Coaxial

Bandpass Filter

ZFBP-400K-S+

50Ω 0.35 to 0.45 MHz

Generic photo used for illustration purposes only
CASE STYLE: H16

The Big Deal

- Very low frequency bandpass filter
- Extended stopband all the way up to 200 MHz
- Connectorized package

Product Overview

ZFBP-400K-S+ is a 50Ω bandpass filter. This is built into a rugged connectorized package of size 1.25" x 1.25" x 0.75". This offers very good matching in passband and excellent stopband rejection. This is suitable for semiconductor processing equipment and other instrumentation applications for low frequency RF and signal processing.

Key Features

Feature	Advantages
Good passband insertion loss	Low insertion loss suitable for high performance application.
Sharp roll-off	Excellent near band rejection.
Extended stopband rejection	Spurious rejection and avoids using additional filters.

Coaxial

Bandpass Filter

50Ω 0.35 to 0.45 MHz

ZFBP-400K-S+

Generic photo used for illustration purposes only

CASE STYLE: H16

Connectors	Model
SMA-FEMALE BRACKET (OPTION "B")	ZFBP-400K-S+

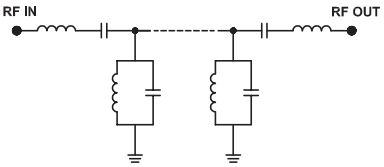
Features

- High Stopband rejection
- Sharp roll-off
- Connectorized package

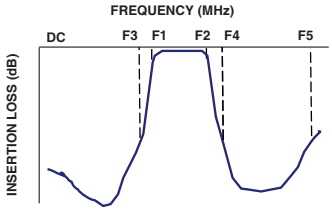
Applications

- Harmonic rejection
- Instrumentation
- Industrial processing equipments
- Lab use

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	—	—	—	0.4	—	MHz
	Insertion Loss	F1-F2	0.35 - 0.45	—	1.1	3.0	dB
	VSWR	F1-F2	0.35 - 0.45	—	1.5	2.0	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 0.18	20	33	—	dB
	VSWR	DC-F3	DC - 0.18	—	67	—	:1
Stop Band, Upper	Insertion Loss	F4-F5	0.8 - 200	20	34	—	dB
	VSWR	F4-F5	0.8 - 200	—	19	—	:1

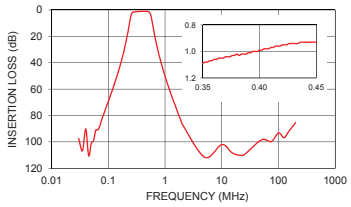
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.5W max.

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

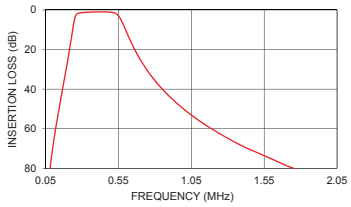
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
0.100	69.34	434.30	0.350	3952.77
0.180	34.59	69.49	0.352	3924.83
0.200	26.28	42.38	0.354	3886.64
0.225	15.16	16.72	0.356	3857.77
0.240	8.25	6.61	0.358	3825.18
0.255	3.22	2.10	0.400	3439.26
0.275	1.61	1.32	0.416	3390.83
0.350	1.09	1.41	0.420	3386.64
0.400	0.99	1.40	0.424	3378.61
0.450	0.93	1.19	0.426	3371.04
0.525	1.51	1.49	0.430	3364.52
0.560	3.96	3.59	0.432	3374.76
0.585	7.65	7.80	0.434	3375.23
0.625	14.37	18.90	0.436	3376.39
0.800	35.65	66.82	0.436	3376.39
1.200	60.56	173.72	0.438	3375.58
2.000	86.38	347.44	0.440	3390.13
50.000	98.50	347.44	0.442	3383.26
100.000	93.23	217.15	0.444	3386.29
200.000	85.40	29.46	0.450	3390.13

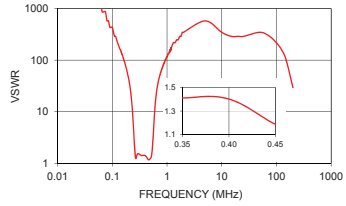
ZFBP-400K-S+
INSERTION LOSS (Full band)



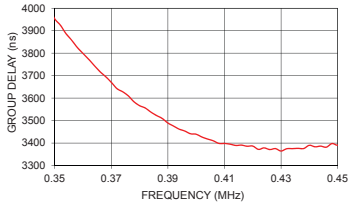
ZFBP-400K-S+
INSERTION LOSS (Passband)



ZFBP-400K-S+
VSWR



ZFBP-400K-S+
GROUP DELAY



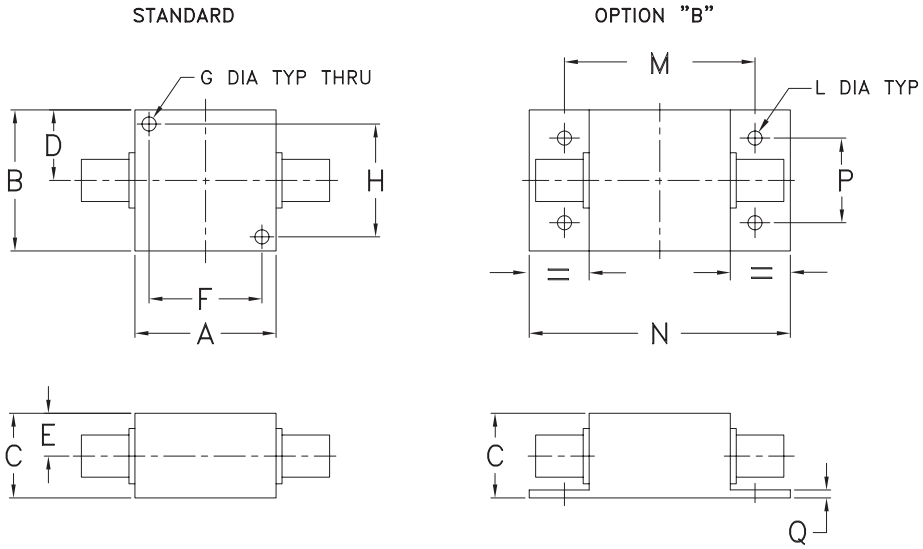
Notes

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
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

Coaxial Band Pass Filter ZFBP-400K-S+

Typical Performance Data

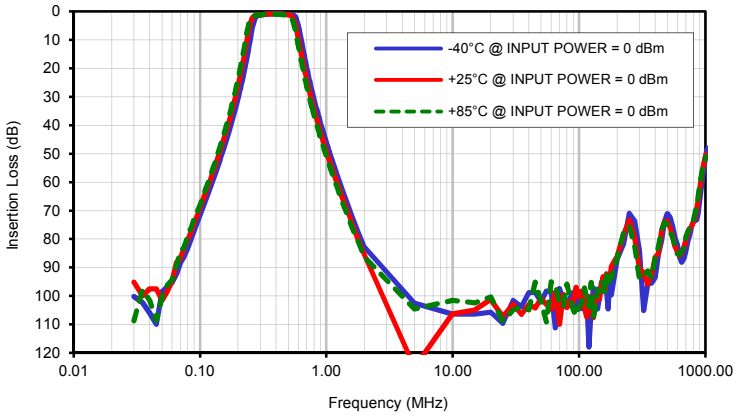
FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
0.100	71.67	69.09	67.82	0.04	0.05	0.05	0.03	0.05	0.05
0.110	66.89	64.12	62.86	0.04	0.06	0.06	0.04	0.06	0.06
0.120	62.27	59.50	58.19	0.05	0.07	0.08	0.05	0.07	0.07
0.130	57.96	55.09	53.67	0.06	0.09	0.09	0.06	0.09	0.09
0.140	53.85	50.82	49.33	0.08	0.11	0.12	0.07	0.10	0.12
0.144	52.26	49.15	47.64	0.09	0.11	0.13	0.08	0.11	0.12
0.148	50.65	47.52	45.91	0.09	0.12	0.13	0.08	0.12	0.14
0.150	49.83	46.68	45.09	0.09	0.13	0.14	0.09	0.13	0.14
0.154	48.28	45.03	43.40	0.10	0.14	0.16	0.10	0.14	0.16
0.158	46.71	43.40	41.71	0.11	0.15	0.17	0.10	0.15	0.17
0.160	45.94	42.58	40.88	0.11	0.15	0.18	0.11	0.15	0.18
0.164	44.39	40.96	39.20	0.12	0.17	0.19	0.12	0.17	0.20
0.168	42.85	39.34	37.53	0.13	0.18	0.21	0.13	0.18	0.21
0.170	42.09	38.53	36.69	0.14	0.19	0.22	0.13	0.19	0.23
0.174	40.56	36.90	35.02	0.14	0.21	0.24	0.15	0.21	0.25
0.178	39.04	35.28	33.33	0.16	0.22	0.26	0.16	0.23	0.28
0.180	38.27	34.46	32.48	0.16	0.23	0.27	0.17	0.24	0.29
0.200	30.62	26.15	23.79	0.25	0.37	0.47	0.26	0.40	0.51
0.225	20.63	15.00	12.07	0.49	0.90	1.35	0.56	1.04	1.61
0.240	14.21	8.08	5.51	0.90	2.26	4.00	1.09	2.71	4.89
0.255	7.66	3.10	2.27	2.31	7.26	11.17	2.91	8.99	15.31
0.275	2.24	1.48	1.49	10.02	15.54	15.85	13.17	18.96	17.64
0.280	1.80	1.39	1.41	12.83	15.71	16.30	17.79	17.71	17.35
0.300	1.30	1.17	1.19	15.17	17.52	20.18	16.44	17.91	20.33
0.340	0.99	0.94	1.02	19.14	24.71	22.45	19.45	27.98	23.90
0.350	0.93	0.91	1.00	21.24	24.79	22.59	22.01	27.54	23.33
0.360	0.89	0.90	0.99	23.68	24.93	23.24	25.37	26.26	22.89
0.370	0.86	0.89	0.99	26.40	25.35	24.31	30.03	25.07	22.51
0.376	0.85	0.89	0.99	28.24	25.72	25.09	34.15	24.44	22.27
0.380	0.84	0.89	0.99	29.60	25.99	25.63	38.15	24.04	22.09
0.390	0.83	0.89	1.00	33.76	26.56	26.87	42.97	23.10	21.60
0.400	0.82	0.89	1.00	38.91	26.63	27.35	33.23	22.20	21.04
0.406	0.82	0.90	1.01	38.96	26.30	27.03	30.26	21.67	20.69
0.410	0.83	0.91	1.02	36.85	25.91	26.59	28.75	21.31	20.44
0.416	0.82	0.92	1.03	33.36	25.13	25.68	26.87	20.78	20.06
0.420	0.83	0.92	1.04	31.32	24.52	24.98	25.80	20.43	19.80
0.426	0.84	0.94	1.06	28.76	23.53	23.90	24.37	19.89	19.40
0.430	0.84	0.95	1.07	27.30	22.86	23.19	23.51	19.54	19.14
0.436	0.85	0.96	1.09	25.39	21.88	22.20	22.34	19.01	18.73
0.440	0.86	0.98	1.11	24.27	21.26	21.60	21.60	18.66	18.46
0.446	0.87	1.00	1.13	22.76	20.40	20.82	20.59	18.16	18.09
0.450	0.88	1.01	1.15	21.87	19.88	20.39	19.96	17.84	17.87
0.525	1.17	1.48	2.07	18.36	22.16	13.46	16.12	16.12	11.57
0.560	1.63	3.62	5.52	16.41	6.14	4.04	13.57	5.70	3.77
0.580	2.81	6.30	8.69	7.84	3.17	2.24	7.24	2.97	2.11
0.585	3.28	7.07	9.53	6.58	2.73	1.97	6.12	2.56	1.86
0.600	5.04	9.52	12.07	3.98	1.82	1.41	3.73	1.72	1.35
0.625	8.74	13.61	16.15	1.92	1.08	0.93	1.80	1.03	0.91
0.650	12.66	17.46	19.91	1.12	0.76	0.70	1.05	0.74	0.69
0.800	30.98	34.67	36.60	0.32	0.29	0.30	0.31	0.30	0.31
1.000	46.12	49.21	50.89	0.18	0.16	0.17	0.18	0.17	0.18
1.200	56.74	59.55	61.11	0.12	0.11	0.12	0.12	0.12	0.13
1.600	71.94	74.41	75.93	0.08	0.07	0.07	0.08	0.08	0.08
2.000	82.79	85.49	86.25	0.06	0.05	0.05	0.06	0.06	0.06
10.000	106.36	106.22	101.48	0.04	0.05	0.06	0.03	0.05	0.06
50.000	102.01	100.98	101.62	0.04	0.05	0.05	0.04	0.05	0.05
100.000	100.24	100.24	103.74	0.05	0.08	0.09	0.04	0.08	0.09
150.000	95.13	96.21	95.47	0.12	0.20	0.25	0.12	0.22	0.27
200.000	87.26	86.18	86.58	0.55	0.94	1.15	0.76	1.35	1.72
400.000	93.50	86.34	86.48	1.26	1.62	1.87	1.02	1.51	1.73
600.000	81.99	84.53	85.08	0.98	1.00	1.09	0.50	0.59	0.67
800.000	73.99	74.23	73.47	0.57	0.76	0.89	0.43	0.64	0.74
1000.000	51.18	50.98	51.63	2.34	2.28	2.16	1.66	2.71	2.92

Typical Performance Data

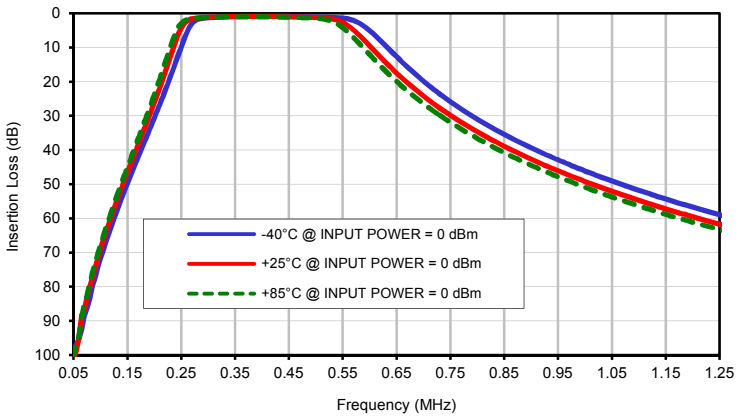
FREQ. (MHz)	GROUP DELAY (ns)		
	@-40°C	@+25°C	@+85°C
0.3500	4034.26	3932.98	3892.00
0.3520	4006.08	3906.90	3867.32
0.3540	3962.31	3865.45	3836.35
0.3560	3924.83	3831.69	3811.55
0.3580	3888.51	3808.99	3781.05
0.3600	3857.31	3781.87	3757.07
0.3620	3817.96	3756.26	3735.30
0.3640	3799.33	3738.79	3720.05
0.3660	3765.45	3705.15	3690.25
0.3680	3735.65	3679.66	3672.79
0.3700	3708.64	3659.05	3654.39
0.3720	3688.39	3637.28	3636.93
0.3740	3658.24	3613.65	3619.70
0.3760	3638.79	3602.94	3612.14
0.3780	3618.19	3584.66	3595.72
0.3800	3592.58	3564.75	3580.47
0.3820	3565.92	3544.61	3557.89
0.3840	3544.15	3530.06	3545.31
0.3860	3524.71	3515.98	3530.41
0.3880	3500.26	3499.91	3519.00
0.3900	3484.66	3484.66	3510.62
0.3920	3465.57	3469.88	3501.89
0.3940	3449.15	3456.14	3484.66
0.3960	3429.36	3443.10	3485.01
0.3980	3422.15	3435.88	3467.08
0.4000	3400.03	3416.79	3453.34
0.4020	3383.96	3410.27	3447.29
0.4040	3368.71	3396.18	3444.26
0.4060	3354.62	3391.64	3420.98
0.4080	3336.23	3371.74	3423.31
0.4100	3329.83	3369.87	3425.99
0.4120	3319.47	3361.84	3413.76
0.4140	3305.38	3355.79	3405.73
0.4160	3295.14	3337.86	3409.92
0.4180	3285.12	3342.05	3407.24
0.4200	3277.56	3342.40	3393.86
0.4220	3264.52	3329.83	3390.83
0.4240	3256.14	3319.93	3394.67
0.4260	3245.54	3320.63	3379.07
0.4280	3232.85	3313.06	3373.72
0.4300	3221.79	3297.35	3379.42
0.4320	3218.77	3298.98	3384.78
0.4340	3214.58	3302.70	3366.38
0.4360	3207.36	3293.62	3375.93
0.4380	3203.17	3297.35	3375.58
0.4400	3199.33	3294.32	3369.06
0.4420	3184.43	3284.43	3371.04
0.4440	3185.59	3282.10	3380.12
0.4460	3175.34	3287.10	3384.78
0.4480	3169.99	3271.50	3387.45
0.4500	3161.61	3275.69	3390.48

Typical Performance Curves

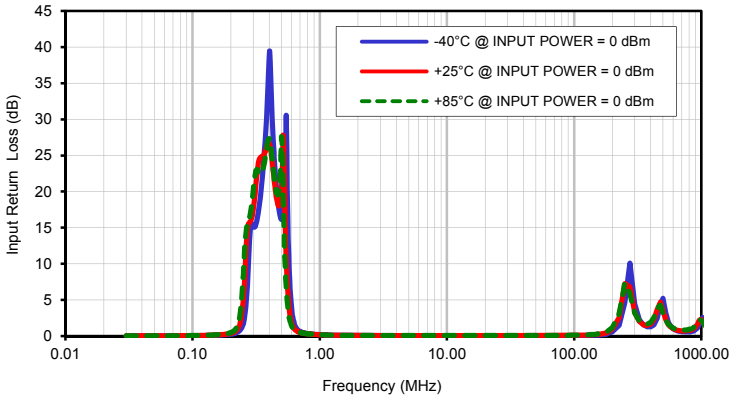
Insertion Loss vs. Temperature



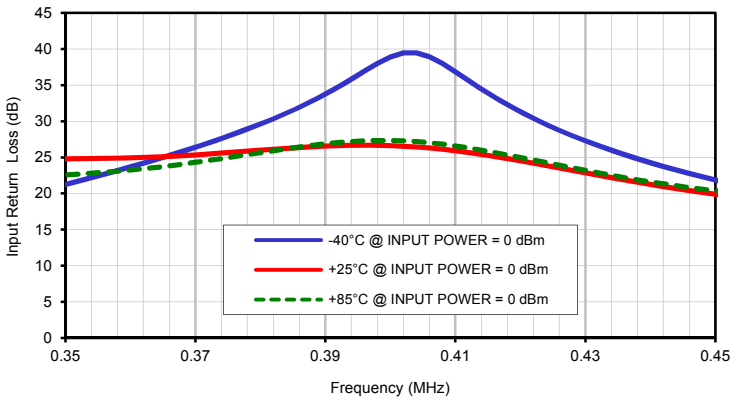
Insertion Loss vs. Temperature



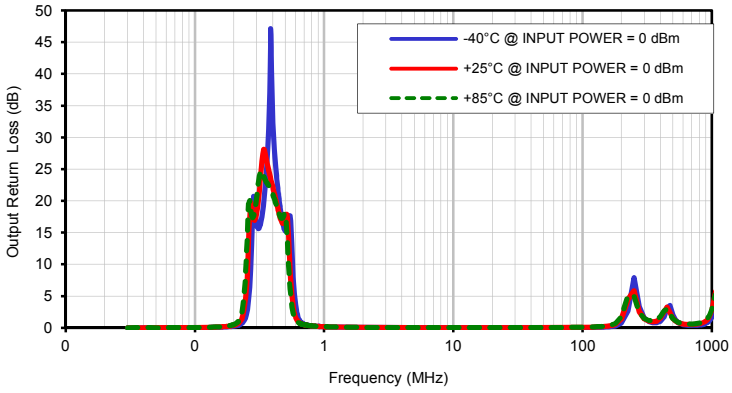
Input Return Loss vs. Temperature



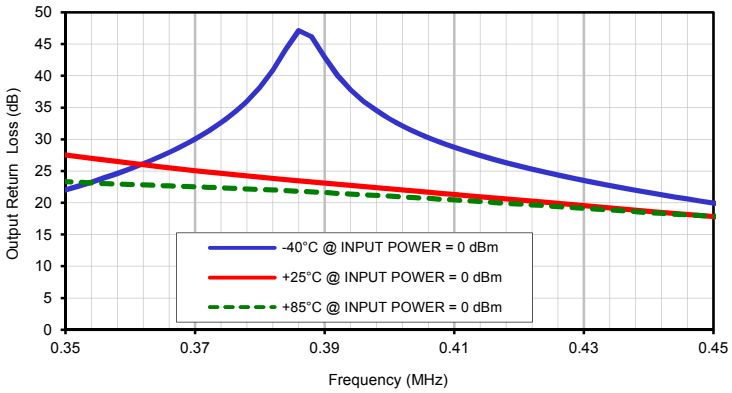
Input Return Loss vs. Temperature



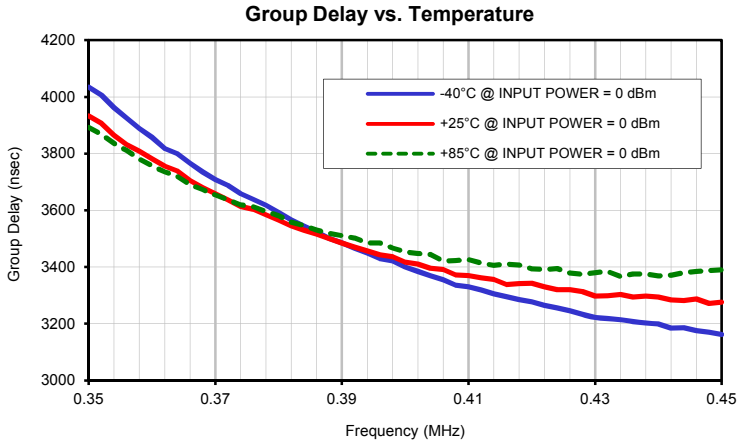
Output Return Loss vs. Temperature



Output Return Loss vs. Temperature



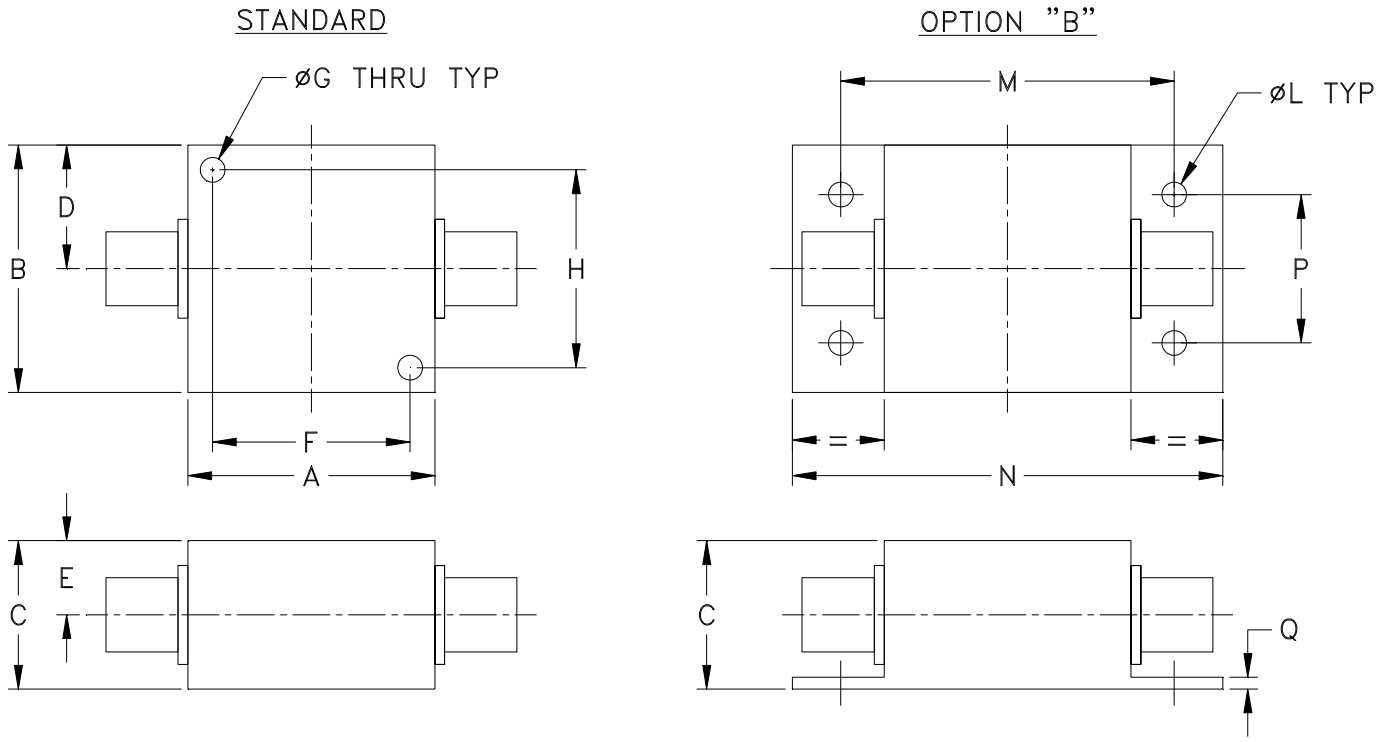
Typical Performance Curves



Case Style H

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.

Mini-Circuits

Environmental Specifications **ENV28T5**

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	-40° to 85°C	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D
Humidity	90% RH, 65°C Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103
Thermal Shock	-65° to 125°C, 5 cycles	MIL-STD-202, Method 107, Condition B
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	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I