



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"> • High Gain • Wideband • Medium RF power | 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"> • Over-voltage • Reverse voltage • In-rush current | 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





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ZVA-02443HP+
ZVA-02443HPX+

Mini-Circuits

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 ² | 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 ¹ | | | | 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^{3,4}

| 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.



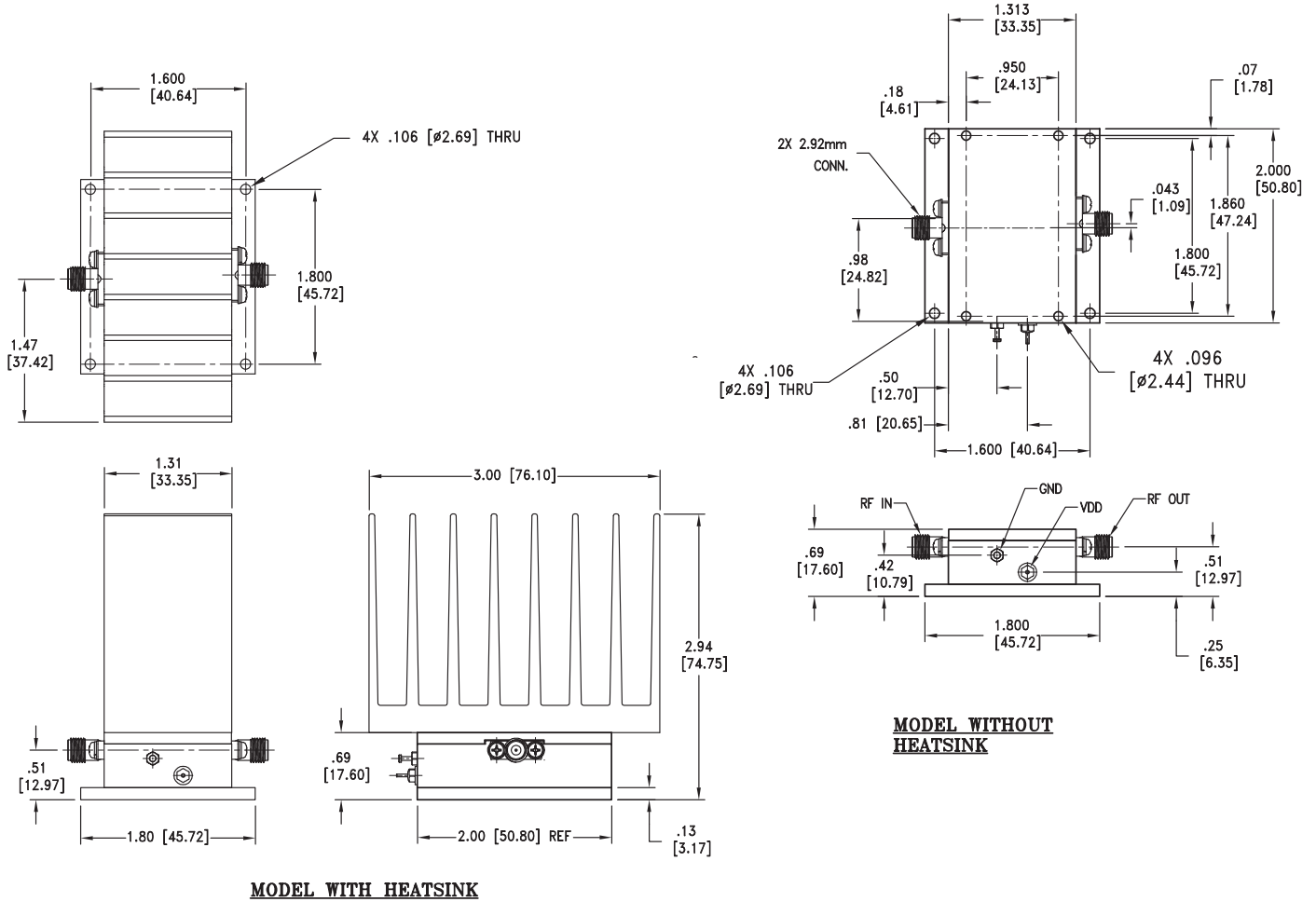


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OUTLINE DRAWING



Weight: 350 grams; Weight without heatsink: 220 grams

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



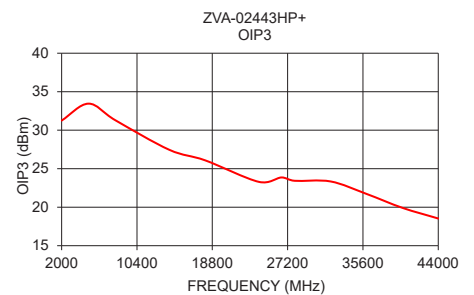
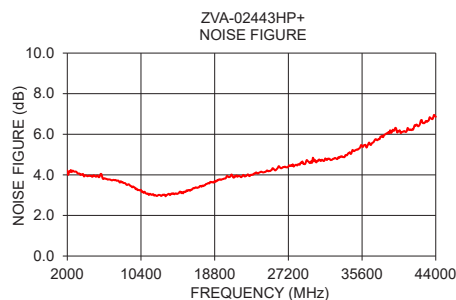
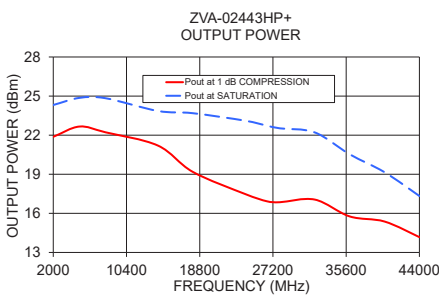
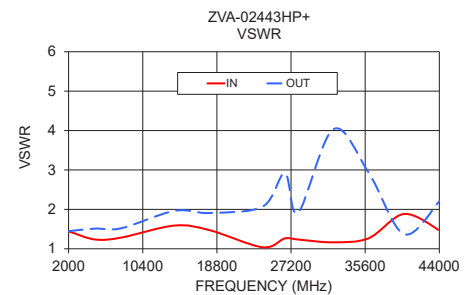
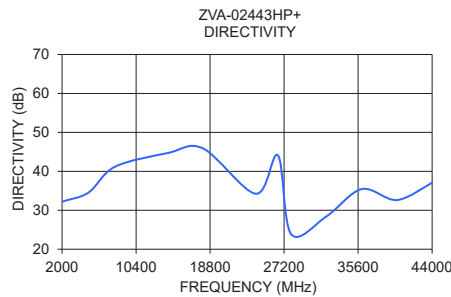
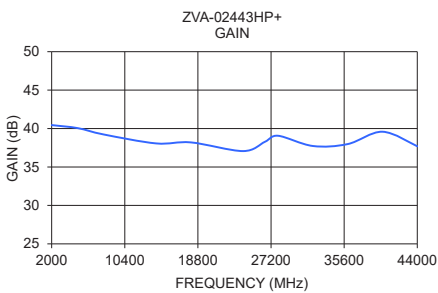
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TYPICAL PERFORMANCE DATA/CURVES

| Frequency (MHz) | Gain (dB) | Directivity (dB) | VSWR (:1) | | NOISE FIGURE (dB) | P _{OUT} at 1 dB COMPR. (dBm) | P _{OUT} at SATURATION (dBm) | OIP ₃ (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

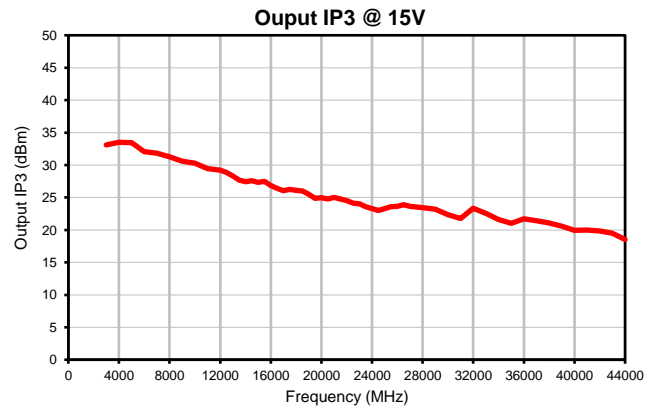
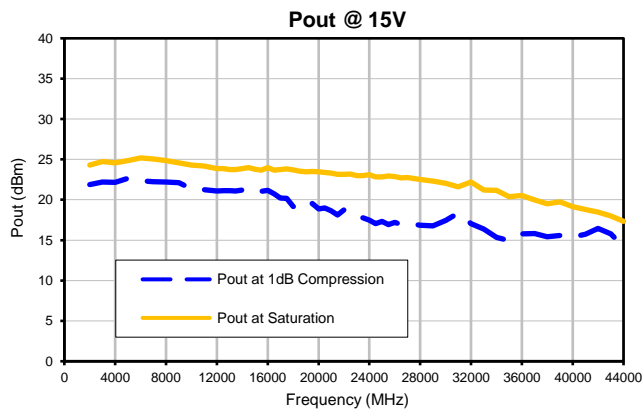
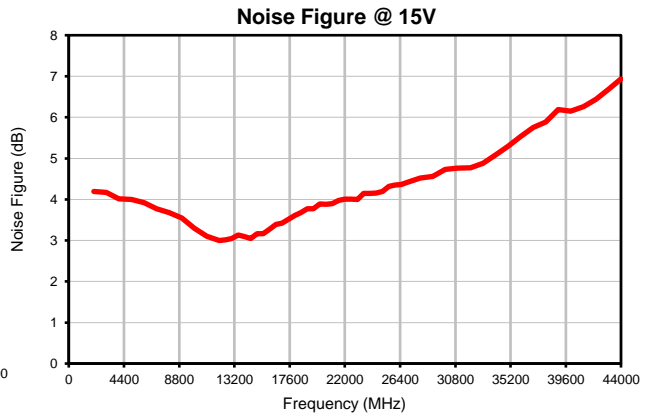
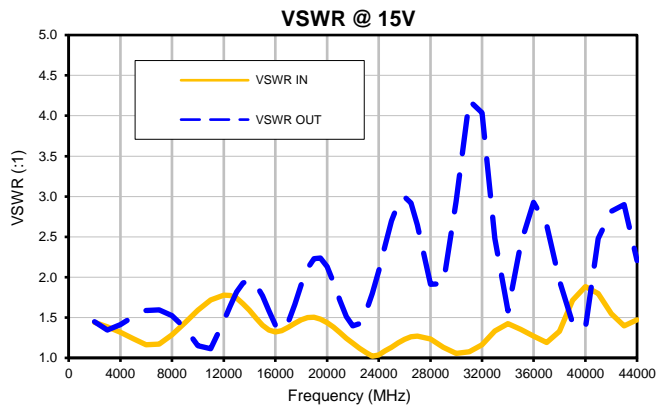
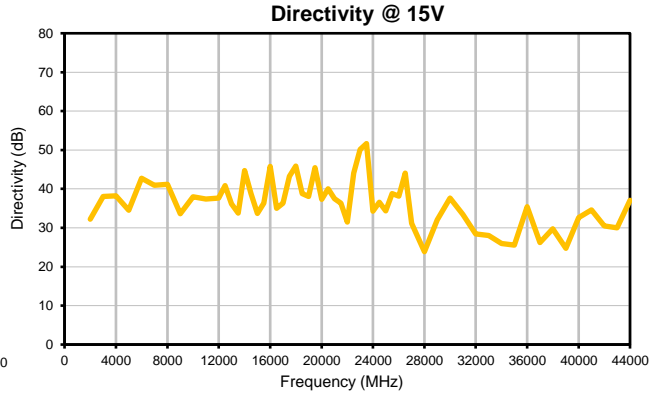
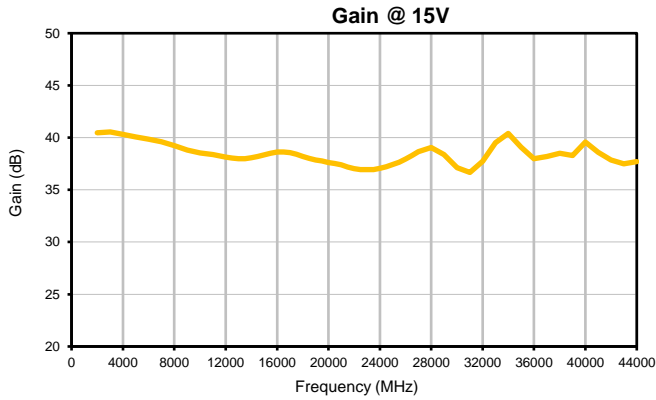
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- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document 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



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

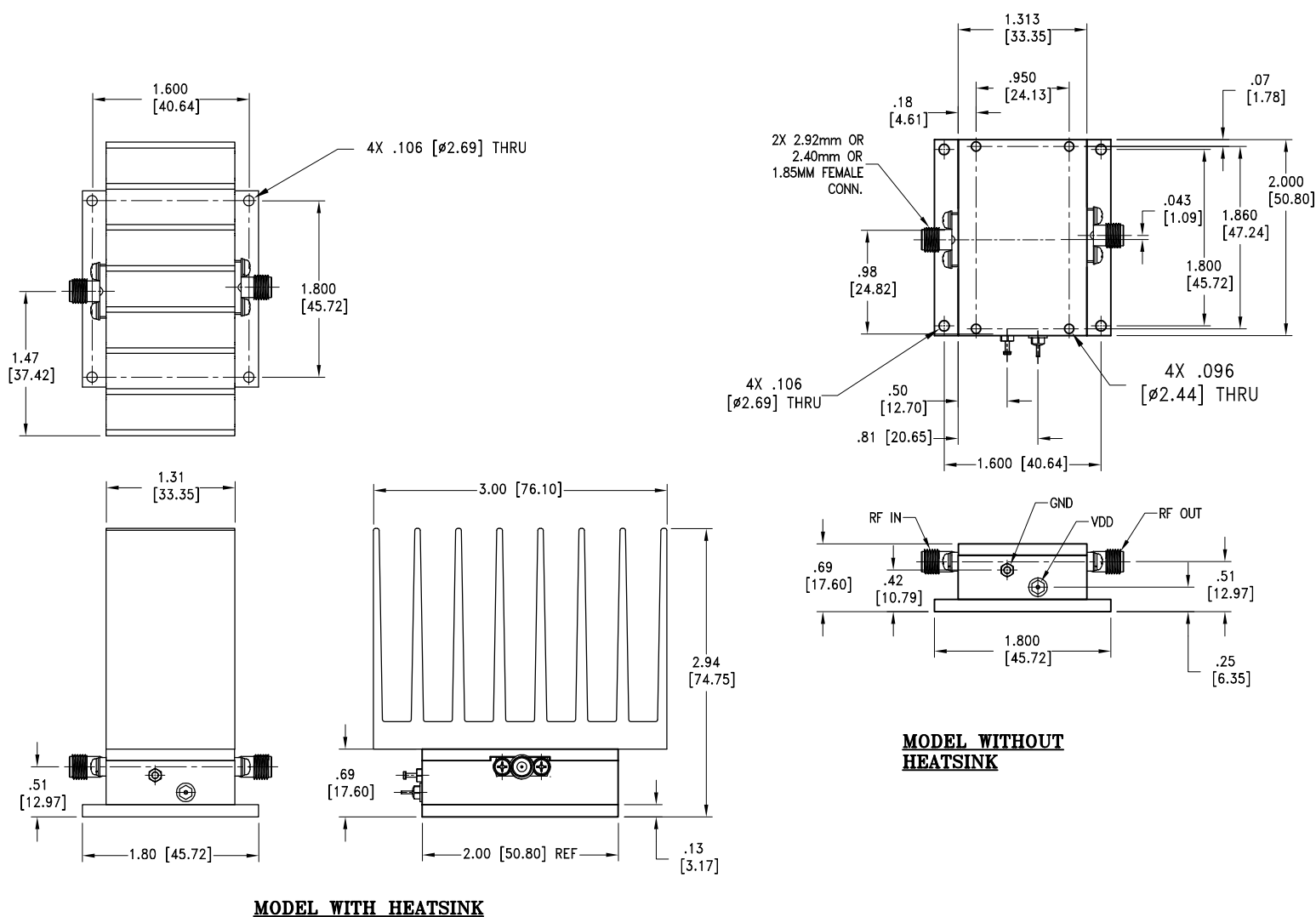


Case Style

T

Outline Dimensions

T2704



Weight: 350 grams; Weight without heatsink: 220 grams

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

Notes:

1. Case Material: Brass Alloy
2. Case Finish: Gold Plating
3. Heat sink finish: Black anodize.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS



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 |