WAVEGUIDE HIGH FREQUENCY

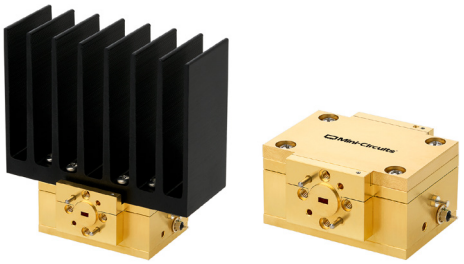
# Medium Power Amplifier

# WVA-71863HP+
# WVA-71863HPX+

71 to 86 GHz $P_{SAT}$ +24.5 dBm WR12

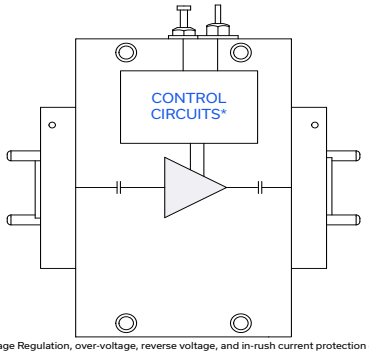
## THE BIG DEAL

- WR12 Waveguide RF Interface
- High Gain, 39 dB Typ.
- Excellent Gain Flatness, ±1.5 dB Typ.
- High Saturated Output Power, +24.5 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

- Automotive Radar Testing
- Aerospace & Defense
- Test and Measurement
- E-Band Backhaul
- Imaging

## PRODUCT OVERVIEW

Mini-Circuits' WVA-71863HP+ is a medium power high gain amplifier, covering 71 to 86 GHz with WR12 waveguide intefaces. The model operates over a 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 protection to protect from damage in case of unexpected spikes in voltage during operation. The high frequency operation combined with high gain and high output power makes this amplifier an ideal choice for automotive, radar/sensing applications, and wireless backhaul testing in E-Band frequency ranges.

## KEY FEATURES

| Features | Advantages |
|---|---|
| Wideband amplifier, 71 to 86 GHz | A single amplifier covers the full 71-86 GHz band, eliminating the need for band specific solutions (71-76 GHz, 77-81 GHz, 81-86 GHz). |
| High Gain<br>Low VSWR<br>High Power | The combination of high gain (39dB typ.) and high output power (+24.5dBm typ. $P_{SAT}$) makes this an excellent choice for chipset testing, over-the-air validation testing, and other test bench applications that require a high power amplifier at E-Band frequencies. |
| DC Protection<br>• Over-voltage<br>• Reverse voltage<br>• In-rush current | The internal DC circuitry allows the amplifier to be protected from external mishandling or unexpected spikes in voltage that could lead to catastrophic failures in the field. |
| Wide DC Operating Voltage | The device is capable of operating on a single supply voltage from +10 to +15 V with consistent DC power consumption, providing ease and when incorporating into test setups and systems. |

REV. OR
ECO-018172
WVA-71863HP+
MCL NY
230613

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## ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE

| Parameter | Condition (GHz) | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Frequency Range | - | 71 | - | 86 | GHz |
| Gain | 71 - 86 | 34 | 39 | - | dB |
| Gain Flatness | 71 - 86 | - | ±1.5 | - | dB |
| Output Power at 1dB Compression (P1dB) | 71 - 81 | +19.5 | +22.5 | - | dBm |
| Saturated Output Power ($P_{SAT}$) | 71 - 86 | +22.0 | +24.5 | - | dBm |
| Input Return Loss | 71 - 86 | - | 10 | - | dB |
| Output Return Loss[1] | 71 - 86 | - | 15 | - | dB |
| DC Supply Voltage (Vs) | - | +10 | - | +15 | V |
| DC Current at Vs = +10V[2] | - | - | 500 | 1000 | mA |

1. Open and short-circuit loads are not recommended at the amplifier output. Ensure proper WR12 load before turning the amplifier on.
2. Max DC Current at $P_{SAT}$. DC current increases as amplifier is driven into compression.

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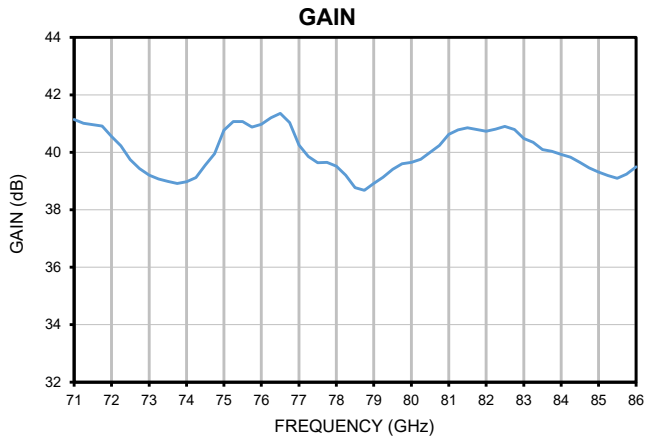
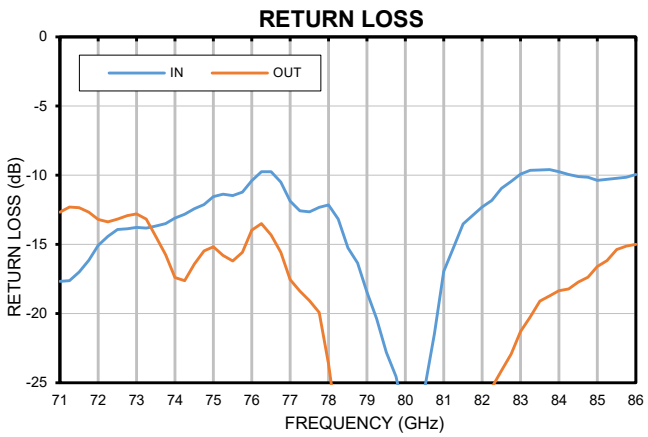
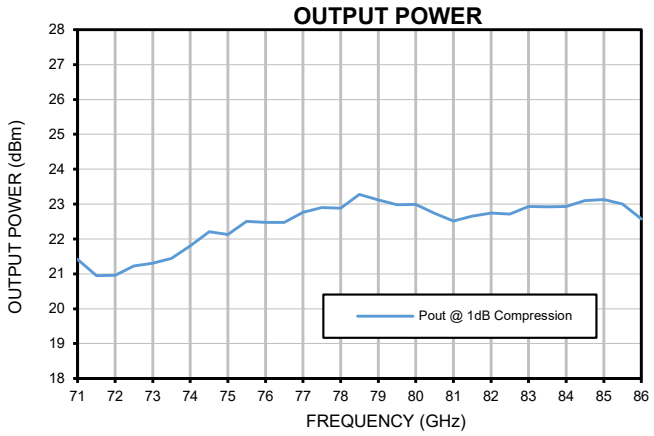
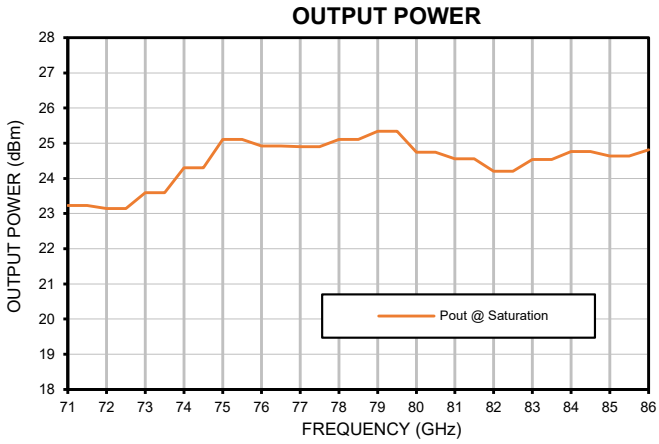
## TYPICAL PERFORMANCE GRAPHS



## ABSOLUTE MAXIMUM RATINGS[3]

| Parameter | Ratings |
|---|---|
| Operating Temperature | WVA-71863HP+ -40 °C to +50 °C Ambient<br>WVA-71863HPX+ -40 °C to +60 °C Baseplate |
| Storage Temperature | -40 °C to +85 °C |
| Total Power Dissipation | 10.5 W |
| RF Input Power[4] (CW) | 0 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 WR12 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)<br>MAXIMUM USER AMBIENT TEMP = +30 °C (USER DEFINED)<br>POWER DISSIPATION = 10 WATTS (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE)<br>THEN MAXIMUM ALLOWABLE THERMAL RESISTANCE = 2 °C/W |

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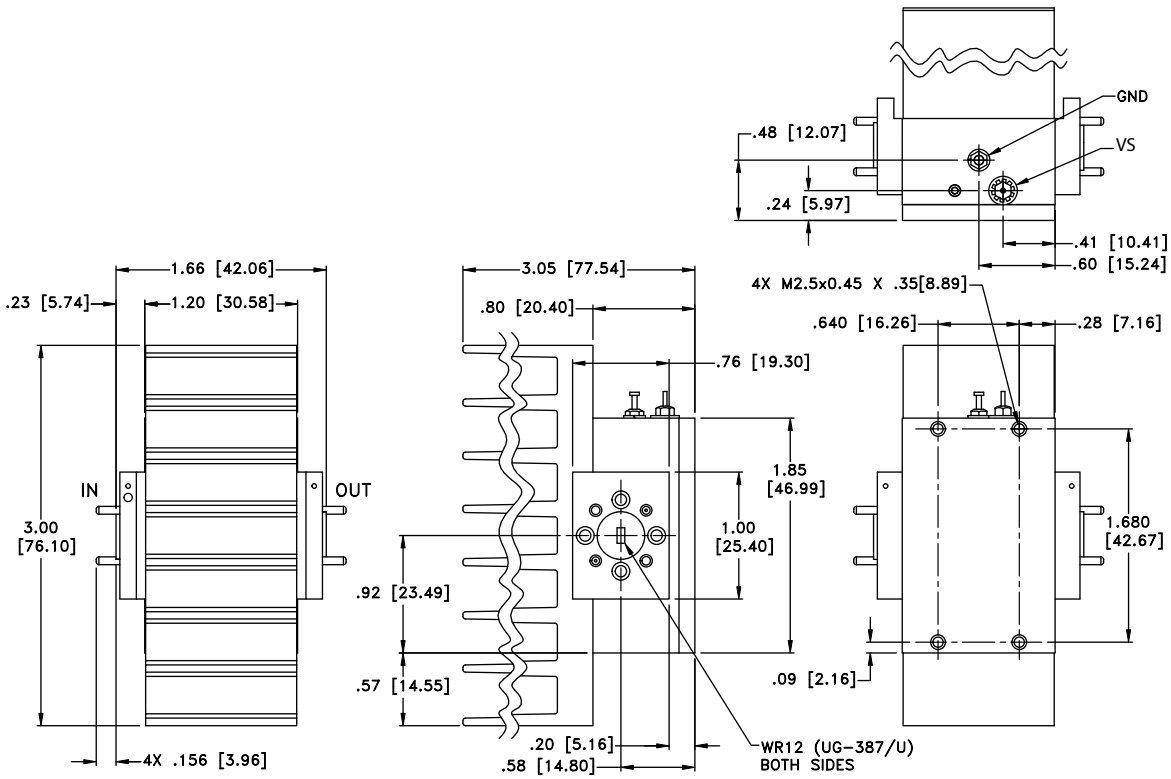
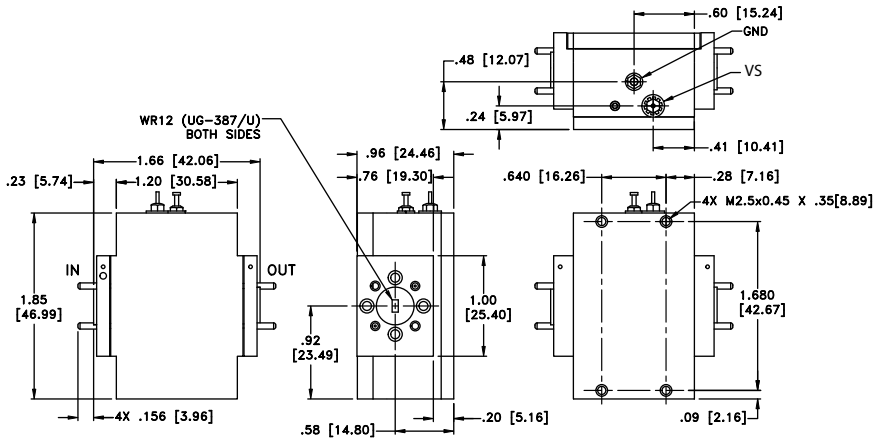
## CASE STYLE DRAWING WITH HEATSINK (WVA-71863HP+)




## CASE STYLE DRAWING WITHOUT HEATSINK (WVA-71863HPX+)




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** | Data Table<br>Swept Graphs<br>S-Parameter (S2P Files) Data Set (.zip file) |
| **RoHs Status** | Compliant |
| **Environmental Ratings** | ENV130 |
| **Export Information** | ECCN #3A001.B.4<br>This item will require an export license when shipped to certain countries |

## ORDERING INFORMATION

| **Model No. Links** | WVA-71863HP+ | WVA-71863HPX+ |
|---|---|---|
| **Option** | With heatsink | Without heatsink |
| **Product Marking** | WVA-71863HP+ | WVA-71863HPX+ |
| **Case Style** | YS3481 | |
| **Connector** | WR12 | |

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

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