

# Coaxial Limiter

ZFLM-43-5W+

50Ω Broadband 20 to 4000 MHz

## The Big Deal

- Wideband, 20 to 4000 MHz
- Wide limiting range, +10 to +37 dBm
- Low output power leakage, +12 dBm
- Fast recovery time, 33ns typ.



CASE STYLE: H16

## Product Overview

Mini-Circuits' ZFLM-43-5W+ is a coaxial RF limiter ideal for protecting sensitive receiver circuitry from high-power signals, while allowing low-scattered signals to be received. Providing input limiting range from +10 to +37 dBm and +12 dBm output power, this model is suitable for many situations where unwanted signals prevail such as manufacturing sites, train tunnels, radar transceivers and more. The unit comes housed in a rugged, aluminum alloy case (1.25" x 1.25 x 0.75") with SMA connectors.

## Key Features

Feature	Advantages
Wideband, from 20 to 4000 MHz	Ideal for a variety of applications requiring protection of sensitive receiver circuitry from unwanted signals, ESD and power surges on the network.
Wide limiting range from +10 to +37 dBm	Prevents a wide range of high input signal levels from passing through the network and damaging sensitive electronic components.
Low $\Delta$ output / 1 dB $\Delta$ input <ul style="list-style-type: none"><li>• 0.3 dB, +10 to +20 dBm input range</li><li>• 0.1 dB, +20 to +37 dBm input range</li></ul>	Low delta output per 1 dB delta input maintains signal stability in the presence of volatile input signal conditions.
Rapid recovery, 33ns	Minimal downtime after unwanted signals are removed with very quick restoration of standard operating levels.
Low insertion loss, 0.36 dB	Preserves the strength of low-power signals in the receive path.
Low-output power, +12 dBm	Low output power prevents saturation of receiver circuitry and provides extra protection for sensitive components.

### 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.
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# Limiter

50Ω Broadband 20 to 4000 MHz

ZFLM-43-5W+

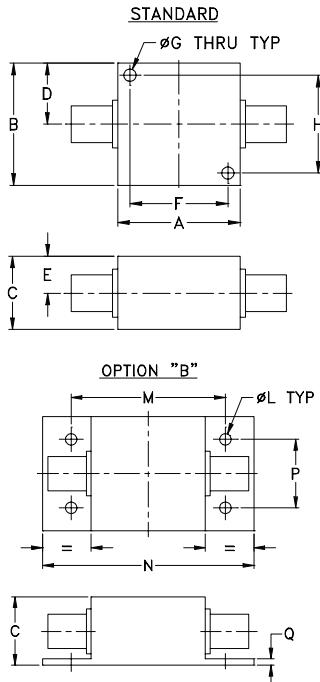
**Maximum Ratings**

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

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

**Coaxial Connections**

INPUT	SMA female
OUTPUT	SMA male

**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

**Features**

- wideband, 20 to 4000 MHz
- low insertion loss 0.36 dB typ.
- fast recovery time, 33nsec typ.
- excellent VSWR 1.2:1 typ.
- low output power, 12 dBm typ.

Generic photo used for illustration purposes only

CASE STYLE: H16

Connectors Model

SMA ZFLM-43-5W+

**+RoHS Compliant**

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

**Applications**

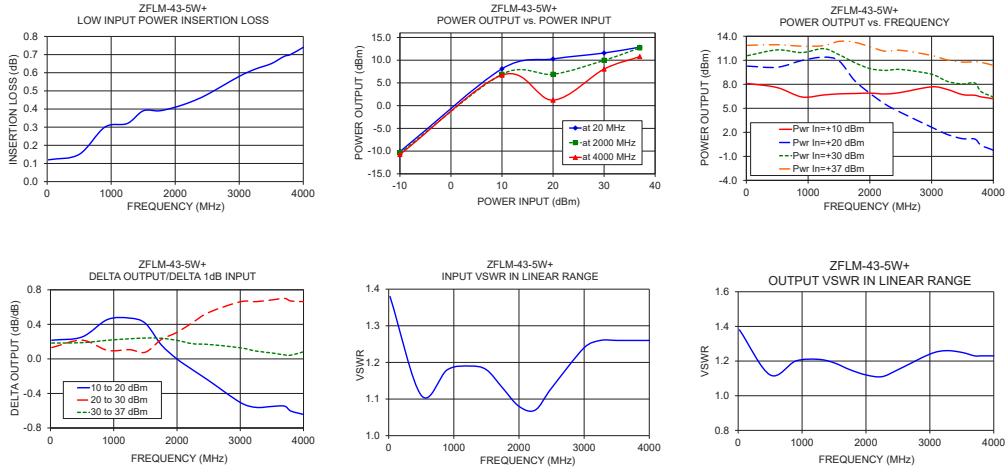
- military, hi-rel applications
- stabilizing generator outputs
- reducing amplitude variations
- protects low noise amplifiers and other devices from ESD or input power damage

**Electrical Specifications**

Parameter	Condition	Min.	Typ.	Max.	Units
Frequency Range		20	—	4000	MHz
<b>Linear Range</b>					
Max Input Power	<0.1 dB compression	—	5	—	dBm
Insertion Loss	<10 dBm	—	0.5	1.2	dB
VSWR	<10 dBm	—	1.3	1.80	:1
<b>Limiting Range</b>					
Input Power	>1dB compression filtered signal frequency	+10	—	+37	dBm
Output Power		—	+13	—	dBm
	Input Power Range (dBm)				
	10 to 20	—	0.3	—	dB/dB
	20 to 30	—	0.1	—	
	30 to 37	—	0.1	—	
Recovery Time	2 watt pulse 50 $\mu$ sec pw 1kHz duty cycle recovery to within 90% of final value @ -5 dBm	—	33	—	nsec
Response Time	-30 to +33 dBm input 50 $\mu$ sec PW 1 kHz duty cycle	—	21	—	nsec

**Typical Performance Data**

Freq. (MHz)	I. Loss in Linear Range (dB)	VSWR in Linear Range (:1)	Power Output (dBm)				Δ Output / 1dB Δ Input		
			+10 dBm Input	+20 dBm Input	+30 dBm Input	+37 dBm Input	+10 to +20 dBm Input	+20 to +30 dBm Input	+30 to +37 dBm Input
20	0.12	1.38	8.11	10.27	11.58	12.87	0.22	0.13	0.18
500	0.15	1.11	7.59	10.13	12.30	12.94	0.25	0.22	0.09
900	0.30	1.18	6.42	10.98	11.97	12.76	0.46	0.10	0.11
1250	0.32	1.19	6.67	11.39	12.46	12.83	0.47	0.11	0.05
1500	0.39	1.18	6.80	10.93	11.70	13.36	0.41	0.08	0.24
1750	0.39	1.13	6.85	8.49	10.72	13.25	0.16	0.22	0.36
2000	0.41	1.08	6.90	6.89	9.97	12.69	0.00	0.31	0.39
2250	0.44	1.07	6.79	5.51	9.73	12.13	-0.13	0.42	0.34
2500	0.48	1.13	6.98	4.48	9.85	12.25	-0.25	0.54	0.34
3000	0.58	1.24	7.68	2.64	9.26	11.60	-0.50	0.66	0.34
3250	0.62	1.26	7.36	1.75	8.38	11.05	-0.56	0.66	0.38
3500	0.65	1.26	6.72	1.21	8.04	10.78	-0.55	0.68	0.39
3700	0.69	1.26	6.63	1.16	8.16	10.81	-0.55	0.70	0.38
3800	0.70	1.26	6.43	0.39	7.09	10.75	-0.60	0.67	0.52
4000	0.74	1.26	6.21	-0.23	6.41	10.37	-0.64	0.66	0.57

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## Typical Performance Data

FREQUENCY (MHz)	LOW INPUT POWER		POWER OUTPUT (dBm)				DELTA OUTPUT/1dB DELTA INPUT (dB/dB)			
	INSERTION LOSS (dB)	VSWR		POWER OUTPUT (dBm)				DELTA OUTPUT/1dB DELTA INPUT (dB/dB)		
		Input	Output	+10 dBm INPUT	+20 dBm INPUT	+30 dBm INPUT	+37 dBm INPUT	+10 to +20 dBm INPUT	+20 to +30 dBm INPUT	+30 to +37 dBm INPUT
20	0.12	1.38	1.38	8.11	10.27	11.58	12.87	0.22	0.13	0.18
40	0.05	1.18	1.38	8.06	10.29	11.55	12.87	0.22	0.13	0.19
60	0.04	1.12	1.24	8.07	10.32	11.64	13.15	0.23	0.13	0.22
80	0.04	1.09	1.18	8.04	10.29	11.67	13.30	0.22	0.14	0.23
100	0.05	1.08	1.14	8.06	10.29	11.80	13.49	0.22	0.15	0.24
200	0.07	1.07	1.12	8.00	10.25	12.51	13.41	0.22	0.23	0.13
300	0.10	1.08	1.11	7.76	10.01	12.59	13.16	0.23	0.26	0.08
400	0.12	1.09	1.10	7.59	9.93	12.23	12.90	0.23	0.23	0.10
500	0.15	1.11	1.12	7.59	10.13	12.30	12.94	0.25	0.22	0.09
600	0.19	1.13	1.08	7.61	10.34	12.18	12.75	0.27	0.18	0.08
700	0.23	1.14	1.08	7.32	10.33	11.88	12.48	0.30	0.15	0.09
800	0.32	1.16	1.07	7.32	10.72	12.09	12.84	0.34	0.14	0.11
850	0.32	1.18	1.07	6.44	10.87	11.97	12.81	0.44	0.11	0.12
900	0.30	1.18	1.20	6.42	10.98	11.97	12.76	0.46	0.10	0.11
950	0.28	1.19	1.08	6.35	10.95	11.88	12.75	0.46	0.09	0.12
1000	0.29	1.19	1.09	6.20	10.93	11.76	12.44	0.47	0.08	0.10
1050	0.29	1.19	1.10	6.13	10.99	11.75	12.39	0.49	0.08	0.09
1100	0.30	1.19	1.11	6.27	11.19	12.32	12.63	0.49	0.11	0.04
1150	0.31	1.19	1.11	6.53	11.49	12.66	12.74	0.50	0.12	0.01
1200	0.32	1.19	1.13	6.80	11.77	12.95	13.39	0.50	0.12	0.06
1250	0.32	1.19	1.21	6.67	11.39	12.46	12.83	0.47	0.11	0.05
1300	0.34	1.19	1.14	6.58	11.35	12.04	12.87	0.48	0.07	0.12
1350	0.35	1.19	1.15	6.39	11.13	11.81	12.81	0.47	0.07	0.14
1400	0.37	1.19	1.16	6.35	11.09	11.62	12.65	0.47	0.05	0.15
1450	0.38	1.19	1.17	6.59	11.10	11.58	13.11	0.45	0.05	0.22
1500	0.39	1.18	1.19	6.80	10.93	11.70	13.36	0.41	0.08	0.24
1550	0.39	1.18	1.20	6.79	10.72	11.57	13.38	0.39	0.08	0.26
1600	0.39	1.17	1.20	6.83	10.57	11.36	13.39	0.37	0.08	0.29
1650	0.39	1.16	1.20	6.75	10.00	10.89	13.23	0.32	0.09	0.33
1700	0.39	1.15	1.20	6.78	9.58	10.77	13.27	0.28	0.12	0.36
1750	0.39	1.13	1.15	6.85	8.49	10.72	13.25	0.16	0.22	0.36
1800	0.39	1.12	1.21	7.01	8.45	10.99	13.71	0.14	0.25	0.39
1850	0.40	1.11	1.20	7.16	8.89	10.98	13.61	0.17	0.21	0.38
1900	0.40	1.10	1.20	7.12	8.10	10.98	13.85	0.10	0.29	0.41
1950	0.40	1.09	1.20	6.96	8.03	10.52	13.31	0.11	0.25	0.40
2000	0.41	1.08	1.12	6.90	6.89	9.97	12.69	0.00	0.31	0.39
2050	0.41	1.07	1.19	6.86	6.15	9.96	12.92	-0.07	0.38	0.42
2100	0.42	1.07	1.19	6.92	5.65	9.97	12.80	-0.13	0.43	0.40
2150	0.43	1.07	1.18	6.95	5.51	10.08	12.74	-0.14	0.46	0.38
2200	0.43	1.07	1.18	6.93	5.79	10.13	12.61	-0.11	0.43	0.35
2250	0.44	1.07	1.11	6.79	5.51	9.73	12.13	-0.13	0.42	0.34
2300	0.45	1.08	1.16	7.04	5.24	9.97	12.47	-0.18	0.47	0.36
2350	0.45	1.09	1.15	7.05	5.17	10.06	12.38	-0.19	0.49	0.33
2400	0.46	1.11	1.14	7.09	5.42	9.97	12.57	-0.17	0.45	0.37
2450	0.47	1.12	1.13	7.01	4.70	9.69	12.06	-0.23	0.50	0.34
2500	0.48	1.13	1.15	6.98	4.48	9.85	12.25	-0.25	0.54	0.34
2550	0.49	1.14	1.11	7.83	4.38	9.51	11.88	-0.34	0.51	0.34
2600	0.50	1.16	1.11	7.85	4.15	9.40	11.70	-0.37	0.53	0.33
2650	0.50	1.17	1.10	7.90	3.76	9.22	11.51	-0.41	0.55	0.33
2700	0.51	1.18	1.09	7.81	3.49	9.16	11.56	-0.43	0.57	0.34
2750	0.52	1.19	1.09	7.88	3.36	9.22	11.37	-0.45	0.59	0.31
2800	0.53	1.20	1.09	7.81	3.15	9.30	11.51	-0.47	0.61	0.32
2850	0.54	1.21	1.09	7.67	2.99	9.04	11.28	-0.47	0.61	0.32
2900	0.55	1.22	1.10	7.59	2.65	8.98	11.40	-0.49	0.63	0.35
2950	0.56	1.23	1.10	7.53	2.64	8.94	11.32	-0.49	0.63	0.34
3000	0.58	1.24	1.24	7.68	2.64	9.26	11.60	-0.50	0.66	0.34
3100	0.59	1.26	1.13	7.60	2.75	9.05	11.54	-0.49	0.63	0.36
3200	0.61	1.26	1.15	7.46	2.02	8.65	10.92	-0.54	0.66	0.32
3300	0.62	1.26	1.17	7.55	1.84	8.62	11.19	-0.57	0.68	0.37
3400	0.64	1.26	1.19	7.17	1.53	8.25	11.08	-0.56	0.67	0.40
3500	0.65	1.26	1.25	6.72	1.21	8.04	10.78	-0.55	0.68	0.39
3600	0.67	1.26	1.24	6.77	1.11	7.82	10.94	-0.57	0.67	0.45
3700	0.69	1.26	1.23	6.63	1.16	8.16	10.81	-0.55	0.70	0.38
3800	0.70	1.26	1.23	6.43	0.39	7.09	10.75	-0.60	0.67	0.52
3900	0.72	1.26	1.28	5.69	-0.47	6.32	9.71	-0.62	0.68	0.48
4000	0.74	1.26	1.23	6.21	-0.23	6.41	10.37	-0.64	0.66	0.57

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IF/RF MICROWAVE COMPONENTS

  
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# Coaxial Limiter

# ZFLM-43-5W+

## Typical Performance Data

POWER INPUT	POWER OUTPUT
@ 20 MHz	
(dBm)	
-10	-10.12
10	8.11
20	10.27
30	11.58
37	12.87

POWER INPUT	POWER OUTPUT
@ 2000 MHz	
(dBm)	
-10	-10.41
10	6.90
20	6.89
30	9.97
37	12.69

POWER INPUT	POWER OUTPUT
@ 4000 MHz	
(dBm)	
-10	-10.74
10	6.21
20	-0.23
30	6.41
37	10.37



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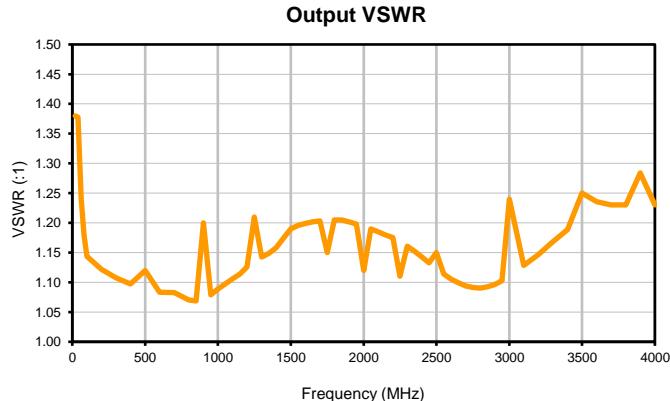
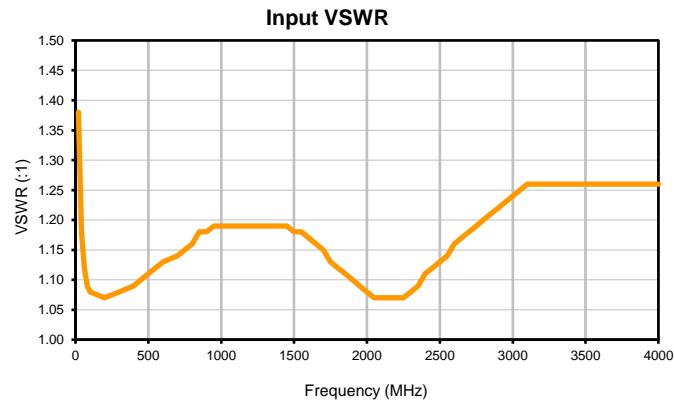
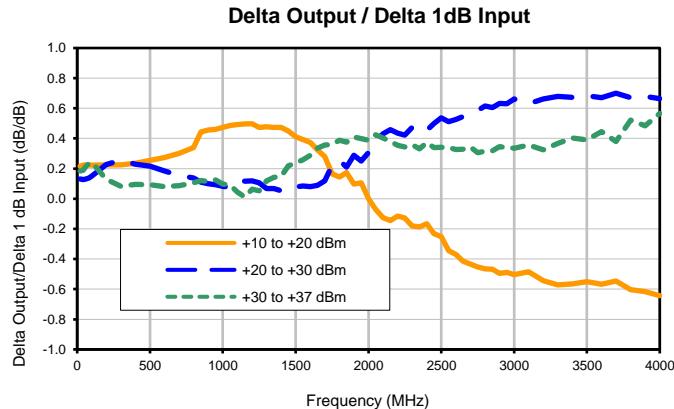
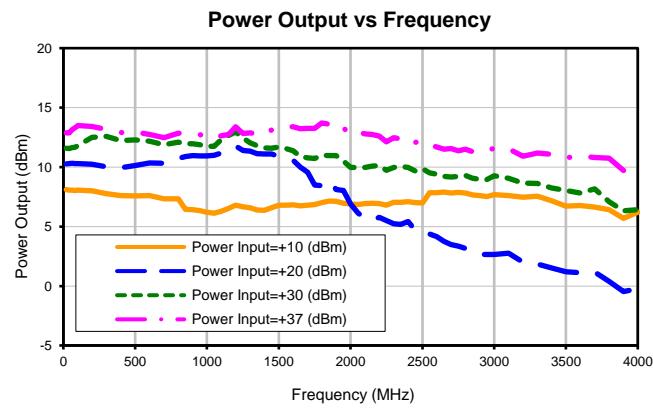
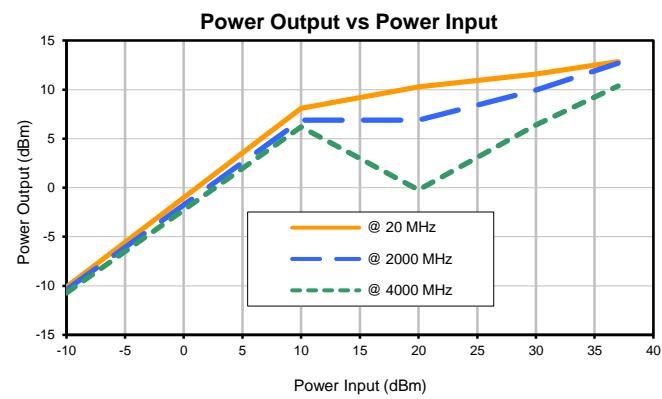
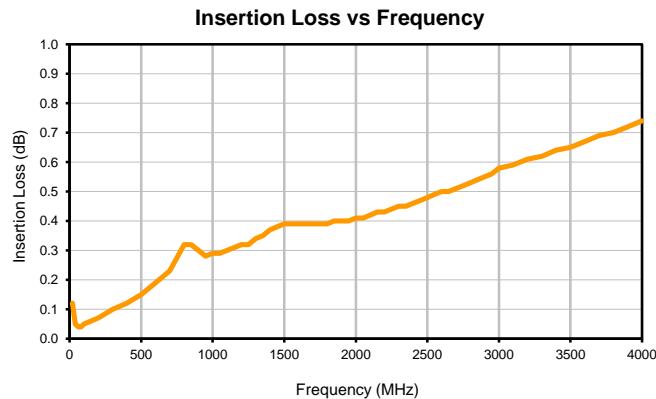


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# Coaxial Limiter

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## Typical Performance Curves



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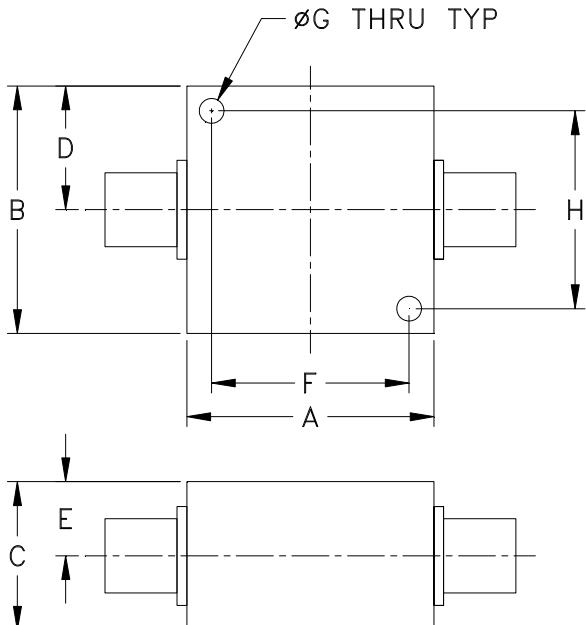
# Case Style

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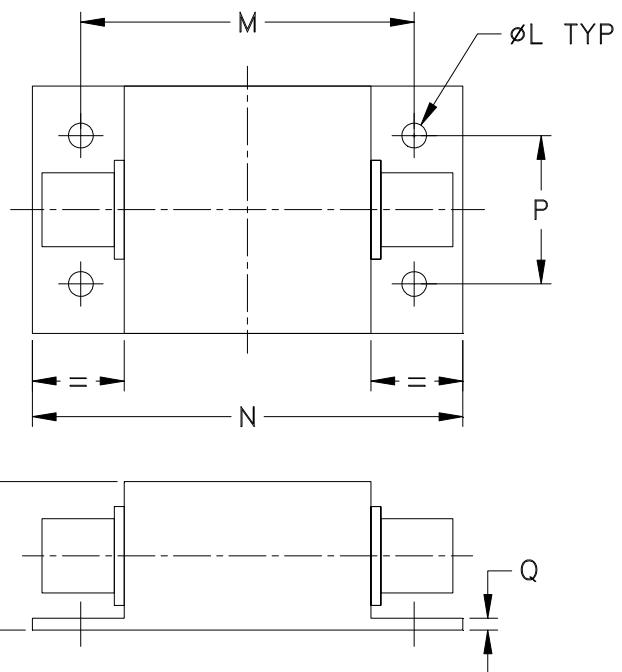
## Outline Dimensions

H16

### STANDARD



### OPTION "B"



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.  $\pm .03$ ; 3PL.  $\pm .015$

### 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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## 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