COAXIAL

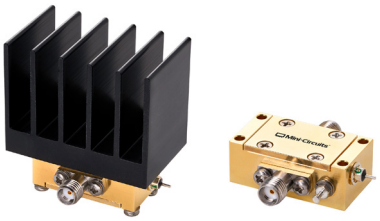
Wideband Amplifier

ZVA-02203LN+
ZVA-02203LNX+

50Ω 2 to 20 GHz Gain 30 dB SMA Female

KEY FEATURES

- Ultra-Wideband Coverage, 2 to 20 GHz
- Excellent Gain Flatness, ±1.5 dB Typ
- Single +12 V Supply
- Reverse Voltage Protected
- Compact Case for Ease of System Integration

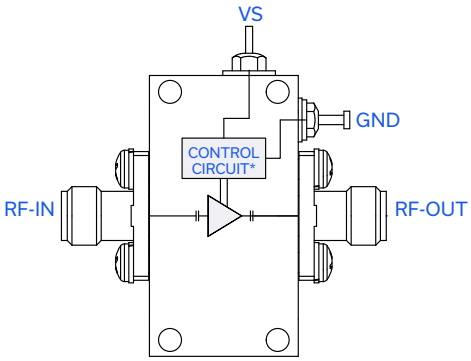


Generic photo used for illustration purposes only

APPLICATIONS

- Fiber Optics
- Wideband Test and Instrumentation
- Military EW and Radar
- Satellite Systems
- 4G LTE & 5G FR1 Infrastructure
- WiFi 6E & WiFi 7
- Aerospace and Defense
- Microwave Point-to-Point Radio

FUNCTIONAL DIAGRAM



*Voltage Regulation, over-voltage, reverse voltage, and in-rush current protection circuit

PRODUCT OVERVIEW

Mini-Circuits' ZVA-02203LN(X)+ is a coaxial, wideband amplifier offering flat gain across a wide frequency range from 2 to 20 GHz. This model operates on a single +12 V supply with 290 mA typical current consumption and is capable of delivering up to 60 mW output power at 1 dB compression. The amplifier comes in a rugged, compact case (1.2 × 0.64 × 0.45") with SMA female RF connectors.

ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE AND V_{DD} = +12.0 V

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		2		20	GHz
Gain	2–20	27	30	–	dB
Noise Figure	2–14 14–20	– –	3.5 2.5	– –	dB
Input Return Loss	2–20	11.0	13.0	–	dB
Output Return Loss	2–20	11.0	13.0	–	dB
Output Power at 1 dB Compression (P1dB)	2–14 14–20	+18.5 +17.0	+20.0 +18.0	– –	dBm
Output Third Order Intercept Point (Output Power = +5 dBm/Tone)	2–20	–	+28.0	–	dBm
DC Supply Voltage (V_S)	–	+10.0	–	+12.0	V
DC Current	–	–	290	320	mA

REV. D
ECO-028795
ZVA-02203LN(X)+
MCL NY
260918

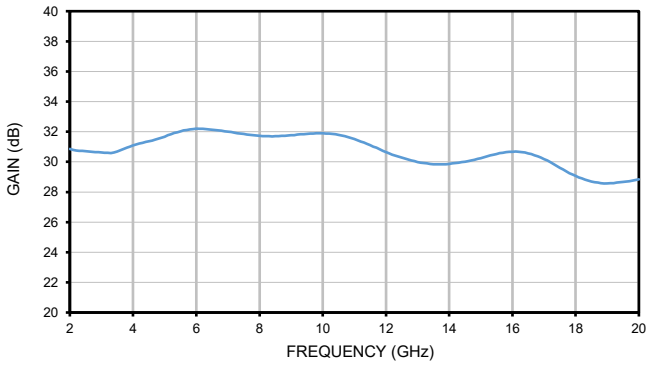
Wideband Amplifier

ZVA-02203LN+
ZVA-02203LNX+

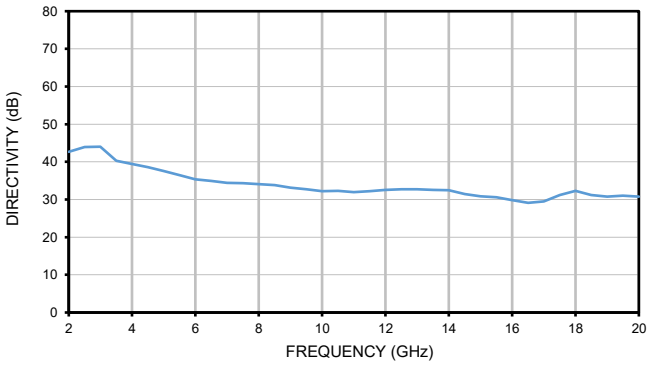
50Ω 2 to 20 GHz Gain 30 dB SMA Female

TYPICAL PERFORMANCE GRAPHS

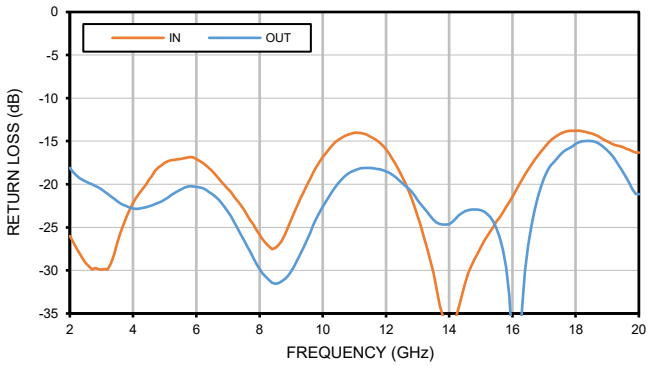
GAIN



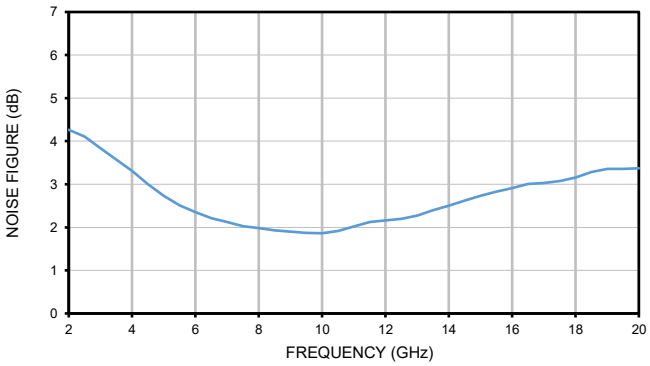
DIRECTIVITY



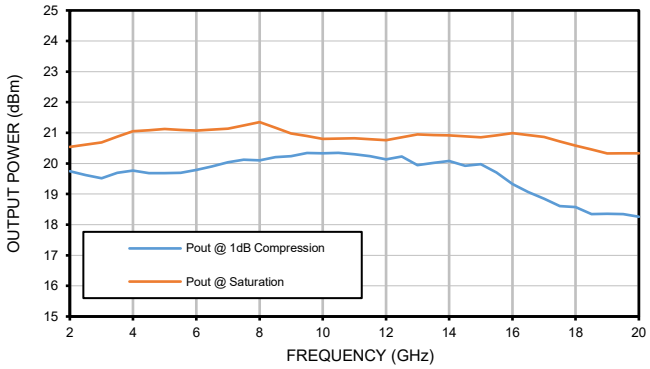
RETURN LOSS



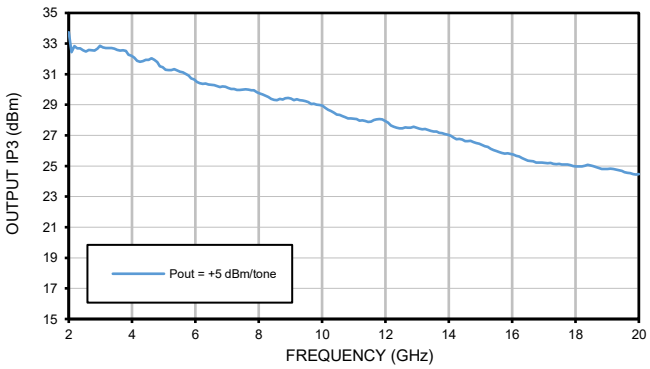
NOISE FIGURE



OUTPUT POWER



OIP3



ABSOLUTE MAXIMUM RATINGS[1]

Parameter	Ratings
Operating Temperature (Baseplate)	-45 °C to +85 °C
Storage Temperature	-55 °C to +100 °C
Total Power Dissipation	4.0 W
RF Input Power[2] (CW), V_S = +12.0 V	+5 dBm
DC Operating Voltage (V_S)	+13 V

1. Continuous operation is not recommended at these extremes. Permanent damage may occur if any of these limits are exceeded.
2. Specified under matched load to 50Ω.

DETERMINING MAXIMUM THERMAL RESISTANCE OF USERS' EXTERNAL HEATSINK

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

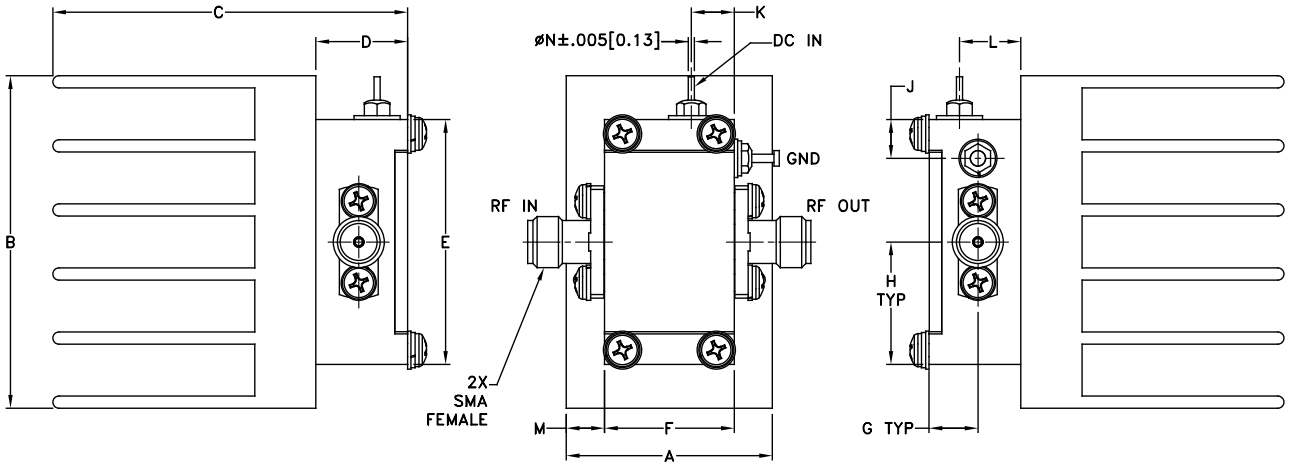
Example:	MAXIMUM OPERATING CASE TEMP = +50 °C (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE) MAXIMUM USER AMBIENT TEMP = +30 °C (USER DEFINED) POWER DISSIPATION = 10 WATTS (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE) THEN MAXIMUM ALLOWABLE THERMAL RESISTANCE = 2 °C/W

Wideband Amplifier

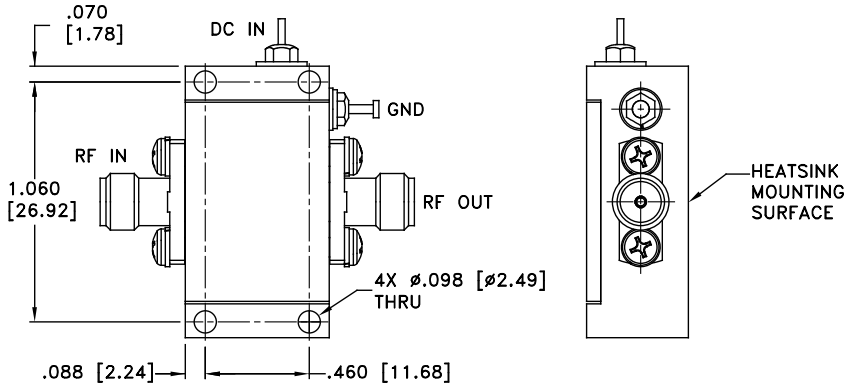
ZVA-02203LN+
ZVA-02203LNX+

50Ω 2 to 20 GHz Gain 30 dB SMA Female

CASE STYLE DRAWING FOR MODELS WITH HEATSINK (ZVA-02203LN+)



CASE STYLE DRAWING FOR MODELS WITHOUT HEATSINK (ZVA-02203LNX+)



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
AV3598	1.01 [25.65]	1.63 [41.40]	1.74 [44.20]	0.45 [11.43]	1.20 [30.48]	0.64 [16.26]	0.24 [6.10]	0.60 [15.24]	0.19 [4.83]	0.21 [5.33]	0.30 [7.62]	0.19 [4.75]	0.03 [0.76]

Weight: 58 grams; Without heatsink: 17 grams
Dimensions are in inches [mm]. Tolerances: 2 Pl. ±0.03; 3 Pl. ±0.015 Inches

Wideband Amplifier

ZVA-02203LN+
ZVA-02203LNX+

50Ω 2 to 20 GHz Gain 30 dB SMA Female

ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD.

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file)
RoHS Status	Compliant
Environmental Ratings	ENV141
Export Information	ECCN# EAR99

ORDERING INFORMATION

Model No. Links	ZVA-02203LN+	ZVA-02203LNX+
Option	With Heatsink	Without Heatsink
Product Marking	ZVA-02203LN+	ZVA-02203LNX+
Case Style	AV3598	AV3598
Connector	SMA Female	

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-Circuits' applicable established test performance criteria and measurement instructions.

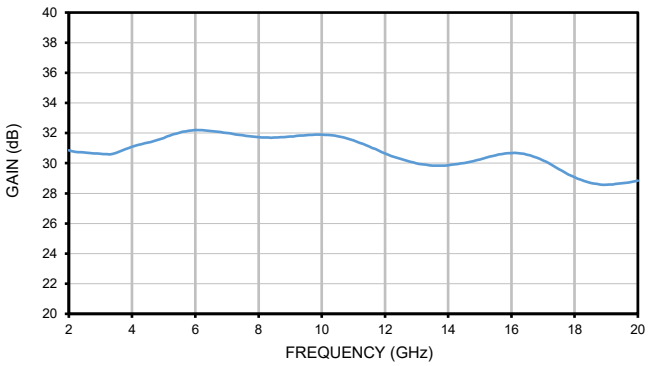
C. The parts covered by this specification document are subject to Mini-Circuits' standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html

Typical Performance Data @ +25°C

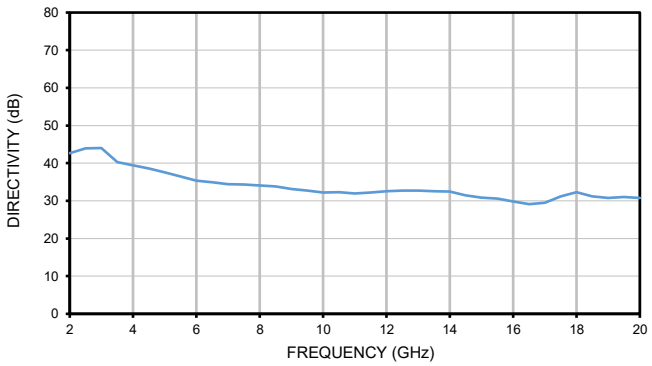
FREQUENCY (GHz)	GAIN (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB)		Pout @ 1 dB COMPRESSION (dBm)	Pout at SATURATION (dBm)	Noise Figure (dB)	OUTPUT IP3 (dBm)
			IN	OUT				@ +5 dBm
2.0	30.28	42.64	25.40	17.54	19.80	20.54	4.26	33.74
2.5	30.19	43.92	28.07	19.46	19.99	20.62	4.11	32.56
3.0	30.19	44.02	30.28	20.34	19.90	20.69	3.84	32.85
3.5	30.29	40.27	28.76	21.67	20.04	20.87	3.58	32.67
4.0	30.73	39.47	23.39	22.71	20.08	21.06	3.31	32.22
4.5	31.03	38.57	20.27	22.67	19.76	21.09	3.00	31.93
5.0	31.37	37.60	17.87	22.01	20.14	21.12	2.73	31.46
5.5	31.74	36.43	17.03	20.81	20.10	21.10	2.51	31.25
6.0	31.96	35.38	16.81	20.23	20.15	21.08	2.35	30.66
6.5	31.94	34.93	18.05	20.87	20.18	21.11	2.21	30.31
7.0	31.85	34.44	19.80	22.69	20.31	21.14	2.12	30.17
7.5	31.71	34.30	22.23	25.76	20.34	21.25	2.03	29.98
8.0	31.60	34.06	25.87	29.23	20.30	21.35	1.98	29.83
8.5	31.57	33.81	28.09	31.46	20.22	21.17	1.93	29.31
9.0	31.64	33.12	25.25	30.68	20.31	20.98	1.90	29.44
9.5	31.75	32.69	21.03	27.30	20.30	20.90	1.87	29.24
10.0	31.85	32.24	17.61	23.27	20.27	20.81	1.86	28.98
10.5	31.76	32.27	14.97	20.26	20.28	20.82	1.92	28.36
11.0	31.54	31.92	14.06	18.53	20.23	20.82	2.02	28.09
11.5	31.18	32.25	14.22	18.09	20.15	20.79	2.13	27.89
12.0	30.79	32.53	15.47	18.34	20.11	20.76	2.16	27.93
12.5	30.39	32.70	18.05	19.47	20.04	20.85	2.20	27.45
13.0	30.02	32.73	22.43	21.28	20.05	20.94	2.27	27.50
13.5	29.77	32.58	29.02	23.67	19.88	20.93	2.40	27.28
14.0	29.71	32.43	37.53	24.71	19.80	20.92	2.51	27.05
14.5	29.83	31.43	33.59	23.32	19.69	20.88	2.62	26.73
15.0	30.04	30.84	28.21	22.96	19.52	20.85	2.73	26.45
15.5	30.35	30.58	25.14	24.28	19.02	20.92	2.83	25.98
16.0	30.60	29.80	22.28	32.34	19.05	20.99	2.91	25.79
16.5	30.65	29.12	18.59	29.82	18.88	20.93	3.01	25.36
17.0	30.35	29.52	16.05	20.26	18.57	20.86	3.03	25.22
17.5	29.91	31.22	14.39	17.07	18.39	20.72	3.07	25.14
18.0	29.32	32.27	13.86	15.56	18.12	20.58	3.16	24.98
18.5	28.93	31.21	14.09	14.95	18.17	20.46	3.28	25.04
19.0	28.77	30.76	14.98	15.70	17.97	20.33	3.35	24.80
19.5	28.84	31.04	15.74	18.06	18.02	20.33	3.36	24.69
20.0	28.93	30.76	16.32	21.41	18.09	20.34	3.37	24.47

Typical Performance Curves

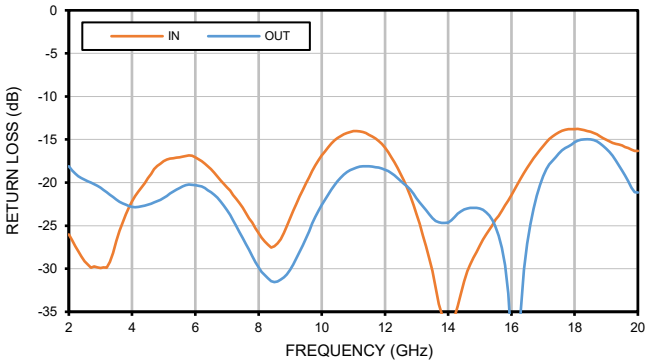
GAIN



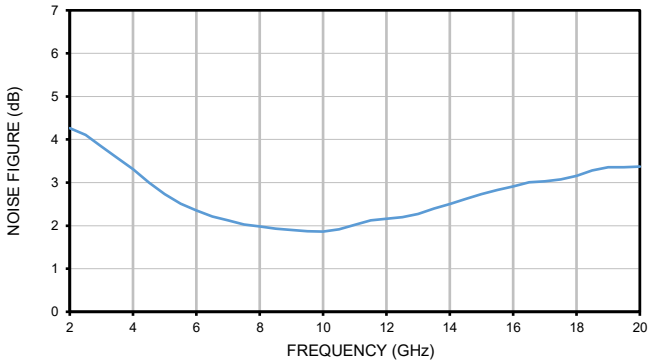
DIRECTIVITY



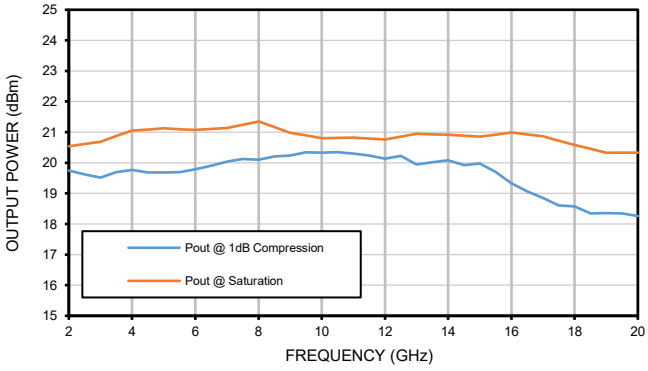
RETURN LOSS



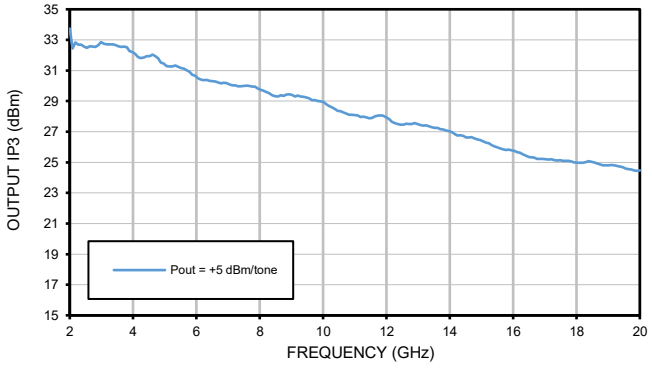
NOISE FIGURE



OUTPUT POWER



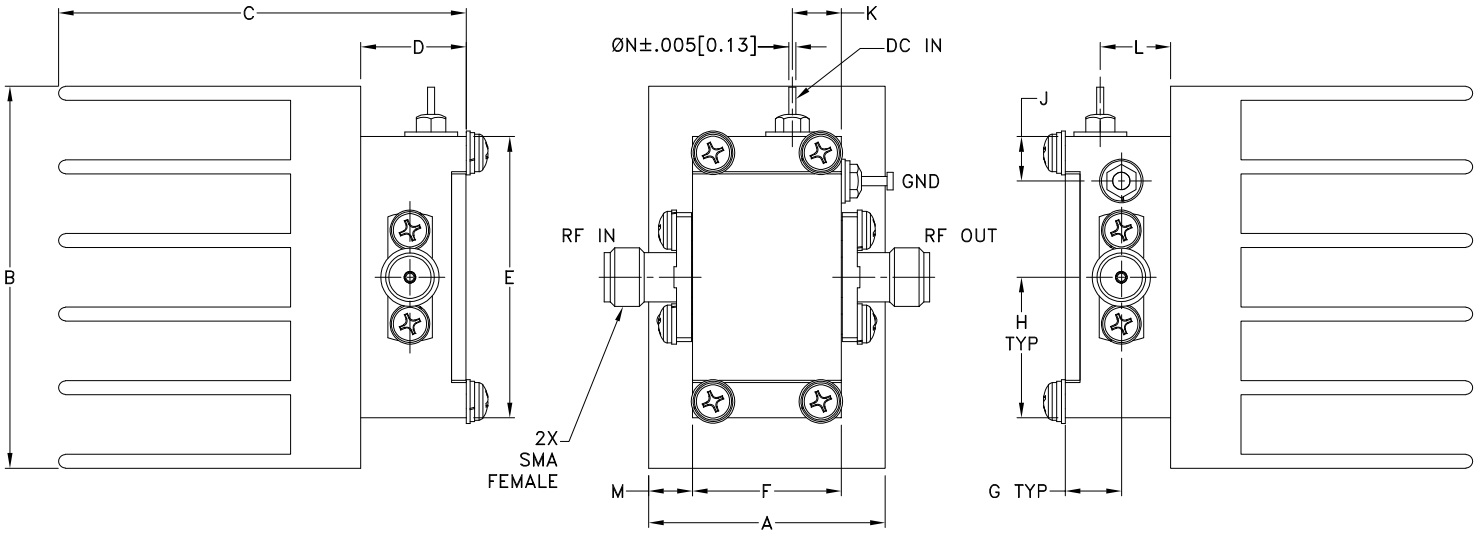
OIP3



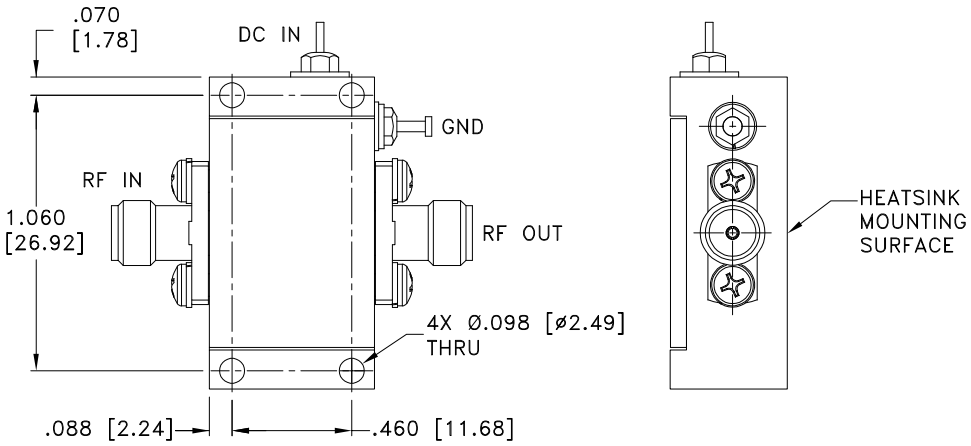
Case Style AV

Outline Dimensions

AV3598



MOUNTING INFORMATION OF MODEL WITHOUT HEATSINK



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
AV3598	1.01 (25.65)	1.63 (41.40)	1.74 (44.20)	0.45 (11.43)	1.20 (30.48)	0.64 (16.26)	0.24 (6.10)	0.60 (15.24)	0.19 (4.83)	0.21 (5.33)	0.30 (7.62)	0.19 (4.75)	0.03 (0.76)

Notes:
1. Case material: Aluminum
2. Case finish: Gold Plating
3. Heat sink finish: Black anodize

Weight: 58 grams; Without Heatsink 17 grams

Dimensions are in inches [mm]. Tolerances: 2 PL±.03; 3 PL ±.015 Inches

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Environmental Specifications ENV141

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	See Data Sheet	Individual Model Data Sheet
Storage Temperature	See Data Sheet	Individual Model Data Sheet
Burn-in	(DC on) 72 hours at 25°C	----
Thermal Shock	-55 °C to +100 °C, 5 cycles	MIL-STD-202, Method 108
Vibration	Random Vibration (non-operating)	MIL-STD-883K, Method 2025, Cond. 1A

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