WAVEGUIDE

Medium Power Amplifier

WVA-50753G+
WVA-50753GX+

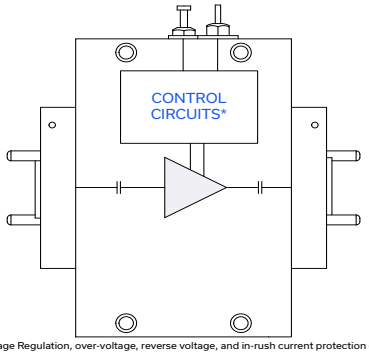
50 to 75 GHz NF 2.5 dB WR15

KEY FEATURES

- Full WR15 Band Coverage
- Low Noise Figure, 2.5 dB Typ.
- High Gain, 44 dB Typ.
- High P_{SAT}, +22 dBm Typ.
- Wide DC Operating Voltage, +10 To +15 V
- Over Voltage And Reverse Voltage Protected

Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



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

APPLICATIONS

- 5G-FR2 Millimeter Wave Testing
- Aerospace & Defense
- Test and Measurement
- Q-band, V-band SATCOM
- Wireless Infrastructure
- IEEE 802.11.ad WiGig

PRODUCT OVERVIEW

Mini-Circuits' WVA-50753G(X)+ is a wideband low noise amplifier, covering the full WR15 50 to 75 GHz 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 operation combined with high gain and medium output power makes this amplifier an ideal choice for SATCOM applications and 5G testing in millimeter wave bands.

ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Units
Frequency Range	-	50	-	75	GHz
Gain	50 - 75	39	44	-	dB
Noise Figure	50 - 75	-	2.5	-	dB
Output Power at 1 dB Compression (P1dB)	50 - 75	-	+19	-	dBm
Output Power at Saturation (P_{SAT})[1]	50 - 75	-	+22	-	dBm
Output IP3	50 - 75	-	+27		dBm
Input Return Loss	50 - 75	-	14	-	dB
Output Return Loss	50 - 75	-	14	-	dB
DC Supply Voltage (Vs)	-	+10	-	+15	V
DC Current at V_S = +10V	-	-	460	900[2]	mA

1. 1. At P_{SAT}, P_{OUT} changes less than 0.1 dB for a 1 dB change in P_{IN}
2. Typical current measured under small signal conditions. Max DC current measured at P_{SAT}. DC current increases as amplifier is driven into compression.

REV. OR
ECO-020122
WVA-50753GX+
MCL NY
231211

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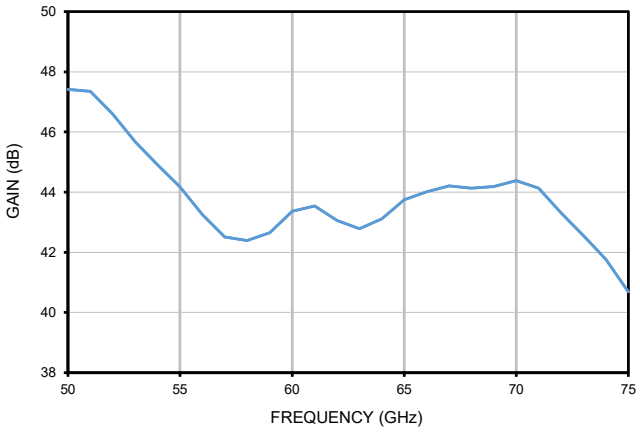
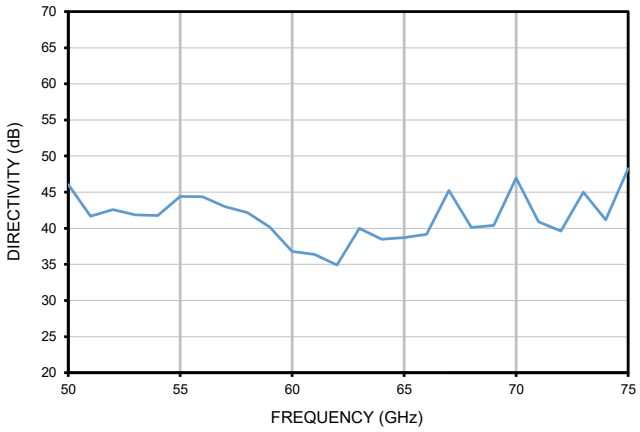
TYPICAL PERFORMANCE GRAPHS

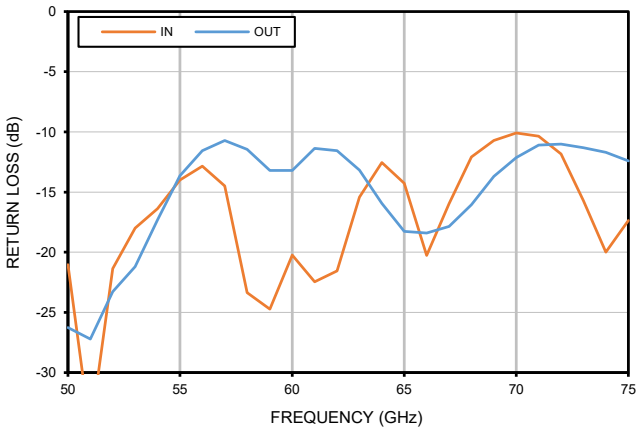
GAIN



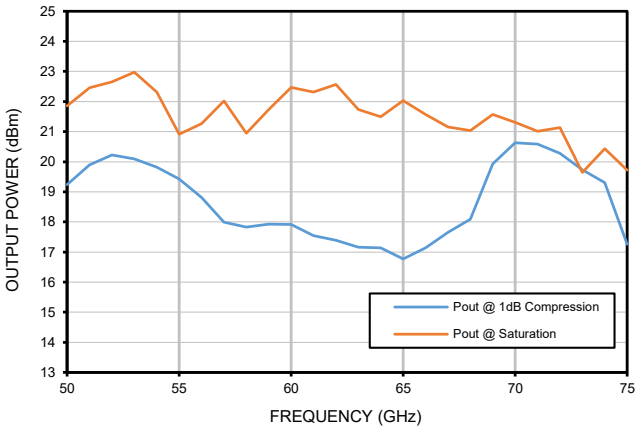
DIRECTIVITY



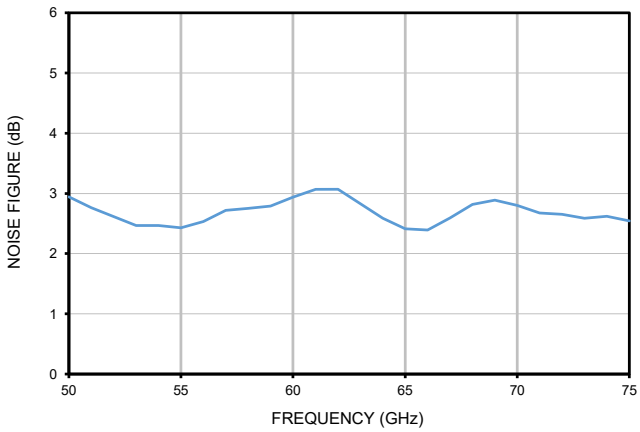
RETURN LOSS



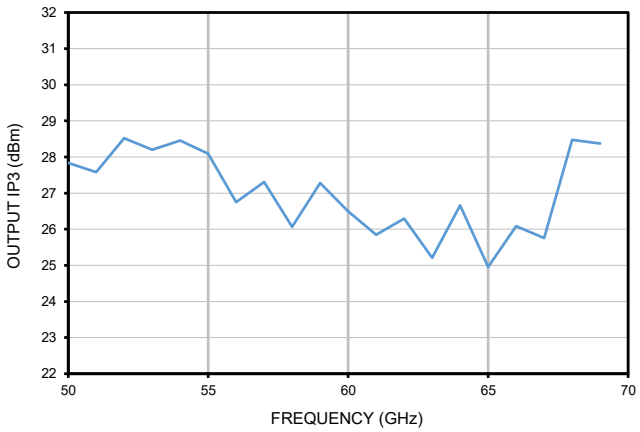
OUTPUT POWER



NOISE FIGURE



OIP3



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ABSOLUTE MAXIMUM RATINGS[3]

Parameter	Ratings	
Operating Temperature	WVA-50753G+	-40 °C to +50 °C Ambient
	WVA-50753GX+	-40 °C to +60 °C Baseplate
Storage Temperature	-40 °C to +85 °C	
Total Power Dissipation	9.5 W	
RF Input Power[4] (CW)	+15 dBm	
DC Operating Voltage (Vs)	+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 WR19 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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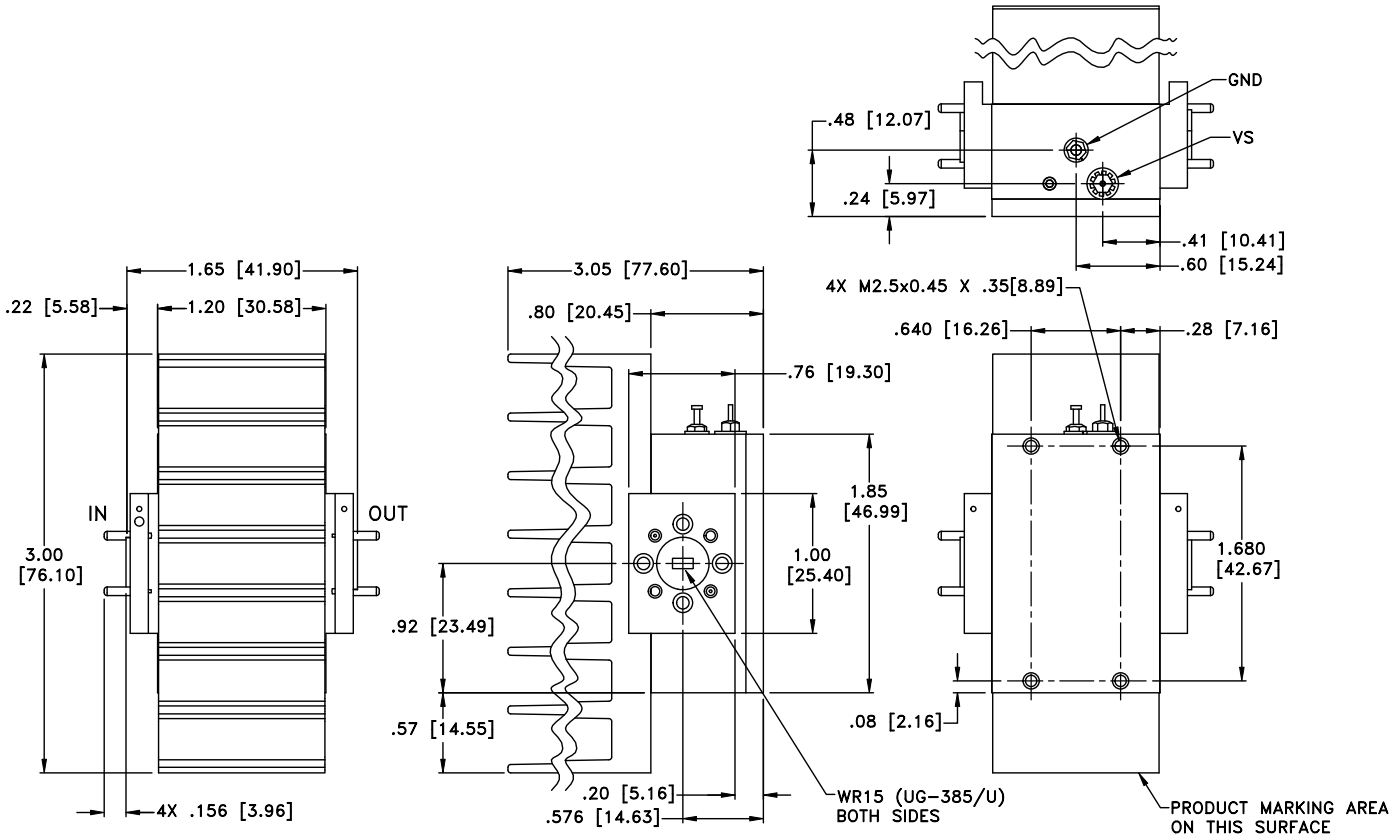
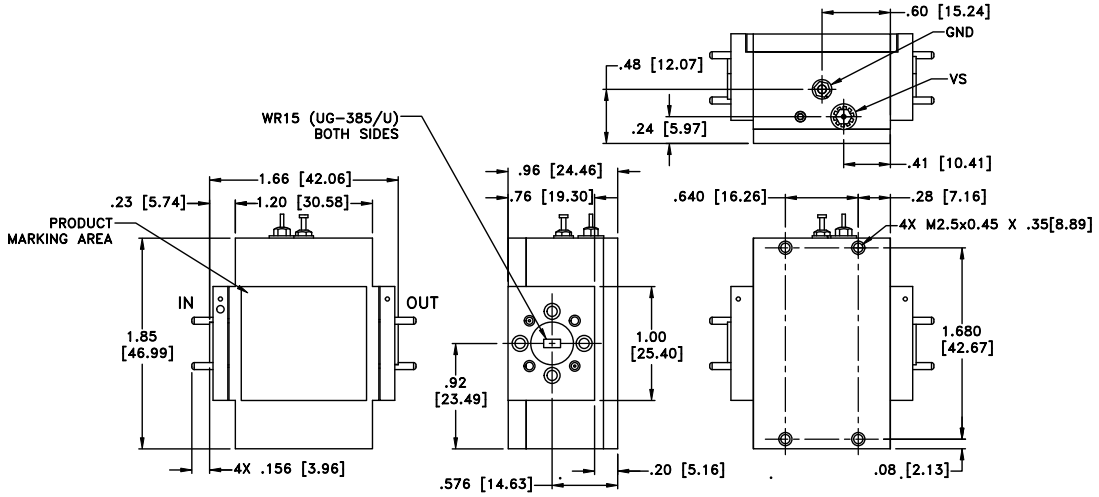
CASE STYLE DRAWING WITH HEATSINK (WVA-50753G+)



CASE STYLE DRAWING WITHOUT HEATSINK (WVA-50753GX+)



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	3A001.b.4.e

ORDERING INFORMATION

Model No. Links	WVA-50753G+	WVA-50753GX+
Option	With heatsink	Without heatsink
Product Marking	WVA-50753G+	WVA-50753GX+
Case Style	YS3543	
Connector	WR15 UG385/U	

NOTES

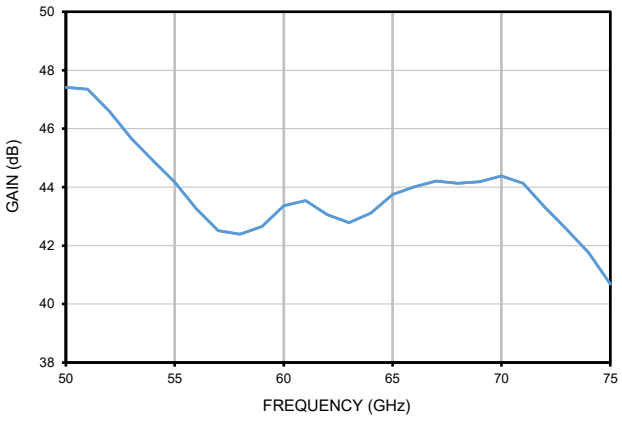
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's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

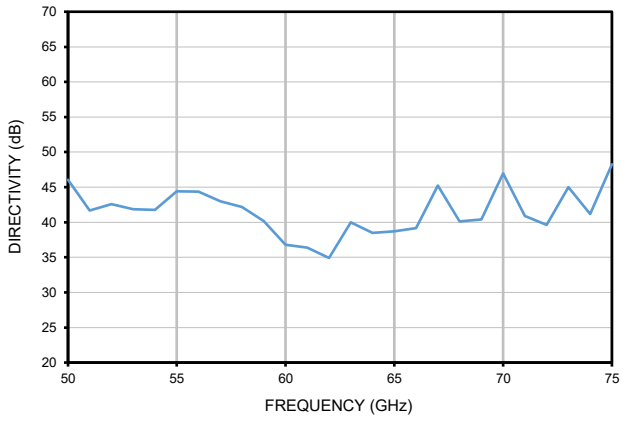
FREQUENCY (GHz)	GAIN (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB)		Pout @ 1 dB COMPRESSION (dBm)	Pout at SATURATION (dBm)	NOISE FIGURE (dB)	OIP3 (dBm)
			IN	OUT				
50	47.42	46.05	21.04	26.25	19.2	21.9	2.9	27.84
51	47.35	41.66	34.88	27.21	19.9	22.5	2.8	27.58
52	46.59	42.61	21.35	23.28	20.2	22.6	2.6	28.52
53	45.68	41.84	17.98	21.21	20.1	23.0	2.5	28.20
54	44.90	41.78	16.38	17.30	19.8	22.3	2.5	28.46
55	44.18	44.43	13.99	13.63	19.4	20.9	2.4	28.09
56	43.26	44.36	12.84	11.56	18.8	21.3	2.5	26.75
57	42.51	42.99	14.49	10.72	18.0	22.0	2.7	27.31
58	42.39	42.17	23.37	11.44	17.8	20.9	2.8	26.06
59	42.65	40.17	24.72	13.19	17.9	21.7	2.8	27.28
60	43.37	36.79	20.23	13.19	17.9	22.5	2.9	26.50
61	43.54	36.38	22.46	11.38	17.5	22.3	3.1	25.85
62	43.06	34.91	21.54	11.55	17.4	22.6	3.1	26.29
63	42.78	39.97	15.43	13.17	17.2	21.7	2.8	25.21
64	43.11	38.48	12.53	15.94	17.1	21.5	2.6	26.66
65	43.74	38.71	14.28	18.26	16.8	22.0	2.4	24.96
66	44.02	39.16	20.27	18.41	17.1	21.6	2.4	26.09
67	44.21	45.21	15.97	17.86	17.7	21.2	2.6	25.76
68	44.13	40.10	12.07	16.04	18.1	21.0	2.8	28.48
69	44.18	40.40	10.70	13.71	19.9	21.6	2.9	28.37
70	44.38	46.94	10.09	12.12	20.6	21.3	2.8	-
71	44.13	40.90	10.36	11.10	20.6	21.0	2.7	-
72	43.31	39.62	11.84	11.02	20.3	21.1	2.7	-
73	42.56	45.00	15.73	11.30	19.7	19.6	2.6	-
74	41.77	41.18	20.00	11.70	19.3	20.4	2.6	-
75	40.69	48.25	17.36	12.40	17.3	19.7	2.5	-

Typical Performance Curves

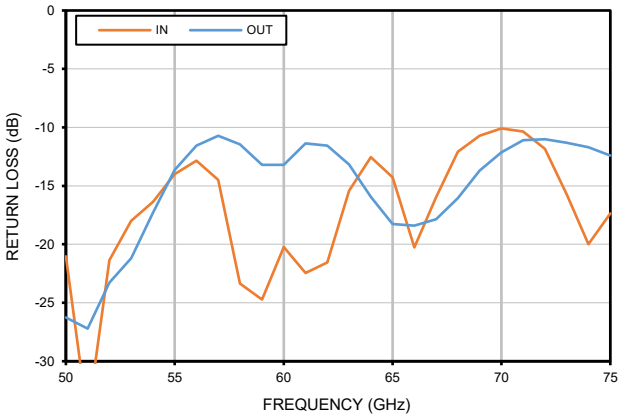
GAIN



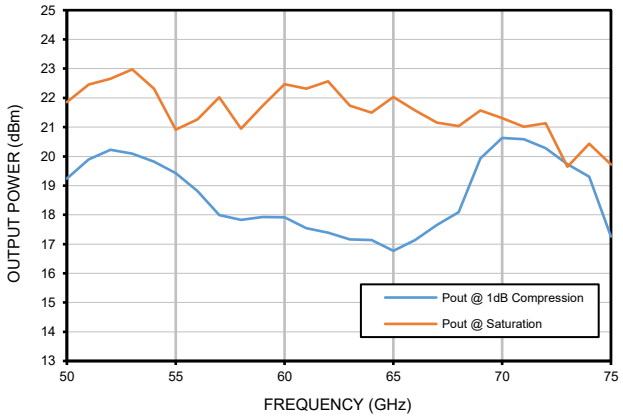
DIRECTIVITY



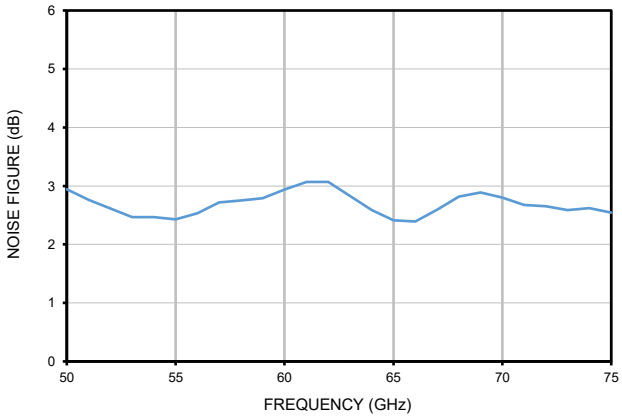
RETURN LOSS



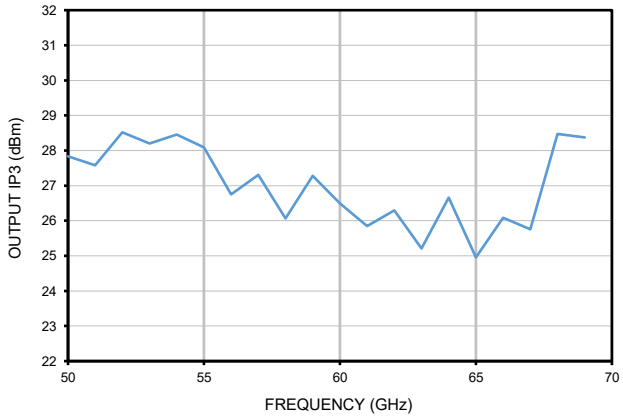
OUTPUT POWER



NOISE FIGURE

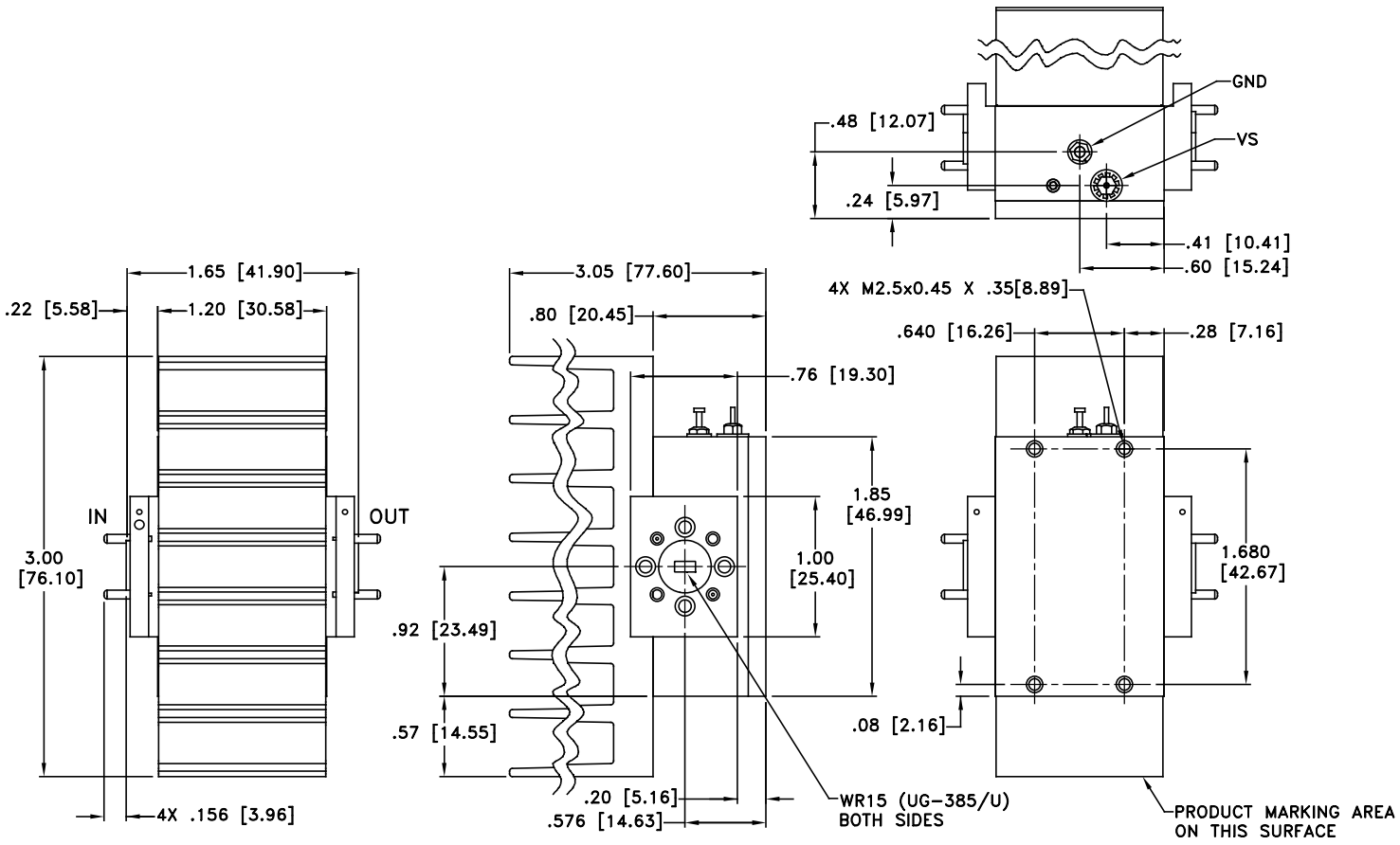


OIP3

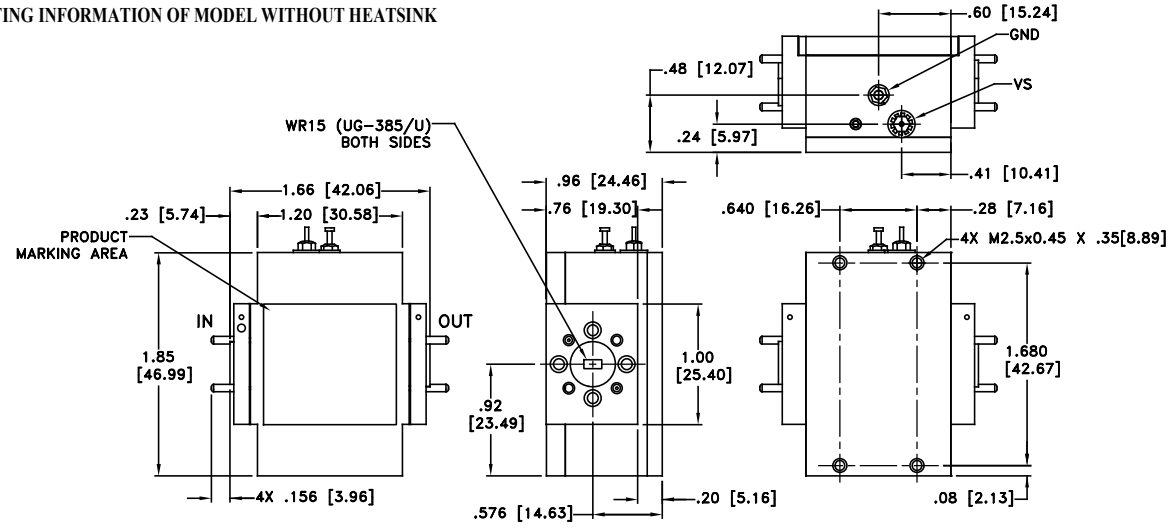


Case Style YS

Outline Dimensions YS3543



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