COAXIAL

Low Noise Amplifier ZX60-33LNR-S+

50Ω 50 to 3000 MHz SMA-Female

THE BIG DEAL

- Wide Bandwidth, 50 to 3000 MHz
- Low Noise Figure 1.1 dB typ.
- Output Power, up to +19 dBm typ.
- High OIP3, up to +35 dBm, typ.
- Protected by US patent 6,790,049

Generic photo used for illustration purposes only

Model No.	ZX60-33LNR-S+
Case Style	GC957
Connectors	SMA Female

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

APPLICATIONS

- Front-end amplifier
- Cellular
- GPS
- Bluetooth
- Lab
- Instrumentation
- Test Equipment

PRODUCT OVERVIEW

Mini-Circuits' ZX60-33LNR-S+ is a wideband low noise connectorized amplifier providing a unique combination of low noise figure, and high IP3 over a wide frequency range, supporting a wide range of sensitive, high-dynamic range receiver applications and many systems where high performance over wideband is needed. This design operates on a single +5V supply and comes in a rugged, compact unibody case (0.74 x 0.75 x 0.46") with SMA connectors, making it an excellent candidate for tough operating conditions and crowded system layouts.

KEY FEATURES

Feature	Advantages
Wideband 50 to 3000 MHz able to work from 20 to 3300 MHz	Enables a single amplifier to be used in a wide range of applications including cellular, GPS, bluetooth , defense, instrumentation and more.
Low noise over the whole band, 1.1 dB typ.	Enables lower system noise figure performance.
High gain, 17.5 dB typ.	Reduces the number of gain stages, lowering component count and overall system cost.
High IP3, up to +35 dBm typ.	The combination of low noise and high IP3 makes the ZX60-33LNR-S+ 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, unibody construction	Mini-Circuits unibody construction integrates the RF connector into the case body, providing high reliability and excellent survivability in critical applications.

REV. C
ECO-016035
ZX60-33LNR-S+
MCL NY
221206

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50Ω 50 to 3000 MHz SMA-Female

ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Condition (MHz)	Min	Typ.	Max.	Units
Frequency	—	50	—	3000	MHz
Noise Figure		—	1.1	—	dB
Gain	100	—	24.7	—	dB
	1000	—	18.7	—	
	2000	13	14.1	—	
	3000	—	11.4	—	
Gain Flatness		—	—	—	dB
Output Power at 1dB compression		14.5	19	—	dBm
Output third order intercept point		—	+35	—	dBm
Input VSWR		—	2.0	—	:1
Output VSWR		—	1.6	—	:1
Active Directivity		—	—	—	dB
DC Supply Voltage		—	5	—	V
Supply Current		—	70	80	mA

MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to 85°C Case
Storage Temperature	-55°C to 100°C
DC Voltage	+5.5 V
Input RF Power (no damage)	+13 dBm
Power Dissipation	0.44W

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

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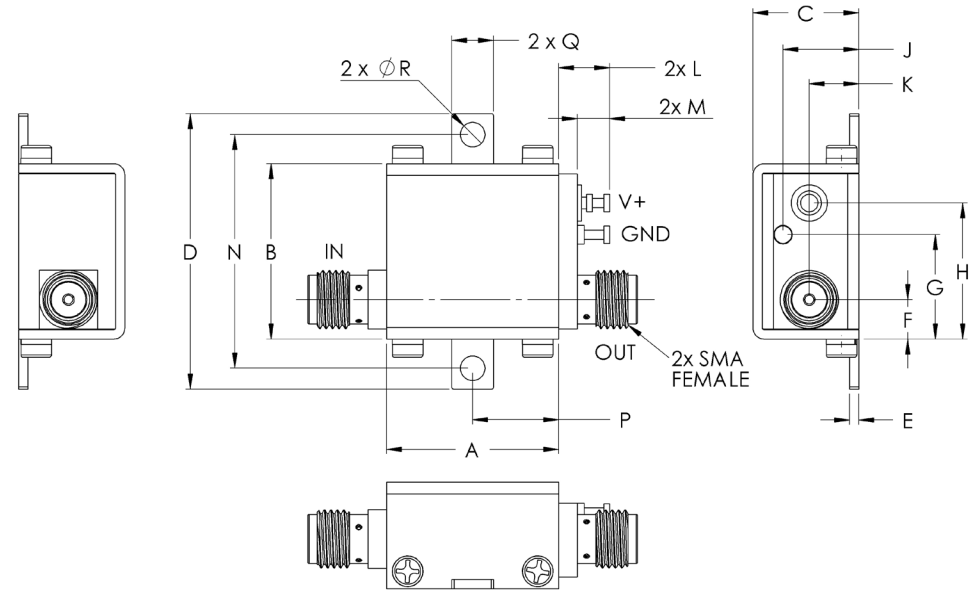
50Ω 50 to 3000 MHz SMA-Female

OUTLINE DRAWING



NOTE: When soldering the DC connections, caution must be used to avoid overheating the DC terminal.
See Application Note. AN-40-010.

OUTLINE DIMENSIONS (Inches / mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	wt
.74	.75	.46	1.18	.04	.17	.45	.59	.33	.21	.22	.14	1.00	.37	.18	.106	grams
18.80	19.1	11.68	30.0	1.02	4.32	11.4	14.99	8.38	5.33	5.59	3.56	25.40	9.40	4.57	2.69	23.0

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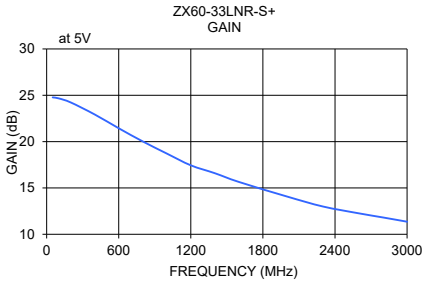
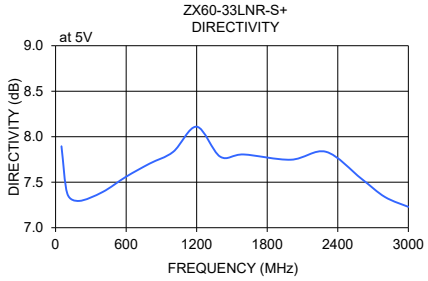
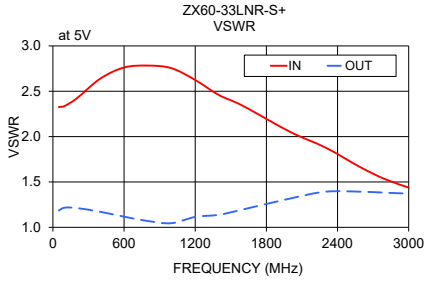
50Ω 50 to 3000 MHz SMA-Female

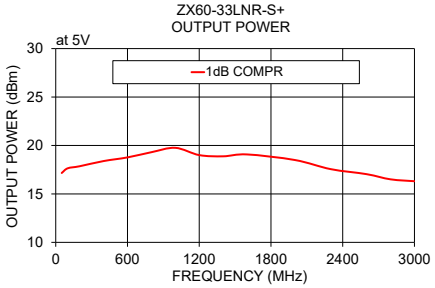
TYPICAL PERFORMANCE DATA/CURVES

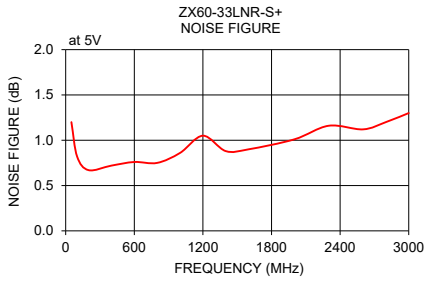
Frequency (MHz)	Gain (dB)	Directivity (dB)	VSVR (:1)		Pout at 1dB Compr. (dBm)	Noise Figure (dB)	OIP3 (dBm)
	5V	5V	IN	OUT	5V	5V	5V
50	24.77	7.89	2.33	1.19	17.16	1.20	27.42
100	24.67	7.37	2.34	1.22	17.64	0.82	27.19
200	24.23	7.29	2.42	1.21	17.85	0.67	28.33
400	22.93	7.39	2.64	1.17	18.39	0.72	29.99
600	21.44	7.56	2.76	1.12	18.77	0.76	31.15
800	20.02	7.70	2.78	1.07	19.31	0.75	32.15
1000	18.71	7.83	2.75	1.05	19.76	0.86	32.38
1200	17.44	8.11	2.62	1.11	19.01	1.05	33.33
1400	16.59	7.78	2.46	1.14	18.88	0.88	33.59
1600	15.65	7.80	2.34	1.20	19.08	0.90	34.03
2000	14.08	7.75	2.05	1.32	18.50	1.01	34.38
2300	13.00	7.83	1.88	1.39	17.56	1.16	34.78
2600	12.26	7.54	1.66	1.39	17.04	1.12	35.65
2800	11.81	7.34	1.53	1.38	16.50	1.20	36.01
3000	11.36	7.23	1.44	1.37	16.31	1.30	35.45

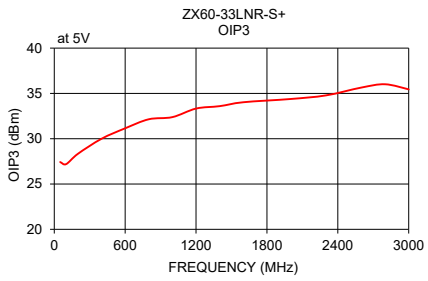












NOTES

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.

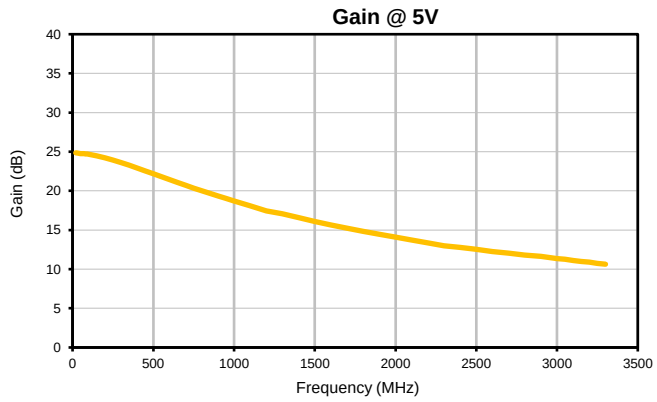
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard. Terms and the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

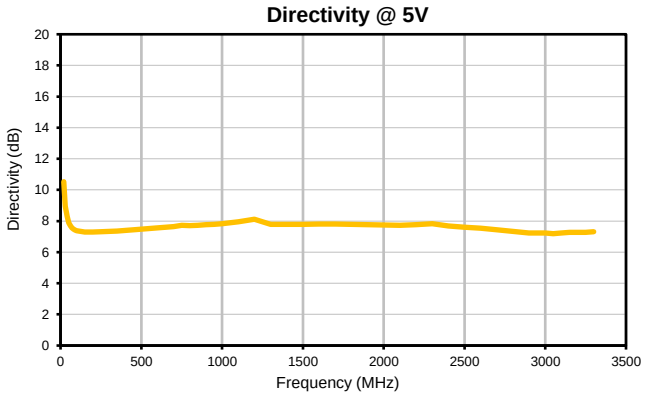
Coaxial Low Noise Amplifier ZX60-33LNR-S+

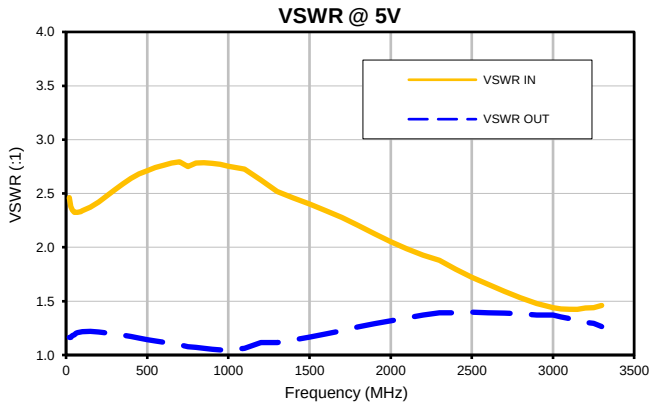
Typical Performance Data

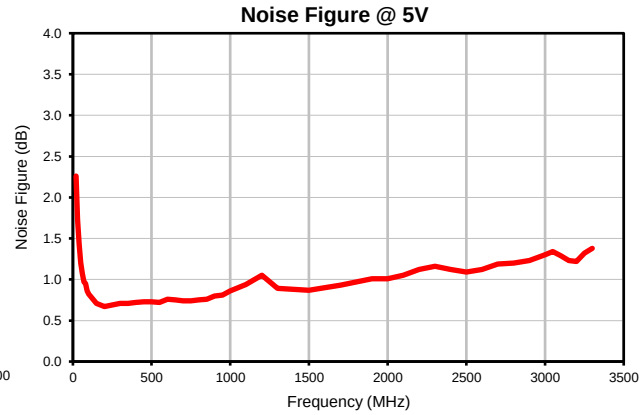
FREQUENCY (MHz)	GAIN (dB) 5V	DIRECTIVITY (dB) 5V	VSWR (:1) IN 5V	VSWR (:1) OUT 5V	NOISE FIGURE (dB) 5V	POUT @ 1 dB COMPRESSION (dBm) 5V	OUTPUT IP3 (dBm) 5V
20	24.85	10.53	2.46	1.16	2.26	17.56	27.09
30	24.83	8.97	2.38	1.16	1.73	17.87	27.30
40	24.80	8.30	2.34	1.18	1.43	17.43	27.53
50	24.77	7.89	2.33	1.19	1.20	17.16	27.42
60	24.77	7.70	2.33	1.20	1.07	17.42	27.22
70	24.75	7.57	2.32	1.21	0.97	17.58	27.15
80	24.72	7.48	2.33	1.21	0.95	17.37	27.22
90	24.69	7.42	2.33	1.21	0.86	17.48	27.10
100	24.67	7.37	2.34	1.22	0.82	17.64	27.19
150	24.47	7.29	2.37	1.22	0.71	17.61	27.67
200	24.23	7.29	2.42	1.21	0.67	17.85	28.33
250	23.94	7.31	2.48	1.21	0.69	17.89	28.81
300	23.62	7.34	2.53	1.19	0.71	18.23	29.51
350	23.28	7.36	2.59	1.18	0.71	18.30	29.57
400	22.93	7.39	2.64	1.17	0.72	18.39	29.99
450	22.56	7.44	2.68	1.16	0.73	18.69	30.48
500	22.18	7.48	2.71	1.14	0.73	18.76	30.54
550	21.81	7.53	2.74	1.13	0.72	18.79	31.01
600	21.44	7.56	2.76	1.12	0.76	18.77	31.15
650	21.08	7.59	2.78	1.11	0.75	19.10	31.70
700	20.71	7.65	2.79	1.09	0.74	18.97	31.80
750	20.34	7.73	2.75	1.08	0.74	19.00	31.86
800	20.02	7.70	2.78	1.07	0.75	19.31	32.15
850	19.68	7.73	2.79	1.06	0.76	18.90	32.34
900	19.35	7.76	2.78	1.05	0.80	19.09	32.63
950	19.03	7.80	2.77	1.05	0.81	19.40	32.89
1000	18.71	7.83	2.75	1.05	0.86	19.76	32.38
1100	18.08	7.94	2.73	1.06	0.94	19.37	33.22
1200	17.44	8.11	2.62	1.11	1.05	19.01	33.33
1300	17.08	7.78	2.52	1.11	0.89	18.77	33.49
1400	16.59	7.78	2.46	1.14	0.88	18.88	33.59
1500	16.11	7.79	2.40	1.17	0.87	18.79	33.71
1600	15.65	7.80	2.34	1.20	0.90	19.08	34.03
1700	15.22	7.81	2.28	1.23	0.93	19.12	34.40
1800	14.82	7.80	2.20	1.26	0.97	18.51	34.05
1900	14.44	7.77	2.13	1.29	1.01	18.61	34.25
2000	14.08	7.75	2.05	1.32	1.01	18.50	34.38
2100	13.71	7.73	1.99	1.34	1.05	18.38	34.97
2200	13.36	7.76	1.93	1.37	1.12	18.04	35.44
2300	13.00	7.83	1.88	1.39	1.16	17.56	34.78
2400	12.77	7.69	1.80	1.39	1.12	17.49	35.29
2500	12.52	7.59	1.72	1.40	1.09	17.47	35.58
2600	12.26	7.54	1.66	1.39	1.12	17.04	35.65
2700	12.03	7.43	1.59	1.39	1.19	16.81	36.04
2800	11.81	7.34	1.53	1.38	1.20	16.50	36.01
2900	11.61	7.23	1.48	1.37	1.23	16.41	35.70
3000	11.36	7.23	1.44	1.37	1.30	16.31	35.45
3050	11.26	7.19	1.43	1.35	1.34	16.30	37.27
3100	11.12	7.23	1.43	1.34	1.29	16.02	37.18
3150	10.99	7.26	1.42	1.33	1.23	15.79	37.20
3200	10.88	7.27	1.44	1.30	1.22	15.71	36.29
3250	10.75	7.28	1.44	1.29	1.32	15.57	36.84
3300	10.64	7.31	1.46	1.26	1.38	15.61	36.67

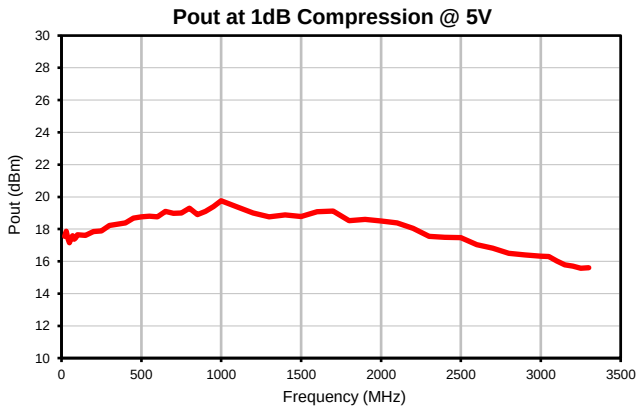
Typical Performance Curves

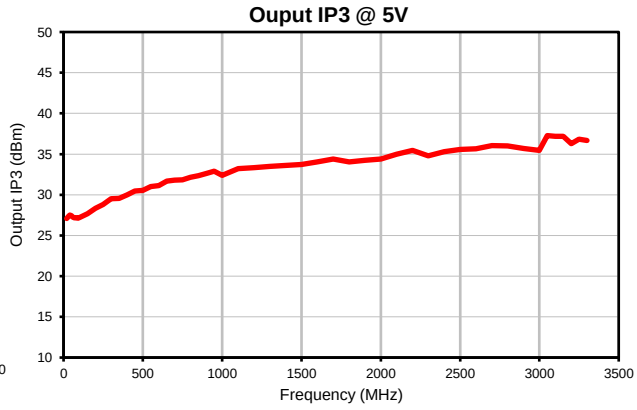








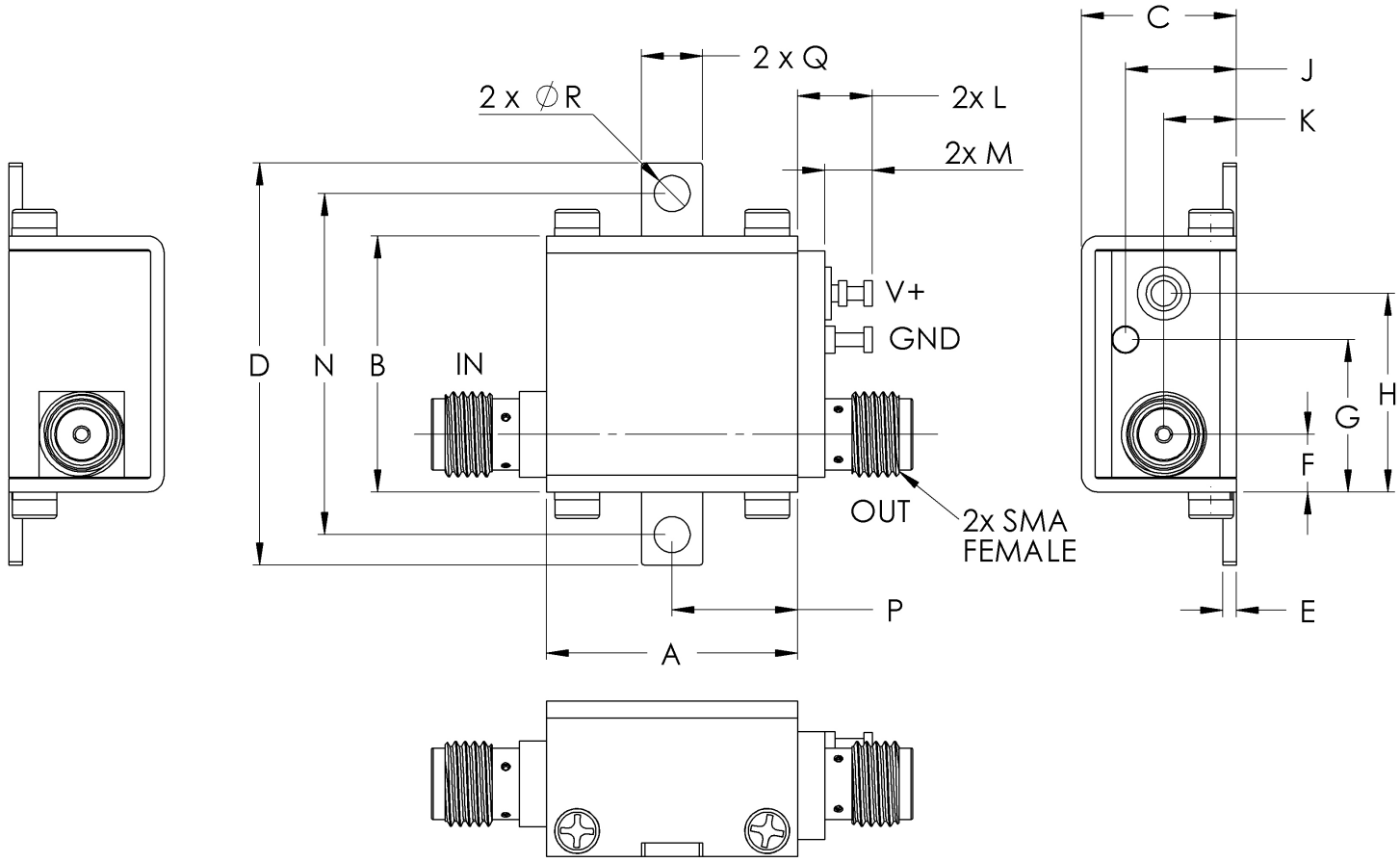




Case Style GC

Outline Dimensions

GC957



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N
GC957	.74 (18.80)	.75 (19.15)	.46 (11.61)	1.18 (30.07)	.04 (1.02)	.17 (4.32)	.45 (11.40)	.59 (14.86)	.33 (8.31)	.21 (5.44)	.22 (5.59)	.14 (3.56)	1.00 (25.4)

CASE #.	P	Q	R	WT GRAMS
GC957	.37 (9.40)	.18 (4.57)	.106 (2.69)	23.0

Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015
Tolerance on hole size and interaxes dimensions to be ± .005.

Note:

1. Case material: Brass
2. Case finish: Nickel plate

Mini-Circuits®
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Mini-Circuits

Environmental Specifications ENV23T10

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	-40° to 85° C Case Temperature	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