		1.3		
	32000 - 40000		1.6		
	40000 - 43500		1.9		
Output VSWR <sup>2</sup>	2000 - 18000		1.7		:1
	18000 - 32000		2.1		
	32000 - 40000		2.3		
	40000 - 43500		2.6		
Output Power at 1dB compression	2000 - 18000		21		dBm
	18000 - 32000		17		
	32000 - 40000		16		
	40000 - 43500		15		
Output IP3	2000 - 18000		27		dBm
	18000 - 32000		23		
	32000 - 40000		21		
	40000 - 43500		20		
Noise Figure	2000-26500		3.5		dB
	26500-43500		6.0		
Operating DC Voltage		+9		+15	V
Device Operating Current at +9V <sup>1</sup>				500	mA
Device Operating Power at Operating DC Voltage		—	4.0	—	W

1. DC Supply must be able to source at least 550mA DC at startup.

2. Open and short-circuit loads and not recommended at the amplifier output. Ensure proper 50 Ohm load before turning the amplifier "ON".

MAXIMUM RATINGS<sup>3,4</sup>

Parameter	Ratings
Operating Temperature (Ambient)	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Total Power dissipation	4.5W
Input Power (CW)	+5 dBm
DC Voltage	+16V

3. For units without heat-sink, limit the maximum base-plate temperature to +45°C to ensure proper performance. Alternative heat sinking and heat removal can be provided by the user with max. thermal resistance of 1.8°C/W. This allows the max. ambient temperature to be +85°C

4. Permanent damage may occur if any of these limits are exceeded.

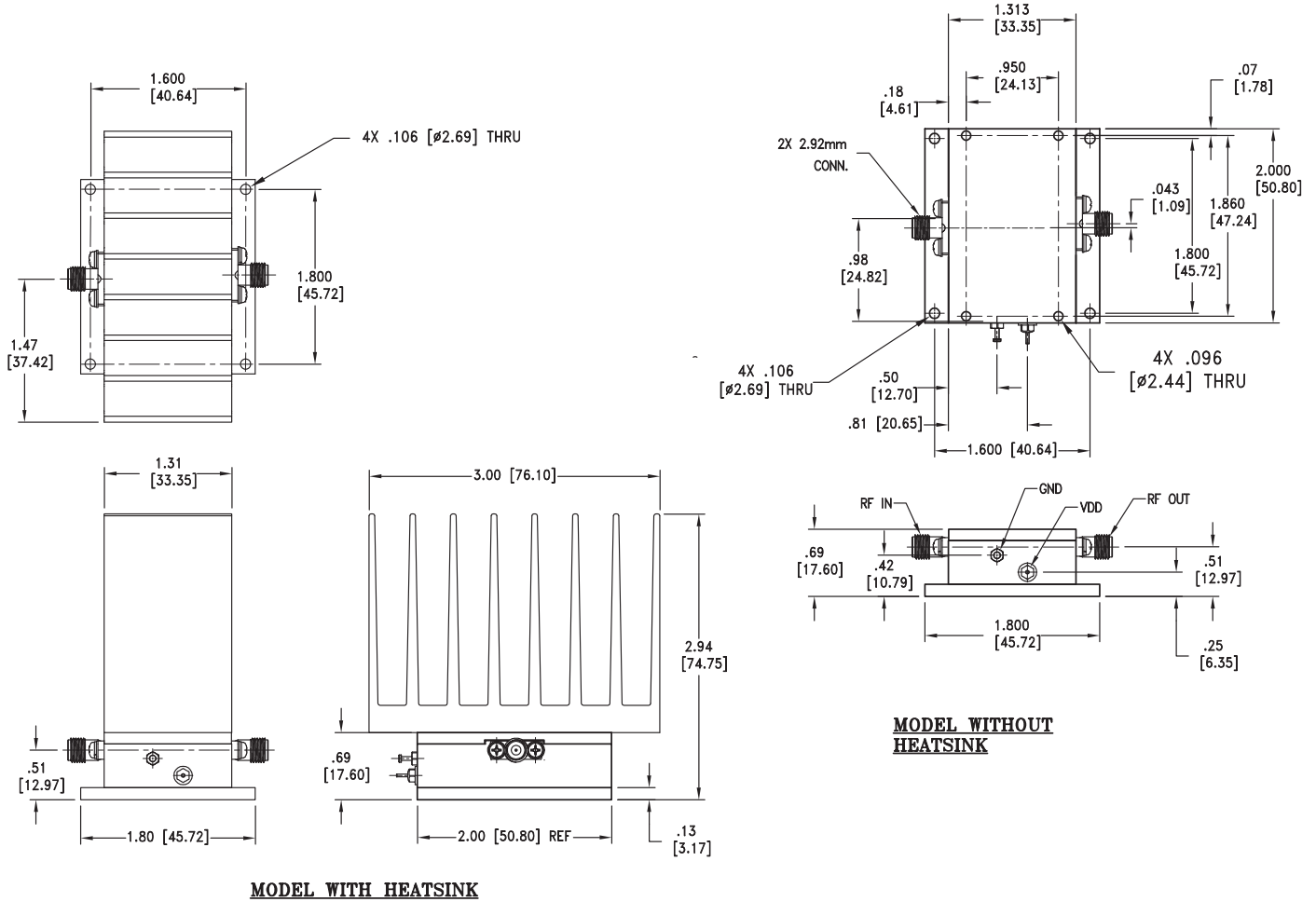


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### OUTLINE DRAWING



Weight: 350 grams; Weight without heatsink: 220 grams

Dimensions are in inches (mm). Tolerances: 2 Pl.±.03; 3 Pl. ± .015



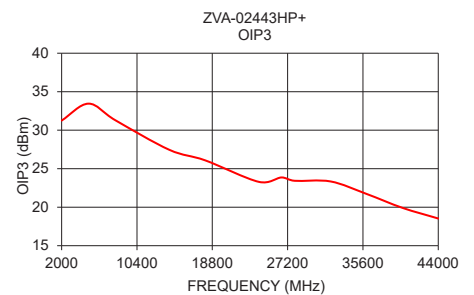
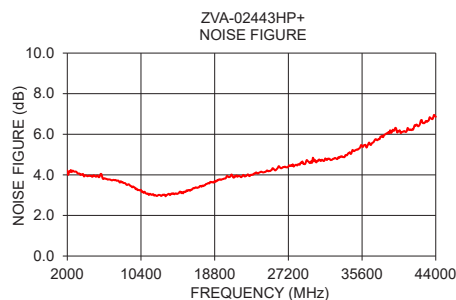
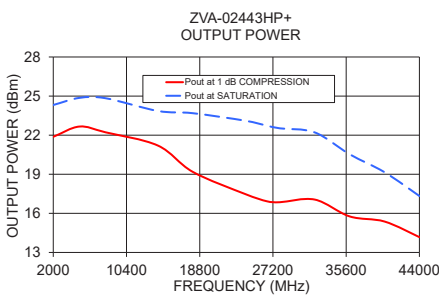
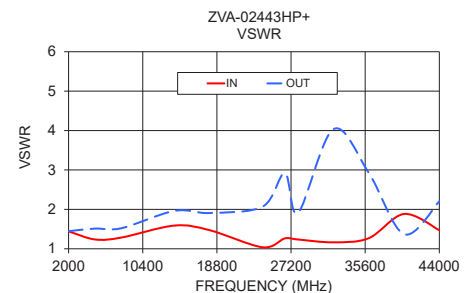
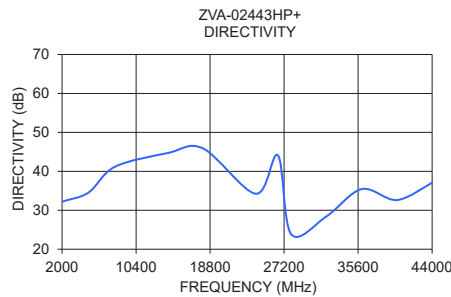
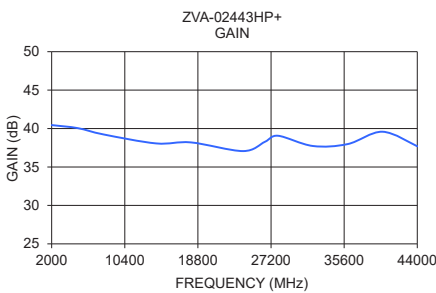
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## ZVA-02443HP+ ZVA-02443HPX+

### TYPICAL PERFORMANCE DATA/CURVES

Frequency (MHz)	Gain (dB)	Directivity (dB)	VSWR (:1)		NOISE FIGURE (dB)	P <sub>OUT</sub> at 1 dB COMPR. (dBm)	P <sub>OUT</sub> at SATURATION (dBm)	OIP <sub>3</sub> (dBm)
			IN	OUT				
2000	40.45	32.20	1.44	1.45	4.21	21.87	24.32	31.25
5000	40.05	34.55	1.24	1.51	3.98	22.66	24.86	33.45
8000	39.22	41.18	1.29	1.52	3.62	22.22	24.84	31.29
14000	38.07	44.70	1.59	1.96	3.06	21.20	23.86	27.46
18000	38.20	45.88	1.47	1.91	3.58	19.18	23.69	26.09
24000	37.07	34.23	1.04	2.07	4.14	17.49	23.11	23.29
26500	38.28	44.09	1.26	2.92	4.35	16.93	22.73	23.86
28000	39.06	23.86	1.24	1.91	4.48	16.86	22.52	23.43
32000	37.73	28.41	1.16	4.04	4.73	17.06	22.21	23.34
36000	37.98	35.43	1.27	2.93	5.34	15.77	20.53	21.73
40000	39.59	32.62	1.88	1.37	6.06	15.37	19.16	19.92
44000	37.69	37.08	1.47	2.20	6.86	14.17	17.33	18.53



### NOTES

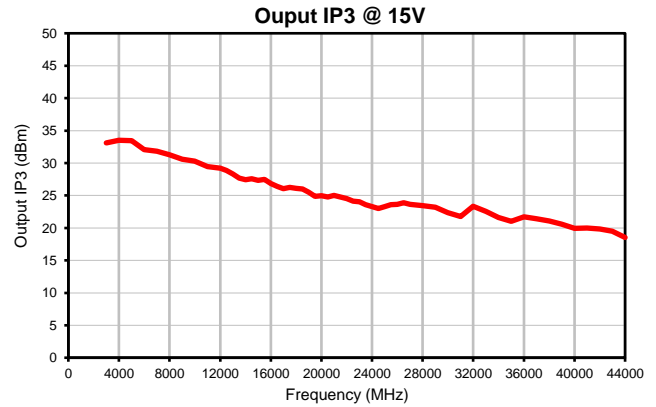
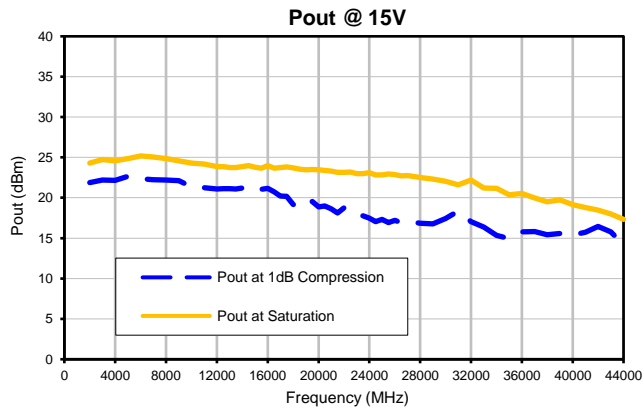
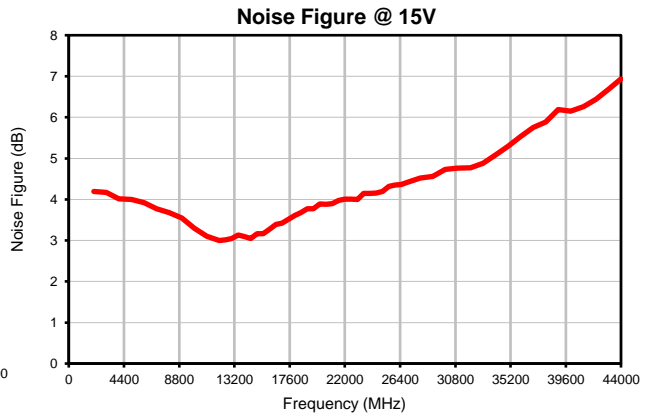
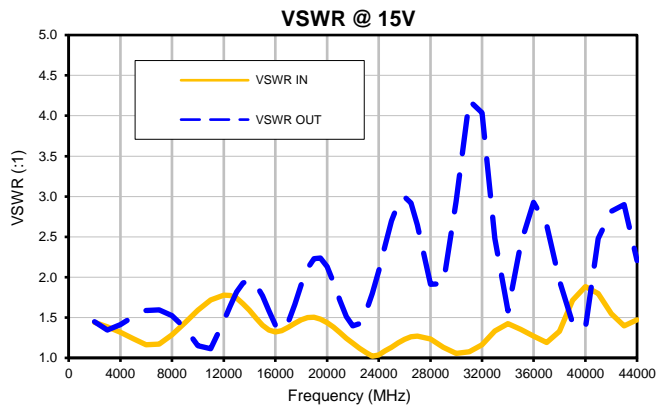
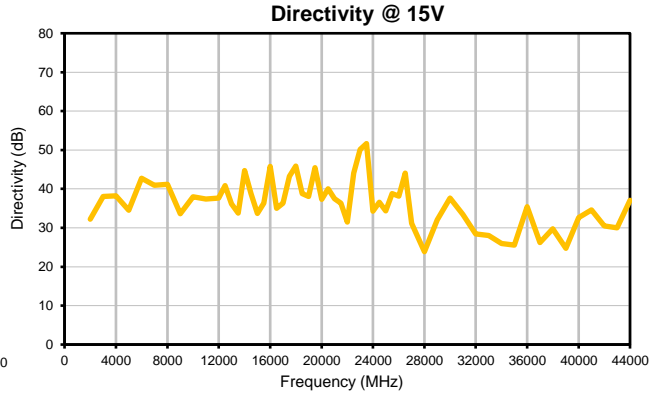
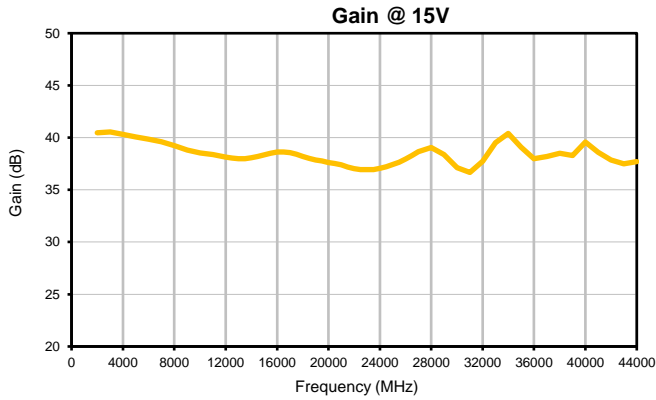
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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 there in. For a full statement of the standard. Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



## Typical Performance Data

FREQUENCY (MHz)	GAIN (dB) 15V	DIRECTIVITY (dB) 15V	VSWR (:1)		NOISE FIGURE (dB) 15V	POUT @ 1 dB COMPRESSION (dBm) 15V	POUT @ SATURATION (dBm) 15V	OUTPUT IP3 (dBm) 15V
			IN 15V	OUT 15V				
2000	40.45	32.20	1.44	1.45	4.19	21.87	24.32	31.25
3000	40.54	38.04	1.38	1.35	4.17	22.22	24.73	33.09
4000	40.32	38.24	1.32	1.41	4.01	22.16	24.60	33.51
5000	40.05	34.55	1.24	1.51	4.00	22.66	24.86	33.45
6000	39.86	42.72	1.16	1.59	3.92	22.37	25.19	32.07
7000	39.61	40.93	1.17	1.60	3.77	22.24	25.04	31.82
8000	39.22	41.18	1.29	1.52	3.68	22.22	24.84	31.29
9000	38.82	33.58	1.44	1.37	3.55	22.13	24.59	30.59
10000	38.55	38.00	1.59	1.15	3.30	21.38	24.30	30.29
11000	38.37	37.40	1.72	1.11	3.10	21.25	24.19	29.45
12000	38.15	37.65	1.78	1.46	3.00	21.11	23.87	29.21
12500	38.06	40.81	1.77	1.64	3.01	21.11	23.85	28.87
13000	37.99	36.17	1.74	1.82	3.04	21.14	23.76	28.34
13500	37.99	33.78	1.67	1.93	3.13	21.08	23.73	27.66
14000	38.07	44.70	1.59	1.96	3.09	21.20	23.86	27.46
14500	38.20	38.84	1.49	1.91	3.04	21.41	23.97	27.58
15000	38.36	33.73	1.41	1.77	3.16	21.40	23.80	27.34
15500	38.51	36.34	1.35	1.58	3.16	21.05	23.68	27.49
16000	38.63	45.79	1.32	1.41	3.28	21.17	23.96	26.82
16500	38.63	35.03	1.34	1.34	3.39	20.72	23.66	26.41
17000	38.56	36.35	1.38	1.45	3.42	20.21	23.74	26.05
17500	38.42	43.20	1.43	1.66	3.52	20.16	23.84	26.25
18000	38.20	45.88	1.47	1.91	3.61	19.18	23.69	26.09
18500	38.00	38.80	1.50	2.11	3.67	18.74	23.53	25.99
19000	37.86	38.02	1.50	2.23	3.77	18.99	23.45	25.50
19500	37.77	45.43	1.48	2.24	3.77	19.53	23.52	24.89
20000	37.63	37.30	1.44	2.13	3.89	18.86	23.45	24.96
20500	37.51	40.01	1.38	1.93	3.88	18.99	23.38	24.76
21000	37.38	37.47	1.31	1.71	3.89	18.65	23.33	25.02
21500	37.18	36.35	1.24	1.51	3.98	18.11	23.14	24.75
22000	37.02	31.45	1.18	1.40	4.01	18.74	23.14	24.51
22500	36.94	44.03	1.12	1.42	4.01	18.48	23.18	24.12
23000	36.95	50.12	1.07	1.57	4.00	17.85	23.01	24.05
23500	36.95	51.65	1.02	1.80	4.15	17.76	22.99	23.57
24000	37.07	34.23	1.04	2.07	4.14	17.49	23.11	23.29
24500	37.23	36.55	1.09	2.39	4.15	17.04	22.83	22.99
25000	37.42	34.35	1.13	2.70	4.20	17.33	22.83	23.27
25500	37.66	38.79	1.19	2.91	4.32	16.94	22.95	23.57
26000	37.95	38.15	1.23	3.00	4.35	17.19	22.86	23.65
26500	38.28	44.09	1.26	2.92	4.36	16.93	22.73	23.86
27000	38.66	31.17	1.27	2.65	4.42	17.10	22.76	23.66
28000	39.06	23.86	1.24	1.91	4.52	16.86	22.52	23.43
29000	38.39	32.01	1.13	1.92	4.56	16.76	22.33	23.18
30000	37.12	37.63	1.06	2.94	4.73	17.44	22.03	22.35
31000	36.67	33.46	1.08	4.19	4.76	18.37	21.62	21.78
32000	37.73	28.41	1.16	4.04	4.77	17.06	22.21	23.34
33000	39.51	28.02	1.33	2.48	4.88	16.38	21.21	22.53
34000	40.40	25.97	1.42	1.58	5.08	15.35	21.17	21.61
35000	39.07	25.58	1.35	2.42	5.29	14.93	20.36	21.04
36000	37.98	35.43	1.27	2.93	5.53	15.77	20.53	21.73
37000	38.19	26.22	1.19	2.65	5.76	15.80	19.97	21.42
38000	38.50	29.71	1.33	1.95	5.88	15.41	19.50	21.08
39000	38.28	24.73	1.71	1.43	6.19	15.58	19.73	20.60
40000	39.59	32.62	1.88	1.37	6.15	15.37	19.16	19.92
41000	38.61	34.58	1.80	2.48	6.26	15.76	18.81	19.98
42000	37.85	30.50	1.55	2.82	6.44	16.44	18.48	19.84
43000	37.50	30.01	1.40	2.90	6.68	15.79	17.99	19.51
44000	37.69	37.08	1.47	2.20	6.94	14.17	17.33	18.53

## Typical Performance Curves







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 85° C Ambient Environment	Individual Model Data Sheet
Base Plate Temperature	85°C	Unit with Heatsink
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Stabilization Bake	(non-operating) 125°C, 24 hours	---
Burn-in at Elevated Temp.	(DC on) 72 hours at 85° C	----
Thermal Shock	-40° C to +85°C, 100 cycles	Transition time = 5 mins, Dwell time = 30 mins