



## COAXIAL

# Medium High Power Amplifier

# ZHL-4240+ ZHL-4240X+

50Ω 600 to 4200 MHz

### THE BIG DEAL

- Wideband, 600 to 4200 MHz
- High Gain, 39 dB Min.
- Excellent Gain Flatness,  $\pm 1.3$  dB
- High IP3, +38 dBm typ.



Generic photo used for illustration purposes only

Model No.	ZHL-4240+	ZHL-4240X+ <sup>▲</sup>
Case Style	U36	
Connectors	SMA	

### APPLICATIONS

- Communication Systems
- Cellular
- Instrumentation
- Laboratory

### +RoHS Compliant

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

### PRODUCT OVERVIEW

Mini-Circuits' ZHL-4240+ is a medium-power connectorized amplifier supporting a wide range of applications from 600 to 4200 MHz, such as test instrumentation, SatCom, and mobile communications systems, including those operating in the new telecom Band 71 allocation (617 to 698 MHz). This model provides +31 dBm output power at saturation and extremely flat gain (39  $\pm$  1.3 dB) across its full bandwidth, making it ideal for systems where consistent performance across frequency is required. The amplifier operates on a +15V DC supply and comes housed in compact aluminum alloy case (7.00 x 3.25 x 2.13") with SMA connectors, built-in bracket for mounting, and an optional heat sink for efficient cooling.

### KEY FEATURES

Feature	Advantages
Wideband, 600 to 4200 MHz	One amplifier supports a broad range of system and test lab applications. Extended bandwidth down to 600 MHz supports new telecom Band 71 allocation (617 to 698 MHz)
High Gain, 39 dB	Reduces the number of gain stages, lowering component count and overall system cost.
Excellent Gain Flatness, $\pm 1.3$ dB	Provides consistent performance across frequency, minimizing the need for external equalizing networks in wideband applications.
Medium Output Power, +31 dBm P3dB	Supports a wide range of power requirements.
High OIP3, +38 dBm	Provides highly linear performance with excellent sensitivity and two-tone spur-free dynamic range.

REV. B  
ECO-017731  
ZHL-4240+  
MCL NY  
230504





### ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	ZHL-4240+ ZHL-4240X+ <sup>▲</sup>			Units
	Min.	Typ.	Max.	
Frequency Range	600	–	4200	MHz
Gain	39	42	47	dB
Gain Flatness	–	±1.3	±1.8	dB
Output Power at 1dB compression <sup>1</sup>	+28	+30	–	dBm
Output Power at 3dB compression <sup>2</sup>	+29	+31	–	dBm
Noise Figure	–	8.0	–	dB
Output third order intercept point	–	+38	–	dBm
Input VSWR	–	–	2.5	:1
Output VSWR	–	–	2.5	:1
DC Supply Voltage	–	+15	–	V
Supply Current	–	–	1.0	A

Open load is not recommended, potentially can cause damage.  
 With no load derate max. input power by 20 dB.  
 1. +27 dBm at 3700-4200 MHz  
 2. +28 dBm at 3700-4200 MHz

<sup>▲</sup> Heat sink not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature to 65°C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 1.3°C/W max.

### ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-20°C to +65°C
Storage Temperature	-55°C to +100°C
DC Voltage	+20V
Input RF Power (no damage)	-5 dBm

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



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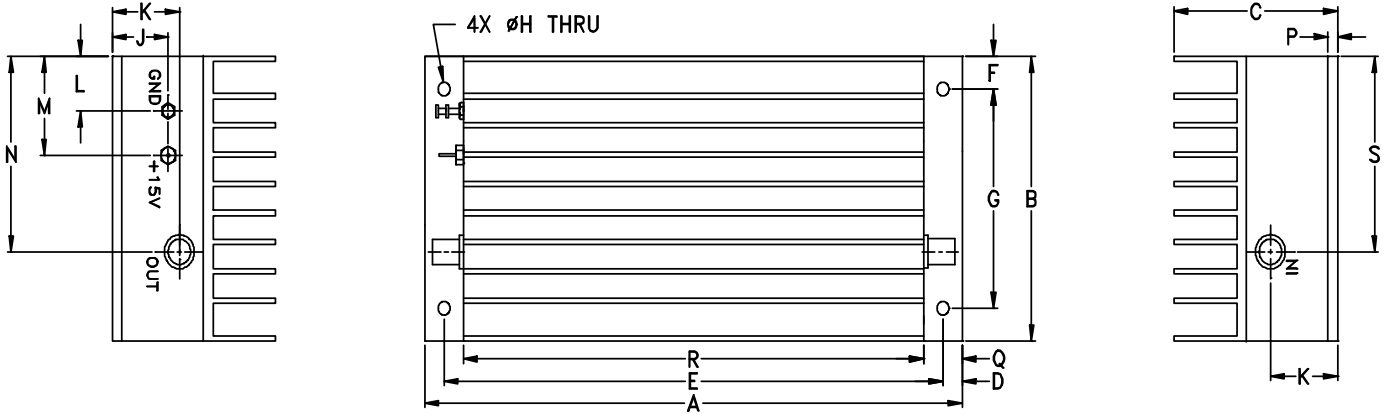
# Medium High Power Amplifier

# ZHL-4240+ ZHL-4240X+

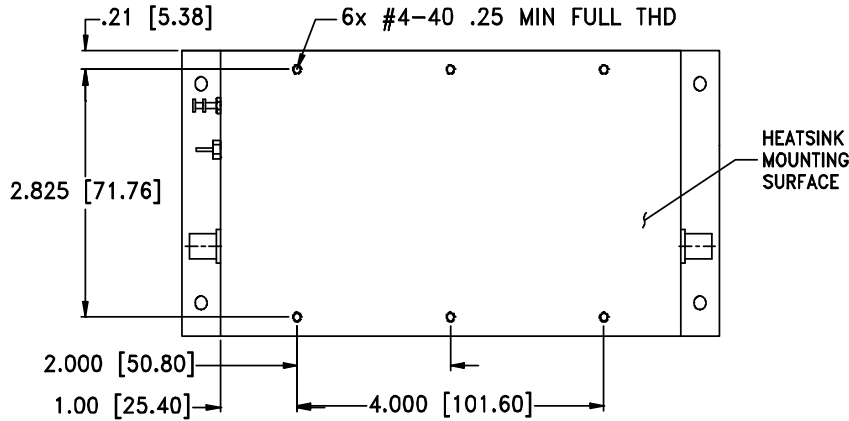
Mini-Circuits

50Ω 600 to 4200 MHz

## OUTLINE DRAWING FOR MODELS WITH HEATSINK



## MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK



## OUTLINE DIMENSIONS (Inch/mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	wt
7.00	3.25	2.13	.25	6.500	.38	2.500	.156	.73	.88	.63	1.13	2.23	.125	.50	6.00	2.23	grams
177.80	82.55	54.10	6.35	165.10	9.65	63.50	3.96	18.54	22.35	16.00	28.70	56.64	3.18	12.70	152.40	56.64	900

\*600 grams without heatsink



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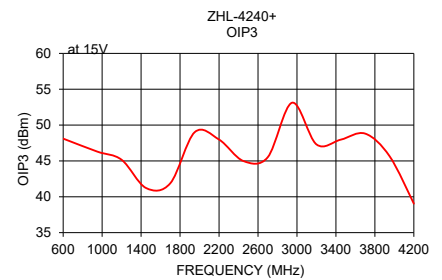
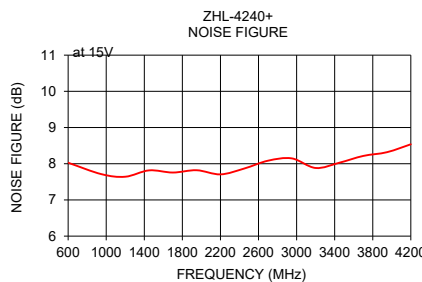
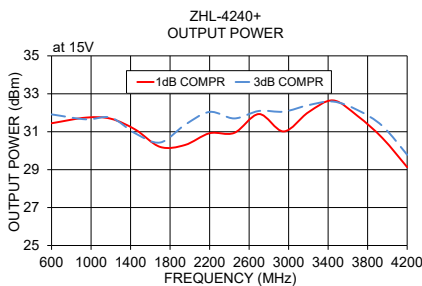
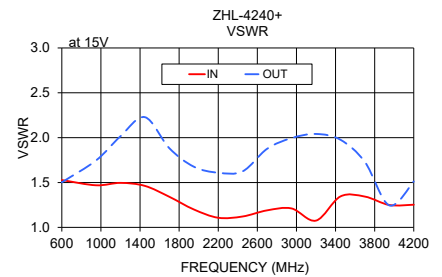
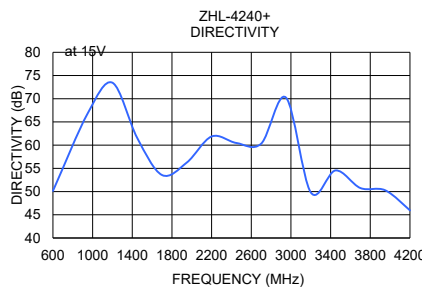
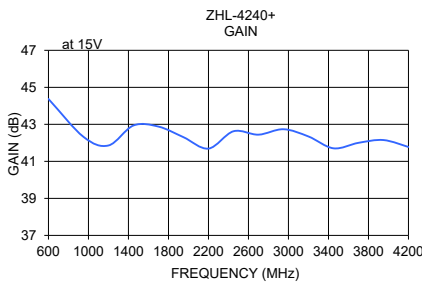
# Medium High Power Amplifier

# ZHL-4240+ ZHL-4240X+

50Ω 600 to 4200 MHz

### TYPICAL PERFORMANCE DATA / GRAPHS

FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		POUT at 1 dB COMPR. (dBm)	POUT at 3 dB COMPR. (dBm)	NOISE FIGURE (dB)	OUTPUT IP3 (dBm)
	15V		IN	OUT	15V	15V		
600	44.37	50.13	1.53	1.50	31.45	31.91	8.03	48.11
950	42.33	66.82	1.47	1.75	31.74	31.65	7.71	46.30
1200	41.86	73.44	1.50	2.02	31.68	31.74	7.64	45.16
1450	42.94	61.55	1.46	2.23	31.11	30.91	7.82	41.23
1700	42.88	53.56	1.34	1.88	30.20	30.43	7.76	41.89
1950	42.31	56.25	1.20	1.68	30.30	31.36	7.82	49.01
2200	41.69	61.87	1.11	1.61	30.92	32.04	7.71	47.98
2450	42.63	60.47	1.12	1.62	30.94	31.70	7.87	44.99
2700	42.44	60.33	1.19	1.88	31.93	32.09	8.08	45.51
2950	42.74	70.24	1.21	2.00	31.01	32.06	8.15	53.12
3200	42.34	49.82	1.08	2.04	32.03	32.40	7.88	47.31
3450	41.71	54.55	1.34	1.98	32.65	32.59	8.03	47.97
3700	42.00	50.76	1.34	1.73	31.82	32.14	8.22	48.81
3950	42.15	50.28	1.25	1.24	30.66	31.30	8.32	45.68
4200	41.78	45.95	1.25	1.51	29.13	29.78	8.54	39.05
4200	41.78	45.95	1.25	1.51	29.13	29.78	8.54	39.05



- 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/terms/viewterm.html](http://www.minicircuits.com/terms/viewterm.html)



*Typical Performance Data*

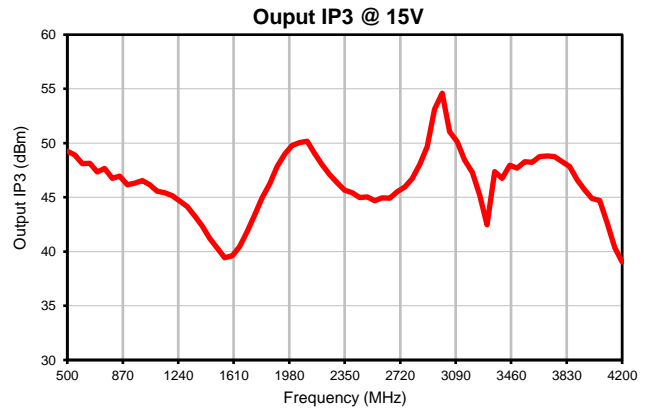
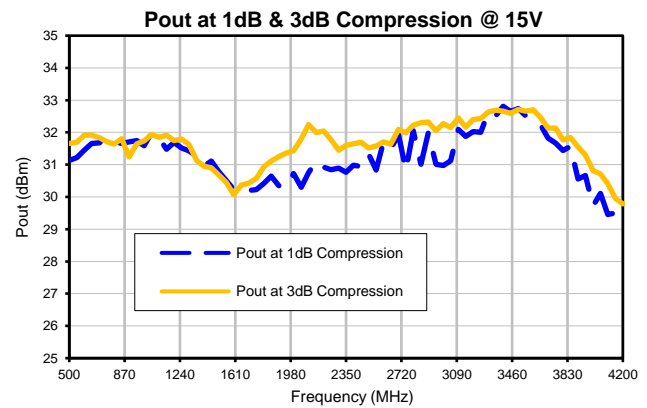
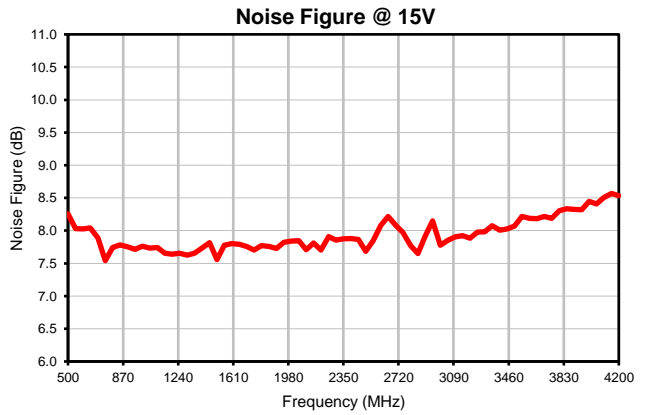
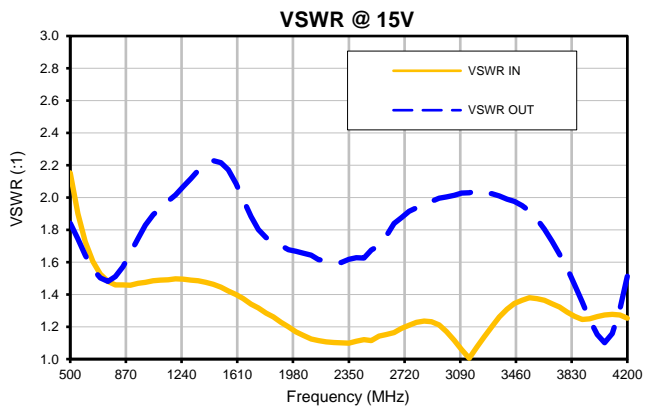
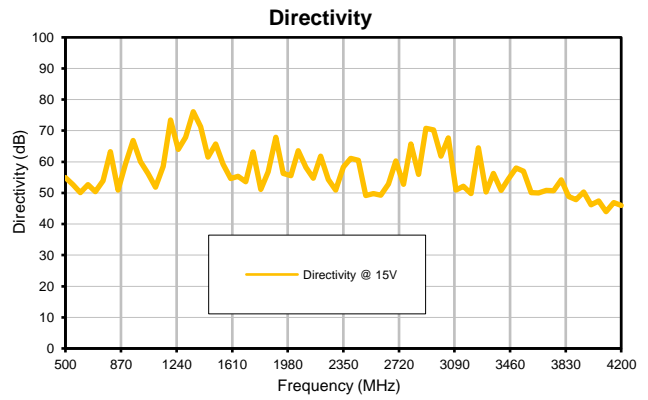
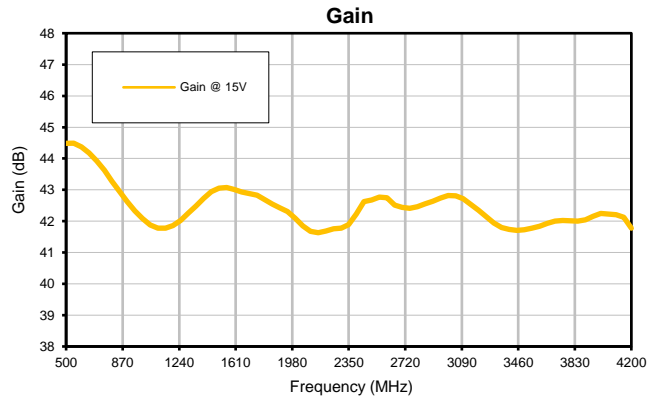
FREQUENCY (MHz)	GAIN (dB) 15V	DIRECTIVITY (dB) 15V	VSWR (:1)		NOISE FIGURE (dB) 15V	POUT @ 1 dB COMPRESSION (dBm) 15V	POUT @ 3 dB COMPRESSION (dBm) 15V	OUTPUT IP3 (dBm) 15V
			IN 15V	OUT 15V				
500	44.48	54.93	2.15	1.84	8.26	31.13	31.65	49.26
550	44.49	52.66	1.90	1.74	8.03	31.22	31.70	48.91
600	44.37	50.13	1.73	1.64	8.03	31.45	31.91	48.11
650	44.18	52.66	1.60	1.56	8.04	31.66	31.92	48.15
700	43.93	50.41	1.53	1.50	7.89	31.67	31.83	47.33
750	43.62	53.90	1.48	1.48	7.54	31.81	31.72	47.66
800	43.27	63.24	1.46	1.51	7.74	31.71	31.64	46.74
850	42.95	50.93	1.46	1.57	7.78	31.66	31.81	46.96
900	42.63	59.20	1.46	1.66	7.75	31.71	31.24	46.17
950	42.33	66.82	1.47	1.75	7.71	31.74	31.65	46.30
1000	42.08	60.03	1.48	1.83	7.76	31.59	31.74	46.55
1050	41.88	56.20	1.48	1.89	7.73	31.98	31.93	46.16
1100	41.78	51.86	1.49	1.94	7.74	31.82	31.85	45.58
1150	41.78	58.55	1.49	1.98	7.66	31.47	31.92	45.43
1200	41.86	73.44	1.50	2.02	7.64	31.68	31.74	45.16
1250	42.03	64.02	1.49	2.07	7.65	31.52	31.80	44.64
1300	42.26	67.92	1.49	2.12	7.62	31.43	31.62	44.17
1350	42.48	76.11	1.49	2.17	7.66	31.26	31.13	43.28
1400	42.73	71.28	1.48	2.21	7.73	30.96	30.95	42.34
1450	42.94	61.55	1.46	2.23	7.82	31.11	30.91	41.23
1500	43.06	65.77	1.45	2.22	7.56	30.78	30.67	40.33
1550	43.08	59.24	1.42	2.17	7.78	30.51	30.45	39.42
1600	43.02	54.63	1.40	2.09	7.80	30.22	30.07	39.60
1650	42.94	55.34	1.37	1.99	7.79	30.17	30.37	40.47
1700	42.88	53.56	1.34	1.88	7.76	30.20	30.43	41.89
1750	42.83	63.14	1.32	1.80	7.71	30.23	30.57	43.38
1800	42.69	51.11	1.29	1.75	7.77	30.42	30.94	44.95
1850	42.54	56.76	1.26	1.73	7.76	30.64	31.11	46.26
1900	42.42	67.92	1.23	1.70	7.73	30.35	31.25	47.83
1950	42.31	56.25	1.20	1.68	7.82	30.30	31.36	49.01
2000	42.10	55.59	1.17	1.67	7.84	30.72	31.43	49.80
2050	41.85	63.59	1.15	1.66	7.84	30.30	31.79	50.05
2100	41.67	58.25	1.13	1.64	7.71	30.76	32.24	50.18
2150	41.63	54.70	1.11	1.62	7.81	31.11	31.99	49.06
2200	41.69	61.87	1.11	1.61	7.71	30.92	32.04	47.98
2250	41.76	54.32	1.10	1.59	7.91	30.84	31.77	47.10
2300	41.78	50.89	1.10	1.60	7.85	30.89	31.45	46.34
2350	41.89	58.34	1.10	1.62	7.88	30.76	31.60	45.65
2400	42.22	61.12	1.11	1.63	7.88	30.99	31.65	45.43
2450	42.63	60.47	1.12	1.62	7.87	30.94	31.70	44.99
2500	42.68	49.15	1.11	1.67	7.68	31.34	31.52	45.04
2550	42.77	49.77	1.14	1.70	7.84	30.83	31.58	44.68
2600	42.75	49.26	1.15	1.76	8.08	31.71	31.70	44.96
2650	42.51	52.84	1.16	1.84	8.22	31.50	31.63	44.92
2700	42.44	60.33	1.19	1.88	8.08	31.93	32.09	45.51
2750	42.42	52.81	1.21	1.91	7.97	30.82	31.99	45.95
2800	42.46	65.78	1.23	1.94	7.77	32.05	32.22	46.72
2850	42.56	55.92	1.23	1.96	7.65	31.01	32.30	48.04
2900	42.64	70.81	1.23	1.98	7.92	31.98	32.32	49.68
2950	42.74	70.24	1.21	2.00	8.15	31.01	32.06	53.12
3000	42.82	61.80	1.17	2.00	7.78	30.97	32.27	54.60
3050	42.81	67.64	1.12	2.01	7.85	31.12	32.16	51.07
3100	42.72	50.87	1.06	2.03	7.90	32.10	32.45	50.12
3150	42.53	52.20	1.01	2.03	7.92	31.88	32.17	48.44
3200	42.34	49.82	1.08	2.04	7.88	32.03	32.40	47.31
3250	42.14	64.49	1.14	2.03	7.98	32.00	32.43	45.22
3300	41.94	50.27	1.20	2.02	7.98	32.62	32.63	42.47
3350	41.80	56.25	1.26	2.01	8.08	32.52	32.69	47.37
3400	41.74	50.79	1.31	1.99	8.00	32.81	32.65	46.74
3450	41.71	54.55	1.34	1.98	8.03	32.65	32.59	47.97
3500	41.72	57.99	1.36	1.95	8.07	32.74	32.71	47.68
3550	41.77	57.00	1.38	1.92	8.22	32.52	32.66	48.30
3600	41.84	50.08	1.37	1.86	8.19	32.35	32.70	48.22
3650	41.93	49.96	1.36	1.80	8.18	32.23	32.46	48.76
3700	42.00	50.76	1.34	1.73	8.22	31.82	32.14	48.81
3750	42.02	50.74	1.32	1.65	8.19	31.67	32.13	48.77
3800	42.02	54.23	1.29	1.56	8.31	31.44	31.77	48.29
3850	42.00	48.85	1.26	1.46	8.34	31.57	31.85	47.85
3900	42.04	47.85	1.25	1.35	8.32	30.55	31.55	46.61
3950	42.15	50.28	1.25	1.24	8.32	30.66	31.30	45.68
4000	42.24	46.21	1.26	1.15	8.45	29.72	30.81	44.88
4050	42.23	47.40	1.27	1.10	8.41	30.11	30.71	44.73
4100	42.20	43.97	1.28	1.16	8.50	29.45	30.41	42.69
4150	42.13	46.91	1.27	1.31	8.57	29.51	29.95	40.37
4200	41.78	45.95	1.25	1.51	8.54	29.13	29.78	39.05

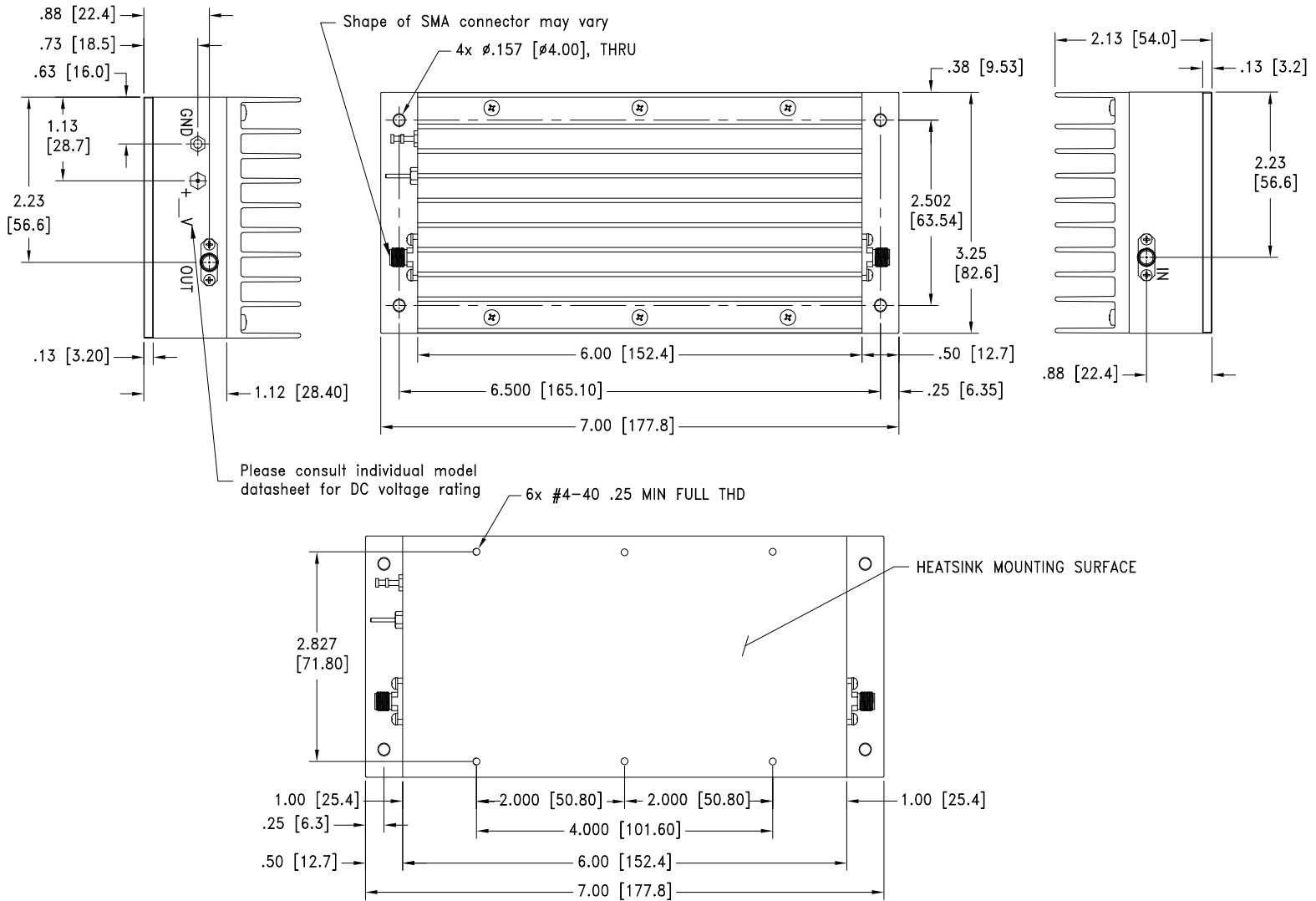


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 The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

REV. OR  
 ZHL-4240+  
 10/26/2015  
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## Typical Performance Curves





#### MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK

Weight: 900.0 grams      Weight without heatsink: 600.0 grams

Dimensions are in inches [mm]. Tolerances: 2 Pl. ±0.03; ; 3 Pl. ±.015 Inch

#### Notes:

1. Case material: Aluminum alloy.
2. Case finish and mounting bracket finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.

For Non-RoHS Case Styles: Yellow hexavalent chrome based conversion coating.  
Due to transition from non-RoHS to RoHS, models will be supplied with either case style finish until the non-RoHS case inventory is depleted.

3. Heat sink finish: Black anodize.



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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	-20° to 65° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Stabilization Bake	(non-operating) 125°C, 24 hours	- - -
Burn-in at Elevated Temp.	(DC on) 160 hours at 85° C	MIL-STD-202, Method 108
Thermal Shock	-55° to 100°C, 5 cycles	MIL-STD-202, Method 107, Condition A, except 100°C