

# Limiter

50Ω Broadband 100 to 2500 MHz

## Maximum Ratings

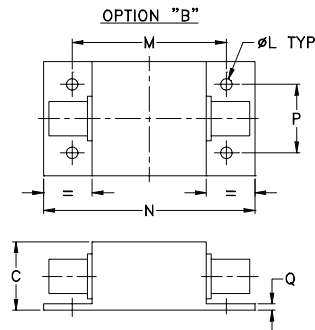
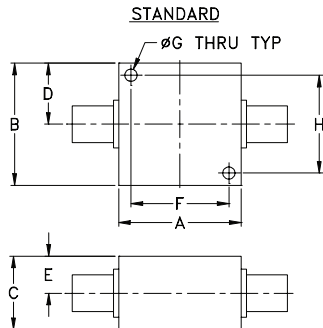
|                       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Input Power        | 1.5W           |

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

## Coaxial Connections

|        |            |
|--------|------------|
| INPUT  | SMA female |
| OUTPUT | SMA male   |

## Outline Drawing



## Outline Dimensions (inch)

| A     | B     | C     | D     | E    | F     | G    | H     |
|-------|-------|-------|-------|------|-------|------|-------|
| 1.25  | 1.25  | .75   | .63   | .38  | 1.000 | .125 | 1.000 |
| 31.75 | 31.75 | 19.05 | 16.00 | 9.65 | 25.40 | 3.18 | 25.40 |

| J  | K  | L    | M     | N     | P     | Q    | wt    |
|----|----|------|-------|-------|-------|------|-------|
| -- | -- | .125 | 1.688 | 2.18  | .750  | .06  | grams |
| -- | -- | 3.18 | 42.88 | 55.37 | 19.05 | 1.52 | 70.0  |

## Features

- low insertion loss, 0.7 dB typ.
- very low output power 0 dBm typ. at 30 dBm input
- low cost

## Applications

- stabilizing generator outputs
- reducing amplitude variations
- protects low noise amplifiers and other devices from ESD or input power damage



CASE STYLE: H16

Connectors Model  
SMA ZFLM-252-1WL-S+  
BRACKET (OPTION "B")

## +RoHS Compliant

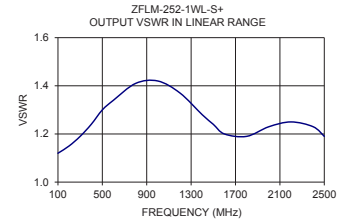
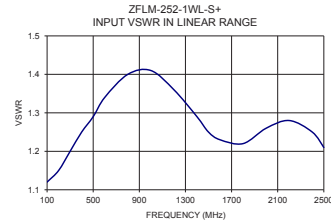
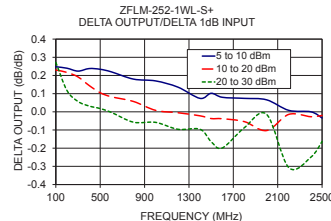
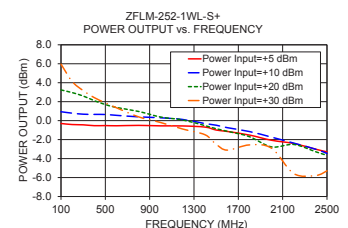
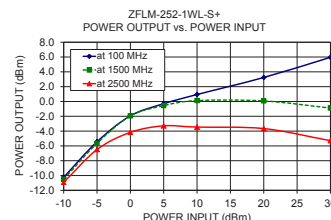
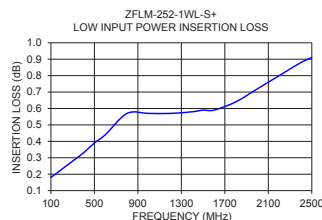
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

## Electrical Specifications

| Parameter             | Condition                                                                     | Min. | Typ.               | Max. | Units |
|-----------------------|-------------------------------------------------------------------------------|------|--------------------|------|-------|
| Frequency Range       |                                                                               | 100  | —                  | 2500 | MHz   |
| <b>Linear Range</b>   |                                                                               |      |                    |      |       |
| Max Input Power       | <0.1 dB compression                                                           | —    | —                  | -10  | dBm   |
| Insertion Loss        | <-10 dBm                                                                      | —    | 0.7                | 1.4  | dB    |
| VSWR                  | <-10 dBm                                                                      | —    | 1.35               | 1.6  | :1    |
| <b>Limiting Range</b> |                                                                               |      |                    |      |       |
| Input Power           | >1dB compression filtered signal frequency                                    | +5   | —                  | +30  | dBm   |
| Output Power          |                                                                               | —    | 0                  | —    | dBm   |
| Δ Output/1dB Δ Input  | Input Power Range (dBm)<br>5 to 10<br>10 to 20<br>20 to 30                    | —    | 0.1<br>0.05<br>0.1 | —    | dB/dB |
| Recovery Time         | 1 watt pulse 50 μsec pw 1kHz duty cycle recovery to within 90% of final value | —    | 8                  | —    | nsec  |
| Response Time         | -30 to +30 dBm input 50 μsec PW 1 kHz duty cycle                              | —    | 2                  | —    | nsec  |

## Typical Performance Data

| Freq.<br>(MHz) | I. Loss<br>in Linear<br>Range<br>(dB) | VSWR<br>in Linear<br>Range<br>(:1) | Power Output<br>(dBm) |                  |                  |                  | Δ Output / 1dB Δ Input |                         |                         |
|----------------|---------------------------------------|------------------------------------|-----------------------|------------------|------------------|------------------|------------------------|-------------------------|-------------------------|
|                |                                       |                                    | +5 dBm<br>Input       | +10 dBm<br>Input | +20 dBm<br>Input | +30 dBm<br>Input | +5 to<br>+10 dBm Input | +10 to<br>+20 dBm Input | +20 to<br>+30 dBm Input |
| 100.00         | 0.18                                  | 1.12                               | -0.30                 | 0.94             | 3.24             | 5.96             | 0.25                   | 0.23                    | 0.27                    |
| 200.00         | 0.23                                  | 1.15                               | -0.41                 | 0.79             | 2.96             | 4.14             | 0.24                   | 0.22                    | 0.12                    |
| 300.00         | 0.28                                  | 1.20                               | -0.44                 | 0.68             | 2.60             | 3.17             | 0.22                   | 0.19                    | 0.06                    |
| 400.00         | 0.33                                  | 1.25                               | -0.53                 | 0.66             | 2.11             | 2.43             | 0.24                   | 0.15                    | 0.03                    |
| 500.00         | 0.39                                  | 1.29                               | -0.52                 | 0.65             | 1.70             | 1.88             | 0.23                   | 0.11                    | 0.02                    |
| 600.00         | 0.44                                  | 1.34                               | -0.54                 | 0.56             | 1.39             | 1.36             | 0.22                   | 0.08                    | 0.00                    |
| 800.00         | 0.57                                  | 1.40                               | -0.50                 | 0.40             | 0.97             | 0.40             | 0.18                   | 0.06                    | -0.06                   |
| 1000.00        | 0.57                                  | 1.41                               | -0.55                 | 0.30             | 0.38             | -0.20            | 0.17                   | 0.01                    | -0.06                   |
| 1200.00        | 0.57                                  | 1.36                               | -0.56                 | 0.12             | 0.07             | -0.89            | 0.14                   | -0.01                   | -0.10                   |
| 1400.00        | 0.58                                  | 1.29                               | -0.68                 | -0.31            | -0.53            | -1.49            | 0.07                   | -0.02                   | -0.10                   |
| 1500.00        | 0.59                                  | 1.25                               | -0.99                 | -0.48            | -0.85            | -2.49            | 0.10                   | -0.04                   | -0.16                   |
| 1600.00        | 0.59                                  | 1.23                               | -1.14                 | -0.74            | -1.12            | -3.11            | 0.08                   | -0.04                   | -0.20                   |
| 1800.00        | 0.64                                  | 1.22                               | -1.52                 | -1.15            | -1.69            | -2.56            | 0.07                   | -0.05                   | -0.09                   |
| 2000.00        | 0.72                                  | 1.26                               | -2.07                 | -1.74            | -2.77            | -2.91            | 0.07                   | -0.10                   | -0.01                   |
| 2200.00        | 0.80                                  | 1.28                               | -2.41                 | -2.37            | -2.51            | -5.58            | 0.01                   | -0.01                   | -0.31                   |
| 2400.00        | 0.88                                  | 1.25                               | -3.02                 | -3.02            | -3.29            | -5.78            | 0.00                   | -0.03                   | -0.25                   |
| 2500.00        | 0.91                                  | 1.21                               | -3.29                 | -3.46            | -3.66            | -5.29            | -0.03                  | -0.02                   | -0.16                   |



## 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.  
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## Typical Performance Data

| FREQUENCY<br>(MHz) | LOW INPUT POWER           |       |        | POWER OUTPUT (dBm) |                  |                  |                  | DELTA OUTPUT/1dB DELTA INPUT (dB/dB) |                         |                         |
|--------------------|---------------------------|-------|--------|--------------------|------------------|------------------|------------------|--------------------------------------|-------------------------|-------------------------|
|                    | INSERTION<br>LOSS<br>(dB) | VSWR  |        | +5 dBm<br>INPUT    | +10 dBm<br>INPUT | +20 dBm<br>INPUT | +30 dBm<br>INPUT | +5 to +10 dBm<br>INPUT               | +10 to +20 dBm<br>INPUT | +20 to +30 dBm<br>INPUT |
|                    |                           | Input | Output |                    |                  |                  |                  |                                      |                         |                         |
|                    |                           | (:1)  |        |                    |                  |                  |                  |                                      |                         |                         |
| 100                | 0.18                      | 1.12  | 1.12   | -0.30              | 0.94             | 3.24             | 5.96             | 0.25                                 | 0.23                    | 0.27                    |
| 200                | 0.23                      | 1.15  | 1.15   | -0.41              | 0.79             | 2.96             | 4.14             | 0.24                                 | 0.22                    | 0.12                    |
| 300                | 0.28                      | 1.20  | 1.19   | -0.44              | 0.68             | 2.60             | 3.17             | 0.22                                 | 0.19                    | 0.06                    |
| 400                | 0.33                      | 1.25  | 1.24   | -0.53              | 0.66             | 2.11             | 2.43             | 0.24                                 | 0.15                    | 0.03                    |
| 500                | 0.39                      | 1.29  | 1.30   | -0.52              | 0.65             | 1.70             | 1.88             | 0.23                                 | 0.11                    | 0.02                    |
| 600                | 0.44                      | 1.34  | 1.34   | -0.54              | 0.56             | 1.39             | 1.36             | 0.22                                 | 0.08                    | 0.00                    |
| 700                | 0.51                      | 1.36  | 1.38   | -0.52              | 0.48             | 1.17             | 0.82             | 0.20                                 | 0.07                    | -0.04                   |
| 800                | 0.57                      | 1.40  | 1.41   | -0.50              | 0.40             | 0.97             | 0.40             | 0.18                                 | 0.06                    | -0.06                   |
| 900                | 0.56                      | 1.42  | 1.43   | -0.38              | 0.36             | 0.45             | 0.03             | 0.15                                 | 0.01                    | -0.04                   |
| 1000               | 0.57                      | 1.41  | 1.42   | -0.55              | 0.30             | 0.38             | -0.20            | 0.17                                 | 0.01                    | -0.06                   |
| 1100               | 0.57                      | 1.39  | 1.40   | -0.51              | 0.19             | 0.21             | -0.61            | 0.14                                 | 0.00                    | -0.08                   |
| 1200               | 0.57                      | 1.36  | 1.37   | -0.56              | 0.12             | 0.07             | -0.89            | 0.14                                 | -0.01                   | -0.10                   |
| 1300               | 0.58                      | 1.33  | 1.33   | -0.72              | -0.09            | -0.21            | -1.33            | 0.13                                 | -0.01                   | -0.11                   |
| 1400               | 0.58                      | 1.29  | 1.28   | -0.68              | -0.31            | -0.53            | -1.49            | 0.07                                 | -0.02                   | -0.10                   |
| 1500               | 0.59                      | 1.25  | 1.24   | -0.99              | -0.48            | -0.85            | -2.49            | 0.10                                 | -0.04                   | -0.16                   |
| 1600               | 0.59                      | 1.23  | 1.20   | -1.14              | -0.74            | -1.12            | -3.11            | 0.08                                 | -0.04                   | -0.20                   |
| 1700               | 0.61                      | 1.21  | 1.18   | -1.32              | -0.94            | -1.33            | -3.01            | 0.08                                 | -0.04                   | -0.17                   |
| 1800               | 0.64                      | 1.22  | 1.19   | -1.52              | -1.15            | -1.69            | -2.56            | 0.07                                 | -0.05                   | -0.09                   |
| 1900               | 0.68                      | 1.24  | 1.20   | -1.78              | -1.36            | -2.43            | -2.42            | 0.08                                 | -0.11                   | 0.00                    |
| 2000               | 0.72                      | 1.26  | 1.23   | -2.07              | -1.74            | -2.77            | -2.91            | 0.07                                 | -0.10                   | -0.01                   |
| 2100               | 0.76                      | 1.28  | 1.24   | -2.24              | -2.04            | -2.93            | -4.50            | 0.04                                 | -0.09                   | -0.16                   |
| 2200               | 0.80                      | 1.28  | 1.25   | -2.41              | -2.37            | -2.51            | -5.58            | 0.01                                 | -0.01                   | -0.31                   |
| 2300               | 0.84                      | 1.28  | 1.25   | -2.78              | -2.74            | -3.51            | -7.65            | 0.01                                 | -0.08                   | -0.41                   |
| 2400               | 0.88                      | 1.25  | 1.23   | -3.02              | -3.02            | -3.29            | -5.78            | 0.00                                 | -0.03                   | -0.25                   |
| 2500               | 0.91                      | 1.21  | 1.19   | -3.29              | -3.46            | -3.66            | -5.29            | -0.03                                | -0.02                   | -0.16                   |

# Coaxial Limiter

# ZFLM-252-1WL+

## Typical Performance Data

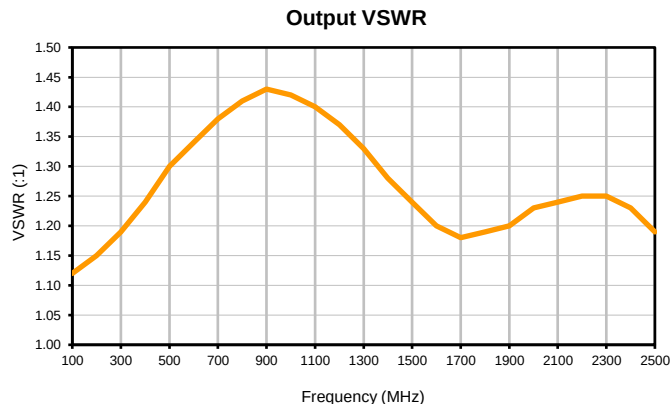
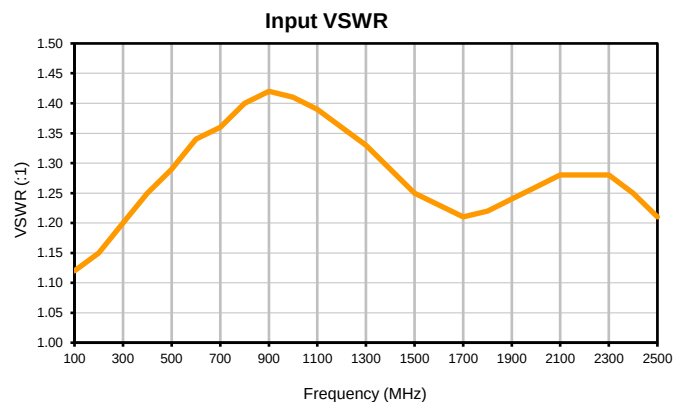
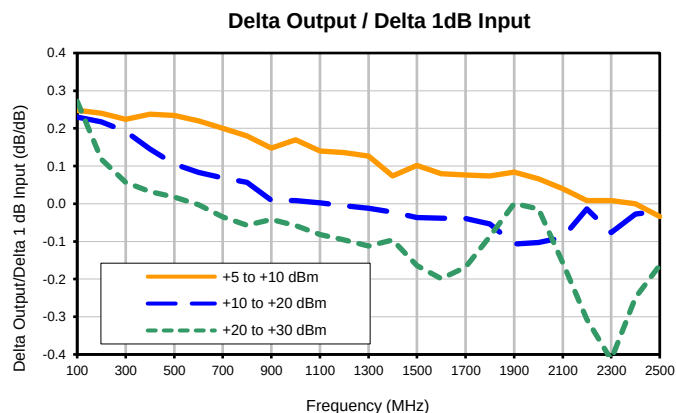
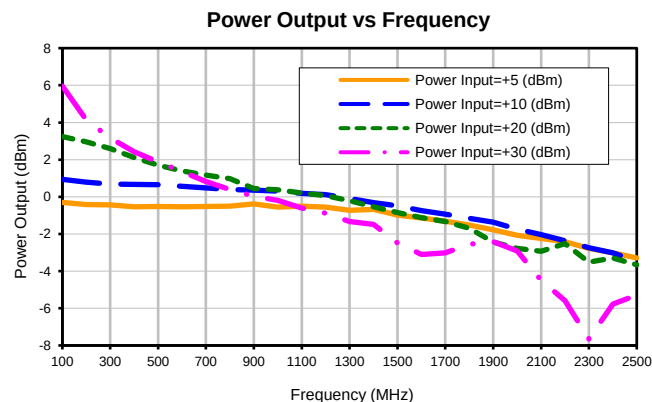
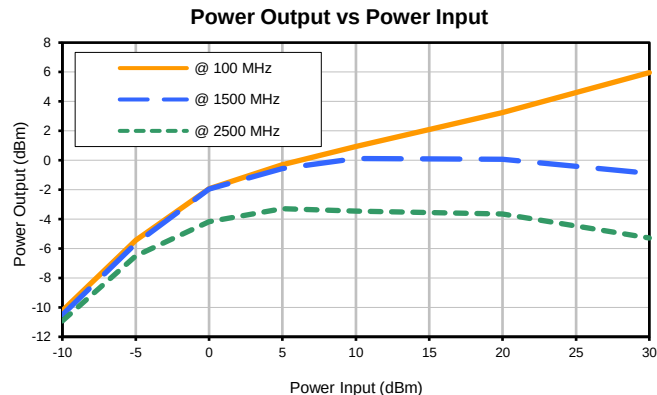
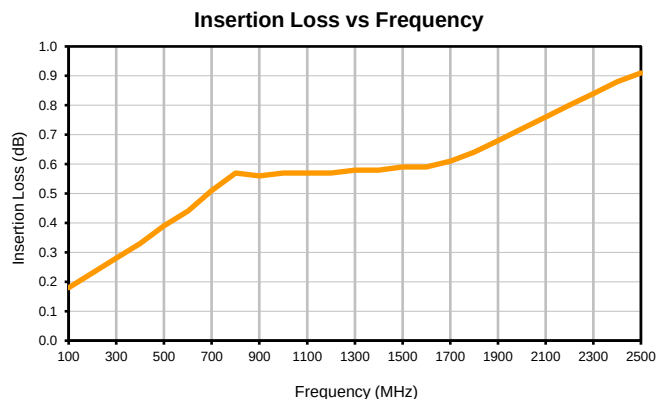
| POWER INPUT | POWER OUTPUT | POWER INPUT | POWER OUTPUT | POWER INPUT | POWER OUTPUT |
|-------------|--------------|-------------|--------------|-------------|--------------|
| @ 100 MHz   |              | @ 1500 MHz  |              | @ 2500 MHz  |              |
| (dBm)       |              | (dBm)       |              | (dBm)       |              |
| -10         | -10.23       | -10         | -10.51       | -10         | -10.92       |
| -5          | -5.44        | -5          | -5.65        | -5          | -6.49        |
| 0           | -1.94        | 0           | -1.95        | 0           | -4.17        |
| 5           | -0.30        | 5           | -0.56        | 5           | -3.29        |
| 10          | 0.94         | 10          | 0.12         | 10          | -3.46        |
| 20          | 3.24         | 20          | 0.07         | 20          | -3.66        |
| 30          | 5.96         | 30          | -0.89        | 30          | -5.29        |



# Coaxial Limiter

ZFLM-252-1WL+

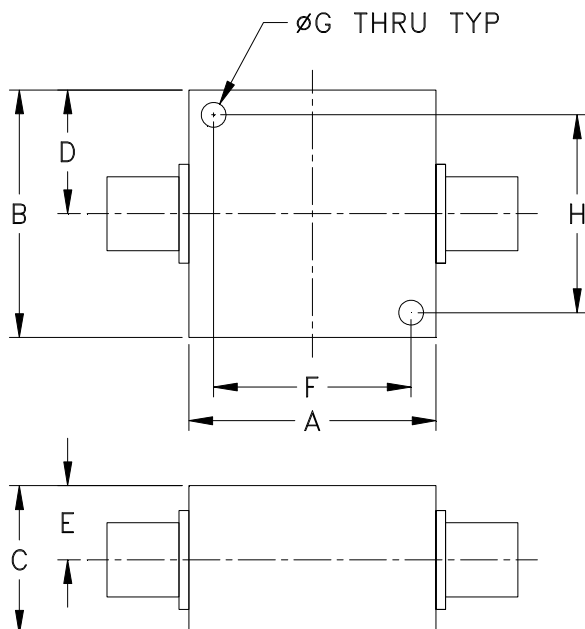
## Typical Performance Curves



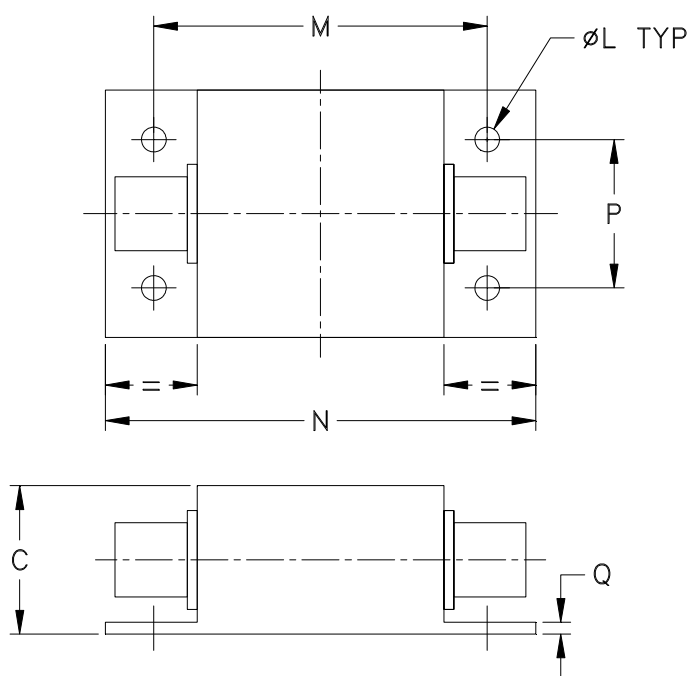
## Outline Dimensions

H16

STANDARD



OPTION "B"



| CASE# | A               | B               | C               | D              | E             | F                | G              | H                | J  | K  | L              | M                | N               |
|-------|-----------------|-----------------|-----------------|----------------|---------------|------------------|----------------|------------------|----|----|----------------|------------------|-----------------|
| H16   | 1.25<br>(31.75) | 1.25<br>(31.75) | .750<br>(19.05) | .63<br>(16.00) | .38<br>(9.65) | 1.000<br>(25.40) | .125<br>(3.18) | 1.000<br>(25.40) | -- | -- | .125<br>(3.18) | 1.688<br>(42.88) | 2.18<br>(55.37) |

| CASE# | P               | Q             | WT.GRAMS |
|-------|-----------------|---------------|----------|
| H16   | .750<br>(19.05) | .06<br>(1.52) | 70       |

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

### Notes:

- Case material: Aluminum alloy.
- Case finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
- Mounting bracket available on request. Add suffix B to part number.
- Bracket version, option B, dimension "C" changes from .75 to .94 inches when connectors are type N.
- Refer to the individual model data sheet for the type of connectors available.



ISO 9001 ISO 14001 CERTIFIED

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

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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                                                                           | Individual Model Data Sheet          |
| Storage Temperature        | -55° to 100° C<br>Ambient Environment                                                  | Individual Model Data Sheet          |
| Barometric Pressure        | 100,000 Feet                                                                           | MIL-STD-202, Method 105, Condition D |
| Humidity                   | 90% RH, 65°C<br>Units may require bake-out after humidity to restore full performance. | MIL-STD-202, Method 103              |
| Thermal Shock              | -65° to 125°C, 5 cycles                                                                | MIL-STD-202, Method 107, Condition B |
| Vibration (High Frequency) | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)    | MIL-STD-202, Method 204, Condition D |
| Mechanical Shock           | 100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)                          | MIL-STD-202, Method 213, Condition I |