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 20 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

Notes
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Cavity

Bandpass Filter

ZVBP-2100-S+

50Ω 2085 to 2115 MHz

Generic photo used for illustration purposes only

CASE STYLE: UD2969

Connectors	Model
SMA-F	ZVBP-2100-S+

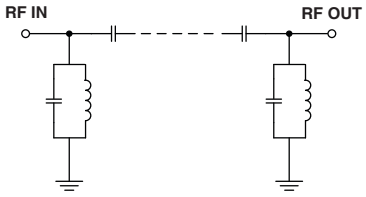
Features

- Low insertion loss, 1.3 dB typ.
- Good VSWR, 1.2:1 typ. in passband
- High rejection
- Narrow bandwidth
- Connectorized package

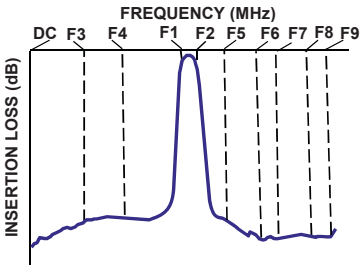
Applications

- Aeronautical Radionavigation
- Space research
- Mobile communication

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		-	2100	-	MHz
	Insertion Loss	F1-F2	2085 - 2115	-	1.3	2.0	dB
	VSWR	F1-F2	2085 - 2115	-	1.2	1.5	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 2000	80	94	-	dB
		F3-F4	2000 - 2065	40	46	-	dB
		F4-F5	2065 - 2073	20	26	-	dB
	VSWR	DC-F5	DC - 2073	-	20	-	:1
Stop Band, Upper	Insertion Loss	F6-F7	2127 - 2135	20	26	-	dB
		F7-F8	2135 - 2200	40	46	-	dB
		F8-F9	2200 - 5750	80	94	-	dB
	VSWR	F6-F9	2127 - 5750	-	20	-	:1

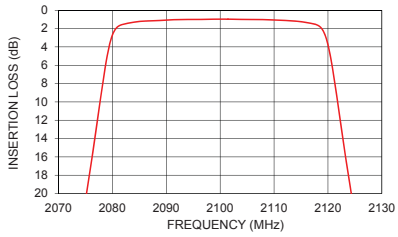
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	20 Watts

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

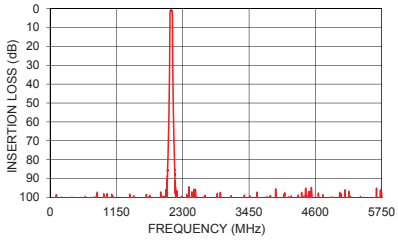
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
10	105.04	1200.59	2085	57.76
100	102.17	353.20	2086	54.79
500	117.88	137.49	2087	52.29
2000	101.63	213.67	2088	50.29
2065	47.32	65.60	2089	48.79
2072	30.39	34.83	2090	47.67
2073	27.39	30.38	2091	46.81
2075	20.72	21.28	2092	46.03
2080	2.72	1.80	2093	45.28
2085	1.23	1.04	2100	43.22
2100	0.97	1.05	2102	43.36
2115	1.25	1.07	2104	43.76
2120	3.77	2.64	2106	44.77
2125	22.38	20.98	2108	46.33
2127	28.83	27.41	2110	48.32
2135	48.42	49.64	2111	49.64
2200	110.91	171.46	2112	51.30
2500	95.77	266.36	2113	53.40
5000	103.44	135.86	2114	55.96
5750	101.14	112.91	2115	59.10

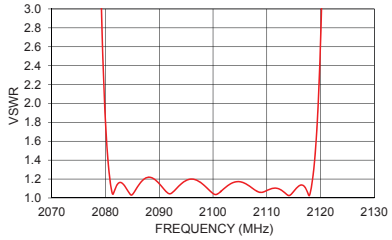
ZVBP-2100-S+
INSERTION LOSS (Zoomed)



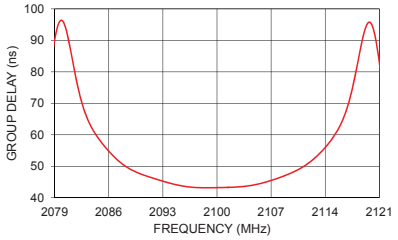
ZVBP-2100-S+
INSERTION LOSS



ZVBP-2100-S+
VSWR



ZVBP-2100-S+
GROUP DELAY



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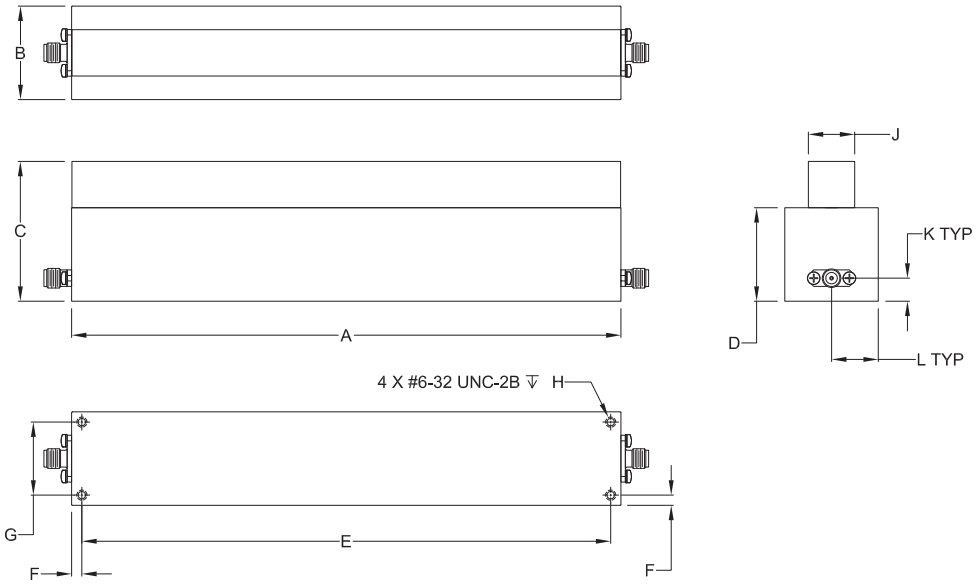
Coaxial Connections

PORT-1	SMA-Female
PORT-2	SMA-Female

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
7.40	**1.26**	**1.88**	**1.26**	**7.126**	**.14**	**.984**
188.0	32.0	47.9	32.0	181.00	3.5	25.00

H	J	K	L	Wt.
.157	**.63**	**.31**	**.63**	grams
4.00	15.9	7.9	16.0	**402**

Note: Please refer to case style drawing for details

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Cavity Band Pass Filter ZVBP-2100-S+

Typical Performance Data

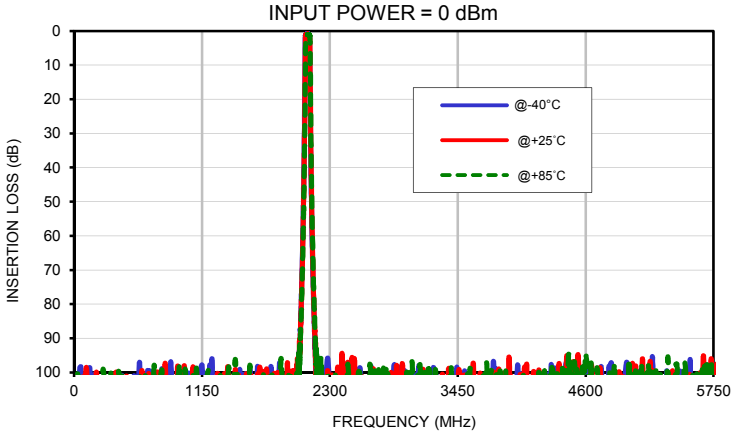
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10	116.75	105.04	119.09	0.01	0.01	0.01	0.01	0.01	0.01
100	103.99	102.17	102.62	0.04	0.05	0.05	0.04	0.04	0.04
110	106.77	98.58	108.16	0.05	0.05	0.05	0.04	0.04	0.04
200	111.05	99.93	106.46	0.07	0.08	0.07	0.06	0.06	0.06
300	106.47	110.06	107.35	0.09	0.10	0.10	0.08	0.08	0.08
400	104.41	112.69	99.77	0.10	0.12	0.11	0.09	0.09	0.09
500	114.26	117.88	105.70	0.11	0.13	0.12	0.09	0.10	0.10
600	116.59	114.43	100.48	0.12	0.13	0.13	0.09	0.10	0.11
700	121.07	103.00	106.08	0.12	0.13	0.13	0.09	0.10	0.11
800	104.35	99.37	118.32	0.12	0.12	0.13	0.08	0.10	0.11
900	103.37	108.38	107.37	0.12	0.12	0.13	0.09	0.10	0.11
1000	101.98	116.49	99.17	0.11	0.12	0.13	0.08	0.10	0.11
1500	105.26	105.70	106.59	0.04	0.08	0.09	0.04	0.07	0.09
2000	102.57	101.63	126.18	0.03	0.08	0.10	0.03	0.07	0.10
2065	43.56	47.32	51.29	0.23	0.26	0.27	0.24	0.26	0.27
2072	24.71	30.39	35.99	0.56	0.50	0.45	0.56	0.49	0.44
2073	21.24	27.39	33.38	0.69	0.57	0.50	0.69	0.56	0.48
2075	13.38	20.72	27.66	1.32	0.82	0.63	1.31	0.81	0.61
2080	1.44	2.72	9.77	19.47	10.89	2.33	19.66	10.81	2.29
2085	1.06	1.23	1.50	20.50	35.02	27.83	20.41	34.93	27.61
2100	0.88	0.97	1.04	26.34	32.79	26.07	24.75	28.49	25.56
2115	1.27	1.25	1.23	33.96	29.59	22.64	30.22	29.79	22.95
2120	10.34	3.77	1.66	1.92	6.93	23.37	1.90	6.89	23.47
2123	21.74	14.94	5.95	0.80	1.31	4.31	0.79	1.32	4.35
2125	28.21	22.38	14.15	0.60	0.83	1.45	0.60	0.84	1.47
2127	33.93	28.83	21.87	0.48	0.63	0.87	0.48	0.64	0.88
2130	41.42	37.11	31.48	0.38	0.48	0.60	0.37	0.48	0.60
2135	51.91	48.42	44.10	0.27	0.35	0.41	0.27	0.35	0.41
2150	74.77	72.65	70.00	0.14	0.21	0.24	0.14	0.20	0.23
2200	105.35	110.91	99.41	0.04	0.10	0.13	0.05	0.10	0.12
2300	110.66	108.70	109.73	0.02	0.08	0.11	0.02	0.07	0.10
2340	106.64	110.41	106.11	0.01	0.07	0.10	0.02	0.07	0.10
2360	104.16	107.13	110.40	0.01	0.07	0.10	0.02	0.07	0.10
2380	106.63	105.71	105.87	0.02	0.08	0.11	0.02	0.08	0.10
2400	105.69	105.80	105.25	0.01	0.08	0.11	0.03	0.08	0.11
2450	108.73	102.11	109.42	0.01	0.07	0.10	0.02	0.07	0.10
2500	98.44	95.77	101.53	0.00	0.07	0.10	0.01	0.07	0.10
2550	111.37	107.44	101.59	0.01	0.07	0.10	0.02	0.07	0.10
2600	107.11	103.02	103.85	0.00	0.07	0.10	0.01	0.07	0.10
2650	102.47	103.04	105.36	0.00	0.07	0.10	0.01	0.07	0.10
2700	107.94	107.28	99.59	0.00	0.06	0.10	0.01	0.07	0.10
2750	106.15	101.29	105.28	0.00	0.06	0.10	0.01	0.06	0.10
2800	99.87	105.60	101.60	0.00	0.07	0.11	0.02	0.07	0.11
2850	108.10	100.09	106.50	0.00	0.07	0.11	0.01	0.07	0.10
2900	113.21	98.15	113.23	0.00	0.07	0.11	0.01	0.06	0.10
2950	106.56	97.70	113.86	0.01	0.08	0.11	0.01	0.07	0.11
3000	103.07	103.29	101.41	0.00	0.07	0.11	0.01	0.07	0.11
3050	100.24	107.16	105.19	0.00	0.07	0.11	0.01	0.07	0.10
3100	98.09	105.99	103.86	0.00	0.08	0.11	0.01	0.07	0.11
3150	102.16	110.39	100.40	0.00	0.07	0.11	0.01	0.07	0.11
3200	101.45	106.32	101.79	0.00	0.07	0.11	0.01	0.07	0.11
3500	109.91	102.17	116.10	0.01	0.09	0.13	0.02	0.09	0.12
3600	101.42	107.07	107.46	0.02	0.10	0.14	0.03	0.10	0.14
4000	108.11	106.92	110.80	0.04	0.11	0.15	0.05	0.11	0.15
4100	103.61	109.72	103.43	0.04	0.12	0.16	0.07	0.13	0.17
4200	111.63	104.16	104.33	0.05	0.12	0.16	0.07	0.13	0.17
4500	116.42	104.07	96.98	0.07	0.15	0.18	0.09	0.16	0.19
5000	99.66	103.44	111.23	0.06	0.13	0.15	0.11	0.16	0.20
5500	99.67	103.70	99.75	0.12	0.19	0.22	0.11	0.15	0.18
5750	106.48	101.14	104.65	0.06	0.15	0.18	0.11	0.16	0.19

Typical Performance Data

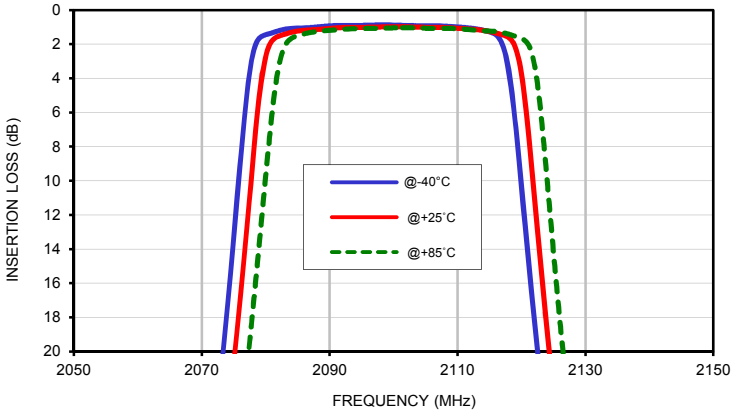
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
2085.0	52.63	57.76	68.44
2085.1	52.38	57.44	67.70
2085.2	52.14	57.12	66.99
2085.3	51.91	56.81	66.31
2085.4	51.70	56.53	65.67
2086.0	50.46	54.79	62.34
2087.0	48.87	52.29	58.26
2088.0	47.75	50.29	55.23
2089.0	46.89	48.79	52.74
2090.0	46.18	47.67	50.76
2091.0	45.47	46.81	49.20
2092.0	44.79	46.03	47.96
2093.0	44.15	45.28	46.94
2094.0	43.67	44.58	46.04
2095.0	43.38	44.00	45.24
2096.0	43.25	43.56	44.54
2097.0	43.22	43.30	44.00
2098.0	43.27	43.20	43.60
2099.0	43.34	43.19	43.39
2100.0	43.40	43.22	43.28
2101.0	43.51	43.26	43.20
2102.0	43.74	43.36	43.18
2103.0	44.10	43.50	43.17
2104.0	44.65	43.76	43.18
2105.0	45.37	44.19	43.33
2106.0	46.23	44.77	43.62
2107.0	47.20	45.48	44.08
2108.0	48.32	46.33	44.72
2109.0	49.59	47.24	45.43
2110.0	51.18	48.32	46.19
2111.0	53.20	49.64	47.00
2112.0	55.73	51.30	47.92
2112.3	56.60	51.88	48.22
2112.5	57.24	52.30	48.46
2113.0	58.92	53.40	49.09
2113.2	59.68	53.89	49.36
2113.5	60.91	54.64	49.82
2114.0	63.28	55.96	50.67
2114.2	64.35	56.54	51.05
2114.5	66.19	57.45	51.66
2115.0	69.86	59.10	52.79

Typical Performance Curves

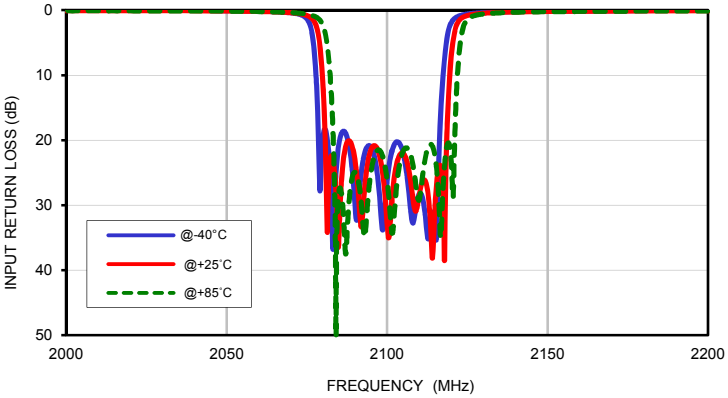
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



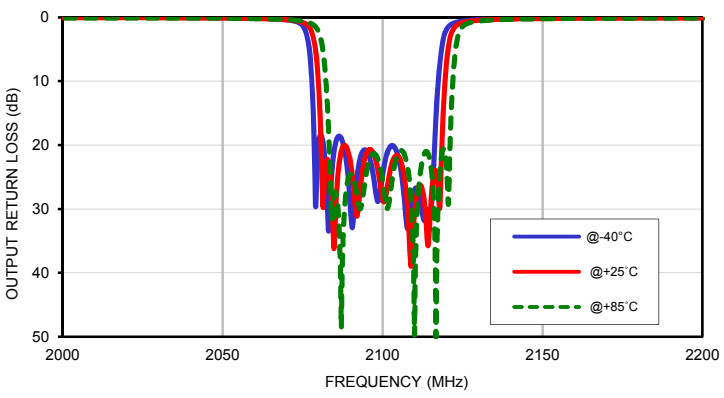
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



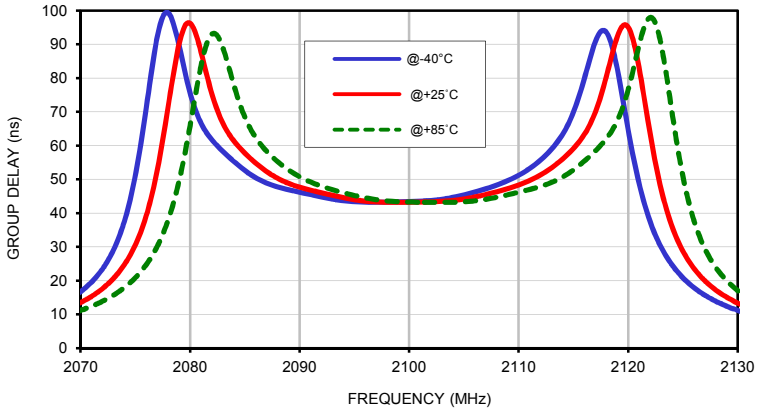
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



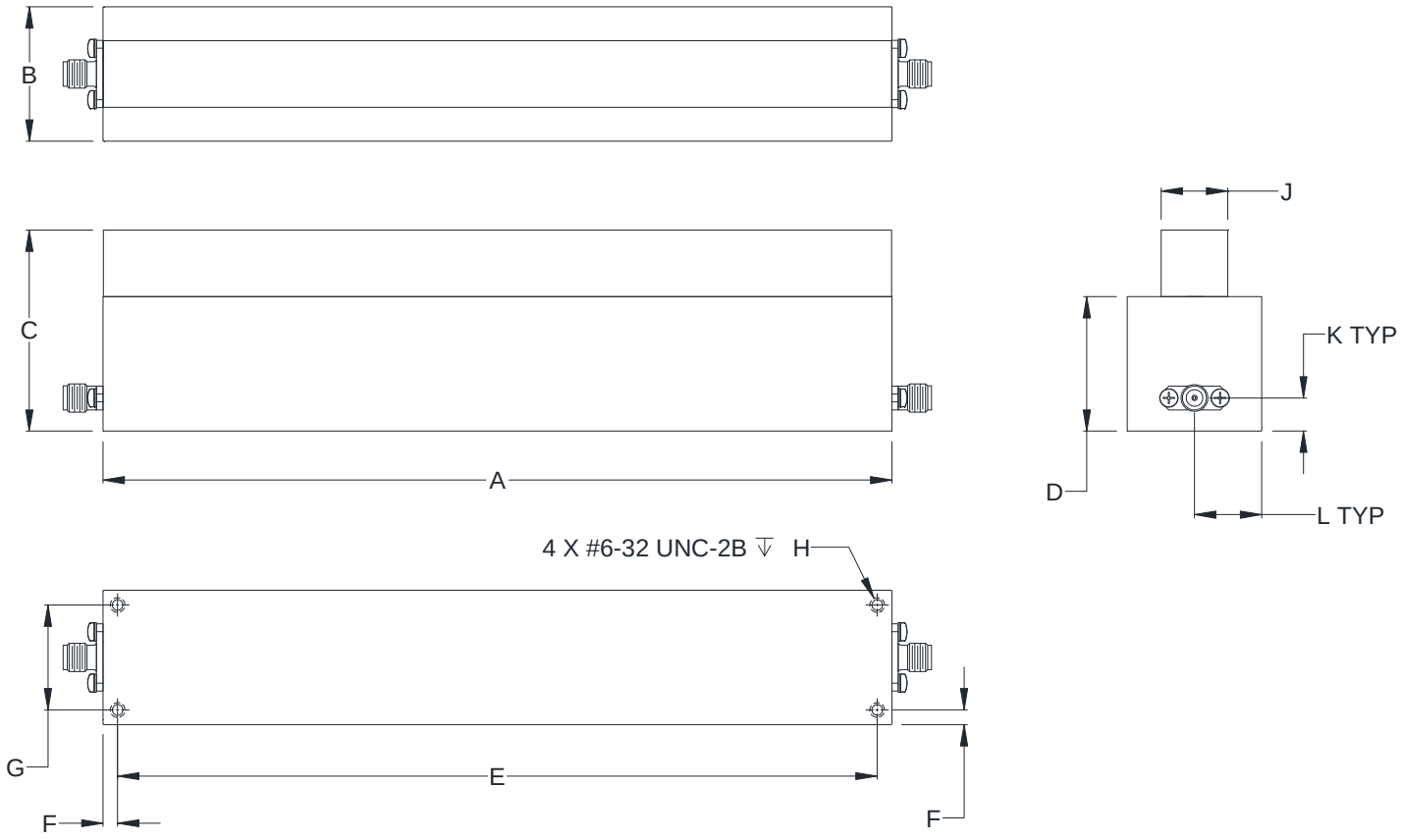
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style UD

Outline Dimensions

UD2969



CASE#	A	B	C	D	E	F	G
UD2969	7.40 (188.0)	1.26 (32.0)	1.88 (47.9)	1.26 (32.0)	7.126 (181.00)	.14 (3.5)	.984 (25.00)

CASE#	H	J	K	L	WT. GRAMS
UD2969	.157 (4.00)	.63 (15.9)	.31 (7.9)	.63 (16.0)	402

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

Notes:

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

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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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