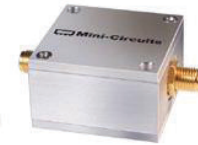


# Coaxial Bandpass Filter

## ZFBP-2400-S+

50Ω 2300 to 2500 MHz



Generic photo used for illustration purposes only  
CASE STYLE: H16

### The Big Deal

- Narrow bandwidth
- Good VSWR, 1.3:1 typical
- High rejection, 50 dB typical
- Flat group delay, 0.3 ns typical
- High power, 8.5W

### Product Overview

ZFBP-2400-S+ is a 50Ω narrow band filter built into a shielded (size: 1.25" x 1.25" x 0.75") case. Covering a bandwidth of 2400 MHz ± 100 MHz, this filter offers good matching in the passband and high rejection in the stopband. Power handling capacity is as high as 8.5W at 25°C.

### Key Features

Feature	Advantages
Narrow bandwidth (Fractional bandwidth of 8.3%)	Suitable for Narrow bandwidth applications like Wireless Communication Service and ISM.
Good VSWR, 1.3:1 typical	The model has good return loss for a narrow bandwidth which provides good matching when used with other devices.
High rejection (50 dB typical on lower side band and > 35 dB rejection till 6000 MHz on upper side band)	This enables the filter to attenuate sub harmonics and spurious signals.
Flat group delay characteristics (0.3 ns typical)	The model has a group delay flatness of 0.3 ns which helps in reducing the signal distortion.
High power (8.5W)	Suitable for base station and long-haul applications and test labs.

#### Notes

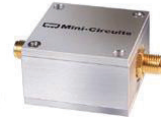
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# Bandpass Filter

50Ω 2300 to 2500 MHz

## ZFBP-2400-S+



Generic photo used for illustration purposes only

CASE STYLE: H16

Connectors Model

SMA-FEMALE ZFBP-2400-S+  
BRACKET (OPTION "B")

### Features

- High rejection, 50 dB typical
- Flat group delay over passband, 0.3 ns typical
- Good VSWR, 1.3:1 typical in passband
- Connectorized package

### Applications

- Harmonic rejection
- Transmitters / receivers
- Lab use

### Electrical Specifications at 25°C

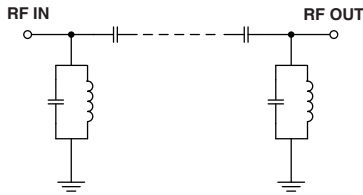
Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit	
Pass Band	Center Frequency	—	—	2400	—	MHz	
	Insertion Loss	F1-F2	2300-2500	—	2.2	3.5	dB
	VSWR	F1-F2	2300-2500	—	1.3	1.65	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-1800	20	30	—	dB
	VSWR	DC-F3	DC-1800	—	50	—	:1
Stop Band, Upper	Insertion Loss	F4-F5	2800-6000	20	28	—	dB
	VSWR	F4-F5	2800-6000	—	16	—	:1

### Maximum Ratings

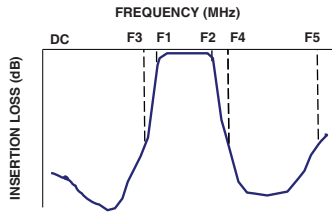
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power Input*	8.5W max. at 25°C

\* Derate linearly to 4W at 100°C ambient.  
Permanent damage may occur if any of these limits are exceeded.

### Functional Schematic



### Typical Frequency Response

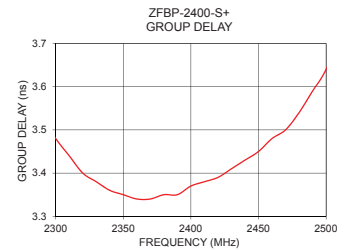
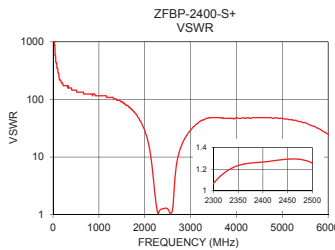
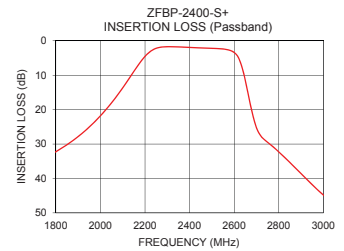
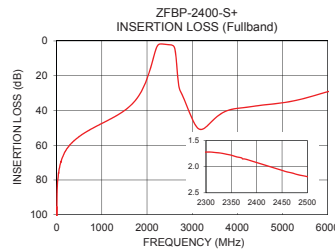


### Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
0.5	95.43	1737.18	2300.0	3.48
500.0	55.03	144.77	2310.0	3.44
1100.0	46.14	115.81	2320.0	3.40
1800.0	32.22	56.04	2330.0	3.38
2070.0	16.34	18.70	2340.0	3.36
2150.0	8.89	7.94	2350.0	3.35
2200.0	4.52	3.42	2360.0	3.34
2270.0	1.86	1.19	2370.0	3.34
2300.0	1.72	1.07	2380.0	3.35
2400.0	1.92	1.07	2390.0	3.35
2500.0	2.19	1.26	2400.0	3.37
2600.0	3.40	1.14	2410.0	3.38
2620.0	5.02	1.52	2420.0	3.39
2660.0	14.64	4.39	2430.0	3.41
2800.0	32.28	15.81	2440.0	3.43
3050.0	47.48	32.79	2450.0	3.45
3300.0	49.58	44.55	2460.0	3.48
4800.0	36.24	46.96	2470.0	3.50
5600.0	32.22	36.20	2480.0	3.54
6000.0	29.22	24.83	2500.0	3.64

### +RoHS Compliant

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



### Notes

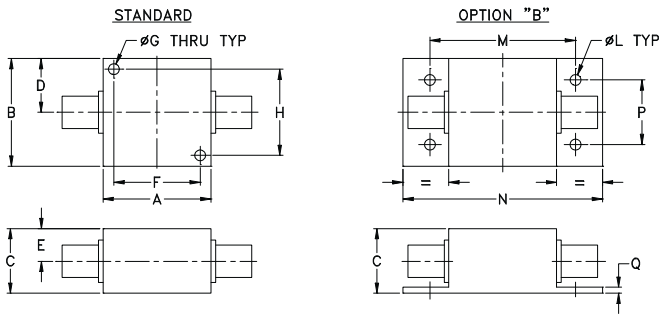
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## Coaxial Connections

PORT - 1	SMA female
PORT - 2	SMA female

## Outline Drawing



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

A	B	C	D	E	F	G	H
1.25	1.25	.75	.63	.38	1.000	.125	1.000
31.75	31.75	19.05	16.00	9.65	25.40	3.18	25.40
J	K	L	M	N	P	Q	wt
--	--	.125	1.688	2.18	.750	.06	grams
--	--	3.18	42.88	55.37	19.05	1.52	70.0

*Note: Please refer to case style drawing for details*

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*Typical Performance Data*

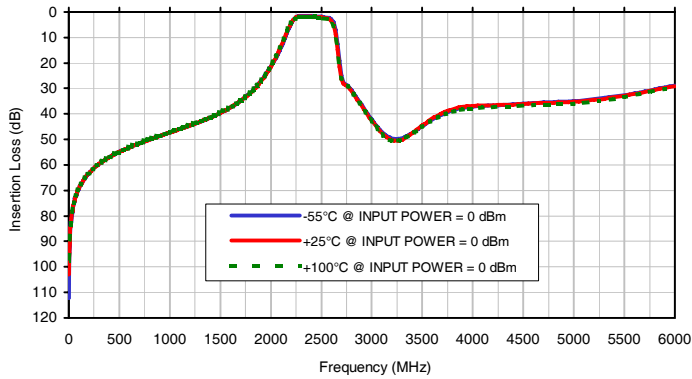
FREQ. (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-55°C	@+25°C	@+100°C	@-55°C	@+25°C	@+100°C	@-55°C	@+25°C	@+100°C
0.5	96.14	94.39	97.38	0.02	0.01	0.01	0.02	0.01	0.00
1.0	106.73	99.83	96.21	0.01	0.01	0.01	0.01	0.00	0.00
50.0	75.41	74.89	74.81	0.01	0.03	0.04	0.00	0.02	0.04
100.0	69.45	69.25	69.08	0.03	0.05	0.06	0.01	0.04	0.06
1000.0	47.29	47.30	47.22	0.09	0.14	0.19	0.01	0.14	0.22
1100.0	45.91	45.90	45.88	0.09	0.14	0.19	0.00	0.14	0.23
1200.0	44.51	44.50	44.42	0.09	0.15	0.20	0.00	0.15	0.24
1300.0	43.03	43.02	42.94	0.09	0.16	0.21	0.01	0.16	0.26
1400.0	41.43	41.41	41.30	0.10	0.17	0.23	0.00	0.17	0.28
1500.0	39.61	39.61	39.50	0.11	0.18	0.25	0.01	0.19	0.31
1600.0	37.50	37.45	37.41	0.13	0.21	0.28	0.02	0.22	0.34
1700.0	34.91	34.85	34.87	0.16	0.25	0.32	0.04	0.25	0.39
1800.0	31.56	31.80	31.60	0.21	0.32	0.40	0.09	0.32	0.47
1900.0	27.12	27.45	27.24	0.31	0.42	0.51	0.18	0.42	0.58
2000.0	21.32	21.49	21.31	0.56	0.63	0.73	0.40	0.62	0.79
2050.0	18.16	17.77	17.57	0.78	0.84	0.95	0.60	0.81	0.99
2100.0	14.12	13.50	13.26	1.09	1.23	1.37	0.91	1.19	1.40
2150.0	9.31	8.77	8.50	1.92	2.22	2.48	1.73	2.17	2.50
2200.0	4.70	4.41	4.23	4.55	5.32	6.01	4.34	5.29	6.08
2250.0	2.02	2.12	2.20	12.89	14.83	16.68	12.87	15.24	17.42
2300.0	1.50	1.76	1.92	24.36	22.45	21.85	25.75	23.00	22.36
2310.0	1.50	1.77	1.93	21.73	20.56	20.49	22.05	20.66	20.64
2320.0	1.51	1.78	1.94	19.98	19.34	19.65	20.00	19.30	19.68
2340.0	1.54	1.81	1.97	18.39	18.41	19.22	18.22	18.28	19.22
2360.0	1.56	1.84	1.99	18.26	18.69	19.96	18.05	18.57	19.96
2370.0	1.57	1.85	2.01	18.46	19.08	20.50	18.27	19.01	20.60
2380.0	1.58	1.86	2.02	18.80	19.61	21.13	18.68	19.64	21.38
2390.0	1.59	1.87	2.04	19.34	20.31	21.92	19.30	20.46	22.34
2400.0	1.60	1.88	2.05	20.06	21.18	22.88	20.12	21.48	23.49
2410.0	1.62	1.90	2.07	20.90	22.17	23.91	21.10	22.66	24.76
2420.0	1.63	1.92	2.10	21.73	23.16	24.78	22.11	23.90	25.83
2440.0	1.67	1.95	2.14	23.55	25.15	26.26	24.30	26.33	27.28
2460.0	1.71	2.00	2.20	25.77	27.35	27.64	26.63	28.34	27.70
2470.0	1.74	2.03	2.23	27.07	28.57	28.31	27.71	28.98	27.69
2480.0	1.76	2.06	2.26	28.51	29.91	29.02	28.75	29.51	27.75
2490.0	1.79	2.09	2.29	29.98	31.20	29.72	29.82	30.17	28.03
2500.0	1.82	2.13	2.33	31.42	32.61	30.70	31.01	31.12	28.71
2520.0	1.89	2.21	2.42	33.62	35.62	35.57	34.72	35.29	33.17
2560.0	2.14	2.51	2.74	27.47	28.09	29.34	29.34	29.93	31.05
2580.0	2.38	2.81	3.09	25.49	26.41	26.63	26.61	28.22	28.22
2600.0	2.84	3.43	3.82	25.38	23.22	22.30	28.78	26.67	24.93
2620.0	4.00	5.03	5.73	15.61	13.16	12.36	16.44	13.92	13.04
2640.0	7.02	8.85	9.96	7.99	6.89	6.58	8.13	7.11	6.83
2660.0	12.46	14.87	16.08	4.44	4.11	4.08	4.40	4.17	4.20
2780.0	29.77	30.14	30.25	1.24	1.33	1.42	1.01	1.26	1.44
2800.0	30.71	31.13	31.29	1.11	1.20	1.29	0.88	1.14	1.33
2820.0	31.78	32.21	32.40	1.00	1.10	1.18	0.78	1.05	1.23
2840.0	32.93	33.35	33.56	0.91	1.01	1.09	0.69	0.96	1.14
2860.0	34.10	34.52	34.71	0.84	0.94	1.02	0.62	0.89	1.08
2880.0	35.32	35.72	35.90	0.77	0.87	0.95	0.55	0.83	1.02
2900.0	36.52	36.91	37.07	0.71	0.81	0.89	0.50	0.78	0.97
2920.0	37.72	38.08	38.25	0.67	0.77	0.85	0.45	0.74	0.93
2960.0	40.03	40.39	40.61	0.58	0.68	0.76	0.38	0.66	0.84
3000.0	42.26	42.64	42.87	0.52	0.62	0.70	0.32	0.60	0.79
3500.0	44.76	44.46	44.97	0.21	0.33	0.44	0.03	0.35	0.57
4000.0	37.05	36.80	37.74	0.24	0.39	0.53	0.03	0.41	0.67
4500.0	35.99	36.09	36.77	0.19	0.36	0.54	0.04	0.38	0.72
5000.0	34.97	35.23	35.93	0.18	0.37	0.58	0.06	0.40	0.77
5500.0	32.58	32.85	33.43	0.26	0.47	0.69	0.01	0.49	0.89
6000.0	28.90	29.13	29.43	0.53	0.74	0.94	0.26	0.76	1.15

## Typical Performance Data

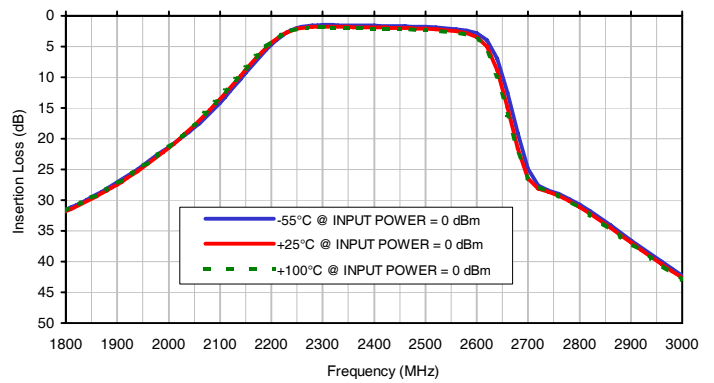
FREQ.  (MHz)	GROUP DELAY		
	(nsec)		
	@-55°C	@+25°C	@+100°C
2300.0	3.51	3.46	3.42
2310.0	3.45	3.41	3.38
2320.0	3.41	3.37	3.35
2330.0	3.37	3.34	3.32
2340.0	3.35	3.32	3.31
2350.0	3.33	3.31	3.31
2360.0	3.32	3.31	3.30
2370.0	3.32	3.31	3.31
2380.0	3.32	3.31	3.31
2390.0	3.33	3.32	3.33
2400.0	3.34	3.34	3.34
2410.0	3.35	3.35	3.35
2420.0	3.36	3.36	3.36
2430.0	3.38	3.38	3.38
2440.0	3.40	3.40	3.40
2450.0	3.42	3.43	3.43
2460.0	3.45	3.45	3.45
2470.0	3.47	3.48	3.48
2480.0	3.50	3.51	3.52
2490.0	3.54	3.55	3.56
2500.0	3.58	3.60	3.61

## Typical Performance Curves

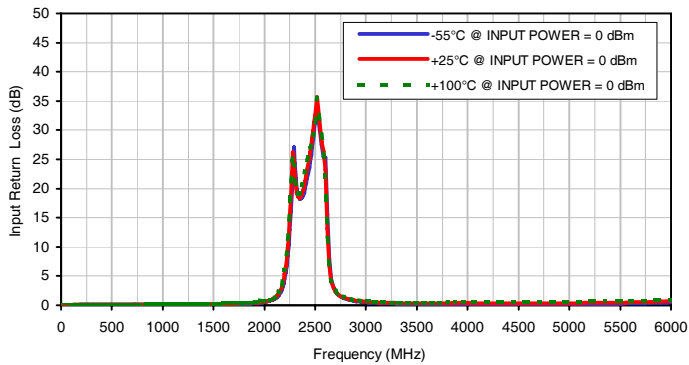
Insertion Loss vs. Temperature (Full band)



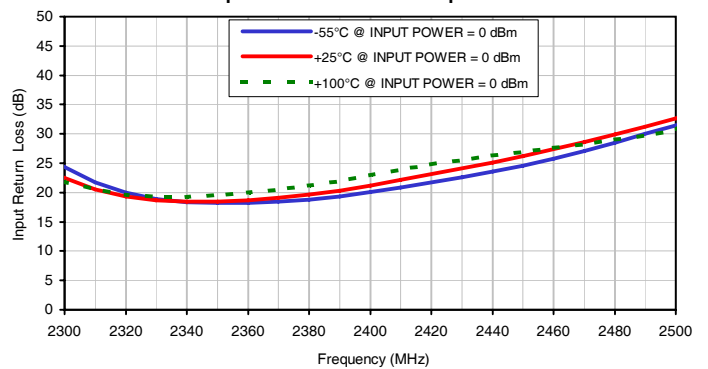
Insertion Loss vs. Temperature (Pass band)



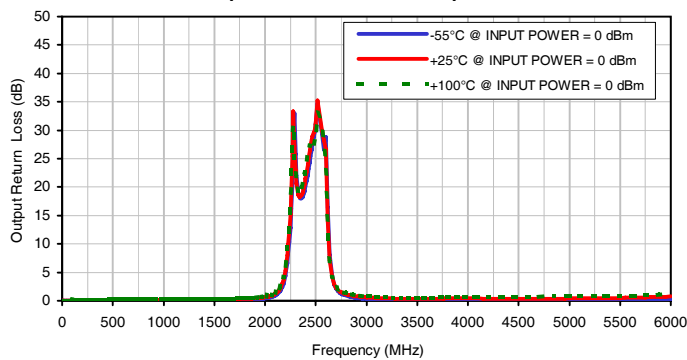
Input Return Loss vs. Temperature



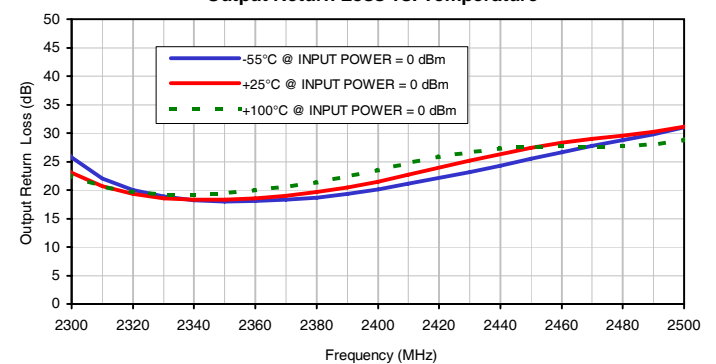
Input Return Loss vs. Temperature



Output Return Loss vs. Temperature



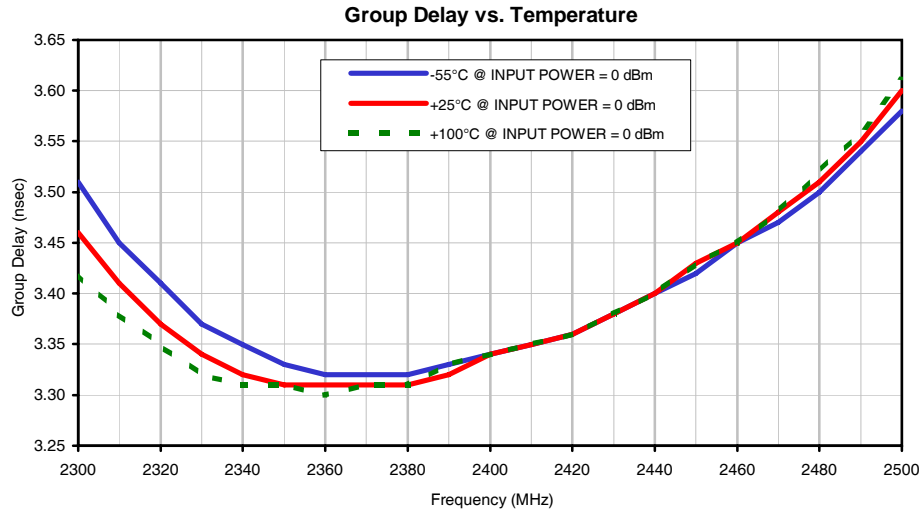
Output Return Loss vs. Temperature



# Coaxial Bandpass Filter

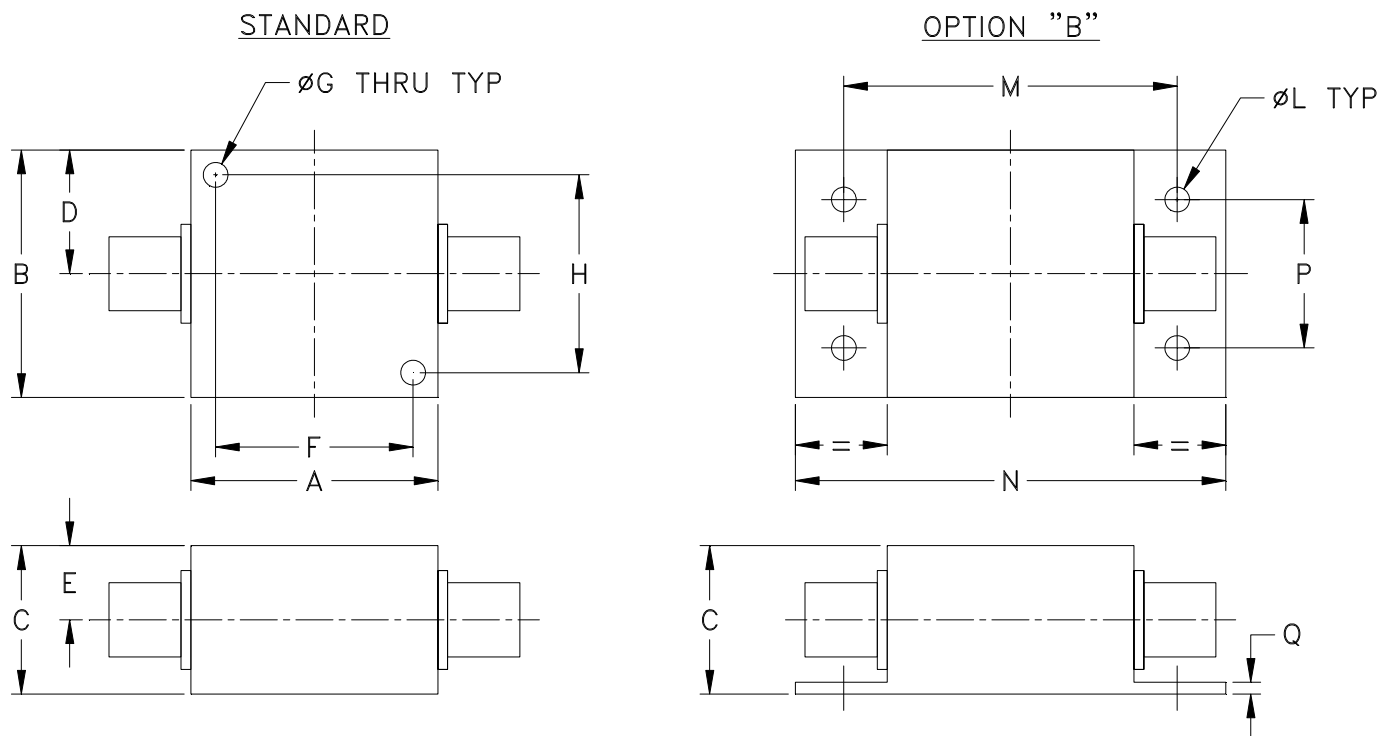
# ZFBP-2400-S+

## Typical Performance Curves



## Outline Dimensions

H16



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
H16	1.25 (31.75)	1.25 (31.75)	.750 (19.05)	.63 (16.00)	.38 (9.65)	1.000 (25.40)	.125 (3.18)	1.000 (25.40)	--	--	.125 (3.18)	1.688 (42.88)	2.18 (55.37)

CASE#	P	Q	WT.GRAMS
H16	.750 (19.05)	.06 (1.52)	70

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

### Notes:

1. Case material: Aluminum alloy.
2. Case finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
3. Mounting bracket available on request. Add suffix B to part number.
4. Bracket version, option B, dimension "C" changes from .75 to .94 inches when connectors are type N.
5. Refer to the individual model data sheet for the type of connectors available.

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RF/IF MICROWAVE COMPONENTS



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