

# Coaxial Reflectionless Low Pass Filter

## ZXLF-Series

50Ω DC to 20 GHz

### The Big Deal

- Patented design terminates stopband signal internally
- Stopband performance up to 40 GHz
- Small In-line package size of 0.80" x 0.56"



CASE STYLE: RA2937

### Product Overview

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

### 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.
Wide Operating temperature from -40 to +85°C	Suitable for use in wide temperature range applications.
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.



# Coaxial Reflectionless Low Pass Filter

50Ω DC to 9.8 GHz

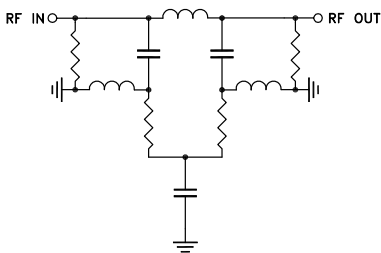
## Features

- Match to 50Ω in the stop band, eliminates undesired reflections
- Cascadable
- Temperature stable, up to 85°C
- Protected by US Patent No. 8,392,495

## Applications

- Harmonics Rejection
- Satellite
- Radar
- Military & Space

## Functional Schematic



# ZXLF-K982+



Generic photo used for illustration purposes only

CASE STYLE: RA2937  
Connectors Model  
2.92mm-F to 2.92mm-M ZXLF-K982+

**+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	
Pass Band	Insertion Loss	DC-F1	DC-9800		1.4	2.2	dB
	Freq. Cut-off	F2	12800		3.0		dB
	VSWR	DC-F1	DC-9800		1.3		:1
Stop Band	Rejection	F3-F4	19000-22000	12	15		dB
		F4-F5	22000-32500	15	22		dB
	VSWR	F3-F4	19000-22000		2.6		:1
		F4-F5	22000-32500		6		:1

## Absolute Maximum Ratings<sup>3</sup>

Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
RF Power Input, Passband (DC-F1) <sup>1</sup>	2W at 25°C
RF Power Input, Stopband (F2-F5) <sup>2</sup>	0.2W at 25°C

<sup>1</sup> Passband rating derates linearly to 1W at 85°C ambient

<sup>2</sup> Stopband rating derates linearly to 0.1W at 85°C ambient

<sup>3</sup> Permanent damage may occur if any of these limits are exceeded

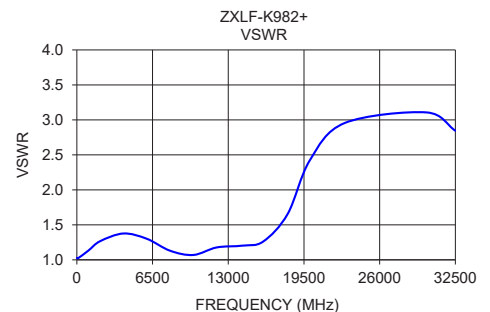
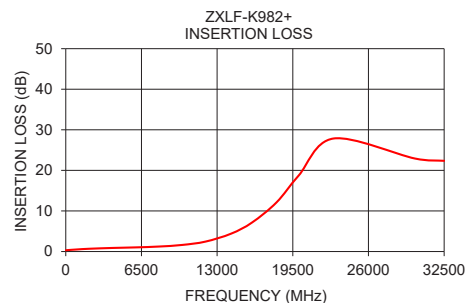
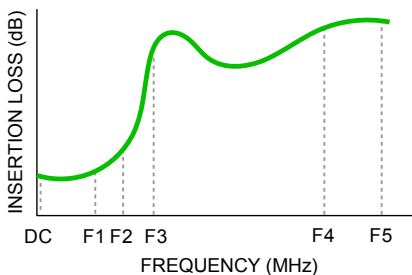
## ESD rating

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

## Typical Performance Data at 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)
10	0.31	1.03
100	0.34	1.02
1000	0.52	1.13
2000	0.68	1.27
4000	0.88	1.38
6000	1.02	1.30
8000	1.23	1.13
10000	1.63	1.07
12000	2.45	1.18
14200	4.40	1.20
16000	7.15	1.26
18100	12.11	1.66
20000	18.72	2.42
23000	27.86	2.96
30000	22.92	3.11
32500	22.36	2.85

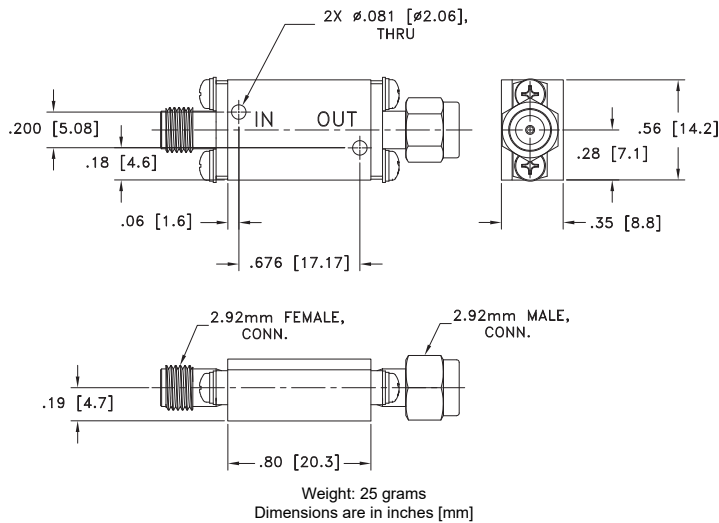
## Specification Definition



## Coaxial Connections

PORT - IN	2.92mm-Fem
PORT - OUT	2.92mm-Male

## Outline Drawing



## Additional Notes

- 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.
- 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 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](http://www.minicircuits.com/MCLStore/terms.jsp)

# Coaxial Reflectionless Low Pass Filter

# ZXLF-K982+

## Typical Performance Data

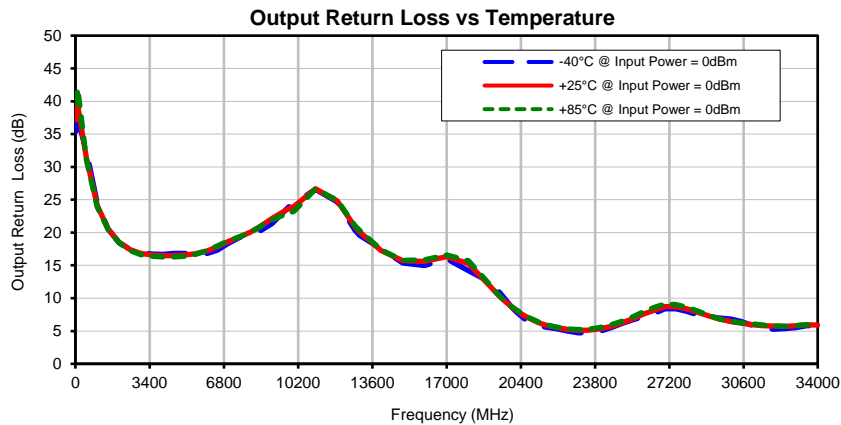
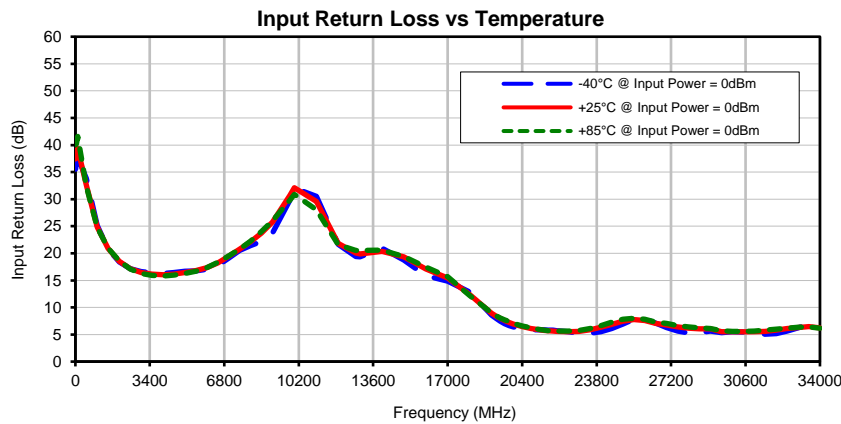
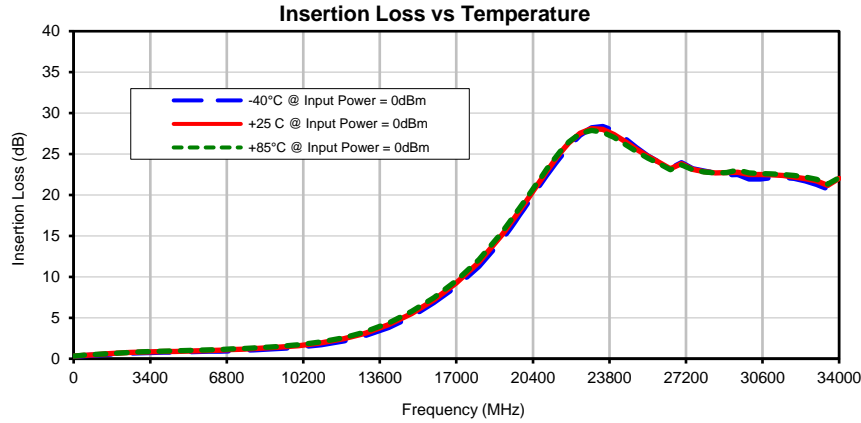
FREQUENCY (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@ -40°C	@ +25°C	@ +85°C	@ -40°C	@ +25°C	@ +85°C	@ -40°C	@ +25°C	@ +85°C
10	0.30	0.31	0.33	35.53	37.40	40.04	35.37	37.14	39.81
50	0.31	0.32	0.34	37.30	38.81	40.20	36.88	38.61	40.18
100	0.32	0.34	0.35	37.71	39.35	41.59	37.23	39.33	41.95
500	0.39	0.43	0.46	33.83	32.59	32.38	32.48	31.39	31.12
1000	0.46	0.51	0.54	25.16	24.84	24.77	24.48	24.12	23.92
1500	0.55	0.60	0.63	20.78	20.88	20.97	20.53	20.53	20.47
2000	0.63	0.68	0.71	18.38	18.52	18.58	18.47	18.51	18.44
2500	0.70	0.75	0.78	17.17	17.17	17.12	17.46	17.40	17.28
3000	0.74	0.80	0.84	16.61	16.48	16.30	16.94	16.83	16.65
3500	0.76	0.84	0.89	16.37	16.16	15.92	16.71	16.60	16.41
4000	0.79	0.87	0.92	16.28	16.05	15.83	16.66	16.48	16.28
4500	0.81	0.90	0.96	16.45	16.16	15.98	16.81	16.50	16.29
5000	0.83	0.93	1.00	16.71	16.46	16.28	16.85	16.58	16.40
5500	0.87	0.97	1.04	16.78	16.81	16.70	16.71	16.77	16.70
6000	0.91	1.01	1.08	17.03	17.35	17.34	16.77	17.16	17.22
6500	0.94	1.06	1.13	17.73	18.23	18.32	17.31	17.82	17.96
7000	0.98	1.10	1.18	19.11	19.45	19.51	18.32	18.61	18.71
7500	1.03	1.16	1.25	20.53	20.78	20.79	19.20	19.31	19.32
8000	1.08	1.23	1.31	21.43	22.13	22.24	19.75	20.04	20.01
8500	1.15	1.30	1.39	22.21	23.74	24.03	20.32	21.03	20.96
9000	1.22	1.38	1.48	23.75	25.77	26.05	21.35	22.14	21.93
9800	1.37	1.55	1.67	29.81	30.70	29.84	24.00	23.70	23.02
10000	1.42	1.61	1.72	32.03	32.09	30.86	24.45	23.96	23.23
11000	1.72	1.93	2.06	30.54	29.57	28.02	26.59	26.65	26.65
12000	2.19	2.43	2.58	21.68	21.81	21.61	24.67	24.80	24.92
12800	2.73	2.99	3.17	19.38	20.05	20.55	20.37	20.94	21.06
13000	2.89	3.16	3.34	19.36	19.90	20.55	19.61	20.16	20.38
14000	3.83	4.16	4.38	20.96	20.36	20.57	17.50	17.27	17.34
15000	5.14	5.50	5.75	18.77	19.33	19.44	15.36	15.71	15.75
16000	6.85	7.20	7.46	15.88	17.12	17.46	14.97	15.62	15.84
17000	8.81	9.23	9.53	14.87	15.43	15.67	16.00	16.35	16.57
18000	11.27	11.78	12.11	12.87	12.37	12.21	14.21	15.28	15.70
19000	14.44	15.02	15.36	8.62	8.94	8.98	12.41	11.82	11.98
19200	15.17	15.75	16.09	8.00	8.44	8.50	11.78	11.08	11.19
19400	15.93	16.50	16.84	7.45	7.99	8.08	11.01	10.39	10.48
19600	16.72	17.26	17.60	6.98	7.57	7.71	10.21	9.76	9.80
19800	17.52	18.04	18.37	6.64	7.24	7.39	9.39	9.16	9.18
20000	18.34	18.85	19.17	6.41	6.95	7.08	8.58	8.62	8.66
20200	19.16	19.64	19.96	6.24	6.70	6.80	7.88	8.14	8.20
20400	19.98	20.45	20.75	6.07	6.47	6.56	7.30	7.67	7.74
20600	20.80	21.25	21.54	5.96	6.29	6.39	6.80	7.27	7.34
20800	21.59	22.04	22.32	5.91	6.12	6.22	6.42	6.93	7.00
21000	22.37	22.84	23.11	5.90	5.98	6.07	6.08	6.59	6.68
21200	23.13	23.61	23.86	5.89	5.86	5.92	5.84	6.31	6.41
21400	23.86	24.36	24.59	5.87	5.76	5.80	5.68	6.07	6.17
21600	24.57	25.07	25.27	5.83	5.68	5.72	5.56	5.87	5.96
21800	25.23	25.74	25.90	5.83	5.62	5.66	5.46	5.70	5.77
22000	25.88	26.36	26.46	5.73	5.55	5.62	5.34	5.54	5.61
22500	27.30	27.55	27.50	5.51	5.51	5.63	5.03	5.25	5.34
23000	28.20	28.11	27.89	5.25	5.59	5.78	4.73	5.10	5.22
23500	28.36	28.01	27.66	5.25	5.87	6.13	4.68	5.14	5.29
24000	27.84	27.40	27.02	5.52	6.34	6.66	4.93	5.32	5.51
24500	26.88	26.53	26.17	6.11	6.91	7.27	5.46	5.68	5.89
25000	25.77	25.60	25.31	6.94	7.46	7.82	6.12	6.21	6.43
25500	24.76	24.73	24.51	7.84	7.74	8.02	6.69	6.85	7.12
26000	23.97	23.99	23.81	7.90	7.58	7.80	7.16	7.55	7.92
26500	23.24	23.22	23.07	7.10	7.08	7.32	7.64	8.13	8.57
27000	23.92	23.82	23.67	6.30	6.78	7.04	8.38	8.72	9.12
27500	23.19	23.13	23.06	5.64	6.40	6.66	8.38	8.70	9.01
28000	22.91	22.85	22.82	5.31	6.17	6.41	7.99	8.38	8.61
28500	22.65	22.69	22.69	5.35	6.06	6.25	7.45	7.86	8.04
29000	22.44	22.74	22.72	5.66	6.02	6.12	7.15	7.32	7.41
29500	22.48	22.78	23.03	5.34	5.54	5.69	7.00	6.82	6.83
30000	21.94	22.52	22.68	5.53	5.53	5.58	6.83	6.45	6.47
30500	21.95	22.48	22.62	5.44	5.50	5.59	6.42	6.19	6.26
31000	22.09	22.44	22.58	5.21	5.52	5.66	5.86	5.98	6.08
31500	22.15	22.36	22.51	5.06	5.61	5.79	5.43	5.81	5.89
32000	22.03	22.20	22.37	5.14	5.80	5.97	5.29	5.76	5.78
32500	21.70	21.98	22.17	5.64	6.09	6.18	5.37	5.73	5.73
33000	21.29	21.70	21.90	6.25	6.31	6.33	5.53	5.80	5.81
33500	20.72	21.17	21.31	6.92	6.47	6.44	5.79	5.95	5.97
34000	21.53	22.01	22.11	6.83	6.23	6.20	5.80	5.92	5.99

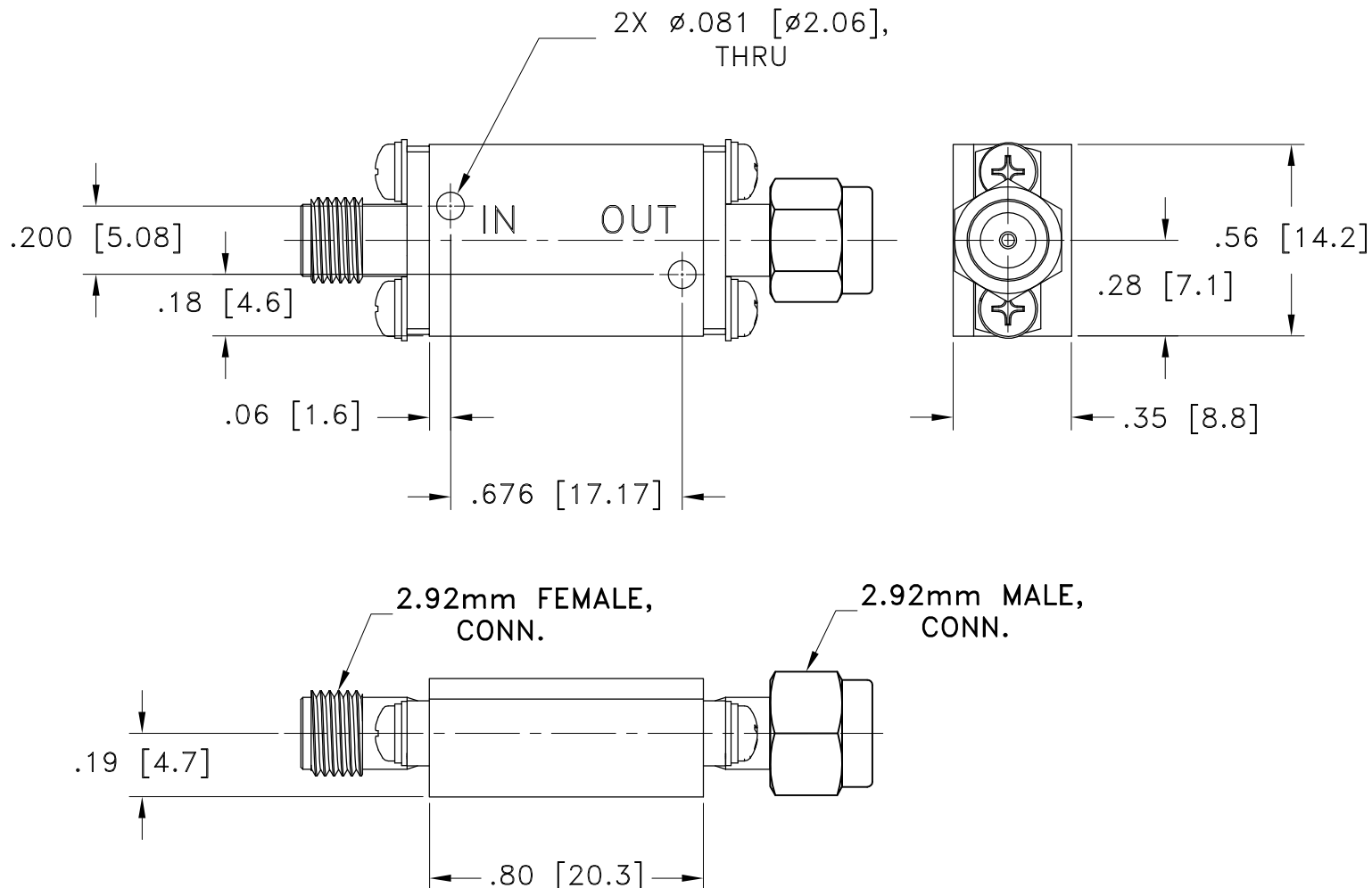


P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site  
 The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

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## Typical Performance Curves





Weight: 25 grams

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm.015$ ; 3 Pl.  $\pm.005$

Notes:

1. Case material: Brass.
2. Case Finish: Gold plate.



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
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C