Cavity

Bandpass Filters

50Ω DC to 15 GHz

The Big Deal

- Very low insertion loss with excellent power handling
- Very fast roll-off with wide stopband
- Passbands up to 15 GHz
- Stopbands up to 22 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-13R1G-S+

50Ω 11700 to 14500 MHz

Generic photo used for illustration purposes only

CASE STYLE: UH2851

Connectors	Model
SMA-F	ZVBP-13R1G-S+

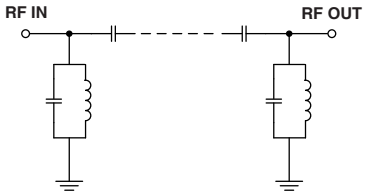
Features

- Low insertion loss, 0.8 dB typical
- Broad stopband performance upto 22 GHz
- High rejection

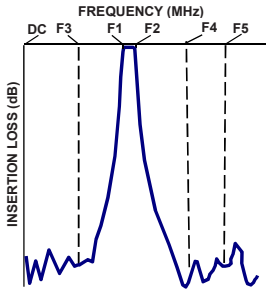
Applications

- Fixed and satellite communication
- Mobile communication
- Broadcasting satellite
- Earth exploration satellite
- Aeronautical Radionavigation

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

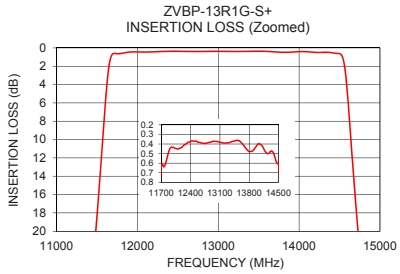
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	Fc		-	13100	-	MHz
	Insertion Loss	F1-F2	11700 - 14500	-	0.8	2.0	dB
	VSWR	F1-F2	11700 - 14500	-	1.45	1.76	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 11000	45	56	-	dB
Stop Band, Upper	Insertion Loss	F4-F5	15000 - 22000	35	42	-	dB

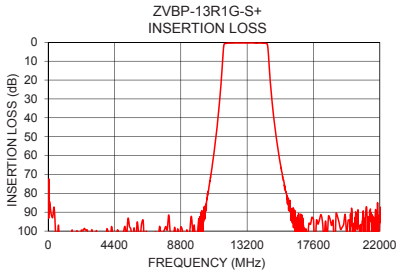
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	10 W max.

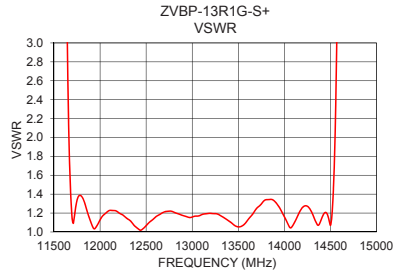
Permanent damage may occur if any of these limits are exceeded.

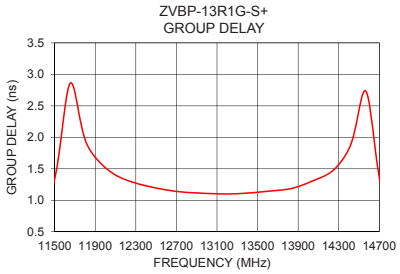
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
100	84.50	9702.19	11700	2.71
500	101.12	198.76	11850	1.79
1000	107.06	156.28	12000	1.52
10000	94.11	101.94	12150	1.36
11000	58.58	88.16	12300	1.27
11380	30.45	53.77	12450	1.21
11480	20.59	42.33	12600	1.16
11630	3.35	4.35	12750	1.13
11700	0.64	1.12	12900	1.12
12500	0.37	1.07	13050	1.11
13100	0.38	1.18	13100	1.10
14000	0.40	1.16	13350	1.11
14500	0.62	1.07	13500	1.13
14580	3.25	3.97	13650	1.15
14730	20.12	39.34	13800	1.18
14840	30.26	72.15	13950	1.25
15000	42.19	97.20	14100	1.34
16000	88.54	686.62	14250	1.48
20000	94.51	37.09	14400	1.81
22000	92.66	47.25	14500	2.44









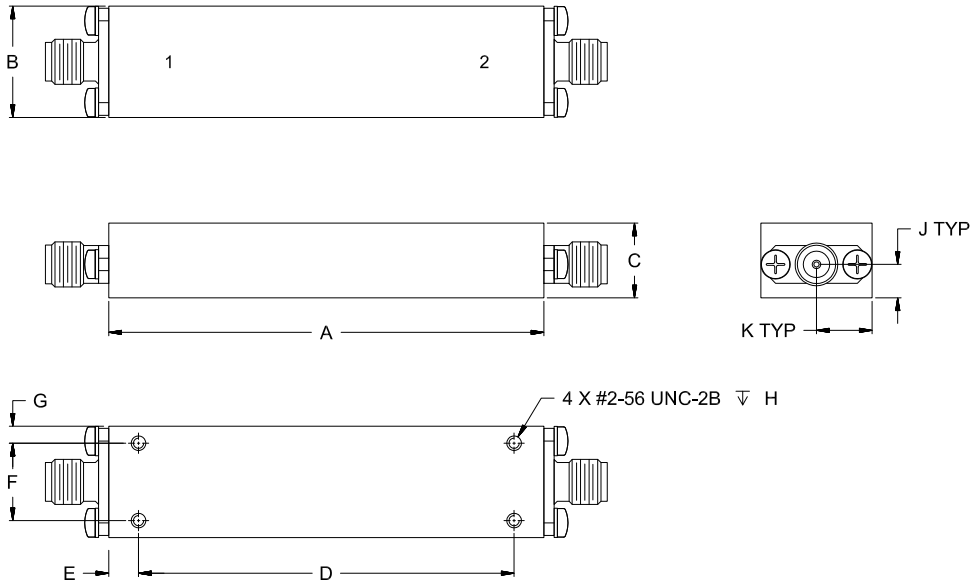
Notes

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
2.56	**.66**	**.44**	**2.209**	**.18**	**.455**
65.0	16.6	11.2	56.11	4.4	11.56

G	H	J	K	Wt.
.10	**.100**	**.20**	**.33**	grams
2.5	2.54	5.0	8.3	**68**

Note: Please refer to case style drawing for details

Cavity Band Pass Filter ZVBP-13R1G-S+

Typical Performance Data

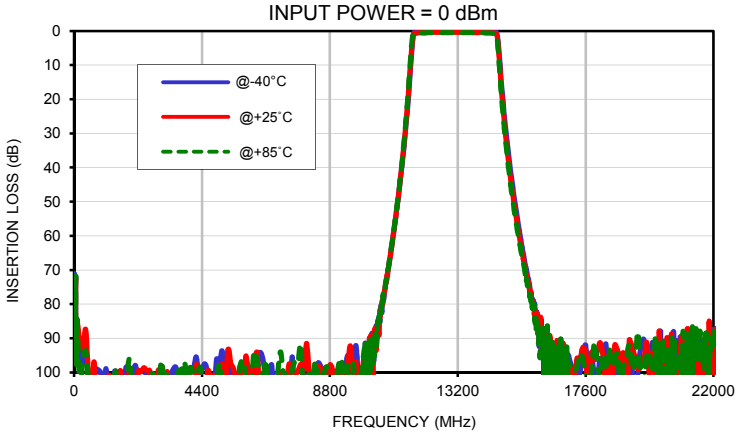
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
100	84.75	84.50	84.16	0.00	0.00	0.01	0.02	0.01	0.01
200	94.28	90.87	104.52	0.03	0.03	0.03	0.01	0.01	0.01
500	103.35	101.12	102.04	0.06	0.09	0.09	0.05	0.08	0.07
1000	106.42	107.06	107.81	0.07	0.11	0.13	0.06	0.10	0.10
3000	107.82	105.62	96.64	0.05	0.05	0.08	0.03	0.06	0.10
5000	97.30	100.54	97.45	0.03	0.14	0.18	0.03	0.14	0.21
8000	101.12	91.51	110.03	0.07	0.26	0.28	0.11	0.26	0.29
9000	106.33	110.25	102.65	0.01	0.21	0.25	0.03	0.23	0.28
10000	99.26	94.11	92.90	0.08	0.17	0.26	0.07	0.17	0.29
10200	93.25	89.27	90.12	0.08	0.16	0.25	0.08	0.16	0.30
10300	95.42	93.45	93.92	0.10	0.16	0.27	0.08	0.16	0.30
10350	93.24	87.12	91.59	0.10	0.15	0.26	0.08	0.16	0.31
10400	91.96	86.94	93.34	0.10	0.16	0.27	0.09	0.16	0.30
10450	84.89	87.40	85.16	0.11	0.16	0.27	0.09	0.16	0.31
10500	85.02	84.54	83.27	0.10	0.16	0.27	0.09	0.16	0.31
10550	81.66	82.89	82.44	0.10	0.16	0.27	0.08	0.17	0.32
10600	79.61	79.73	78.80	0.09	0.17	0.28	0.08	0.17	0.33
10650	78.68	77.72	77.20	0.10	0.17	0.28	0.08	0.17	0.33
10700	75.58	74.94	75.02	0.11	0.16	0.30	0.06	0.18	0.35
11000	58.84	58.58	58.30	0.06	0.20	0.33	0.00	0.22	0.40
11380	31.32	30.45	29.79	0.08	0.32	0.46	0.16	0.36	0.49
11400	29.53	28.60	27.88	0.08	0.32	0.44	0.17	0.38	0.50
11480	21.82	20.59	19.55	0.17	0.41	0.54	0.24	0.46	0.57
11500	19.71	18.40	17.25	0.21	0.46	0.59	0.27	0.50	0.62
11630	4.35	3.35	2.47	2.61	4.07	5.78	2.59	4.00	5.72
11700	0.43	0.64	0.73	19.96	25.23	29.95	18.10	21.30	22.50
11900	0.21	0.45	0.56	25.98	26.12	32.07	24.78	25.31	31.27
12000	0.22	0.44	0.54	19.86	24.43	28.00	19.63	23.38	24.93
12500	0.12	0.37	0.48	24.72	29.85	41.30	23.07	27.43	34.95
13100	0.13	0.38	0.50	19.38	21.58	21.79	20.63	22.67	22.29
13500	0.09	0.36	0.48	24.58	31.65	32.77	24.37	29.20	31.52
13800	0.22	0.48	0.56	15.45	16.73	19.16	14.86	16.23	18.43
14000	0.09	0.40	0.54	35.67	22.54	20.48	37.45	22.06	20.06
14300	0.14	0.48	0.62	29.30	20.75	19.80	26.70	19.99	19.45
14500	0.29	0.62	0.83	22.73	29.41	21.70	21.76	29.14	22.98
14580	2.25	3.25	4.40	5.11	4.47	3.64	5.33	4.60	3.73
14700	14.85	16.93	18.42	0.32	0.57	0.63	0.29	0.51	0.60
14730	17.94	20.12	21.62	0.16	0.44	0.51	0.14	0.39	0.49
14840	27.89	30.26	31.80	0.10	0.24	0.31	0.05	0.21	0.31
15000	39.74	42.19	43.76	0.19	0.18	0.22	0.16	0.11	0.20
15500	67.35	68.71	70.18	0.32	0.05	0.11	0.18	0.05	0.14
16000	92.44	88.54	87.55	0.23	0.03	0.10	0.12	0.09	0.19
16500	95.43	103.57	98.00	0.16	0.12	0.20	0.06	0.15	0.26
17000	94.84	101.60	98.08	0.12	0.19	0.31	0.00	0.23	0.37
17500	95.97	92.66	95.97	0.08	0.24	0.37	0.06	0.29	0.46
18000	101.59	93.86	96.63	0.07	0.29	0.43	0.08	0.35	0.53
18500	94.89	104.14	98.19	0.02	0.35	0.48	0.11	0.40	0.59
19000	100.85	115.02	96.17	0.07	0.33	0.49	0.12	0.43	0.61
19200	98.98	92.51	99.35	0.07	0.34	0.51	0.12	0.47	0.62
19500	92.75	98.00	99.84	0.06	0.39	0.53	0.10	0.44	0.60
19800	96.66	101.32	95.19	0.02	0.43	0.53	0.11	0.47	0.62
20000	96.73	94.51	89.96	0.02	0.47	0.56	0.09	0.46	0.60
20200	100.43	101.72	92.93	0.00	0.46	0.56	0.10	0.46	0.61
20500	93.58	99.16	93.48	0.06	0.38	0.49	0.10	0.44	0.58
20800	94.89	99.92	95.24	0.01	0.42	0.53	0.06	0.45	0.59
21000	103.20	102.47	102.64	0.01	0.40	0.51	0.09	0.40	0.55
21200	97.90	94.56	100.47	0.09	0.38	0.46	0.09	0.40	0.54
21300	91.22	101.64	102.70	0.05	0.39	0.50	0.09	0.39	0.53
21500	100.83	91.76	91.16	0.06	0.36	0.40	0.10	0.37	0.49
22000	87.53	92.66	89.20	0.05	0.37	0.40	0.09	0.34	0.45

Typical Performance Data

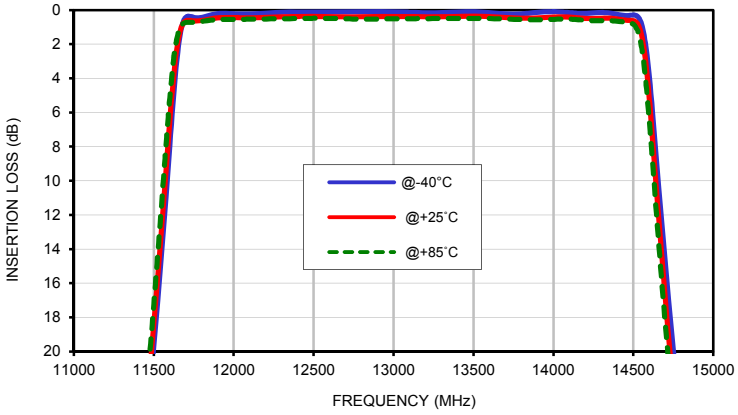
FREQ.	GROUP DELAY		
	(nsec)		
(MHz)	@-40°C	@+25°C	@+85°C
11700	2.82	2.71	2.61
11750	2.41	2.29	2.19
11800	2.03	1.97	1.92
11850	1.84	1.79	1.76
11900	1.72	1.68	1.65
11950	1.63	1.59	1.57
12000	1.54	1.52	1.49
12050	1.47	1.45	1.44
12100	1.42	1.40	1.39
12150	1.38	1.36	1.35
12200	1.35	1.33	1.31
12250	1.32	1.30	1.28
12300	1.29	1.27	1.26
12350	1.27	1.25	1.24
12400	1.24	1.23	1.22
12450	1.22	1.21	1.20
12500	1.21	1.20	1.19
12550	1.19	1.18	1.17
12600	1.18	1.16	1.16
12650	1.17	1.15	1.14
12700	1.16	1.14	1.13
12750	1.15	1.13	1.12
12800	1.14	1.13	1.11
12850	1.14	1.12	1.11
12900	1.13	1.12	1.10
12950	1.12	1.11	1.10
13000	1.12	1.11	1.10
13050	1.12	1.11	1.10
13100	1.11	1.10	1.10
13150	1.11	1.10	1.10
13200	1.11	1.10	1.10
13250	1.11	1.10	1.10
13700	1.15	1.16	1.16
13750	1.16	1.17	1.17
13800	1.18	1.18	1.18
14000	1.29	1.28	1.27
14100	1.34	1.34	1.35
14200	1.41	1.42	1.44
14300	1.56	1.57	1.58
14400	1.77	1.81	1.86
14500	2.33	2.44	2.52

Typical Performance Curves

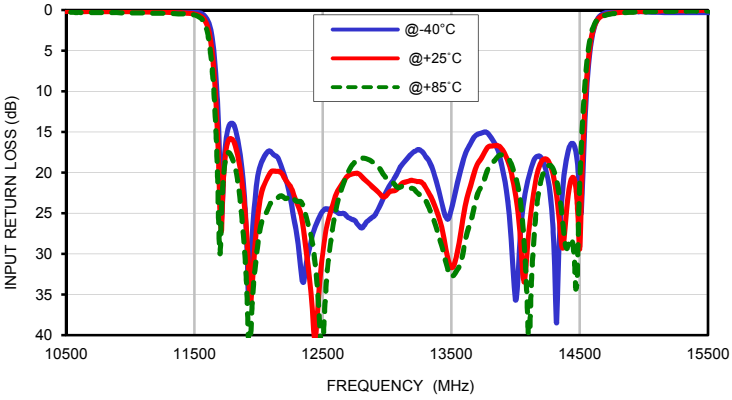
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



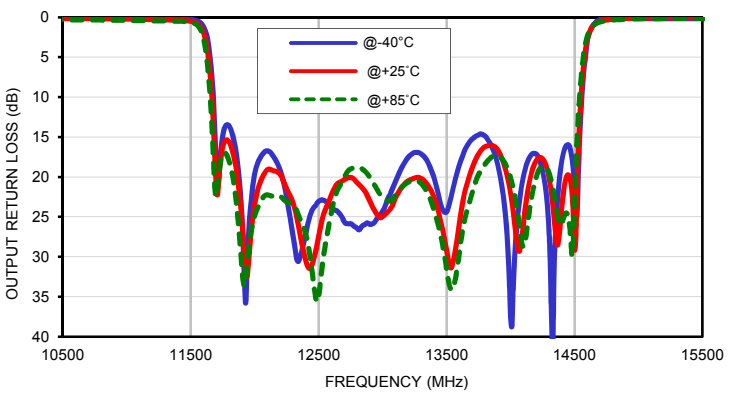
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



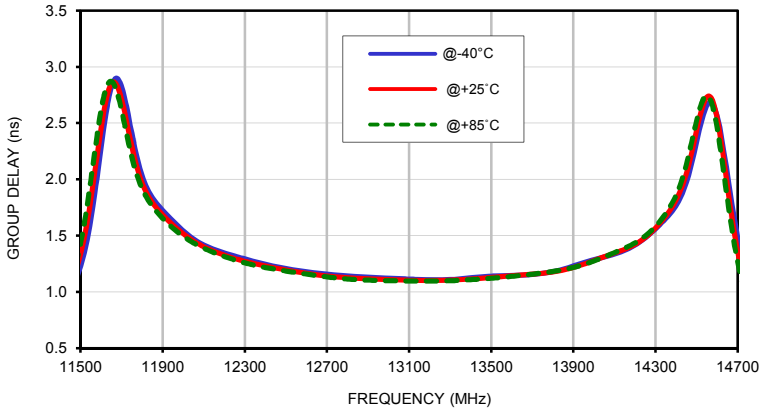
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



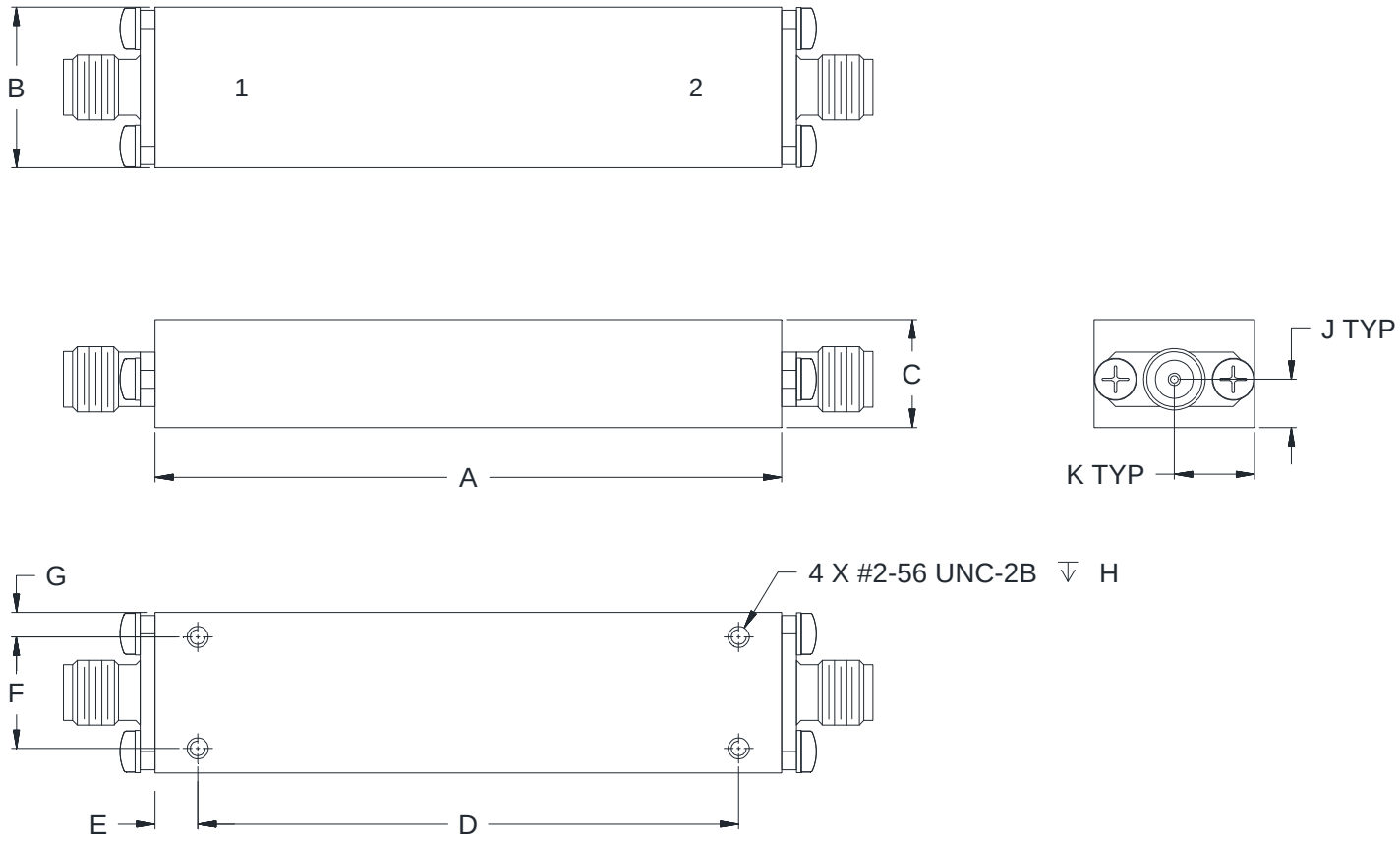
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style UH

Outline Dimensions

UH2851



CASE#	A	B	C	D	E	F
UH2851	2.56 (65.0)	.66 (16.6)	.44 (11.2)	2.209 (56.11)	.18 (4.4)	.455 (11.56)

CASE#	G	H	J	K	WT. GRAMS
UH2851	.10 (2.5)	.100 (2.54)	.20 (5.0)	.33 (8.3)	68

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

Notes:

1. Case material: Brass and Aluminum alloy.
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