Surface Mount

RF Transformer

SYTX2-451-5W+

50Ω 5 Watt 10 to 450 MHz

The Big Deal

- High power handling, 5W
- Low insertion loss, 0.5 dB
- Small size, 0.43 x 0.69 x 0.42”
- Balanced outputs
- Good amplitude and phase unbalances
- DC isolated

CASE STYLE: AH202-1

Product Overview

Mini-Circuits’ SYTX2-451-5W+ is a high-power, DC isolated surface-mount transformer with a secondary/primary impedance ratio of 2 for applications from 10 to 450 MHz. With proper heat sinking, the transformer is capable of handling RF input power up to 5W. It provides very low insertion loss (0.5 dB typ.) as well as low typical phase unbalance (7˚) and amplitude unbalance (0.2 dB). Featuring core and wire construction mounted on a printed laminate base with wraparound terminations, the unit comes enclosed in a miniature, shielded package measuring just 0.43 x 0.69 x 0.42”, ideal for dense circuit board layouts.

Key Features

Feature	Advantages
High RF power handling (5W)	Supports systems with high power requirements and may be used to isolate DC current.
Low insertion loss, 0.5 dB typ.	Excellent transmission of signal power from input to output.
Low phase and amplitude unbalance, 7˚, 0.5 dB	Low phase and amplitude unbalance can improve a system’s electromagnetic compatibility by rejecting unwanted common-mode noise.
Small footprint, 0.43 x 0.69 x .42”	Accommodates tight space requirements for dense PCB layouts.

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Generic photo used for illustration purposes only

CASE STYLE: AH202-1

+RoHS Compliant

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

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
13"	200

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	5W
DC Current	30mA

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

Pin Connections

PRIMARY DOT	4
PRIMARY	1
SECONDARY DOT	5
SECONDARY	8
GROUND	2,3,6,7

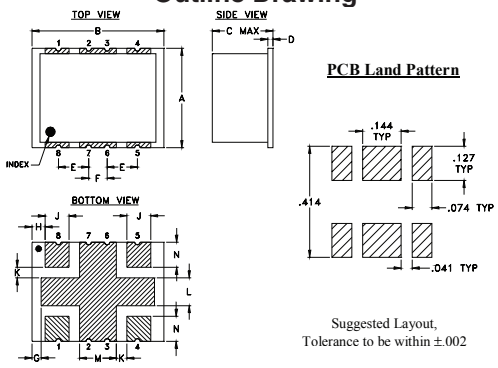
Features

- high power input, 5 Watt max.
- wide bandwidth, 440 MHz
- good amplitude unbalance, 0.2 dB typ. at 1 dB bandwidth
- excellent phase unbalance 7 deg. typ. at 1 dB bandwidth

Applications

- PCS
- BALUN
- diode matching

Outline Drawing



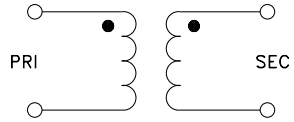
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.38	.50	.25	.020	.115	.070	.035
9.65	12.70	6.35	0.51	2.92	1.78	0.89

H	J	K	L	M	N	wt
.050	.090	.040	.105	.140	.095	grams
1.27	2.29	1.02	2.67	3.56	2.41	0.80

Config. C



Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (SEC/PRI)			2		
Frequency Range		10	—	450	MHz
Insertion Loss*	10-450	—	0.3	0.8	dB
Amplitude Unbalance	10-450	—	0.5	1.4	dB
Phase Unbalance	10-450	—	7	18	Degree
RF Power	10-50		2	1	W
	50-450			5	

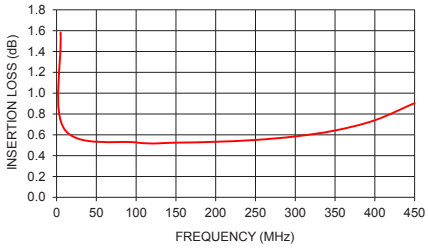
* Insertion Loss is referenced to mid-band loss 0.5 dB typ.

1. The user must provide adequate means of heat removal to limit the temperature of ground connections under the PCB to +85°C, in order to ensure proper performance. At 25°C ambient temperature this requires thermal resistance of the user's PC board heat sink to be 10°C/W.

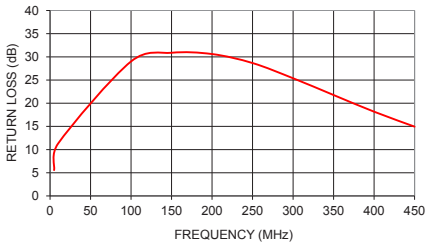
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
5	1.58	5.56	0.00	0.12
10	0.65	11.31	0.00	0.24
100	0.53	29.02	0.02	2.51
150	0.52	30.88	0.06	3.54
200	0.53	30.60	0.12	4.63
250	0.55	28.66	0.19	5.72
300	0.58	25.38	0.31	6.76
350	0.64	21.77	0.44	7.70
400	0.74	18.17	0.62	8.65
450	0.90	14.95	0.84	9.68

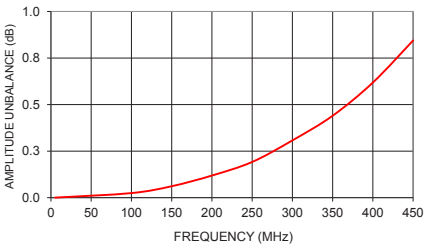
SYTX2-451-5W+
INSERTION LOSS



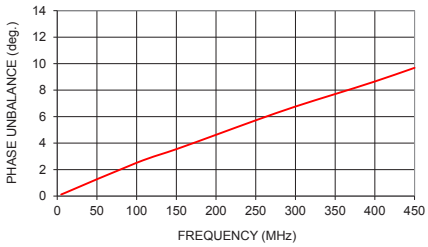
SYTX2-451-5W+
INPUT RETURN LOSS



SYTX2-451-5W+
AMPLITUDE UNBALANCE



SYTX2-451-5W+
PHASE UNBALANCE



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

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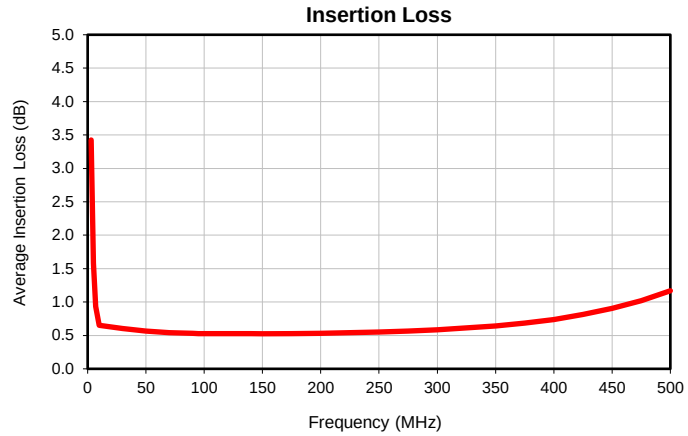
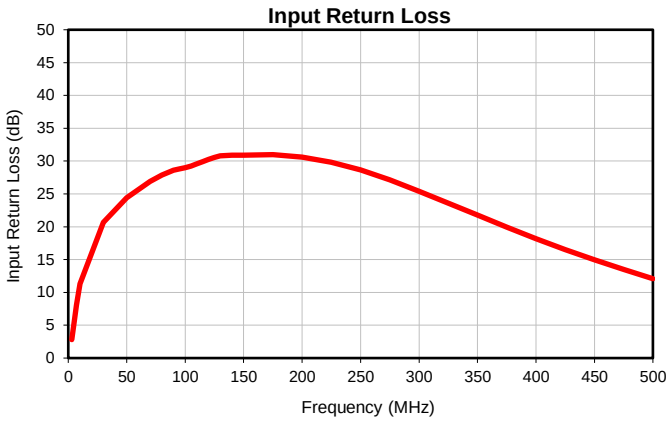
Typical Performance Data

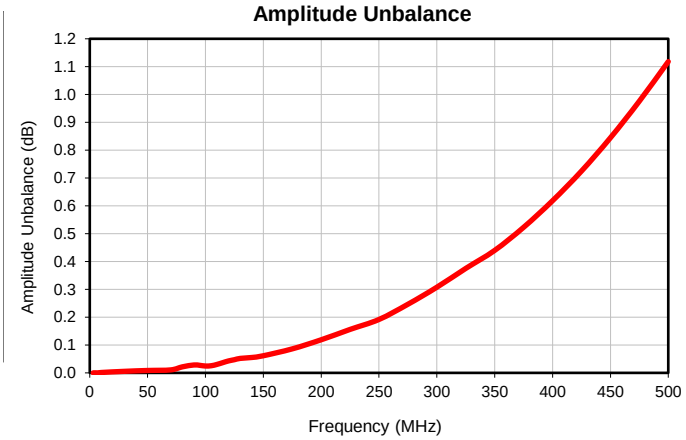
FREQUENCY MHz	INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
3.0	3.43	2.81	0.00	0.07
5.0	1.58	5.56	0.00	0.12
7.0	0.93	8.09	0.00	0.18
10	0.65	11.31	0.00	0.24
30	0.60	20.68	0.01	0.73
50	0.56	24.43	0.01	1.23
70	0.54	26.91	0.01	1.66
80	0.54	27.89	0.02	1.89
90	0.53	28.58	0.03	2.17
95	0.53	28.82	0.03	2.34
100	0.53	29.02	0.02	2.51
105	0.53	29.25	0.03	2.67
110	0.53	29.56	0.03	2.77
115	0.53	29.93	0.04	2.84
120	0.53	30.29	0.04	2.91
125	0.53	30.56	0.05	2.98
130	0.53	30.78	0.05	3.07
140	0.53	30.91	0.06	3.30
150	0.52	30.88	0.06	3.54
175	0.53	30.98	0.09	4.12
200	0.53	30.60	0.12	4.63
225	0.54	29.82	0.16	5.19
250	0.55	28.66	0.19	5.72
275	0.57	27.13	0.25	6.26
300	0.58	25.38	0.31	6.76
325	0.61	23.59	0.38	7.25
350	0.64	21.77	0.44	7.70
375	0.68	19.94	0.52	8.16
400	0.74	18.17	0.62	8.65
425	0.81	16.50	0.72	9.16
450	0.90	14.95	0.84	9.68
475	1.02	13.48	0.98	10.25
500	1.17	12.11	1.12	10.82

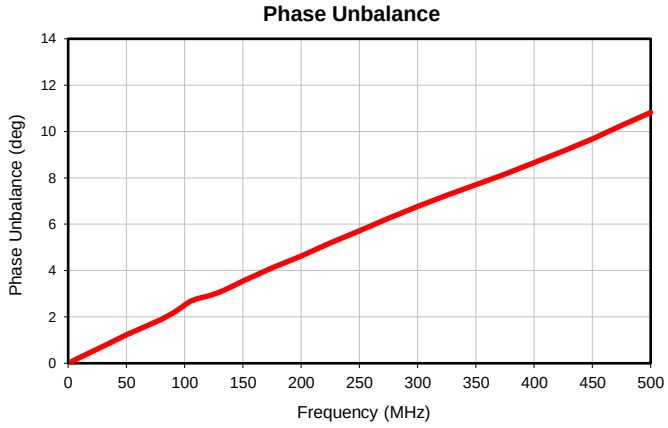
RF Transformer SYTX2-451-5W+

Typical Performance Data





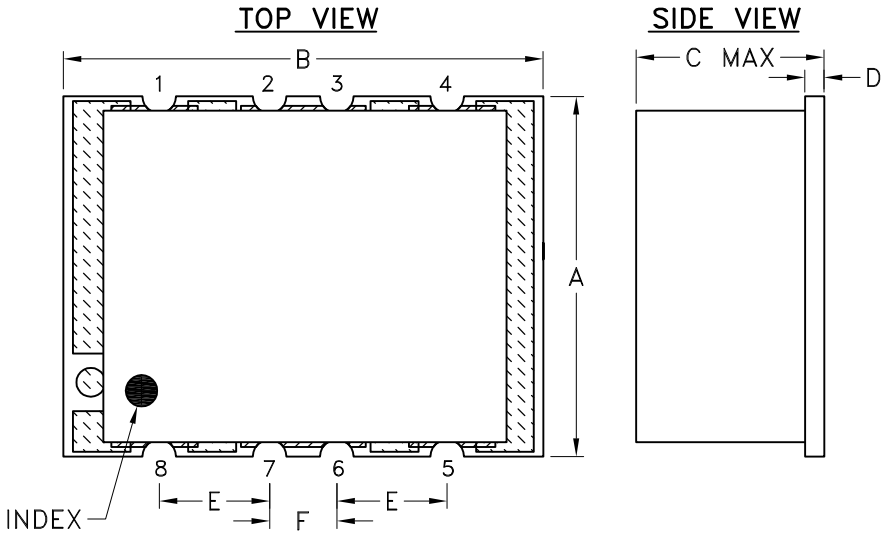


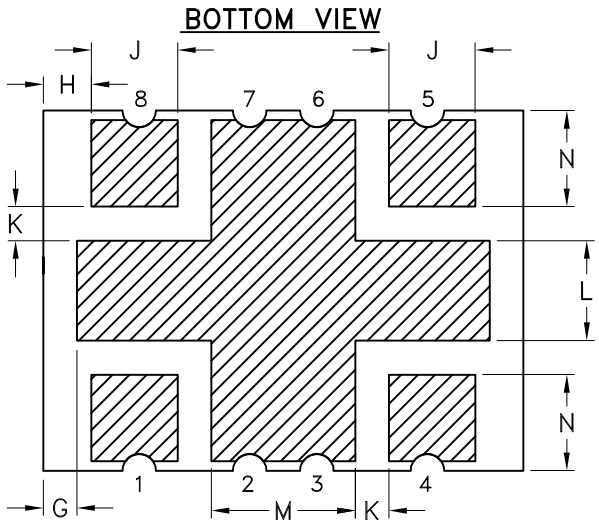


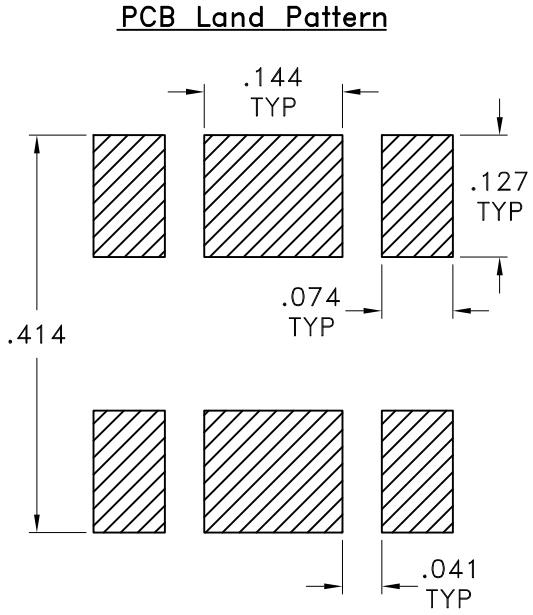
Case Style AH

Outline Dimensions

AH202-1







Suggested Layout,
Tolerance to be within ±.002

DENOTES METALLIZATION

DENOTES SOLDER RESIST

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	WT, GRAM
AH202-1	.38 (9.65)	.50 (12.70)	.25 (6.35)	.020 (0.51)	.115 (2.92)	.070 (1.78)	.035 (0.89)	.050 (1.27)	.090 (2.29)	.040 (1.02)	.105 (2.67)	.140 (3.56)	.095 (2.41)	.80

Dimensions are in inches (mm). Tolerances: 2 Pl.±.01; 3 Pl. ±.005

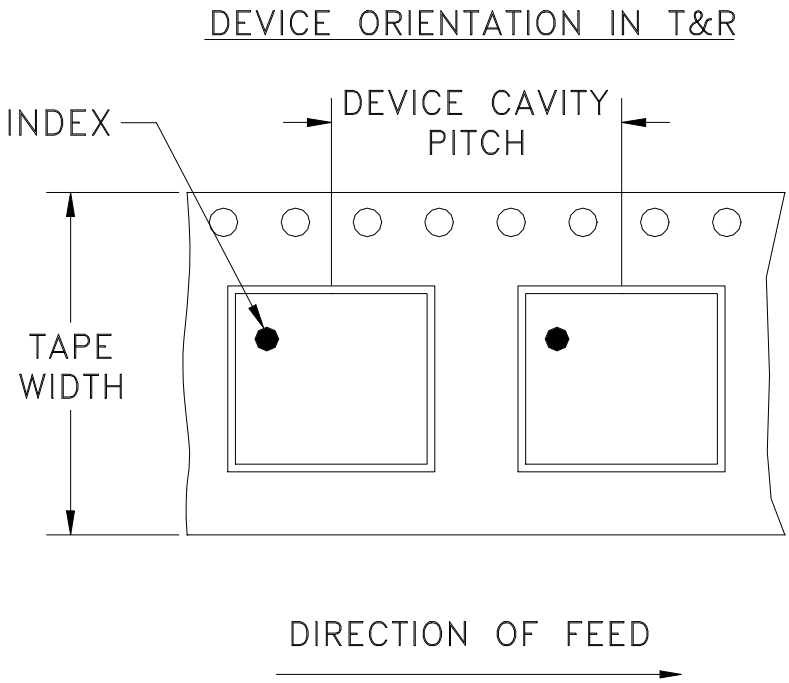
Notes:

1. Case material: Nickel Silver alloy.
2. Base material: Printed wiring laminate.
3. Termination finish:

For RoHS 3-5 μ inch (.08-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate. All models, (+) suffix.

For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

Tape & Reel Packaging TR-F61



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	12	13	200

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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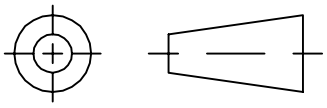
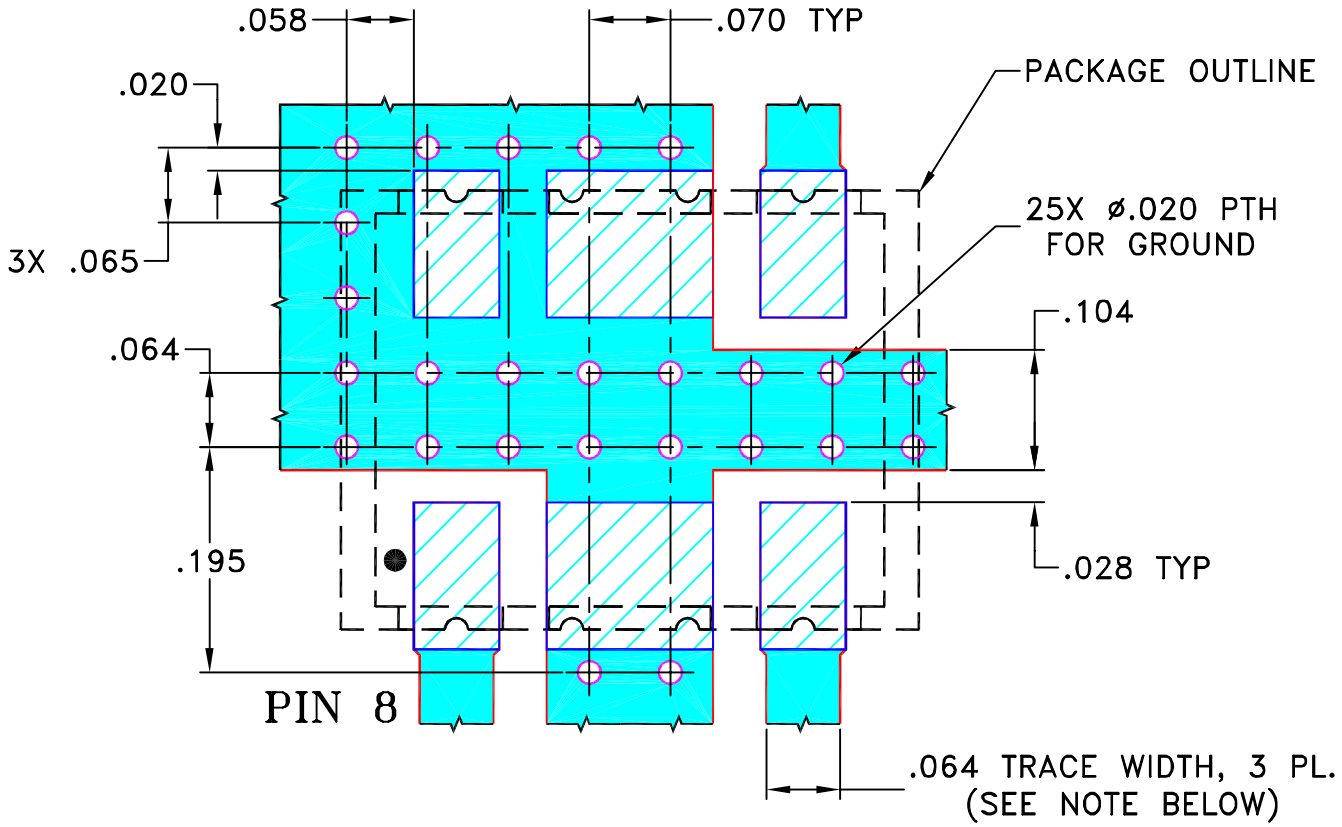
THIRD ANGLE PROJECTION

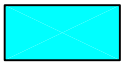


REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M110938	NEW RELEASE	04/12/07	AV	HY

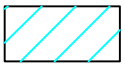
SUGGESTED MOUNTING CONFIGURATION FOR AH202-2 CASE STYLE, "sb" PIN CONNECTION



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	AV	04/11/07
TOLERANCES ON:	CHECKED	IL	04/12/07
2 PL DECIMALS ±	APPROVED	HY	04/12/07
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

ASHEETA1.DWG REV:A DATE:01/12/95

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, sb, AH202-2, SYPS-2, TB-427+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-274	OR

FILE:	SCALE:	SHEET:
98PL274	6:1	1 OF 1

Mini-Circuits

Environmental Specifications ENV02T1

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 Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215