*Coaxial Reflectionless*

# High Pass Filter

## ZXHF Series

50Ω DC to 30 GHz

## The Big Deal

- Patented design eliminates in band spurs
- Wideband performance up to 30 GHz

## Product Overview

Mini-Circuits' ZXHF Series reflectionless filters employs a novel filter topology which absorbs and terminates stop band signals internally rather than reflecting them back to the source. Reflectionless filters eliminate stopband reflections, allowing them to be paired with sensitive devices and used in applications that otherwise require circuits such as isolation amplifiers or attenuators. This is developed in a new broadband, stable connectorized package.

## Key Features

| Feature | Advantages |
|---|---|
| Easy integration with sensitive reflective components, e.g. mixers, multipliers | Reflectionless filters absorb unwanted signals, preventing reflections back to the source. This reduces generation of additional unwanted signals without the need for extra components like attenuators, improving system dynamic range. |
| Cascadable | Reflectionless filters can be cascaded in multiple sections to provide sharper and higher attenuation, while also preventing any standing waves that could affect pass band signals. |
| Excellent stability over temperature | Minimal variation in electrical performance across temperature. |
| Operating temperature up to 105˚C | Suitable for operation close to high power components. |
| Broadband connectorized package | The connectorized package works well even in high frequencies and easy to interface with other devices. This is well suited for test setups. |

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# High Pass Filter

50Ω 5000 to 11000 MHz

# ZXHF-K53H+

*Generic photo used for illustration purposes only*

CASE STYLE: UK3042

| Connectors | Model |
|---|---|
| **2.92mm-F** | ZXHF-K53H+ |

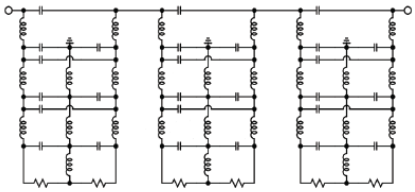
## Features

- Match to 50Ω in the stop band, eliminates undesired reflections
- Cascadable
- Temperature stable, up to 105°C
- Protected by US Patent No. 8,392,495 ; 9,705,467, additional patent pending
- Protected by China Patent 201080014266.1
- Protected by Taiwan Patent I581494

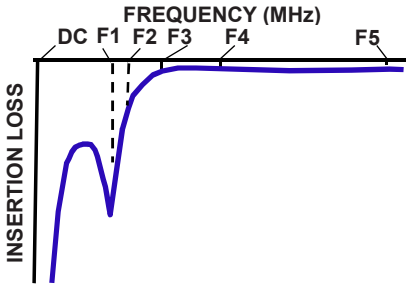
## Applications

- Telecom
- Aerospace & Defense
- point-to-point radios
- X-band radars

## Functional Schematic



## Typical Frequency Response




***+RoHS Compliant***

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

## Electrical Specifications at 25°C

| Parameter | | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Stop Band | Rejection | DC-F1 | DC- 3100 | 33 | 50 | - | dB |
| | Freq. Cut-Off | F2 | 4200 | - | 3.4 | - | dB |
| | VSWR | DC-F1 | DC- 3100 | - | 1.3 | - | :1 |
| Pass Band | Insertion Loss | F3-F4 | 5000 - 8000 | - | 2.3 | 3.1 | dB |
| | | F4-F5 | 8000 - 11000 | - | 1.5 | - | dB |
| | VSWR | F3-F4 | 5000 - 8000 | - | 1.3 | - | :1 |
| | | F4-F5 | 8000 - 11000 | - | 1.4 | - | :1 |

## Absolute Maximum Ratings[3]

| Parameter | Ratings |
|---|---|
| Operating Temperature | -55°C to +105°C |
| Storage Temperature | -55°C to +105°C |
| RF Power Input, Passband (F3-F5)[1] | 1.26W at 25°C |
| RF Power Input, Stopband (DC-F3)[2] | 0.79W at 25°C |

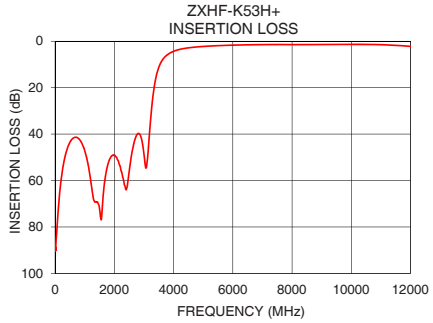
[1] Passband rating derates linearly to 0.63W at 105°C ambient
[2] Stopband rating derates linearly to 0.39W at 105°C ambient
[3] Permanent damage may occur if any of these limits are exceeded

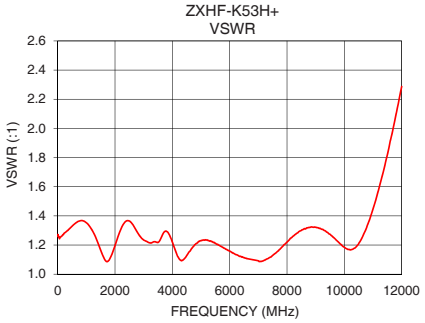
## ESD rating

Human body model (HBM): Class 2(Pass 2000V) in accordance with ANSI/ESD 5.1-2001

## Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) |
|---|---|---|
| 1 | 89.48 | 1.27 |
| 10 | 90.26 | 1.27 |
| 100 | 73.66 | 1.25 |
| 200 | 59.93 | 1.27 |
| 300 | 51.72 | 1.29 |
| 500 | 43.51 | 1.33 |
| 1000 | 47.15 | 1.35 |
| 3100 | 52.97 | 1.23 |
| 3240 | 31.40 | 1.21 |
| 3300 | 23.94 | 1.22 |
| 3500 | 11.23 | 1.22 |
| 4200 | 3.53 | 1.12 |
| 5000 | 2.24 | 1.23 |
| 6000 | 1.69 | 1.16 |
| 7000 | 1.46 | 1.09 |
| 8000 | 1.45 | 1.22 |
| 9000 | 1.43 | 1.32 |
| 10000 | 1.35 | 1.19 |
| 11000 | 1.49 | 1.45 |
| 12000 | 2.19 | 2.29 |



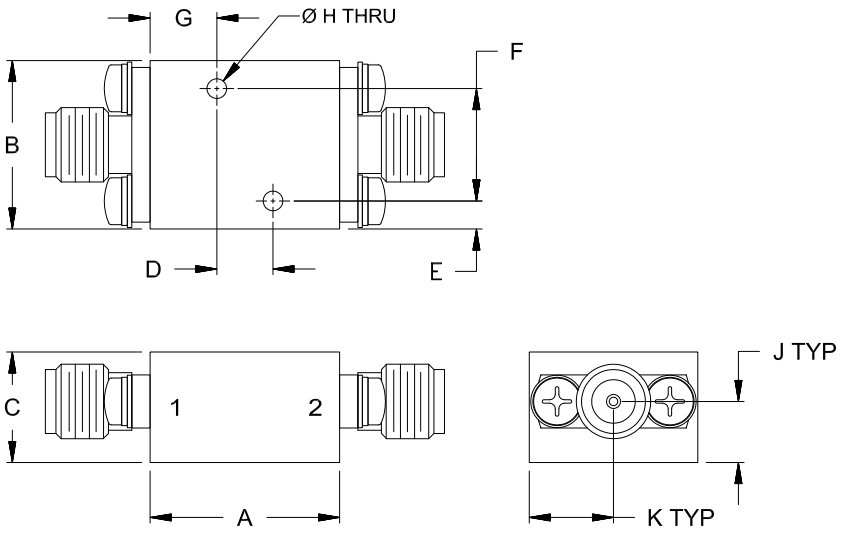

Notes

**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/MCLStore/terms.jsp

## Coaxial Connections

| | |
|---|---|
| PORT - 1 | 2.92mm-Female |
| PORT - 2 | 2.92mm-Female |

## Outline Drawing




## Outline Dimensions ( inch / mm )

| A | B | C | D | E | F |
|---|---|---|---|---|---|
| **.68** | **.60** | **.39** | **.200** | **.10** | **.400** |
| 17.1 | 15.2 | 10.0 | 5.08 | 2.5 | 10.16 |

| G | H | J | K | | Wt. |
|---|---|---|---|---|---|
| **.24** | **.070** | **.22** | **.30** | | grams |
| 6.0 | 1.78 | 5.5 | 7.6 | | **24** |

*Note: Please refer to case style drawing for details*

# Coaxial Reflectionless High Pass Filter ZXHF-K53H+

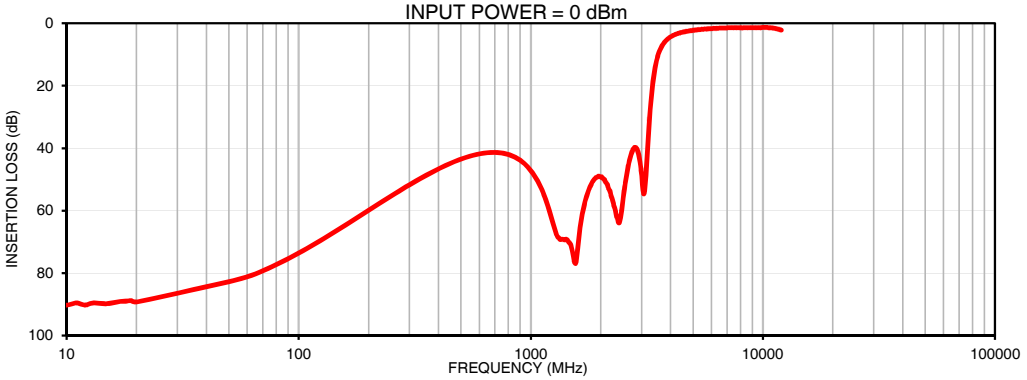
## *Typical Performance Data*

| FREQ. (MHz) | Insertion Loss (dB) | Input Return Loss (dB) | Output Return Loss (dB) |
|---|---|---|---|
| 1 | 89.48 | 18.44 | 18.47 |
| 5 | 90.45 | 18.54 | 18.47 |
| 10 | 90.26 | 18.61 | 18.53 |
| 20 | 89.27 | 18.88 | 18.79 |
| 100 | 73.66 | 18.95 | 19.02 |
| 200 | 59.93 | 18.45 | 18.36 |
| 300 | 51.72 | 17.89 | 18.04 |
| 360 | 48.37 | 17.67 | 17.84 |
| 400 | 46.63 | 17.45 | 17.67 |
| 500 | 43.51 | 17.00 | 17.27 |
| 600 | 41.83 | 16.62 | 16.93 |
| 700 | 41.35 | 16.32 | 16.60 |
| 800 | 42.00 | 16.19 | 16.48 |
| 900 | 43.86 | 16.23 | 16.45 |
| 1000 | 47.15 | 16.47 | 16.64 |
| 1100 | 52.31 | 16.94 | 17.00 |
| 1200 | 59.84 | 17.63 | 17.60 |
| 1300 | 68.17 | 18.65 | 18.45 |
| 1400 | 69.37 | 20.22 | 19.86 |
| 1500 | 72.15 | 22.41 | 21.77 |
| 1600 | 70.19 | 25.18 | 24.31 |
| 1700 | 58.10 | 27.61 | 26.93 |
| 1800 | 52.34 | 26.51 | 27.10 |
| 1900 | 49.49 | 23.63 | 24.47 |
| 2000 | 49.13 | 20.96 | 21.69 |
| 2100 | 50.88 | 18.91 | 19.41 |
| 2500 | 56.12 | 16.23 | 15.99 |
| 3000 | 48.72 | 19.59 | 18.58 |
| 3100 | 52.97 | 19.89 | 18.79 |
| 3200 | 37.55 | 20.25 | 19.06 |
| 3240 | 31.40 | 20.30 | 19.11 |
| 3300 | 23.94 | 20.16 | 19.04 |
| 3500 | 11.23 | 20.17 | 19.00 |
| 4000 | 4.33 | 20.10 | 18.89 |
| 4200 | 3.53 | 25.08 | 21.66 |
| 4500 | 2.84 | 24.47 | 21.08 |
| 5000 | 2.24 | 19.75 | 18.76 |
| 5100 | 2.15 | 19.56 | 18.75 |
| 5200 | 2.10 | 19.59 | 18.92 |
| 5300 | 2.02 | 19.85 | 19.33 |
| 5400 | 1.95 | 20.00 | 19.68 |
| 5500 | 1.91 | 20.35 | 20.07 |
| 5600 | 1.84 | 20.77 | 20.59 |
| 5700 | 1.80 | 21.21 | 21.11 |
| 5800 | 1.77 | 21.74 | 21.56 |
| 5900 | 1.72 | 22.15 | 21.83 |
| 6000 | 1.69 | 22.69 | 21.95 |
| 6100 | 1.66 | 23.38 | 22.07 |
| 6200 | 1.62 | 23.94 | 21.92 |
| 6300 | 1.60 | 24.41 | 21.59 |
| 6400 | 1.57 | 24.93 | 21.25 |
| 6500 | 1.54 | 25.46 | 20.89 |
| 7000 | 1.46 | 27.15 | 18.94 |
| 7200 | 1.44 | 26.90 | 18.26 |
| 8000 | 1.45 | 20.07 | 16.36 |
| 8500 | 1.44 | 17.68 | 16.04 |
| 9000 | 1.43 | 17.16 | 16.78 |
| 10000 | 1.35 | 21.44 | 27.59 |
| 11000 | 1.49 | 14.75 | 15.95 |
| 12000 | 2.19 | 8.15 | 8.57 |

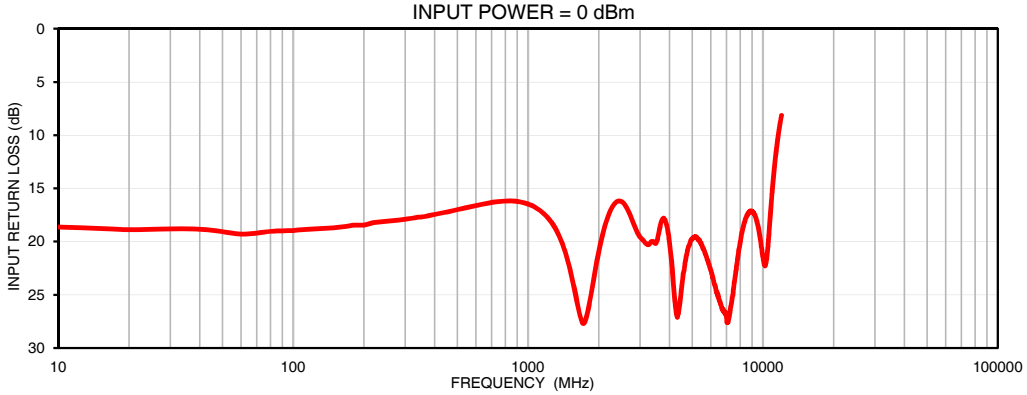
| FREQ. (MHz) | Group Delay (ns) |
|---|---|
| 5000 | 0.33 |
| 5100 | 0.32 |
| 5200 | 0.31 |
| 5300 | 0.30 |
| 5400 | 0.29 |
| 5500 | 0.29 |
| 5600 | 0.28 |
| 5700 | 0.28 |
| 5800 | 0.27 |
| 5900 | 0.27 |
| 6000 | 0.26 |
| 6100 | 0.26 |
| 6200 | 0.26 |
| 6300 | 0.25 |
| 6400 | 0.25 |
| 6500 | 0.25 |
| 6600 | 0.25 |
| 6700 | 0.24 |
| 6800 | 0.24 |
| 6900 | 0.24 |
| 7000 | 0.24 |
| 7100 | 0.24 |
| 7200 | 0.23 |
| 7300 | 0.23 |
| 7400 | 0.23 |
| 7500 | 0.23 |
| 7600 | 0.23 |
| 7700 | 0.22 |
| 7800 | 0.22 |
| 7900 | 0.22 |
| 8000 | 0.22 |
| 8100 | 0.22 |
| 8200 | 0.22 |
| 8300 | 0.22 |
| 8400 | 0.21 |
| 8500 | 0.21 |
| 8600 | 0.21 |
| 8700 | 0.21 |
| 8800 | 0.21 |
| 8900 | 0.21 |
| 9000 | 0.21 |
| 9100 | 0.21 |
| 9200 | 0.21 |
| 9300 | 0.21 |
| 9400 | 0.21 |
| 9500 | 0.21 |
| 9600 | 0.21 |
| 9700 | 0.21 |
| 9800 | 0.21 |
| 9900 | 0.21 |
| 10000 | 0.21 |
| 10100 | 0.21 |
| 10200 | 0.21 |
| 10300 | 0.21 |
| 10400 | 0.21 |
| 10500 | 0.21 |
| 10600 | 0.21 |
| 10700 | 0.21 |
| 10800 | 0.21 |
| 11000 | 0.21 |

*Typical Performance Curves*

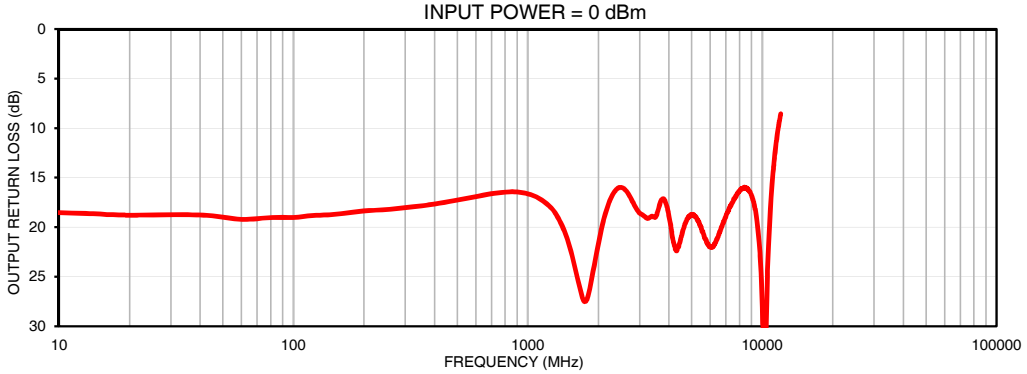
**INSERTION LOSS**
INPUT POWER = 0 dBm



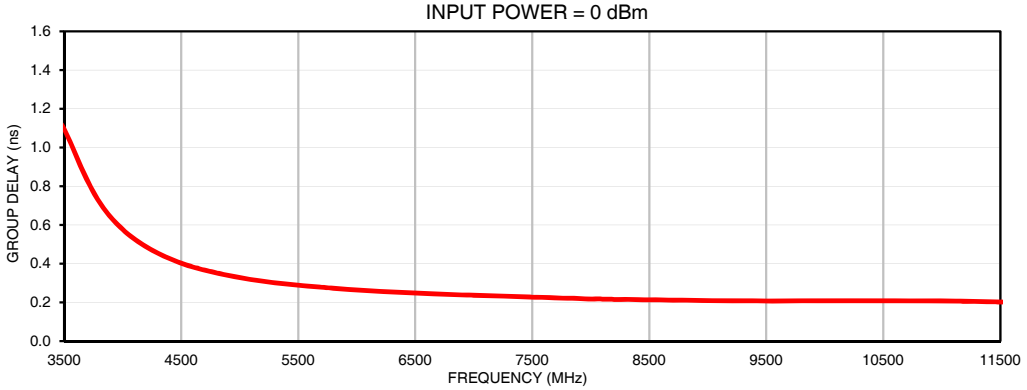

**INPUT RETURN LOSS**
INPUT POWER = 0 dBm




**OUTPUT RETURN LOSS**
INPUT POWER = 0 dBm



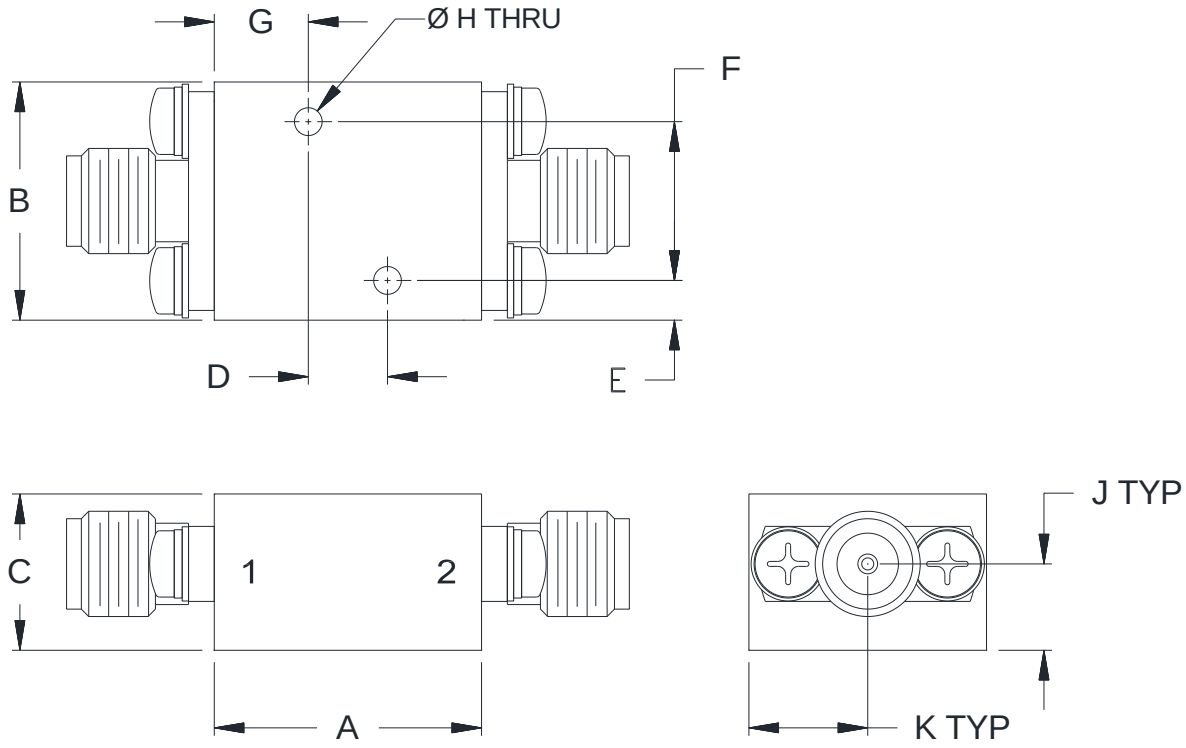

**GROUP DELAY**
INPUT POWER = 0 dBm



# Case Style UK

## Outline Dimensions

**UK3042**




| CASE# | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| UK3042 | .68<br>(17.1) | .60<br>(15.2) | .39<br>(10.0) | .200<br>(5.08) | .10<br>(2.5) | .400<br>(10.16) |

| CASE# | G | H | J | K | WT.GRAMS |
|---|---|---|---|---|---|
| UK3042 | .24<br>(6.0) | .070<br>(1.78) | .22<br>(5.5) | .30<br>(7.6) | 24 |

**Dimensions are in inches (mm). Tolerances: 2 Pl. ± .050; 3 Pl. ± .015**

### Notes:

1. Case material: Brass alloy.
2. Case Finish:
   a. Case & Cover of the units –Gold plating.
3. Refer to the individual model data sheet for the type of connectors available.

Mini-Circuits

# Environmental Specifications ENV002

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 | -55° to 105°C<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 105°C<br>Ambient Environment | Individual Model Data Sheet |