Coaxial Reflectionless

Low Pass Filter

VXLF-172H+

50Ω DC to 2000 MHz

Generic photo used for illustration purposes only
CASE STYLE: FF704

The Big Deal

- Match to 50Ω in the stop band, eliminates undesired reflections
- Cascadable
- Excellent power handling
- Temperature stable up to 100°C

Product Overview

Mini-Circuits' VXLF-172H+ reflectionless filter employs a novel filter topology which absorbs and terminates stop band signals internally rather than reflecting them back to the source. This new capability enables unique applications for filter circuits beyond those suited to traditional approaches. Reflectionless filters eliminate stop band reflections,allowing them to be paired with sensitive devices and used in applications that otherwise require circuits such as isolation amplifiers or attenuators.

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.
Enables stable integration of wideband amplifiers	Because reflectionless filters maintain good impedance in the stop band; they can be integrated with high gain, wideband amplifiers without the risk of creating instabilities in these out of band regions.
Excellent power handling	High power handling extends the usability of these filters to the transmit path for interstage filtering.
Operating temperature up to 100˚C	Suitable for operation close to high power components.
Connectorized package	The connectorized package is easy to interface with other devices and well suited for test setups.

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Connectors	Model
SMA-M/F	VXLF-172H+

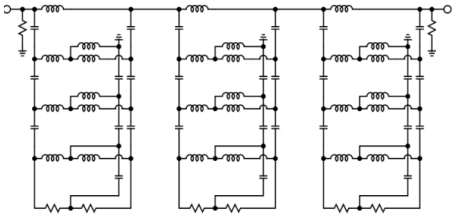
Features

- Match to 50Ω in the stop band, eliminates undesired reflections
- Cascadable
- Excellent stopband rejection, 47 dB typ.
- Temperature stable, up to 100°C
- Protected by US Patents 8,392,495; 9,705,467, additional patent pending
- Protected by China Patent 201080014266.1
- Protected by Taiwan Patent I581494

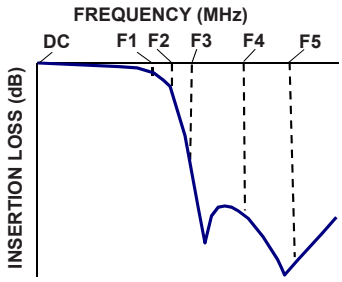
Applications

- Cellular, PCS
- GPS
- Radio astronomy
- Telemetry

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
Pass Band	Insertion Loss	DC-F1	DC - 2000	-	1.7	3.4	dB
	Frequency Cut-off	F2	2350	-	3.0	-	dB
	VSWR	DC-F1	DC-2000	-	1.4	-	:1
Stop Band	Rejection	F3-F4	3600 - 3800	10	28	-	dB
		F4-F5	3800 - 11000	26	47	-	dB
	VSWR	F3-F4	3600 - 3800	-	1.4	-	:1
		F4-F5	3800 - 11000	-	1.7	-	:1

Absolute Maximum Ratings[3]

Parameter	Ratings
Operating Temperature	-55°C to +100°C
Storage Temperature	-55°C to +100°C
RF Power Input, Passband (DC-F1)[1]	7.9W at 25°C
RF Power Input, Stopband (F3-F5)[2]	1.58W at 25°C

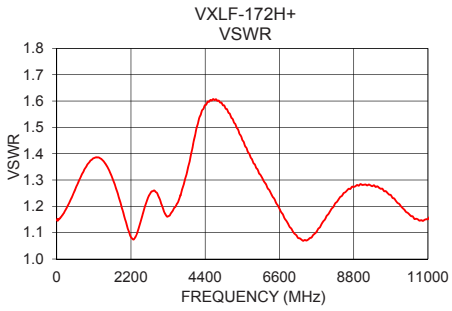
[1] Passband rating derates linearly to 3.9W at 100°C ambient
[2] Stopband rating derates linearly to 0.75W at 100°C ambient
[3] Permanent damage may occur if any of these limits are exceeded

ESD rating

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

Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
10	1.07	1.15
100	1.10	1.15
300	1.18	1.20
600	1.33	1.28
1000	1.61	1.37
2000	2.48	1.16
2350	3.01	1.09
2500	3.35	1.15
3000	5.55	1.24
3600	19.98	1.22
3610	20.64	1.22
3720	30.58	1.27
3800	42.52	1.30
4000	52.23	1.41
5000	46.04	1.57
6000	35.46	1.32
7000	37.69	1.10
9000	51.09	1.28
10000	54.46	1.23
11000	57.94	1.15



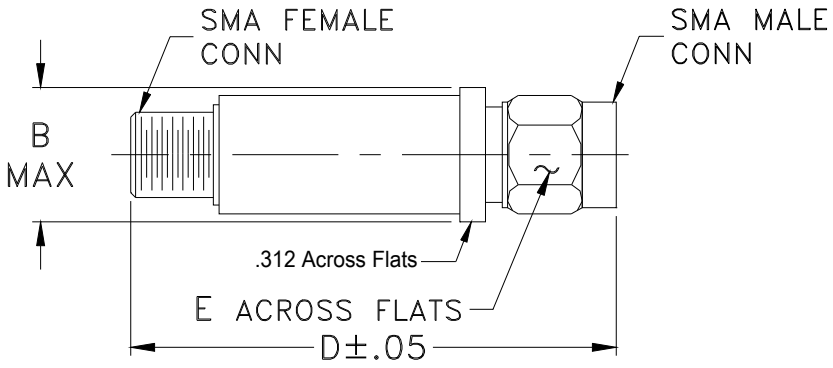
Notes

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	SMA-Male
PORT - 2	SMA-Female

Outline Drawing



Outline Dimensions (inch / mm)

B	D	E	wt.
.410	**1.43**	**.312**	grams
10.41	36.32	7.92	10

Note: Please refer to case style drawing for details

Coaxial Reflectionless Low Pass Filter VXLF-172H+

Typical Performance Data

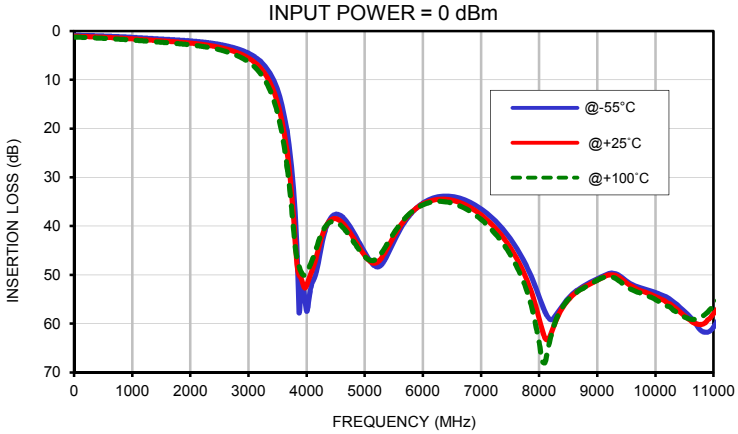
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-55°C	@+25˚C	@+100˚C	@-55°C	@+25˚C	@+100˚C	@-55°C	@+25˚C	@+100˚C
10	0.86	1.07	1.27	26.64	23.26	21.19	26.51	23.20	21.05
20	0.86	1.08	1.27	26.35	23.23	20.89	26.31	23.22	20.92
100	0.89	1.10	1.29	25.38	22.89	21.19	25.66	22.91	21.15
120	0.90	1.11	1.29	25.04	22.66	21.04	25.51	22.79	21.13
300	0.95	1.18	1.38	24.02	21.01	19.06	23.51	21.27	19.57
450	1.00	1.25	1.47	20.71	19.57	17.93	21.18	19.94	18.56
500	1.03	1.28	1.50	19.87	19.07	17.73	20.52	19.52	18.38
600	1.07	1.33	1.56	18.69	18.21	17.37	19.34	18.74	17.98
700	1.12	1.39	1.63	18.06	17.50	17.00	18.44	18.03	17.49
1000	1.30	1.61	1.86	16.49	16.06	16.21	16.80	16.54	16.55
1200	1.44	1.77	2.03	15.73	15.83	16.00	16.14	16.12	16.16
1300	1.51	1.85	2.12	15.52	15.91	16.03	16.01	16.09	16.11
1500	1.66	2.01	2.31	15.89	16.54	16.64	16.05	16.36	16.36
1600	1.72	2.10	2.40	16.43	17.14	17.32	16.44	16.72	16.70
1700	1.79	2.18	2.50	17.06	17.94	18.30	16.98	17.27	17.27
1800	1.87	2.27	2.61	18.01	19.01	19.65	17.60	17.97	17.99
1900	1.95	2.37	2.72	19.51	20.48	21.35	18.36	18.82	18.84
2000	2.03	2.48	2.84	21.73	22.48	23.50	19.25	19.83	19.76
2200	2.25	2.75	3.15	29.21	28.02	28.27	21.13	21.83	21.55
2350	2.47	3.01	3.45	30.83	27.55	26.81	21.58	21.92	21.81
2600	2.99	3.64	4.16	21.14	21.10	21.00	19.02	19.18	19.32
2800	3.62	4.40	5.03	18.46	18.94	19.00	17.17	17.58	17.90
3000	4.56	5.55	6.36	18.77	19.31	19.48	16.73	17.50	18.20
3200	6.15	7.51	8.63	21.58	21.92	21.80	17.42	18.49	19.24
3400	9.29	11.37	13.04	21.86	21.80	21.82	18.22	18.68	19.19
3600	16.48	19.98	22.64	19.81	20.18	20.49	17.53	17.73	18.10
3800	36.74	42.52	43.75	17.39	17.65	18.02	15.45	15.69	15.95
4000	57.48	52.23	49.53	15.25	15.41	15.67	13.74	14.02	14.25
4200	47.61	44.77	43.31	12.98	13.66	14.14	12.15	12.80	13.23
4390	38.78	39.01	39.29	12.06	12.92	13.48	11.78	12.47	13.00
4600	37.99	39.16	40.00	11.89	12.71	13.28	12.06	12.76	13.32
4800	41.15	42.34	43.10	12.27	12.72	13.18	12.71	13.31	13.86
5000	45.41	46.04	46.25	12.95	13.05	13.30	13.76	14.09	14.55
5200	48.32	47.54	46.72	13.56	13.53	13.51	14.64	15.04	15.46
5400	45.68	44.29	43.40	14.05	14.24	13.98	15.39	15.98	16.34
5600	40.89	40.16	39.72	14.64	15.12	14.76	16.28	17.07	17.22
5800	37.41	37.23	37.16	15.10	16.04	15.73	17.34	17.95	18.07
6000	35.27	35.46	35.64	15.54	17.11	17.08	18.28	18.92	18.76
6200	34.17	34.62	34.98	16.06	18.10	18.67	18.97	19.83	19.54
6400	33.84	34.52	35.04	17.14	19.53	20.89	19.59	20.43	19.93
6600	34.16	35.03	35.68	18.59	21.18	23.65	20.14	21.09	20.79
6800	35.04	36.09	36.88	20.57	23.37	27.11	20.38	21.74	21.92
7000	36.47	37.69	38.62	23.25	26.12	30.50	19.85	22.00	23.04
7200	38.43	39.84	40.96	26.37	28.44	31.72	19.72	22.65	25.26
7400	40.98	42.66	43.96	28.69	29.40	30.83	20.00	23.01	26.78
7600	44.27	46.31	47.97	27.28	27.21	27.40	20.43	23.45	27.71
7800	48.65	51.39	53.75	24.77	24.89	24.35	21.44	24.24	26.67
8000	54.48	58.93	63.82	22.83	22.41	21.36	23.58	24.44	25.03
8200	59.21	62.25	62.78	22.43	20.90	19.47	26.29	24.70	23.73
8400	56.38	56.78	56.63	21.14	19.55	18.32	26.51	24.08	22.79
8600	53.67	53.91	53.99	19.13	18.78	17.99	25.11	23.35	22.30
8800	52.04	52.33	52.46	17.81	18.39	18.35	23.05	22.43	22.28
8850	51.70	52.06	52.12	17.67	18.32	18.47	22.54	22.10	22.02
9000	50.81	51.09	51.10	17.20	18.09	18.91	20.98	21.24	21.65
9500	51.26	51.64	52.37	18.35	18.33	18.96	19.15	19.27	19.37
9800	52.87	53.46	54.05	20.08	19.06	18.34	19.27	18.36	17.69
10000	53.63	54.46	55.08	19.85	19.74	18.49	19.16	17.89	16.70
10500	57.49	58.43	58.65	18.34	22.47	23.08	18.07	17.19	15.45
10600	58.66	59.36	59.09	18.90	23.02	24.55	17.66	17.19	15.44
11000	60.70	57.94	56.28	29.21	23.06	21.80	15.46	17.67	16.75

Typical Performance Data

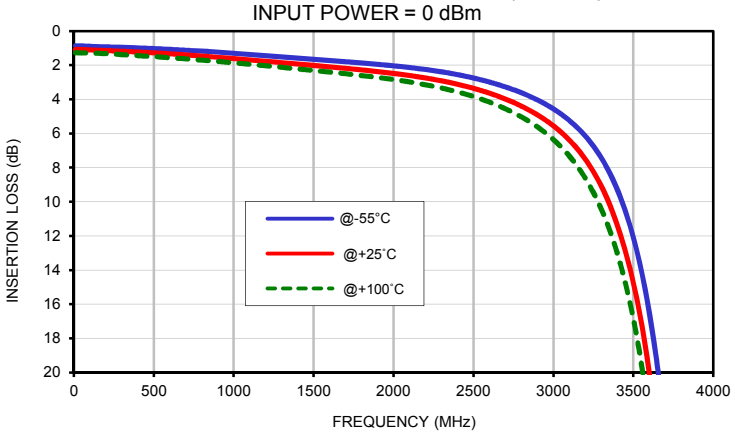
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-55°C	@+25°C	@+100°C
10	0.35	0.37	0.32
40	0.37	0.37	0.34
80	0.37	0.37	0.36
120	0.37	0.36	0.36
160	0.37	0.36	0.36
200	0.37	0.36	0.36
240	0.37	0.36	0.36
280	0.37	0.36	0.36
320	0.37	0.36	0.36
360	0.37	0.36	0.36
400	0.37	0.36	0.36
440	0.37	0.36	0.36
480	0.37	0.36	0.36
520	0.37	0.36	0.36
560	0.37	0.36	0.36
600	0.37	0.36	0.36
640	0.37	0.36	0.36
680	0.37	0.36	0.36
720	0.37	0.36	0.36
760	0.37	0.36	0.36
800	0.37	0.36	0.36
840	0.37	0.36	0.36
880	0.37	0.36	0.36
920	0.38	0.36	0.36
960	0.38	0.36	0.36
1000	0.37	0.36	0.36
1040	0.37	0.37	0.36
1080	0.37	0.37	0.36
1120	0.38	0.37	0.36
1160	0.38	0.37	0.36
1200	0.38	0.37	0.37
1240	0.38	0.37	0.37
1280	0.38	0.37	0.37
1320	0.38	0.37	0.37
1360	0.38	0.37	0.37
1400	0.38	0.38	0.37
1440	0.39	0.38	0.37
1480	0.39	0.38	0.37
1520	0.39	0.38	0.38
1560	0.39	0.38	0.38
1600	0.39	0.39	0.38
1640	0.40	0.39	0.38
1680	0.40	0.39	0.39
1720	0.40	0.39	0.39
1760	0.40	0.40	0.39
1800	0.41	0.40	0.39
1840	0.41	0.40	0.40
1880	0.41	0.41	0.40
1920	0.42	0.41	0.41
1960	0.42	0.41	0.41
2000	0.43	0.42	0.41

Typical Performance Curves

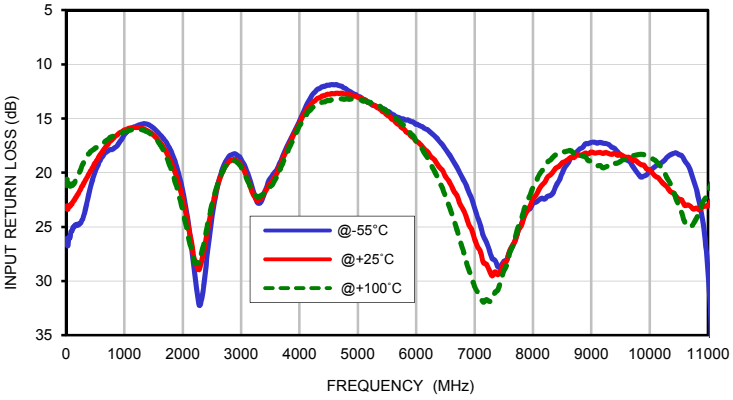
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



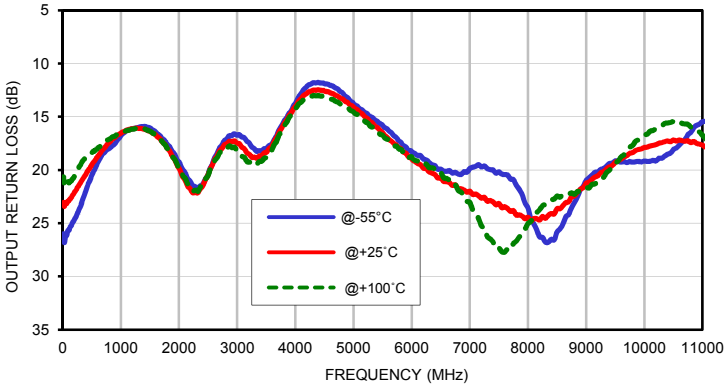
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



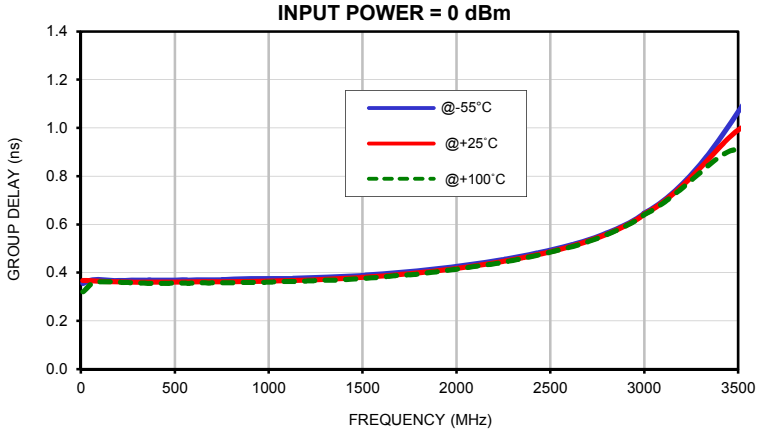
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



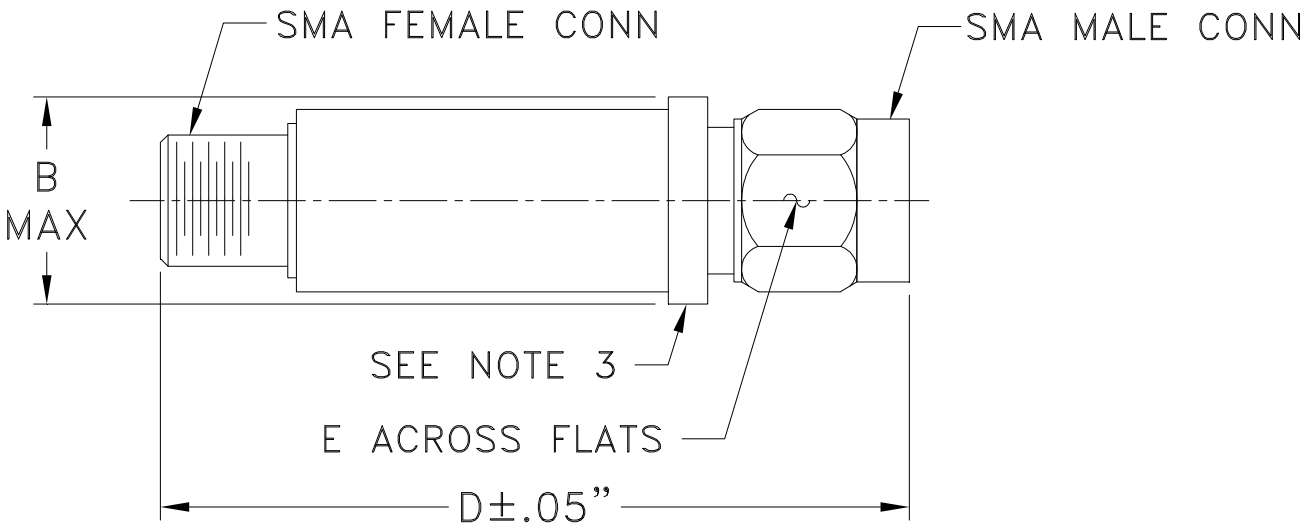
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style FF

FF704

Outline Dimensions



CASE #.	A	B	C	D	E	WT GRAMS
FF704	-- --	.410 (10.41)	-- --	1.43 (36.32)	.312 (7.92)	10.0

Dimensions are in inches (mm). Tolerances: 2Pl. ± .04; 3Pl. ± .030

Notes:

1. Case material: Stainless steel.
2. Case finish: Gold plated.
3. Round Flange may have .312 Across Flats in some models.

Mini-Circuits

Environmental Specifications **ENV112**

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 100° 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, 5 cycles	MIL-STD-202, Method 107, Condition A, Except +100°C