CAVITY

Bandpass Filter

ZVBP MODEL SERIES

50Ω DC to 57 GHz

THE BIG DEAL

- Very Low Insertion Loss with Excellent Power Handling
- Fast Roll-Off with Wide Stopband
- Passbands Up to 36 GHz
- Stopband Up to 57 GHz

PRODUCT OVERVIEW

Mini-Circuits' coaxial 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 0.5% 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' coaxial 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.

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-16R3G-S+

50Ω 15.9 to 16.7 GHz SMA-Female

FEATURES

- Low Insertion Loss of 0.5dB Typ.
- Good Return Loss of 21dB Typ.
- Great Rejection (40 to 100 dB Typ.)
- Stopband up to 28 GHz

Generic photo used for illustration purposes only

Model No.	ZVBP-16R3G-S+
Case Style	WY3407
Connectors	SMA-FEMALE

APPLICATIONS

- Test & Measurement Equipment
- R&D Lab, Production, and OTA Test Systems

+RoHS Compliant
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

ELECTRICAL SPECIFICATIONS AT 25°C

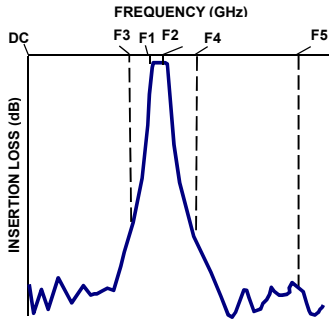
Parameter		F#	Frequency (GHz)	Min.	Typ.	Max.	Units
	Center Frequency	Fc	—	—	16.3	—	GHz
Passband	Insertion Loss	F1-F2	15.9 - 16.7	—	0.5	0.9	dB
	Return Loss	F1-F2	15.9 - 16.7	14	21	—	dB
Stop Band, Lower	Rejection	DC-F3	DC - 14.7	49	58	—	dB
Stop Band, Upper	Rejection	F4-F5	17.4 - 28	35	39	—	dB

ABSOLUTE MAXIMUM RATINGS

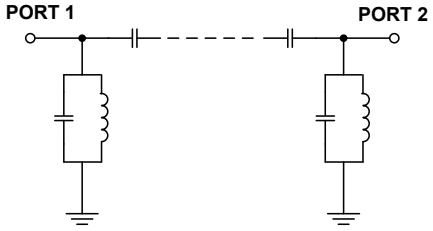
Parameter	Ratings
Operating temperature	-40°C to +85°C
Storage temperature	-55°C to +100°C
RF Power Input	15W at 25°C

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

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL DIAGRAM



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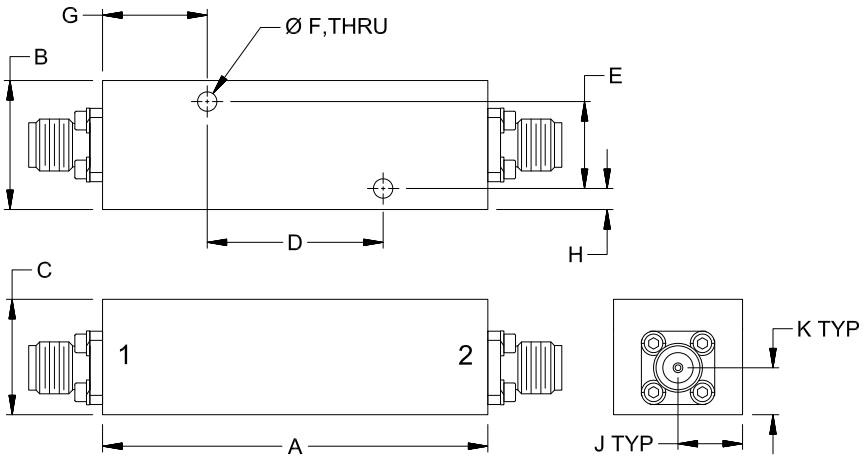
Bandpass Filter

ZVBP-16R3G-S+

COAXIAL CONNECTIONS

PORT 1	SMA-Female
PORT 2	SMA-Female

OUTLINE DRAWING



OUTLINE DIMENSIONS (Inches / mm)

A	B	C	D	E	F
1.97	**.66**	**.59**	**.900**	**.445**	**.100**
50.0	16.8	15.0	22.86	11.30	2.54
G	H	J	K		Wt.
.54	**.11**	**.33**	**.24**		grams
13.6	2.7	8.4	6.1		72

Note. Please refer to case style drawing for details

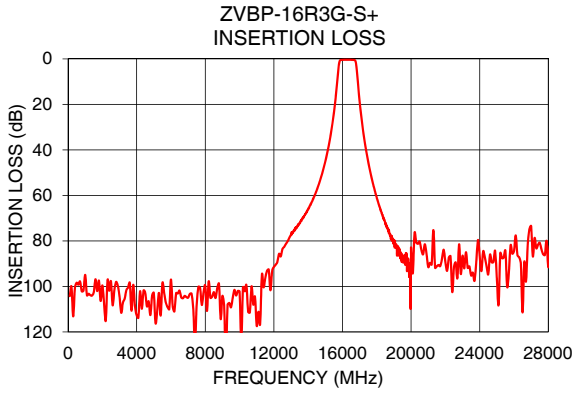
CAVITY

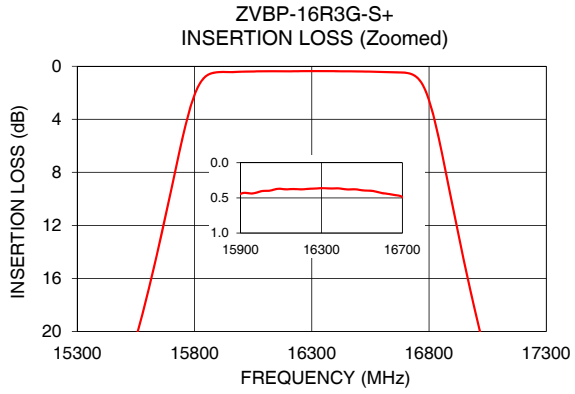
Bandpass Filter

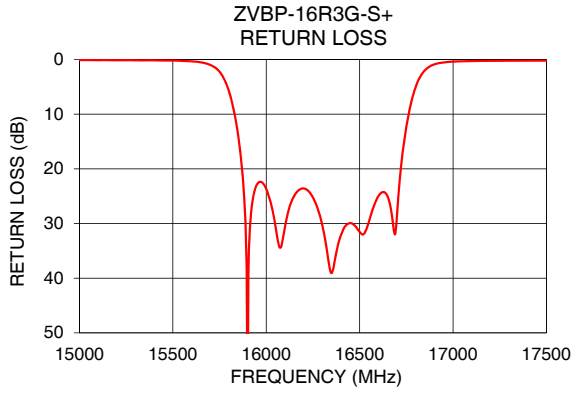
ZVBP-16R3G-S+

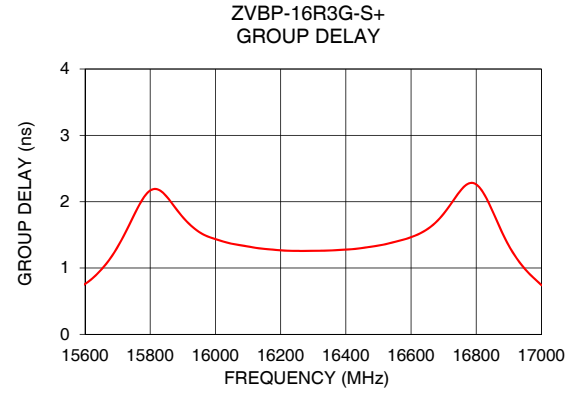
TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)	Frequency (MHz)	GROUP DELAY (ns)
100	104.24	0.01	15900	1.77
1000	94.96	0.09	15940	1.58
10000	102.28	0.13	15980	1.47
14700	53.28	0.07	16020	1.41
15500	23.66	0.19	16060	1.36
15780	3.22	3.96	16100	1.32
15900	0.44	58.65	16140	1.29
16000	0.41	23.67	16180	1.28
16300	0.36	30.32	16220	1.26
16500	0.39	31.54	16260	1.26
16700	0.49	28.47	16300	1.26
17200	31.50	0.25	16340	1.26
17400	41.15	0.22	16380	1.27
20000	89.88	0.19	16500	1.34
28000	91.55	0.13	16700	1.82









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

Cavity Band Pass Filter ZVBP-16R3G-S+

Typical Performance Data

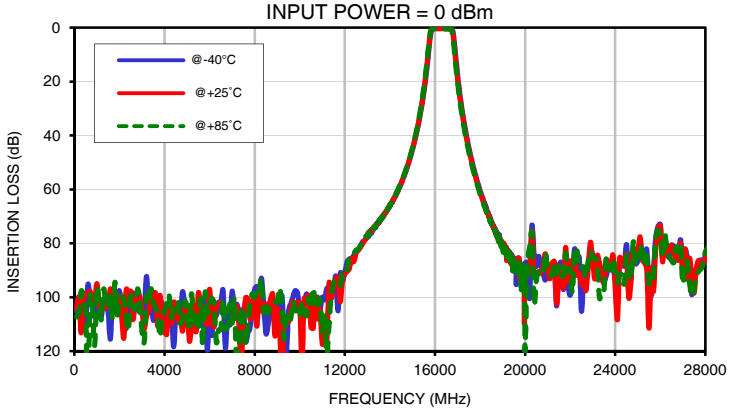
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
100	105.11	104.24	107.25	0.00	0.01	0.02	0.00	0.01	0.02
500	109.34	98.40	105.94	0.08	0.09	0.10	0.07	0.08	0.09
1000	96.53	94.96	96.79	0.07	0.09	0.11	0.06	0.08	0.10
1500	105.82	102.58	103.07	0.04	0.07	0.09	0.04	0.06	0.08
2000	97.63	99.58	101.14	0.02	0.05	0.07	0.01	0.04	0.06
2500	99.88	97.74	99.58	0.01	0.04	0.07	0.00	0.03	0.05
3000	102.85	104.34	112.51	0.00	0.04	0.07	0.01	0.03	0.05
3500	108.47	100.47	101.85	0.00	0.04	0.07	0.01	0.03	0.05
4000	110.90	112.80	105.17	0.01	0.04	0.07	0.01	0.03	0.06
4500	108.01	102.77	103.57	0.00	0.04	0.07	0.00	0.04	0.07
5000	108.03	102.88	104.82	0.00	0.05	0.08	0.00	0.05	0.08
5500	102.42	98.58	112.12	0.00	0.05	0.09	0.00	0.05	0.08
6000	103.46	96.99	102.60	0.01	0.06	0.09	0.00	0.05	0.08
6500	102.07	101.84	111.80	0.02	0.07	0.10	0.01	0.06	0.09
7000	97.78	104.93	109.62	0.03	0.08	0.12	0.02	0.07	0.10
7500	104.33	107.95	107.33	0.04	0.10	0.14	0.03	0.08	0.11
8000	96.88	99.74	100.12	0.06	0.11	0.16	0.03	0.09	0.12
7500	104.33	107.95	107.33	0.04	0.10	0.14	0.03	0.08	0.11
8000	96.88	99.74	100.12	0.06	0.11	0.16	0.03	0.09	0.12
8500	113.39	102.52	101.89	0.06	0.12	0.17	0.03	0.09	0.13
9000	101.66	104.16	101.86	0.06	0.13	0.18	0.02	0.09	0.13
9500	105.29	109.16	105.85	0.06	0.13	0.18	0.02	0.09	0.13
10000	104.88	102.28	107.33	0.06	0.13	0.19	0.02	0.09	0.13
10500	101.89	111.12	104.18	0.06	0.13	0.19	0.02	0.09	0.14
11000	100.01	117.34	112.93	0.07	0.15	0.20	0.01	0.09	0.14
11500	97.75	96.30	94.80	0.09	0.17	0.23	0.03	0.11	0.16
12000	90.98	91.43	89.50	0.11	0.19	0.26	0.05	0.14	0.19
13000	77.78	77.23	77.53	0.09	0.18	0.24	0.09	0.18	0.23
14700	53.58	53.28	53.01	0.02	0.07	0.14	0.03	0.06	0.13
15300	34.54	33.89	33.25	0.05	0.14	0.22	0.01	0.11	0.18
15500	24.61	23.66	22.75	0.08	0.19	0.28	0.04	0.16	0.24
15780	4.35	3.22	2.43	2.63	3.96	5.45	2.55	3.89	5.40
15900	0.35	0.44	0.52	25.16	58.65	30.55	25.22	40.84	28.94
16000	0.29	0.41	0.48	21.63	23.67	25.79	21.13	22.82	24.36
16100	0.25	0.37	0.46	33.57	30.64	27.83	32.00	30.61	28.21
16200	0.25	0.38	0.46	23.93	23.58	24.32	24.46	24.16	24.98
16300	0.24	0.36	0.44	26.88	30.32	35.81	27.80	32.07	39.82
16350	0.24	0.37	0.45	33.97	39.07	34.48	35.48	45.30	35.55
16400	0.24	0.37	0.46	42.16	32.15	29.46	39.81	32.03	29.67
16500	0.26	0.39	0.48	33.34	31.54	30.79	33.98	33.26	33.65
16600	0.29	0.43	0.53	25.79	25.02	24.00	26.46	25.58	24.33
16700	0.32	0.49	0.63	31.56	28.47	22.02	32.60	28.40	21.83
16810	2.01	3.14	4.37	5.64	4.13	3.09	5.60	4.11	3.06
17100	24.17	25.63	26.78	0.19	0.29	0.36	0.13	0.23	0.30
17200	30.21	31.50	32.50	0.15	0.25	0.32	0.08	0.19	0.26
17400	40.08	41.15	41.94	0.12	0.22	0.30	0.05	0.15	0.23
18000	60.34	61.03	61.61	0.08	0.20	0.28	0.02	0.13	0.21
20000	93.83	89.88	91.80	0.07	0.19	0.27	0.01	0.13	0.20
23000	83.90	86.69	85.46	0.03	0.18	0.28	0.01	0.13	0.23
23500	94.17	94.64	97.41	0.03	0.19	0.28	0.05	0.19	0.28
24000	94.13	96.51	90.20	0.01	0.16	0.27	0.04	0.19	0.27
24500	80.46	84.40	84.70	0.01	0.19	0.29	0.02	0.17	0.25
25000	86.45	84.52	87.34	0.02	0.19	0.30	0.05	0.20	0.28
25500	95.84	111.43	95.21	0.00	0.18	0.29	0.03	0.19	0.27
26000	72.97	73.55	76.72	0.06	0.10	0.22	0.03	0.19	0.28
26500	80.68	80.83	86.46	0.03	0.14	0.26	0.01	0.16	0.26
27000	86.87	91.55	94.99	0.03	0.13	0.25	0.01	0.16	0.26
27500	90.22	98.44	97.05	0.01	0.15	0.26	0.05	0.13	0.25
27800	86.17	88.85	89.51	0.02	0.15	0.26	0.03	0.15	0.26
28000	84.09	85.57	83.18	0.03	0.14	0.25	0.04	0.13	0.25

Typical Performance Data

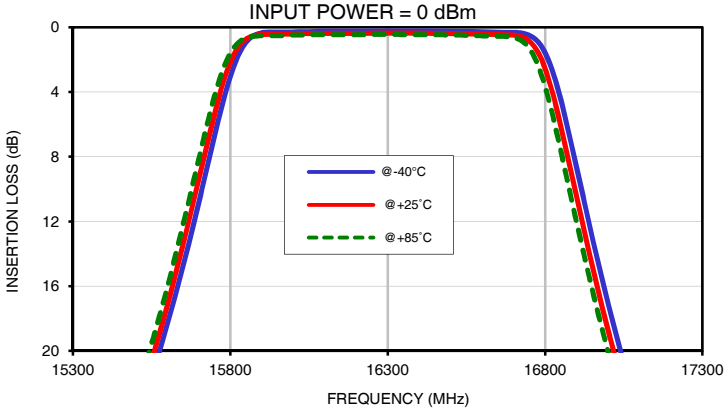
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25˚C	@+85˚C
15900	1.88	1.77	1.68
15920	1.76	1.66	1.60
15940	1.65	1.58	1.53
15960	1.57	1.51	1.48
15980	1.51	1.47	1.44
16000	1.47	1.44	1.41
16020	1.43	1.41	1.39
16040	1.40	1.38	1.36
16060	1.38	1.36	1.34
16080	1.36	1.34	1.33
16100	1.34	1.32	1.31
16120	1.32	1.31	1.30
16140	1.31	1.29	1.29
16160	1.30	1.28	1.28
16180	1.28	1.28	1.27
16200	1.27	1.27	1.26
16220	1.27	1.26	1.26
16240	1.26	1.26	1.26
16260	1.26	1.26	1.26
16280	1.26	1.26	1.26
16300	1.26	1.26	1.26
16320	1.26	1.26	1.26
16340	1.26	1.26	1.27
16360	1.26	1.27	1.27
16380	1.27	1.27	1.28
16400	1.27	1.28	1.28
16420	1.28	1.28	1.29
16440	1.29	1.29	1.31
16460	1.30	1.31	1.32
16480	1.31	1.32	1.34
16500	1.32	1.34	1.35
16520	1.34	1.36	1.38
16540	1.36	1.38	1.40
16560	1.38	1.41	1.43
16580	1.41	1.43	1.46
16600	1.43	1.46	1.50
16620	1.47	1.50	1.55
16640	1.51	1.55	1.61
16660	1.56	1.62	1.69
16680	1.63	1.71	1.80
16700	1.72	1.82	1.93

Typical Performance Curves

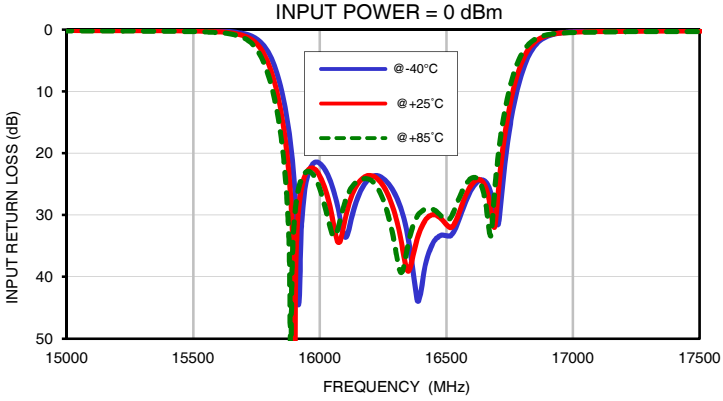
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



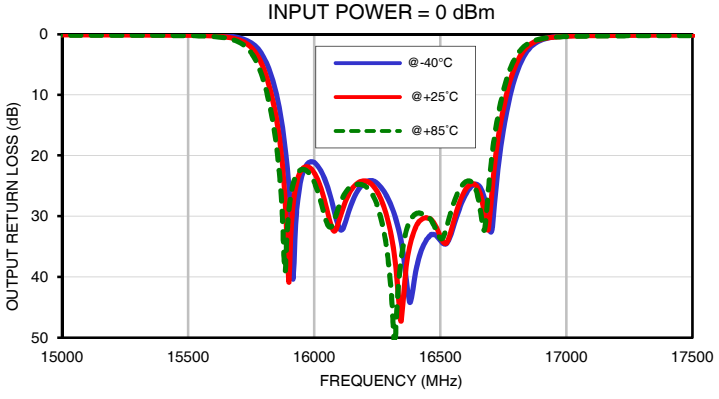
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



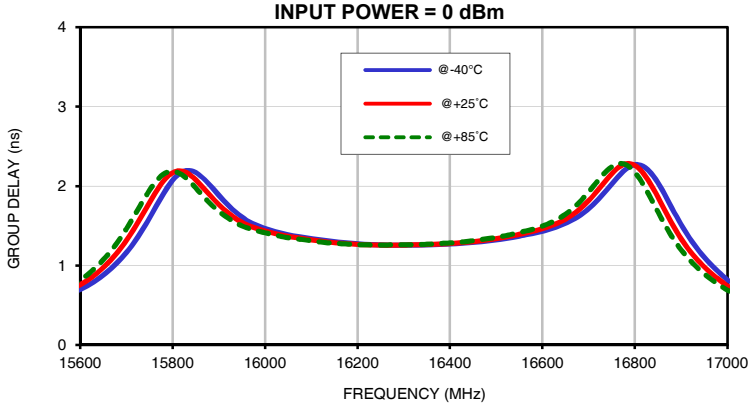
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



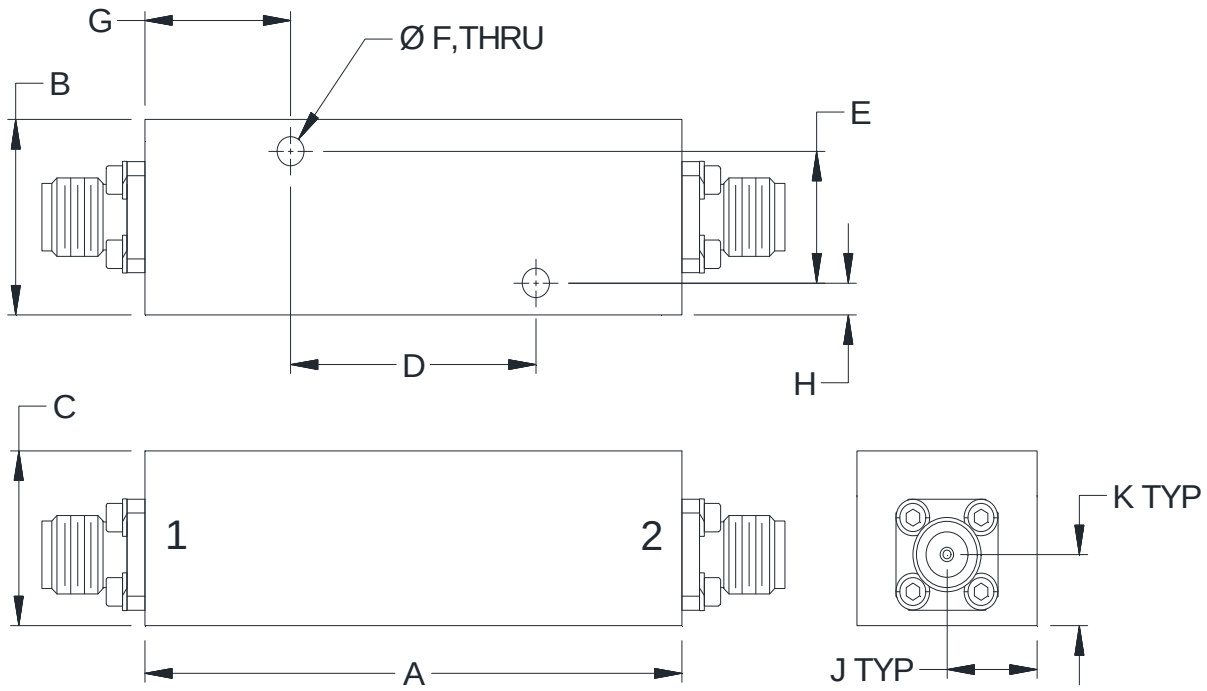
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style WY

Outline Dimensions

WY3407



CASE#	A	B	C	D	E	F
WY3407	1.97 (50.0)	.66 (16.8)	.59 (15.0)	.900 (22.86)	.445 (11.30)	.100 (2.54)

CASE#	G	H	J	K	WT. GRAMS
WY3407	.54 (13.6)	.11 (2.7)	.33 (8.4)	.24 (6.1)	72

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.

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RF/IF MICROWAVE COMPONENTS

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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

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