COAXIAL

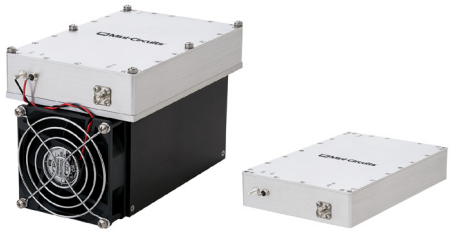
High Power Amplifier

ZHL-20W-83-S+
ZHL-20W-83X-S+

50Ω 20 W 4000 to 8000 MHz

THE BIG DEAL

- Saturated Power, 20 W Typ.
- Wide Bandwidth, 4000 to 8000 MHz
- High Gain, 56 dB Typ.
- Self-Protected From Overheating, Reverse Polarity and DC Shorting/Unshorting



Generic photo used for illustration purposes only

Model No.	ZHL-20W-83-S+	ZHL-20W-83X-S+▲
Case Style	CP2548-2	
Connectors	IN-SMA, OUT-SMA	

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

APPLICATIONS

- High Power Test Sets
- Burn-In Setups
- Communications
- Radar

PRODUCT OVERVIEW

The ZHL-20W-83-S+ is a Class AB, high-power amplifier providing 20 W saturated power over the 4000 to 8000 MHz band, ideal for a variety of high-power test setups as well as applications including communications, radar and more. The ruggedly-designed amplifier provides unconditional stability and built-in self-protection against reverse polarity and overheating. The amplifier's output stage is further protected in the event of a fault condition, allowing high power operation for up to 2 minutes into an OPEN or SHORT up to 15 W output power. Housed in a rugged aluminum alloy case measuring 4.3x6.7x1.2", the unit features SMA connectors and optional heat sink and fan attachment for cooling.

KEY FEATURES

Feature	Advantages
Wideband, Usable from 4000 to 8000 MHz	Suitable for a broad range of high-power, wideband applications, including test setups, communications and defense applications.
High Gain, 56 dB Typ.	Enables signal amplification to 20 W output without the need for multiple gain stages.
Built-In Self-Protection	In instances of potentially-damaging overheating within the housing an automatic sensing feature signals the unit to power down.
Unconditional Stability	Provides reliable performance independent of input and load conditions.
Ruggedness	Able to operate into an open and short for 2 minutes at 15 W output power.

REV. B
ECO-017840
ZHL-20W-83-S+
MCL NY
260115

High Power Amplifier

ZHL-20W-83-S+
ZHL-20W-83X-S+

50Ω 20 W 4000 to 8000 MHz

ELECTRICAL SPECIFICATIONS AT T(HEATSINK MOUNTING SURFACE) = +25 °C

Parameter	ZHL-20W-83-S+ ZHL-20W-83X-S+▲ Min.	Typ.	Max.	Units
Frequency Range	4000		8000	MHz
Gain[1]	44.5	56	60.5	dB
Gain Flatness[1]		3.2	5.5	dB
Output Power at 1 dB Compression[2]	+34.5	+39		dBm
Output Power at Saturation[2]	+41.5	+44		dBm
Noise Figure		11		dB
Output Third Order Intercept Point[3]	+39.5	+50		dBm
Input VSWR[1]		1.6		:1
Output VSWR[1]		1.7		:1
DC Supply Voltage[4]	+26	+28	+29	V
Supply Current		4	8	A

1. Small signal input power -50 dBm typ.
2. Power measured of fundamental tone only. Does not include power contribution of harmonic signals.
3. Two tones, +35 dBm/tone, 1 MHz spacing.
4. Typical spec is recommended operating voltage.

▲ Heat sink not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature to +80 °C, in order to ensure proper performance.

ABSOLUTE MAXIMUM RATINGS[5]

Parameter	Ratings
Operating Heatsink Mounting Surface Temperature	0 °C to +80 °C
Storage Temperature	-55 °C to +100 °C
DC Voltage	+29 V
Input RF Power (No Damage)	+5 dBm[6]

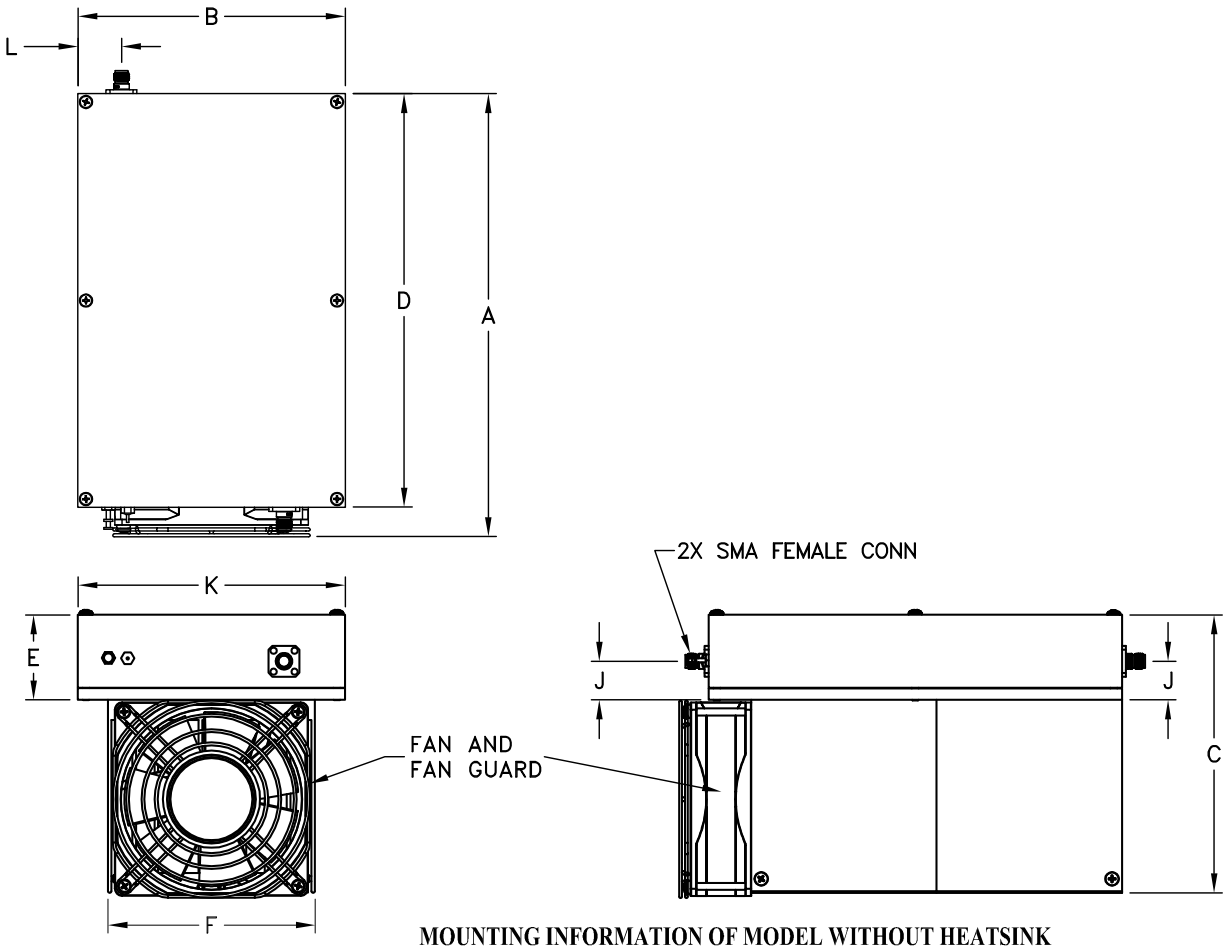
5. Specifications apply to CW signals only. Permanent damage may occur if any of these limits are exceeded.
6. Into 50Ω load.

High Power Amplifier

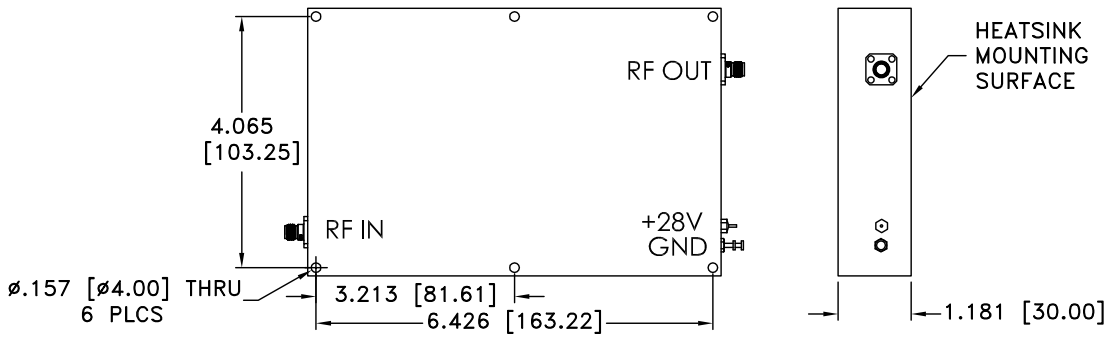
ZHL-20W-83-S+
ZHL-20W-83X-S+

50Ω 20 W 4000 to 8000 MHz

OUTLINE DRAWING FOR MODELS WITH HEATSINK



MOUNTING INFORMATION OF MODEL WITHOUT HEATSINK



OUTLINE DIMENSIONS (Inch / mm)

A	B	C	D	E	F	G	H	J	K	L	wt
7.25	4.33	4.58	6.69	1.38	3.36	--	--	.62	3.34	.71	grams*
184.15	110.0	116.33	170	35.05	85.34	--	--	15.75	84.84	18.03	2041

*880 grams without heatsink

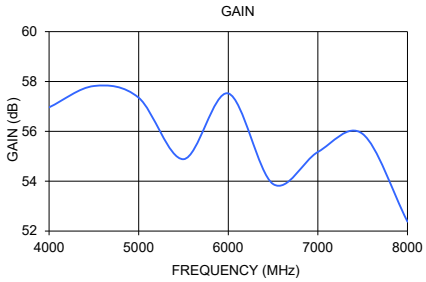
High Power Amplifier

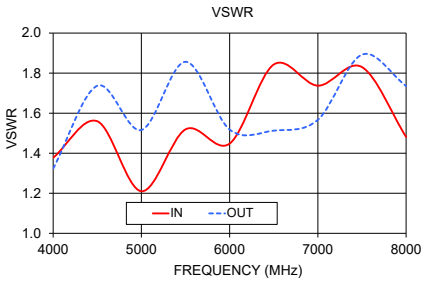
ZHL-20W-83-S+
ZHL-20W-83X-S+

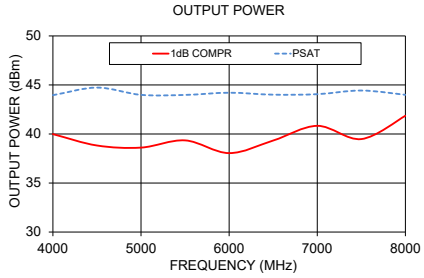
50Ω 20 W 4000 to 8000 MHz

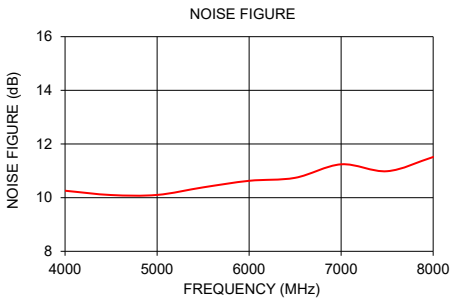
TYPICAL PERFORMANCE DATA/CURVES

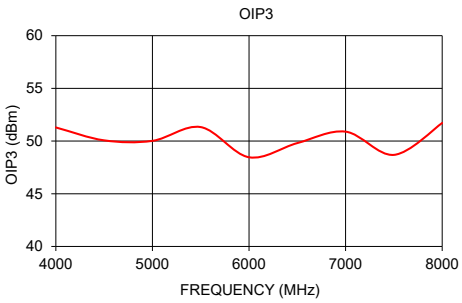
Frequency (MHz)	Gain (dB)	VSWR (:1)		P_{OUT} at 1 dB (dBm)	P_{SAT} (dBm)	NOISE FIGURE (dB)	IP3
	+28 V	IN	OUT	+28 V	+28 V	+28 V	+28 V
4000	57.0	1.38	1.32	+39.99	+43.96	10.26	51.29
4500	57.8	1.56	1.74	+38.83	+44.73	10.10	50.07
5000	57.3	1.21	1.52	+38.61	+43.99	10.10	50.02
5500	54.9	1.52	1.86	+39.35	+43.98	10.38	51.33
6000	57.5	1.45	1.52	+38.05	+44.21	10.63	48.46
6500	53.9	1.84	1.51	+39.33	+44.01	10.74	49.81
7000	55.2	1.74	1.57	+40.83	+44.06	11.24	50.89
7500	55.90	1.83	1.89	+39.48	+44.43	10.99	48.69
8000	52.38	1.48	1.74	+41.86	+43.99	11.51	51.72











NOTES

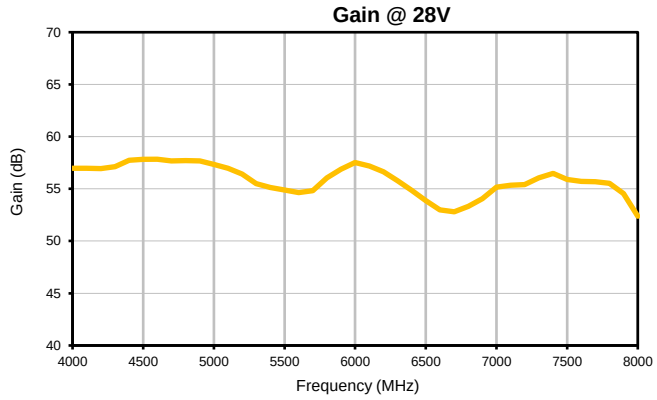
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's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

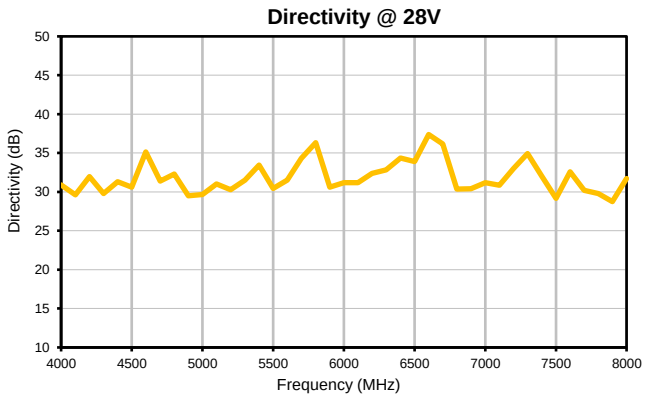
Amplifier ZHL-20W-83-S+

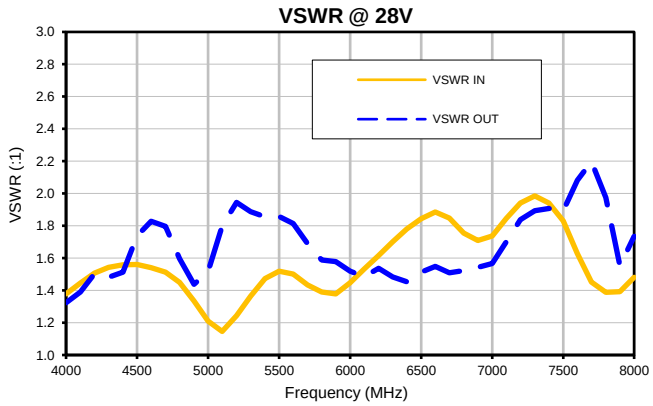
Typical Performance Data

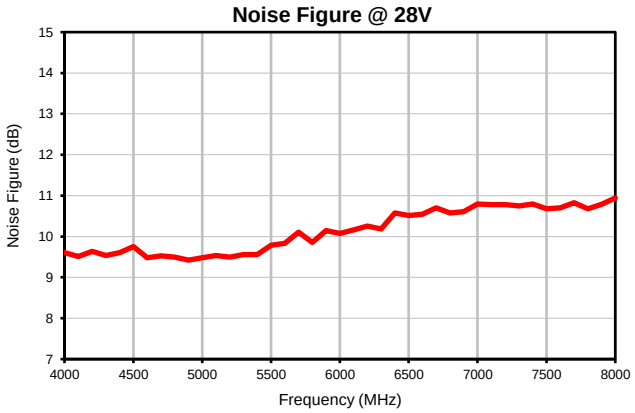
FREQUENCY (MHz)	GAIN (dB) 28V	DIRECTIVITY (dB) 28V	VSWR (:1) IN 28V	VSWR (:1) OUT 28V	NOISE FIGURE (dB) 28V	Pout @ 1 dB COMPRESSION (dBm) 28V	Pout @ SATURATION (dBm) 28V	OUTPUT IP3 (dBm) 28V
4000	56.96	30.91	1.38	1.32	9.61	39.99	43.96	51.29
4100	56.97	29.63	1.45	1.39	9.51	40.03	44.45	51.28
4200	56.93	31.97	1.51	1.50	9.64	39.35	44.28	50.63
4300	57.12	29.80	1.54	1.48	9.53	38.70	44.35	50.06
4400	57.74	31.31	1.56	1.51	9.61	38.77	44.62	50.13
4500	57.82	30.61	1.56	1.74	9.75	38.83	44.73	50.07
4600	57.84	35.16	1.54	1.83	9.48	38.54	44.67	50.11
4700	57.67	31.38	1.51	1.80	9.53	38.36	44.46	49.88
4800	57.69	32.31	1.45	1.60	9.49	37.90	44.03	49.37
4900	57.68	29.51	1.34	1.44	9.42	38.30	44.15	49.72
5000	57.35	29.68	1.21	1.52	9.48	38.61	43.99	50.02
5100	56.97	31.00	1.15	1.80	9.54	38.49	44.05	50.17
5200	56.43	30.30	1.24	1.95	9.50	38.52	44.18	50.30
5300	55.50	31.53	1.36	1.89	9.56	38.48	44.10	50.24
5400	55.15	33.45	1.47	1.85	9.56	38.67	43.94	50.66
5500	54.88	30.45	1.52	1.86	9.79	39.35	43.98	51.33
5600	54.63	31.52	1.50	1.81	9.84	39.89	44.15	51.71
5700	54.83	34.31	1.43	1.69	10.11	39.90	44.30	51.35
5800	56.06	36.33	1.39	1.59	9.86	39.16	44.42	50.41
5900	56.86	30.61	1.38	1.58	10.15	38.47	44.38	49.25
6000	57.52	31.18	1.45	1.52	10.08	38.05	44.21	48.46
6100	57.18	31.20	1.53	1.48	10.17	37.71	43.90	47.75
6200	56.64	32.39	1.62	1.54	10.26	37.14	43.63	47.42
6300	55.77	32.85	1.70	1.48	10.18	37.25	43.58	47.65
6400	54.87	34.37	1.78	1.45	10.58	38.15	43.79	48.51
6500	53.89	33.92	1.84	1.51	10.51	39.33	44.01	49.81
6600	53.00	37.38	1.89	1.55	10.54	40.14	43.97	51.20
6700	52.81	36.18	1.85	1.51	10.70	40.86	44.09	52.59
6800	53.34	30.35	1.75	1.52	10.57	41.20	44.16	52.13
6900	54.05	30.39	1.71	1.54	10.61	41.49	44.33	52.04
7000	55.17	31.20	1.74	1.57	10.79	40.83	44.06	50.89
7100	55.33	30.87	1.85	1.70	10.78	40.36	43.97	50.03
7200	55.41	33.01	1.94	1.84	10.78	39.58	43.77	48.53
7300	56.04	34.92	1.98	1.89	10.75	38.69	43.72	47.31
7400	56.49	32.05	1.94	1.91	10.79	38.72	44.08	47.23
7500	55.90	29.16	1.83	1.89	10.68	39.48	44.43	48.69
7600	55.72	32.58	1.63	2.08	10.70	40.01	44.46	49.09
7700	55.68	30.20	1.45	2.20	10.83	40.81	44.38	49.86
7800	55.54	29.78	1.39	1.97	10.68	40.92	44.15	49.91
7900	54.55	28.76	1.39	1.55	10.79	41.69	44.09	50.56
8000	52.38	31.73	1.48	1.74	10.94	41.86	43.99	51.72

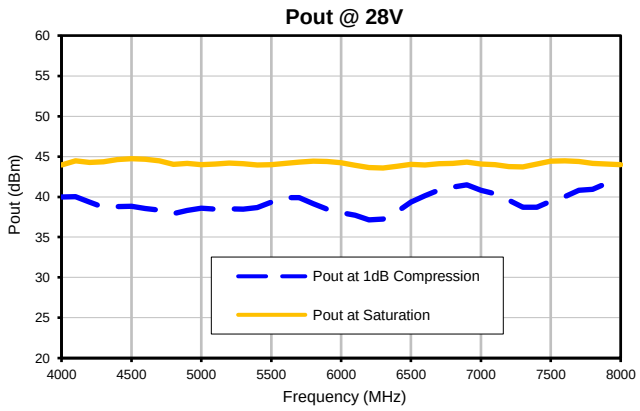
Typical Performance Curves

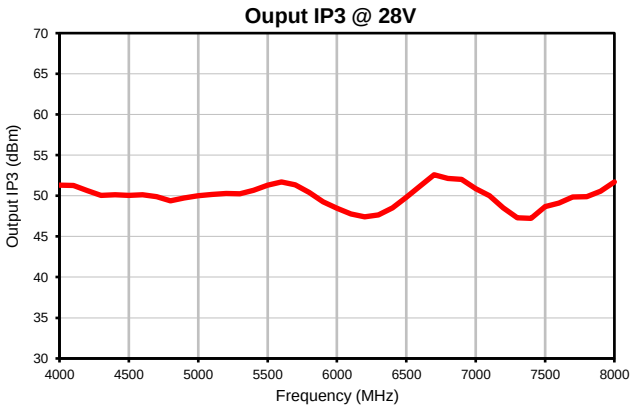








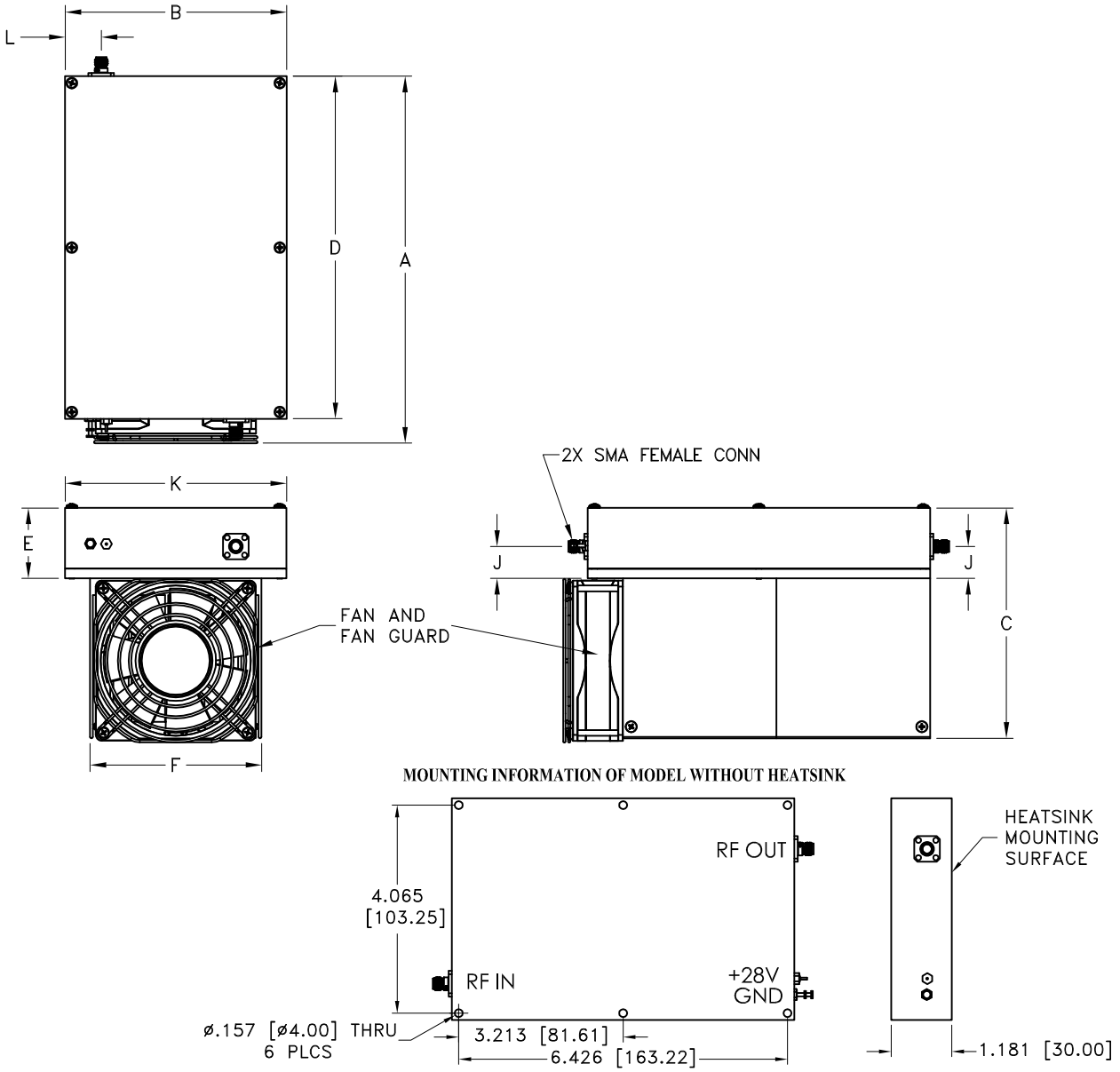




Case Style CP

Outline Dimensions

CP2548-2



CASE#	A	B	C	D	E	F	G	H	J	K	L	WT. GRAMS	WT. WITHOUT HEATSINK GRAMS
CP2548-2	7.25 (184.15)	4.33 (110.0)	4.58 (116.33)	6.69 (170.0)	1.38 (35.05)	3.36 (85.34)	-- --	-- --	.62 (15.65)	3.34 (84.80)	.71 (18.00)	2041	880

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

Notes:

1. Case material: Aluminum alloy
2. Finish:
   For RoHS Case Styles: Clear Chemical conversion coating, non-chrome or trivalent chrome based.
3. Heat sink finish: Black anodize.
4. Refer to the individual model data sheet for the type of connectors available.
5. Recommended screws for mounting model without heat sink on 3/32" thick sheet: #6-32, 1.50" Length.
6. Shape of connector flange may vary.

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Environmental Specifications ENV23T26

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	0° to 80° C	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, 100 cycles	MIL-STD-202, Method 107, Condition A, except 100°C

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