MEDIUM POWER, HIGH GAIN

Wideband Amplifier

ZVE-453HP+
ZVE-453HPX+

50Ω 1.25 W 18 to 45 GHz 2.4 mm Female

THE BIG DEAL

- High Gain, 39 dB Typ. Over the Entire Operating Band
- Excellent Gain Flatness, ±2.5 dB Typ.
- Saturated Output Power, +31 dBm Typ.
- Adjustable DC Voltage, +10 to +15 V

Generic photo used for illustration purposes only

APPLICATIONS

- Wideband Test and Instrumentation
- 5G mmW
- SATCOM
- Wireless Infrastructure

Model No.	ZVE-453HP+	ZVE-453HPX+
Option	With Heatsink & Fan	Without Heatsink & Fan
Case Style	VN3071-4	
Connectors	2.4 mm Female	

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

PRODUCT OVERVIEW

Mini-Circuits' ZVE-453HP(X)+ is a coaxial, 1.25 W wideband high gain amplifier, operating from 18 to 45 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 wideband operation combined with high output power makes this amplifier an ideal choice for testing and instrumentation applications.

KEY FEATURES

Feature	Advantages
Wideband Amplifier, 18 to 45 GHz	A single amplifier supports a wide range of applications, including 5G bands (24 to 39 GHz), SATCOM, and test and instrumentation.
Integrated Fan Assembly	Model ZVE-453HP+ utilizes two integrated fans, keeping the amplifier cool to the touch during normal operation at room temperature.
High Gain Low VSWR Medium RF Power	The amplifier provides 39 dB (typ.) of gain over the entire operating band, and is capable of delivering over 1 W of RF power.
Adjustable DC Supply Voltage	The device is capable of operating from +10 to +15 V with consistent DC power consumption.
DC Protection – Over-Voltage Reverse-Voltage In-Rush Current	The internal DC circuitry allows the amplifier to be protected from external mishandling, that could lead to catastrophic failures in the field.

REV. B
ECO-022344
ZVE-453HP(X)+
MCL NY
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Wideband Amplifier

ZVE-453HP+
ZVE-453HPX+

50Ω 1.25 W 18 to 45 GHz 2.4 mm Female

ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE

Parameter	Condition (MHz)	ZVE-453HP+[1] ZVE-453HPX+[2] Min.	Typ.	Max.	Units
Frequency Range		18000		45000	MHz
Gain	18000–30000	33.0	37	–	dB
	30000–45000	35.0	40	–	
Output Power at 1 dB Compression	18000–26000	+25.0	+29.0	–	dBm
	26000–40000	+29.0	+30.5	–	
	40000–45000	+25.5	+28.5	–	
Saturated Output Power[3]	18000–26000	+28.0	+30.5	–	dBm
	26000–40000	+30	+32.0	–	
	40000–45000	+27.5	+30.0	–	
Output IP3	18000–45000	–	+41	–	dBm
Input VSWR	18000–45000	–	1.5	2.0	:1
Output VSWR[4]	18000–45000	–	1.5	2.0	:1
Operating DC Voltage (V_{DD})	–	+10	–	+15	V
Device Operating Current at +15 V (ZVE-453HPX+ / ZVE-453HP+)	–	–	900[2] / 1100[1]	1600[2] / 1800[1]	mA
Device Operating Power at +15 V	–	–	19[5]	–	W

1. For units with heatsink, limit ambient temperature to +50 °C.
2. For units without heatsink, limit the maximum baseplate temperature to +60 °C.
3. At P_{SAT}, P_{OUT} changes less than 0.1 dB for a 1 dB change in P_{IN}.
4. Open and short-circuit loads are not recommended at the amplifier output. Ensure proper 50Ω load before turning the amplifier "ON".
5. Device operating power is based on current when amplifier is in saturation.

ABSOLUTE MAXIMUM RATINGS[6, 7]

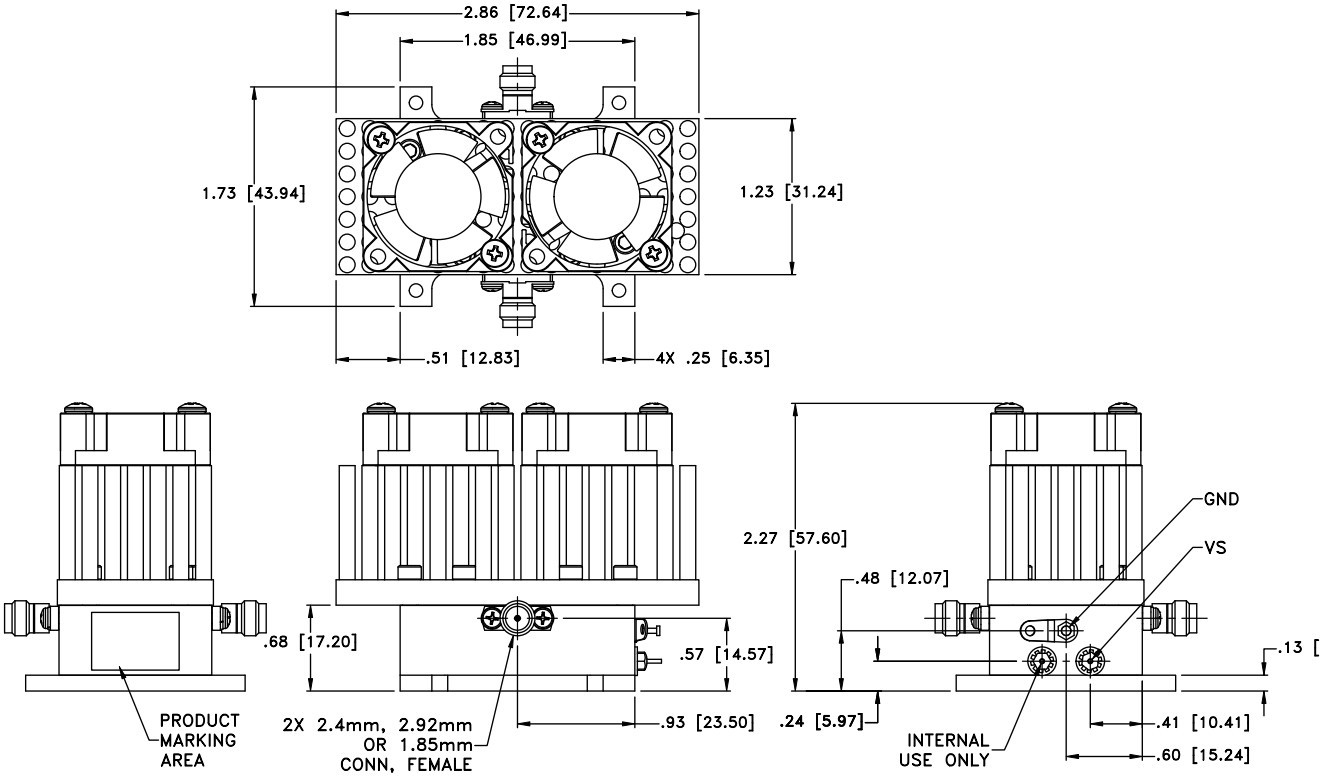
Parameter	Ratings
Operating Temperature	ZVE-453HP+ -40 °C to +50 °C Ambient ZVE-453HPX+ -40 °C to +60 °C Baseplate Temperature
Storage Temperature	-40 °C to +85 °C
Total Power Dissipation	24 W
RF Input Power (CW)	+2 dBm
DC Operating Voltage	+16 V

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

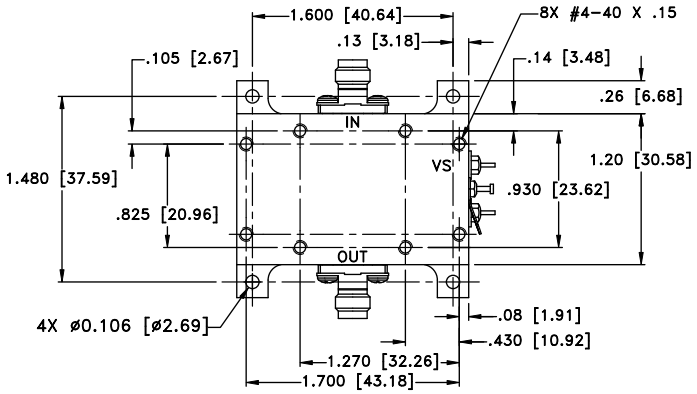
Wideband Amplifier

50Ω 1.25 W 18 to 45 GHz 2.4 mm Female

OUTLINE DRAWING FOR MODEL WITH HEATSINK & FAN (ZVE-453HP+)



MOUNTING INFORMATION FOR MODEL WITHOUT HEATSINK & FAN (ZVE-453HPX+)



Weight: 160 grams; Without heatsink: 60 grams
Dimensions are in inches [mm]. Tolerances: 2 Pl. ±0.03; 3 Pl. ±0.015

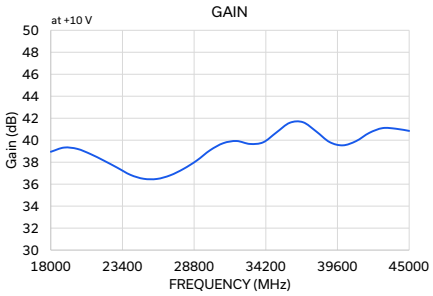
Wideband Amplifier

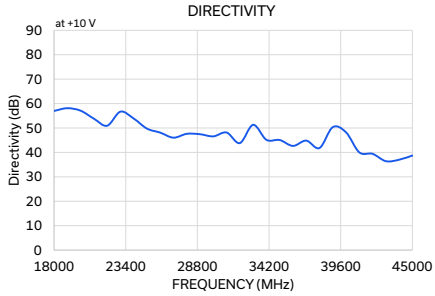
ZVE-453HP+
ZVE-453HPX+

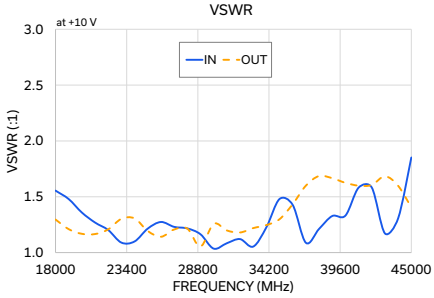
50Ω 1.25 W 18 to 45 GHz 2.4 mm Female

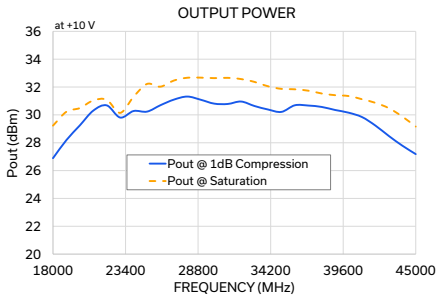
TYPICAL PERFORMANCE DATA/CURVES

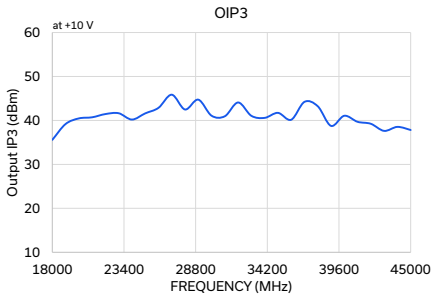
Frequency (MHz)	Gain (dB)	Directivity (dB)	VSWR (:1)		P_{OUT} at 1 dB Compression (dBm)	P_{OUT} at Saturation (dBm)	Output IP3 (dBm)
	+10 V	+10 V	IN	OUT	+10 V	+10 V	+10 V
18000	38.95	56.99	1.56	1.30	26.89	29.23	35.57
21000	38.74	53.83	1.27	1.17	30.31	31.04	40.71
24000	36.85	53.88	1.10	1.31	30.28	31.30	40.20
27000	36.80	46.04	1.23	1.21	31.10	32.47	45.85
30000	39.08	46.57	1.04	1.26	30.81	32.64	41.07
33000	39.66	51.30	1.05	1.22	30.64	32.37	41.05
36000	41.58	42.67	1.43	1.43	30.69	31.84	40.16
39000	39.83	50.34	1.33	1.67	30.35	31.42	38.76
42000	40.67	39.41	1.58	1.61	29.23	30.87	39.23
45000	40.85	38.74	1.85	1.40	27.18	29.16	37.82











NOTES

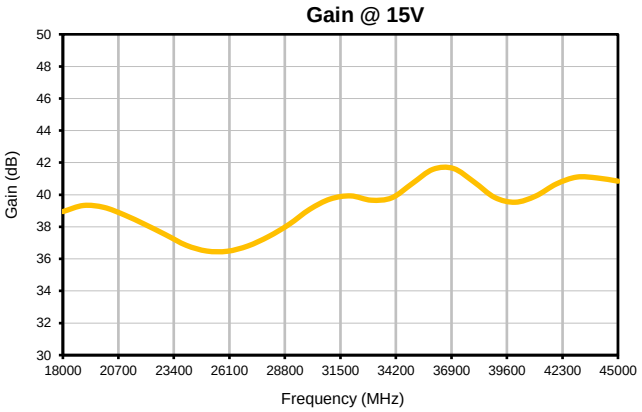
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits'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

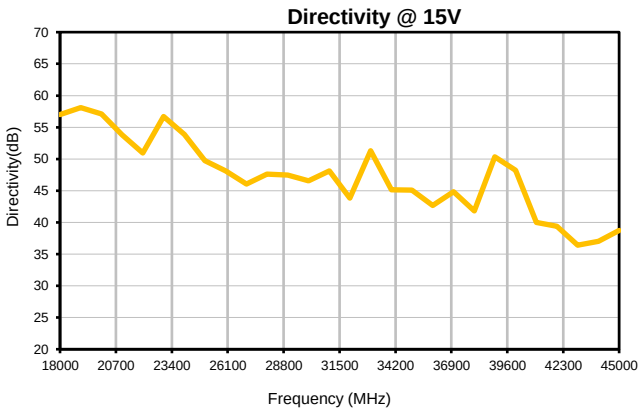
Wideband Amplifier ZVE-453HP+

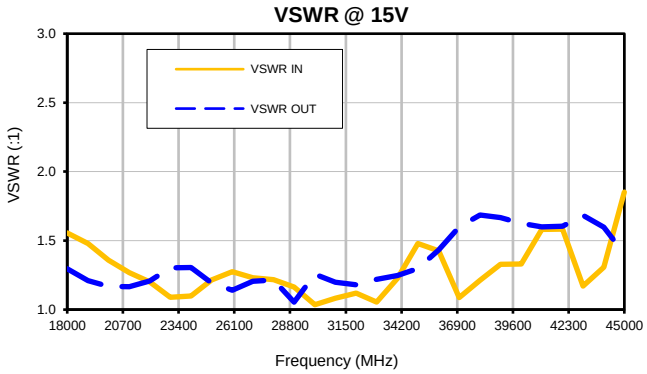
Typical Performance Data

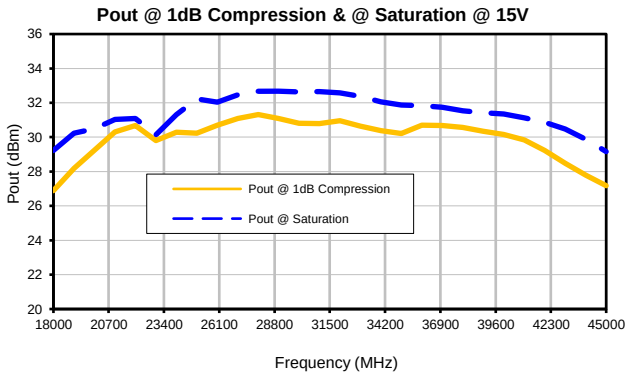
FREQ. (MHz)	GAIN (dB) 15V	DIRECTIVITY (dB) 15V	VSWR (:1) IN 15V	VSWR (:1) OUT 15V	Pout @ 1 dB COMPRESSION (dBm) 15V	Pout @ SATURATION (dBm) 15V	OUTUPUT IP3 (dBm) 15V
18000	38.95	56.99	1.56	1.30	26.89	29.23	35.57
19000	39.33	58.10	1.48	1.21	28.19	30.23	39.18
20000	39.21	57.09	1.36	1.17	29.25	30.49	40.46
21000	38.74	53.83	1.27	1.17	30.31	31.04	40.71
22000	38.14	50.93	1.20	1.21	30.68	31.09	41.45
23000	37.50	56.69	1.09	1.30	29.81	30.14	41.64
24000	36.85	53.88	1.10	1.31	30.28	31.30	40.20
25000	36.49	49.75	1.21	1.19	30.24	32.22	41.60
26000	36.48	48.10	1.27	1.14	30.70	32.03	42.86
27000	36.80	46.04	1.23	1.21	31.10	32.47	45.85
28000	37.39	47.62	1.22	1.22	31.32	32.67	42.48
29000	38.15	47.45	1.16	1.05	31.09	32.68	44.73
30000	39.08	46.57	1.04	1.26	30.81	32.64	41.07
31000	39.73	48.15	1.08	1.20	30.78	32.66	40.95
32000	39.93	43.81	1.12	1.18	30.96	32.57	44.08
33000	39.66	51.30	1.05	1.22	30.64	32.37	41.05
34000	39.81	45.16	1.23	1.25	30.39	32.06	40.58
35000	40.71	45.08	1.48	1.30	30.21	31.87	41.72
36000	41.58	42.67	1.43	1.43	30.69	31.84	40.16
37000	41.64	44.83	1.09	1.60	30.67	31.74	44.22
38000	40.80	41.80	1.21	1.69	30.57	31.54	43.23
39000	39.83	50.34	1.33	1.67	30.35	31.42	38.76
40000	39.53	48.21	1.33	1.62	30.16	31.35	41.06
41000	39.92	40.01	1.58	1.60	29.84	31.12	39.68
42000	40.67	39.41	1.58	1.61	29.23	30.87	39.23
43000	41.10	36.41	1.17	1.68	28.48	30.48	37.62
44000	41.04	37.01	1.31	1.60	27.79	29.88	38.53
45000	40.85	38.74	1.85	1.40	27.18	29.16	37.82

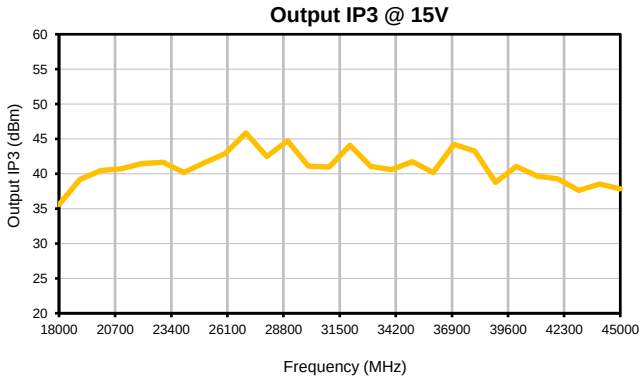
Typical Performance Curves





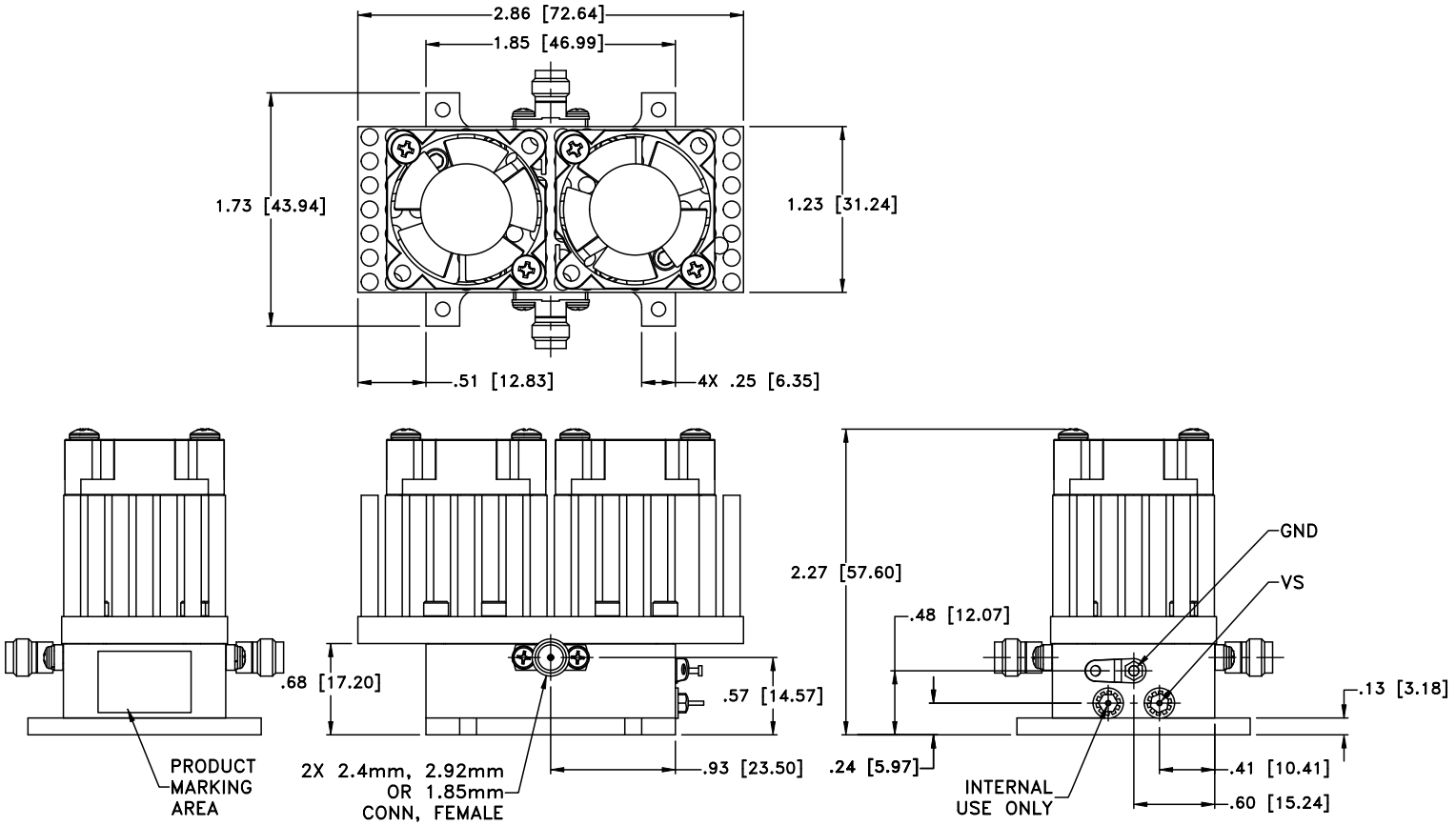




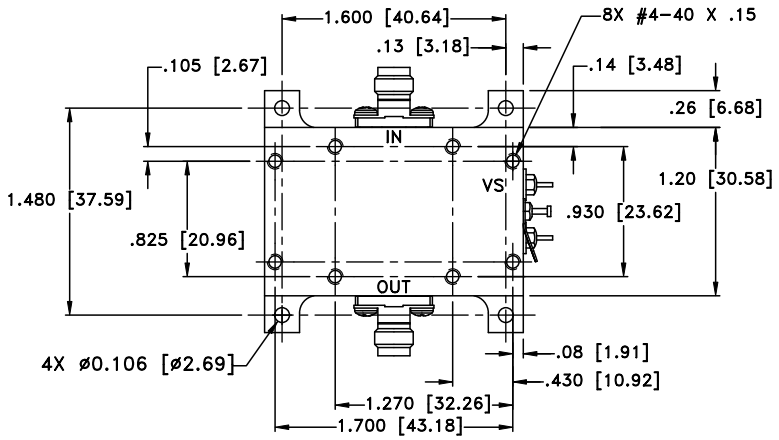


Outline Dimensions

VN3071-4



MOUNTING INFORMATION OF MODEL WITHOUT HEATSINK



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

Dimensions are in inches (mm). Tolerances: 2 Pl.Ñ03; 3 Pl. Ñ015

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.

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RF/IF MICROWAVE COMPONENTS

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

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