COAXIAL

Medium High Power Amplifier

ZHL-1W-63-S+
ZHL-1W-63X-S+

50Ω 1 W 600 to 6000 MHz SMA Female

THE BIG DEAL

- Wideband, 600 to 6000 MHz
- High Gain, 35 dB Typ.
- High OIP3, +35 dBm Typ.

Generic photo used for illustration purposes only

Model No.	ZHL-1W-63-S+	ZHL-1W-63X-S+▲
Case Style	U2847	
Connectors	SMA female	

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

APPLICATIONS

- Communication Systems
- Cellular
- Instrumentation
- Laboratory

PRODUCT OVERVIEW

Mini-Circuits' ZHL-1W-63-S+ is a class AB medium-power connectorized amplifier with GaN output transistor supporting a wide range of applications from 600 to 6000 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 +30 dBm output power at saturation. The amplifier operates on a +15 V DC supply and comes housed in compact aluminum alloy case (7.00x3.25x1.12") with SMA connectors, built-in bracket for mounting, and an optional heat sink for efficient cooling.

KEY FEATURES

Feature	Advantages
Wideband, Usable from 500 to 6100 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, 35 dB	Reduces the number of gain stages, lowering component count and overall system cost.
Medium Output Power, +30 dBm	Supports a wide range of power requirements.
High OIP3, +35 dBm	Provides highly linear performance with excellent sensitivity and two-tone spur-free dynamic range.

REV. B
ECO-018143
ZHL-1W-63-S+
MCL NY
260217

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ZHL-1W-63X-S+

50Ω 1 W 600 to 6000 MHz SMA Female

ELECTRICAL SPECIFICATIONS AT +25 °C

Parameter	Condition (MHz)	ZHL-1W-63-S+ ZHL-1W-63X-S+▲			Units
		Min.	Typ.	Max.	
Frequency Range		600		6000	MHz
Gain	600-6000	29	35	46	dB
Gain Flatness	600-6000		±3.5		dB
Output Power at 3 dB Compression	600-6000		+28		dBm
Output Power at Saturation	600-6000	+28	+30		dBm
Noise Figure	600-6000		12		dB
Output Third Order Intercept Point	600-6000		+35		dBm
Input VSWR	600-6000		2.5		:1
Output VSWR	600-6000		3.5		:1
DC Supply Voltage			+15		V
Supply Current			1.0	1.5	A

▲ Heat sink not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature to +85 °C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 1.1°C/W max.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	0 °C to +60 °C
Storage Temperature	-55 °C to +100 °C
DC Voltage	+20 V
Input RF Power (No Damage) at Load	+7 dBm
Input RF Power at OPEN / SHORT	-18 dBm

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

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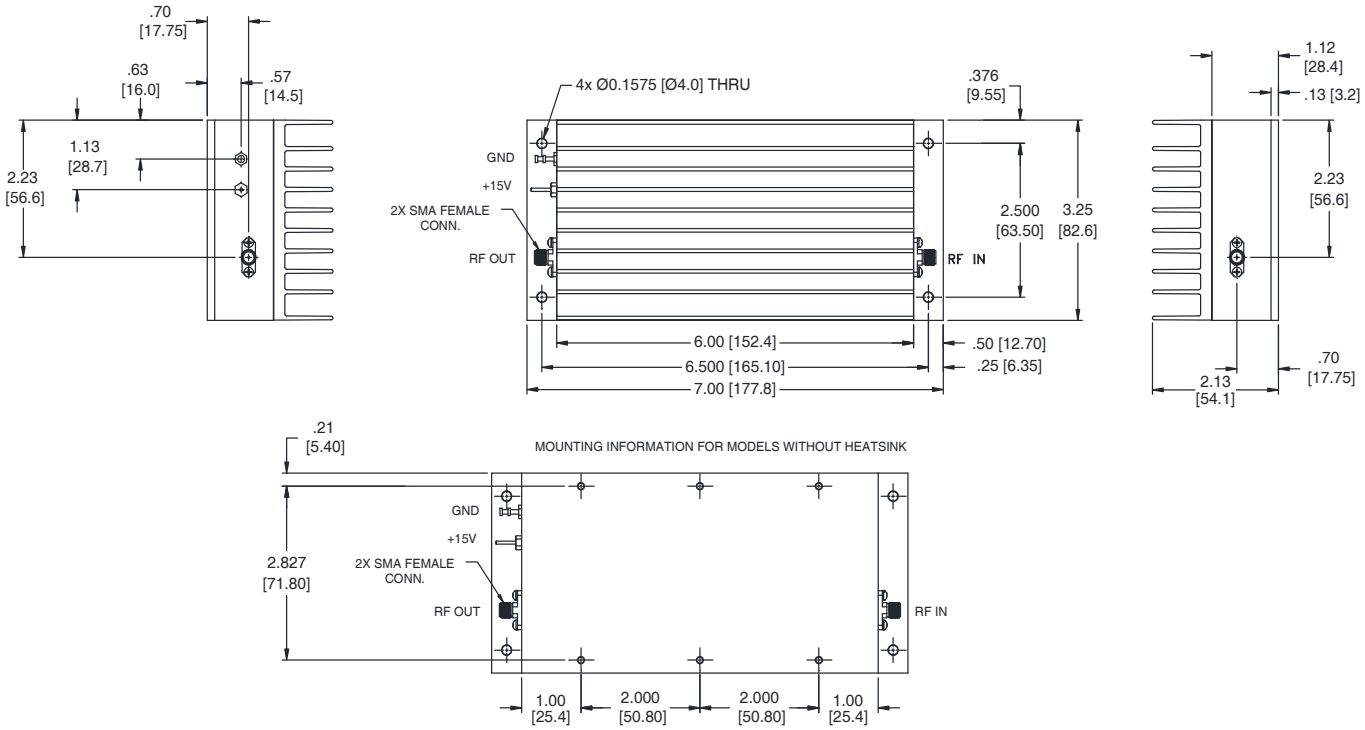
ZHL-1W-63X-S+

50Ω 1 W 600 to 6000 MHz SMA Female

OUTLINE DRAWING



Dimensions are in inches (mm). Tolerances: 2 Pl. +.03; 3 Pl. + .015
Weight: 650 grams
950 grams with heatsink

Medium High Power Amplifier

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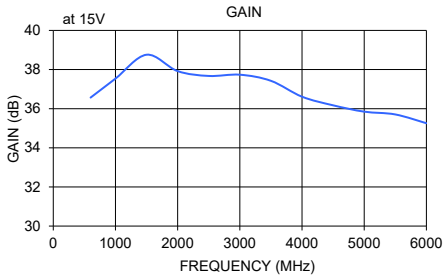
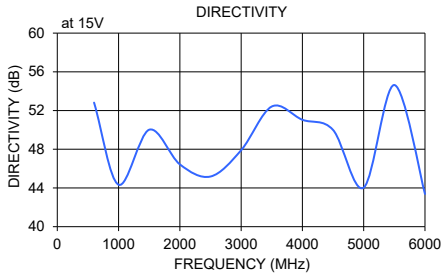
ZHL-1W-63X-S+

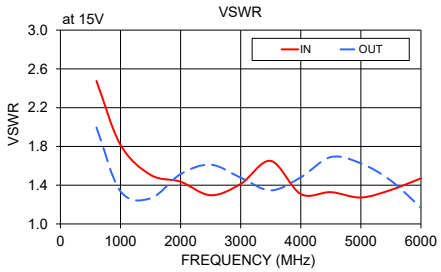
50Ω 1 W 600 to 6000 MHz SMA Female

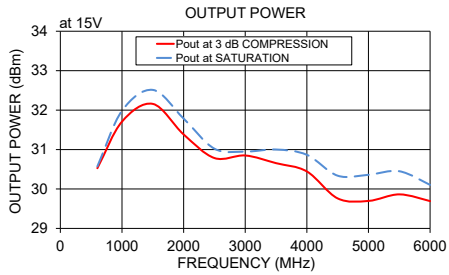
TYPICAL PERFORMANCE DATA/CURVES

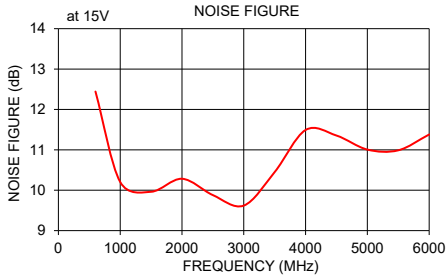
FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		NOISE FIGURE (dB)	P_{OUT} at 3 dB COMPR. (dBm)	P_{OUT} at SATURATION (dBm)	OIP3 (dBm)
	+15 V	+15 V	IN	OUT	+15 V	+15 V	+15 V	+15 V
600	36.57	52.82	2.48	2.00	12.44	30.53	30.57	44.35
1000	37.54	44.33	1.82	1.34	10.20	31.71	31.98	45.58
1500	38.76	50.02	1.51	1.26	9.96	32.16	32.51	44.57
2000	37.92	46.44	1.44	1.51	10.28	31.38	31.79	43.89
2500	37.67	45.18	1.30	1.61	9.88	30.78	31.02	42.76
3000	37.74	47.90	1.41	1.48	9.62	30.85	30.95	42.98
3500	37.42	52.42	1.65	1.35	10.45	30.65	31.00	42.74
4000	36.61	51.04	1.31	1.48	11.49	30.44	30.87	42.82
4500	36.17	50.00	1.33	1.69	11.35	29.76	30.34	41.77
5000	35.85	44.03	1.27	1.63	11.01	29.70	30.36	41.11
5500	35.71	54.64	1.35	1.45	10.99	29.86	30.45	41.10
6000	35.26	43.38	1.47	1.17	11.38	29.69	30.10	41.27

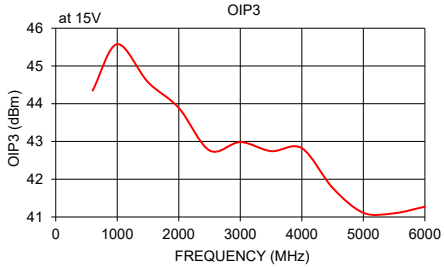












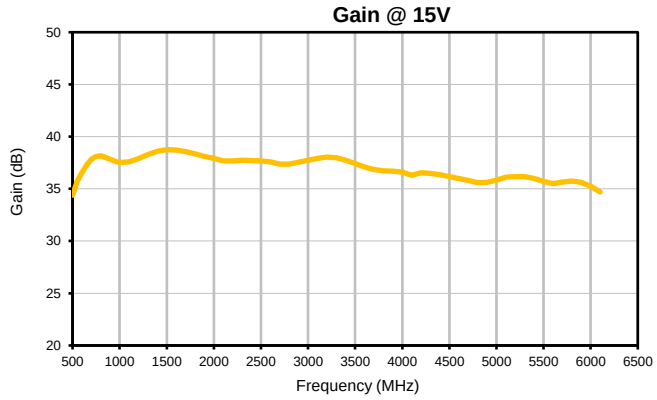
NOTES

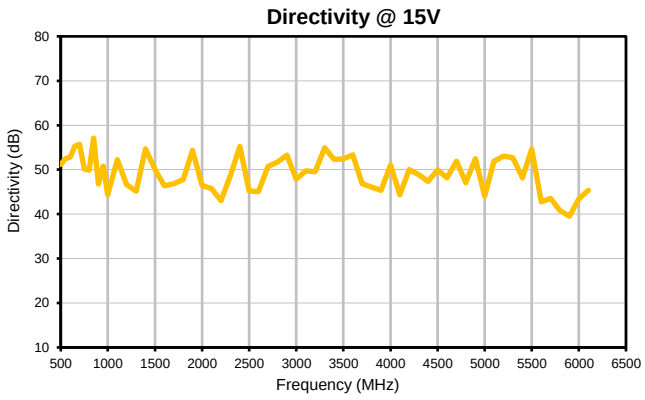
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

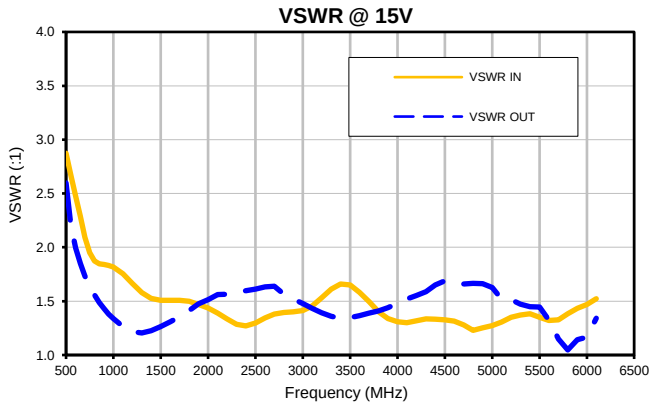
Typical Performance Data

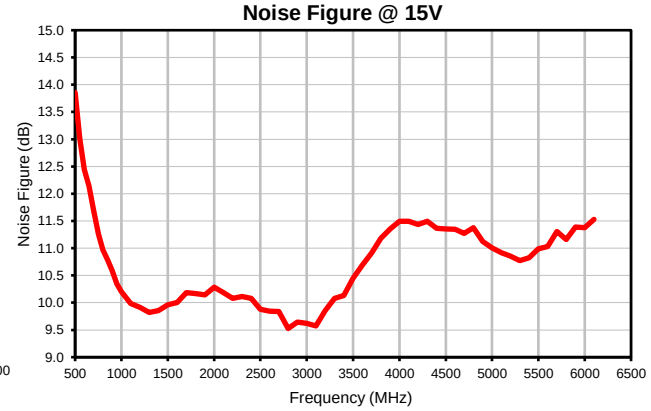
FREQUENCY (MHz)	GAIN (dB) 15V	DIRECTIVITY (dB) 15V	VSWR (:1) IN 15V	VSWR (:1) OUT 15V	NOISE FIGURE (dB) 15V	Pout at 3dB COMPRESSION (dBm) 15V	Pout at SATURATION (dBm) 15V	OUTPUT IP3 (dBm) 15V
500	34.39	51.20	2.87	2.60	13.86	29.51	29.81	43.60
550	35.75	52.48	2.67	2.21	13.01	29.97	30.17	44.21
600	36.57	52.82	2.48	2.00	12.44	30.53	30.57	44.35
650	37.27	55.30	2.28	1.85	12.13	30.75	31.02	44.56
700	37.82	55.70	2.09	1.73	11.70	30.97	31.14	44.29
750	38.12	50.19	1.95	1.64	11.27	31.14	31.49	44.43
800	38.16	49.86	1.87	1.56	10.97	31.15	31.47	44.72
850	38.02	57.13	1.85	1.49	10.78	31.56	31.82	45.02
900	37.82	46.83	1.84	1.43	10.59	31.58	31.76	44.96
950	37.65	50.84	1.83	1.38	10.34	31.76	32.02	45.11
1000	37.54	44.33	1.82	1.34	10.20	31.71	31.98	45.58
1100	37.57	52.28	1.75	1.26	9.99	31.89	32.27	45.06
1200	37.88	46.64	1.67	1.22	9.91	32.21	32.46	44.99
1300	38.27	45.14	1.58	1.20	9.82	32.25	32.60	44.83
1400	38.60	54.71	1.52	1.22	9.85	32.27	32.56	44.64
1500	38.76	50.02	1.51	1.26	9.96	32.16	32.51	44.57
1600	38.73	46.36	1.51	1.31	10.00	32.20	32.44	44.35
1700	38.56	46.85	1.51	1.36	10.19	31.85	32.43	44.33
1800	38.36	47.83	1.50	1.41	10.17	31.88	32.22	44.27
1900	38.11	54.36	1.47	1.48	10.15	31.62	32.01	44.11
2000	37.92	46.44	1.44	1.51	10.28	31.38	31.79	43.89
2100	37.68	45.81	1.39	1.56	10.19	31.05	31.54	43.46
2200	37.69	43.03	1.34	1.56	10.08	31.01	31.43	43.15
2300	37.74	48.59	1.29	1.58	10.11	30.68	31.24	42.91
2400	37.71	55.25	1.27	1.60	10.08	30.63	31.11	42.72
2500	37.67	45.18	1.30	1.61	9.88	30.78	31.02	42.76
2600	37.59	45.03	1.35	1.63	9.84	30.44	30.97	42.80
2700	37.36	50.79	1.38	1.64	9.84	30.64	31.07	42.98
2800	37.38	51.72	1.40	1.56	9.53	30.67	31.03	43.15
2900	37.54	53.31	1.40	1.52	9.65	30.50	30.89	43.12
3000	37.74	47.90	1.41	1.48	9.62	30.85	30.95	42.98
3100	37.93	49.73	1.45	1.43	9.58	30.77	30.98	42.89
3200	38.04	49.50	1.53	1.39	9.86	30.93	30.99	42.83
3300	37.98	54.93	1.61	1.36	10.08	30.83	30.98	42.73
3400	37.75	52.32	1.66	1.34	10.13	30.78	31.14	42.79
3500	37.42	52.42	1.65	1.35	10.45	30.65	31.00	42.74
3600	37.09	53.37	1.58	1.37	10.69	30.69	31.08	42.90
3700	36.84	46.89	1.49	1.39	10.92	30.67	30.99	43.03
3800	36.72	46.11	1.40	1.41	11.18	30.71	30.90	42.98
3900	36.71	45.33	1.34	1.44	11.35	30.45	30.86	42.83
4000	36.61	51.04	1.31	1.48	11.49	30.44	30.87	42.82
4100	36.31	44.32	1.30	1.52	11.50	30.53	30.82	42.61
4200	36.53	50.00	1.32	1.55	11.44	30.31	30.81	42.49
4300	36.48	48.85	1.33	1.59	11.49	30.21	30.71	42.34
4400	36.36	47.34	1.33	1.65	11.37	30.10	30.45	41.94
4500	36.17	50.00	1.33	1.69	11.35	29.76	30.34	41.77
4600	35.99	48.14	1.31	1.68	11.35	29.58	30.26	41.45
4700	35.80	51.91	1.28	1.66	11.27	29.80	30.27	41.36
4800	35.58	47.11	1.23	1.66	11.38	29.56	30.29	40.98
4900	35.62	52.47	1.25	1.66	11.12	29.58	30.29	41.01
5000	35.85	44.03	1.27	1.63	11.01	29.70	30.36	41.11
5100	36.11	51.90	1.31	1.52	10.92	29.56	30.12	40.90
5200	36.18	53.07	1.35	1.51	10.85	29.59	30.23	41.00
5300	36.18	52.68	1.37	1.47	10.77	29.56	30.27	40.83
5400	35.99	48.18	1.38	1.45	10.82	29.69	30.24	40.85
5500	35.71	54.64	1.35	1.45	10.99	29.86	30.45	41.10
5600	35.49	42.79	1.32	1.32	11.03	29.78	30.35	41.25
5700	35.66	43.54	1.33	1.15	11.30	29.86	30.33	41.33
5800	35.75	40.80	1.38	1.05	11.16	29.98	30.35	41.39
5900	35.63	39.54	1.43	1.14	11.39	29.75	30.31	41.46
6000	35.26	43.38	1.47	1.17	11.38	29.69	30.10	41.27
6100	34.70	45.35	1.52	1.34	11.53	29.38	29.88	40.91

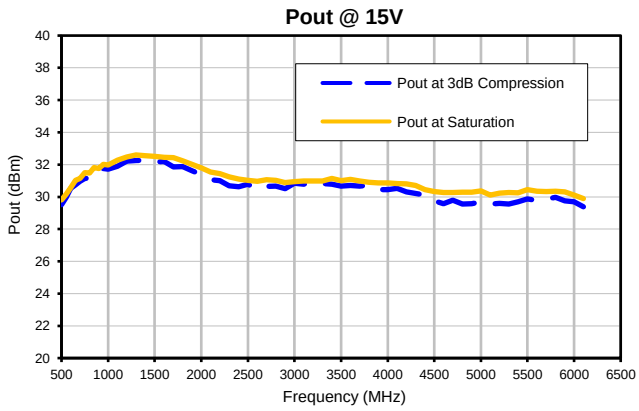
Typical Performance Curves

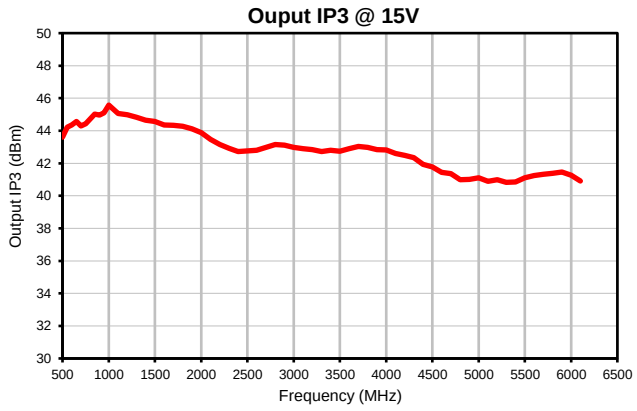






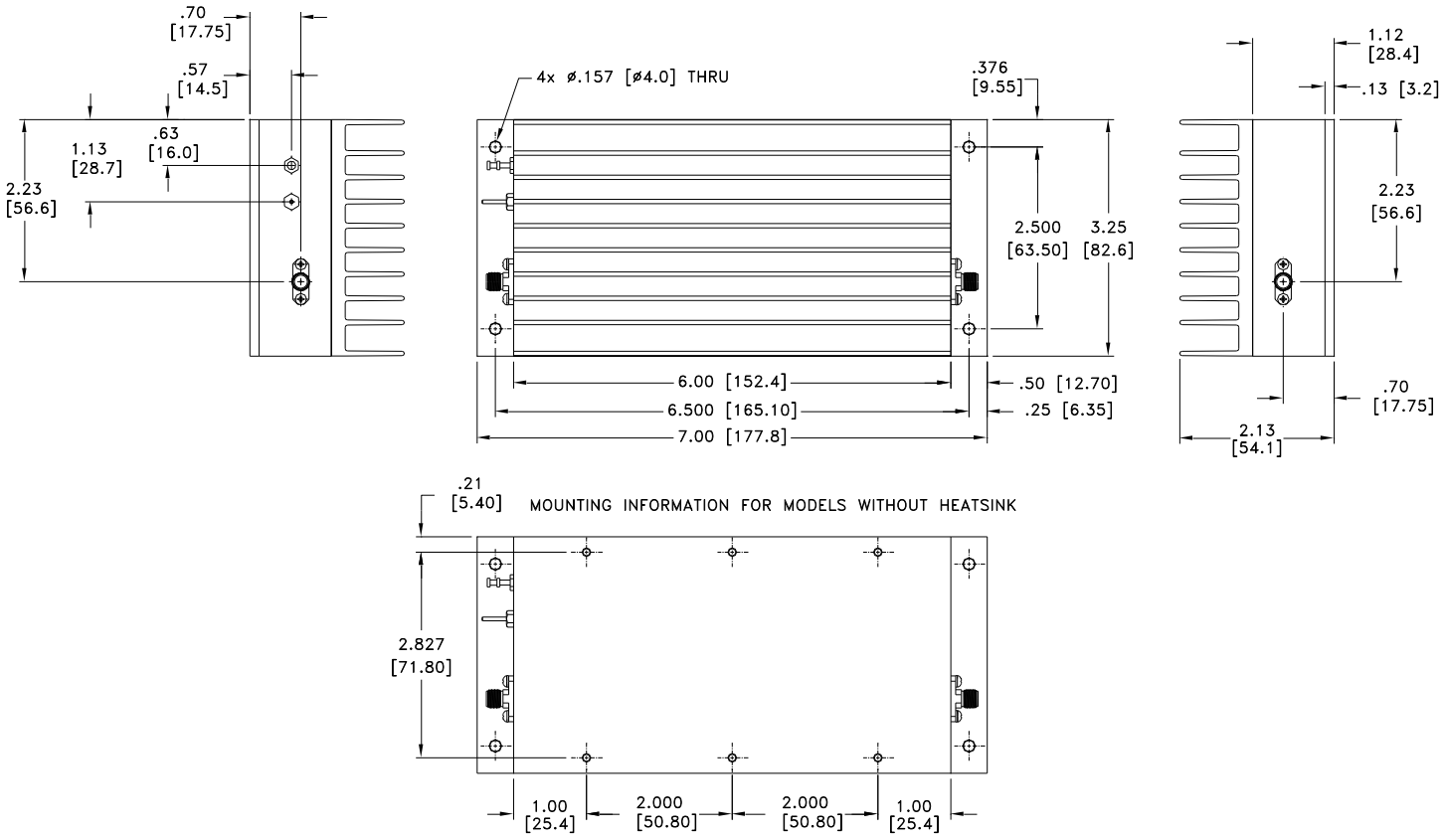






Case Style U

Outline Dimensions U2847



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

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.
4. Weight: 650 grams No HTSK
   950 grams W/HTSK

Mini-Circuits

Environmental Specifications ENV23T19

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 45°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 60° C base plate Temperature	MIL-STD-202, Method 108
Thermal Shock	-55° to 100°C, 5 cycles	MIL-STD-202, Method 107, Condition A, except 100°C