Connectorized

Amplifier

ZX60-2531MA+

50Ω 0.5 to 2.5 GHz

Features

- From 2.8V to 5V operation
- High directivity, 27 dB typ.
- Wide bandwidth, 0.5 to 2.5 GHz
- Low noise figure, 2.9 dB typ.
- Output power, up to 19 dBm typ.
- Protected by US patent 6,790,049

CASE STYLE: GA955

Connectors	Model
SMA	ZX60-2531MA-S+

+RoHS Compliant

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

Applications

- Buffer amplifier
- Cellular
- PCN
- Lab
- Instrumentation
- Test equipment

Electrical Specifications at T_{AMB} = 25°C

MODEL NO.	FREQ. (GHz) f_L- f_U	DC VOLTAGE @ Pin V+ (V)	GAIN over frequency in GHz Typ (dB) 0.5	1.0	1.5	2.0	2.5	Min.at 2 GHz	MAXIMUM POWER (dBm) Output (1 dB Comp.) Typ. f_L	f_U	DYNAMIC RANGE NF (dB) Typ. 1GHz	IP3 (dBm) Typ. 1GHz	2GHz	VSWR (:1) Typ. 1.5-2.5 GHz In	Out	ACTIVE DIRECTIVITY (dB) Isolation-Gain Typ.	DC OPERATING CURRENT @ Pin V+ (mA) Typ.	Max.
ZX60-2531MA+	0.5-2.5	5.0	37	41.5	41	39	37	33	19	17	2.9	24	26	1.3	1.5	24	102	130
		2.8	34	37	36	34	32	-	10	11	3.1	19	22	1.3	1.7	27		

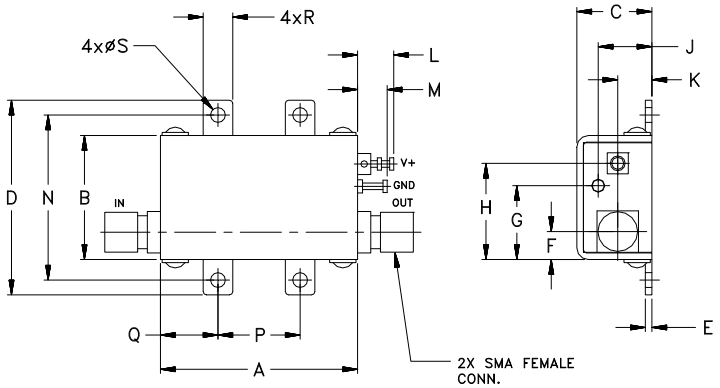
Maximum Ratings

Operating Temperature	-40°C to 80°C case
Storage Temperature	-55°C to 100°C
DC Voltage	7V
Input Power (no damage)	-15dBm
Power Dissipation	500mW

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

NOTE: When soldering the DC connections, caution must be used to avoid overheating the DC terminals. See Application Note AN-40-10 .

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	wt.
1.20	.75	.46	1.18	.04	.17	.45	.59	.33	.21	.22	.18	1.00	.50	.35	.18	.106	grams
30.48	19.05	11.68	29.97	1.02	4.32	11.43	14.99	8.38	5.33	5.59	4.57	25.40	12.70	8.89	4.57	2.69	35.0

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

V+ = 5.0V

FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR IN (:1)	VSWR OUT (:1)	POWER OUT @1dB COMPRESSION (dBm)	IP3 (dBm)	NF (dB)
500	37.09	31.59	3.16	1.56	18.92	29.29	3.33
550	38.42	22.68	2.86	1.45	19.20	28.38	3.32
600	39.30	29.15	2.68	1.35	19.30	27.14	3.21
650	39.90	29.32	2.51	1.28	19.15	26.15	3.15
700	40.33	34.45	2.35	1.21	19.37	26.06	3.12
800	40.82	26.29	2.09	1.16	19.42	25.05	2.97
900	41.16	21.34	1.91	1.17	19.30	25.05	2.86
1000	41.40	24.62	1.74	1.20	19.26	24.2	2.83
1100	41.54	21.79	1.62	1.23	18.85	23.91	2.80
1300	41.45	24.15	1.41	1.26	18.71	24.05	2.95
1400	41.23	18.27	1.33	1.26	18.68	24.1	2.91
1500	40.90	26.12	1.26	1.24	18.78	24.84	2.96
1600	40.50	25.94	1.21	1.25	18.22	24.6	2.89
1800	39.58	20.03	1.11	1.24	18.08	25.59	2.83
2000	38.63	25.40	1.06	1.27	18.01	26.45	2.82
2200	37.74	18.99	1.02	1.34	17.75	27.02	2.75
2300	37.33	20.40	1.01	1.38	17.45	27.33	2.78
2400	36.91	22.75	1.01	1.42	17.26	27.48	2.81
2450	36.71	19.32	1.02	1.44	17.23	27.58	2.80
2500	36.49	20.04	1.03	1.46	16.89	27.7	2.80

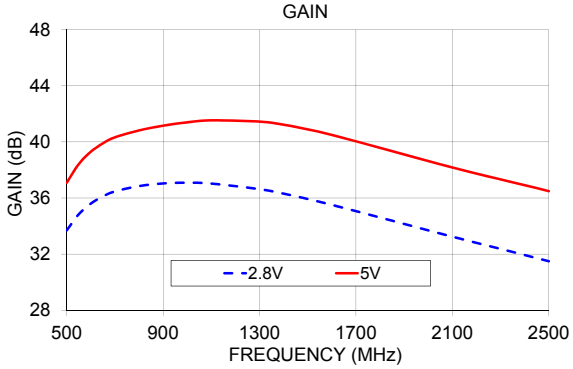
V+ = 2.8V

FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR IN (:1)	VSWR OUT (:1)	POWER OUT @1dB COMPRESSION (dBm)	IP3 (dBm)	NF (dB)
500	33.69	34.22	3.12	1.69	9.56	18.92	3.40
550	34.84	35.99	2.80	1.62	9.82	18.92	3.40
600	35.60	33.95	2.55	1.58	10.22	19.41	3.34
650	36.11	28.51	2.34	1.57	10.33	19.44	3.31
700	36.47	27.92	2.18	1.57	10.39	19.16	3.27
800	36.85	32.24	1.93	1.60	10.84	19.28	3.21
900	37.04	25.11	1.75	1.66	10.56	19.38	3.08
1000	37.09	38.47	1.62	1.71	10.69	19.16	3.10
1100	37.03	26.40	1.51	1.74	10.74	19.58	3.08
1300	36.63	22.41	1.34	1.77	10.62	20.23	3.14
1400	36.31	25.06	1.28	1.76	10.88	20.59	3.13
1500	35.93	23.14	1.22	1.73	10.66	20.85	3.18
1600	35.51	23.16	1.17	1.71	10.92	21.34	3.14
1800	34.61	22.26	1.11	1.66	10.98	21.41	3.15
2000	33.69	21.48	1.07	1.62	11.23	21.47	3.16
2200	32.80	23.99	1.07	1.61	11.15	21.61	3.17
2300	32.37	23.35	1.07	1.61	11.14	21.6	3.17
2400	31.93	27.38	1.08	1.61	11.09	21.69	3.19
2450	31.71	26.86	1.08	1.61	11.20	21.87	3.23
2500	31.49	24.91	1.09	1.62	11.18	22.03	3.24

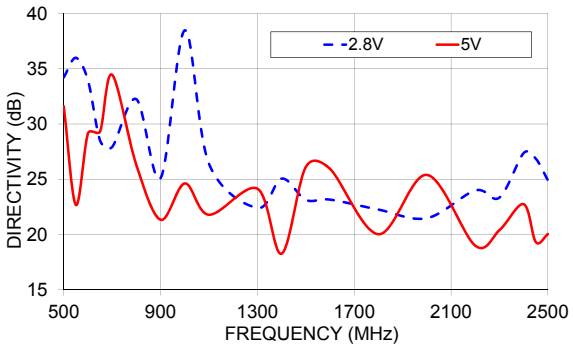
Typical Performance Curves at 25°C

ZX60-2531MA+

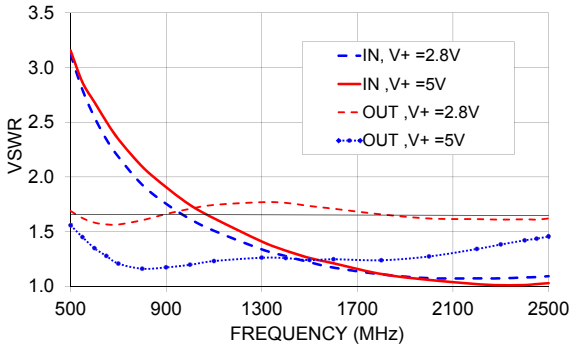
ZX60-2531MA+
GAIN



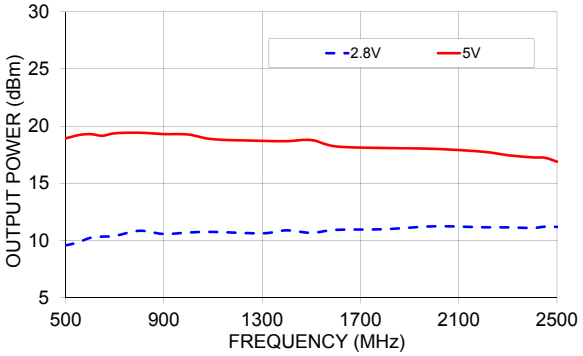
ZX60-2531MA+
DIRECTIVITY



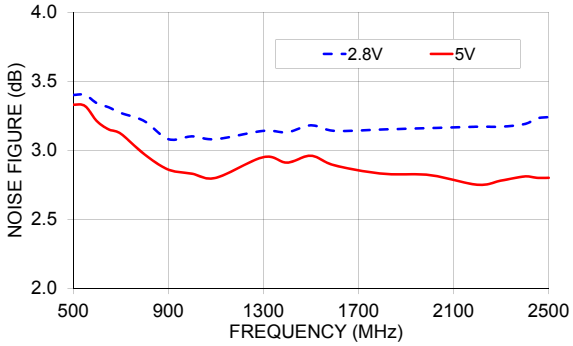
ZX60-2531MA+
VSWR



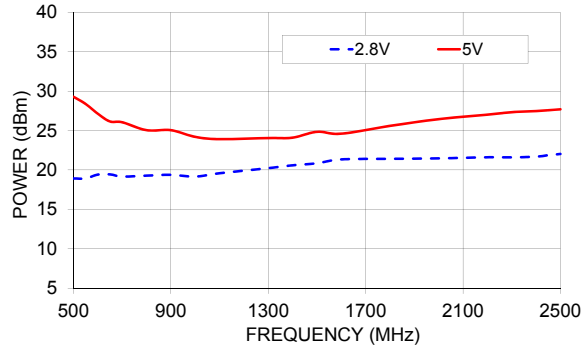
ZX60-2531MA+
OUTPUT POWER AT 1dB COMPRESSION



ZX60-2531MA+
NOISE FIGURE



ZX60-2531MA+
IP3



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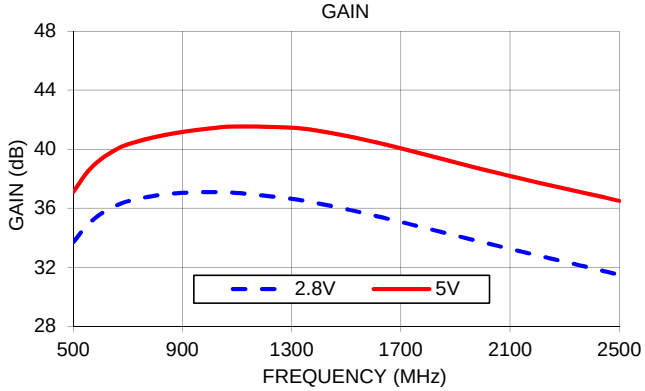
Typical Performance Data

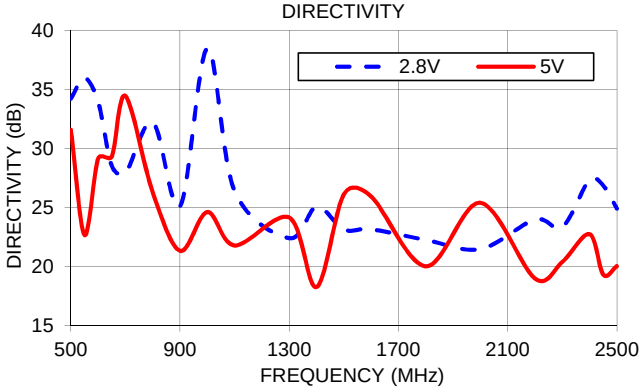
FREQ. (MHz)	GAIN (dB)		DIRECTIVITY (dB)		VSWR IN (:1)		VSWR OUT (:1)		POWER OUT @ 1dB COMPRESSION (dBm)		IP3 (dBm)		NF (dB)	
	2.8V	5V	2.8V	5V	2.8V	5V	2.8V	5V	2.8V	5V	2.8V	5V	2.8V	5V
500	33.69	37.09	34.22	31.59	3.12	3.16	1.69	1.56	9.56	18.92	18.92	29.29	3.40	3.33
550	34.84	38.42	35.99	22.68	2.80	2.86	1.62	1.45	9.82	19.20	18.92	28.38	3.40	3.32
600	35.60	39.30	33.95	29.15	2.55	2.68	1.58	1.35	10.22	19.30	19.41	27.14	3.34	3.21
650	36.11	39.90	28.51	29.32	2.34	2.51	1.57	1.28	10.33	19.15	19.44	26.15	3.31	3.15
700	36.47	40.33	27.92	34.45	2.18	2.35	1.57	1.21	10.39	19.37	19.16	26.06	3.27	3.12
800	36.85	40.82	32.24	26.29	1.93	2.09	1.60	1.16	10.84	19.42	19.28	25.05	3.21	2.97
900	37.04	41.16	25.11	21.34	1.75	1.91	1.66	1.17	10.56	19.30	19.38	25.05	3.08	2.86
1000	37.09	41.40	38.47	24.62	1.62	1.74	1.71	1.20	10.69	19.26	19.16	24.2	3.10	2.83
1100	37.03	41.54	26.40	21.79	1.51	1.62	1.74	1.23	10.74	18.85	19.58	23.91	3.08	2.80
1300	36.63	41.45	22.41	24.15	1.34	1.41	1.77	1.26	10.62	18.71	20.23	24.05	3.14	2.95
1400	36.31	41.23	25.06	18.27	1.28	1.33	1.76	1.26	10.88	18.68	20.59	24.1	3.13	2.91
1500	35.93	40.90	23.14	26.12	1.22	1.26	1.73	1.24	10.66	18.78	20.85	24.84	3.18	2.96
1600	35.51	40.50	23.16	25.94	1.17	1.21	1.71	1.25	10.92	18.22	21.34	24.6	3.14	2.89
1800	34.61	39.58	22.26	20.03	1.11	1.11	1.66	1.24	10.98	18.08	21.41	25.59	3.15	2.83
2000	33.69	38.63	21.48	25.40	1.07	1.06	1.62	1.27	11.23	18.01	21.47	26.45	3.16	2.82
2200	32.80	37.74	23.99	18.99	1.07	1.02	1.61	1.34	11.15	17.75	21.61	27.02	3.17	2.75
2300	32.37	37.33	23.35	20.40	1.07	1.01	1.61	1.38	11.14	17.45	21.6	27.33	3.17	2.78
2400	31.93	36.91	27.38	22.75	1.08	1.01	1.61	1.42	11.09	17.26	21.69	27.48	3.19	2.81
2450	31.71	36.71	26.86	19.32	1.08	1.02	1.61	1.44	11.20	17.23	21.87	27.58	3.23	2.80
2500	31.49	36.49	24.91	20.04	1.09	1.03	1.62	1.46	11.18	16.89	22.03	27.7	3.24	2.80

Typical Performance Curves

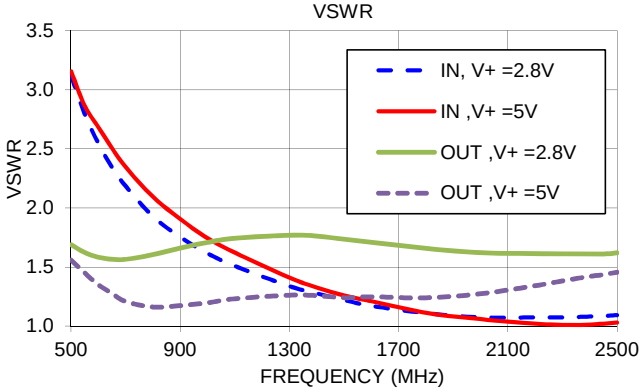
ZX60-2531MA+
GAIN



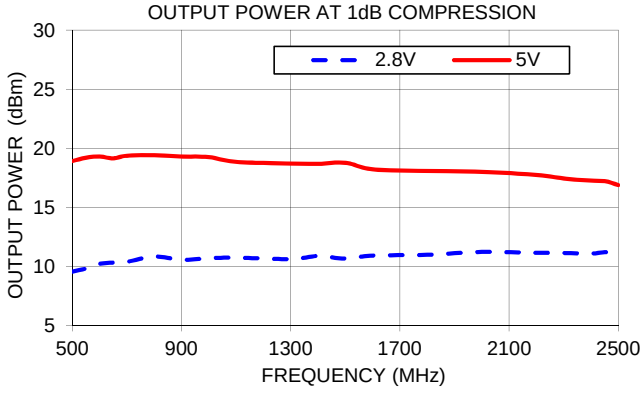
ZX60-2531MA+
DIRECTIVITY



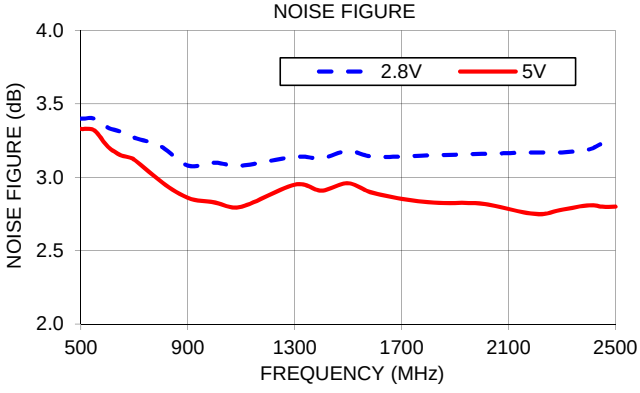
ZX60-2531MA+
VSWR



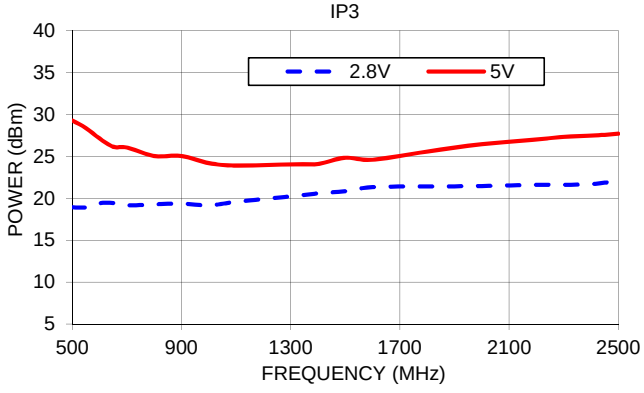
ZX60-2531MA+
OUTPUT POWER AT 1dB COMPRESSION



ZX60-2531MA+
NOISE FIGURE



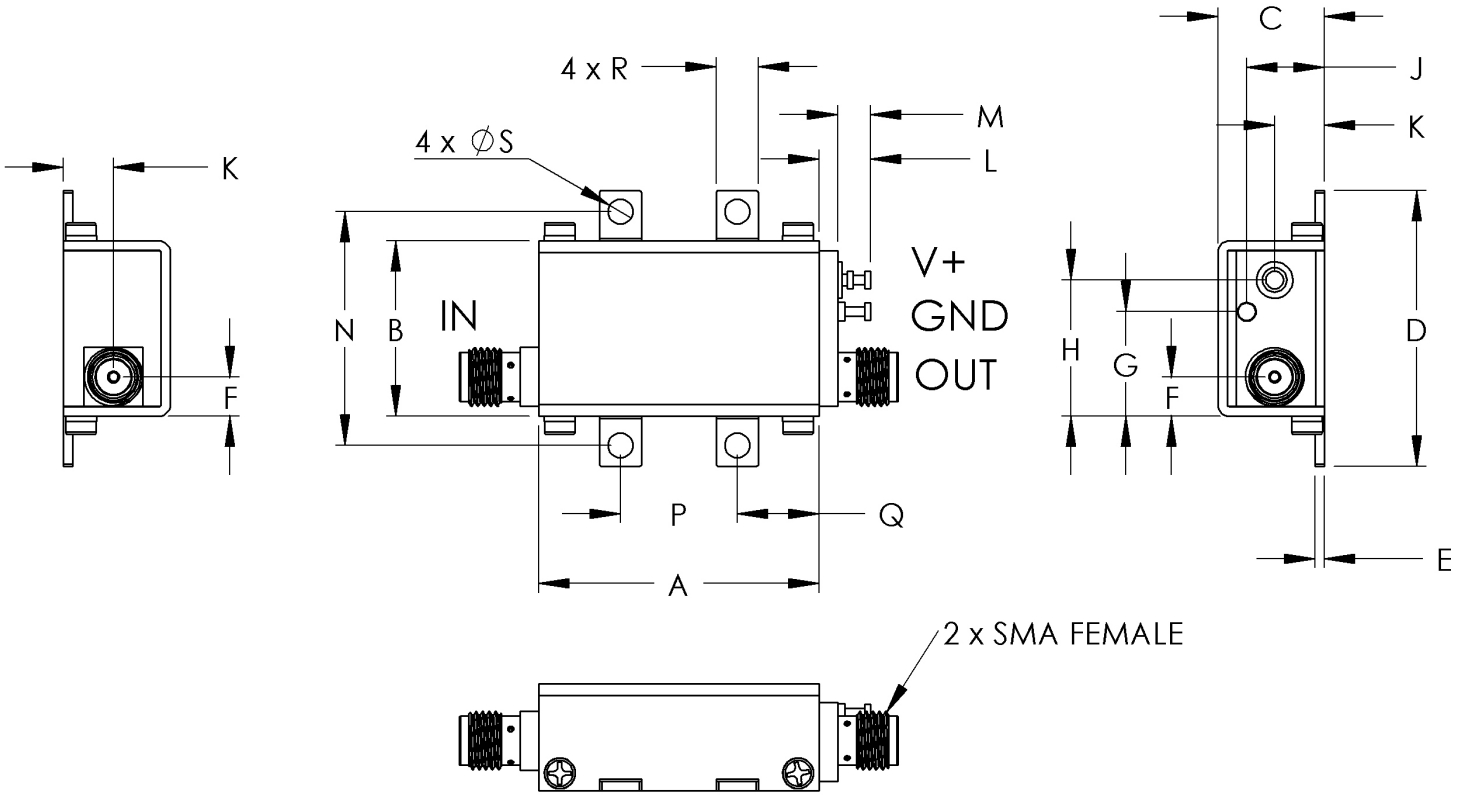
ZX60-2531MA+
IP3



Case Style GA

Outline Dimensions

GA955



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N
GA955	1.20 (30.48)	.75 (19.05)	.46 (11.61)	1.18 (29.97)	.04 (1.02)	.17 (4.27)	.45 (11.35)	.58 (14.81)	.33 (8.46)	.21 (5.44)	.22 (5.59)	.14 (3.56)	1.000 (25.4)

CASE #.	P	Q	R	S	WT GRAMS
GA955	.500 (12.70)	.35 (8.89)	.18 (4.57)	.106 (2.69)	35.0

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

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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