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 17 GHz

ZXLF-K173+

Generic photo used for illustration purposes only

CASE STYLE: RA2937

Connectors	Model
2.92mm-F to 2.92mm-M	ZXLF-K173+

+RoHS Compliant

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

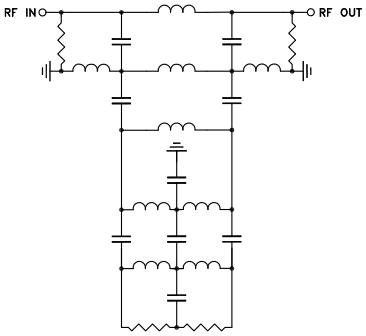
Features

- Match to 50Ωin 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



Electrical Specifications at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	DC-F1	DC-17000		2.3	2.8	dB
	Freq. Cut-off	F2	18000		3.0		dB
	VSWR	DC-F1	DC-17000		1.4		:1
Stop Band	Rejection	F3-F4	25000-35000	18.0	25.0		dB
		F4-F5	35000-40000		22.0		dB
	VSWR	F3-F4	25000-35000		3.0		:1
		F4-F5	35000-40000		5.8		:1

Absolute Maximum Ratings[3]

Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
RF Power Input, Passband (DC-F1)[1]	2W at 25°C
RF Power Input, Stopband (F2-F5)[2]	30mW at 25°C

[1] Passband rating derates linearly to 1W at 85°C ambient

[2] Stopband rating derates linearly to 15mW at 85°C ambient

[3] Permanent damage may occur if any of these limits are exceeded

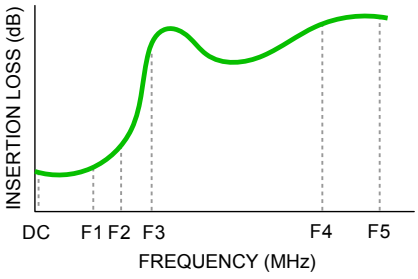
ESD rating

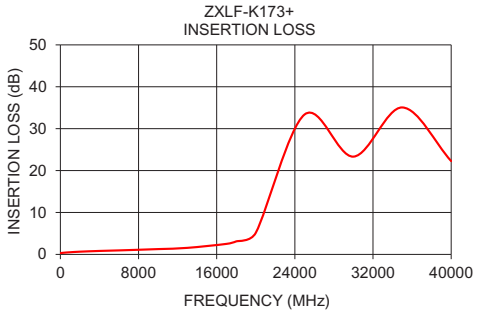
Human Body Model (HBM): Class 1A (250 to <500V) in accordance with ANSI/ESD 5.1 - 2001

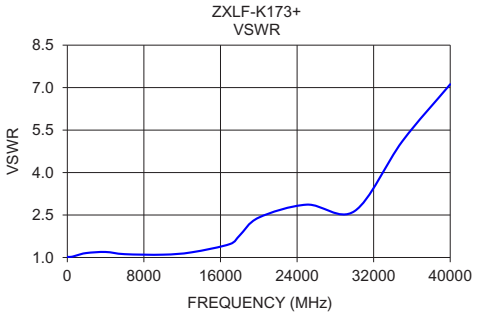
Typical Performance Data at 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)
10	0.31	1.03
100	0.34	1.02
500	0.43	1.03
1000	0.51	1.08
2000	0.65	1.16
4000	0.83	1.19
6000	0.96	1.12
10000	1.27	1.10
13000	1.56	1.18
17000	2.51	1.48
18000	3.11	1.78
20000	5.16	2.41
25000	33.40	2.87
30000	23.33	2.64
35000	35.07	5.11
40000	22.27	7.12

Specification Definition



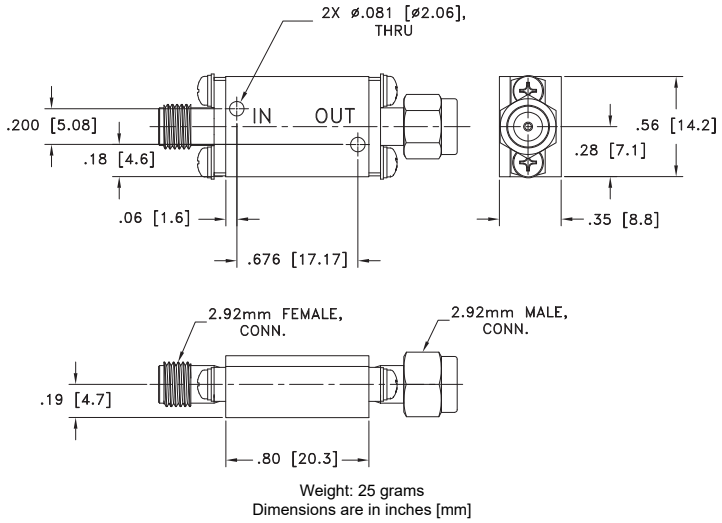




Coaxial Connections

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

Outline Drawing



Weight: 25 grams
Dimensions are in inches [mm]

Additional 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.

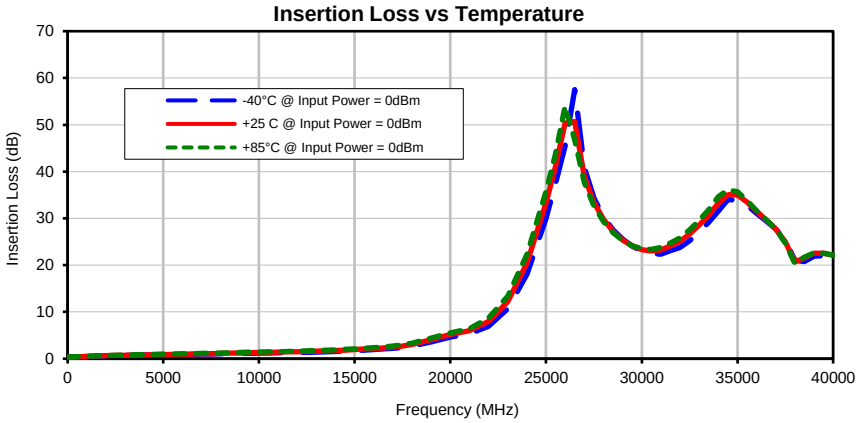
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

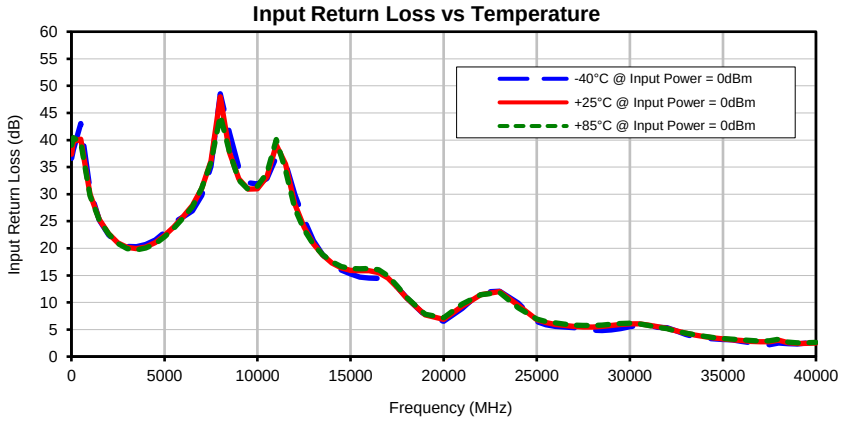
Coaxial Reflectionless Low Pass Filter ZXLF-K173+

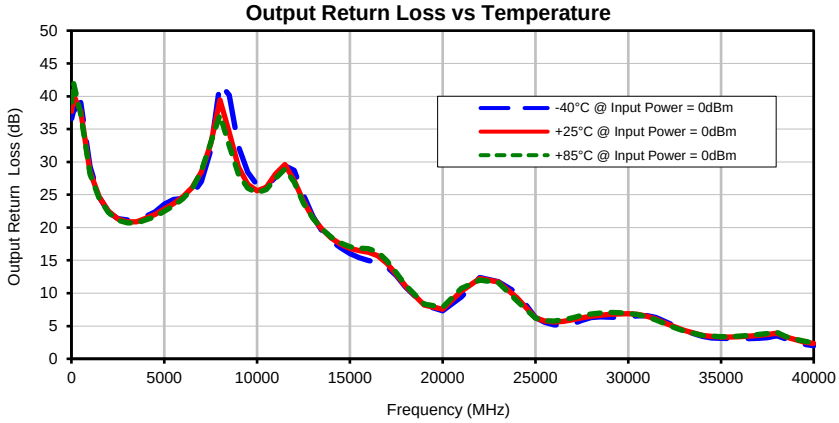
Typical Performance Data

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	0.31	0.30	0.34	36.59	37.37	39.03	36.58	37.68	39.13
100	0.34	0.33	0.37	38.19	39.75	40.47	37.70	40.23	42.13
500	0.41	0.42	0.46	43.04	40.18	39.59	39.05	37.67	37.23
1000	0.48	0.50	0.55	30.84	29.99	29.67	29.28	28.50	28.15
1500	0.55	0.57	0.62	25.23	25.30	25.20	24.61	24.63	24.39
2000	0.62	0.64	0.69	22.50	22.72	22.67	22.35	22.46	22.29
2500	0.68	0.70	0.76	20.91	21.03	20.89	21.34	21.30	21.12
3000	0.72	0.75	0.81	20.34	20.20	19.97	21.16	20.88	20.72
3500	0.75	0.79	0.85	20.32	19.96	19.73	21.16	20.88	20.69
4000	0.78	0.82	0.89	20.70	20.24	20.04	21.70	21.39	21.18
4500	0.81	0.85	0.93	21.56	21.06	20.85	22.38	21.99	21.67
5000	0.83	0.88	0.97	22.97	22.38	22.10	23.54	22.82	22.49
5500	0.86	0.92	1.01	24.76	23.94	23.73	24.28	23.63	23.31
6000	0.90	0.96	1.05	25.79	25.86	25.64	24.41	24.68	24.38
6500	0.93	1.01	1.10	26.93	27.91	27.66	25.00	26.09	25.91
7000	0.97	1.05	1.14	29.72	31.07	31.12	27.01	28.50	28.60
7500	1.00	1.09	1.19	35.12	36.12	35.88	31.72	32.73	32.92
8000	1.04	1.14	1.24	48.54	47.98	44.50	41.93	39.45	37.17
8500	1.08	1.18	1.28	41.25	37.64	37.71	40.20	34.46	32.48
9000	1.12	1.23	1.33	34.89	32.79	32.59	32.32	29.22	28.09
9500	1.16	1.28	1.38	32.12	30.91	30.89	28.40	26.56	26.00
10000	1.20	1.32	1.43	31.86	31.02	31.47	26.46	25.62	25.29
10500	1.23	1.36	1.47	32.89	33.22	33.92	26.21	26.13	25.78
11000	1.26	1.41	1.51	36.82	39.10	40.07	27.72	28.17	27.49
11500	1.29	1.45	1.56	35.70	35.52	34.37	29.39	29.59	28.92
12000	1.34	1.50	1.62	29.90	28.16	27.30	28.71	27.18	26.92
12500	1.38	1.56	1.68	25.33	23.89	23.43	24.98	23.99	23.71
13000	1.43	1.62	1.75	21.43	20.82	20.69	21.75	21.52	21.46
13500	1.49	1.69	1.83	18.79	18.78	18.84	19.44	19.77	19.77
14000	1.56	1.77	1.91	17.07	17.30	17.51	17.97	18.39	18.53
14500	1.64	1.86	2.01	15.96	16.39	16.65	16.91	17.46	17.66
15000	1.73	1.96	2.11	15.26	15.95	16.25	16.06	16.81	17.05
15500	1.84	2.07	2.23	14.67	15.84	16.20	15.42	16.47	16.89
16000	1.95	2.18	2.35	14.49	15.84	16.28	14.99	16.24	16.76
16500	2.07	2.32	2.50	14.42	15.51	16.03	14.70	15.70	16.27
17000	2.20	2.49	2.69	14.05	14.51	14.91	14.01	14.55	14.95
17500	2.39	2.73	2.95	12.85	12.81	13.04	12.67	12.87	13.12
18000	2.68	3.07	3.32	10.91	10.86	10.96	10.94	11.05	11.23
19000	3.61	4.09	4.39	7.58	7.72	7.83	8.22	8.19	8.34
20000	4.61	5.15	5.49	6.53	6.88	7.16	7.31	7.58	7.85
21000	5.30	5.97	6.44	8.89	9.29	9.74	9.42	10.29	10.71
22000	6.94	8.00	8.76	11.89	11.41	11.40	12.41	12.22	11.99
23000	10.68	12.23	13.39	12.07	12.04	11.87	11.74	11.69	11.61
24000	18.12	20.51	22.32	9.87	9.46	9.04	10.04	9.33	8.83
25000	29.97	33.18	35.68	6.47	6.83	6.92	6.28	6.26	6.21
25500	37.45	41.09	43.71	5.86	6.29	6.49	5.54	5.74	5.79
26000	45.46	50.35	53.98	5.60	5.96	6.21	5.18	5.60	5.74
26500	57.52	50.70	46.75	5.49	5.74	6.00	5.11	5.72	5.94
27000	40.89	38.98	37.65	5.34	5.58	5.84	5.34	5.97	6.27
27500	34.36	33.40	32.63	5.10	5.49	5.75	5.84	6.27	6.61
28000	30.31	29.77	29.29	4.90	5.49	5.75	6.29	6.49	6.85
28500	27.53	27.22	26.93	4.82	5.56	5.82	6.40	6.63	6.98
29000	25.55	25.38	25.27	4.92	5.74	5.97	6.35	6.76	7.05
29500	24.08	24.09	24.14	5.16	5.93	6.09	6.30	6.84	7.03
30000	23.04	23.30	23.51	5.51	6.07	6.15	6.42	6.86	6.92
30500	22.46	23.00	23.37	5.77	6.08	6.07	6.56	6.76	6.73
31000	22.37	23.25	23.77	5.80	5.82	5.74	6.58	6.51	6.42
31500	23.11	24.09	24.70	5.39	5.50	5.43	6.28	6.04	5.92
32000	23.77	25.10	25.86	5.37	5.23	5.15	5.68	5.44	5.31
32500	25.19	26.68	27.56	4.78	4.78	4.72	5.03	4.87	4.76
33000	27.08	28.59	29.57	4.13	4.34	4.34	4.39	4.35	4.27
33500	29.16	30.70	31.85	3.61	3.98	4.03	3.86	3.94	3.89
34000	31.56	33.28	34.63	3.38	3.68	3.76	3.44	3.59	3.58
34500	34.01	35.06	36.12	3.25	3.45	3.52	3.17	3.41	3.45
35000	33.85	35.01	35.70	3.18	3.25	3.34	3.11	3.33	3.37
35500	32.79	33.50	33.80	3.07	3.10	3.21	3.08	3.33	3.39
36000	31.11	31.55	31.66	2.83	2.96	3.09	3.05	3.36	3.45
36500	29.44	29.66	29.71	2.56	2.82	2.98	3.06	3.45	3.58
37000	27.76	27.73	27.72	2.29	2.73	2.89	3.11	3.54	3.69
37500	25.30	25.00	24.74	2.19	2.74	2.94	3.23	3.69	3.86
38000	21.07	20.73	20.37	2.50	3.03	3.21	3.51	3.92	4.06
38500	20.75	21.50	21.69	2.38	2.58	2.69	3.04	3.31	3.37
39000	21.93	22.54	22.60	2.34	2.42	2.54	2.58	2.91	3.00
39500	22.01	22.54	22.54	2.54	2.43	2.56	2.18	2.57	2.68
40000	21.89	22.17	22.14	2.66	2.50	2.65	2.00	2.35	2.41

Typical Performance Curves



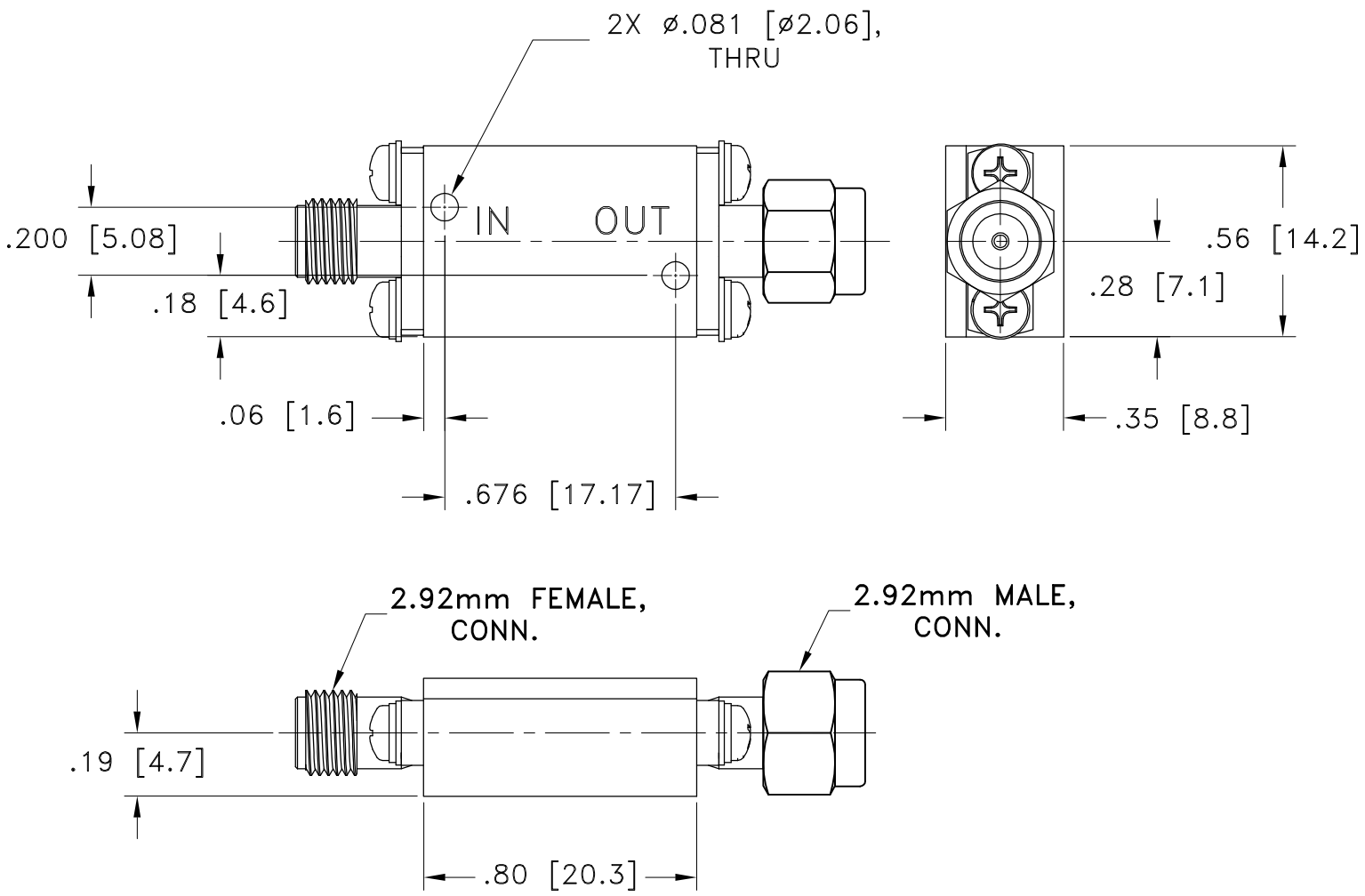




Case Style RA

Outline Dimensions

RA2937



Weight: 25 grams

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

Notes:

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

Mini-Circuits

Environmental Specifications **ENV105**

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