

# Coaxial-Ceramic Resonator Filters and Multiplexers

50Ω

DC to 6 GHz

## The Big Deal

- Low insertion loss with excellent power handling
- Passbands up to 6 GHz
- Fractional bandwidth from <1 to 25%
- Excellent temperature stability
- Rugged construction to handle demanding environmental conditions



## Product Overview

Mini-Circuits' *Coaxial-Ceramic Resonator filters* offer low insertion loss in very small form factors, using ceramic material with high dielectric constant and superior Q factor. Bandpass and bandstop filters, diplexer and multiplexer designs can be constructed using this technology. Low insertion loss combined with excellent power handling makes these filters well suited for transmitter and receiver signal chains. Advanced filter design and construction can achieve stopband width greater than 3x the center frequency

All our coaxial-ceramic resonator filters are built with rugged construction, qualified to withstand multiple demanding reflow cycles. Custom integrated assembly with LNA greatly simplifying system integration. They can be realized in small form factors with high-quality, precise machining 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 signal chain
Fast roll-off	Higher selectivity results in better adjacent channel rejection and dynamic range
Wide stop band	Wide spur-free stopband results in better receiver sensitivity
Excellent power handling	Well suited for transmitter applications
Rugged Construction	These filter assemblies have been qualified over a wide range of thermal, mechanical and environmental conditions including withstanding the stress of extensive solder reflow cycles
Small Size	Very well suited for high performance applications where size is a constraint.
Temperature stability	Very minimal change in electrical performance across temperature makes these filters suitable for a wide range of operating conditions.

### 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](http://www.minicircuits.com/MCLStore/terms.jsp)



# Coaxial Bandpass Filter

## ZX75BP-1062-S+

50Ω 960 to 1164 MHz



Generic photo used for illustration purposes only

CASE STYLE: HY1238

Connectors	Model
SMA-MF	ZX75BP-1062-S+

### Features

- Low Insertion loss
- High selectivity
- Good VSWR
- Connectorized package

### Applications

- Traffic collision avoidance system (TCAS)
- Aeronautical radio navigation
- Fixed satellite
- Radio astronomy
- Radar and navigation system

### Electrical Specifications at 25°C

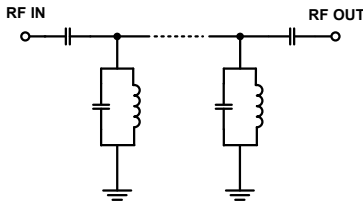
Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	-	-	1062	-	MHz
	Insertion Loss	F1-F2	960-1164	0.7	2	dB
	VSWR	F1-F2	960-1164	1.3	-	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 735	20	30	dB
	VSWR	DC-F3	DC - 735	-	20	:1
Stop Band, Upper	Insertion Loss	F4-F5	1620-2000	20	30	dB
	VSWR	F4-F5	1620-2000	-	20	:1

### Maximum Ratings

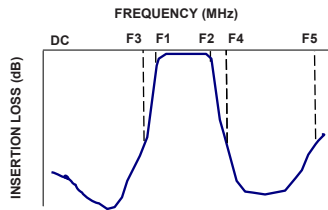
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input*	5 W max.

\* Passband rating, derate linearly to 3.5W at 85 °C ambient. Permanent damage may occur if any of these limits are exceeded.

### Functional Schematic



### Typical Frequency Response

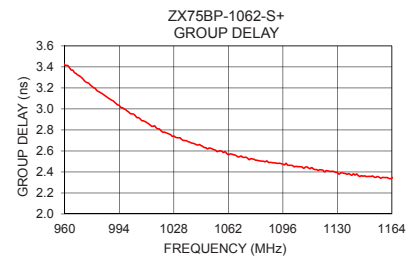
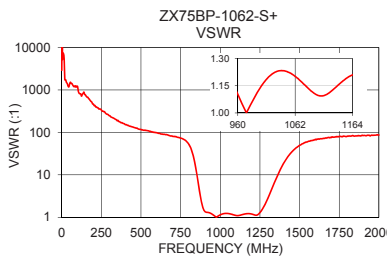
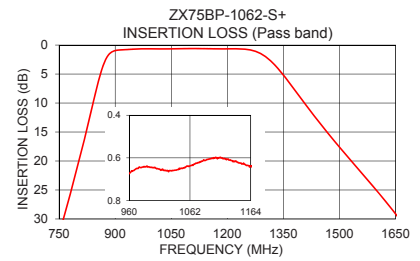


### Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	97.96	4391.58	960	3.42
250	68.28	336.79	970	3.30
700	45.02	80.42	980	3.18
735	36.22	76.10	990	3.08
760	30.37	71.54	1000	2.97
800	20.78	53.69	1010	2.88
840	10.25	18.67	1020	2.79
870	3.17	3.93	1030	2.73
900	0.95	1.41	1040	2.67
960	0.67	1.10	1050	2.63
1062	0.64	1.20	1062	2.56
1164	0.64	1.21	1070	2.55
1270	0.98	1.66	1080	2.51
1320	3.00	4.18	1090	2.49
1400	9.48	18.78	1100	2.46
1535	20.28	57.52	1110	2.45
1620	26.74	70.09	1120	2.42
1660	30.03	72.89	1130	2.40
1800	50.88	80.71	1150	2.36
2000	39.89	86.64	1164	2.34

### +RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications



### Notes

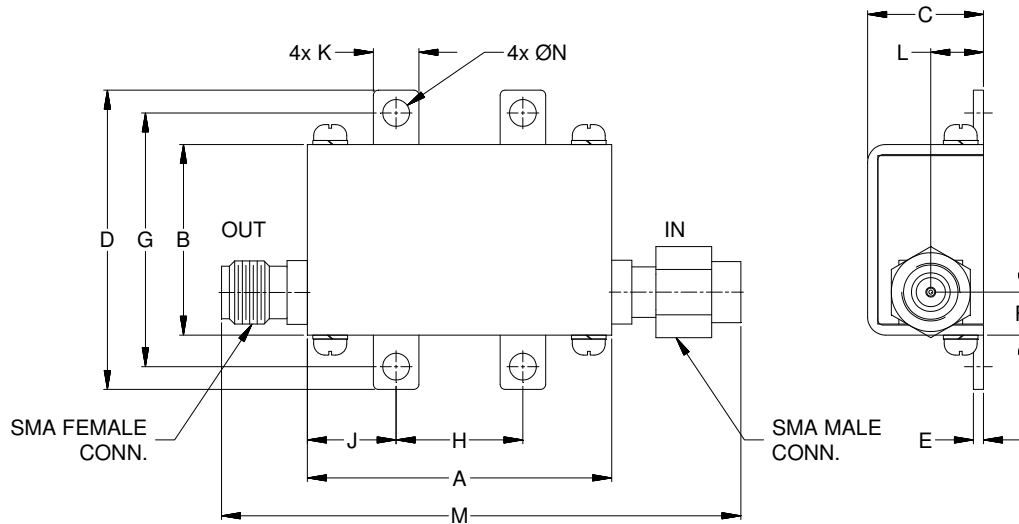
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## Coaxial Connections

INPUT	SMA-MALE
OUTPUT	SMA-FEMALE

## Outline Drawing



## Outline Dimensions ( $\frac{\text{inch}}{\text{mm}}$ )

A	B	C	D	E	F	G
<b>1.20</b>	<b>.75</b>	<b>.46</b>	<b>1.18</b>	<b>.04</b>	<b>.17</b>	<b>1.00</b>
30.48	19.05	11.68	29.97	1.02	4.32	25.40
H	J	K	L	M	N	Wt.
<b>.50</b>	<b>.35</b>	<b>.18</b>	<b>.21</b>	<b>2.05</b>	<b>.106</b>	grams
12.70	8.89	4.57	5.28	52.07	2.69	35.0

Note: Please refer to case style drawing for details

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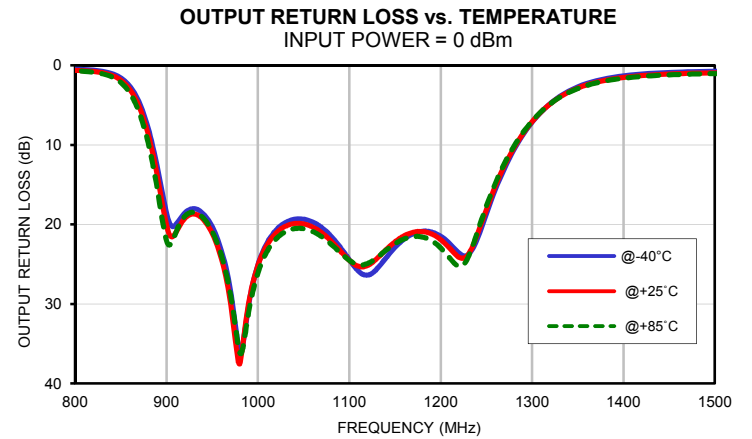
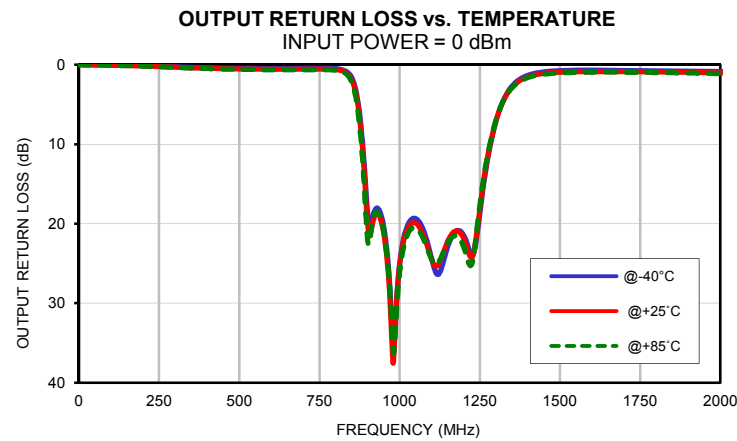
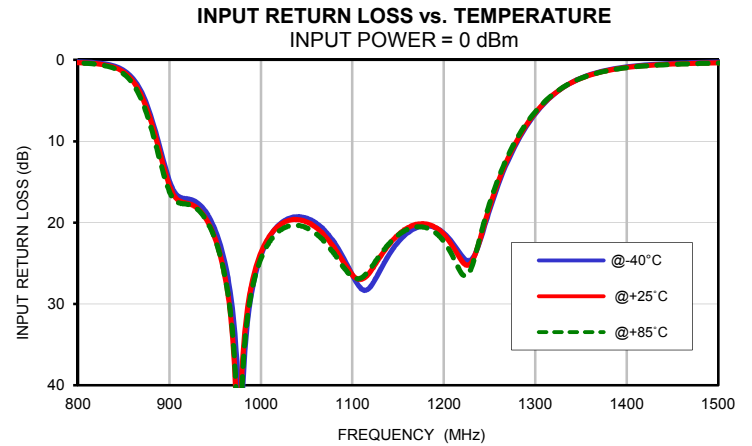
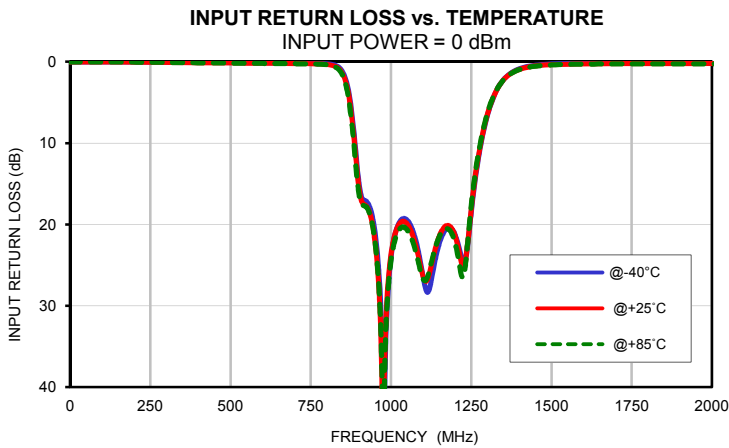
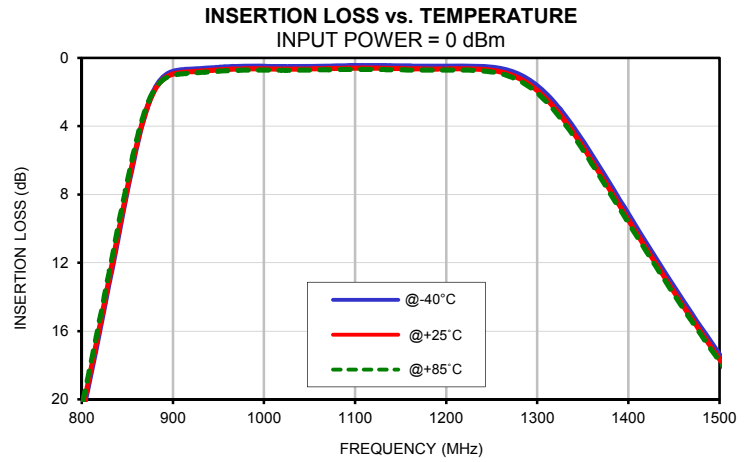
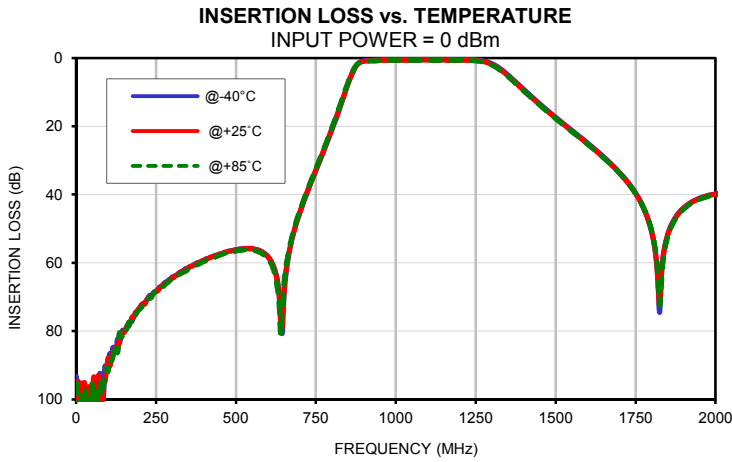
*Typical Performance Data*

FREQ.  (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	93.37	97.96	95.37	0.00	0.00	0.00	0.00	0.00	0.00
10	99.80	106.05	116.95	0.00	0.00	0.00	0.00	0.00	0.00
50	96.56	100.88	95.55	0.01	0.01	0.01	0.02	0.03	0.03
100	90.16	87.92	91.86	0.00	0.01	0.02	0.03	0.05	0.05
150	80.14	80.45	79.63	0.01	0.02	0.02	0.06	0.09	0.10
200	72.94	73.09	73.51	0.01	0.04	0.04	0.11	0.16	0.17
250	68.27	68.28	68.62	0.02	0.05	0.05	0.19	0.24	0.26
300	64.18	64.53	64.85	0.04	0.07	0.07	0.25	0.31	0.33
350	61.39	61.64	61.92	0.05	0.09	0.10	0.31	0.38	0.41
400	59.18	59.25	59.64	0.07	0.11	0.12	0.36	0.45	0.48
450	57.41	57.45	57.75	0.08	0.13	0.14	0.40	0.50	0.53
500	56.16	56.21	56.58	0.09	0.15	0.16	0.43	0.53	0.58
550	55.81	55.80	56.29	0.10	0.16	0.18	0.45	0.55	0.60
600	58.20	58.28	58.84	0.12	0.18	0.20	0.46	0.57	0.62
650	69.81	68.32	66.06	0.13	0.19	0.22	0.46	0.57	0.62
700	45.28	45.02	44.60	0.15	0.22	0.24	0.44	0.56	0.61
735	36.43	36.22	35.87	0.16	0.23	0.25	0.43	0.55	0.61
750	32.91	32.70	32.35	0.17	0.24	0.26	0.43	0.55	0.61
760	30.58	30.37	30.01	0.17	0.24	0.27	0.42	0.55	0.61
780	25.88	25.66	25.28	0.19	0.27	0.30	0.43	0.56	0.63
800	21.01	20.78	20.38	0.23	0.32	0.36	0.47	0.60	0.68
830	13.20	12.96	12.54	0.50	0.63	0.72	0.74	0.91	1.05
870	3.20	3.17	2.99	4.06	4.52	5.07	4.58	5.14	5.86
900	0.79	0.95	1.02	14.85	15.45	16.20	18.55	20.07	22.03
910	0.70	0.85	0.93	16.77	17.27	17.57	20.06	21.09	21.10
925	0.65	0.80	0.87	17.23	17.83	17.93	18.15	18.81	18.57
950	0.56	0.70	0.78	20.89	21.98	22.09	20.30	21.13	20.89
960	0.52	0.67	0.75	24.58	26.19	26.22	23.22	24.26	23.84
980	0.49	0.65	0.72	40.57	36.97	38.74	36.19	37.57	36.05
1000	0.50	0.65	0.72	24.07	23.71	24.45	25.10	25.17	26.13
1025	0.51	0.66	0.73	19.82	19.99	20.67	20.18	20.60	21.31
1050	0.51	0.65	0.71	19.47	19.92	20.64	19.36	19.95	20.55
1062	0.49	0.64	0.70	20.19	20.76	21.52	19.82	20.46	21.01
1080	0.48	0.62	0.69	22.35	23.02	23.77	21.48	22.09	22.49
1100	0.45	0.60	0.67	26.44	26.42	26.70	24.45	24.51	24.52
1150	0.47	0.63	0.70	22.42	21.51	21.55	22.90	22.20	22.43
1164	0.48	0.64	0.71	20.99	20.44	20.67	21.52	21.21	21.66
1180	0.49	0.65	0.72	20.39	20.15	20.61	20.87	20.92	21.59
1200	0.49	0.65	0.72	21.27	21.44	22.31	21.48	21.91	22.95
1225	0.48	0.65	0.72	24.64	25.23	26.54	23.95	24.25	25.06
1250	0.54	0.73	0.82	18.48	18.10	17.69	18.67	18.10	17.69
1275	0.86	1.08	1.20	11.24	10.98	10.71	11.72	11.44	11.20
1300	1.64	1.91	2.06	6.65	6.52	6.39	7.14	7.08	7.00
1320	2.69	3.00	3.17	4.28	4.24	4.18	4.77	4.83	4.82
1325	3.01	3.32	3.50	3.83	3.81	3.76	4.33	4.40	4.41
1400	9.15	9.48	9.65	0.85	0.93	0.96	1.31	1.51	1.60
1450	13.40	13.69	13.84	0.43	0.51	0.54	0.88	1.09	1.18
1500	17.37	17.63	17.77	0.27	0.35	0.39	0.73	0.93	1.02
1525	19.28	19.53	19.65	0.24	0.32	0.35	0.70	0.89	0.98
1540	20.41	20.65	20.78	0.21	0.29	0.33	0.69	0.88	0.97
1550	21.17	21.40	21.52	0.21	0.29	0.32	0.68	0.88	0.96
1600	24.96	25.19	25.29	0.18	0.25	0.29	0.68	0.86	0.93
1620	26.52	26.74	26.83	0.17	0.25	0.28	0.68	0.85	0.93
1660	29.81	30.03	30.09	0.16	0.24	0.27	0.69	0.86	0.93
1750	39.56	39.75	39.71	0.14	0.22	0.25	0.73	0.88	0.95
1775	43.89	44.02	43.92	0.14	0.21	0.25	0.75	0.89	0.97
1800	50.73	50.88	50.50	0.13	0.22	0.25	0.76	0.91	0.98
1825	74.51	72.51	72.47	0.13	0.21	0.25	0.77	0.92	0.99
1900	43.93	44.03	44.32	0.12	0.21	0.24	0.81	0.96	1.04
2000	39.82	39.89	40.16	0.11	0.20	0.24	0.84	1.02	1.11

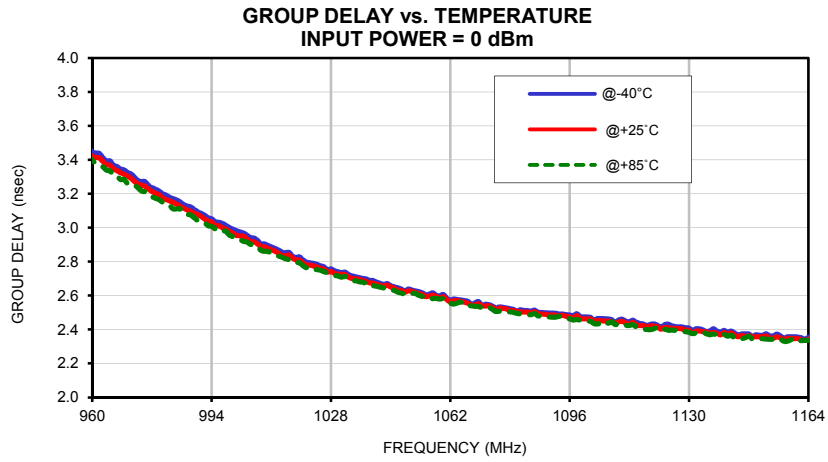
## Typical Performance Data

FREQ.  (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
960	3.44	3.42	3.40
964	3.39	3.37	3.34
968	3.35	3.32	3.28
972	3.30	3.27	3.25
976	3.25	3.23	3.20
980	3.20	3.18	3.15
984	3.16	3.14	3.11
988	3.12	3.10	3.08
992	3.07	3.05	3.03
996	3.03	3.01	2.98
1000	2.99	2.97	2.95
1004	2.96	2.93	2.92
1008	2.90	2.89	2.87
1012	2.88	2.86	2.85
1016	2.85	2.84	2.81
1020	2.81	2.79	2.78
1024	2.78	2.77	2.75
1028	2.76	2.74	2.73
1032	2.74	2.72	2.71
1036	2.71	2.70	2.68
1040	2.69	2.67	2.66
1044	2.67	2.66	2.64
1048	2.64	2.63	2.61
1052	2.63	2.62	2.61
1056	2.61	2.60	2.58
1060	2.61	2.59	2.58
1062	2.57	2.56	2.55
1068	2.55	2.54	2.54
1072	2.55	2.54	2.53
1076	2.53	2.53	2.51
1080	2.52	2.51	2.50
1084	2.51	2.50	2.49
1088	2.50	2.49	2.48
1092	2.50	2.48	2.47
1096	2.49	2.47	2.46
1100	2.47	2.46	2.45
1102	2.47	2.46	2.45
1104	2.47	2.45	2.43
1106	2.46	2.45	2.45
1108	2.46	2.45	2.45
1110	2.46	2.45	2.43
1112	2.45	2.44	2.42
1114	2.45	2.44	2.43
1116	2.44	2.42	2.41
1118	2.42	2.41	2.40
1120	2.43	2.42	2.40
1122	2.41	2.40	2.40
1124	2.43	2.41	2.40
1126	2.42	2.41	2.40
1128	2.42	2.40	2.39
1130	2.41	2.40	2.38
1132	2.40	2.39	2.38
1135	2.39	2.39	2.37
1140	2.39	2.38	2.37
1145	2.37	2.36	2.35
1150	2.37	2.36	2.35
1155	2.37	2.36	2.35
1158	2.36	2.35	2.33
1160	2.36	2.35	2.35
1164	2.35	2.34	2.34

## Typical Performance Curves



## Typical Performance Curves

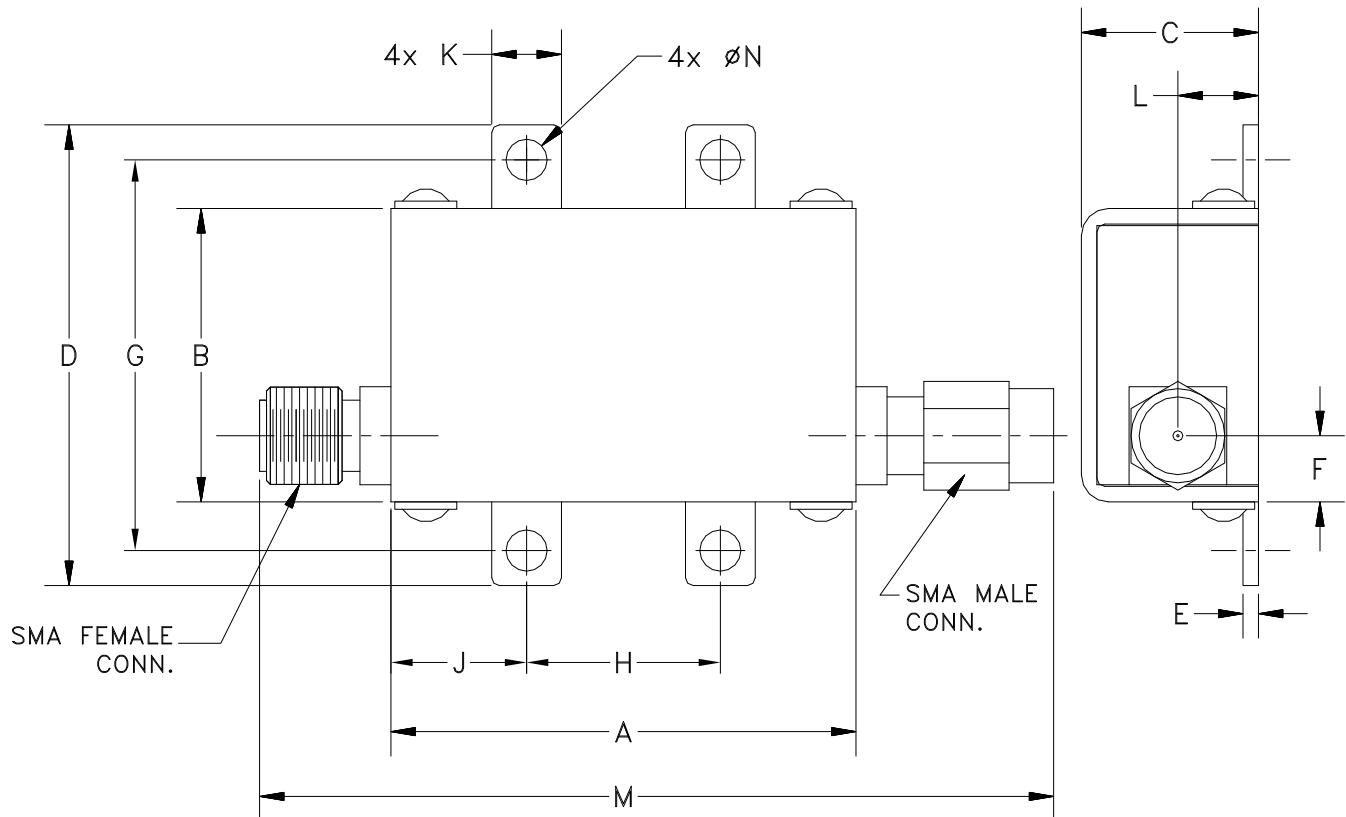


# Case Style

# HY

## Outline Dimensions

## HY1238



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N	WT GRAMS
HY1238	1.20 (30.48)	.75 (19.05)	.46 (11.68)	1.18 (29.97)	.04 (1.02)	.17 (4.32)	1.00 (25.40)	.50 (12.70)	.35 (8.89)	.18 (4.57)	.21 (5.28)	2.05 (52.07)	.106 (2.69)	35.0

Dimensions are in inches (mm). Tolerances: 2Pl.  $\pm .03$ ; 3Pl.  $\pm .015$   
 Tolerance on hole size and interaxes dimensions to be  $\pm .005$ .

### Note:

1. Case material: Brass
2. Case finish: Nickel plate

**Mini-Circuits®**

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Mini-Circuits ISO 9001 & ISO 14001 Certified



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, Condition 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