Coaxial Reflectionless

High Pass Filter

ZXHF Series

50Ω DC to 30 GHz



The Big Deal

- Patented design eliminates in band spurs
- Pass band cut-off up to 18.3 GHz
- Stop band 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	Ensures 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.

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 Reflectionless

High Pass Filter

ZXHF-K153+

50Ω 15.3 to 30 GHz



Generic photo used for illustration purposes only

CASE STYLE: UK3042

Connectors	Model
2.92mm-F	ZXHF-K153+

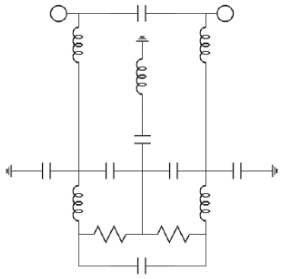
Features

- 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

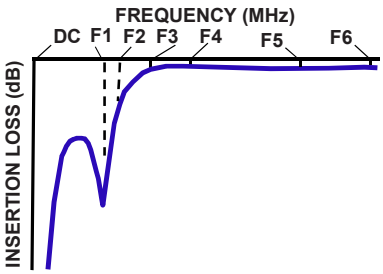
Applications

- KA Band Satellite Transmission
- Microwave Radio
- Military and Space

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- 2400	-	6.8	-	dB
		F1-F2	2400 - 12000	11	13.7	-	dB
	Freq. Cut-Off	F3	14200	-	3.4	-	dB
	VSWR	DC-F1	DC - 2400	-	2.7	-	:1
		F1-F2	2400 - 12000		2.2	-	:1
Pass Band	Insertion Loss	F4-F5	15300 - 26000	-	3.0	-	dB
		F5-F6	26000 - 30000	-	2.2	-	dB
	VSWR	F4-F5	15300 - 26000	-	2.1	-	:1
		F5-F6	26000 - 30000	-	1.6	-	: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 (F4-F6)[1]	1.26W at 25°C
RF Power Input, Stopband (DC-F4)[2]	0.16W at 25°C

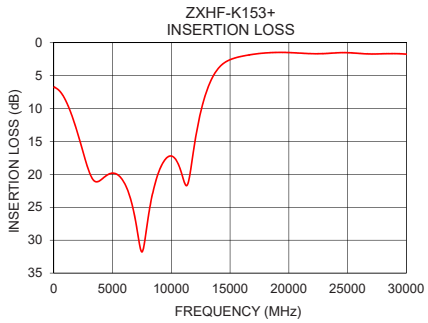
[1] Passband rating derates linearly to 0.63W at 105°C ambient
[2] Stopband rating derates linearly to 0.08W at 105°C ambient
[3] Permanent damage may occur if any of these limits are exceeded

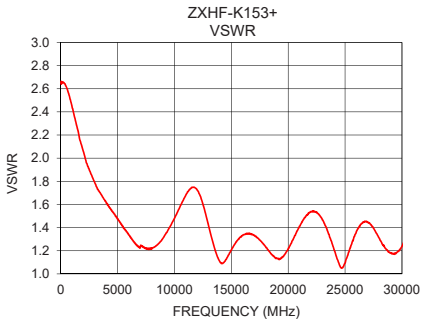
ESD rating

Human body model (HBM): Class 1A(250 to<500 V) in accordance with ANSI/ESD STM 5.1-2001

Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
25	6.80	2.66
100	6.79	2.65
500	7.33	2.62
1000	8.73	2.44
1500	10.88	2.24
2400	16.04	1.93
3000	19.55	1.79
5000	19.83	1.47
7000	27.50	1.23
10000	17.21	1.48
12000	15.13	1.72
14200	3.50	1.09
15000	2.58	1.21
15300	2.38	1.26
16000	2.05	1.33
17000	1.75	1.33
18000	1.55	1.24
20000	1.49	1.22
26000	1.61	1.37
30000	1.74	1.24





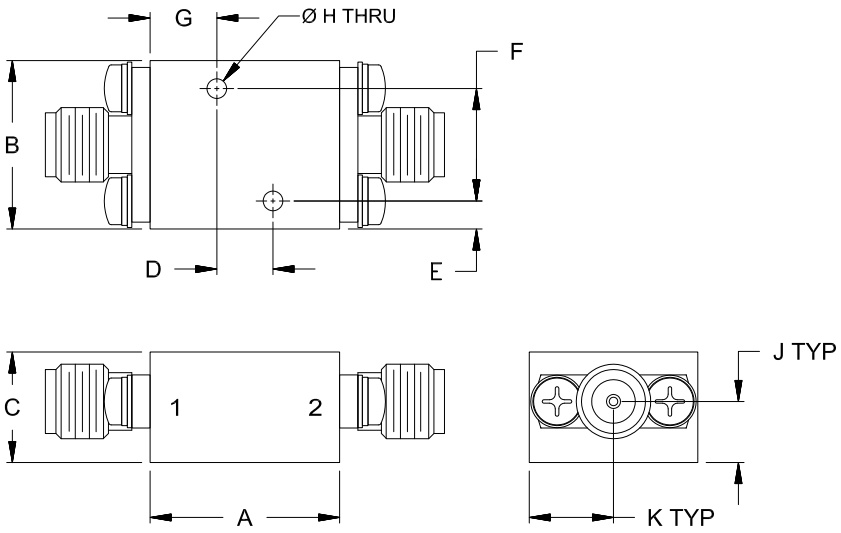
Notes

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

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 Reflectionless High Pass Filter ZXHF-K153+

Typical Performance Data

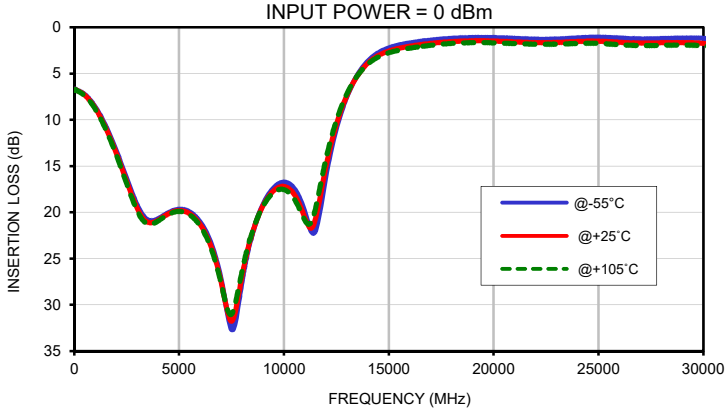
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-55°C	@+25°C	@+105°C	@-55°C	@+25°C	@+105°C	@-55°C	@+25°C	@+105°C
25	6.78	6.80	6.82	6.86	6.86	6.85	6.87	6.86	6.86
50	6.69	6.71	6.73	6.92	6.93	6.92	6.94	6.93	6.94
100	6.77	6.79	6.81	6.87	6.89	6.88	6.90	6.90	6.90
400	7.11	7.16	7.21	6.90	6.94	6.95	6.92	6.96	6.98
500	7.27	7.33	7.39	6.95	7.00	7.03	6.99	7.03	7.06
600	7.48	7.56	7.62	7.03	7.08	7.12	7.06	7.10	7.15
750	7.85	7.94	8.02	7.15	7.23	7.28	7.20	7.26	7.33
800	7.98	8.07	8.15	7.22	7.29	7.36	7.25	7.31	7.39
1000	8.61	8.73	8.84	7.46	7.56	7.66	7.50	7.59	7.70
1200	9.37	9.52	9.65	7.72	7.85	7.98	7.78	7.89	8.03
1400	10.24	10.41	10.55	8.00	8.17	8.33	8.05	8.20	8.37
2000	13.34	13.59	13.79	8.95	9.23	9.46	8.94	9.18	9.43
2100	13.92	14.17	14.38	9.14	9.43	9.67	9.08	9.35	9.60
2200	14.52	14.79	15.01	9.33	9.64	9.88	9.26	9.54	9.81
2300	15.13	15.42	15.65	9.49	9.82	10.07	9.40	9.70	9.97
2400	15.75	16.04	16.29	9.63	9.98	10.23	9.50	9.82	10.10
2500	16.36	16.66	16.92	9.78	10.14	10.40	9.64	9.97	10.25
2600	16.97	17.29	17.55	9.93	10.30	10.57	9.78	10.11	10.40
2700	17.58	17.91	18.17	10.08	10.47	10.75	9.91	10.25	10.54
2800	18.16	18.50	18.77	10.25	10.65	10.93	10.06	10.40	10.69
2900	18.71	19.04	19.32	10.42	10.82	11.11	10.20	10.56	10.85
3000	19.21	19.55	19.81	10.58	10.99	11.29	10.35	10.72	11.01
3200	20.07	20.39	20.64	10.95	11.35	11.66	10.69	11.06	11.35
3600	20.91	21.14	21.30	11.50	11.92	12.22	11.26	11.64	11.90
4000	20.70	20.84	20.93	12.23	12.60	12.93	12.00	12.37	12.65
4400	20.16	20.27	20.34	12.85	13.27	13.58	12.83	13.23	13.55
4800	19.76	19.88	19.95	13.47	13.97	14.32	13.78	14.23	14.54
5000	19.69	19.83	19.91	13.81	14.39	14.77	14.40	14.90	15.27
5600	20.10	20.30	20.43	15.05	15.81	16.33	16.27	17.00	17.54
5800	20.51	20.73	20.88	15.47	16.27	16.87	16.85	17.70	18.31
6000	21.05	21.30	21.48	16.00	16.86	17.59	17.45	18.43	19.18
6200	21.75	22.03	22.23	16.54	17.51	18.32	17.96	19.10	19.95
6300	22.18	22.47	22.68	16.80	17.82	18.65	18.19	19.40	20.32
6800	25.35	25.67	25.89	18.08	19.38	20.36	18.51	19.91	20.92
7000	27.22	27.50	27.67	18.33	19.62	20.61	18.02	19.38	20.23
7100	28.37	28.57	28.66	18.02	19.26	20.21	17.42	18.69	19.44
8000	27.51	26.93	26.41	18.96	20.23	21.42	16.67	17.50	18.42
10000	16.76	17.21	17.56	14.14	14.25	14.40	15.23	15.50	15.64
11000	20.02	20.60	20.88	11.46	11.90	11.89	12.03	12.22	12.21
12000	16.11	15.13	14.27	10.80	11.51	11.97	9.72	10.26	10.63
12500	10.94	10.53	10.10	11.90	12.73	13.56	10.05	10.88	11.46
13000	7.49	7.39	7.20	14.13	15.28	16.53	12.01	13.15	14.13
13500	5.17	5.26	5.24	17.66	19.74	21.53	16.26	17.88	19.42
14200	3.25	3.50	3.62	24.23	27.19	28.83	30.41	29.57	26.67
15000	2.24	2.58	2.76	21.71	20.58	20.16	19.75	18.62	17.96
15300	2.03	2.38	2.57	19.68	18.88	18.35	18.03	17.19	16.77
15500	1.91	2.26	2.46	18.58	18.04	17.46	17.13	16.46	16.09
16000	1.69	2.05	2.26	17.03	16.95	16.38	16.09	15.78	15.47
17000	1.40	1.75	1.95	16.94	16.93	16.56	16.77	16.76	16.44
18000	1.19	1.55	1.74	19.78	19.50	19.51	20.45	20.49	20.36
19000	1.12	1.48	1.67	22.86	24.00	24.31	23.79	24.83	25.65
20000	1.12	1.49	1.69	19.86	20.20	20.55	19.26	19.36	19.87
21000	1.19	1.58	1.76	15.26	15.35	16.09	14.79	14.85	15.64
22000	1.29	1.66	1.83	12.94	13.50	14.49	12.68	13.14	14.09
23000	1.28	1.64	1.82	13.28	14.46	15.58	13.07	14.00	15.16
23500	1.23	1.60	1.80	14.70	16.33	17.58	14.48	15.74	17.08
24000	1.16	1.54	1.75	17.79	20.07	21.66	17.30	19.07	20.86
26000	1.16	1.61	1.87	16.52	16.16	15.39	16.05	15.82	15.21
26500	1.23	1.68	1.95	14.73	14.90	14.31	14.25	14.48	13.92
30000	1.20	1.74	2.01	22.29	19.42	19.22	24.94	21.78	21.05

Typical Performance Data

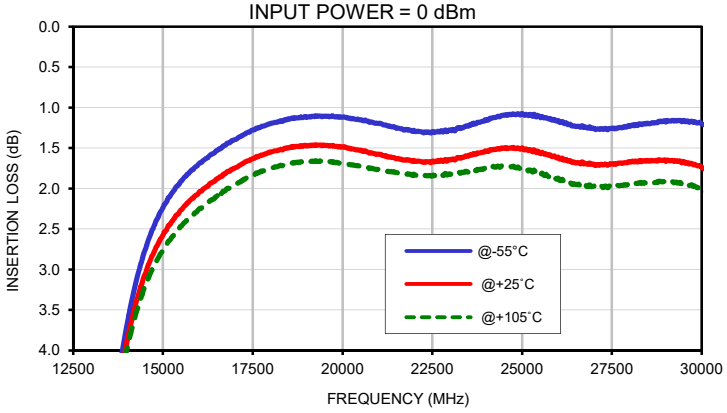
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-55°C	@+25°C	@+105°C
15300	0.21	0.21	0.21
15600	0.20	0.20	0.20
15900	0.20	0.20	0.20
16200	0.20	0.20	0.20
16500	0.19	0.19	0.19
16800	0.19	0.19	0.19
17100	0.19	0.19	0.19
17400	0.19	0.19	0.19
17700	0.19	0.19	0.19
18000	0.19	0.19	0.19
18300	0.19	0.19	0.19
18600	0.19	0.18	0.19
18900	0.18	0.18	0.18
19200	0.18	0.18	0.18
19500	0.18	0.18	0.18
19800	0.18	0.18	0.18
20100	0.18	0.18	0.18
20400	0.18	0.18	0.18
20700	0.18	0.18	0.18
21000	0.18	0.18	0.18
21300	0.18	0.18	0.18
21600	0.18	0.18	0.18
21900	0.18	0.18	0.18
22200	0.18	0.18	0.18
22500	0.17	0.18	0.18
22800	0.17	0.17	0.18
23100	0.17	0.17	0.18
23400	0.18	0.18	0.18
23700	0.18	0.18	0.18
24000	0.18	0.18	0.18
24300	0.18	0.18	0.18
24600	0.18	0.18	0.18
24900	0.18	0.18	0.18
25200	0.18	0.18	0.18
25500	0.18	0.18	0.18
25800	0.18	0.18	0.18
26000	0.18	0.17	0.18
26400	0.17	0.17	0.18
26700	0.17	0.17	0.17
27000	0.17	0.17	0.18
27300	0.18	0.18	0.18
27600	0.18	0.18	0.18
27900	0.18	0.18	0.18
28200	0.18	0.18	0.18
28500	0.18	0.18	0.18
28800	0.18	0.18	0.18
29100	0.18	0.18	0.18
29400	0.18	0.18	0.18
29700	0.18	0.18	0.18
29800	0.18	0.18	0.18
30000	0.18	0.18	0.19

Typical Performance Curves

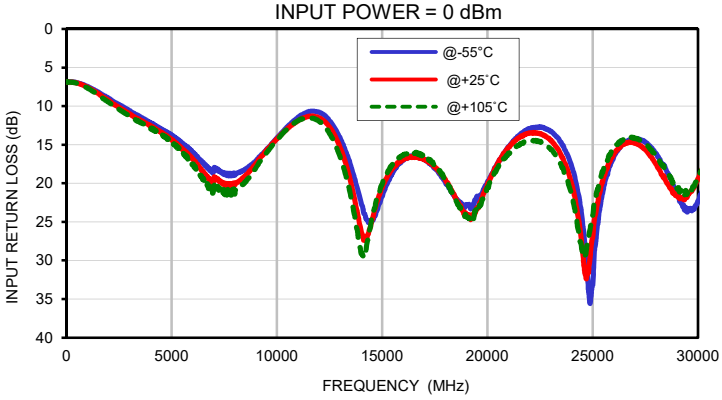
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



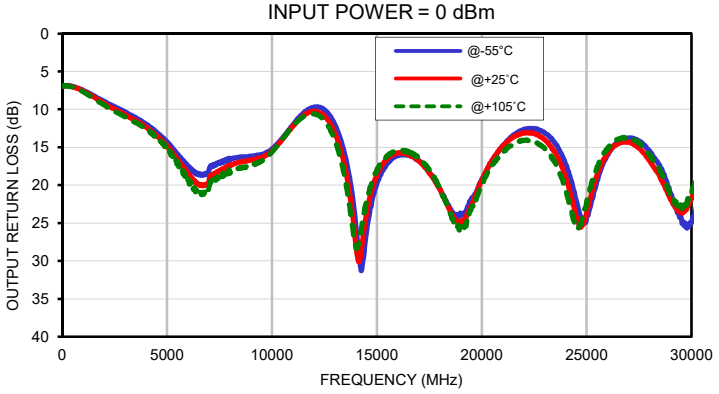
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



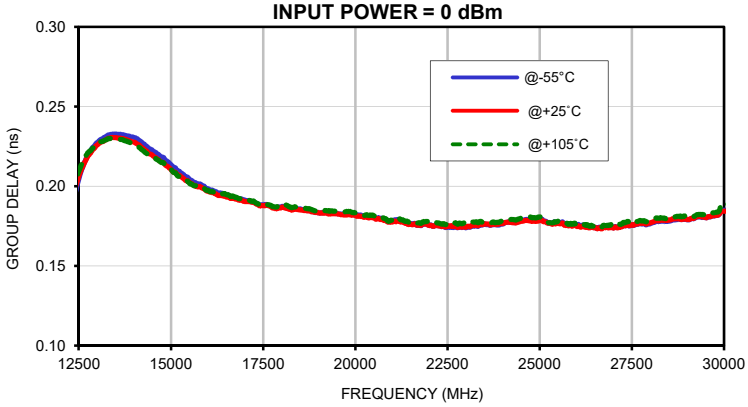
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



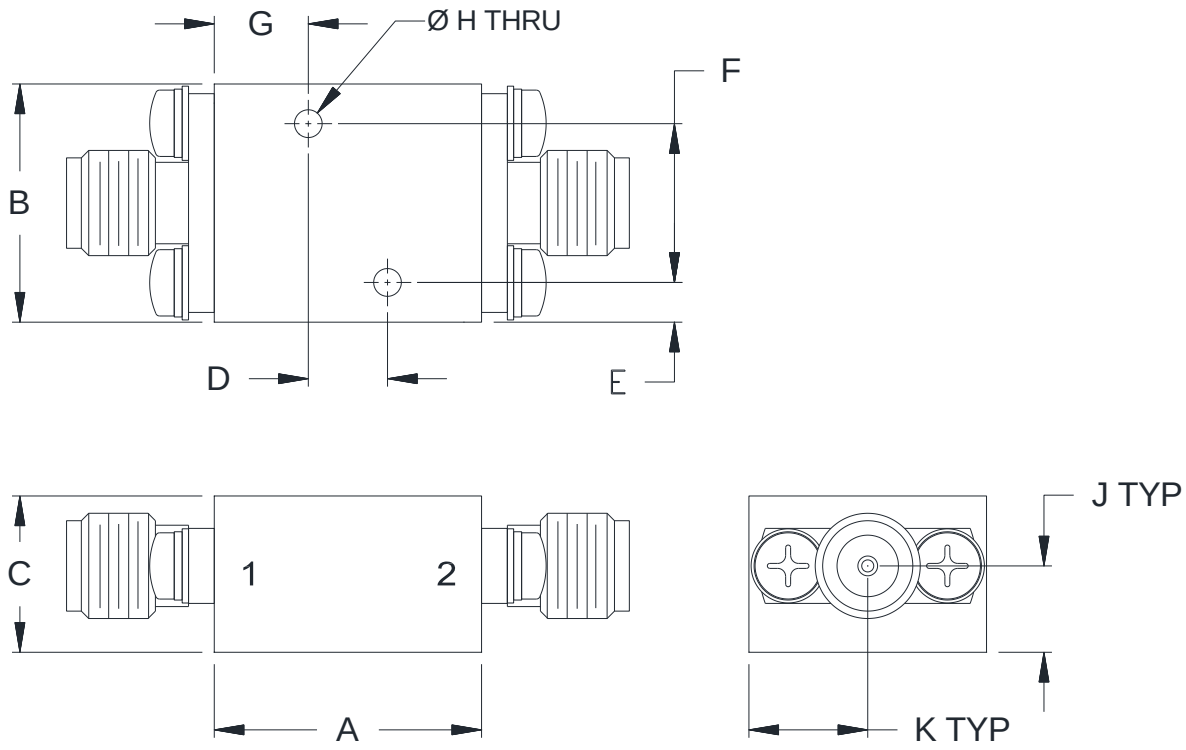
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style UK

Outline Dimensions

UK3042



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

CASE#	G	H	J	K	WT.GRAMS
UK3042	.24 (6.0)	.070 (1.78)	.22 (5.5)	.30 (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®
ISO 9001 ISO 14001 CERTIFIED
ALL NEW minicircuits.com
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

This document and its contents are the property of Mini-Circuits

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 Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 105°C Ambient Environment	Individual Model Data Sheet

This document and its contents are the property of Mini-Circuits.