

Cavity Bandpass Filters

50Ω DC to 27.125 GHz

The Big Deal

- Very low insertion loss with excellent power handling
- Very fast roll-off with wide stopband
- Passbands up to 27.125 GHz
- Stopbands up to 37 GHz



Product Overview

Mini-Circuits' cavity filters are designed by implementing resonant structures with very high Q and are ideal for narrow-band, high-selectivity applications. These designs can provide bandwidths as narrow as 1% with very high selectivity and excellent low noise floor. Low insertion loss combined with excellent power handling makes them well-suited for transmitter and receiver front end. Advanced filter design and construction enables stopband width greater than 3x the center frequency.

Mini-Circuits' cavity filters feature a special protective assembly to prevent accidental de-tuning that would otherwise require expensive replacement or return to factory for re-tuning. Precise machining allows realization of cavity filters with small form factors for applications where size is critical. Excellent repeatability across units is achieved through precise tuning and process control.

Key Features

Feature	Advantages
Low insertion loss	Low signal loss results in better SNR in receiver front end and better power delivery to antenna in transmitter
Fast roll-off	Higher selectivity results in better adjacent channel rejection and dynamic range
Wide stopband	Wide spur free band results in better receiver sensitivity
High power handling	Well suited for transmitter application
Protective assembly	Prevents accidental de-tuning of precisely tuned resonant circuit

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



Bandpass Filter

50Ω 9495 to 9505 MHz

ZVBP-9500-S+



Generic photo used for illustration purposes only

CASE STYLE: WB3291

Connectors	Model
SMA-F	ZVBP-9500-S+

Features

- Low Insertion loss, 1.7dB typ.
- Narrow bandwidth, 0.1%
- Good Return loss, 20dB typ.
- High rejection, 62dB typ.

Applications

- Satellite
- Radar

Electrical Specifications at 25°C

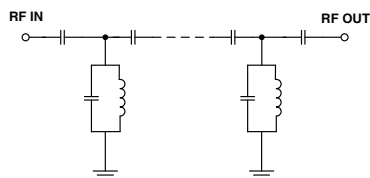
Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	-	-	9500	-	MHz
	3 dB Bandwidth	-	10	-	-	MHz
	Insertion Loss	F1	-	1.7	2.5	dB
	VSWR	F1	-	1.2	1.5	:1
Stop Band, Lower	Insertion Loss	F2	9400	55	63	dB
Stop Band, Upper	Insertion Loss	F3	9600	55	62	dB

Maximum Ratings

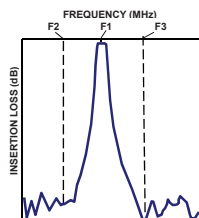
Operating Temperature	+15°C to 35°C
Storage Temperature	-55°C to 100°C
RF Power Input	10 W max. @ 25°C

Permanent damage may occur if any of these limits are exceeded.

Functional Schematic



Typical Frequency Response

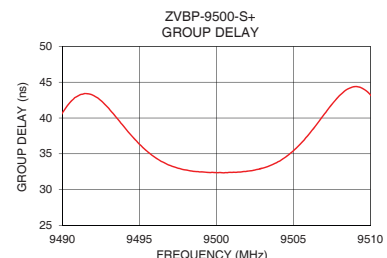
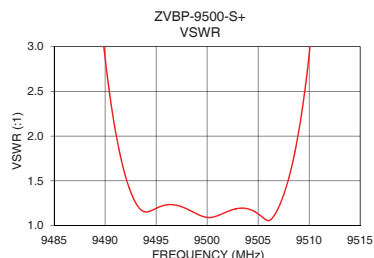
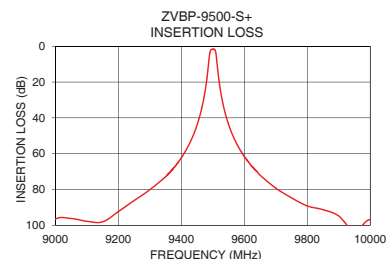
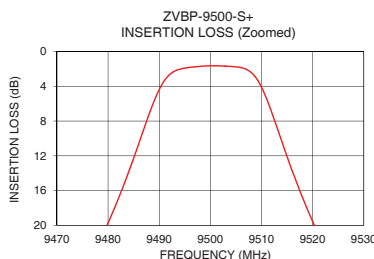


Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
9400	62.34	84.69	9495.0	36.33
9420	56.43	83.95	9495.5	35.35
9440	48.81	79.89	9496.0	34.52
9450	44.01	74.45	9496.5	33.87
9460	38.12	67.23	9497.0	33.37
9470	30.50	53.57	9497.5	32.99
9480	19.73	28.89	9498.0	32.75
9491	3.36	2.07	9498.5	32.55
9495	1.91	1.19	9499.0	32.49
9498	1.71	1.19	9499.5	32.40
9500	1.65	1.09	9500.0	32.38
9502	1.66	1.16	9500.5	32.35
9505	1.76	1.13	9501.0	32.40
9509	3.09	2.06	9501.5	32.45
9520	19.56	27.39	9502.0	32.58
9530	30.26	49.52	9502.5	32.74
9550	43.63	68.64	9503.0	33.00
9560	48.36	73.28	9503.5	33.37
9580	55.75	78.77	9504.0	33.90
9600	61.62	81.28	9505.0	35.44

+RoHS Compliant

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



Notes

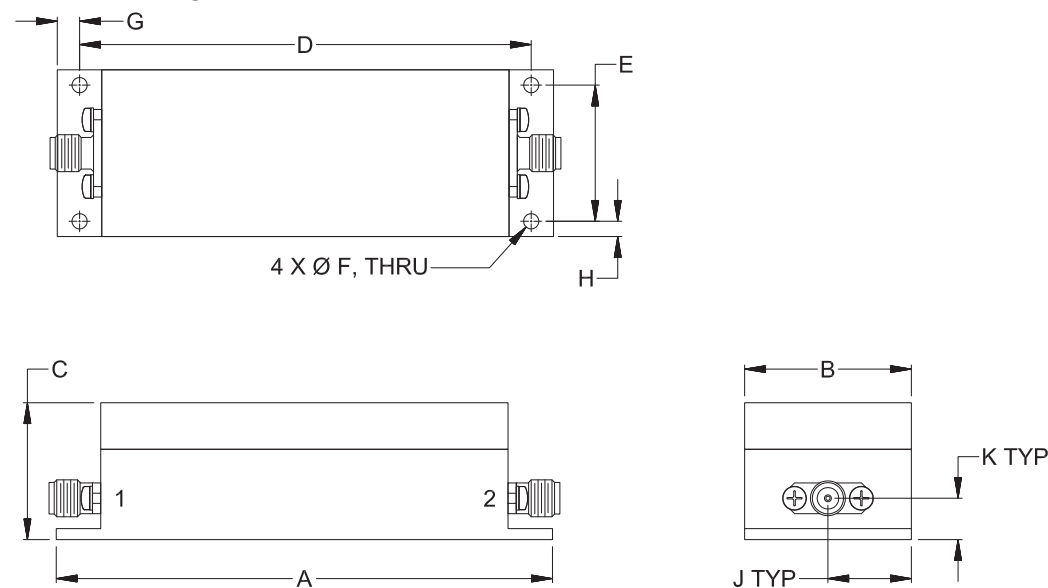
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Coaxial Connections

PORT-1	SMA-FEMALE
PORT-2	SMA-FEMALE

Outline Drawing



Outline Dimensions ($\frac{\text{inch}}{\text{mm}}$)

A	B	C	D	E	F
3.57	1.20	.99	3.250	.980	.110
90.7	30.5	25.0	82.55	24.89	2.79
G	H	J	K		Wt.
.16	.11	.60	.30		grams
4.1	2.8	15.2	7.6		115

Note: Please refer to case style drawing for details

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Cavity Bandpass Filter

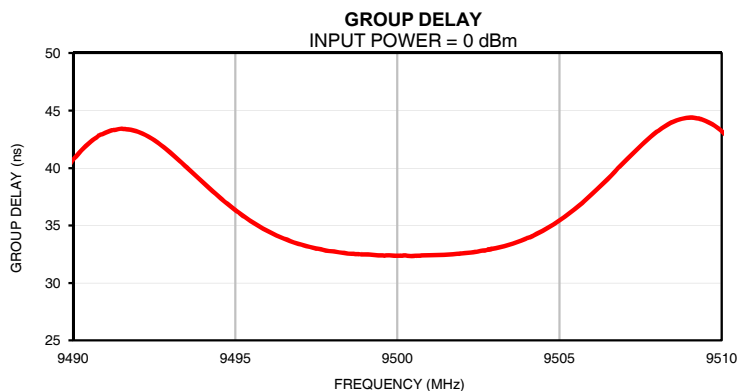
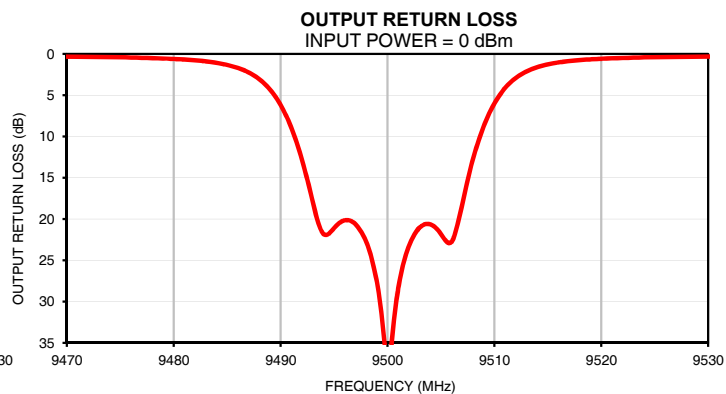
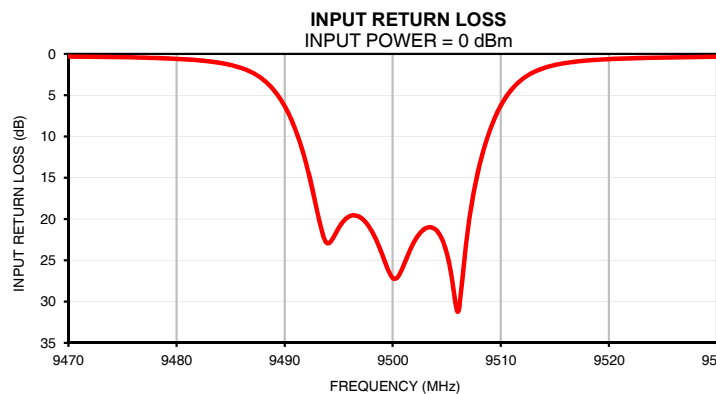
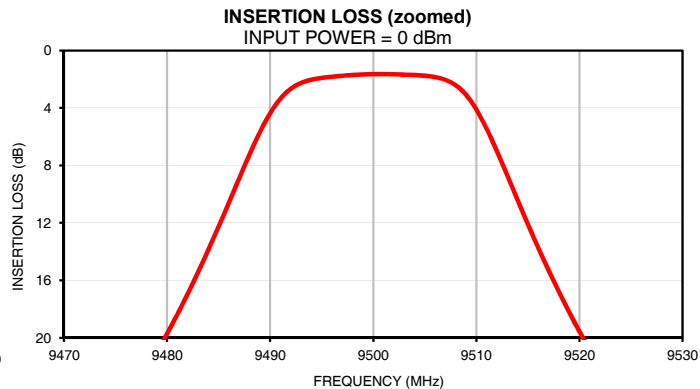
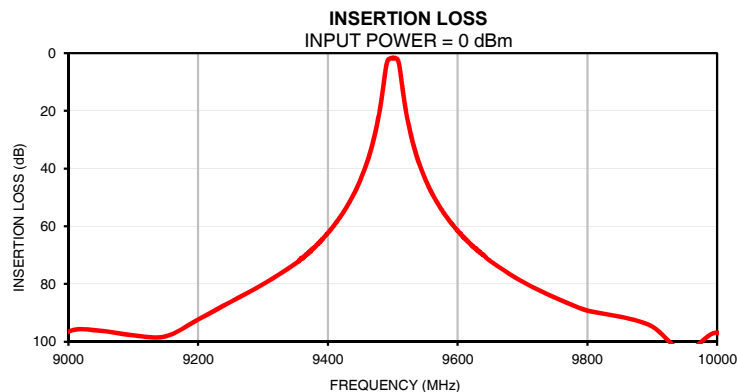
ZVBP-9500-S+

Typical Performance Data

FREQ.	Insertion Loss	Input Return Loss	Output Return Loss
(MHz)	(dB)	(dB)	(dB)
9400	62.34	0.21	0.21
9402	61.79	0.21	0.21
9404	61.25	0.21	0.21
9406	60.69	0.21	0.21
9408	60.08	0.21	0.21
9410	59.56	0.21	0.21
9412	58.91	0.21	0.21
9414	58.32	0.21	0.22
9416	57.72	0.21	0.22
9418	57.10	0.21	0.22
9420	56.43	0.21	0.22
9422	55.79	0.21	0.22
9424	55.05	0.21	0.22
9426	54.37	0.21	0.22
9428	53.62	0.21	0.22
9430	52.93	0.21	0.22
9432	52.13	0.21	0.22
9434	51.32	0.21	0.23
9436	50.52	0.22	0.23
9450	44.01	0.23	0.24
9452	42.93	0.24	0.25
9454	41.80	0.24	0.25
9456	40.63	0.25	0.26
9458	39.41	0.25	0.26
9460	38.12	0.26	0.27
9462	36.76	0.27	0.28
9464	35.33	0.28	0.29
9466	33.81	0.29	0.30
9468	32.21	0.31	0.32
9470	30.50	0.32	0.34
9495	1.91	21.12	21.09
9496	1.82	19.68	20.17
9498	1.71	21.35	22.79
9499	1.67	24.23	27.66
9500	1.65	27.15	38.12
9501	1.64	25.65	28.41
9502	1.66	22.72	23.26
9503	1.69	21.16	21.05
9504	1.72	21.33	20.64
9505	1.76	24.15	21.85
9510	4.11	6.25	5.99
9512	7.02	3.05	2.91
9514	10.42	1.70	1.61
9516	13.73	1.10	1.04
9518	16.79	0.80	0.75
9520	19.56	0.63	0.59
9522	22.08	0.53	0.50
9524	24.38	0.46	0.43
9526	26.49	0.42	0.39
9528	28.45	0.38	0.36
9530	30.26	0.35	0.33
9532	31.96	0.33	0.31
9534	33.55	0.31	0.29
9536	35.04	0.30	0.28
9538	36.46	0.29	0.27
9540	37.79	0.28	0.27
9550	43.63	0.25	0.24
9560	48.36	0.24	0.24
9580	55.75	0.22	0.22
9600	61.62	0.21	0.21

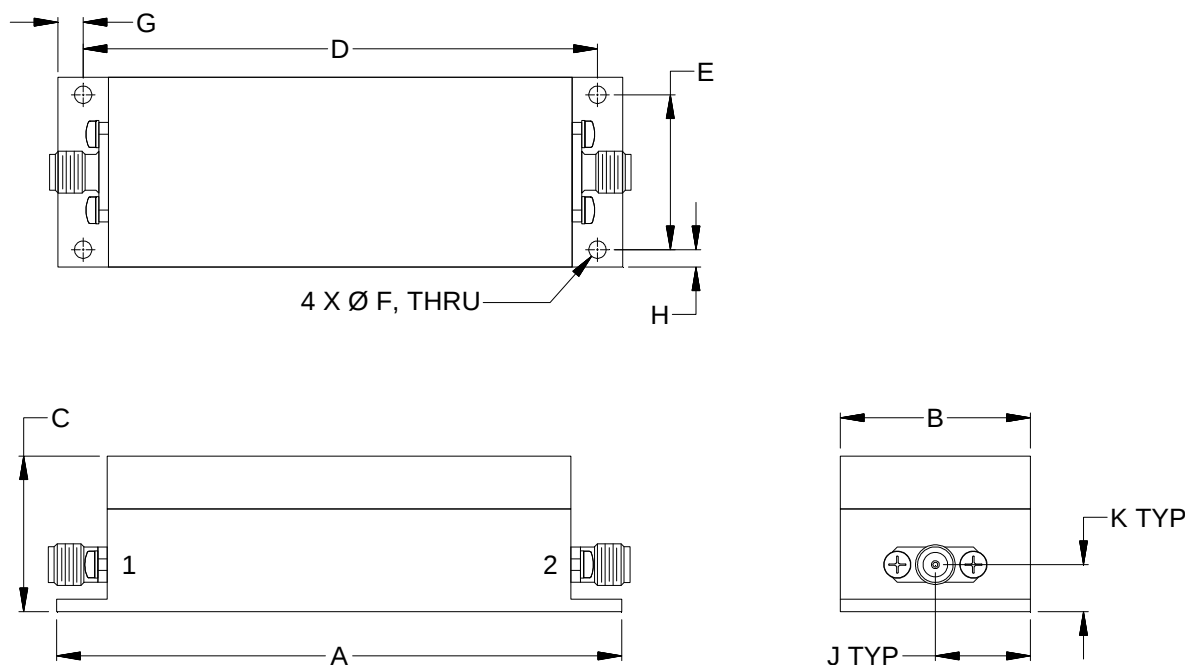
FREQ.	Group Delay
(MHz)	(ns)
9470	3.72
9471	3.98
9472	4.30
9473	4.65
9474	5.06
9475	5.53
9476	6.06
9477	6.70
9478	7.37
9479	8.01
9480	8.61
9481	10.49
9482	11.98
9483	13.78
9484	16.08
9485	18.87
9486	22.38
9487	26.58
9488	31.45
9489	36.42
9490	40.74
9491	43.07
9492	43.15
9493	41.36
9494	38.77
9495	36.33
9496	34.52
9497	33.37
9498	32.75
9499	32.49
9500	32.38
9501	32.40
9502	32.58
9503	33.00
9504	33.90
9505	35.44
9506	37.73
9507	40.54
9508	43.15
9509	44.38
9510	43.22
9511	39.58
9512	34.53
9513	29.30
9514	24.57
9515	20.63
9516	17.38
9517	14.84
9518	12.81
9519	11.18
9520	9.29
9521	8.72
9522	8.05
9523	7.36
9524	6.65
9525	6.03
9526	5.51
9527	5.04
9528	4.65
9530	3.99

Typical Performance Curves



Outline Dimensions

WB3291



CASE#	A	B	C	D	E	F
WB3291	3.57 (90.7)	1.20 (30.5)	.99 (25.0)	3.250 (82.55)	.980 (24.89)	.110 (2.79)

CASE#	G	H	J	K	WT. GRAMS
WB3291	.16 (4.1)	.11 (2.8)	.60 (15.2)	.30 (7.6)	115

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .100$; 3 Pl. $\pm .015$

Notes:

1. Case material: Aluminum.
2. Case Finish: Powder coated.
3. Refer to the individual model data sheet for the type of connectors available.



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

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
Humidity	90 to 95% RH, 40°C, 96 hours; Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103, Condition B
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11ms half-sine, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition A