SUPER ULTRA

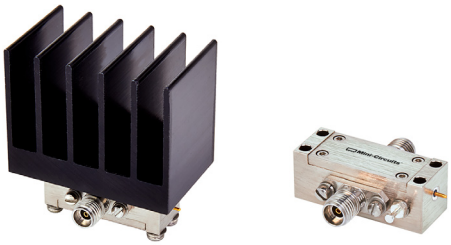
Wideband Amplifier

ZVE-323LN-K+
ZVE-323LNX-K+

50Ω 18 to 32 GHz

THE BIG DEAL

- Extremely wideband, 18 to 32 GHz
- Flat Gain, 20±1.5 dB typ.
- High OIP3, +23 dBm typ.
- +10 dBm Pout typ.



Generic photo used for illustration purposes only

Model No.	ZVE-323LN-K+	ZVE-323LNX-K+ ▲
Option	With heatsink	Without heatsink
Case Style	AV1280-1	
Connectors	2.92mm (K-Type)	

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

APPLICATIONS

- Radar and military
- Test instrumentation
- Satellite repeaters
- Communication

PRODUCT OVERVIEW

Mini-Circuits' ZVE-323LN-K+ is a Class-A, three-stage, unconditionally stable amplifier providing flat gain over an extremely wide frequency range from 18 to 32 GHz. This model is capable of delivering up to 10mW output power at P1dB with high output IP3 supporting a wide range of sensitive, high-dynamic range receiver applications and many systems where high performance over wideband is needed. It operates on a +12V supply and features built-in safety features including protection against reverse bias and immunity to accidental open or short loads for 2 minutes. The amplifier comes in a rugged, compact case (1.2 x0.46 x0.45") with K-type (2.92mm) connectors and an optional heat sink for efficient cooling.

KEY FEATURES

Feature	Advantages
Ultra-wideband, 18 to 32 GHz able to work from 17 to 33 GHz	Enables a single amplifier to be used in a wide range of applications.
Excellent gain flatness, ±1.5 dB across full frequency range	Provides consistent performance across its operating frequency, minimizing the need for external equalizing networks in wideband applications.
High gain, 20 dB typ.	Reduces the number of gain stages, lowering component count and overall system cost.
Class A Amplifier	Provides good linearity with low signal distortion.
Low Noise and High OIP3: • NF, 3 dB typ. • OIP3, +23 dBm typ.	The combination of low noise and high OIP3 makes the ZVE-323LN-K+ ideal for use in low noise receiver front end (RFE) as it gives the user the advantages of sensitivity and two-tone IM performance at both ends of the dynamic range.
Rugged design	Built-in protection against reverse bias and accidental open and short loads provides added reliability for demanding operating conditions.

ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Condition (GHz)	ZVE-323LN-K+ ZVE-323LNX-K+▲			Units
		Min.	Typ.	Max.	
Frequency range		18		32	GHz
Gain	18-32	17	20	24	dB
Gain Flatness	18-32		±1.5	±2.5	dB
Output Power at 1dB compression	18-32		10		dBm
Noise Figure	18-32		3	4	dB
Output third order intercept point	18-32		23		dBm
Input VSWR	18-32		1.9	3.0	:1
Output VSWR	18-32		1.8	3.0	:1
DC Supply Voltage			12*		V
Supply Current			50	75	mA

* Recommended operating voltage

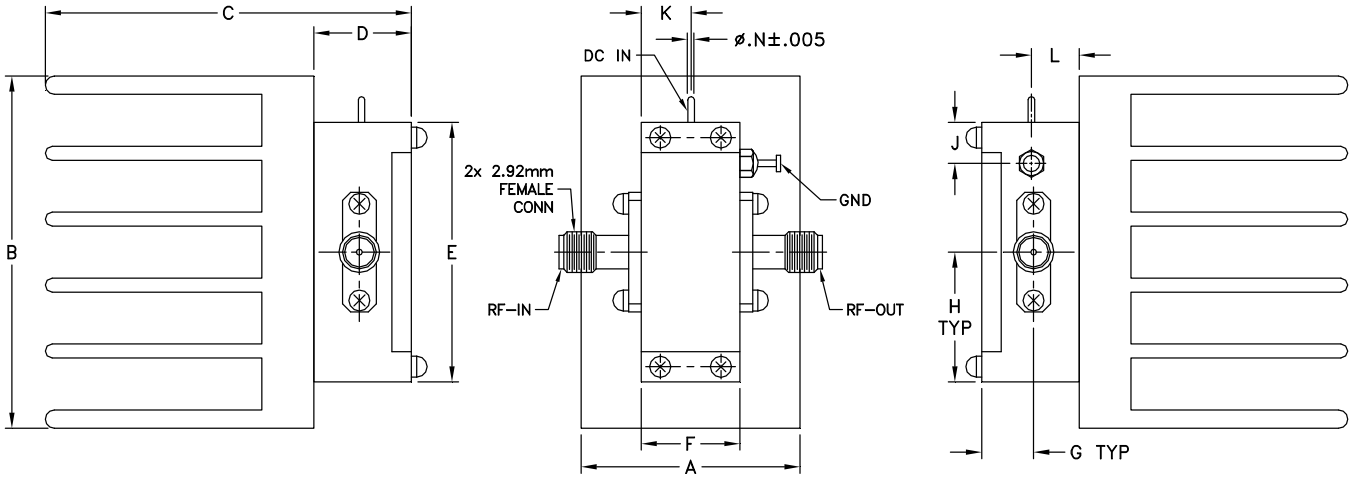
▲ Heat sink not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature to 85°C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 20°C/W max.

MAXIMUM RATINGS

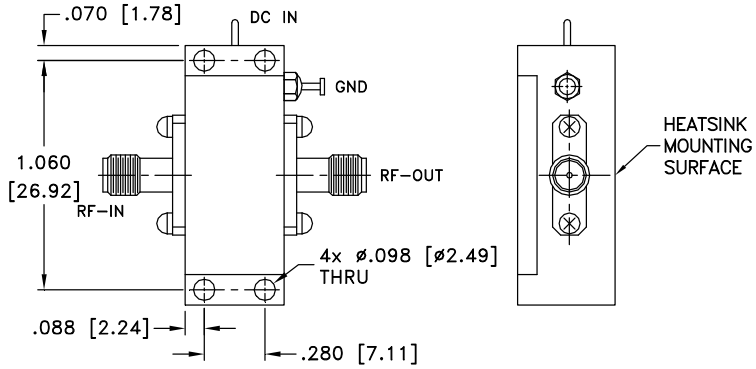
Parameter	Ratings
Operating temperature	ZVE-323LN-K+ -40°C to 60°C ambient ZVE-323LNX-K+ -40°C to 85°C base plate temp.
Storage temperature	-65°C to 150°C
DC Voltage	14V
CW Input RF Power (no damage)	+15 dBm

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

OUTLINE DRAWING FOR MODELS WITH HEATSINK (ZVE-323LN-K+)



MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK (ZVE-323LNX-K+)



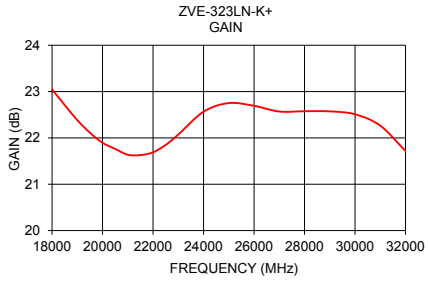
OUTLINE DIMENSIONS (MM/INCH)

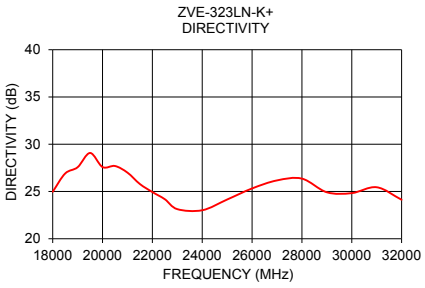
A	B	C	D	E	F	G	H	J	K	L	M	N	wt
1.01	1.63	1.74	.45	1.20	.46	.24	.60	.19	.23	.27	-	.03	grams*
25.65	41.40	44.20	11.43	30.48	11.68	6.10	15.24	4.83	5.84	6.86	-	0.76	58

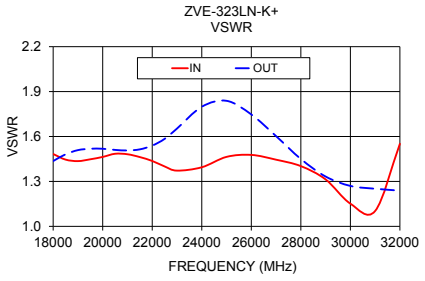
*17 grams without heatsink

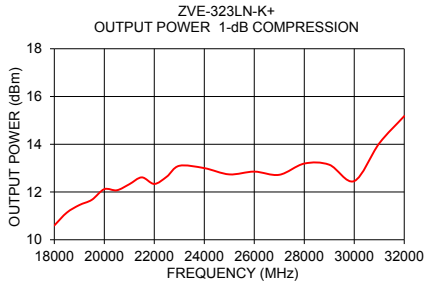
TYPICAL PERFORMANCE DATA/CURVES

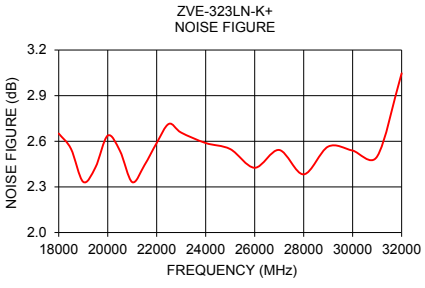
Frequency (MHz)	Gain (dB)	Directivity (dB)	VSWR (:1)		Pout at 1 dB Compr. (dBm)	Noise Figure (dB)	OIP3 (dBm)
	12V	12V	IN	OUT	12V	12V	12V
18000	23.05	24.97	1.48	1.44	10.60	2.65	20.09
18500	22.71	26.90	1.45	1.48	11.14	2.55	20.97
19000	22.38	27.57	1.44	1.51	11.45	2.33	21.41
19500	22.11	29.08	1.45	1.52	11.67	2.43	21.65
20000	21.89	27.59	1.46	1.52	12.12	2.64	22.29
20500	21.76	27.70	1.48	1.51	12.07	2.54	23.03
21000	21.64	27.00	1.48	1.51	12.33	2.33	23.60
21500	21.63	25.79	1.46	1.51	12.61	2.44	24.18
22000	21.69	24.94	1.44	1.54	12.34	2.59	24.16
22500	21.85	24.18	1.40	1.58	12.64	2.71	24.71
23000	22.07	23.13	1.37	1.65	13.10	2.66	24.38
24000	22.57	23.02	1.39	1.80	13.00	2.59	24.97
25000	22.75	24.15	1.46	1.84	12.74	2.55	25.83
26000	22.69	25.32	1.48	1.75	12.85	2.43	26.12
27000	22.57	26.17	1.45	1.60	12.72	2.54	25.61
28000	22.58	26.36	1.40	1.45	13.19	2.38	25.42
29000	22.57	24.92	1.31	1.33	13.14	2.57	25.55
30000	22.51	24.83	1.15	1.27	12.46	2.54	25.80
31000	22.26	25.45	1.10	1.25	14.04	2.50	25.88
32000	21.72	24.13	1.55	1.24	15.18	3.05	26.12

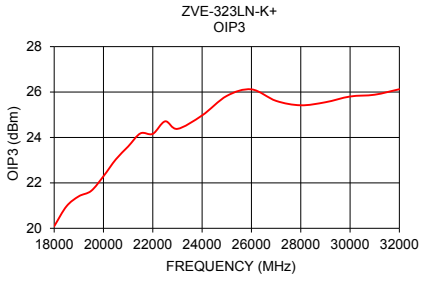












NOTES

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/MCLStore/terms.jsp

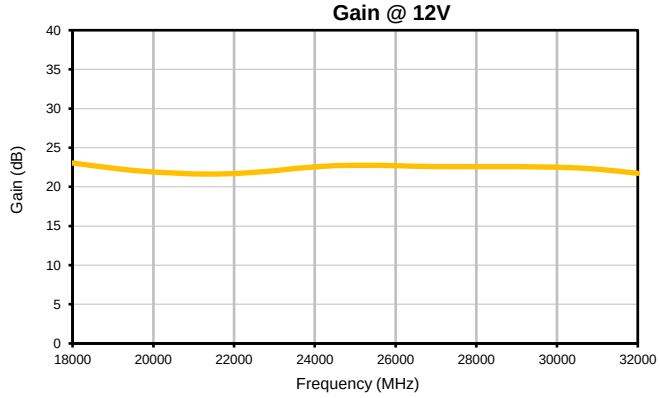
Low Noise Wideband Amplifier ZVE-323LN-K+

Typical Performance Data

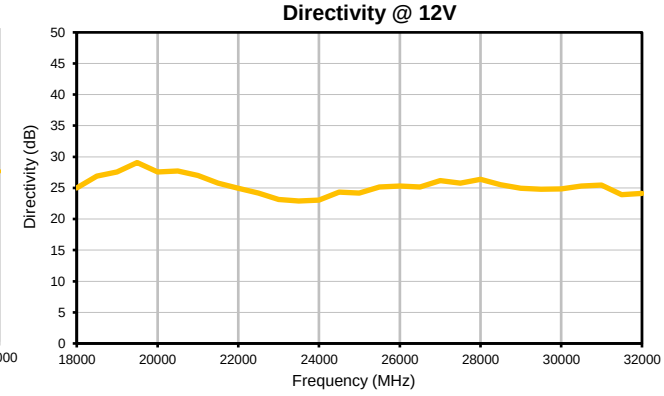
FREQUENCY (MHz)	GAIN (dB) 12V	DIRECTIVITY (dB) 12V	VSWR (:1) IN 12V	VSWR (:1) OUT 12V	NOISE FIGURE (dB) 12V	Pout at 1 dB COMPRESSION (dBm) 12V	OUTPUT IP3 (dBm) 12V
18000	23.05	24.97	1.48	1.44	2.65	10.60	20.09
18500	22.71	26.90	1.45	1.48	2.55	11.14	20.97
19000	22.38	27.57	1.44	1.51	2.33	11.45	21.41
19500	22.11	29.08	1.45	1.52	2.43	11.67	21.65
20000	21.89	27.59	1.46	1.52	2.64	12.12	22.29
20500	21.76	27.70	1.48	1.51	2.54	12.07	23.03
21000	21.64	27.00	1.48	1.51	2.33	12.33	23.60
21500	21.63	25.79	1.46	1.51	2.44	12.61	24.18
22000	21.69	24.94	1.44	1.54	2.59	12.34	24.16
22500	21.85	24.18	1.40	1.58	2.71	12.64	24.71
23000	22.07	23.13	1.37	1.65	2.66	13.10	24.38
23500	22.33	22.90	1.37	1.73	2.54	12.82	24.97
24000	22.57	23.02	1.39	1.80	2.59	13.00	24.97
24500	22.71	24.34	1.43	1.83	2.65	13.00	25.14
25000	22.75	24.15	1.46	1.84	2.55	12.74	25.83
25500	22.74	25.17	1.48	1.81	2.37	13.07	25.51
26000	22.69	25.32	1.48	1.75	2.43	12.85	26.12
26500	22.64	25.15	1.47	1.68	2.47	12.78	25.96
27000	22.57	26.17	1.45	1.60	2.54	12.72	25.61
27500	22.58	25.75	1.43	1.53	2.38	12.91	25.50
28000	22.58	26.36	1.40	1.45	2.38	13.19	25.42
28500	22.58	25.50	1.37	1.38	2.50	13.21	25.50
29000	22.57	24.92	1.31	1.33	2.57	13.14	25.55
29500	22.56	24.81	1.24	1.29	2.52	13.08	25.71
30000	22.51	24.83	1.15	1.27	2.54	12.46	25.80
30500	22.42	25.30	1.04	1.26	2.52	16.00	25.97
31000	22.26	25.45	1.10	1.25	2.50	14.04	25.88
31500	22.03	23.92	1.29	1.25	2.79	14.49	25.92
32000	21.72	24.13	1.55	1.24	3.05	15.18	26.12

Typical Performance Curves

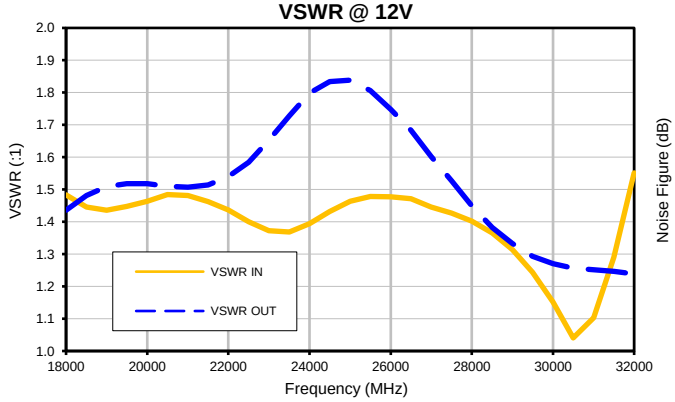
Gain @ 12V



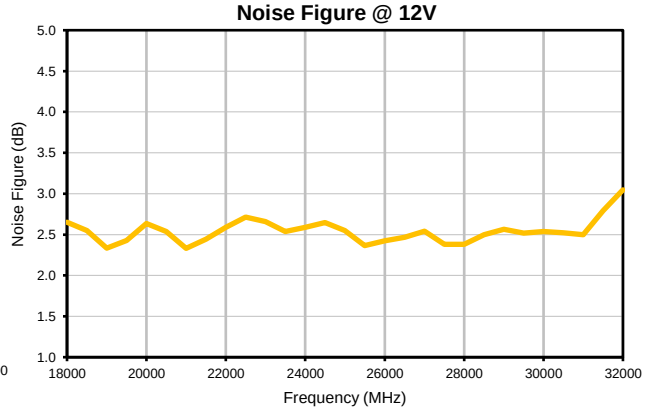
Directivity @ 12V



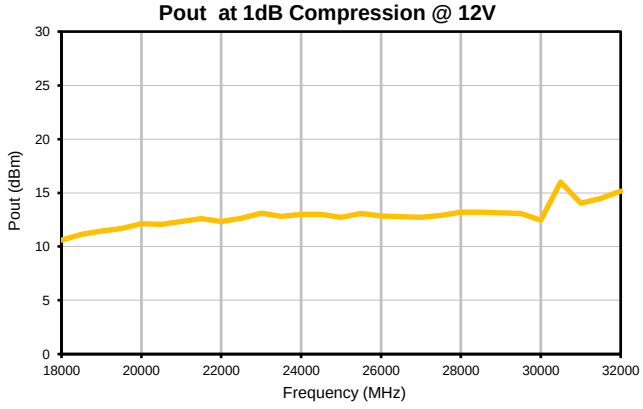
VSWR @ 12V



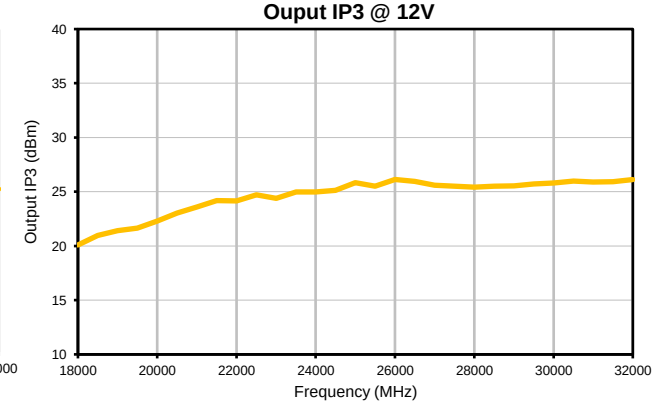
Noise Figure @ 12V



Pout at 1dB Compression @ 12V



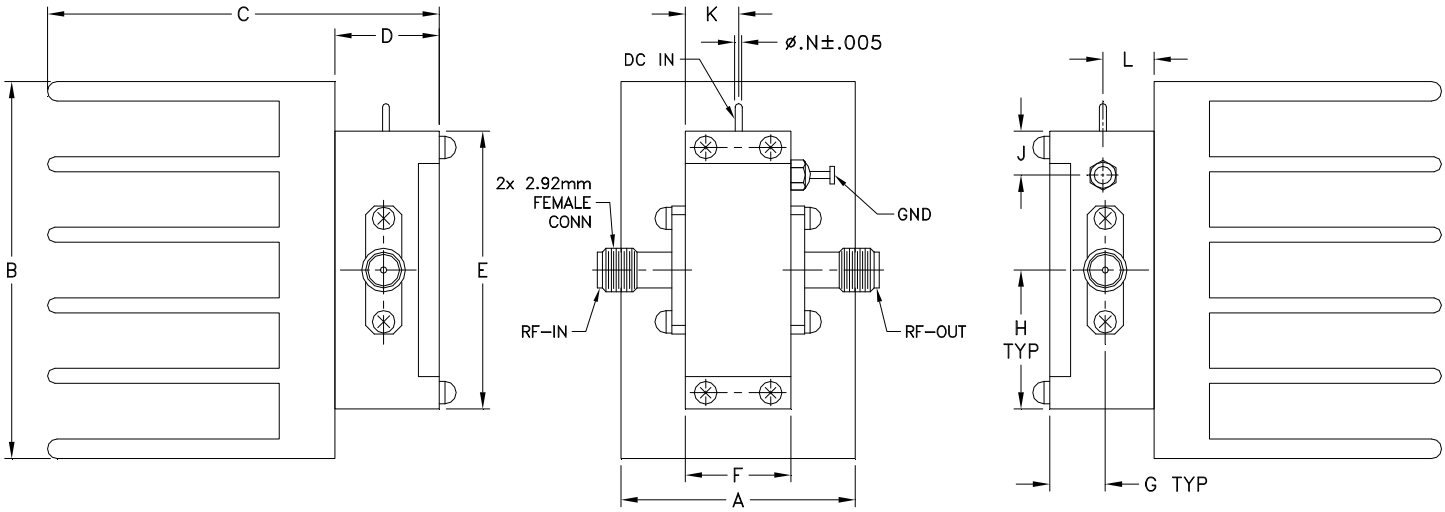
Ouput IP3 @ 12V



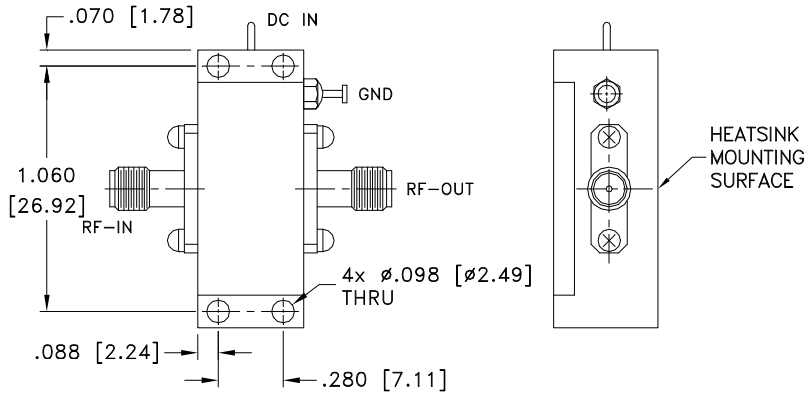
Case Style AV

Outline Dimensions

AV1280-1



MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	WT. GRAM
AV1280-1	1.01 (25.65)	1.63 (41.40)	1.74 (44.20)	.45 (11.43)	1.20 (30.48)	.46 (11.58)	.24 (6.10)	.60 (15.24)	.19 (4.83)	.23 (5.84)	.22 (5.59)	-- --	.03 (.76)	58

CASE#	WT. WITHOUT HEATSINK GRAM
AV1280-1	17

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

Notes:

1. Case material: Aluminum alloy.
2. Case finish: Nickel plate.
3. Heat sink finish: Black anodize.

Mini-Circuits

Environmental Specifications ENV23T9

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	-55° to 54° 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