LTCC COAXIAL

Bandpass Filter

ZBFHK-K2162+

50Ω 19.4 to 23.8 GHz 2.92mm Female

KEY FEATURES

- Low Insertion Loss, 3.4 dB Typ.
- Return Loss, 11 dB Typ.
- Stopband Rejection, 90 dB Typ.
- Broadband Connectorized Package
- Power Handling: 1 Watts



Generic photo used for illustration purposes only

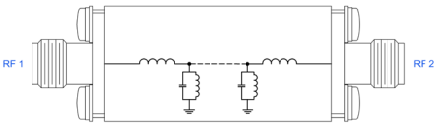
APPLICATIONS

- Test and Measurement
- Aerospace and Defense Signal Conditioning
- Satellite Communications

PRODUCT OVERVIEW

ZBFHK-K2162+ is a 50Ω band pass filter built in broad band connectorized package. Covering 19.4-23.8 GHz bandwidth, these units offer good matching within the passband and good rejection in stopband. ZBFHK-K2162+ offer low insertion loss, and excellent power handling capability. It handles up to 1 W RF input power and provides a wide operating temperature range from -55°C to 125°C.

FUNCTIONAL DIAGRAM



ELECTRICAL SPECIFICATIONS[1] AT +25°C

Parameter		F#	Frequency (GHz)	Min.	Typ.	Max.	Units
Passband	Center Frequency[2]	—	—	—	21.6	—	GHz
	Insertion Loss	F1-F2	19.4 - 23.8	—	3.4	5	dB
	Return Loss	F1-F2	19.4 - 23.8	—	11	—	dB
Stopband, Lower	Rejection	DC-F3	0.1 - 5.5	80	89	—	dB
		F3-F4	5.5 - 10.3	65	90	—	
		F4-F5	10.3 - 15	60	70	—	
Stopband, Upper	Rejection	F6-F7	29.1 - 30.9	60	77	—	dB
		F7-F8	30.9 - 36.3	70	80	—	
		F8-F9	36.3 - 40	52	62	—	

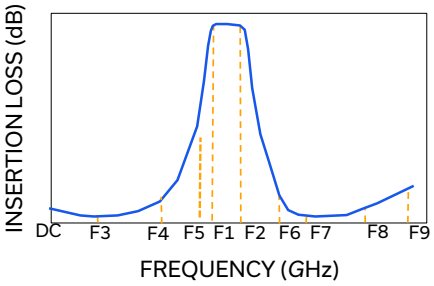
1. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.
2. Typical variation ± 5%

ABSOLUTE MAXIMUM RATINGS[3]

Parameter	Ratings
Operating Temperature	-55°C to +125°C
Storage Temperature	-55°C to +125°C
Input Power	1 W

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

TYPICAL FREQUENCY RESPONSE



REV. OR
ECO-031035
EDU4810
ZBFHK-K1272+
MCINU
260903

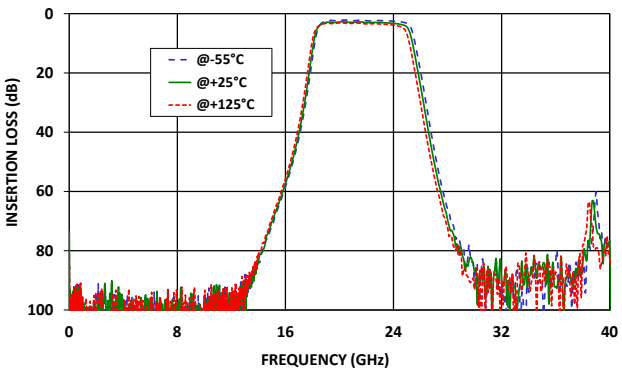
Bandpass Filter

ZBFHK-K2162+

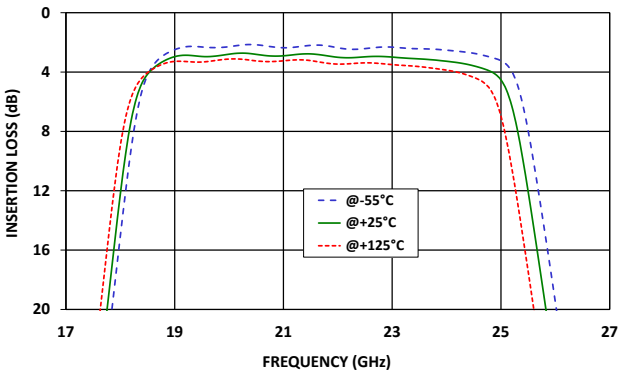
50Ω 19.4 to 23.8 GHz 2.92mm Female

TYPICAL PERFORMANCE GRAPHS

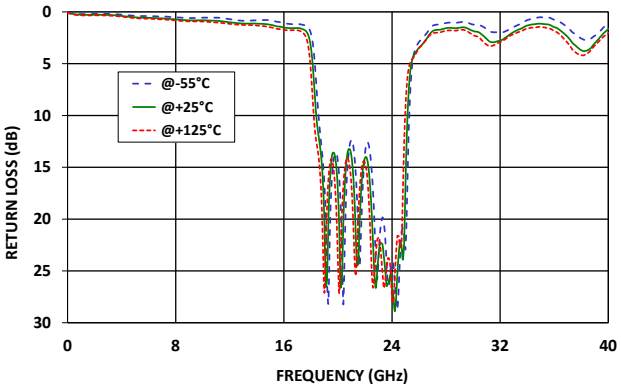
ZBFHK-K2162+
INSERTION LOSS



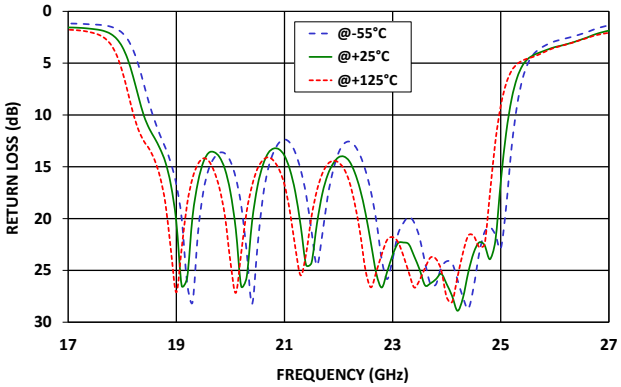
ZBFHK-K2162+
INSERTION LOSS (Zoomed)



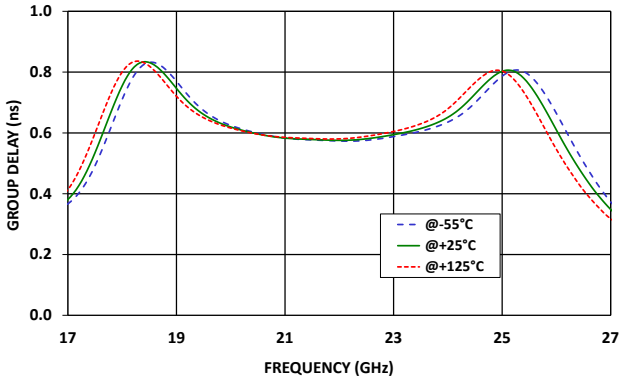
ZBFHK-K2162+
RETURN LOSS



ZBFHK-K2162+
RETURN LOSS (Zoomed)



ZBFHK-K2162+
GROUP DELAY



Bandpass Filter

ZBFHK-K2162+

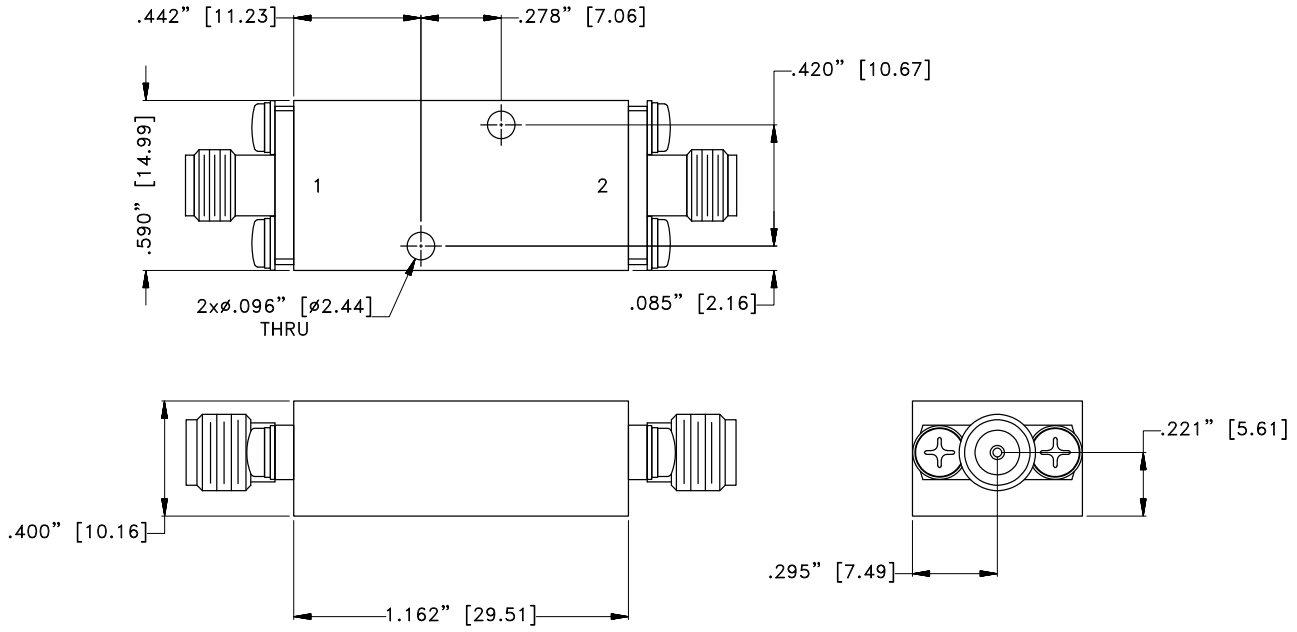
50Ω 19.4 to 23.8 GHz 2.92mm Female

CONNECTOR DESCRIPTION

Function	Connector
RF1[4]	2.92mm Female
RF2[4]	2.92mm Female

4. This filter is bi-directional, RF1 and RF2 ports may be interchanged, see S-Parameters for actual performance.

CASE STYLE DRAWING



Weight: 37 grams
Dimensions are in inches (mm). Tolerances: 2Pl ± .030 [.76]; 3Pl. ± .015 [.38]

PRODUCT MARKING*: ZBFHK-K2162+

*Marking may contain other features or characters for internal lot control.

Bandpass Filter

ZBFHK-K2162+

50Ω 19.4 to 23.8 GHz 2.92mm Female

ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD CLICK HERE

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	BBW3851
RoHS Status	Compliant
Environmental Ratings	ENV124

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-Circuits' 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/terms/viewterm.html

Coaxial Band Pass Filter ZBFHK-K2162+

Typical Performance Data

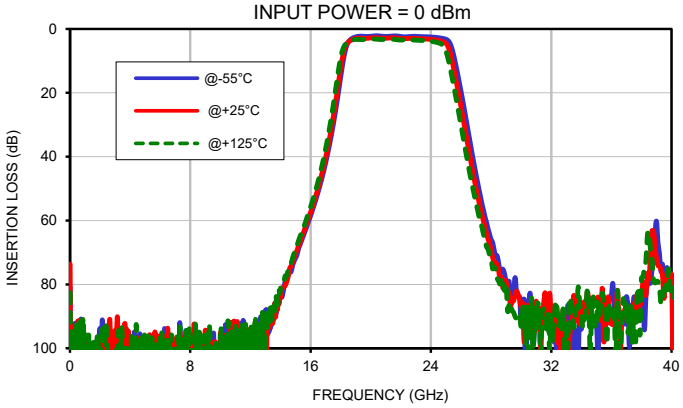
FREQ. (GHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C
0.1	104.72	102.53	97.13	0.07	0.11	0.14	0.08	0.11	0.14
0.2	99.64	109.77	107.61	0.10	0.14	0.18	0.12	0.15	0.19
0.5	103.35	102.05	94.22	0.17	0.22	0.27	0.19	0.23	0.29
1.0	112.06	120.10	95.65	0.21	0.27	0.33	0.23	0.29	0.35
1.5	99.83	101.86	103.01	0.20	0.28	0.34	0.22	0.29	0.36
2.0	94.02	107.89	101.94	0.19	0.28	0.34	0.22	0.30	0.36
2.5	99.35	96.41	99.35	0.18	0.28	0.34	0.22	0.30	0.37
3.0	107.01	94.56	101.54	0.20	0.29	0.36	0.24	0.33	0.40
3.5	105.81	107.04	100.82	0.21	0.33	0.39	0.28	0.38	0.46
4.0	96.20	98.81	106.77	0.27	0.39	0.46	0.34	0.45	0.52
4.5	102.05	101.74	111.83	0.32	0.46	0.53	0.39	0.51	0.59
5.0	107.66	104.66	104.68	0.38	0.52	0.60	0.43	0.56	0.64
5.5	108.79	113.59	104.65	0.40	0.56	0.64	0.43	0.58	0.67
6.0	99.68	106.87	95.70	0.40	0.57	0.66	0.44	0.59	0.69
6.5	99.85	93.70	105.02	0.42	0.60	0.69	0.45	0.61	0.72
7.0	107.26	106.72	107.37	0.44	0.62	0.72	0.48	0.65	0.77
7.5	107.39	100.59	107.15	0.47	0.67	0.77	0.54	0.71	0.83
8.0	113.31	97.48	100.90	0.52	0.72	0.83	0.59	0.77	0.89
8.6	112.10	101.40	94.93	0.57	0.78	0.89	0.64	0.82	0.94
9.0	98.34	94.32	102.14	0.59	0.81	0.91	0.64	0.85	0.97
9.5	105.33	102.97	107.89	0.58	0.81	0.92	0.63	0.86	0.97
10.0	104.30	95.06	102.05	0.56	0.81	0.93	0.62	0.86	0.99
10.3	96.40	104.29	98.65	0.56	0.82	0.95	0.61	0.87	1.01
11.0	106.57	100.13	93.12	0.56	0.86	1.02	0.64	0.92	1.10
12.0	102.38	105.79	94.58	0.71	1.01	1.16	0.79	1.07	1.25
13.0	88.07	103.21	92.88	0.86	1.13	1.26	0.89	1.14	1.30
14.0	83.91	83.76	81.11	0.81	1.13	1.31	0.90	1.20	1.38
15.0	71.77	70.21	69.13	0.82	1.25	1.49	1.01	1.42	1.68
16.0	58.50	57.43	55.76	1.09	1.51	1.74	1.22	1.62	1.85
17.0	41.93	40.32	37.55	1.17	1.55	1.77	1.23	1.56	1.80
18.0	15.07	12.24	8.97	2.08	3.42	5.78	2.22	3.56	5.91
19.4	2.28	2.92	3.33	21.41	16.50	14.74	21.07	16.44	14.91
19.5	2.31	2.95	3.32	17.39	14.55	14.19	17.41	14.68	14.45
19.6	2.34	2.96	3.29	15.20	13.65	14.44	15.41	13.89	14.72
19.7	2.35	2.94	3.25	14.14	13.59	15.45	14.49	13.91	15.70
19.8	2.35	2.90	3.20	13.64	14.07	17.12	14.01	14.31	17.06
19.9	2.33	2.85	3.15	13.72	15.25	19.79	14.12	15.41	19.31
20.0	2.29	2.80	3.12	14.46	17.43	24.14	14.71	17.21	22.05
20.5	2.16	2.81	3.25	22.76	16.91	15.19	21.30	16.99	15.55
21.6	2.18	2.81	3.29	24.51	20.52	17.30	27.07	21.90	18.07
22.0	2.37	3.01	3.46	13.65	14.08	14.58	14.42	14.80	15.44
23.0	2.32	2.99	3.50	23.91	23.52	21.79	24.80	23.34	22.37
23.8	2.47	3.19	3.76	26.36	25.86	23.88	29.29	25.14	23.38
25.0	3.23	4.53	6.97	22.87	16.46	9.12	22.41	17.08	9.59
26.0	19.50	24.37	30.16	2.89	3.45	3.51	3.51	3.87	3.84
27.0	45.61	49.87	54.66	1.35	1.86	2.07	1.48	1.97	2.20
27.1	47.95	52.04	56.54	1.28	1.79	2.03	1.43	1.91	2.17
29.1	79.08	81.64	88.33	0.99	1.50	1.73	1.48	1.98	2.29
30.0	91.86	87.15	93.20	1.21	1.83	2.21	1.49	2.14	2.47
30.9	93.15	94.75	86.72	1.57	2.49	3.07	1.65	2.46	2.95
31.0	87.51	85.24	94.05	1.66	2.60	3.16	1.72	2.53	3.05
32.0	91.08	90.19	89.79	1.98	2.77	2.92	2.12	2.80	3.12
33.0	91.75	92.44	94.88	1.47	1.95	2.15	1.84	2.30	2.53
34.0	94.04	88.43	88.57	0.80	1.32	1.59	1.24	1.72	2.01
35.0	90.27	85.62	92.12	0.51	1.14	1.44	0.86	1.46	1.78
36.0	83.54	92.05	87.24	0.76	1.47	1.85	0.90	1.68	2.11
36.3	94.88	90.35	103.59	0.88	1.65	2.07	1.09	1.93	2.48
37.0	83.88	86.99	85.93	1.51	2.42	3.00	1.91	2.83	3.50
38.0	86.77	84.84	78.05	2.57	3.70	4.18	2.68	3.49	4.13
40.0	77.69	76.84	82.38	1.09	1.68	2.07	1.27	1.86	2.21

Typical Performance Data

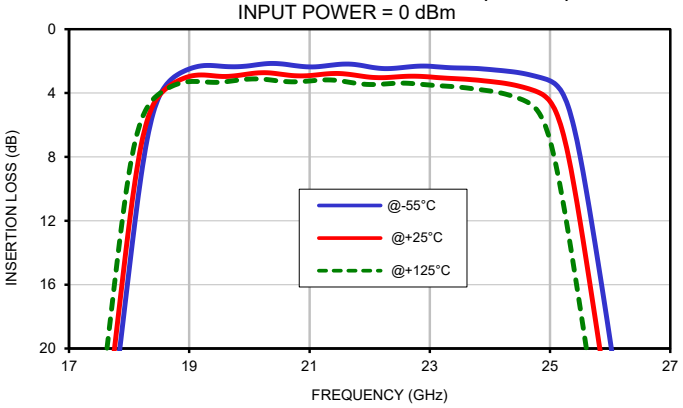
FREQ. (GHz)	GROUP DELAY (nsec)		
	@-55°C	@+25°C	@+125°C
19	0.69	0.67	0.66
20	0.67	0.66	0.65
20	0.66	0.65	0.64
20	0.65	0.64	0.63
20	0.64	0.63	0.63
20	0.63	0.63	0.62
20	0.62	0.62	0.62
20	0.62	0.61	0.61
20	0.61	0.61	0.61
20	0.61	0.60	0.60
20	0.60	0.60	0.60
21	0.60	0.60	0.60
21	0.60	0.59	0.59
21	0.59	0.59	0.59
21	0.59	0.59	0.59
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22	0.57	0.58	0.58
22	0.57	0.58	0.59
23	0.58	0.58	0.59
23	0.58	0.58	0.59
23	0.58	0.59	0.59
23	0.58	0.59	0.60
23	0.59	0.59	0.60
23	0.59	0.59	0.60
23	0.59	0.60	0.61
23	0.60	0.61	0.62
24	0.62	0.63	0.65

Typical Performance Curves

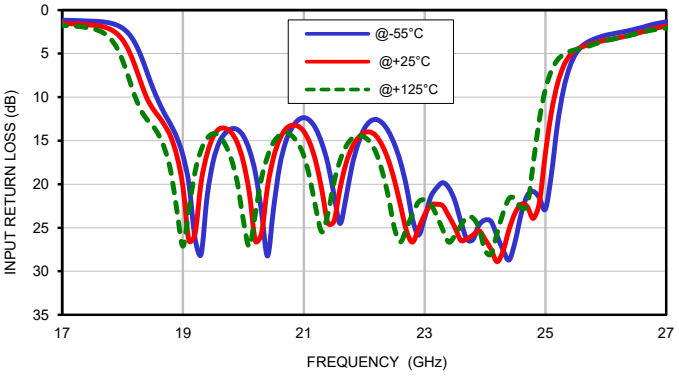
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



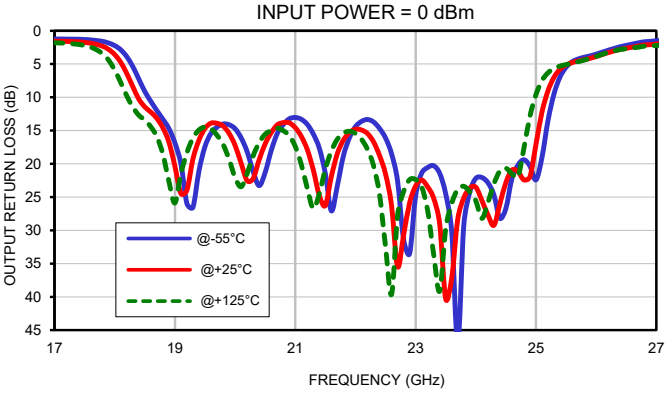
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



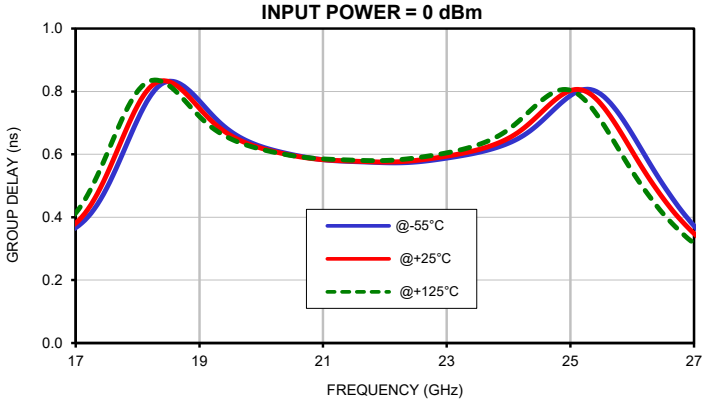
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



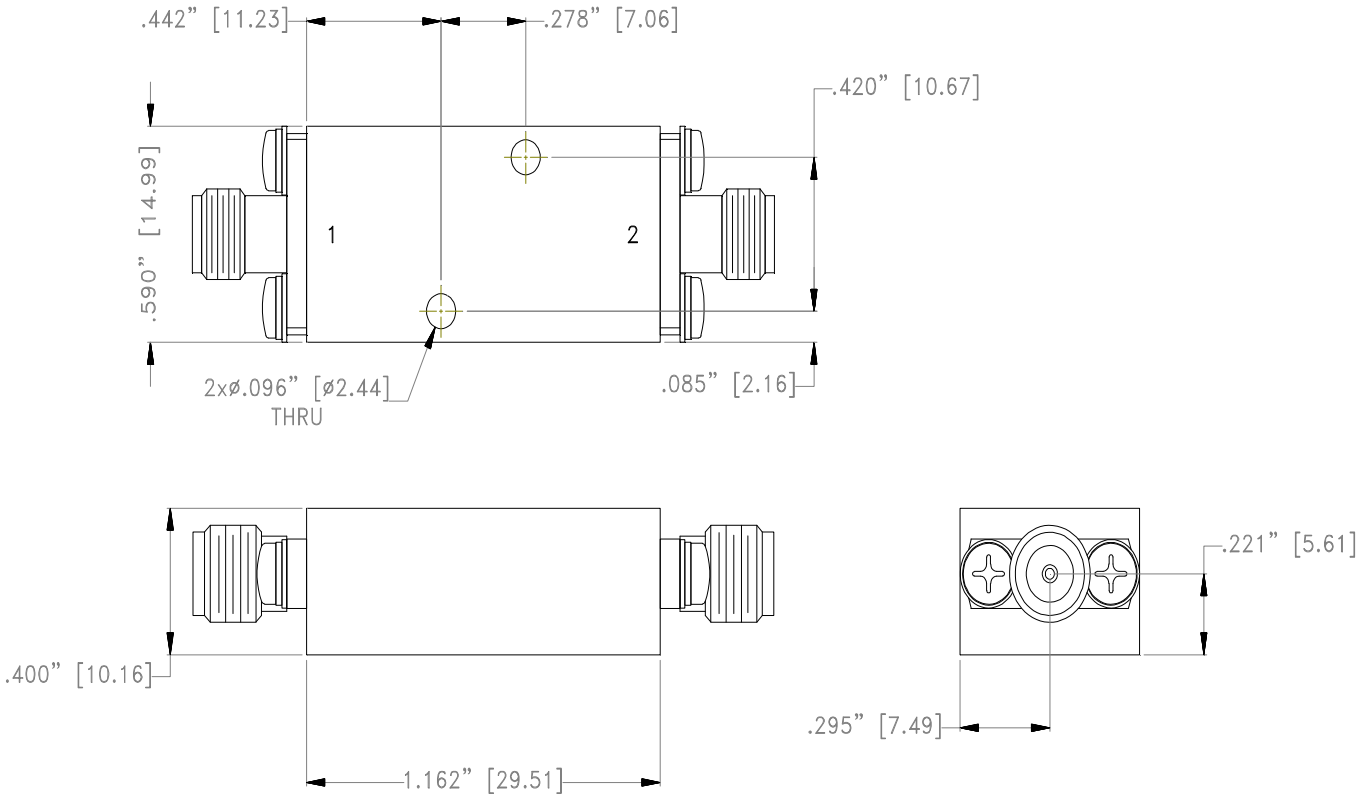
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style BBW

Outline Dimension

BBW3851



Dimensions are in inches [mm]. Tolerances: 2 Pl ± .030 [.76]; 3 Pl ± .015[.38]

Notes:

1. Case material: Brass alloy.
2. Case finish:
   a. Case & Cover of the units-Gold plating.
3. Unit weight: 37g
4. Refer to the individual model data sheet for the type of connectors available.

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Mini-Circuits

Environmental Specifications ENV124

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 125° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 125° C Ambient Environment	Individual Model Data Sheet

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