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

REV. A
ECO-016077
ZVBP-K22R5G+
EDU4340
URJ
221207

CAVITY

Bandpass Filter

ZVBP-K22R5G+

50Ω 22 to 23 GHz 2.92mm-Female

FEATURES

- Low Insertion Loss, 1dB Typ.
- Good Return Loss of 25dB Typ.
- Good Rejection Floor of 90 dB Typ.
- Stopband Up to 40 GHz

Generic photo used for illustration purposes only

Model No.	ZVBP-K22R5G+
Case Style	YJ3430
Connectors	2.92mm-FEMALE

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

APPLICATIONS

- Satellite Communications
- LTE & 5G MIMO Infrastructure

ELECTRICAL SPECIFICATIONS AT 25°C

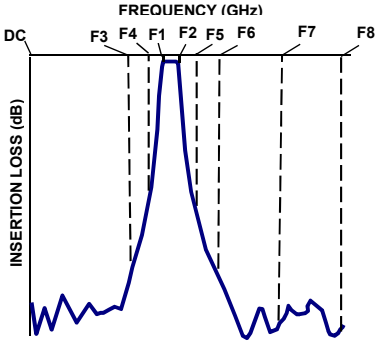
Parameter		F#	Frequency (GHz)	Min.	Typ.	Max.	Units
Passband	Center Frequency	Fc	—	—	22.5	—	GHz
	Insertion Loss	F1-F2	22 - 23	—	1.0	2.0	dB
	Return Loss	F1-F2	22 - 23	14	25	—	dB
Stop Band, Lower	Rejection	DC-F3	DC - 20.8	40	46	—	dB
		F3-F4	20.8 - 21.4	20	25	—	
Stop Band, Upper	Rejection	F5-F6	23.6 - 24.2	18	23	—	dB
		F6-F7	24.2 - 35	37	43	—	
		F7-F8	35 - 40	—	30	—	

ABSOLUTE MAXIMUM RATINGS

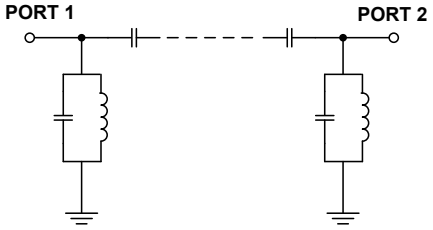
Parameter	Ratings
Operating temperature	-40°C to +85°C
Storage temperature	-55°C to +100°C
RF Power Input	5W at 25°C

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



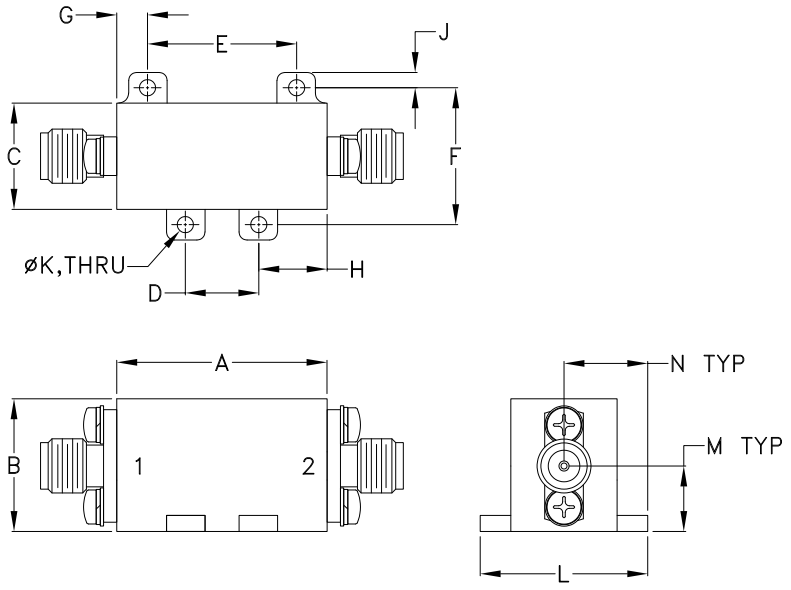
Bandpass Filter

ZVBP-K22R5G+

COAXIAL CONNECTIONS

PORT 1	2.92mm-Female
PORT 2	2.92mm-Female

OUTLINE DRAWING



OUTLINE DIMENSIONS (Inches / mm)

A	B	C	D	E	F	G
1.03	**.65**	**.52**	**.360**	**.730**	**.670**	**.15**
26.2	16.5	13.2	9.14	18.54	17.02	3.8
H	J	K	L	M	K	Wt.
.34	**.07**	**.074**	**.82**	**.32**	**.41**	grams
8.5	1.9	1.88	20.8	8.1	10.4	46

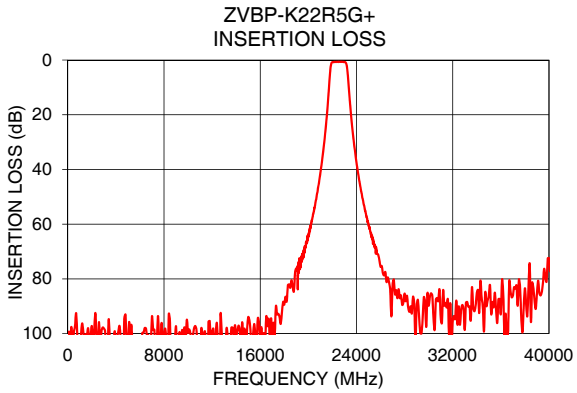
Note. Please refer to case style drawing for details

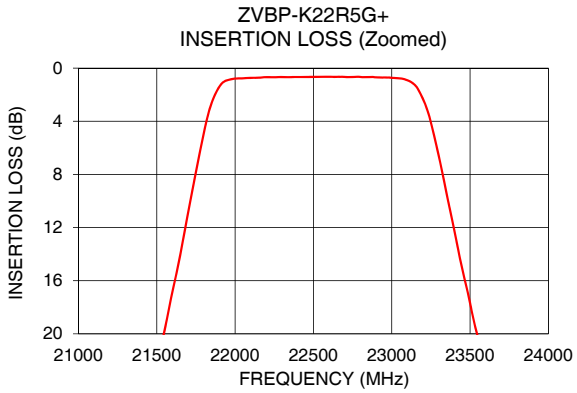
Bandpass Filter

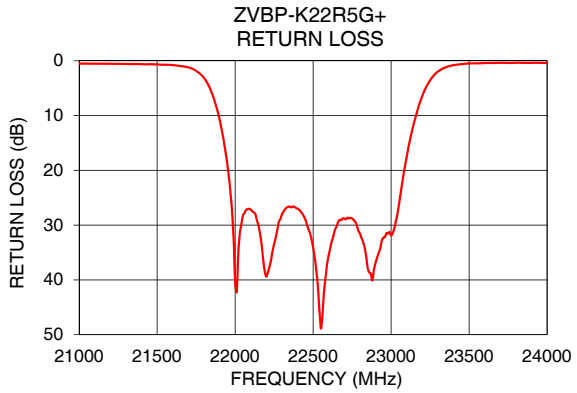
ZVBP-K22R5G+

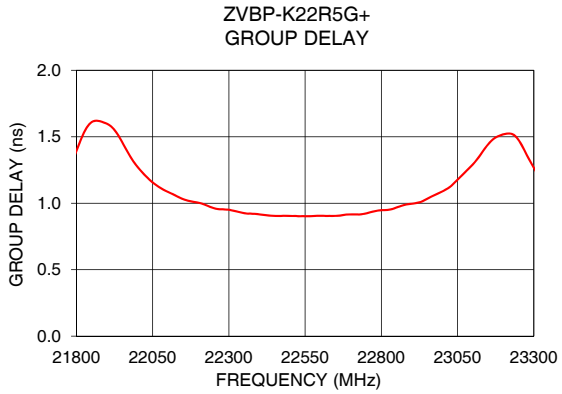
TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)	Frequency (MHz)	GROUP DELAY (ns)
100	99.28	0.20	22000	1.27
1000	106.30	0.42	22050	1.16
10000	99.59	0.13	22100	1.09
20800	46.84	0.48	22150	1.03
21300	30.76	0.59	22200	1.00
21400	26.57	0.61	22250	0.96
22000	0.78	40.43	22300	0.95
22200	0.67	39.40	22350	0.93
22500	0.65	34.05	22500	0.90
23000	0.73	31.87	22550	0.90
23240	3.64	4.01	22600	0.91
23600	22.53	0.41	22650	0.91
24200	43.18	0.39	22700	0.92
35000	86.07	0.42	22900	1.00
40000	72.45	0.31	23000	1.09









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 Bandpass Filter ZVBP-K22R5G+

Typical Performance Data

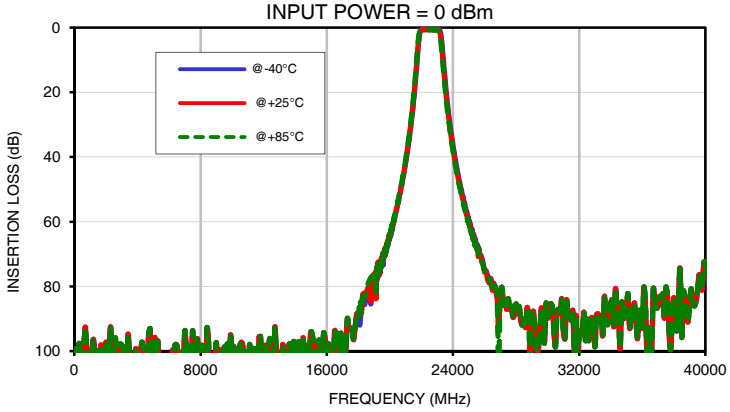
FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
100	99.28	99.28	99.28	0.20	0.20	0.20	0.20	0.20	0.20
500	99.70	99.70	99.70	0.34	0.34	0.34	0.33	0.33	0.33
1000	106.30	106.30	106.30	0.42	0.42	0.42	0.41	0.41	0.41
1500	100.23	100.23	100.23	0.47	0.47	0.47	0.45	0.45	0.45
2000	97.26	97.26	97.26	0.48	0.48	0.48	0.47	0.47	0.47
2500	104.01	104.01	104.01	0.47	0.47	0.47	0.45	0.45	0.45
3000	98.10	98.10	98.10	0.45	0.45	0.45	0.43	0.43	0.43
3500	102.56	102.56	102.56	0.42	0.42	0.42	0.40	0.40	0.40
4000	102.83	102.83	102.83	0.38	0.38	0.38	0.36	0.36	0.36
4500	102.80	102.80	102.80	0.34	0.34	0.34	0.32	0.32	0.32
5000	104.98	104.98	104.98	0.30	0.30	0.30	0.27	0.27	0.27
6000	108.53	108.53	108.53	0.21	0.21	0.21	0.20	0.20	0.20
7000	93.72	93.72	93.72	0.13	0.13	0.13	0.15	0.15	0.15
8000	100.30	100.30	100.30	0.05	0.05	0.05	0.16	0.16	0.16
9000	97.32	97.32	97.32	0.05	0.05	0.05	0.18	0.18	0.18
10000	99.59	99.59	99.59	0.13	0.13	0.13	0.20	0.20	0.20
12000	99.58	99.58	99.58	0.21	0.21	0.21	0.20	0.20	0.20
14000	100.33	100.33	100.33	0.16	0.16	0.16	0.16	0.16	0.16
16000	102.38	102.38	102.38	0.13	0.13	0.13	0.13	0.13	0.13
18000	89.39	89.39	89.39	0.23	0.23	0.23	0.24	0.24	0.24
20000	64.26	64.12	64.03	0.21	0.39	0.46	0.14	0.34	0.44
20800	47.46	46.84	46.59	0.30	0.48	0.57	0.29	0.50	0.61
21300	31.53	30.76	30.10	0.41	0.59	0.69	0.44	0.65	0.76
21400	27.44	26.57	25.79	0.43	0.61	0.71	0.50	0.72	0.83
21550	20.84	19.74	18.72	0.54	0.74	0.86	0.59	0.82	0.95
21700	12.27	10.88	9.64	0.88	1.22	1.53	0.96	1.33	1.63
21840	4.00	2.97	2.34	3.41	5.14	6.93	3.40	5.11	6.85
22000	0.62	0.78	0.88	21.22	40.43	35.35	20.66	28.25	27.48
22100	0.53	0.74	0.83	33.58	27.19	29.03	28.56	25.02	26.06
22200	0.47	0.67	0.78	36.91	39.40	35.72	32.49	32.22	33.51
22300	0.46	0.67	0.78	29.23	28.02	26.10	31.74	29.42	27.59
22500	0.45	0.65	0.76	39.86	34.05	37.12	40.65	34.59	35.69
22700	0.46	0.66	0.77	25.89	28.79	28.03	27.26	29.02	28.53
22800	0.46	0.67	0.78	27.84	31.51	32.16	29.40	30.82	31.58
22900	0.47	0.69	0.81	35.12	36.95	36.68	30.98	31.02	31.41
23000	0.50	0.73	0.86	27.39	31.87	31.02	25.95	31.87	36.86
23220	1.76	2.92	3.84	7.13	5.06	4.03	7.33	5.19	4.12
23360	8.12	10.01	11.36	1.23	1.09	1.01	1.22	1.08	0.99
23550	18.67	20.24	21.38	0.31	0.47	0.54	0.19	0.37	0.46
23600	21.02	22.53	23.66	0.25	0.41	0.49	0.18	0.38	0.46
23800	29.43	30.67	31.63	0.19	0.37	0.45	0.10	0.32	0.41
23900	32.94	34.15	35.02	0.20	0.38	0.46	0.09	0.31	0.41
24000	36.28	37.41	38.22	0.21	0.40	0.48	0.09	0.31	0.42
24100	39.35	40.41	41.18	0.22	0.40	0.48	0.11	0.33	0.44
24200	42.19	43.18	43.92	0.21	0.39	0.48	0.14	0.36	0.47
24300	44.77	45.75	46.42	0.19	0.38	0.47	0.15	0.37	0.49
24400	47.24	48.17	48.78	0.21	0.40	0.49	0.17	0.39	0.50
24500	49.62	50.50	51.09	0.21	0.40	0.49	0.17	0.39	0.50
24600	51.87	52.74	53.25	0.22	0.41	0.50	0.18	0.40	0.51
24700	53.99	54.83	55.34	0.23	0.42	0.51	0.17	0.39	0.52
24800	55.77	56.65	56.99	0.23	0.42	0.51	0.18	0.41	0.52
24900	57.54	58.27	58.71	0.24	0.43	0.52	0.20	0.42	0.54
25000	59.45	60.02	60.54	0.24	0.44	0.52	0.22	0.44	0.55
30000	89.78	89.78	89.78	0.54	0.54	0.54	0.52	0.52	0.52
31000	94.08	94.08	94.08	0.52	0.52	0.52	0.49	0.49	0.49
32000	95.14	95.14	95.14	0.52	0.52	0.52	0.47	0.47	0.47
35000	86.07	86.07	86.07	0.42	0.42	0.42	0.39	0.39	0.39
36000	92.83	92.83	92.83	0.41	0.41	0.41	0.30	0.30	0.30
38000	83.45	83.45	83.45	0.30	0.30	0.30	0.21	0.21	0.21
40000	72.45	72.45	72.45	0.31	0.31	0.31	0.33	0.33	0.33

Typical Performance Data

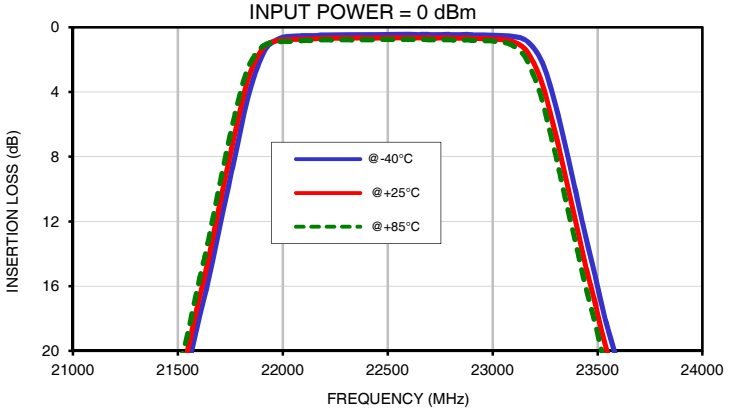
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
22000	1.36	1.27	1.22
22020	1.31	1.22	1.18
22040	1.25	1.18	1.14
22060	1.20	1.14	1.11
22100	1.12	1.09	1.06
22120	1.10	1.06	1.05
22140	1.07	1.04	1.02
22160	1.04	1.02	1.01
22180	1.03	1.01	1.00
22200	1.02	1.00	0.99
22220	1.01	0.99	0.98
22240	0.99	0.97	0.96
22260	0.97	0.96	0.95
22280	0.97	0.95	0.95
22300	0.96	0.95	0.94
22320	0.95	0.94	0.94
22340	0.94	0.93	0.93
22360	0.93	0.92	0.92
22380	0.93	0.92	0.92
22400	0.92	0.92	0.91
22420	0.92	0.91	0.91
22440	0.91	0.91	0.90
22460	0.91	0.90	0.90
22480	0.91	0.91	0.91
22500	0.91	0.90	0.91
22520	0.90	0.90	0.91
22540	0.90	0.90	0.90
22560	0.90	0.90	0.90
22580	0.90	0.90	0.91
22600	0.90	0.91	0.91
22620	0.90	0.90	0.91
22640	0.90	0.90	0.91
22660	0.90	0.91	0.91
22680	0.91	0.91	0.92
22700	0.91	0.92	0.92
22750	0.92	0.92	0.93
22800	0.94	0.95	0.96
22850	0.95	0.97	0.98
22900	0.98	1.00	1.01
22950	1.01	1.03	1.06
23000	1.06	1.09	1.12

Typical Performance Curves

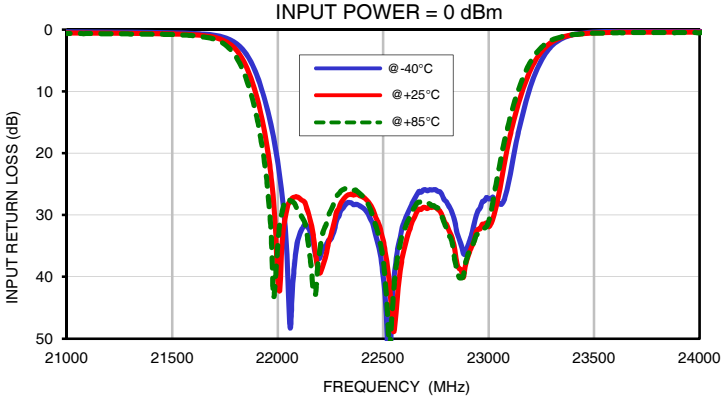
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



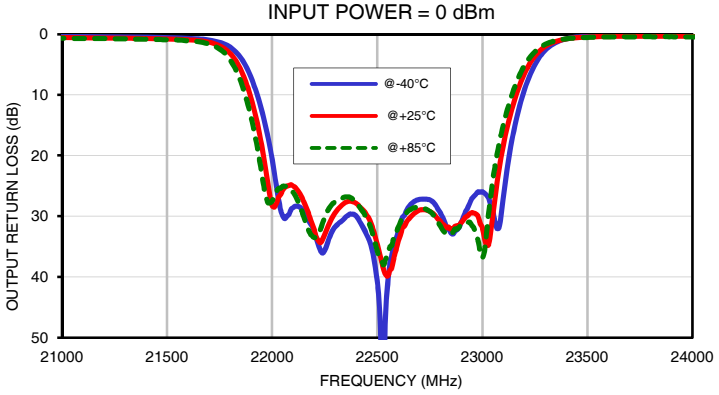
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



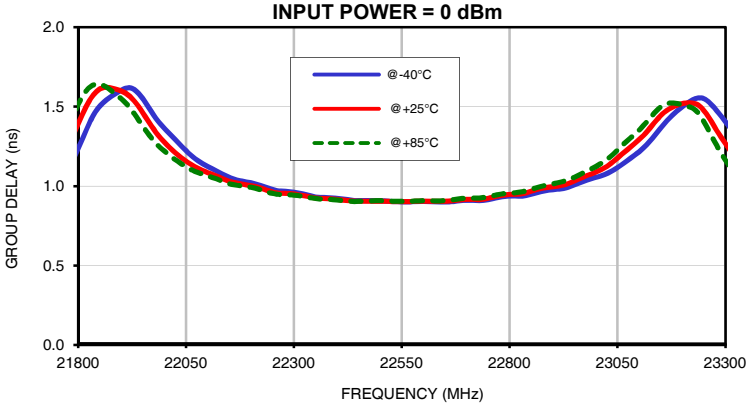
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



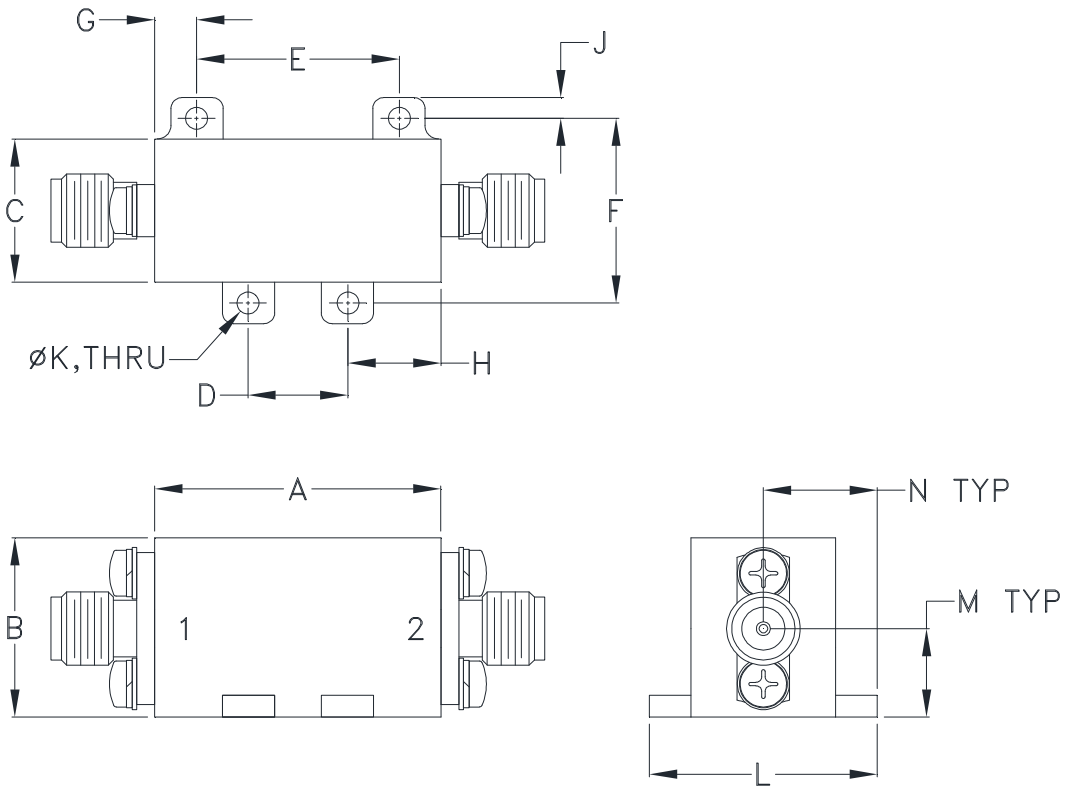
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style YJ

Outline Dimensions

YJ3430



CASE#	A	B	C	D	E	F	G
YJ3430	1.03 (26.2)	.65 (16.5)	.52 (13.2)	.360 (9.14)	.730 (18.54)	.670 (17.02)	.15 (3.8)

CASE#	H	J	K	L	M	N	WT. GRAMS
YJ3430	.34 (8.5)	.07 (1.9)	.074 (1.88)	.82 (20.8)	.32 (8.1)	.41 (10.4)	46

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