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

Cavity

Bandpass Filter

ZVBP-9750-S+

50Ω 9500 to 10000 MHz

Generic photo used for illustration purposes only

CASE STYLE: WC3295

Connectors	Model
SMA-F	ZVBP-9750-S+

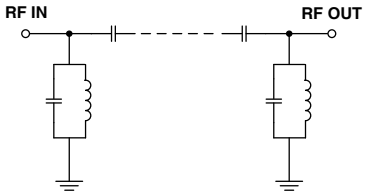
Features

- Low Insertion loss, 1.1dB typ.
- Good VSWR, 1.2:1 typ.
- Good Rejection, 50dB typ.
- Wide stopband up to 26500 MHz

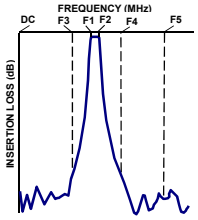
Applications

- Space research
- Radar applications
- Radio Astronomy

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

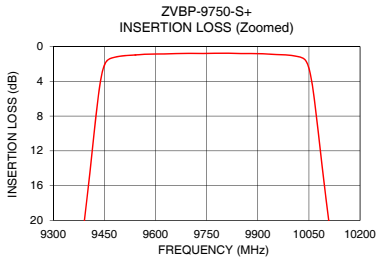
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	-	-	-	9750	-	MHz
	Insertion Loss	F1-F2	9500 - 10000	-	1.1	1.5	dB
	VSWR	F1-F2	9500 - 10000	-	1.2	1.5	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 9250	45	54	-	dB
Stop Band, Upper	Insertion Loss	F4-F5	10250 - 26500	45	50	-	dB

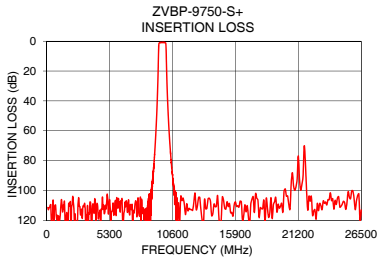
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	10W max. @ 25°C

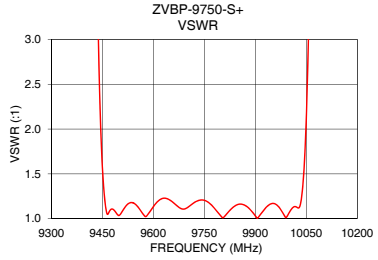
Permanent damage may occur if any of these limits are exceeded.
Input and output ports are DC short to ground.

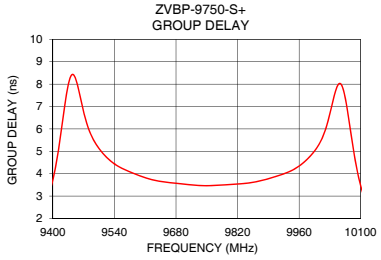
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
100	111.45	2329.91	9500	5.27
1000	117.44	236.77	9526	4.66
3000	118.83	243.75	9550	4.32
6000	111.92	71.92	9576	4.08
9250	53.14	79.40	9600	3.89
9356	30.44	39.41	9626	3.73
9390	20.43	23.74	9650	3.64
9442	3.23	2.40	9676	3.58
9500	1.09	1.04	9700	3.53
9600	0.86	1.13	9726	3.48
9750	0.79	1.20	9750	3.47
9900	0.81	1.03	9776	3.48
10000	1.03	1.07	9800	3.51
10054	3.12	2.64	9826	3.55
10108	19.93	22.82	9850	3.60
10146	30.24	33.98	9876	3.70
10250	50.74	55.80	9900	3.84
15000	111.94	74.08	9926	4.00
20000	100.58	89.07	9950	4.22
26500	113.19	18.42	10000	5.15









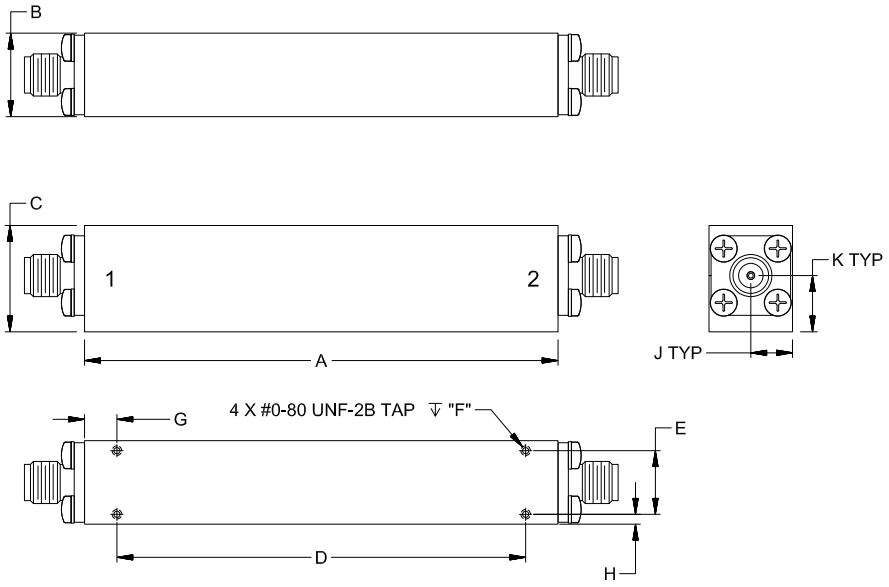
Notes

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-FEMALE
PORT-2	SMA-FEMALE

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F
2.98	**.53**	**.67**	**2.570**	**.400**	**.157**
75.6	13.3	17.0	65.28	10.16	4.00
G	H	J	K		Wt.
.20	**.06**	**.26**	**.35**		grams
5.2	1.6	6.7	9.0		90

Note: Please refer to case style drawing for details

Cavity Band Pass Filter ZVBP-9750-S+

Typical Performance Data

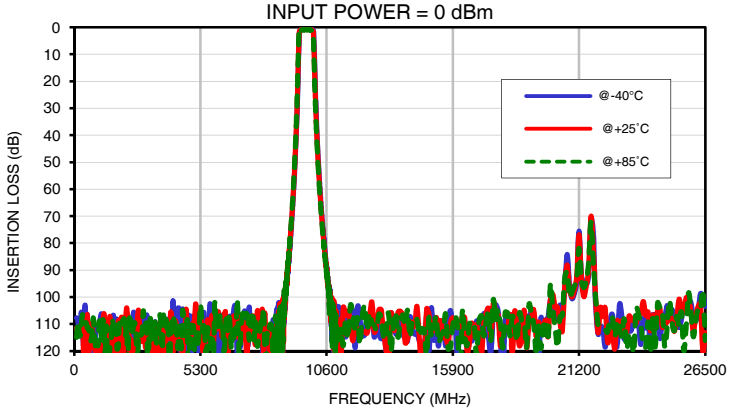
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
100	107.69	111.45	114.91	0.02	0.01	0.00	0.02	0.01	0.00
200	114.34	111.66	112.29	0.00	0.01	0.01	0.02	0.00	0.01
300	105.57	109.90	110.11	0.01	0.02	0.03	0.01	0.02	0.02
400	117.84	122.28	108.27	0.03	0.04	0.05	0.02	0.03	0.03
500	109.57	115.68	109.54	0.03	0.05	0.06	0.03	0.04	0.04
600	123.92	130.66	111.40	0.04	0.06	0.07	0.04	0.06	0.06
800	117.15	116.15	107.70	0.05	0.07	0.08	0.05	0.07	0.08
1000	111.33	117.44	117.94	0.05	0.07	0.09	0.04	0.07	0.08
1500	112.98	107.34	118.26	0.03	0.07	0.09	0.03	0.06	0.07
2000	109.98	107.69	108.33	0.01	0.06	0.09	0.00	0.04	0.06
2500	105.66	121.96	110.64	0.00	0.05	0.09	0.01	0.04	0.07
3000	112.16	118.83	109.43	0.01	0.07	0.12	0.00	0.06	0.11
3500	113.27	127.44	112.85	0.03	0.10	0.16	0.03	0.10	0.15
4000	117.16	115.15	130.80	0.06	0.14	0.20	0.06	0.13	0.18
4500	115.83	113.42	118.94	0.10	0.18	0.24	0.09	0.16	0.21
5000	111.80	112.54	110.59	0.13	0.21	0.27	0.12	0.19	0.25
5500	118.37	114.09	116.47	0.15	0.23	0.29	0.15	0.22	0.27
6000	109.89	111.92	111.64	0.17	0.24	0.30	0.16	0.22	0.26
6500	107.70	115.57	107.46	0.16	0.24	0.29	0.15	0.21	0.24
7000	117.54	116.38	112.22	0.15	0.23	0.27	0.14	0.20	0.23
8000	115.56	105.97	117.48	0.11	0.18	0.22	0.10	0.16	0.18
9000	87.80	86.22	85.69	0.06	0.14	0.18	0.05	0.13	0.16
9250	54.75	53.14	51.72	0.11	0.22	0.30	0.10	0.20	0.27
9356	32.88	30.44	28.21	0.26	0.44	0.61	0.24	0.41	0.57
9390	23.37	20.43	17.66	0.45	0.73	1.05	0.42	0.68	0.98
9420	13.22	9.85	6.94	1.09	1.97	3.42	1.05	1.90	3.33
9442	5.40	3.23	2.22	3.81	7.72	13.90	3.77	7.62	13.82
9500	0.98	1.09	1.18	32.24	34.68	28.85	30.47	36.09	28.75
9550	0.82	0.94	1.04	21.07	23.07	25.70	20.94	22.65	25.04
9600	0.72	0.86	0.97	27.18	24.00	22.34	26.01	23.74	22.36
9650	0.70	0.83	0.93	19.09	20.66	22.21	19.30	21.43	24.04
9700	0.64	0.78	0.90	26.15	24.76	22.98	33.98	29.86	25.66
9750	0.66	0.79	0.90	19.87	20.64	22.04	20.57	21.14	22.03
9800	0.63	0.77	0.89	27.06	38.73	33.64	26.42	30.06	27.63
9850	0.65	0.80	0.93	23.91	22.62	22.10	23.51	22.37	21.99
9900	0.66	0.81	0.95	26.69	36.11	36.87	26.89	35.57	32.92
9950	0.73	0.91	1.06	23.80	22.13	21.86	23.56	21.85	21.51
10000	0.82	1.03	1.25	42.20	29.48	24.71	40.32	29.56	24.77
10054	1.59	3.12	5.68	12.93	6.91	3.91	13.61	7.15	4.02
10078	6.22	10.06	13.66	2.81	1.73	1.35	2.88	1.75	1.34
10108	16.29	19.93	23.05	0.78	0.76	0.78	0.78	0.75	0.75
10146	27.31	30.24	32.77	0.43	0.51	0.56	0.41	0.48	0.52
10250	48.79	50.74	52.45	0.23	0.31	0.35	0.23	0.30	0.33
10500	80.25	81.45	82.85	0.10	0.18	0.22	0.11	0.18	0.21
11000	112.82	127.18	114.78	0.03	0.12	0.18	0.05	0.12	0.17
11500	107.66	105.19	115.24	0.01	0.11	0.18	0.01	0.10	0.16
12000	107.98	112.05	117.50	0.00	0.12	0.22	0.00	0.10	0.18
12500	104.25	101.83	109.52	0.00	0.14	0.26	0.00	0.12	0.22
13000	111.93	113.48	115.66	0.01	0.16	0.30	0.01	0.14	0.27
13500	113.65	112.03	105.75	0.02	0.18	0.33	0.01	0.15	0.29
14000	116.31	115.67	104.93	0.04	0.20	0.35	0.03	0.18	0.32
14500	116.59	116.61	114.30	0.05	0.22	0.39	0.04	0.20	0.35
15000	103.94	111.94	114.32	0.06	0.23	0.41	0.05	0.21	0.38
15500	109.16	114.99	112.98	0.07	0.25	0.44	0.06	0.23	0.41
16000	109.97	110.74	106.78	0.08	0.27	0.46	0.08	0.25	0.44
18000	129.00	111.61	118.78	0.14	0.34	0.53	0.15	0.33	0.51
20000	100.93	100.58	95.31	0.04	0.20	0.30	0.07	0.20	0.30
22000	113.70	113.28	110.22	0.01	0.17	0.29	0.05	0.20	0.32
25000	106.08	107.31	101.23	0.21	0.50	0.82	0.30	0.61	1.00
26500	103.44	113.19	116.07	0.45	0.94	1.45	0.67	1.17	1.73

Typical Performance Data

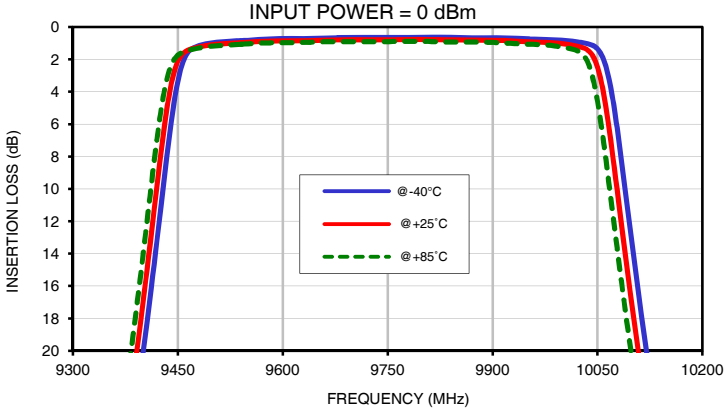
FREQ.	GROUP DELAY		
(MHz)	(nsec)		
	@-40°C	@+25°C	@+85°C
9500	5.60	5.27	5.03
9510	5.26	5.00	4.81
9520	4.99	4.78	4.62
9530	4.77	4.59	4.46
9540	4.58	4.44	4.33
9550	4.43	4.32	4.23
9560	4.31	4.21	4.14
9570	4.21	4.13	4.06
9580	4.13	4.04	3.98
9590	4.04	3.97	3.91
9600	3.96	3.89	3.84
9610	3.89	3.82	3.78
9620	3.82	3.76	3.73
9630	3.76	3.71	3.68
9640	3.70	3.67	3.65
9650	3.67	3.64	3.62
9660	3.64	3.61	3.60
9670	3.61	3.59	3.58
9680	3.59	3.57	3.56
9690	3.57	3.55	3.54
9700	3.55	3.53	3.52
9710	3.53	3.51	3.50
9720	3.51	3.49	3.48
9730	3.49	3.48	3.48
9740	3.47	3.47	3.47
9750	3.46	3.47	3.48
9760	3.46	3.47	3.48
9780	3.47	3.49	3.51
9790	3.48	3.50	3.52
9800	3.50	3.51	3.53
9810	3.51	3.53	3.54
9820	3.53	3.54	3.56
9830	3.54	3.55	3.58
9840	3.55	3.57	3.60
9850	3.57	3.60	3.64
9860	3.59	3.63	3.68
9870	3.62	3.67	3.73
9880	3.66	3.72	3.78
9900	3.77	3.84	3.90
9950	4.10	4.22	4.35
10000	4.86	5.15	5.49

Typical Performance Curves

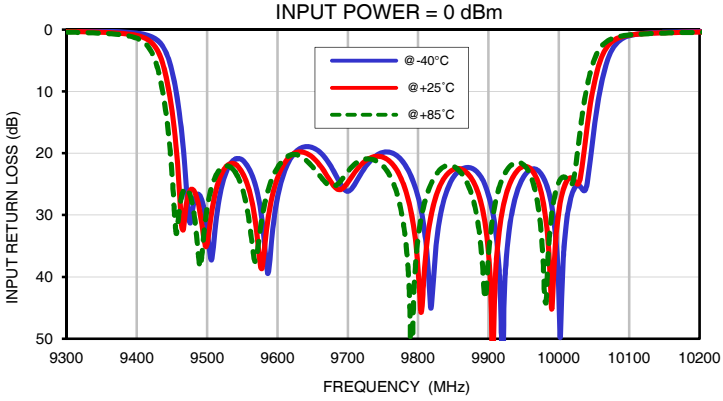
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



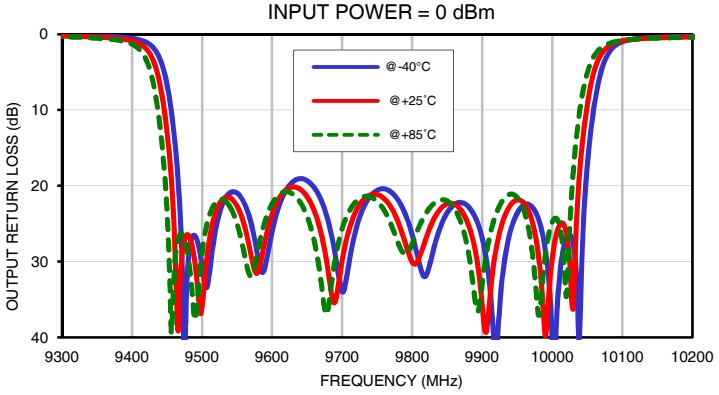
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



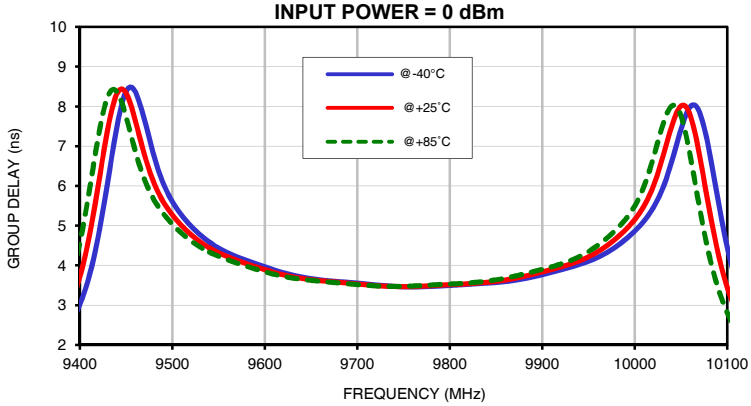
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



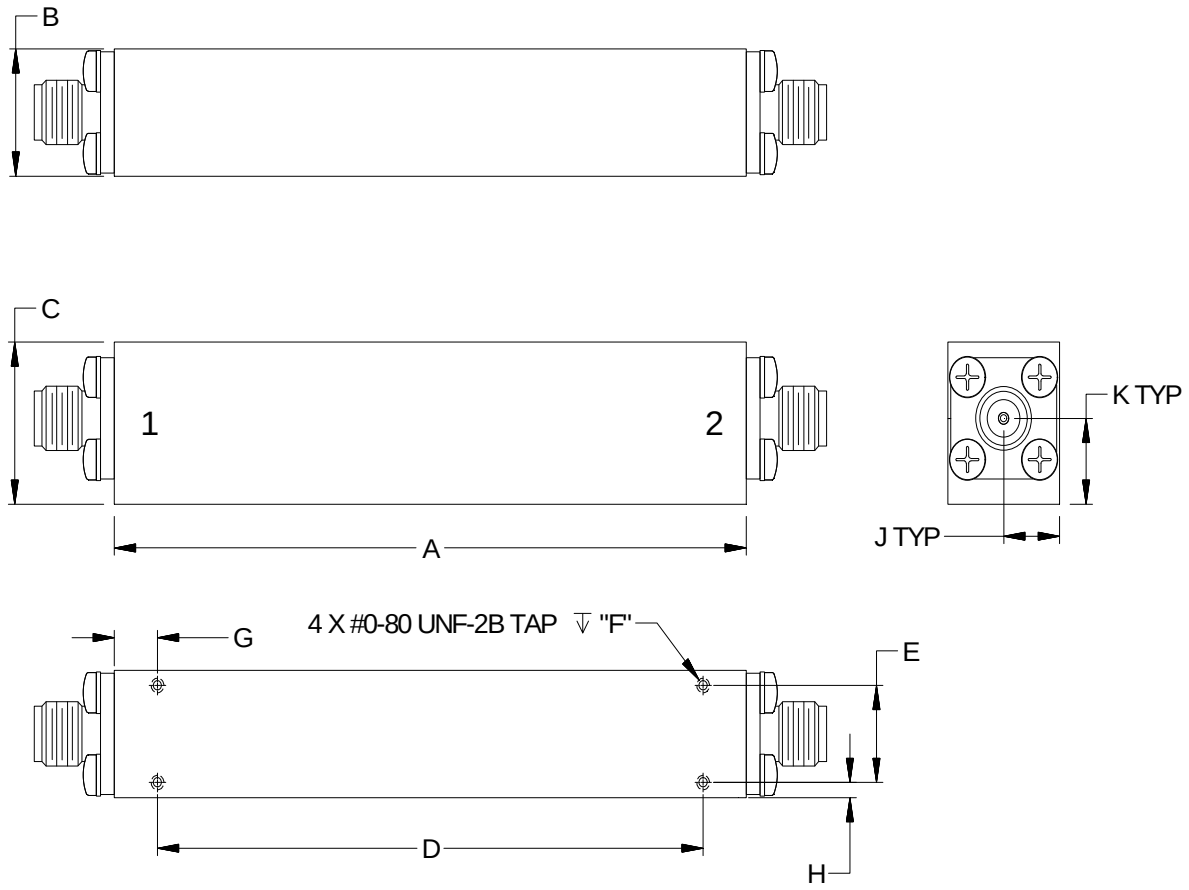
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style WC

Outline Dimensions

WC3295



CASE#	A	B	C	D	E	F
WC3295	2.98 (75.6)	.53 (13.3)	.67 (17.0)	2.570 (65.28)	.400 (10.16)	.157 (4.00)

CASE#	G	H	J	K	WT. GRAMS
WC3295	.20 (5.2)	.06 (1.6)	.26 (6.7)	.35 (9.0)	90

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

Notes:

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

Mini-Circuits

Environmental Specifications ENV46

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, Condintion 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