

# Coaxial Bandpass Filter

## ZX75BP-960-S+

50Ω 30 to 1890 MHz

### The Big Deal

- Low insertion loss of typ. 0.6dB at center frequency
- Good Matching and good out of band rejection
- Stopband up to 8 GHz
- Excellent temperature stability
- Rugged construction to handle demanding environmental conditions.



Generic photo used for illustration purposes only  
CASE STYLE: HY1239

### Product Overview

ZX75BP-960-S+ is a low loss bandpass filter in a rugged connectorized package covering 30 to 1890 MHz. This offers lower pass band insertion loss and good rejection. It has repeatable performance across lots and consistent performance across temperature.

### Key Features

Feature	Advantages
Low insertion loss	Lower insertion loss result in better SNR in receiver front end and better power delivery to antenna in transmitter.
Good matching and good out of band rejection	This filter has good matching, which enables maximum power transform and better out of band rejection results in wide spur free band.
Wide stopband	Wide spur-free stopband results in better receiver sensitivity
Temperature stability	Very minimal change in electrical performance across temperature makes these filters suitable for a wide range of operating conditions
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 cycle

#### Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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)



# Bandpass Filter

## ZX75BP-960-S+

50Ω 30 to 1890 MHz



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CASE STYLE: HY1239

Connectors	Model
SMA-F	ZX75BP-960-S+

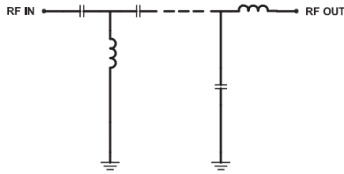
### Features

- Wide passband
- Low insertion loss, 0.6dB typ.
- Higher rejection, 50dB typ.
- Good VSWR, 1.5:1 typ.
- Connectorized package
- Wide stopband up to 8GHz (center frequency x 8)

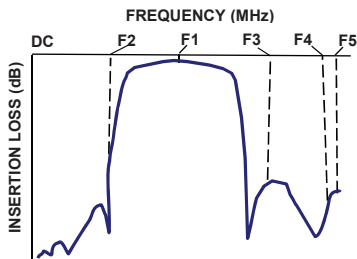
### Applications

- All GPS bands
- UHF Military Radios
- LTE
- Mobile communication
- Satellite communication

### Functional Schematic



### Typical Frequency Response



### Electrical Specifications at 25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	-	-	960	-	MHz
	3 dB Bandwidth	-	1860	-	-	MHz
	Insertion Loss	F1	960	0.6	1	dB
	VSWR	F1	960	1.5	-	:1
Stop Band, Lower	Insertion Loss	DC-F2	DC - 25	45	50	dB
Stop Band, Upper	Insertion Loss	F3-F4	2450 - 6000	45	50	dB
		F4-F5	6000 - 8000	-	50	dB

### Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	1 W Max @25°C.

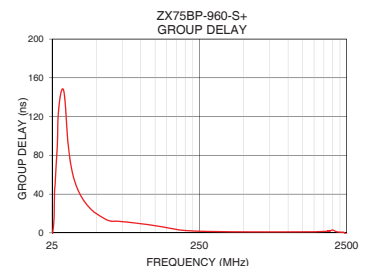
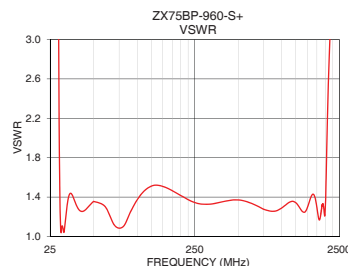
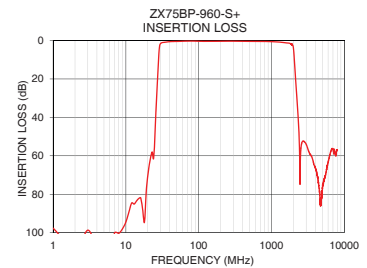
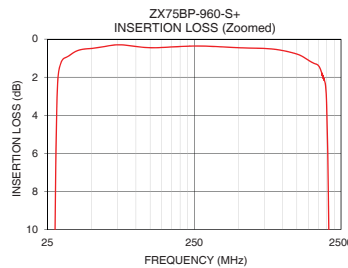
Permanent damage may occur if any of these limits are exceeded.

### Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (ns)
1.0	97.64	59289.35	30.0	146.64
10.0	94.43	1339.38	150.0	5.41
20.0	70.33	152.40	270.0	1.56
25.0	51.00	43.90	390.0	1.18
26.4	30.15	25.89	510.0	1.06
27.2	20.48	16.42	630.0	1.01
29.0	3.12	1.76	750.0	1.00
30.0	1.56	1.09	870.0	1.00
500.0	0.45	1.37	890.0	1.00
960.0	0.57	1.27	960.0	1.01
1800.0	1.54	1.18	1050.0	1.02
1890.0	2.01	1.29	1140.0	1.03
1986.0	3.05	1.21	1240.0	1.06
2146.0	20.00	2.97	1320.0	1.09
2238.0	30.08	3.75	1410.0	1.12
2450.0	63.79	6.71	1500.0	1.17
4500.0	76.82	4.45	1620.0	1.28
6000.0	63.49	1.32	1700.0	1.39
7000.0	56.53	1.22	1800.0	1.56
8000.0	57.15	2.44	1890.0	1.84

### +RoHS Compliant

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



### Notes

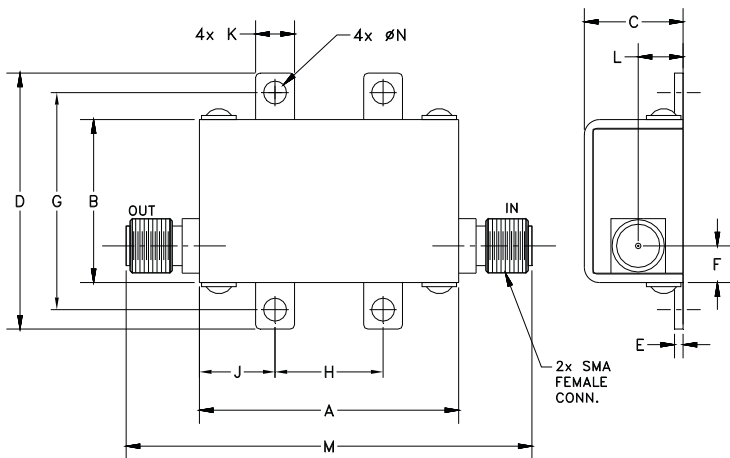
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## Coaxial Connections

PORT - 1	SMA-FEMALE
PORT - 2	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>1.88</b>	<b>.106</b>	grams
12.70	8.89	4.57	5.28	47.75	2.69	35.0

Note: Please refer to case style drawing for details

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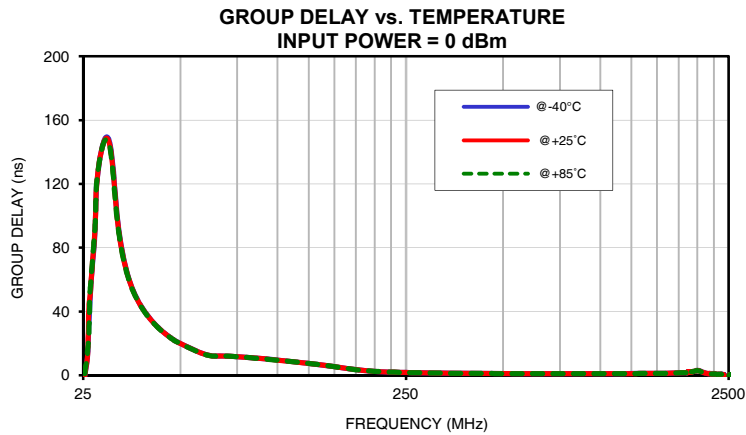
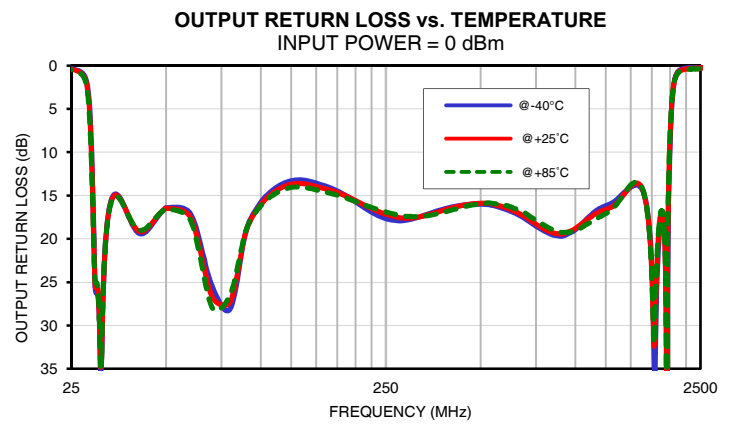
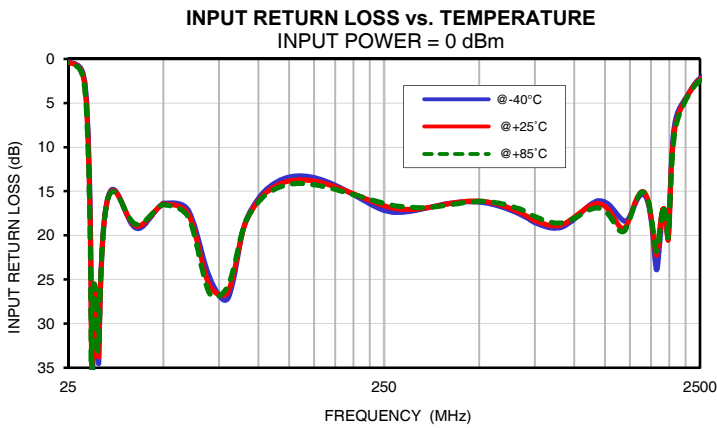
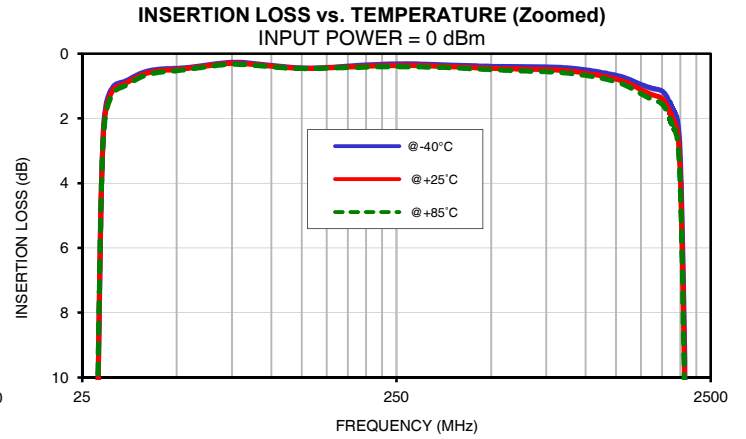
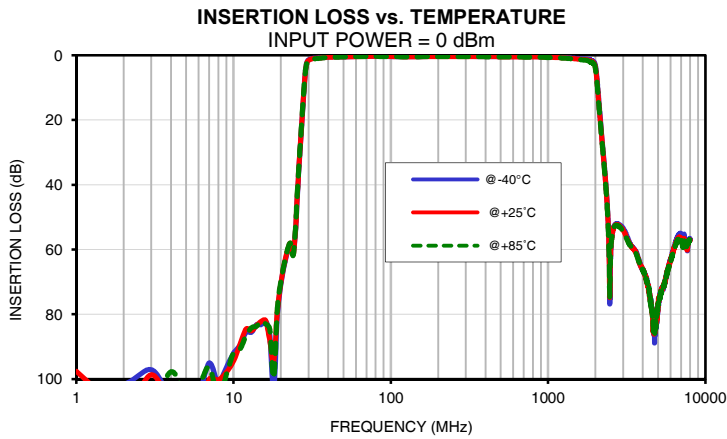
*Typical Performance Data*

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	103.09	97.64	103.82	0.00	0.00	0.00	0.00	0.00	0.00
2	101.63	108.67	117.43	0.00	0.00	0.00	0.00	0.00	0.00
4	105.18	107.12	97.77	0.00	0.00	0.00	0.00	0.00	0.00
6	104.47	110.84	102.23	0.00	0.00	0.00	0.00	0.00	0.01
8	101.14	100.32	105.93	0.01	0.01	0.01	0.01	0.01	0.01
10	92.04	94.43	91.97	0.01	0.01	0.01	0.02	0.02	0.02
12	85.57	84.58	86.57	0.02	0.02	0.03	0.02	0.03	0.03
14	83.24	83.50	83.67	0.03	0.03	0.04	0.04	0.04	0.05
16	82.14	81.94	82.97	0.04	0.05	0.06	0.05	0.07	0.08
18	103.71	94.54	99.76	0.06	0.07	0.09	0.08	0.10	0.11
20	70.88	70.33	69.85	0.10	0.11	0.13	0.13	0.14	0.16
21	64.95	64.52	64.48	0.12	0.14	0.16	0.15	0.18	0.20
22	60.59	60.40	60.17	0.15	0.18	0.20	0.19	0.22	0.24
23	58.18	58.04	58.04	0.20	0.23	0.26	0.23	0.27	0.30
24	61.02	61.42	61.63	0.26	0.29	0.33	0.29	0.34	0.38
25	51.88	51.00	50.13	0.35	0.40	0.44	0.38	0.43	0.48
26	35.75	35.25	34.71	0.50	0.56	0.63	0.52	0.59	0.66
27	23.28	22.86	22.39	0.82	0.92	1.04	0.80	0.91	1.02
28	11.48	11.15	10.81	2.04	2.31	2.61	1.91	2.17	2.45
29	3.08	3.12	3.16	10.23	11.21	12.32	9.46	10.28	11.17
30	1.44	1.56	1.68	28.87	27.73	26.71	26.26	25.67	25.04
100	0.37	0.39	0.41	15.81	16.08	16.22	15.83	16.08	16.20
200	0.35	0.39	0.41	15.40	15.28	15.39	15.71	15.57	15.69
300	0.32	0.37	0.41	17.29	17.04	16.80	17.73	17.59	17.42
400	0.36	0.41	0.45	16.38	16.41	16.56	16.38	16.48	16.74
500	0.39	0.45	0.49	16.23	16.11	16.14	16.00	15.89	15.94
600	0.40	0.47	0.52	16.89	16.70	16.47	16.59	16.39	16.14
800	0.42	0.50	0.57	18.93	18.67	18.26	19.12	18.88	18.49
960	0.48	0.57	0.64	18.64	18.38	18.36	19.33	19.13	19.20
1100	0.56	0.67	0.74	16.77	16.82	17.22	17.53	17.68	18.22
1200	0.63	0.74	0.82	16.08	16.41	16.93	16.46	16.86	17.44
1400	0.83	0.96	1.07	18.05	19.10	19.53	14.97	15.26	15.23
1600	1.05	1.24	1.38	15.66	15.42	15.50	13.92	13.72	13.64
1700	1.11	1.32	1.47	15.96	15.70	15.67	17.13	17.30	17.44
1890	1.71	2.01	2.22	18.52	17.84	17.93	17.14	16.87	16.89
1986	2.58	3.05	3.37	20.11	20.41	20.17	12.88	11.83	11.27
2146	19.40	20.00	20.35	5.70	6.10	6.39	0.52	0.63	0.70
2238	29.62	30.08	30.38	4.60	4.74	4.89	0.31	0.42	0.49
2400	49.46	50.15	50.73	2.89	2.96	3.08	0.22	0.32	0.39
2450	62.09	63.79	64.96	2.50	2.61	2.74	0.21	0.30	0.37
2800	52.21	52.47	52.70	1.70	1.98	2.18	0.17	0.26	0.32
3000	53.36	53.91	54.41	2.55	3.03	3.32	0.16	0.24	0.30
3200	56.28	56.99	57.23	5.26	5.52	5.63	0.15	0.23	0.28
3400	58.96	59.24	59.23	7.66	7.45	7.31	0.15	0.22	0.27
3600	60.49	60.61	60.88	10.15	10.08	9.96	0.15	0.22	0.27
3800	63.65	64.10	64.01	13.32	13.89	14.13	0.13	0.20	0.24
4000	66.38	66.03	66.25	16.93	18.01	18.20	0.12	0.20	0.23
4200	68.55	68.88	69.41	9.35	8.57	8.42	0.15	0.22	0.26
4400	72.84	73.77	73.48	5.01	4.79	4.75	0.14	0.21	0.26
4600	78.27	80.23	80.03	3.47	3.48	3.53	0.13	0.20	0.24
4800	86.50	82.79	82.28	3.09	3.32	3.45	0.15	0.23	0.28
5000	78.06	77.76	77.28	3.41	3.79	3.97	0.13	0.23	0.29
5200	73.79	73.17	73.82	4.42	4.92	5.13	0.11	0.20	0.25
5400	71.40	71.43	71.18	5.90	6.55	6.83	0.16	0.25	0.30
5600	68.79	68.92	69.06	7.52	8.28	8.73	0.15	0.26	0.33
6000	62.96	63.49	63.70	14.44	17.19	18.41	0.14	0.24	0.30
6500	57.51	58.06	58.39	10.49	10.64	10.91	0.09	0.22	0.30
7000	55.19	56.53	57.03	17.36	20.03	19.81	0.12	0.27	0.37
7500	57.81	58.65	58.48	8.99	9.17	9.35	0.24	0.42	0.55
8000	56.92	57.15	56.77	7.01	7.58	7.79	0.18	0.30	0.41

## Typical Performance Data

FREQ.  (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
30	147.78	146.64	145.43
80	11.19	11.17	11.14
130	7.04	7.02	7.00
180	3.21	3.20	3.19
230	1.92	1.92	1.91
280	1.52	1.51	1.50
330	1.32	1.31	1.30
380	1.20	1.19	1.19
430	1.13	1.12	1.12
480	1.08	1.08	1.07
530	1.05	1.05	1.04
580	1.03	1.03	1.02
630	1.02	1.01	1.01
680	1.01	1.01	1.00
730	1.01	1.00	0.99
780	1.01	1.00	0.99
830	1.01	1.00	0.99
880	1.01	1.00	0.99
930	1.01	1.00	1.00
980	1.02	1.01	1.00
1030	1.02	1.02	1.01
1080	1.03	1.02	1.02
1130	1.04	1.03	1.03
1180	1.05	1.04	1.04
1230	1.06	1.06	1.05
1280	1.08	1.08	1.07
1330	1.10	1.09	1.09
1380	1.12	1.11	1.11
1430	1.14	1.13	1.13
1480	1.16	1.16	1.15
1530	1.20	1.19	1.19
1580	1.24	1.23	1.23
1630	1.29	1.29	1.28
1680	1.36	1.36	1.35
1730	1.44	1.44	1.44
1780	1.52	1.52	1.51
1830	1.61	1.61	1.60
1850	1.62	1.62	1.62
1860	1.72	1.72	1.71
1890	1.84	1.84	1.83

## Typical Performance Curves

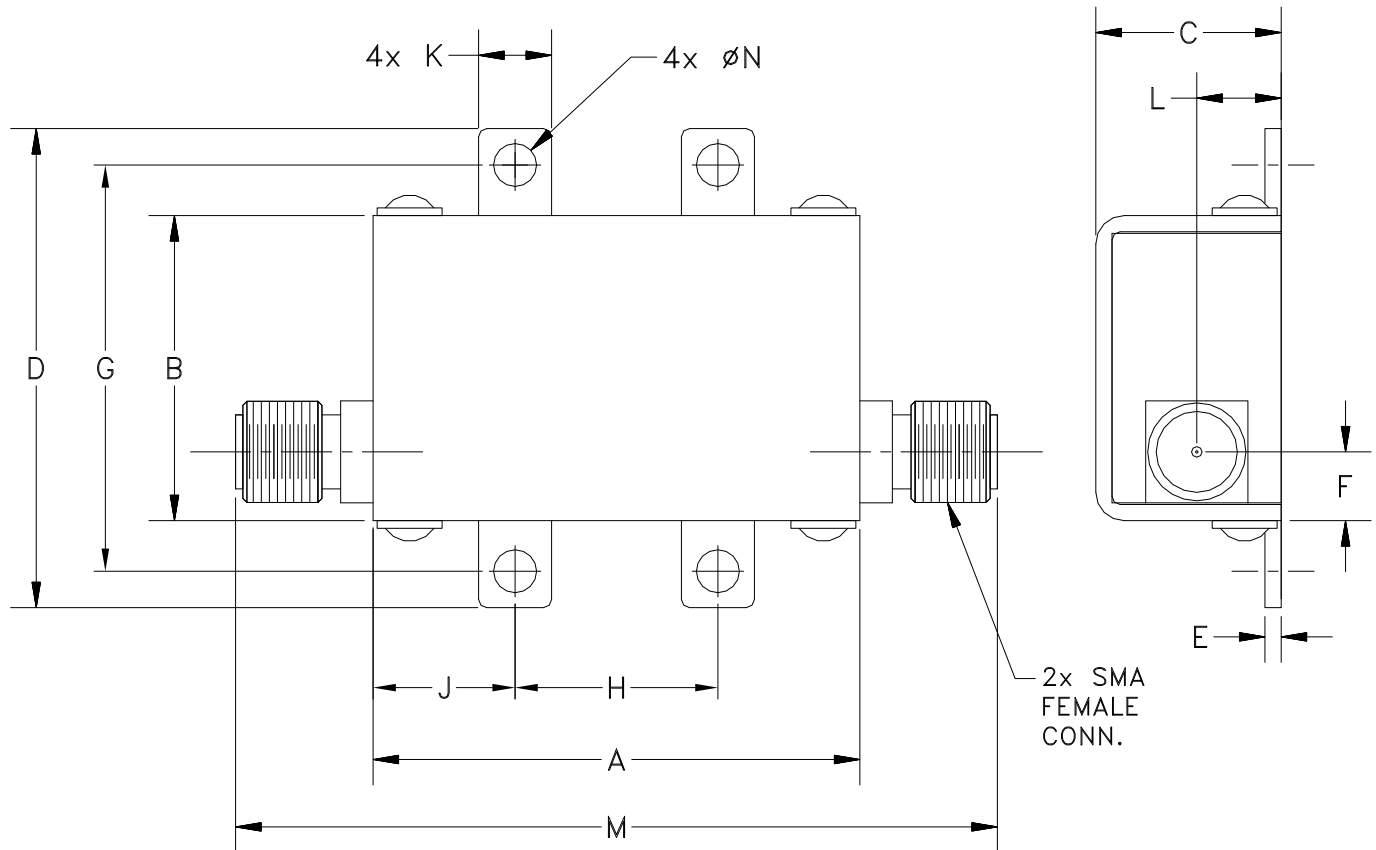


# Case Style

# HY

## Outline Dimensions

## HY1239



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N	WT GRAMS
HY1239	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)	1.88 (47.75)	.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

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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