Cavity

Bandpass Filters

50Ω DC to 50 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 50 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

Coaxial

Bandpass Cavity Filter

ZVBP-909-S+

50Ω 902 to 915 MHz

Generic photo used for illustration purposes only

CASE STYLE: KT1510

Connectors	Model
SMA-F	ZVBP-909-S+

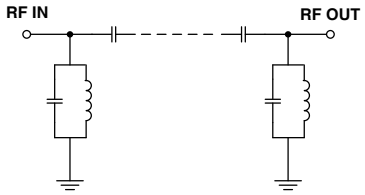
Features

- Low Insertion loss, 2.0 dB typ.
- Good VSWR, 1.2:1 typ. in passband
- Narrow bandwidth with high selectivity

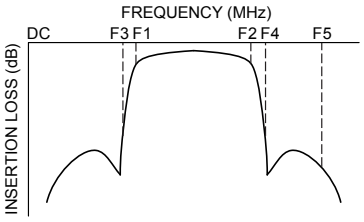
Applications

- CDMA band rejection for GSM base station
- Receivers/Transmitters

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

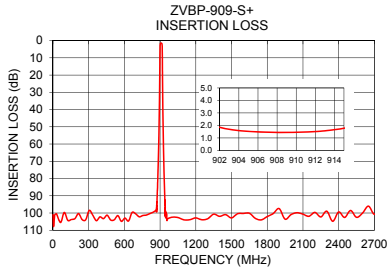
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	908.5	—	MHz
	Insertion Loss	F1-F2	902 - 915	—	2.0	2.7	dB
	VSWR	F1-F2	902 - 915	—	1.2	1.4	:1
Stop Band, Lower	Insertion Loss	DC-F3	10 - 895	20	33	—	dB
	VSWR	DC-F3	10 - 895	—	30	—	:1
Stop Band, Upper	Insertion Loss	F4-F5	925 - 2300	20	34	—	dB
	VSWR	F4-F5	925 - 2300	—	25	—	:1

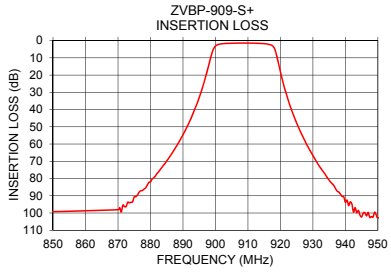
Maximum Ratings	
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power Input*	15W max. at 25°C

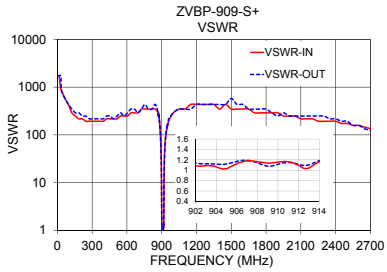
*Derate linearly to 5 W at 100°C
Permanent damage may occur if any of these limits are exceeded.
Input and output ports are DC short to ground.

Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR-In (:1)	VSWR-Out (:1)
10.00	104.69	1737.18	1737.18
870.00	98.08	289.53	289.53
888.00	61.26	108.58	108.58
895.00	33.04	34.07	37.77
897.50	17.32	14.50	17.05
899.00	6.81	5.25	6.21
900.00	3.15	2.09	2.37
902.00	1.85	1.14	1.09
908.50	1.44	1.10	1.15
915.00	1.77	1.17	1.18
918.00	3.98	1.65	1.24
919.00	9.87	3.58	2.55
920.00	18.20	10.56	7.94
925.00	47.86	43.44	41.37
929.00	63.41	64.35	64.35
950.00	102.83	157.93	157.93
1300.00	103.35	434.30	434.30
2300.00	98.96	193.02	248.17







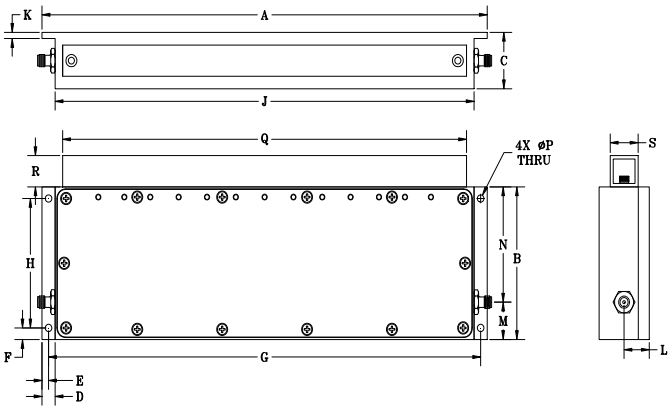
Notes

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	G	H	J
10.193	3.110	1.150	0.300	0.150	0.236	9.893	2.637	9.593
258.90	78.99	29.21	7.62	3.81	5.99	251.28	66.98	243.66

K	L	M	N	P	Q	R	S	wt
0.127	0.577	0.761	2.349	0.150	9.250	0.638	0.638	grams
3.23	14.66	19.33	59.66	3.81	234.95	16.21	16.21	845.00

Note: Please refer to case style drawing for details

Cavity Band Pass Filter ZVBP-909-S+

Typical Performance Data

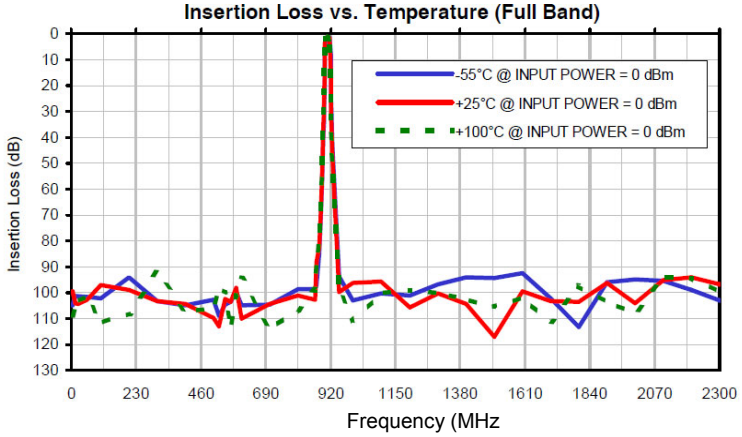
FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@-55°C	@+25°C	@+100°C	@-55°C	@+25°C	@+100°C	@-55°C	@+25°C	@+100°C
5.0	104.85	99.40	108.97	0.01	0.01	0.01	0.00	0.01	0.01
15.0	101.31	103.96	105.68	0.01	0.02	0.02	0.00	0.02	0.03
25.0	101.39	104.25	103.24	0.02	0.02	0.03	0.01	0.02	0.04
55.0	101.71	102.67	101.29	0.04	0.04	0.05	0.03	0.05	0.05
105.0	102.27	96.94	111.52	0.06	0.06	0.07	0.04	0.06	0.06
205.0	93.95	99.00	108.23	0.08	0.08	0.09	0.05	0.09	0.09
305.0	103.37	103.17	92.29	0.08	0.09	0.10	0.05	0.09	0.11
405.0	104.99	104.21	107.42	0.07	0.09	0.10	0.03	0.09	0.11
505.0	102.77	109.72	105.89	0.06	0.08	0.10	0.01	0.08	0.11
525.0	108.85	112.86	98.01	0.05	0.07	0.10	0.01	0.08	0.11
545.0	104.49	102.35	100.06	0.05	0.07	0.10	0.01	0.08	0.11
565.0	103.51	103.49	113.81	0.04	0.06	0.09	0.01	0.08	0.11
585.0	99.79	98.03	101.02	0.04	0.06	0.09	0.00	0.08	0.11
605.0	104.93	110.03	94.69	0.03	0.06	0.08	0.00	0.07	0.11
705.0	104.50	104.27	114.11	0.02	0.05	0.08	0.02	0.06	0.10
805.0	98.60	101.07	106.36	0.00	0.03	0.07	0.03	0.06	0.10
865.0	98.71	102.67	98.79	0.02	0.06	0.10	0.03	0.06	0.11
870.0	97.03	88.00	88.95	0.02	0.07	0.12	0.03	0.08	0.13
880.0	84.98	82.39	79.48	0.04	0.08	0.13	0.02	0.09	0.15
885.0	72.98	71.11	68.22	0.07	0.12	0.18	0.01	0.12	0.19
890.0	58.58	56.11	52.32	0.14	0.20	0.28	0.07	0.19	0.28
895.0	39.02	35.27	29.06	0.35	0.49	0.74	0.25	0.45	0.67
896.0	34.02	29.82	22.71	0.45	0.64	1.07	0.34	0.58	0.94
897.0	28.45	23.70	15.47	0.60	0.91	1.84	0.47	0.81	1.58
898.0	22.21	16.77	7.95	0.88	1.50	4.67	0.71	1.32	3.94
899.0	15.19	9.36	3.42	1.54	3.35	16.34	1.26	2.95	12.40
900.0	7.89	3.90	2.36	3.74	10.56	24.57	3.19	9.21	22.01
901.0	3.14	2.28	2.02	11.95	27.21	27.58	10.25	21.26	37.36
902.0	1.92	1.89	1.86	26.39	29.44	21.43	22.10	32.90	22.07
903.0	1.61	1.70	1.76	30.83	29.02	20.41	33.07	30.82	21.35
904.0	1.45	1.59	1.67	33.79	26.25	23.78	36.81	28.56	28.95
905.0	1.36	1.52	1.62	29.92	27.06	24.14	38.48	48.01	29.78
906.0	1.30	1.48	1.60	26.54	24.17	21.10	32.69	27.10	21.81
907.0	1.27	1.45	1.59	23.25	22.40	21.13	24.69	22.75	20.56
908.0	1.25	1.43	1.57	23.24	24.24	24.76	23.01	22.70	22.20
908.5	1.24	1.43	1.58	24.71	25.23	26.19	23.16	22.91	23.12
910.0	1.23	1.43	1.59	29.12	28.20	30.46	23.62	23.56	25.89
911.0	1.24	1.45	1.62	23.59	25.07	29.00	21.63	23.48	28.25
912.0	1.26	1.47	1.68	22.88	27.07	31.06	22.27	27.85	34.85
913.0	1.27	1.52	1.76	27.15	29.09	34.64	29.35	36.97	38.58
914.0	1.32	1.59	1.89	26.60	25.19	28.97	29.53	26.19	28.15
915.0	1.41	1.69	2.15	22.28	29.57	19.10	22.44	28.54	19.62
920.0	8.20	15.80	25.34	3.07	1.45	0.93	3.89	1.76	1.08
921.0	16.86	23.65	31.78	1.16	0.89	0.73	1.37	1.03	0.82
922.0	24.67	30.44	37.50	0.72	0.66	0.60	0.78	0.74	0.67
923.0	31.37	36.39	42.67	0.54	0.54	0.52	0.54	0.59	0.57
925.0	42.51	46.53	51.68	0.37	0.39	0.41	0.33	0.42	0.44
950.0	93.71	99.76	98.89	0.07	0.10	0.15	0.00	0.10	0.15
1000.0	102.84	96.29	110.77	0.02	0.06	0.10	0.05	0.06	0.11
1100.0	100.22	95.72	100.17	0.01	0.03	0.08	0.06	0.05	0.12
1200.0	101.20	105.62	99.06	0.02	0.02	0.07	0.06	0.06	0.12
1300.0	96.85	100.17	100.05	0.03	0.02	0.08	0.08	0.05	0.12
1400.0	93.93	104.45	102.73	0.02	0.02	0.08	0.09	0.04	0.12
1500.0	94.30	116.93	105.38	0.02	0.02	0.09	0.09	0.05	0.14
1600.0	92.56	99.44	101.99	0.01	0.04	0.10	0.10	0.05	0.15
1700.0	102.25	103.11	111.13	0.01	0.04	0.11	0.10	0.06	0.15
1800.0	113.24	103.50	97.46	0.00	0.05	0.12	0.11	0.06	0.16
1900.0	95.98	96.09	103.75	0.01	0.06	0.14	0.11	0.06	0.17
2000.0	94.83	104.10	107.54	0.02	0.08	0.15	0.12	0.06	0.18
2100.0	95.50	95.22	94.10	0.03	0.09	0.16	0.13	0.06	0.19
2200.0	98.83	94.06	94.44	0.03	0.08	0.15	0.13	0.06	0.19
2300.0	102.96	96.86	99.71	0.03	0.08	0.15	0.14	0.07	0.21

Typical Performance Data

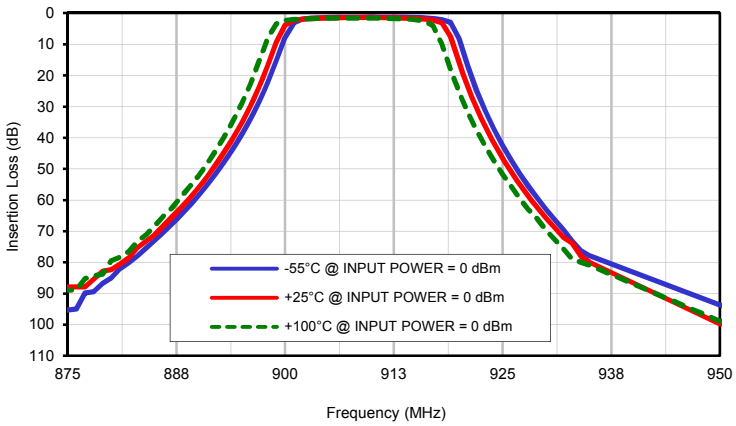
FREQ.	GROUP DELAY		
	(nsec)		
(MHz)	@-55°C	@+25˚C	@+100˚C
902	126.45	130.08	126.25
903	129.84	124.99	113.73
904	125.91	112.69	104.22
905	114.04	103.57	98.81
906	104.26	98.41	95.59
907	98.77	95.35	93.88
908	95.50	93.65	93.21
909	94.85	93.60	93.61
910	92.92	93.43	94.80
911	93.22	94.83	97.37
912	94.49	97.45	101.45
913	96.88	101.67	107.80
914	100.90	108.19	119.47
915	107.01	120.19	132.14

Typical Performance Curves

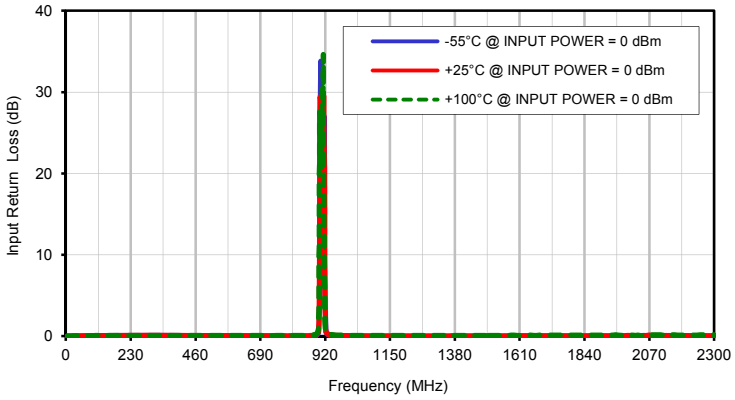
Insertion Loss vs. Temperature (Full Band)



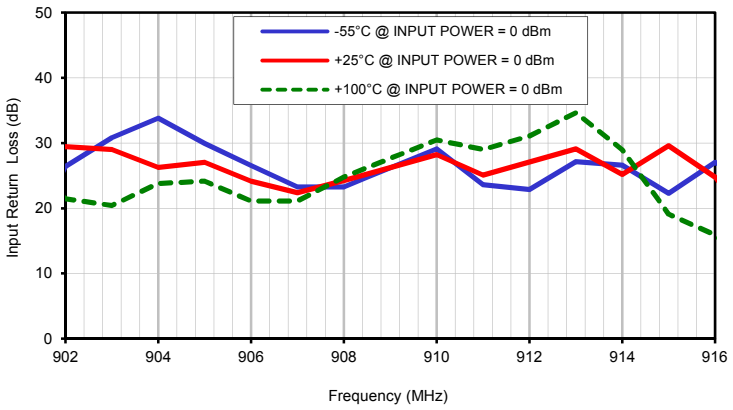
Insertion Loss vs. Temperature (Pass band)



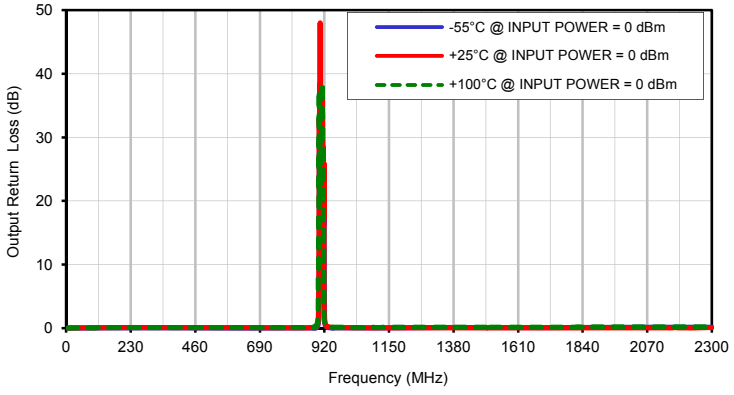
Input Return Loss vs. Temperature



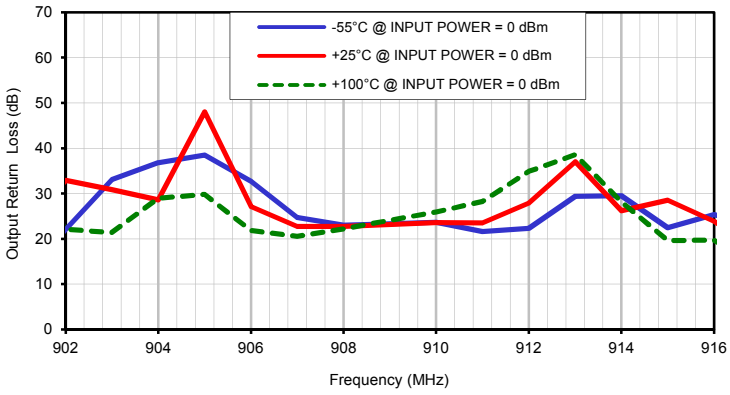
Input Return Loss vs. Temperature



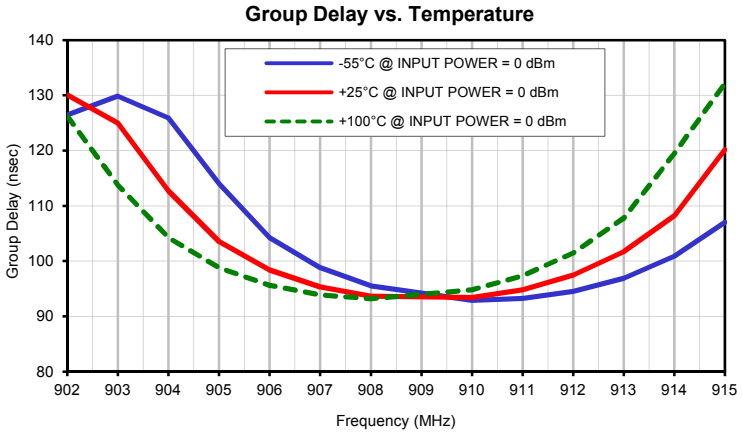
Output Return Loss vs. Temperature



Output Return Loss vs. Temperature



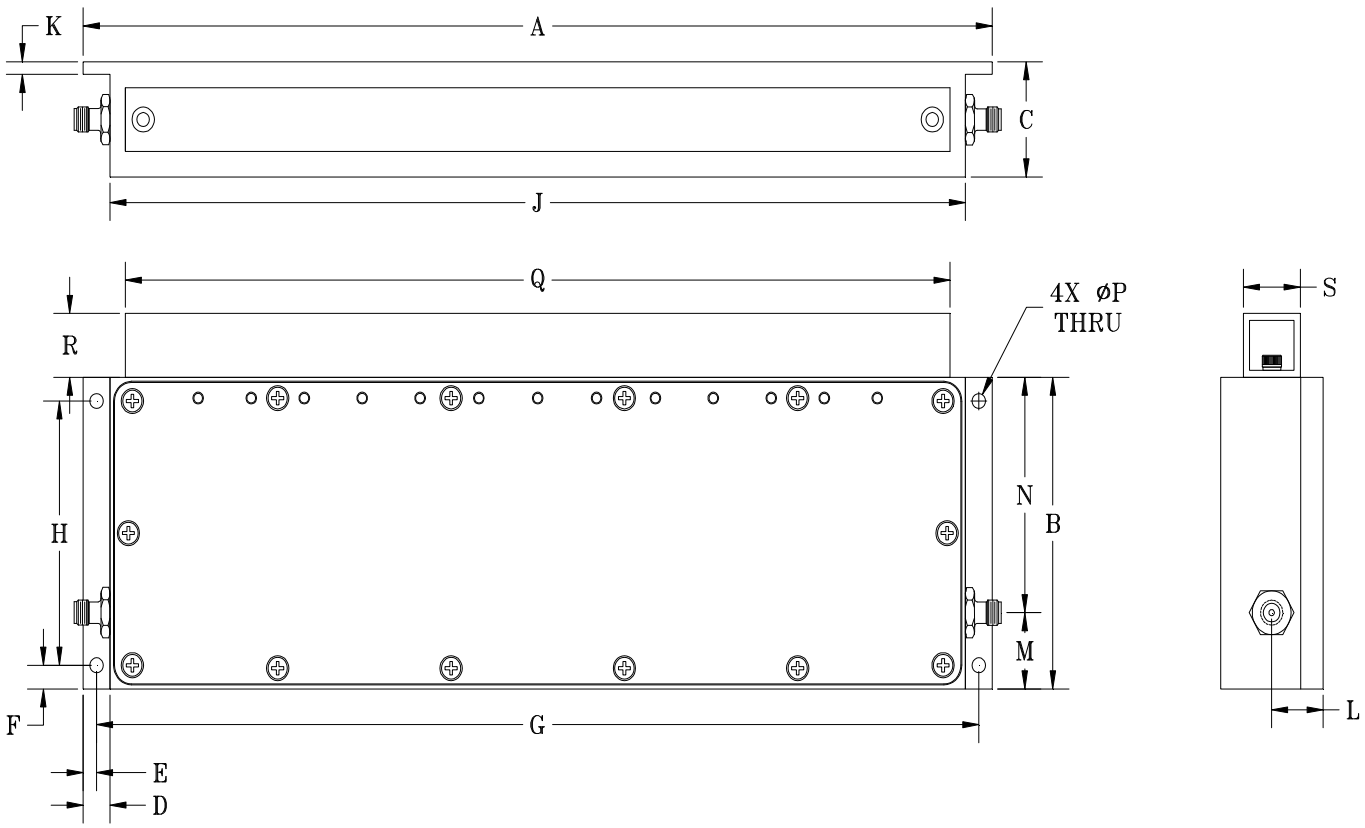
Typical Performance Curves



Case Style KT

KT1510

Outline Dimensions



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N	P
KT1510	10.193 (258.90)	3.110 (78.99)	1.150 (29.21)	0.300 (7.62)	0.150 (3.81)	0.236 (5.99)	9.893 (251.28)	2.637 (66.98)	9.593 (243.66)	0.127 (3.23)	0.577 (14.66)	0.761 (19.33)	2.349 (59.66)	0.150 (3.81)

CASE #.	Q	R	S	WT, GRAM
KT1510	9.250 (234.95)	0.638 (16.21)	0.638 (16.21)	845

Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015

Notes:

1. Case material: Aluminum alloy.
2. Case finish:
   (i) Case & Cover of the unit – coated with epoxy polyester over Silver plated.
   (ii) Tuning screw protective cover – coated with epoxy polyester over aluminium alloy.

Mini-Circuits®
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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