

# Coaxial Amplifier

50Ω Medium Power 10 to 2000 MHz

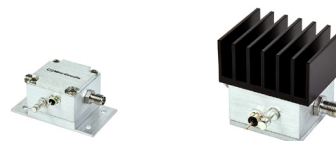
## ZFL-2000+

### Features

- wideband, 10 to 2000 MHz
- high gain, 20 dB min.
- unconditionally stable
- protected by US Patent, 6,943,629

### Applications

- instrumentation
- communication
- lab use



ZFL-2000X+

ZFL-2000+

Generic photo used for illustration purposes only

CASE STYLE: SS98

| Connectors           | Model      |
|----------------------|------------|
| SMA                  | ZFL-2000+  |
| BRACKET (OPTION "B") |            |
| SMA                  | ZFL-2000X+ |

### +RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

### Amplifier Electrical Specifications

| MODEL NO.  | FREQUENCY (MHz) |                | GAIN (dB) |               | MAXIMUM POWER (dBm)               |                   | DYNAMIC RANGE |                | VSWR (:1) Typ. |     | DC POWER      |                   |
|------------|-----------------|----------------|-----------|---------------|-----------------------------------|-------------------|---------------|----------------|----------------|-----|---------------|-------------------|
|            | f <sub>L</sub>  | f <sub>U</sub> | Min.      | Flatness Max. | Output <sup>1</sup> (1 dB Compr.) | Input (no damage) | NF (dB) Typ.  | IP3 (dBm) Typ. | In             | Out | Volt (V) Nom. | Current (mA) Max. |
| ZFL-2000+  | 10              | 2000           | 20        | ±1.5          | +16                               | +5                | 7.0           | +25            | 2.0            | 2.0 | 15            | 120               |
| ZFL-2000X+ | 10              | 2000           | 20        | ±1.5          | +16                               | +5                | 7.0           | +25            | 2.0            | 2.0 | 15            | 120               |

\* Heat sink not included

<sup>1</sup>+15 dBm below 1000 MHz.

Open load is not recommended, potentially can cause damage.  
With no load derate max input power by 20 dB

To order without heat sink, add suffix X to model number. Alternative heat sinking and heat removal must be provided by the user to limit maximum temperature to 71°C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 15°C/W Max.

### Maximum Ratings

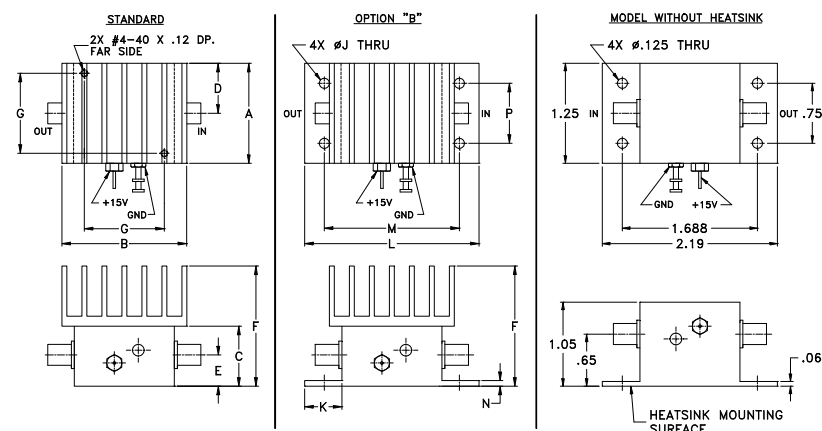
Operating Temperature -20°C to 71°C

Storage Temperature -55°C to 100°C

DC Voltage +17V Max.

Permanent damage may occur if any of these limits are exceeded.

### Outline Drawing



### Outline Dimensions (inch/mm)

| A     | B     | C     | D     | E    | F     | G     | H  | J    | K     | L     | M     | N    | P     | wt*   |
|-------|-------|-------|-------|------|-------|-------|----|------|-------|-------|-------|------|-------|-------|
| 1.25  | 1.56  | .75   | .63   | .39  | 1.50  | 1.000 | -- | .125 | .46   | 2.19  | 1.688 | .06  | .750  | grams |
| 31.75 | 39.62 | 19.05 | 16.00 | 9.91 | 38.10 | 25.40 | -- | 3.18 | 11.68 | 55.63 | 42.88 | 1.52 | 19.05 | 85.0  |

\*70 grams without heat sink

### 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.

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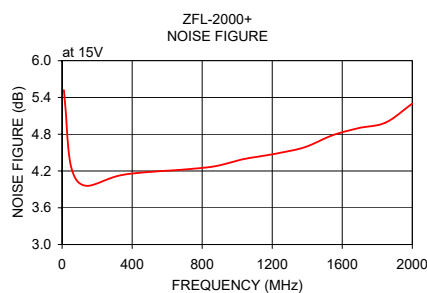
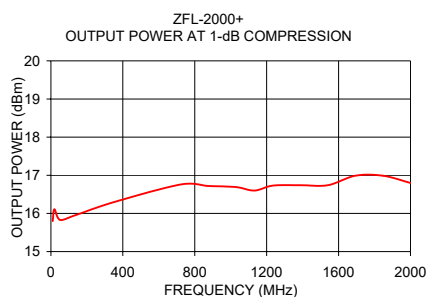
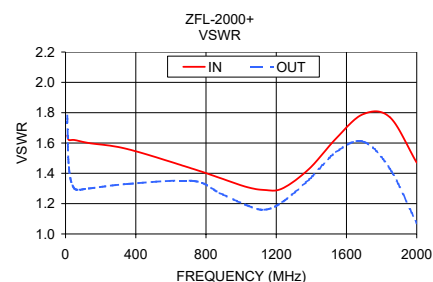
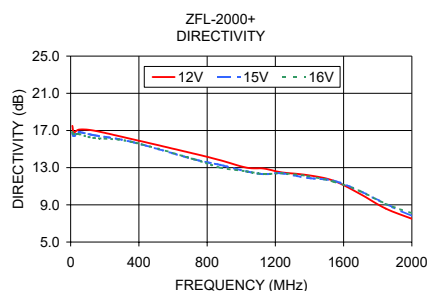
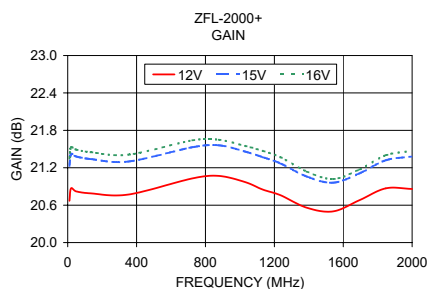
REV. F  
ECO-010199  
ZFL-2000+  
211019



# Typical Performance Data/Curves

## ZFL-2000+

| FREQUENCY<br>(MHz) | GAIN<br>(dB) |       |       | DIRECTIVITY<br>(dB) |       |       | VSWR<br>(:1) |      | NOISE<br>FIGURE<br>(dB) | POUT<br>at 1 dB<br>COMPR.<br>(dBm) |
|--------------------|--------------|-------|-------|---------------------|-------|-------|--------------|------|-------------------------|------------------------------------|
|                    | 12V          | 15V   | 16V   | 12V                 | 15V   | 16V   | IN           | OUT  |                         |                                    |
| 10.00              | 20.67        | 21.23 | 21.35 | 17.50               | 16.70 | 16.80 | 1.65         | 1.78 | 5.52                    | 15.80                              |
| 19.10              | 20.87        | 21.42 | 21.53 | 16.80               | 16.40 | 16.60 | 1.62         | 1.44 | 5.24                    | 16.11                              |
| 50.50              | 20.82        | 21.38 | 21.49 | 17.10               | 16.80 | 16.60 | 1.62         | 1.30 | 4.28                    | 15.83                              |
| 133.40             | 20.79        | 21.34 | 21.45 | 17.00               | 16.50 | 16.20 | 1.60         | 1.30 | 3.96                    | 15.95                              |
| 352.30             | 20.77        | 21.30 | 21.41 | 16.10               | 15.80 | 15.80 | 1.56         | 1.33 | 4.14                    | 16.30                              |
| 724.40             | 21.03        | 21.53 | 21.64 | 14.50               | 13.90 | 13.90 | 1.43         | 1.35 | 4.23                    | 16.76                              |
| 877.40             | 21.07        | 21.56 | 21.65 | 13.80               | 13.30 | 13.00 | 1.37         | 1.27 | 4.28                    | 16.72                              |
| 1030.50            | 20.97        | 21.46 | 21.55 | 13.00               | 12.60 | 12.60 | 1.31         | 1.19 | 4.39                    | 16.69                              |
| 1132.60            | 20.85        | 21.37 | 21.47 | 12.90               | 12.30 | 12.30 | 1.29         | 1.16 | 4.44                    | 16.60                              |
| 1234.60            | 20.76        | 21.27 | 21.37 | 12.50               | 12.40 | 12.40 | 1.30         | 1.21 | 4.49                    | 16.73                              |
| 1387.70            | 20.56        | 21.06 | 21.14 | 12.20               | 11.90 | 12.10 | 1.43         | 1.36 | 4.59                    | 16.74                              |
| 1540.80            | 20.50        | 20.96 | 21.02 | 11.60               | 11.60 | 11.50 | 1.63         | 1.54 | 4.78                    | 16.74                              |
| 1693.80            | 20.68        | 21.11 | 21.17 | 10.20               | 10.50 | 10.50 | 1.79         | 1.61 | 4.90                    | 16.99                              |
| 1846.90            | 20.87        | 21.32 | 21.40 | 8.60                | 9.10  | 9.10  | 1.77         | 1.43 | 4.99                    | 16.99                              |
| 2000.00            | 20.86        | 21.38 | 21.47 | 7.50                | 7.80  | 8.10  | 1.47         | 1.07 | 5.30                    | 16.80                              |



### Notes

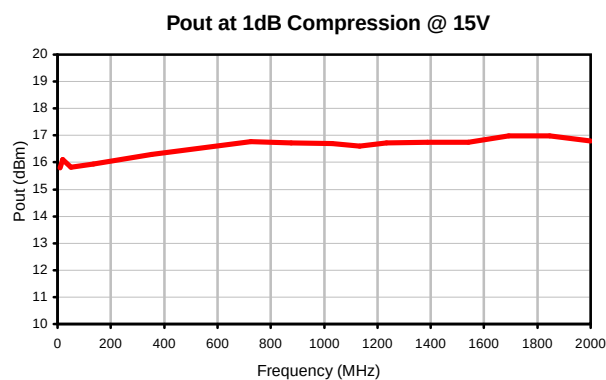
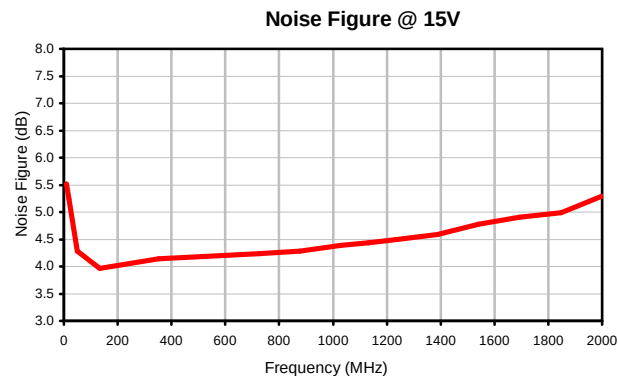
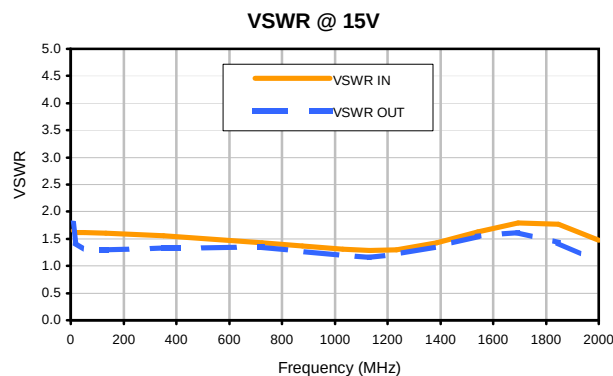
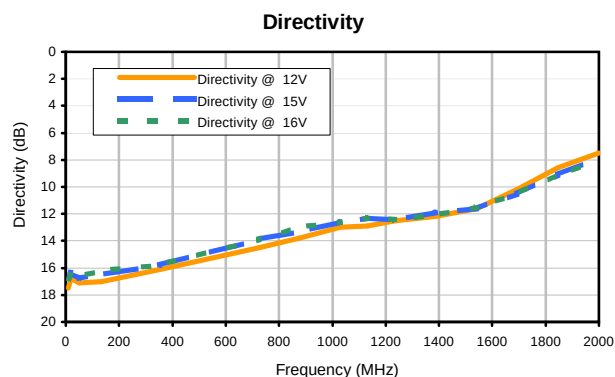
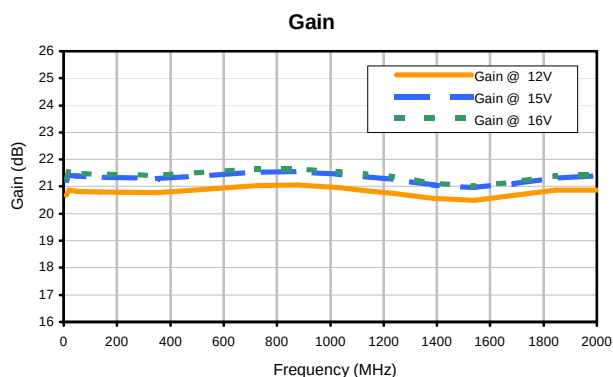
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## Typical Performance Data

| FREQUENCY<br>(MHz) | GAIN<br>(dB) |       |       | DIRECTIVITY<br>(dB) |       |       | VSWR<br>IN<br>(:1)<br>15V | VSWR OUT<br>(:1)<br>15V | NOISE<br>FIGURE<br>(dB)<br>15V | Pout at<br>1dB Comp.<br>(dBm)<br>15V |
|--------------------|--------------|-------|-------|---------------------|-------|-------|---------------------------|-------------------------|--------------------------------|--------------------------------------|
|                    | 12V          | 15V   | 16V   | 12V                 | 15V   | 16V   |                           |                         |                                |                                      |
| 10.0               | 20.67        | 21.23 | 21.35 | 17.50               | 16.70 | 16.80 | 1.65                      | 1.78                    | 5.52                           | 15.80                                |
| 19.1               | 20.87        | 21.42 | 21.53 | 16.80               | 16.40 | 16.60 | 1.62                      | 1.44                    | 5.24                           | 16.11                                |
| 50.5               | 20.82        | 21.38 | 21.49 | 17.10               | 16.80 | 16.60 | 1.62                      | 1.30                    | 4.28                           | 15.83                                |
| 133.4              | 20.79        | 21.34 | 21.45 | 17.00               | 16.50 | 16.20 | 1.60                      | 1.30                    | 3.96                           | 15.95                                |
| 352.3              | 20.77        | 21.30 | 21.41 | 16.10               | 15.80 | 15.80 | 1.56                      | 1.33                    | 4.14                           | 16.30                                |
| 724.4              | 21.03        | 21.53 | 21.64 | 14.50               | 13.90 | 13.90 | 1.43                      | 1.35                    | 4.23                           | 16.76                                |
| 877.4              | 21.07        | 21.56 | 21.65 | 13.80               | 13.30 | 13.00 | 1.37                      | 1.27                    | 4.28                           | 16.72                                |
| 1030.5             | 20.97        | 21.46 | 21.55 | 13.00               | 12.60 | 12.60 | 1.31                      | 1.19                    | 4.39                           | 16.69                                |
| 1132.6             | 20.85        | 21.37 | 21.47 | 12.90               | 12.30 | 12.30 | 1.29                      | 1.16                    | 4.44                           | 16.60                                |
| 1234.6             | 20.76        | 21.27 | 21.37 | 12.50               | 12.40 | 12.40 | 1.30                      | 1.21                    | 4.49                           | 16.73                                |
| 1387.7             | 20.56        | 21.06 | 21.14 | 12.20               | 11.90 | 12.10 | 1.43                      | 1.36                    | 4.59                           | 16.74                                |
| 1540.8             | 20.50        | 20.96 | 21.02 | 11.60               | 11.60 | 11.50 | 1.63                      | 1.54                    | 4.78                           | 16.74                                |
| 1693.8             | 20.68        | 21.11 | 21.17 | 10.20               | 10.50 | 10.50 | 1.79                      | 1.61                    | 4.90                           | 16.99                                |
| 1846.9             | 20.87        | 21.32 | 21.40 | 8.60                | 9.10  | 9.10  | 1.77                      | 1.43                    | 4.99                           | 16.99                                |
| 2000.0             | 20.86        | 21.38 | 21.47 | 7.50                | 7.80  | 8.10  | 1.47                      | 1.07                    | 5.30                           | 16.80                                |

## Typical Performance Curves

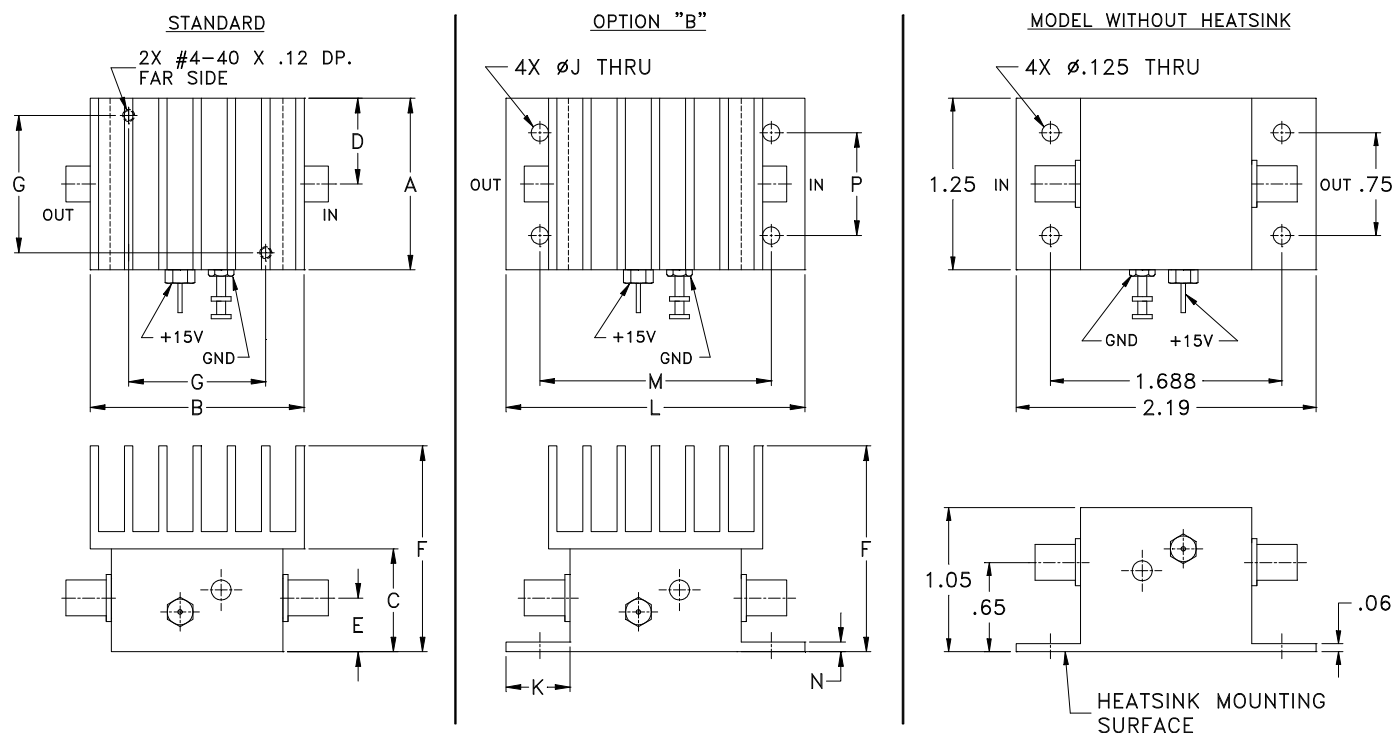


# Case Style

# SS

SS98

## Outline Dimensions



| CASE# | A               | B               | C              | D              | E             | F               | G                | H        | J              | K              | L               | M                | N             |
|-------|-----------------|-----------------|----------------|----------------|---------------|-----------------|------------------|----------|----------------|----------------|-----------------|------------------|---------------|
| SS98  | 1.25<br>(31.75) | 1.56<br>(39.62) | .75<br>(19.05) | .63<br>(16.00) | .39<br>(9.91) | 1.50<br>(38.10) | 1.000<br>(25.40) | --<br>-- | .125<br>(3.18) | .46<br>(11.68) | 2.19<br>(55.63) | 1.688<br>(42.88) | .06<br>(1.52) |

| CASE# | P               | WT. GRAMS | WT. WITHOUT HEATSINK GRAMS |
|-------|-----------------|-----------|----------------------------|
| SS98  | .750<br>(19.05) | 85.0      | 70.0                       |

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

### Notes:

- Case material: Aluminum alloy.
- Case finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
- Heat sink finish: Black anodize.
- Refer to the individual model data sheet for the type of connector available.

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| Specification             | Test/Inspection Condition             | Reference/Spec                                     |
|---------------------------|---------------------------------------|----------------------------------------------------|
| Operating Temperature     | -20° to 71° C<br>Ambient Environment  | Individual Model Data Sheet                        |
| Storage Temperature       | -55° to 100° C<br>Ambient Environment | Individual Model Data Sheet                        |
| Stabilization Bake        | (non-operating)<br>125°C, 24 hours    | - - -                                              |
| Burn-in at Elevated Temp. | (DC on)<br>160 hours at 85° C         | MIL-STD-202, Method 108                            |
| Thermal Shock             | -55° to 100°C, 5 cycles               | MIL-STD-202, Method 107, Condition A, except 100°C |