COAXIAL

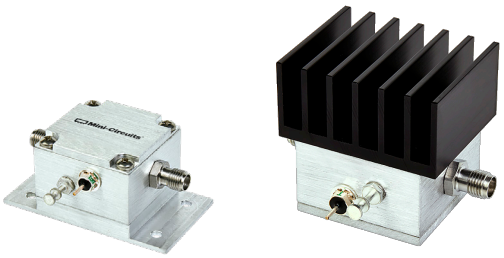
Power Amplifier

50Ω 10 to 2500 MHz SMA

ZFL-2500VH+
ZFL-2500VHX+

THE BIG DEAL

- Wideband Operation, 10 to 2500 MHz
- High IP3, +35 dBm Typ.
- Low Noise Figure, 5.5 dB Typ.

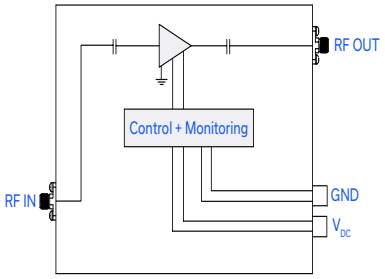


Generic photo used for illustration purposes only

APPLICATIONS

- Instrumentation Testing
- Communication Systems
- Lab Use

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

The ZFL-2500VH+ is a solid-state connectorized amplifier module which can be used in a wide range of wideband test applications from 10 to 2500 MHz band. This rugged amplifier is capable of amplifying CW signals with 15 V supply voltage over the operating bandwidth. The typical gain is 23 dB with a flatness of ±1.35 dB.

The ruggedly designed amplifier is capable of withstanding short and open circuits indefinitly with input up to -10 dBm. The amplifier operating baseplate temperature is between -20 to +65°C. The amplifier is designed to have a compact size of 2.19 ×1.25 × 0.75'' and a light weight of 70 grams (without heatsink).

KEY FEATURES

Features	Advantages
Wideband, Useable from 10 to 2500 MHz	Suitable for a broad range of high-power wideband applications, including test setups, communications and defense applications.
Low Noise, 5.5 dB Typ.	Enables signal amplification with minimal siganl degradation.
Small and Lightweight	A modular design sporting a small footprint of 2.19 × 1.25 × 0.75'' and a light weight of 70 grams.
Low Voltage	The ZFL-2500VH+ is powered by a low voltage of 15 V supply.

ELECTRICAL SPECIFICATIONS, +25°C, V_{DC}= +15 V

Parameter	Symbol	Condition (MHz)		Min.	Typ.	Max.	Units
Frequency Range	f	–		10	–	2500	MHz
Gain	G_{SS}	P_{IN}=- 20 dBm	10 - 2500	20	23	–	dB
Gain Flatness	$G_{SS-FLAT}$	P_{IN}=- 20 dBm	10 - 2500	–	±1.35	±1.50	dB
Output Power at 1 dB Compression	P_{1dB}	10 - 2500		+23	+25	–	dBm
Noise Figure	NF	10 - 2500		–	5.5	–	dB
Output Third Order Intercept Point	OIP3	P_{IN}=- 20 dBm	10 - 2500	–	+35	–	dBm
Input Return Loss	I-RL	P_{IN}=- 20 dBm	10 - 2500	9.5	11.5	–	dB
Output Return Loss	O-RL	P_{IN}=- 20 dBm	10 - 2500	7.5	9.5	–	dB
DC Supply Voltage	V_{SUPPLY}	10 - 2500		–	15	–	V
DC Supply Current	I_{SUPPLY}	P_{IN}=- 20 dBm	10 - 2500	–	260	300	mA

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings	
Operating Temperature	ZFL-2500VH+	$T_{AMBIENT}$: -20°C to +65°C
	ZFL-2500VHX+	$T_{MOUNTINGBASE}$: +71°C
Storage Temperature	-55°C to +100°C	
RF Input Power (no damage)	Into 50 ohm load	+10 dBm
	Into open or short	-10 dBm
DC Operating Voltage	+17 V	

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

DETERMINING MAXIMUM THERMAL RESISTANCE OF USERS' EXTERNAL HEAT SINK

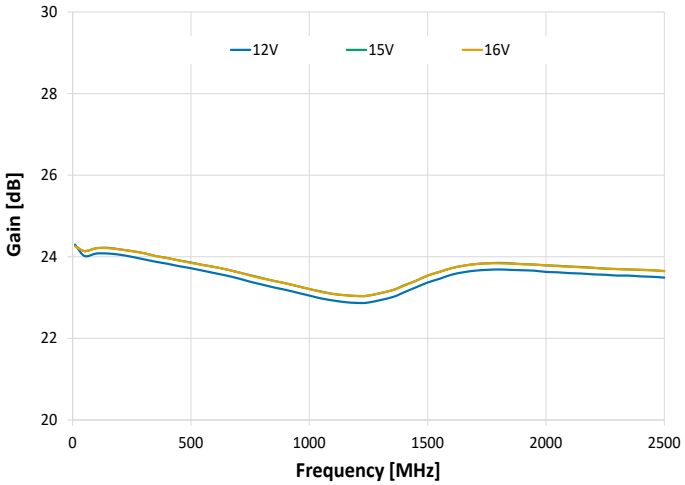
$$\textit{MAXIMUM THERMAL RESISTANCE} = \frac{\textit{MAXIMUM OPERATING CASE TEMP} - \textit{MAXIMUM USER AMBIENT TEMP}}{\textit{POWER DISSIPATION}}$$

Example:

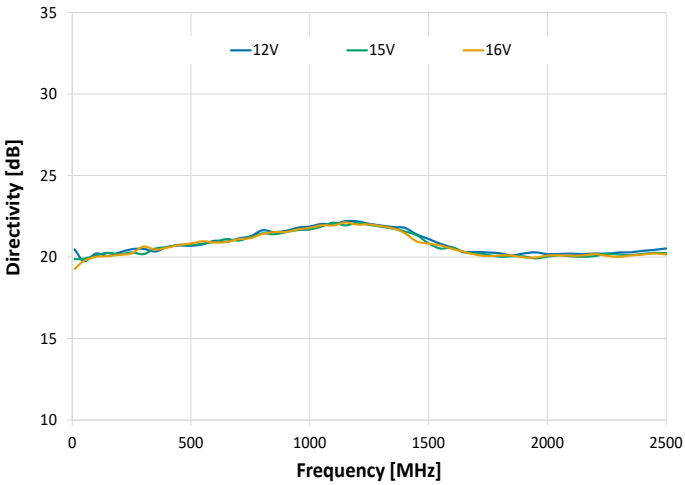
MAXIMUM MOUNTING BASE TEMP = +71 °C (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE)
MAXIMUM USER AMBIENT TEMP = +36 °C (USER DEFINED)
POWER DISSIPATION = 5 WATTS
THEN MAXIMUM ALLOWABLE THERMAL RESISTANCE = 7 °C/W

TYPICAL PERFORMANCE GRAPHS

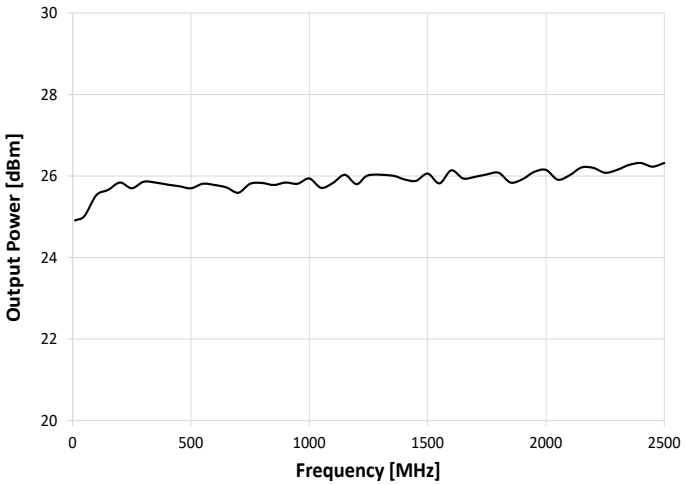
Gain vs. Frequency



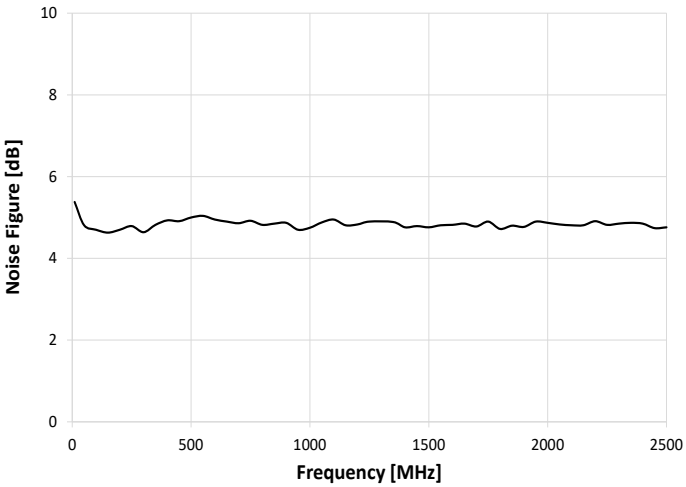
Directivity vs. Frequency



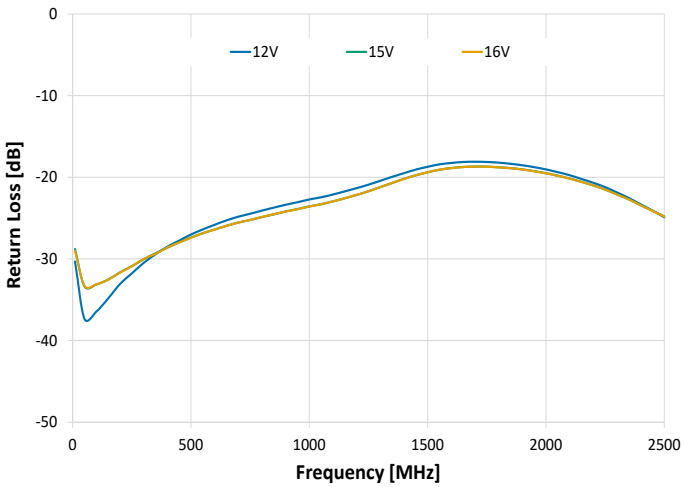
Output Power at 1dB Compression vs. Frequency



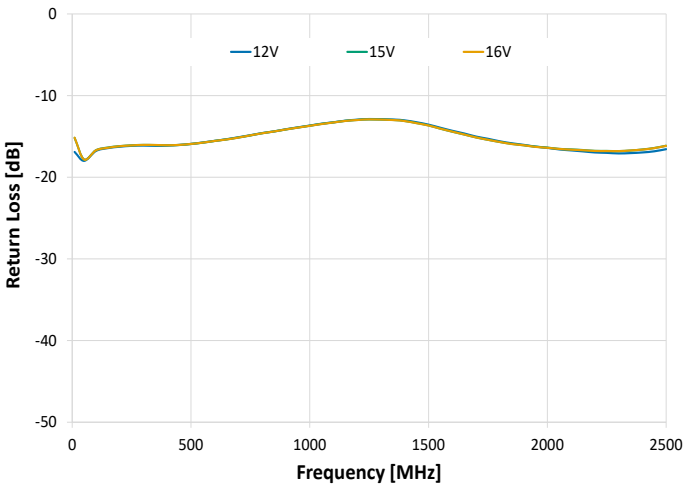
Noise Figure vs. Frequency



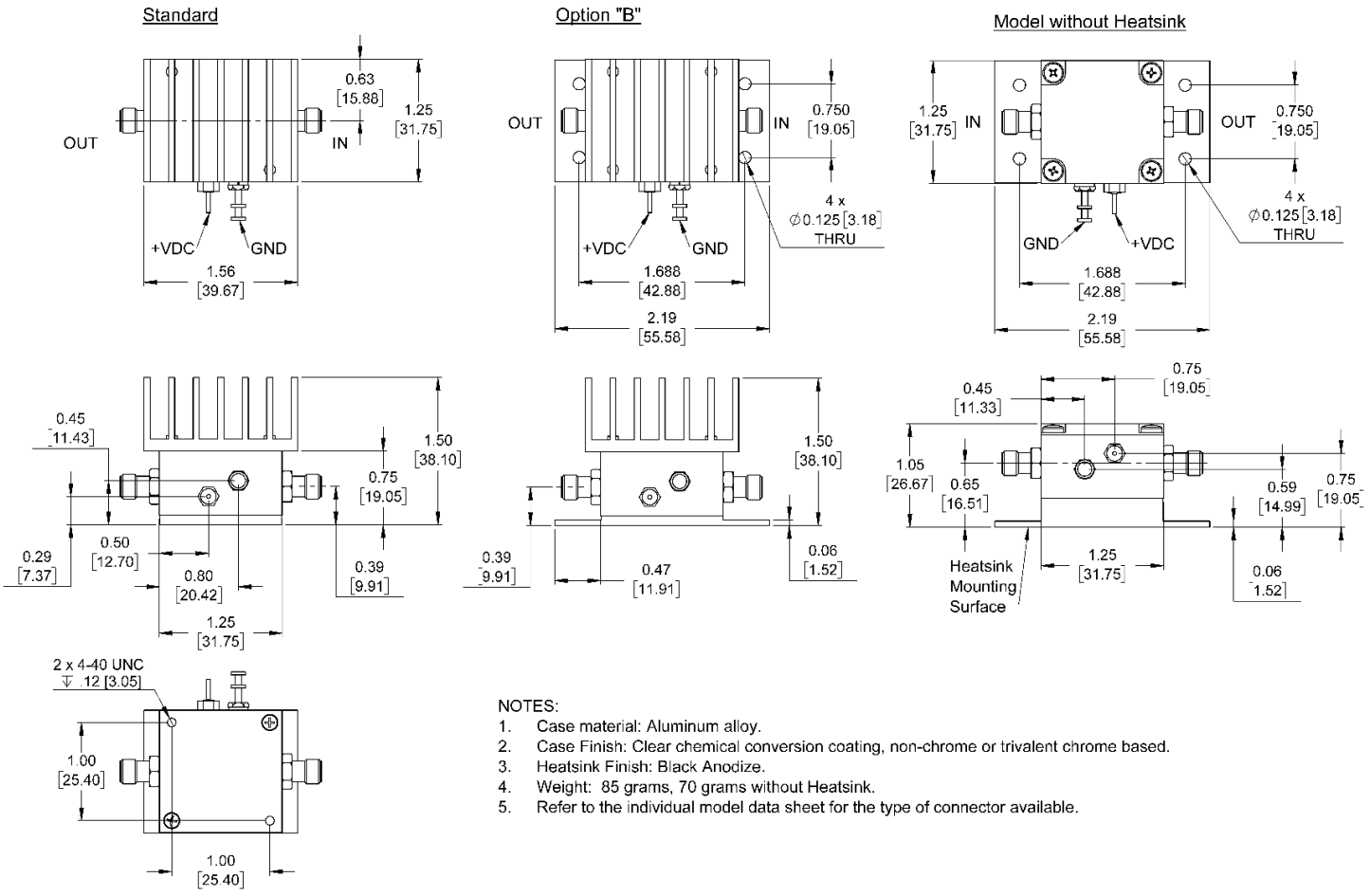
Return Loss In vs. Frequency



Return Loss Out vs. Frequency



CASE STYLE DRAWING (WITH HEATSINK / WITH BRACKET / WITHOUT HEATSINK)



NOTES:
1. Case material: Aluminum alloy.
2. Case Finish: Clear chemical conversion coating, non-chrome or trivalent chrome based.
3. Heatsink Finish: Black Anodize.
4. Weight: 85 grams, 70 grams without Heatsink.
5. Refer to the individual model data sheet for the type of connector available.

COAXIAL CONNECTIONS

IN (RF IN)	SMA
OUT (RF OUT)	SMA

DETAILED MODEL INFORMATION IS AVAILABLE ON OUR WEBSITE CLICK HERE

Performance Data	Table Graphs S-Parameter (S2P Files) Data Set (.zip file)
RoHS Status	Compliant
Environmental Ratings	ENV23T3

ORDERING INFORMATION

Model No. Links	ZFL-2500VH+	ZFL-2500VHB+	ZFL-2500VHX+
Option	With heatsink	With heatsink and bracket	With bracket
Case Style	SS98		
Connector	IN (SMA) / OUT (SMA)		

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 ZFL-2500VH+

Typical Performance Data

FREQUENCY (MHz)	GAIN (dB)			DIRECTIVITY (dB)			VSWR IN (:1)	VSWR OUT (:1)	NOISE FIGURE (dB)	Pout at 1dB Comp. (dBm)
	12V	15V	16V	12V	15V	16V	15V	15V	15V	15V
10.0	24.67	24.50	24.32	17.38	18.27	18.56	1.25	1.56	6.31	26.96
173.3	24.75	25.24	25.12	17.14	16.67	16.52	1.27	1.32	4.86	27.17
336.7	24.83	25.31	25.18	16.79	15.73	16.12	1.32	1.30	4.99	27.13
500.0	24.95	25.45	25.34	15.43	14.82	15.04	1.37	1.25	5.00	27.07
510.0	24.97	25.45	25.32	16.10	16.30	15.45	1.38	1.24	5.00	27.09
673.3	24.80	25.70	25.62	16.31	13.77	13.71	1.40	1.17	5.00	26.91
836.7	24.90	25.34	25.22	15.98	13.45	14.21	1.38	1.09	4.95	26.51
1000.0	25.00	25.42	25.35	15.44	13.28	13.29	1.37	1.08	4.93	26.30
1010.0	25.13	25.46	25.38	15.80	13.69	13.12	1.37	1.08	4.97	26.31
1173.3	25.04	25.84	25.74	15.56	13.69	14.04	1.40	1.10	4.98	26.25
1336.7	25.29	25.79	25.69	15.70	14.42	14.35	1.36	1.10	5.01	26.11
1500.0	25.00	25.58	25.47	15.99	15.33	14.80	1.27	1.11	5.08	25.78
1510.0	24.98	25.57	25.47	15.87	15.42	15.80	1.26	1.11	5.10	25.79
1673.3	25.16	25.53	25.40	15.62	15.21	15.24	1.16	1.15	5.12	25.25
1836.7	24.85	25.36	25.26	15.68	15.71	15.13	1.16	1.20	5.13	24.66
2000.0	24.81	25.35	25.21	14.94	15.80	16.75	1.19	1.25	5.11	25.48
2010.0	24.76	25.28	25.15	15.39	16.39	16.24	1.19	1.26	5.13	25.53
2173.3	24.46	25.57	25.44	15.41	15.61	15.92	1.20	1.33	5.16	26.08
2336.7	24.32	25.41	25.25	15.45	16.51	17.29	1.22	1.46	5.26	26.09
2500.0	23.94	25.62	25.42	15.23	16.57	17.90	1.26	1.71	5.18	25.81

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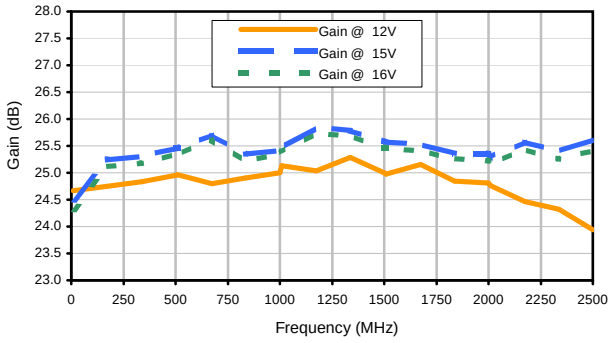
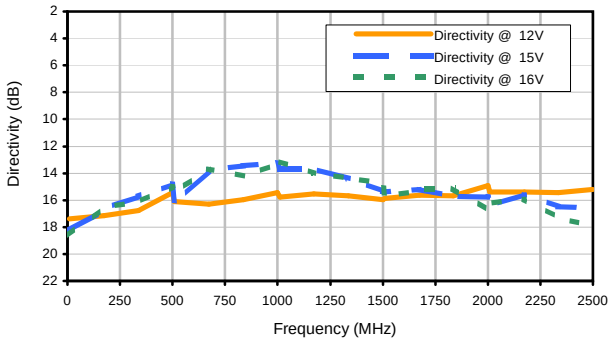
Typical Performance Curves

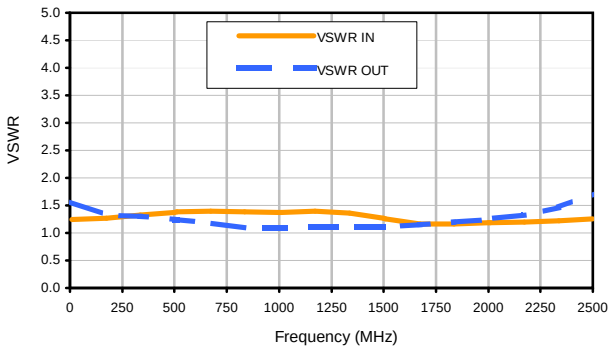
Gain



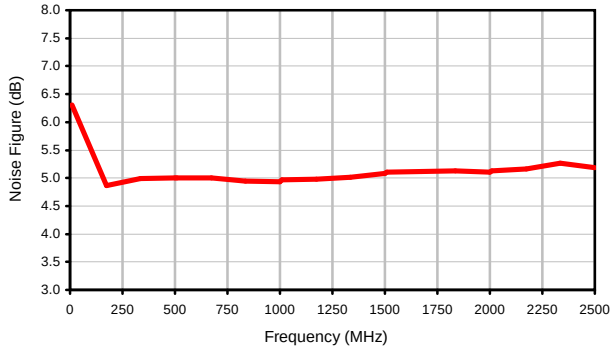
Directivity



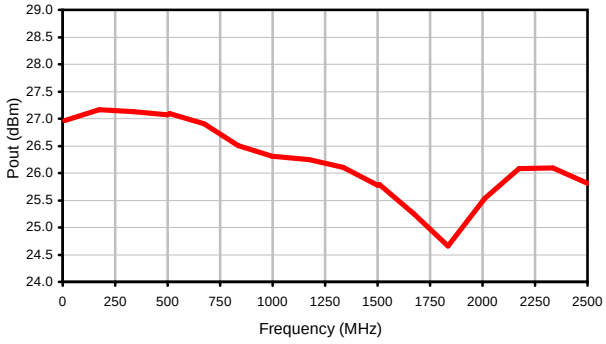
VSWR @ 15V



Noise Figure @ 15V



Pout at 1dB Compression @ 15V



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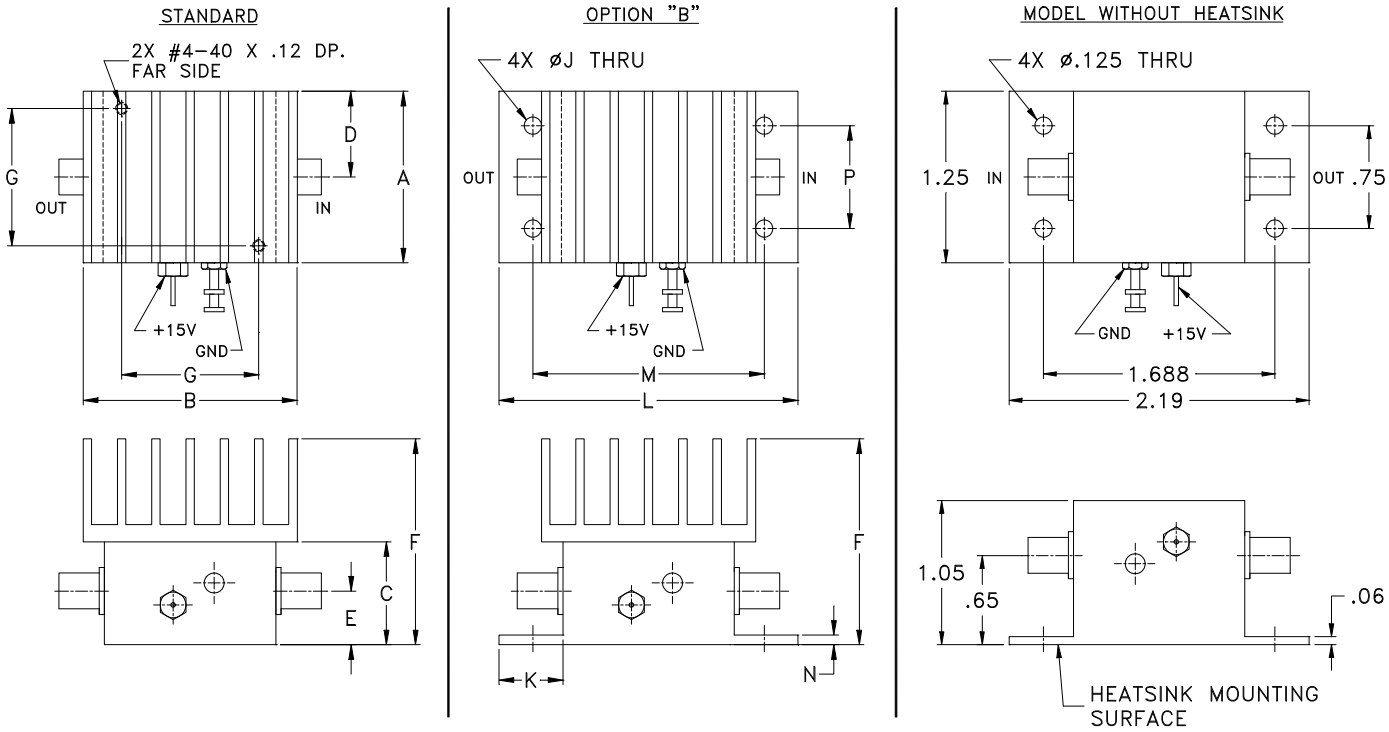
Case Style SS

SS98

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
SS98	1.25 (31.75)	1.56 (39.62)	.75 (19.05)	.63 (16.00)	.39 (9.91)	1.50 (38.10)	1.000 (25.40)	-- --	.125 (3.18)	.46 (11.68)	2.19 (55.63)	1.688 (42.88)	.06 (1.52)

CASE#	P	WT. GRAMS	WT. WITHOUT HEATSINK GRAMS
SS98	.750 (19.05)	85.0	70.0

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .03; 3 Pl. ± .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. Heat sink finish: Black anodize.
4. Refer to the individual model data sheet for the type of connector available.

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Environmental Specifications ENV23T3

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

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