COAXIAL

Amplifier

ZHL-5W-63-S+
ZHL-5W-63X-S+

50Ω Medium High Power 600 to 6000 MHz SMA Female

THE BIG DEAL

- Wideband, 600 to 6000 MHz
- High OIP3, +42 dBm Typ.
- High Gain, 45 dB Typ.



Generic photo used for illustration purposes only

Model No.	ZHL-5W-63-S+	ZHL-5W-63X-S+▲
Case Style	CP2548-2	
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-5W-63-S+ is a class AB medium-power connectorized amplifier utilizing a 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 +37 dBm output power at saturation. The amplifier operates on a +28 V DC supply and comes housed in compact aluminum alloy case (6.7x4.3x1.18") with SMA connectors 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, 45 dB	Reduces the number of gain stages, lowering component count and overall system cost.
Medium Output Power, +37 dBm	Supports a wide range of power requirements.
High OIP3, +42 dBm	Provides highly linear performance with excellent sensitivity and two-tone spur-free dynamic range.

REV. A
ECO-017840
ZHL-5W-63-S+
MCL NY
260203

ELECTRICAL SPECIFICATIONS AT +25 °C

Parameter	Condition (MHz)	ZHL-5W-63-S+ ZHL-5W-63X-S+ ▲ Min.	Typ.	Max.	Units
Frequency Range		600		6000	MHz
Gain	600-6000	36	45	53	dB
Gain Flatness	600-6000		±3.5		dB
Output Power at 3 dB Compression	600-6000		+35		dBm
Output Power at Saturation	600-6000	+35	+37		dBm
Noise Figure	600-6000		12		dB
Output Third Order Intercept Point	600-6000		+42		dBm
Input VSWR	600-6000		2.5		:1
Output VSWR	600-6000		3.5		:1
DC Supply Voltage			+28	+32	V
Supply Current			3.0	3.5	A

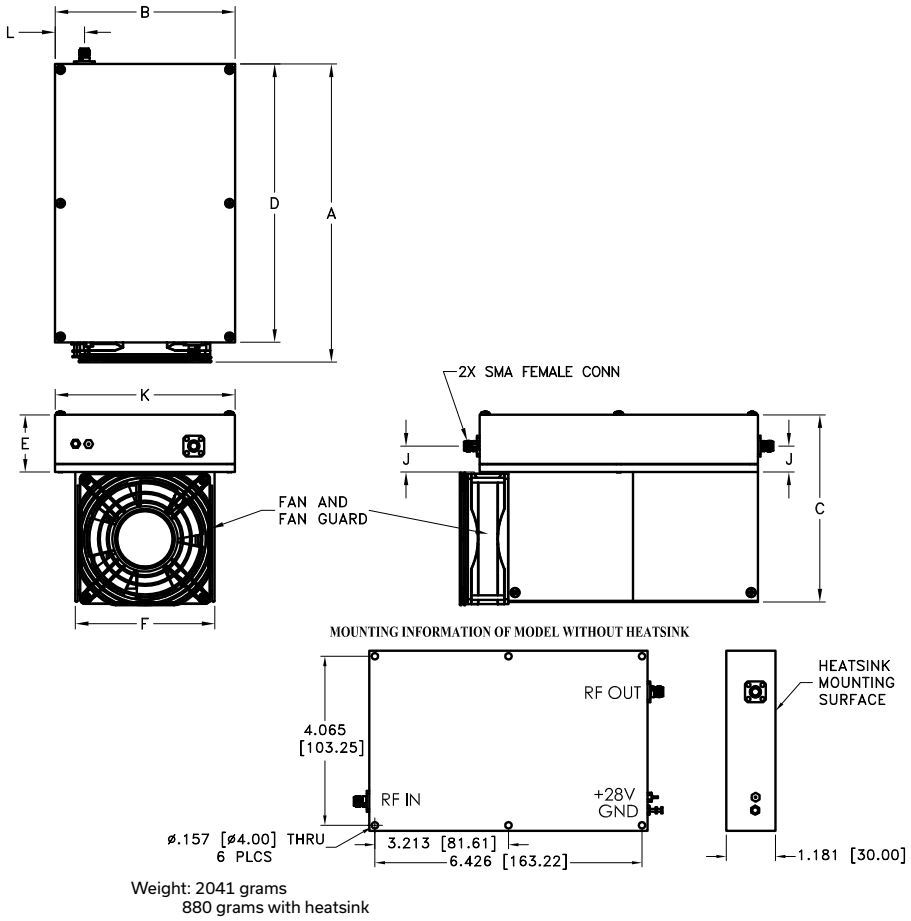
▲ Heat sink not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature to +85 °C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 0.3°C/W max.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	0 °C to +60 °C
Storage Temperature	-55 °C to +100 °C
DC Voltage	+32 V
Input RF Power (No Damage) at Load	+7 dBm
Input RF Power at OPEN / SHORT	-16 dBm

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

OUTLINE DRAWING



Weight: 2041 grams
880 grams with 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	-	-	0.62	3.34	0.71	grams*
184.15	109.98	116.33	169.93	35.052	85.344	-	-	15.748	84.836	18.034	2041

*880 grams without heatsink

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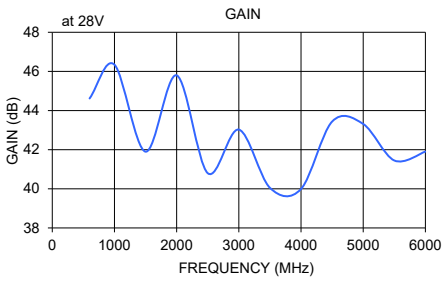
Amplifier

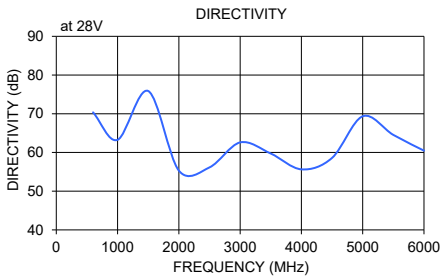
ZHL-5W-63-S+
ZHL-5W-63X-S+

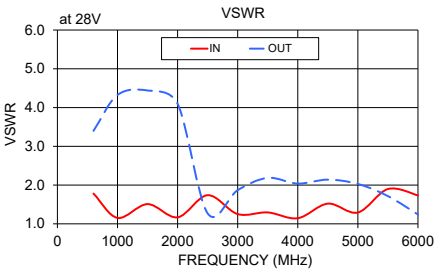
50Ω Medium High Power 600 to 6000 MHz SMA Female

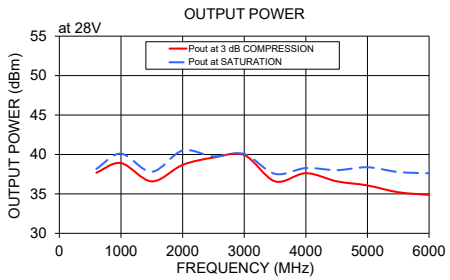
TYPICAL PERFORMANCE DATA/CURVES

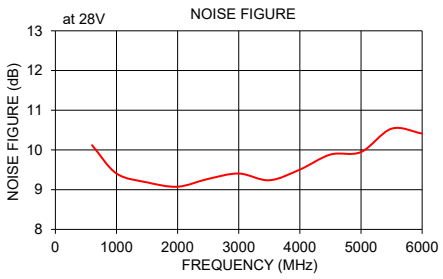
FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		NOISE FIGURE (dB)	P_{OUT} at 3 dB COMPR. (dBm)	P_{OUT} at SATURATION (dBm)	OIP3 (dBm)
	+28 V	+28 V	IN	OUT	+28 V	+28 V	+28 V	+28 V
600	44.62	70.36	1.78	3.40	10.12	37.69	38.17	43.10
1000	46.34	63.26	1.15	4.33	9.41	38.90	40.10	46.06
1500	41.90	75.87	1.51	4.44	9.18	36.59	37.81	45.26
2000	45.80	55.31	1.17	4.10	9.07	38.68	40.50	49.94
2500	40.80	56.14	1.74	1.27	9.27	39.61	39.76	45.80
3000	43.03	62.60	1.25	1.87	9.41	39.92	40.06	44.56
3500	40.05	59.72	1.29	2.19	9.24	36.59	37.54	42.47
4000	39.99	55.64	1.14	2.04	9.51	37.62	38.28	43.78
4500	43.44	58.59	1.52	2.14	9.88	36.60	38.01	43.86
5000	43.31	69.35	1.29	2.03	9.95	36.07	38.38	43.72
5500	41.45	64.53	1.90	1.72	10.54	35.21	37.77	43.13
6000	41.90	60.47	1.73	1.24	10.41	34.87	37.61	43.14

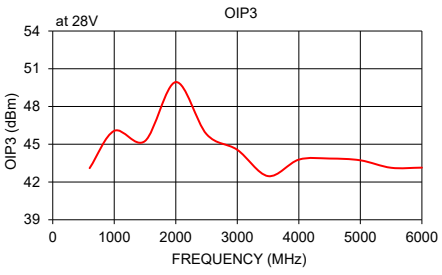












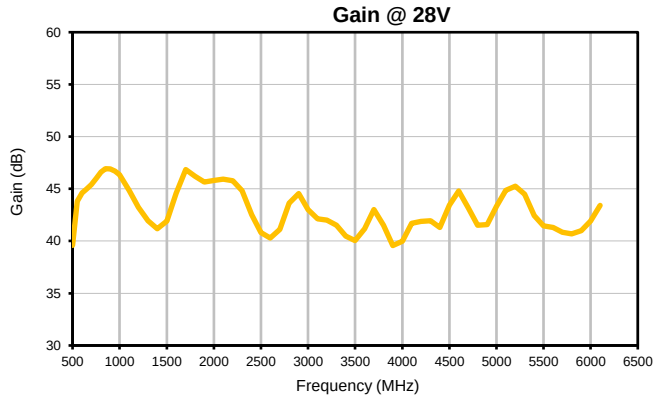
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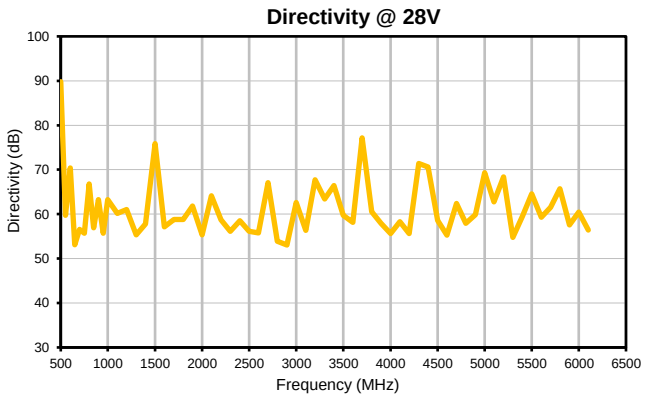
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's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

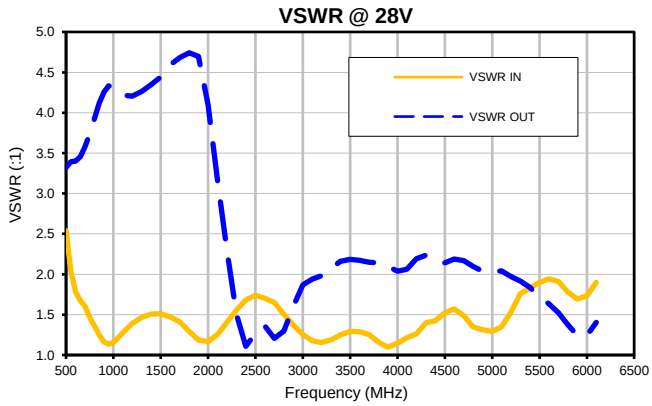
Typical Performance Data

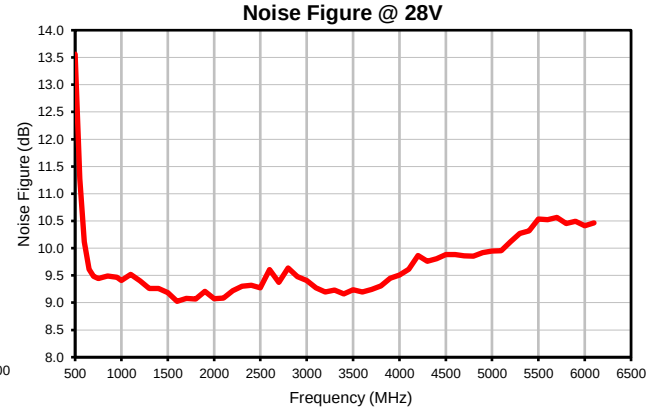
FREQUENCY (MHz)	GAIN (dB) 28V	DIRECTIVITY (dB) 28V	VSWR (:1) IN 28V	VSWR (:1) OUT 28V	NOISE FIGURE (dB) 28V	Pout at 3dB COMPRESSION (dBm) 28V	Pout at SATURATION (dBm) 28V	OUTPUT IP3 (dBm) 28V
500	39.58	89.80	2.54	3.32	13.56	36.81	37.60	41.19
550	43.83	59.74	2.05	3.39	11.28	37.09	37.65	42.12
600	44.62	70.36	1.78	3.40	10.12	37.69	38.17	43.10
650	44.99	53.08	1.67	3.45	9.61	37.96	38.75	43.74
700	45.41	56.53	1.61	3.57	9.48	38.34	39.09	43.96
750	45.99	55.69	1.47	3.74	9.44	38.96	39.55	44.85
800	46.61	66.81	1.36	3.93	9.47	39.01	39.85	45.64
850	46.93	56.94	1.25	4.12	9.49	38.80	39.68	45.45
900	46.91	63.23	1.16	4.26	9.48	38.92	39.56	45.66
950	46.70	55.71	1.13	4.33	9.47	39.35	40.15	46.22
1000	46.34	63.26	1.15	4.33	9.41	38.90	40.10	46.06
1100	44.85	60.14	1.28	4.22	9.52	37.50	40.45	46.31
1200	43.25	61.04	1.39	4.20	9.40	35.67	38.48	45.69
1300	41.95	55.34	1.47	4.26	9.26	36.42	39.05	45.96
1400	41.18	57.76	1.51	4.35	9.26	36.18	38.23	45.65
1500	41.90	75.87	1.51	4.44	9.18	36.59	37.81	45.26
1600	44.57	57.17	1.47	4.59	9.03	35.88	37.64	46.35
1700	46.86	58.80	1.41	4.68	9.08	35.98	38.33	46.68
1800	46.20	58.83	1.29	4.74	9.07	36.68	39.14	47.06
1900	45.64	61.80	1.19	4.70	9.21	37.86	39.97	48.65
2000	45.80	55.31	1.17	4.10	9.07	38.68	40.50	49.94
2100	45.92	64.14	1.26	3.15	9.09	39.47	40.91	50.84
2200	45.77	58.70	1.40	2.30	9.22	40.47	41.07	49.42
2300	44.83	56.16	1.56	1.50	9.30	40.81	40.92	46.92
2400	42.52	58.48	1.68	1.11	9.32	40.15	40.71	45.82
2500	40.80	56.14	1.74	1.27	9.27	39.61	39.76	45.80
2600	40.29	55.80	1.70	1.35	9.61	39.57	39.64	45.63
2700	41.11	67.07	1.65	1.21	9.37	39.46	39.95	45.10
2800	43.63	53.92	1.50	1.30	9.64	40.05	40.58	45.12
2900	44.55	53.05	1.37	1.60	9.48	40.55	40.90	44.80
3000	43.03	62.60	1.25	1.87	9.41	39.92	40.06	44.56
3100	42.13	56.37	1.18	1.94	9.27	38.86	39.42	45.01
3200	41.99	67.76	1.15	1.98	9.20	37.57	38.06	44.38
3300	41.53	63.44	1.19	2.08	9.23	38.31	38.72	44.09
3400	40.46	66.45	1.25	2.16	9.16	37.40	37.89	43.42
3500	40.05	59.72	1.29	2.19	9.24	36.59	37.54	42.47
3600	41.18	58.18	1.29	2.17	9.20	36.16	37.43	42.65
3700	43.01	77.20	1.25	2.15	9.24	34.84	37.38	42.41
3800	41.50	60.50	1.16	2.14	9.31	35.58	37.46	42.18
3900	39.57	57.92	1.10	2.10	9.45	36.09	37.20	42.81
4000	39.99	55.64	1.14	2.04	9.51	37.62	38.28	43.78
4100	41.71	58.26	1.21	2.06	9.61	37.95	38.86	44.06
4200	41.87	55.60	1.26	2.19	9.87	38.13	38.92	44.64
4300	41.95	71.41	1.40	2.23	9.76	37.15	37.49	44.28
4400	41.29	70.57	1.42	2.18	9.81	36.42	36.95	44.06
4500	43.44	58.59	1.52	2.14	9.88	36.60	38.01	43.86
4600	44.78	55.30	1.57	2.19	9.88	36.64	38.02	43.15
4700	43.16	62.39	1.49	2.17	9.86	35.73	37.81	43.01
4800	41.52	57.95	1.35	2.10	9.85	35.37	37.50	42.55
4900	41.57	59.88	1.31	2.04	9.92	35.07	37.29	42.57
5000	43.31	69.35	1.29	2.03	9.95	36.07	38.38	43.72
5100	44.87	62.74	1.35	2.04	9.95	36.72	38.88	44.15
5200	45.25	68.35	1.53	1.97	10.12	36.41	38.90	43.97
5300	44.49	54.78	1.76	1.91	10.27	35.27	38.85	43.31
5400	42.43	59.53	1.83	1.84	10.32	34.97	37.73	42.75
5500	41.45	64.53	1.90	1.72	10.54	35.21	37.77	43.13
5600	41.29	59.28	1.94	1.63	10.52	37.68	39.05	44.55
5700	40.85	61.54	1.91	1.52	10.57	36.57	38.17	44.41
5800	40.68	65.69	1.78	1.38	10.45	34.96	36.38	43.58
5900	40.98	57.55	1.69	1.24	10.49	34.62	36.31	42.83
6000	41.90	60.47	1.73	1.24	10.41	34.87	37.61	43.14
6100	43.41	56.42	1.90	1.40	10.47	33.78	38.19	41.90

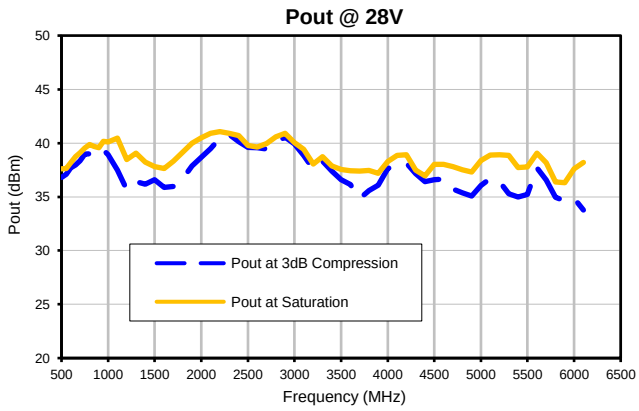
Typical Performance Curves

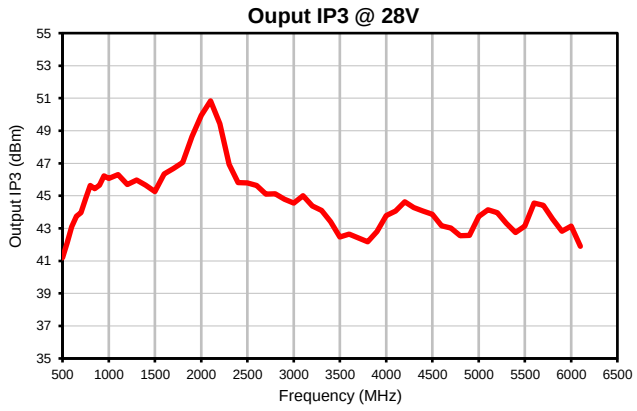








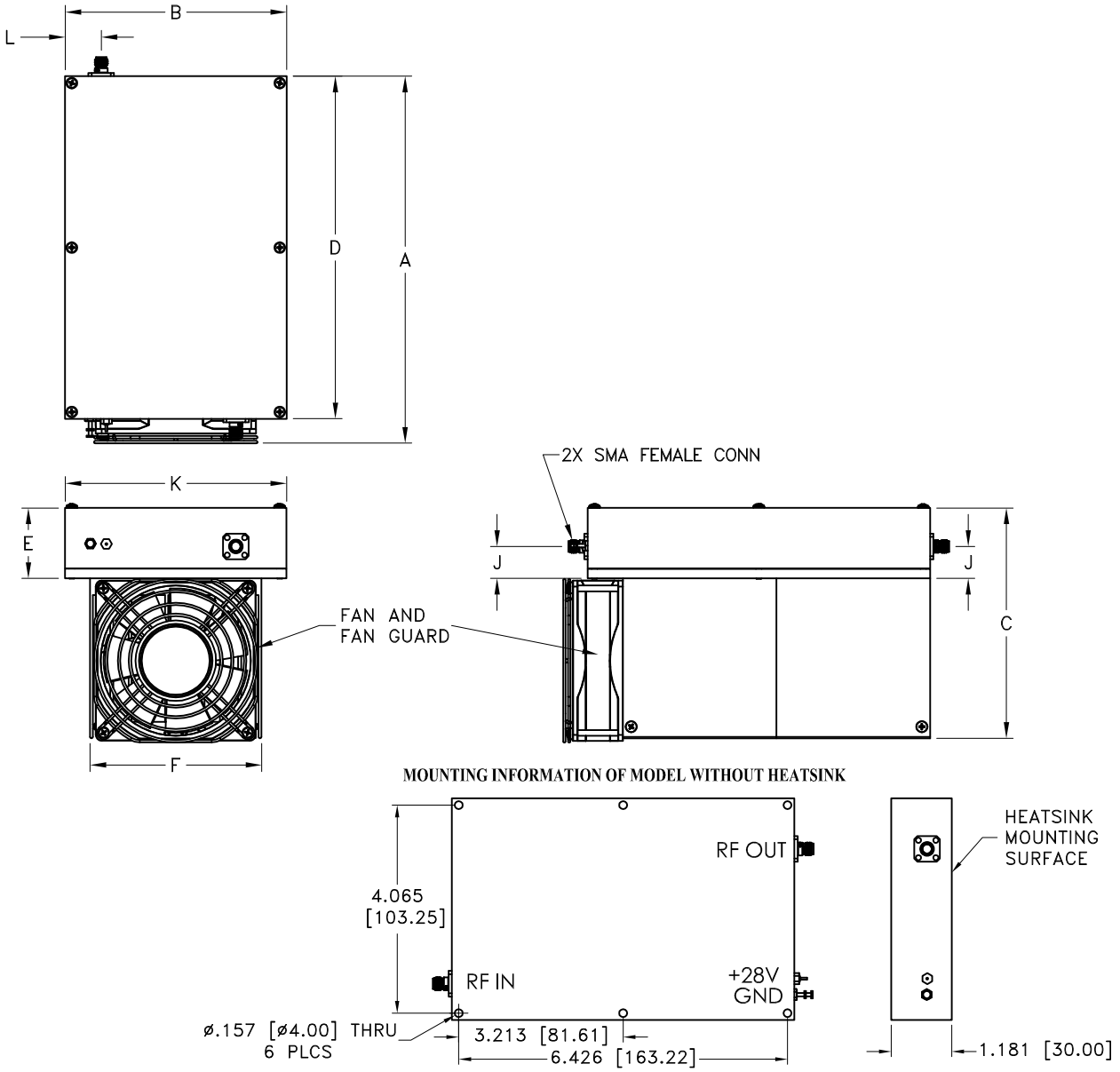




Case Style CP

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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RF/IF MICROWAVE COMPONENTS

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

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