Cavity

Bandpass Filters

50Ω DC to 40 GHz

The Big Deal

- Very low insertion loss with excellent power handling
- Very fast roll-off with wide stopband
- Passbands up to 36 GHz
- Stopbands up to 40 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. Custom integrated assembly with LNA and bias tees results in greatly simplifying system integration . 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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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.
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Cavity

Bandpass Filter

ZVBP-4300-S+

50Ω 4250 to 4350 MHz

Generic photo used for illustration purposes only

CASE STYLE: ME1656

Connectors	Model
SMA-F	ZVBP-4300-S+

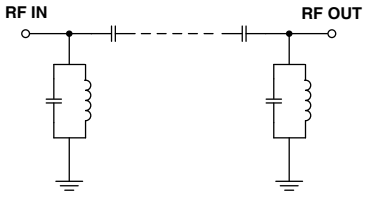
Features

- Low insertion loss, 1 dB typical
- Good VSWR, 1.3:1 typical
- High rejection
- Fast roll-off
- Connectorized package

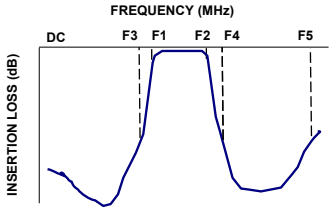
Applications

- Aviation/Aeronautical
- Broadband
- Passive sensors (satellite)

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	-	-	-	4300	-	MHz
	Insertion Loss	F1-F2	4250-4350	-	1	1.5	dB
	VSWR	F1-F2	4250-4350	-	1.3	1.43	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 4140	20	29	-	dB
	VSWR	DC-F3	DC - 4140	-	20	-	:1
Stop Band, Upper	Insertion Loss	F4-F5	4480-8000	20	29	-	dB
	VSWR	F4-F5	4480-8000	-	20	-	:1

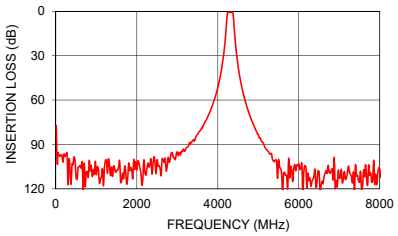
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	10 W max.

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

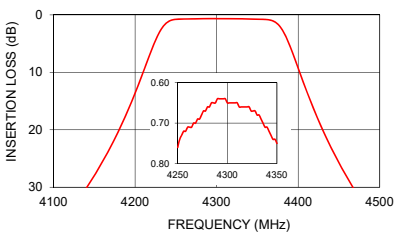
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
10	77.25	1737.18	4250	8.28
500	112.86	133.63	4254	7.74
1500	107.49	193.02	4260	7.12
3600	79.00	108.58	4264	6.83
4140	30.22	66.82	4270	6.53
4180	20.13	43.44	4276	6.36
4228	3.52	4.08	4280	6.27
4232	2.49	2.95	4284	6.20
4250	0.76	1.08	4290	6.10
4300	0.65	1.09	4296	6.04
4350	0.75	1.24	4300	6.00
4380	2.50	2.85	4304	5.98
4384	3.51	3.90	4310	5.98
4430	20.02	35.46	4316	6.01
4470	30.69	52.65	4320	6.06
4480	32.91	56.04	4324	6.12
4700	62.88	86.86	4330	6.22
5500	100.21	91.43	4340	6.45
7000	112.78	124.09	4346	6.68
8000	106.65	173.72	4350	6.89

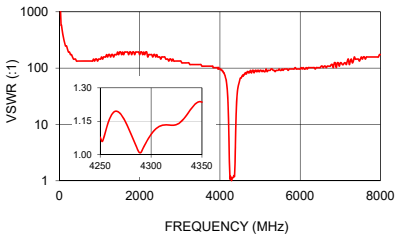
ZVBP-4300-S+
INSERTION LOSS (Full band)



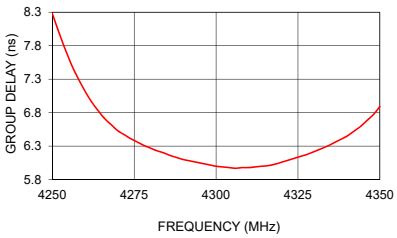
ZVBP-4300-S+
INSERTION LOSS (Pass band)



ZVBP-4300-S+
VSWR



ZVBP-4300-S+
GROUP DELAY



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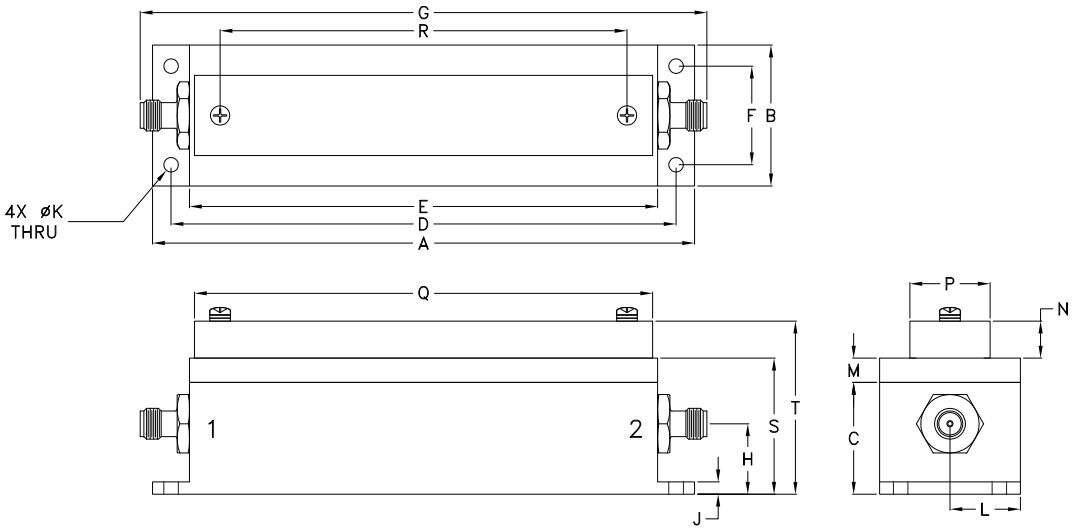
Coaxial Connections

PORT - 1	SMA-FEMALE
PORT - 2	SMA-FEMALE

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K
4.40	**1.14**	**0.91**	**4.096**	**3.80**	**0.800**	**4.60**	**0.57**	**0.10**	**0.118**
111.66	29.03	23.01	104.04	96.42	20.32	116.74	14.50	2.54	3.00

L	M	N	P	Q	R	S	T		Wt.
0.57	**0.20**	**0.30**	**0.65**	**3.72**	**3.30**	**1.10**	**1.40**		grams
14.53	5.00	7.62	16.51	94.39	83.82	28.02	35.64		**160**

Note: Please refer to case style drawing for details.

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Coaxial Band Pass Filter ZVBP-4300-S+

Typical Performance Data

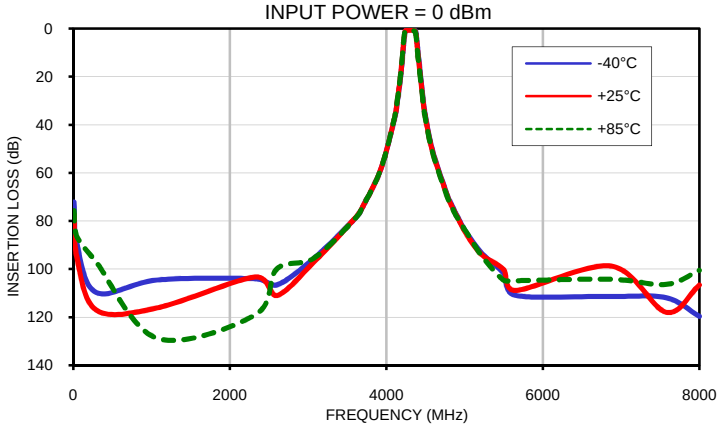
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10	72.11	77.25	75.62	0.00	0.00	0.01	0.01	0.01	0.01
50	89.97	95.66	86.59	0.02	0.03	0.03	0.02	0.03	0.03
300	109.80	117.17	97.31	0.10	0.10	0.11	0.10	0.11	0.11
1075	104.53	116.12	128.74	0.09	0.12	0.14	0.07	0.12	0.12
2325	104.01	103.31	118.95	0.04	0.11	0.15	0.02	0.12	0.16
2600	106.61	111.01	99.92	0.03	0.11	0.16	0.03	0.14	0.17
3075	95.54	97.09	95.40	0.05	0.14	0.19	0.05	0.17	0.21
3610	78.67	78.50	78.59	0.07	0.16	0.20	0.08	0.19	0.23
3700	74.03	73.99	73.88	0.08	0.16	0.20	0.08	0.20	0.23
3930	58.54	58.42	58.36	0.09	0.17	0.21	0.09	0.20	0.23
4100	38.18	37.87	37.66	0.14	0.21	0.24	0.14	0.24	0.26
4140	30.67	30.22	29.92	0.17	0.26	0.28	0.17	0.28	0.29
4180	20.82	20.13	19.67	0.30	0.40	0.44	0.28	0.41	0.43
4190	17.81	17.03	16.50	0.39	0.50	0.56	0.37	0.51	0.54
4216	8.63	7.65	6.97	1.29	1.68	1.99	1.23	1.65	1.93
4220	7.13	6.16	5.50	1.71	2.26	2.71	1.63	2.21	2.63
4228	4.30	3.52	3.00	3.24	4.35	5.33	3.13	4.26	5.18
4236	2.15	1.73	1.48	6.42	8.58	10.65	6.24	8.40	10.32
4240	1.46	1.23	1.11	8.97	11.95	15.04	8.74	11.65	14.44
4242	1.20	1.06	0.99	10.56	14.09	18.01	10.28	13.69	17.11
4248	0.76	0.80	0.82	17.07	23.66	32.35	16.56	22.46	27.62
4250	0.69	0.76	0.81	20.13	28.47	28.83	19.44	26.52	27.19
4256	0.58	0.72	0.79	30.98	25.15	21.16	30.95	25.53	21.29
4260	0.57	0.71	0.79	26.27	22.16	19.67	27.25	22.56	19.81
4262	0.56	0.71	0.79	24.53	21.46	19.40	25.30	21.81	19.52
4264	0.56	0.71	0.79	23.42	21.09	19.36	24.05	21.41	19.44
4270	0.55	0.69	0.77	22.54	21.52	20.41	22.92	21.69	20.31
4284	0.51	0.65	0.72	30.48	31.84	31.95	29.19	28.49	27.14
4286	0.50	0.65	0.71	33.73	36.18	36.89	30.80	29.44	27.92
4288	0.50	0.65	0.71	38.78	44.38	47.07	31.96	29.74	28.11
4298	0.50	0.64	0.71	29.64	28.54	27.59	27.60	25.77	24.67
4300	0.50	0.65	0.71	28.04	27.20	26.34	26.65	25.08	24.07
4304	0.50	0.65	0.72	25.93	25.43	24.68	25.35	24.20	23.27
4318	0.51	0.66	0.73	24.49	24.10	23.46	26.05	25.33	24.23
4322	0.51	0.66	0.73	24.82	24.14	23.55	27.65	26.61	25.38
4326	0.52	0.67	0.74	24.88	23.85	23.42	29.33	27.67	26.50
4340	0.56	0.71	0.78	20.82	20.44	20.91	23.47	23.53	24.63
4346	0.58	0.74	0.80	19.26	19.53	20.31	21.15	22.05	23.60
4350	0.60	0.75	0.82	18.80	19.53	20.46	20.42	21.87	23.55
4356	0.61	0.77	0.85	19.27	20.66	21.09	20.65	22.72	23.20
4358	0.61	0.78	0.87	19.80	21.21	20.90	21.08	22.93	22.23
4362	0.63	0.82	0.94	21.33	21.21	18.81	22.11	21.49	18.79
4370	0.77	1.11	1.38	18.01	13.94	11.66	17.04	13.43	11.29
4378	1.39	2.09	2.62	9.79	7.51	6.36	9.32	7.27	6.16
4390	4.21	5.46	6.28	3.45	2.80	2.51	3.29	2.74	2.45
4400	7.93	9.29	10.12	1.54	1.40	1.37	1.45	1.40	1.35
4480	32.20	32.91	33.36	0.18	0.31	0.38	0.18	0.35	0.41
4500	36.31	36.95	37.36	0.15	0.27	0.34	0.16	0.32	0.38
4520	39.99	40.57	40.95	0.15	0.26	0.32	0.14	0.30	0.36
4600	51.74	52.21	52.50	0.11	0.23	0.28	0.11	0.26	0.31
4780	69.31	69.66	69.97	0.10	0.21	0.25	0.10	0.24	0.28
4840	73.54	74.05	74.30	0.09	0.20	0.24	0.09	0.23	0.27
4900	77.57	77.87	78.24	0.08	0.19	0.23	0.09	0.23	0.27
5025	84.92	85.60	84.64	0.08	0.19	0.23	0.10	0.23	0.27
5225	93.54	94.16	94.68	0.07	0.19	0.22	0.09	0.22	0.26
5500	101.82	100.21	104.57	0.07	0.19	0.22	0.08	0.21	0.25
5650	110.92	108.89	104.75	0.07	0.18	0.21	0.07	0.20	0.23
6875	111.35	98.78	104.15	0.02	0.14	0.14	0.06	0.19	0.20
7575	111.93	117.95	106.32	0.02	0.11	0.10	0.02	0.15	0.17
8000	119.64	106.65	100.46	0.03	0.10	0.09	0.02	0.16	0.18

Typical Performance Data

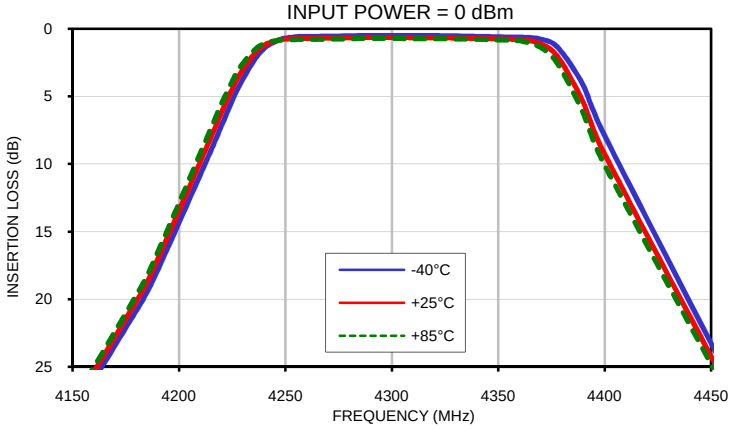
FREQ.	GROUP DELAY		
(MHz)	(nsec)		
	@-40°C	@+25°C	@+85°C
4250	8.74	8.28	7.98
4252	8.45	8.00	7.71
4254	8.16	7.74	7.48
4256	7.89	7.50	7.26
4258	7.64	7.30	7.08
4260	7.42	7.12	6.93
4262	7.23	6.96	6.79
4264	7.06	6.83	6.69
4266	6.92	6.71	6.59
4268	6.79	6.62	6.51
4270	6.69	6.53	6.44
4272	6.60	6.47	6.39
4274	6.52	6.41	6.34
4276	6.46	6.36	6.30
4278	6.39	6.31	6.26
4280	6.35	6.27	6.23
4282	6.30	6.23	6.19
4284	6.26	6.20	6.16
4286	6.22	6.16	6.13
4288	6.18	6.13	6.10
4290	6.15	6.10	6.08
4292	6.12	6.08	6.06
4294	6.10	6.06	6.04
4296	6.07	6.04	6.02
4298	6.05	6.02	6.00
4300	6.03	6.00	6.00
4302	6.01	5.99	5.98
4304	6.00	5.98	5.98
4306	5.99	5.97	5.97
4308	5.98	5.98	5.98
4310	5.98	5.98	5.98
4312	5.99	5.99	5.99
4314	5.99	6.00	6.01
4316	6.00	6.01	6.02
4318	6.02	6.03	6.05
4320	6.04	6.06	6.07
4322	6.06	6.09	6.11
4324	6.08	6.12	6.14
4326	6.11	6.15	6.18
4328	6.15	6.18	6.22
4330	6.17	6.22	6.25
4332	6.21	6.26	6.30
4334	6.25	6.30	6.35
4336	6.29	6.35	6.40
4338	6.33	6.40	6.46
4340	6.37	6.45	6.53
4342	6.42	6.52	6.61
4344	6.48	6.59	6.69
4346	6.55	6.68	6.79
4348	6.62	6.77	6.91
4350	6.71	6.89	7.04

Typical Performance Curves

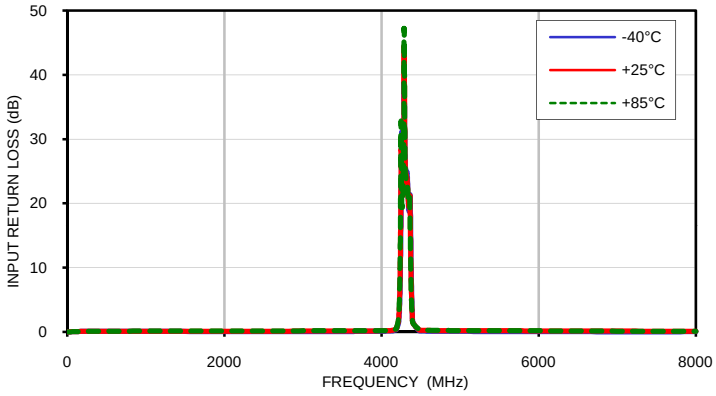
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



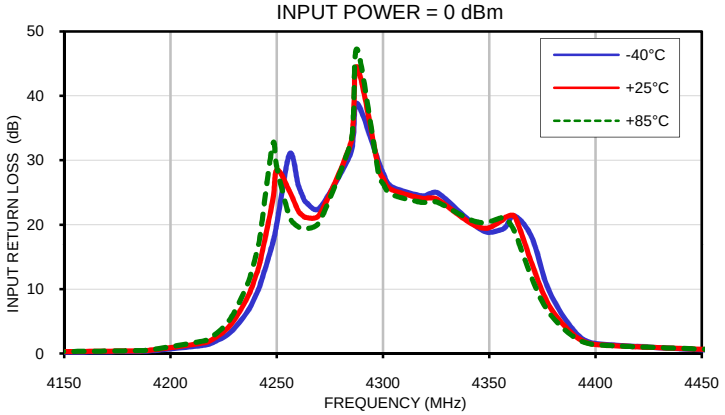
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



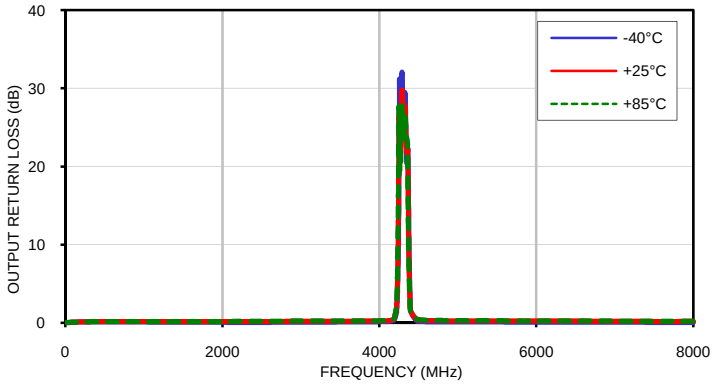
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



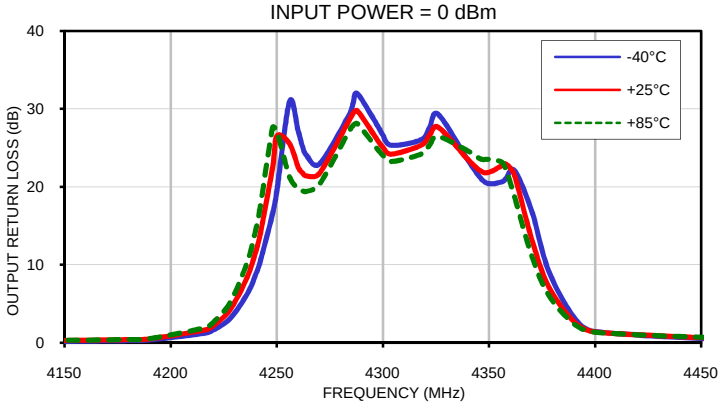
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



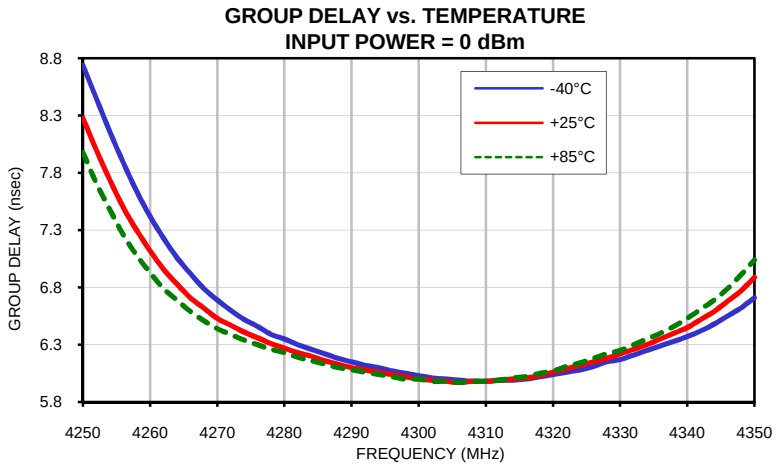
OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



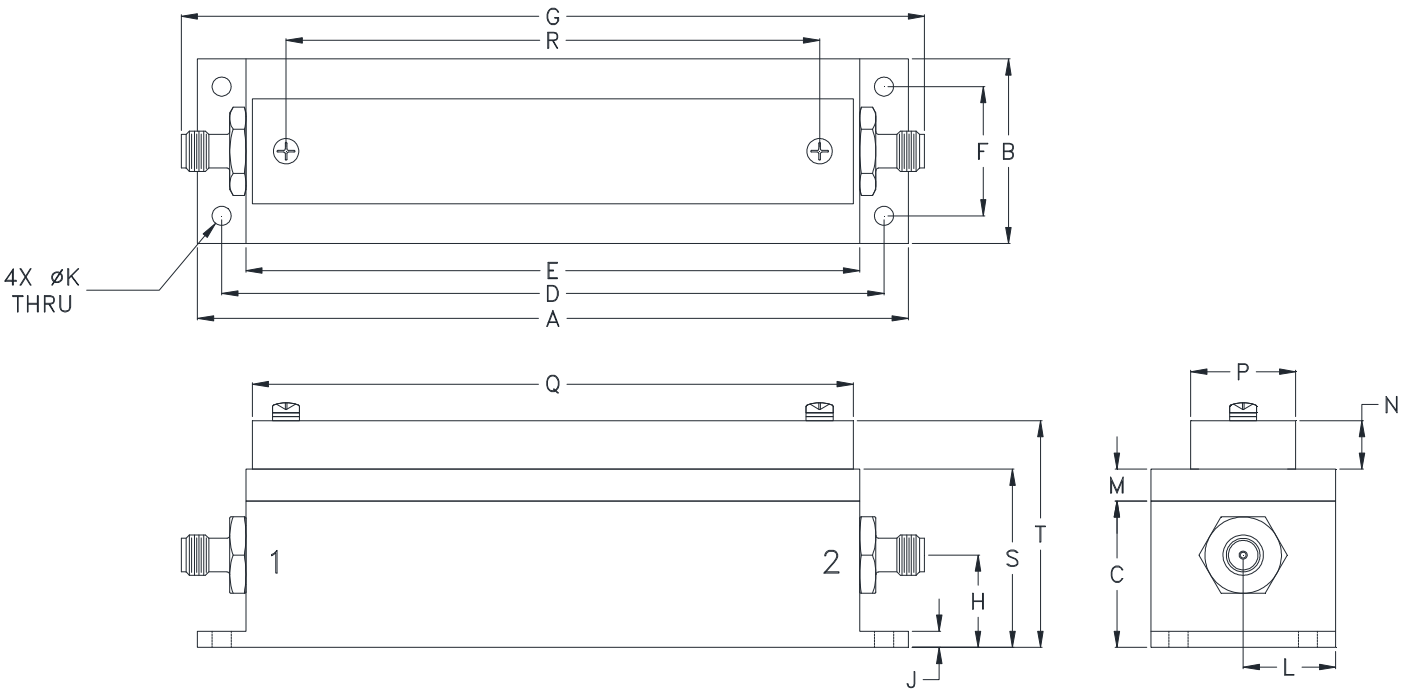
Typical Performance Curves



Case Style ME

ME1656

Outline Dimensions



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N	P
ME1656	4.40 (111.66)	1.14 (29.03)	0.91 (23.01)	4.096 (104.04)	3.80 (96.42)	0.800 (20.32)	4.60 (116.74)	0.57 (14.50)	0.10 (2.54)	0.118 (3.00)	0.57 (14.53)	0.20 (5.00)	0.30 (7.62)	0.65 (16.51)

CASE #.	Q	R	S	T	WT, GRAM
ME1656	3.72 (94.39)	3.30 (83.82)	1.10 (28.02)	1.40 (35.64)	160

Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .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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