

Cavity Bandpass Filters

50Ω DC to 50 GHz

The Big Deal

- Very low insertion loss with excellent power handling
- Very fast roll-off with wide stopband
- Passbands up to 36 GHz
- Stopbands up to 50 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 6300 to 6700 MHz

ZVBP-6500-S+



Generic photo used for illustration purposes only

CASE STYLE: WM3323

Connectors	Model
SMA-F	ZVBP-6500-S+

Features

- Low Insertion loss, 0.3dB typ.
- Good VSWR, 1.2:1 typ.
- High Rejection
- Stopband up to 16GHz

Applications

- Satellite communication
- Mobile communication

Electrical Specifications at 25°C

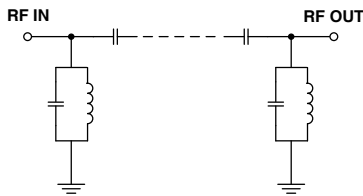
Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	-	-	6500	-	MHz
	Insertion Loss	F1-F2	-	0.3	0.6	dB
	VSWR	F1-F2	-	1.2	1.5	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 4000	60	65	dB
		F3-F4	4000 - 4625	50	-	dB
Stop Band, Upper	Insertion Loss	F5-F6	8375 - 9000	50	-	dB
		F6-F7	9000 - 16000	70	80	dB

Maximum Ratings

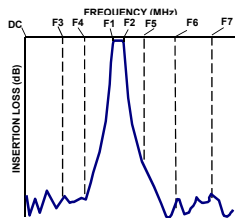
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	10W max. @ 25°C

Permanent damage may occur if any of these limits are exceeded.
Input and output ports are DC short to ground.

Functional Schematic



Typical Frequency Response

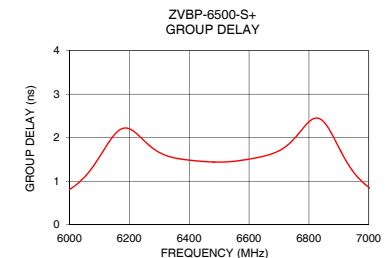
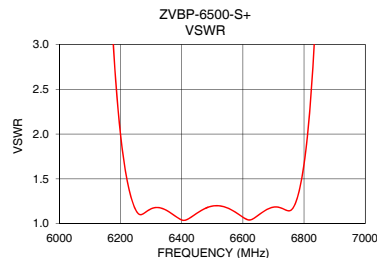
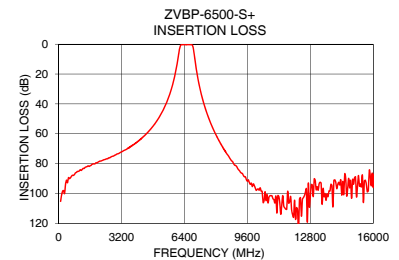
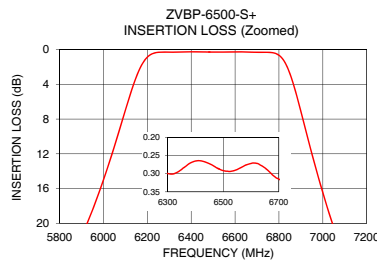


Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
100	105.32	373.19	6300	1.66
1000	85.23	260.29	6320	1.60
2000	79.04	305.41	6340	1.55
4000	65.52	203.23	6360	1.52
4625	57.73	167.10	6380	1.50
5730	30.21	138.75	6400	1.48
5925	20.08	90.70	6420	1.47
6150	3.14	5.05	6440	1.46
6300	0.30	1.17	6460	1.45
6400	0.26	1.04	6480	1.44
6500	0.29	1.20	6500	1.44
6600	0.27	1.07	6520	1.44
6700	0.31	1.18	6540	1.45
6855	3.13	4.81	6560	1.46
7045	20.13	67.39	6580	1.48
7195	30.13	101.26	6600	1.51
8375	69.81	182.25	6620	1.53
9000	81.26	186.47	6640	1.56
12000	104.59	87.54	6660	1.59
16000	96.08	67.50	6700	1.70

+RoHS Compliant

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



Notes

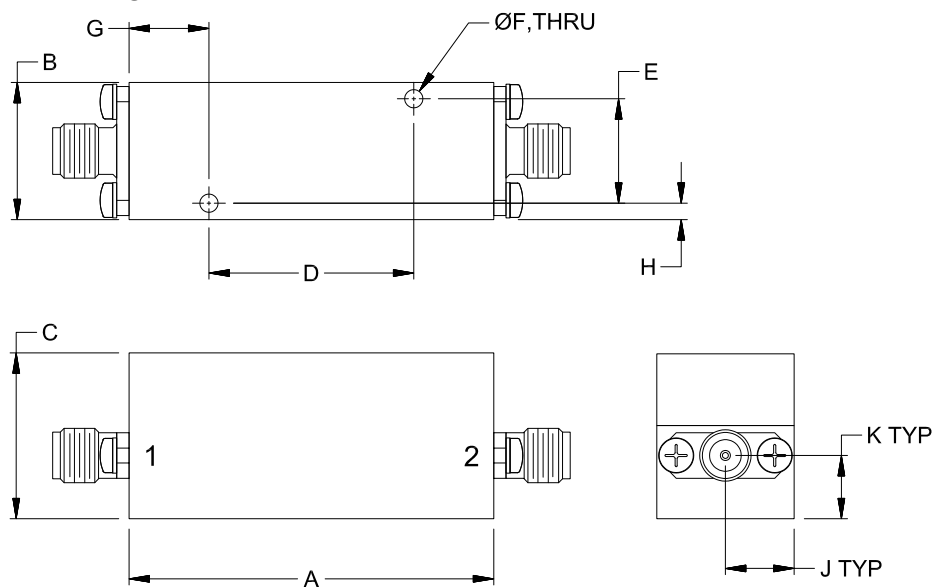
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Coaxial Connections

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

Outline Drawing



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

A	B	C	D	E	F
1.78	.67	.81	1.000	.510	.090
45.2	17.0	20.6	25.40	12.95	2.29
G	H	J	K		Wt.
.39	.08	.34	.31		grams
9.9	2.0	8.5	7.8		40

Note: Please refer to case style drawing for details

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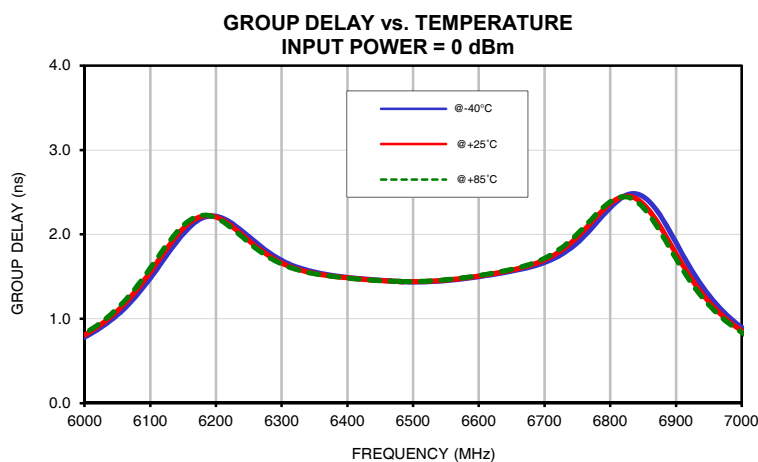
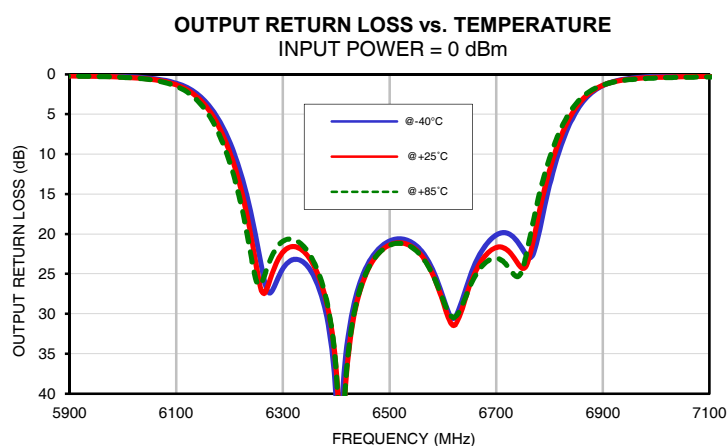
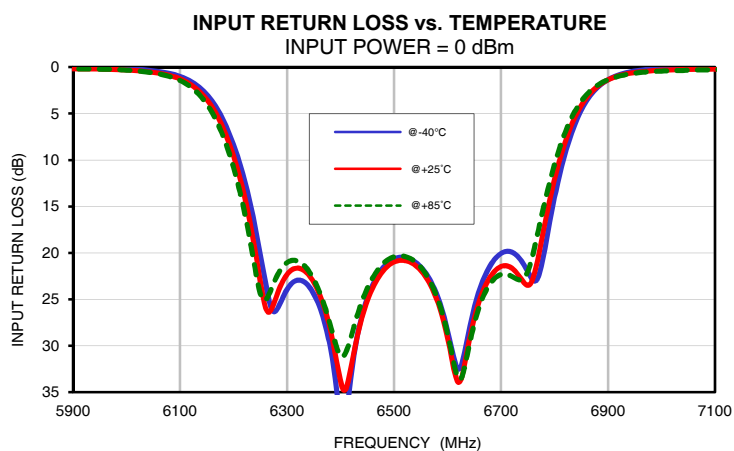
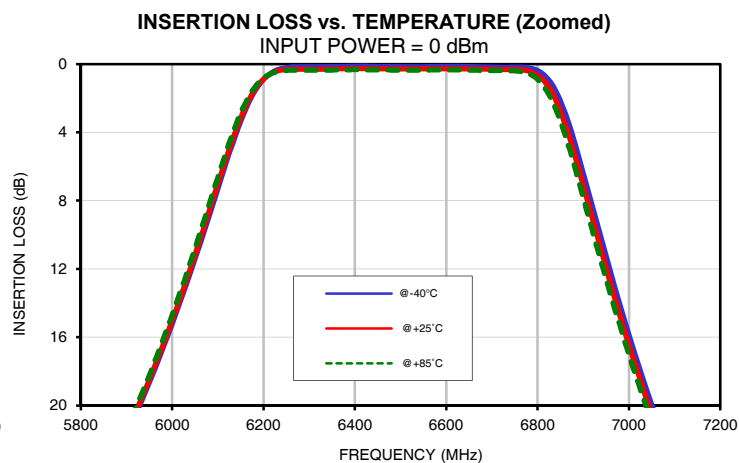
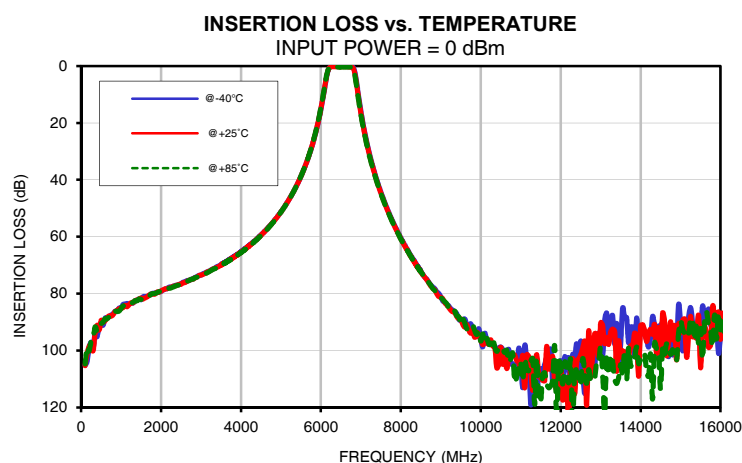
Typical Performance Data

FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
100	105.25	105.32	104.72	0.01	0.05	0.04	0.02	0.04	0.03
200	98.86	98.52	100.22	0.04	0.07	0.07	0.04	0.06	0.06
300	99.57	100.07	95.63	0.05	0.08	0.09	0.06	0.07	0.08
400	95.15	91.13	93.19	0.04	0.08	0.09	0.07	0.08	0.09
500	90.44	89.47	90.57	0.02	0.07	0.08	0.07	0.09	0.10
600	88.69	89.56	88.82	0.02	0.08	0.08	0.07	0.10	0.10
700	88.19	87.84	88.26	0.02	0.08	0.08	0.07	0.10	0.11
800	87.20	87.41	87.06	0.03	0.09	0.09	0.07	0.11	0.11
900	86.30	85.94	86.26	0.01	0.08	0.07	0.07	0.11	0.11
1000	85.09	85.23	85.27	0.01	0.07	0.06	0.06	0.10	0.11
1400	82.28	82.24	82.54	0.00	0.07	0.08	0.05	0.10	0.11
1600	81.07	81.50	81.33	0.03	0.06	0.06	0.05	0.10	0.11
1800	79.91	80.24	80.01	0.03	0.06	0.06	0.04	0.10	0.11
2000	79.26	79.04	79.30	0.04	0.06	0.07	0.03	0.09	0.11
2300	77.41	77.42	77.71	0.06	0.05	0.06	0.02	0.08	0.12
2600	75.78	76.13	75.89	0.05	0.06	0.08	0.02	0.09	0.13
3000	73.52	73.48	73.60	0.07	0.06	0.09	0.01	0.10	0.15
3500	69.87	69.97	70.00	0.06	0.08	0.11	0.01	0.11	0.16
4000	65.35	65.52	65.53	0.06	0.09	0.12	0.03	0.13	0.19
4625	57.63	57.73	57.82	0.03	0.10	0.13	0.06	0.15	0.21
5000	51.25	51.30	51.35	0.02	0.12	0.14	0.08	0.16	0.21
5730	30.30	30.21	30.08	0.00	0.13	0.13	0.10	0.17	0.19
5925	20.27	20.08	19.83	0.06	0.19	0.20	0.16	0.23	0.25
6065	10.22	9.92	9.54	0.51	0.70	0.78	0.62	0.75	0.83
6150	3.36	3.14	2.85	2.94	3.49	3.98	3.09	3.57	4.07
6300	0.15	0.30	0.37	23.93	22.32	21.04	24.33	22.27	20.90
6350	0.14	0.29	0.35	24.41	23.16	22.86	24.37	23.07	22.54
6400	0.12	0.26	0.33	38.21	33.83	31.09	40.74	37.05	37.27
6450	0.13	0.27	0.34	24.89	25.14	23.81	25.11	26.00	25.86
6475	0.14	0.28	0.35	21.91	22.25	21.44	22.20	22.78	22.77
6500	0.15	0.29	0.36	20.64	20.98	20.43	20.88	21.37	21.40
6525	0.16	0.29	0.36	20.55	20.89	20.47	20.66	21.15	21.22
6550	0.15	0.29	0.35	21.50	21.89	21.55	21.46	22.01	22.09
6600	0.13	0.27	0.34	28.34	29.14	28.69	27.85	28.46	28.19
6650	0.14	0.28	0.36	25.87	27.02	27.60	25.48	26.52	26.70
6700	0.18	0.31	0.38	20.04	21.46	22.31	20.12	21.69	23.04
6855	2.47	3.13	3.74	4.08	3.67	3.29	4.15	3.68	3.29
6930	9.31	10.06	10.74	0.66	0.78	0.84	0.74	0.81	0.85
7045	19.56	20.13	20.62	0.08	0.26	0.34	0.18	0.30	0.38
7195	29.69	30.13	30.47	0.00	0.17	0.23	0.11	0.22	0.29
8000	60.42	60.72	60.81	0.06	0.10	0.11	0.07	0.16	0.18
8375	69.44	69.81	69.56	0.07	0.10	0.09	0.06	0.14	0.16
9000	81.11	81.26	81.41	0.06	0.09	0.09	0.04	0.13	0.14
9200	84.39	84.81	84.89	0.08	0.09	0.09	0.04	0.13	0.15
9400	87.04	88.07	87.78	0.09	0.09	0.09	0.04	0.13	0.15
9600	88.94	91.81	90.34	0.08	0.09	0.10	0.04	0.14	0.16
9800	92.81	93.12	90.89	0.08	0.09	0.10	0.03	0.13	0.16
10000	95.80	96.48	96.72	0.10	0.09	0.10	0.03	0.13	0.17
10200	96.95	97.82	97.73	0.10	0.10	0.11	0.03	0.14	0.18
10500	98.78	98.85	98.89	0.11	0.10	0.13	0.03	0.14	0.20
10800	104.65	101.53	101.03	0.08	0.12	0.16	0.03	0.15	0.22
11000	102.00	106.37	104.15	0.06	0.14	0.20	0.04	0.17	0.24
11500	106.43	109.63	118.04	0.06	0.17	0.24	0.04	0.19	0.29
12000	103.83	104.59	106.42	0.07	0.20	0.28	0.08	0.24	0.37
12500	96.68	101.51	112.13	0.04	0.23	0.34	0.10	0.28	0.44
13000	96.13	90.29	98.97	0.03	0.25	0.38	0.10	0.30	0.49
13500	97.75	102.22	104.96	0.01	0.28	0.42	0.09	0.30	0.52
14000	92.93	91.31	102.84	0.10	0.23	0.37	0.11	0.34	0.57
15000	90.25	93.88	89.62	0.08	0.25	0.39	0.10	0.34	0.58
16000	94.41	96.08	92.77	0.05	0.26	0.38	0.09	0.32	0.53

Typical Performance Data

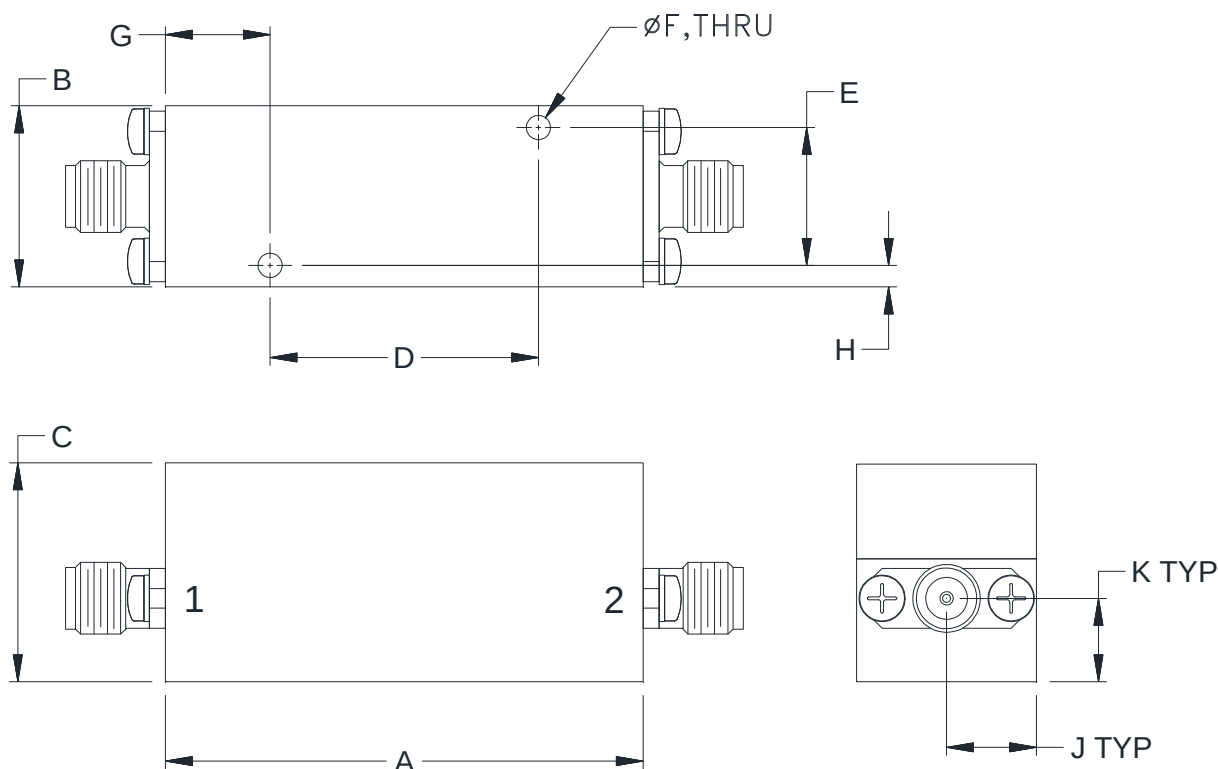
FREQ.	GROUP DELAY		
(MHz)	(nsec)		
	@-40°C	@+25°C	@+85°C
6300	1.69	1.66	1.65
6305	1.67	1.64	1.63
6310	1.65	1.63	1.62
6315	1.64	1.61	1.60
6320	1.62	1.60	1.59
6325	1.61	1.58	1.58
6330	1.59	1.57	1.57
6335	1.58	1.56	1.56
6340	1.57	1.55	1.55
6345	1.56	1.54	1.54
6350	1.55	1.54	1.53
6355	1.54	1.53	1.53
6360	1.54	1.52	1.52
6365	1.53	1.52	1.51
6370	1.52	1.51	1.51
6375	1.52	1.51	1.50
6380	1.51	1.50	1.50
6385	1.50	1.50	1.49
6390	1.50	1.49	1.49
6395	1.49	1.49	1.49
6400	1.49	1.48	1.48
6405	1.49	1.48	1.48
6410	1.48	1.48	1.48
6415	1.48	1.47	1.47
6420	1.47	1.47	1.47
6425	1.47	1.47	1.47
6430	1.47	1.46	1.46
6435	1.46	1.46	1.46
6440	1.46	1.46	1.46
6445	1.46	1.45	1.45
6450	1.45	1.45	1.45
6455	1.45	1.45	1.45
6460	1.45	1.45	1.45
6465	1.45	1.45	1.45
6500	1.44	1.44	1.44
6525	1.44	1.44	1.45
6575	1.47	1.48	1.48
6600	1.50	1.51	1.51
6625	1.53	1.54	1.55
6675	1.61	1.63	1.64
6700	1.67	1.70	1.72

Typical Performance Curves



Outline Dimensions

WM3323



CASE#	A	B	C	D	E	F
WM3323	1.78 (45.2)	.67 (17.0)	.81 (20.6)	1.000 (25.40)	.510 (12.95)	.090 (2.29)

CASE#	G	H	J	K	WT. GRAMS
WM3323	.39 (9.9)	.08 (2.0)	.34 (8.5)	.31 (7.8)	40

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



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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