MEDIUM POWER, HIGH GAIN

Wideband Amplifier

50Ω 1 W 18 to 45 GHz 2.4 mm Female

ZVE-453+
ZVE-453X+

THE BIG DEAL

- High Gain, 33 dB Typ. Over the Entire Operating Band
- Excellent Gain Flatness, ±2.5 dB Typ.
- Saturated Output Power, +30 dBm Typ. Over 24 to 32 GHz
- Adjustable DC Voltage, +10 to +15 V
- High Active Directivity (Isolation - Gain), 40 dB Typ.



Generic photo used for illustration purposes only

Model No.	ZVE-453+	ZVE-453X+
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

APPLICATIONS

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

PRODUCT OVERVIEW

Mini-Circuits' ZVE-453(X)+ is a coaxial, 1 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-453+ utilizes two integrated fans, keeping the amplifier cool to the touch during normal operation at room temperature.
High Gain Low VSWR Medium RF Power	Delivers rated power when connected to most lab signal generators enabling it to be used for many test applications.
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.
High Active Directivity (Isolation - Gain), 40 dB Typ.	High active directivity enables it to be easily integrated into high power amplifier chains minimizing interaction with adjacent circuitry.

REV. B
ECO-024843
ZVE-453(X)+
MCL NY
260916

Wideband Amplifier

50Ω 1 W 18 to 45 GHz 2.4 mm Female

ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE

Parameter	Condition (MHz)	ZVE-453+[1] ZVE-453X+[2] Min.	Typ.	Max.	Units
Frequency Range		18000		45000	MHz
Gain	18000–30000	28.0	32	–	dB
	30000–45000	30.0	34	–	
Output Power at 1 dB Compression	18000–20000	+25.0	+27.5	–	dBm
	20000–37000	+27.0	+29.0	–	
	37000–45000	+24.5	+27.0	–	
Saturated Output Power[3]	18000–20000	+27.0	+28.5	–	dBm
	20000–37000	+28.0	+30.0	–	
	37000–45000	+25.5	+28.0	–	
Output IP3	18000–45000	–	+37	–	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-453+ / ZVE-453X+)	–	–	550[2] / 750[1]	1000[2] / 1200[1]	mA
Device Operating Power at +15 V	–	–	13[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]

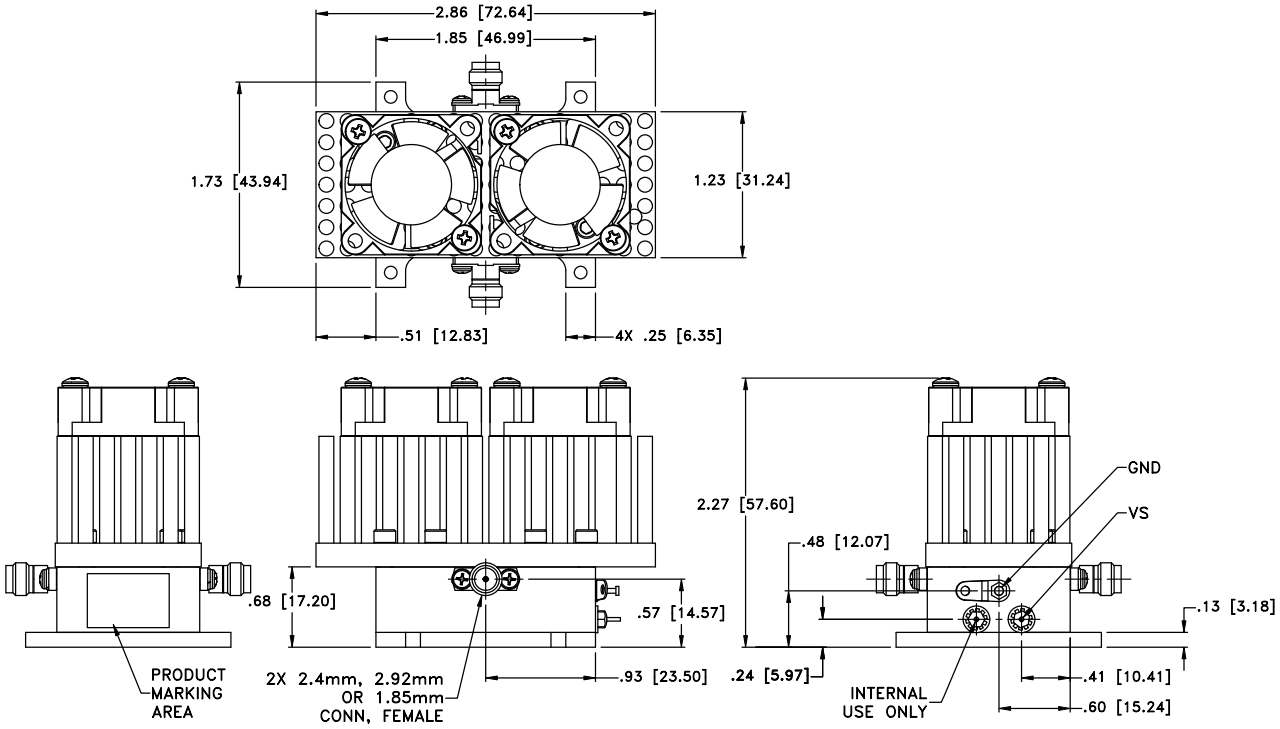
Parameter	Ratings
Operating Temperature	ZVE-453+ -40 °C to +50 °C Ambient ZVE-453X+ -40 °C to +60 °C Baseplate Temperature
Storage Temperature	-40 °C to +85 °C
Total Power Dissipation	14.5 W
RF Input Power (CW)	+7 dBm
DC Operating Voltage	+16 V

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.

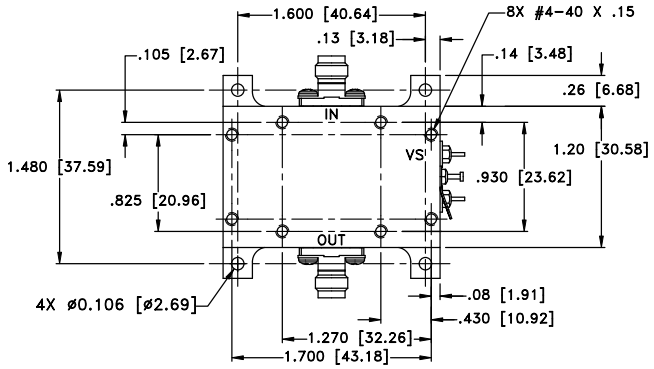
Wideband Amplifier

50Ω 1 W 18 to 45 GHz 2.4 mm Female

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



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



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

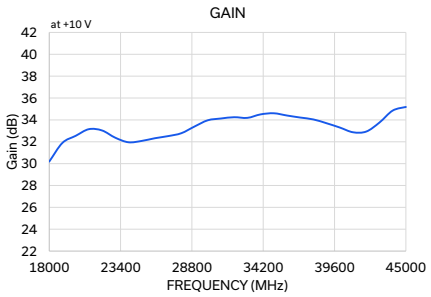
Wideband Amplifier

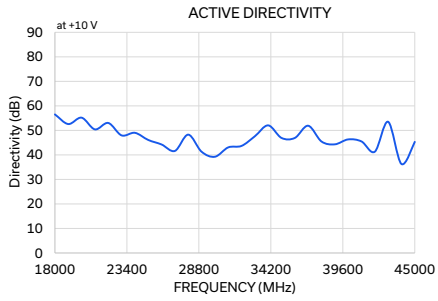
ZVE-453+
ZVE-453X+

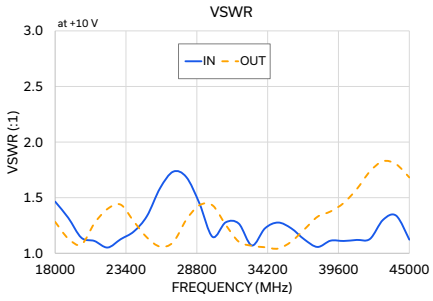
50Ω 1 W 18 to 45 GHz 2.4 mm Female

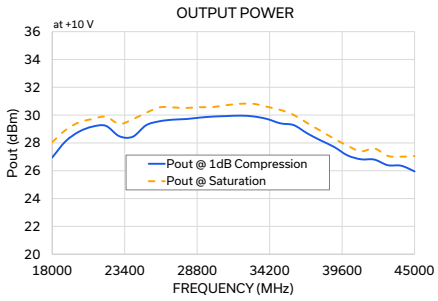
TYPICAL PERFORMANCE DATA/CURVES

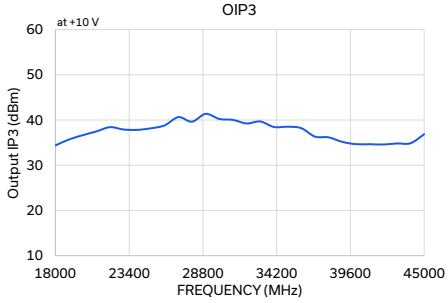
Frequency (MHz)	Gain (dB)	Active Directivity (dB)	VSWR (:1)		P_{OUT} at 1 dB Compression (dBm)	P_{OUT} at Saturation (dBm)	Output IP3 (dBm)
	+10 V	+10 V	IN	OUT	+10 V	+10 V	+10 V
18000	30.18	56.51	1.46	1.28	26.95	28.05	34.38
21000	33.15	50.41	1.11	1.27	29.17	29.72	37.47
24000	31.95	49.01	1.20	1.29	28.44	29.70	37.82
27000	32.52	41.62	1.73	1.10	29.67	30.55	40.63
30000	33.96	39.25	1.15	1.43	29.89	30.58	40.23
33000	34.19	47.60	1.07	1.07	29.90	30.81	39.67
36000	34.40	46.92	1.22	1.10	29.28	30.01	38.19
39000	33.69	44.31	1.11	1.38	27.72	28.31	35.16
42000	32.93	41.31	1.13	1.74	26.80	27.60	34.58
45000	35.18	45.32	1.12	1.68	25.95	27.05	36.86











NOTES

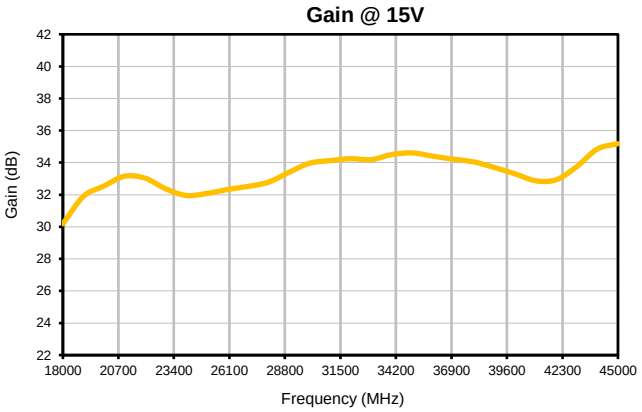
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits'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

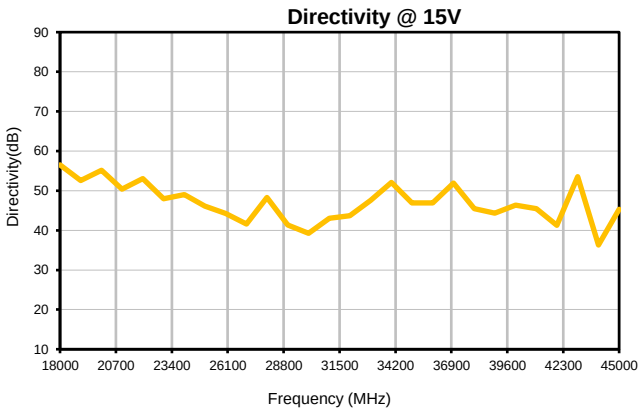
Wideband Amplifier ZVE-453+

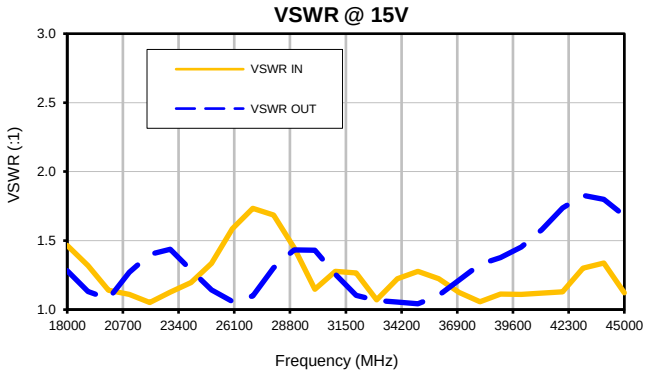
Typical Performance Data

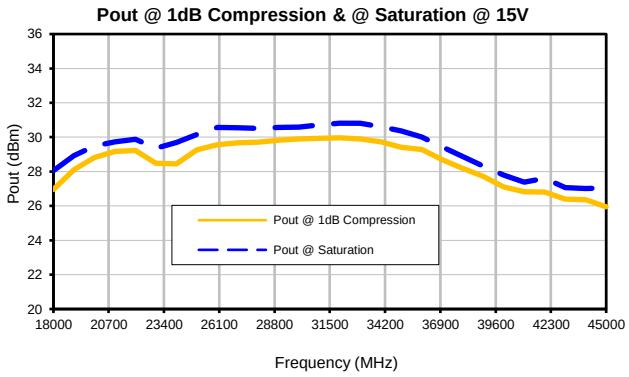
FREQ. (MHz)	GAIN (dB) 15V	DIRECTIVITY (dB) 15V	VSWR (:1) IN 15V	VSWR (:1) OUT 15V	Pout @ 1 dB COMPRESSION (dBm) 15V	Pout @ SATURATION (dBm) 15V	OUTPUT IP3 (dBm) 15V
18000	30.18	56.51	1.46	1.28	26.95	28.05	34.38
19000	31.90	52.59	1.32	1.13	28.12	28.93	35.70
20000	32.54	55.19	1.14	1.08	28.81	29.48	36.64
21000	33.15	50.41	1.11	1.27	29.17	29.72	37.47
22000	33.03	53.03	1.05	1.40	29.23	29.89	38.41
23000	32.37	47.97	1.13	1.44	28.48	29.36	37.89
24000	31.95	49.01	1.20	1.29	28.44	29.70	37.82
25000	32.08	46.10	1.33	1.14	29.27	30.17	38.16
26000	32.32	44.26	1.59	1.06	29.56	30.56	38.81
27000	32.52	41.62	1.73	1.10	29.67	30.55	40.63
28000	32.78	48.27	1.69	1.30	29.72	30.51	39.63
29000	33.40	41.32	1.45	1.43	29.82	30.57	41.35
30000	33.96	39.25	1.15	1.43	29.89	30.58	40.23
31000	34.13	43.06	1.28	1.26	29.93	30.72	40.01
32000	34.25	43.67	1.27	1.10	29.96	30.81	39.23
33000	34.19	47.60	1.07	1.07	29.90	30.81	39.67
34000	34.50	52.05	1.22	1.05	29.72	30.60	38.45
35000	34.61	46.92	1.28	1.04	29.41	30.37	38.50
36000	34.40	46.92	1.22	1.10	29.28	30.01	38.19
37000	34.22	51.90	1.12	1.21	28.69	29.43	36.32
38000	34.04	45.48	1.06	1.33	28.18	28.87	36.16
39000	33.69	44.31	1.11	1.38	27.72	28.31	35.16
40000	33.30	46.32	1.11	1.45	27.10	27.80	34.65
41000	32.87	45.50	1.12	1.58	26.82	27.39	34.65
42000	32.93	41.31	1.13	1.74	26.80	27.60	34.58
43000	33.76	53.52	1.30	1.83	26.40	27.07	34.81
44000	34.85	36.29	1.34	1.80	26.36	27.01	34.86
45000	35.18	45.32	1.12	1.68	25.95	27.05	36.86

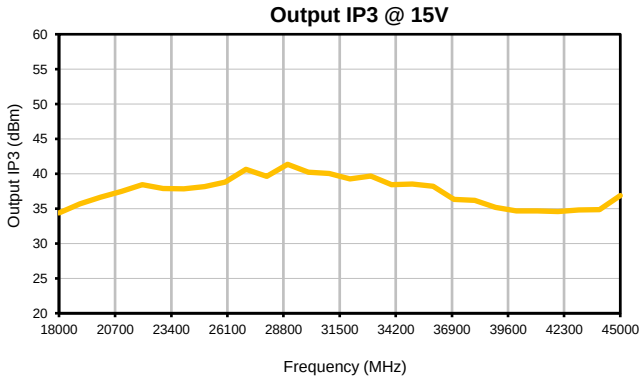
Typical Performance Curves





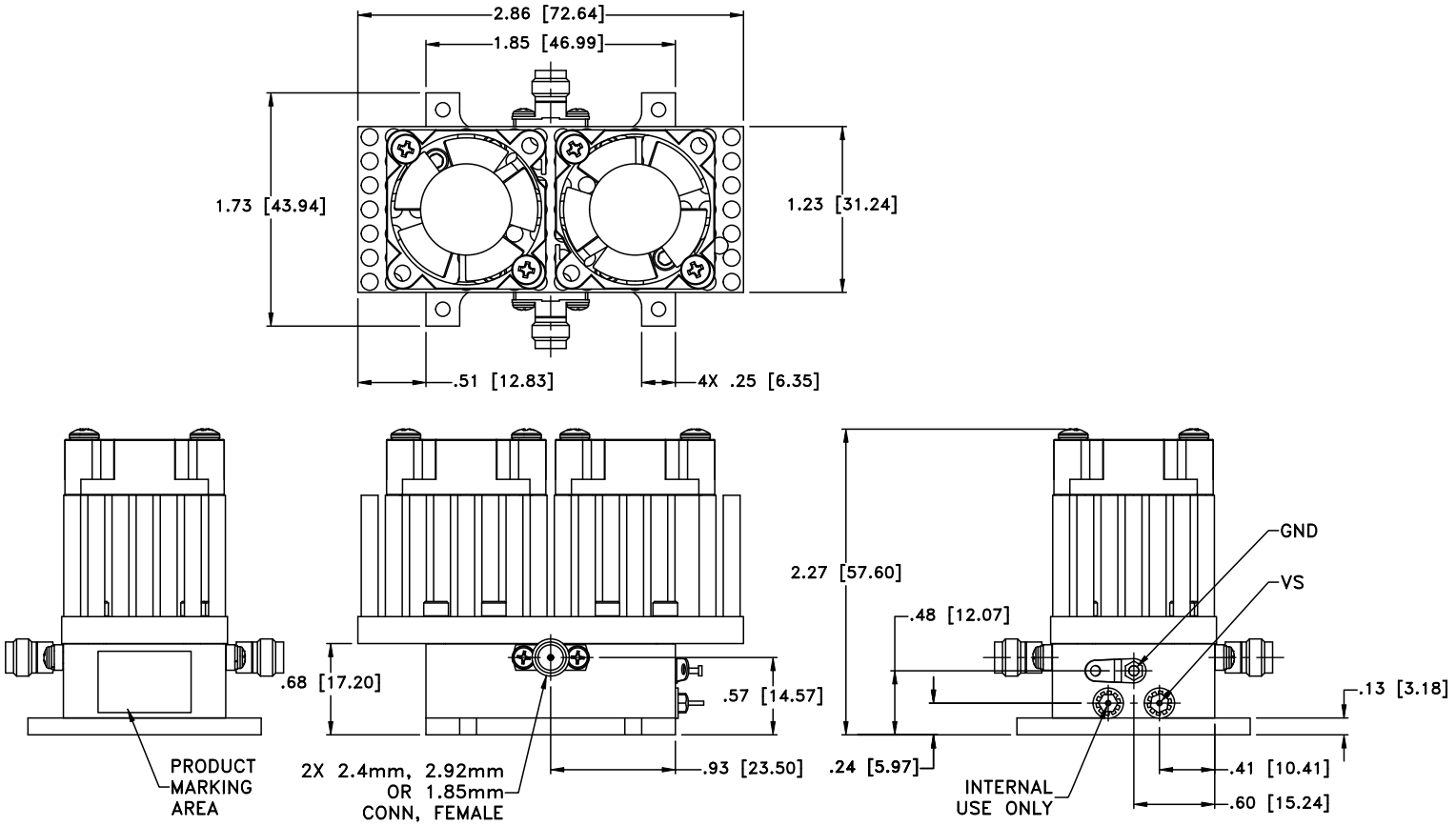




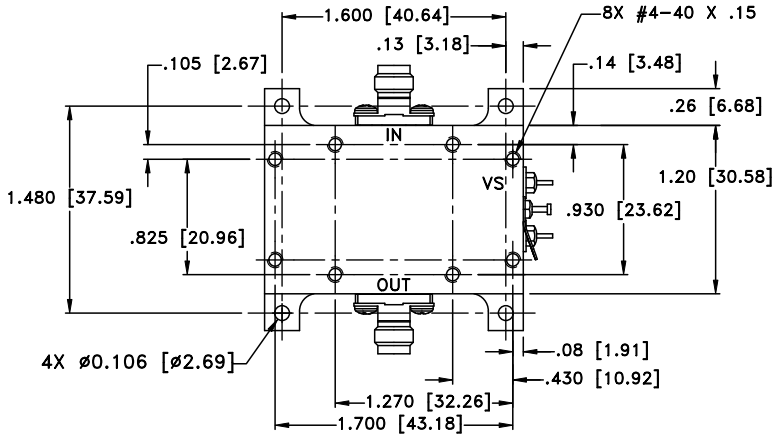


Case Style VN

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

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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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