

Surface Mount

Power Splitter/Combiner

SY PQ-181+

2 Way-90° 50Ω 120 to 180 MHz

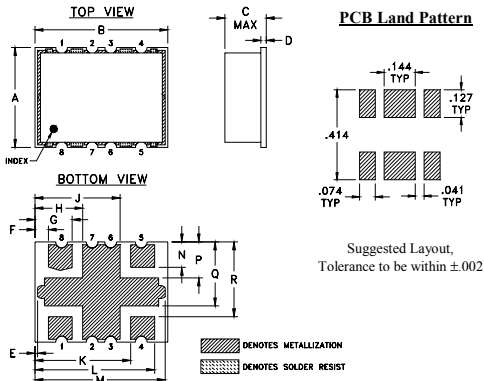
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Permanent damage may occur if any of these limits are exceeded.	

Pin Connections

SUM PORT	1
PORT 1 (0°)	5
PORT 2 (+90°)	8
GROUND	2,3,6,7
50 OHM TERM EXTERNAL	4

Outline Drawing

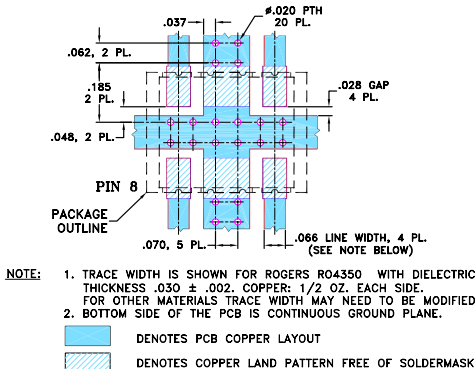


Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	
.375	.500	.156	.020	.010	.050	.140	.180	
9.53	12.70	3.96	0.51	0.25	1.27	3.56	4.57	
J	K	L	M	N	P	Q	R	wt
.320	.360	.450	.490	.095	.135	.240	.280	grams
8.13	9.14	11.43	12.45	2.41	3.43	6.10	7.11	0.80

Demo Board MCL P/N: TB-265

Suggested PCB Layout (PL-138)



Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuit's 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp

Features

- good phase unbalance, 3.0 deg. max.
- good amplitude balance, 0.5 dB max.
- low height, 0.16" max.
- low cost

Applications

- VHF
- balanced amplifiers
- I&Q modulators

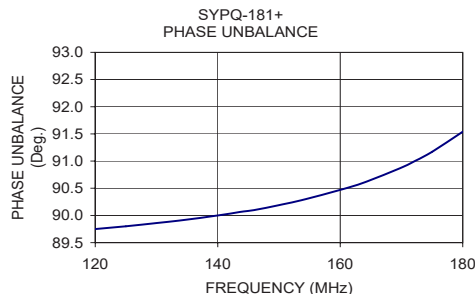
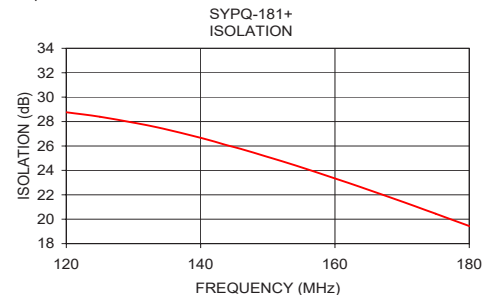
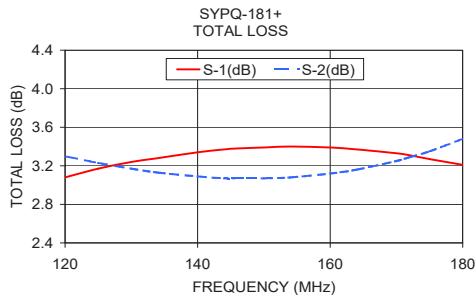
Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		120		180	MHz
Insertion Loss Above (Avg. of Coupled Output less 3 dB)	120-180	—	0.3	0.6	dB
Isolation	120-180	16	20	—	dB
Phase Unbalance	120-180	—	1.8	3.0	Degree
Amplitude Unbalance	120-180	—	0.3	0.8	dB
VSWR (Port S)	120-180	—	1.2	1.4	:1
VSWR (Port 1-2)	120-180	—	1.2	1.4	:1

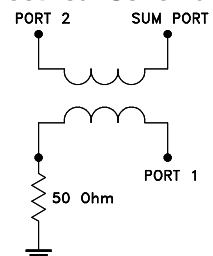
Typical Performance Data

Frequency (MHz)	Total Loss ¹ (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
120.0	3.08	3.30	0.22	28.76	89.75	1.10	1.11	1.10
125.0	3.17	3.23	0.06	28.39	89.80	1.11	1.12	1.11
130.0	3.24	3.17	0.07	27.91	89.86	1.11	1.12	1.11
134.0	3.28	3.13	0.16	27.47	89.91	1.11	1.13	1.12
140.0	3.34	3.09	0.25	26.67	90.00	1.12	1.13	1.13
144.0	3.37	3.07	0.29	26.05	90.07	1.12	1.14	1.13
146.0	3.38	3.07	0.31	25.76	90.10	1.13	1.14	1.14
150.0	3.39	3.07	0.32	25.10	90.19	1.13	1.15	1.15
154.0	3.40	3.08	0.31	24.43	90.29	1.14	1.16	1.16
160.0	3.39	3.12	0.27	23.34	90.47	1.15	1.17	1.17
164.0	3.37	3.16	0.21	22.60	90.61	1.16	1.18	1.19
170.0	3.33	3.25	0.08	21.44	90.88	1.18	1.20	1.21
172.0	3.31	3.29	0.02	21.05	90.99	1.19	1.21	1.22
175.0	3.27	3.35	0.07	20.45	91.17	1.20	1.22	1.23
180.0	3.21	3.48	0.27	19.44	91.54	1.22	1.24	1.26

1. Total Loss = Insertion Loss + 3dB splitter theoretical loss.



Electrical Schematic


www.minicircuits.com P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

 REV. A
 M151107
 SY PQ-181+
 ED-13926/1
 HY/CP/AM
 200407

2 Way-90° Power Splitter/Combiner

SYPQ-181+

Typical Performance Data

FREQUENCY (MHz)	TOTAL LOSS ¹ (dB)		AMPLITUDE UNBALANCE (dB)	ISOLATION (dB) 1-2	PHASE UNBALANCE (deg.)	FREQUENCY (MHz)	VSWR (:1)		
	S-1	S-2					S	1	2
120.0	3.08	3.30	0.22	28.76	89.75	120.0	1.10	1.11	1.10
125.0	3.17	3.23	0.06	28.39	89.80	125.0	1.11	1.12	1.11
130.0	3.24	3.17	0.07	27.91	89.86	130.0	1.11	1.12	1.11
132.0	3.26	3.15	0.12	27.69	89.88	132.0	1.11	1.12	1.11
134.0	3.28	3.13	0.16	27.47	89.91	134.0	1.11	1.13	1.12
136.0	3.30	3.11	0.19	27.19	89.94	136.0	1.12	1.13	1.12
138.0	3.32	3.10	0.22	26.95	89.97	138.0	1.12	1.13	1.12
140.0	3.34	3.09	0.25	26.67	90.00	140.0	1.12	1.13	1.13
142.0	3.35	3.08	0.27	26.38	90.03	142.0	1.12	1.14	1.13
144.0	3.37	3.07	0.29	26.05	90.07	144.0	1.12	1.14	1.13
146.0	3.38	3.07	0.31	25.76	90.10	146.0	1.13	1.14	1.14
148.0	3.38	3.07	0.32	25.44	90.15	148.0	1.13	1.15	1.14
150.0	3.39	3.07	0.32	25.10	90.19	150.0	1.13	1.15	1.15
152.0	3.39	3.08	0.32	24.76	90.24	152.0	1.14	1.15	1.15
154.0	3.40	3.08	0.31	24.43	90.29	154.0	1.14	1.16	1.16
156.0	3.40	3.09	0.30	24.07	90.35	156.0	1.14	1.16	1.16
158.0	3.39	3.11	0.29	23.70	90.41	158.0	1.15	1.16	1.17
160.0	3.39	3.12	0.27	23.34	90.47	160.0	1.15	1.17	1.17
162.0	3.38	3.14	0.24	22.98	90.54	162.0	1.16	1.18	1.18
164.0	3.37	3.16	0.21	22.60	90.61	164.0	1.16	1.18	1.19
166.0	3.36	3.19	0.17	22.21	90.70	166.0	1.17	1.19	1.19
168.0	3.34	3.22	0.13	21.82	90.79	168.0	1.17	1.19	1.20
170.0	3.33	3.25	0.08	21.44	90.88	170.0	1.18	1.20	1.21
172.0	3.31	3.29	0.02	21.05	90.99	172.0	1.19	1.21	1.22
175.0	3.27	3.35	0.07	20.45	91.17	175.0	1.20	1.22	1.23
180.0	3.21	3.48	0.27	19.44	91.54	180.0	1.22	1.24	1.26

¹Total Loss = Insertion Loss + 3dB Splitter Loss



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com



IF/RF MICROWAVE COMPONENTS

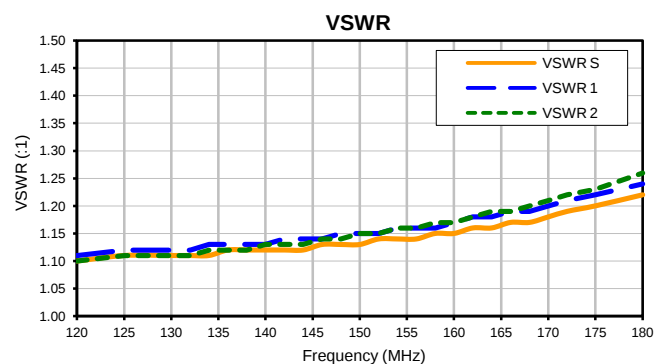
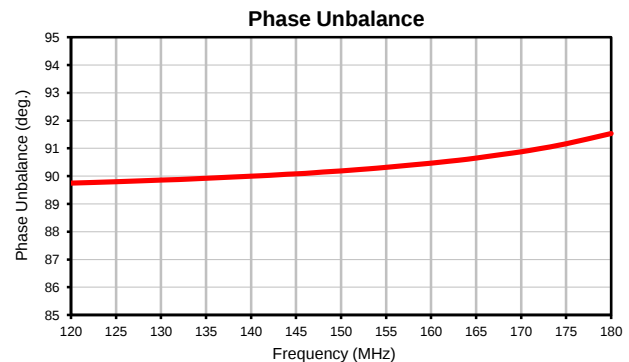
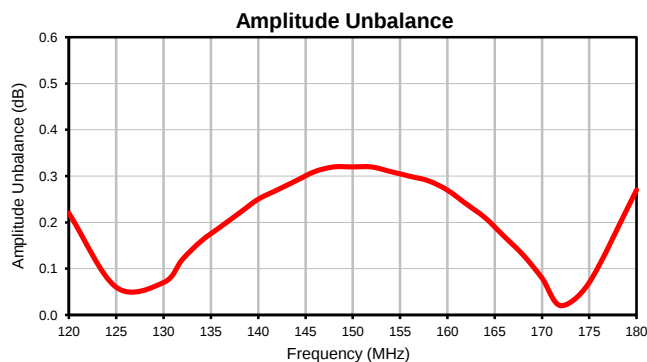
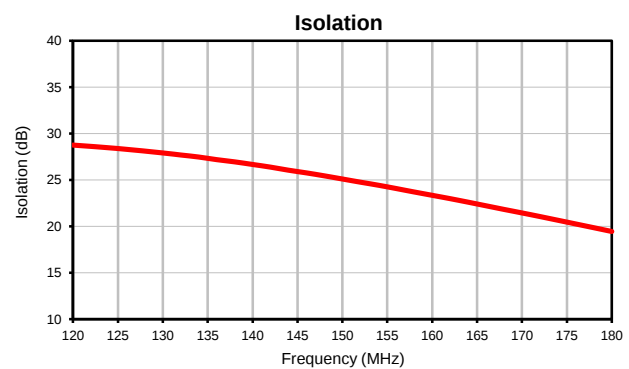
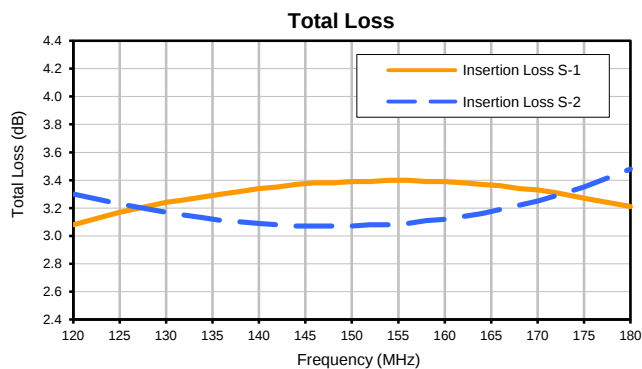


REV. OR
SYPQ-181+
2/24/2014
Page 1 of 1

2 Way-90° Power Splitter/Combiner

SYPQ-181+

Typical Performance Curves



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com



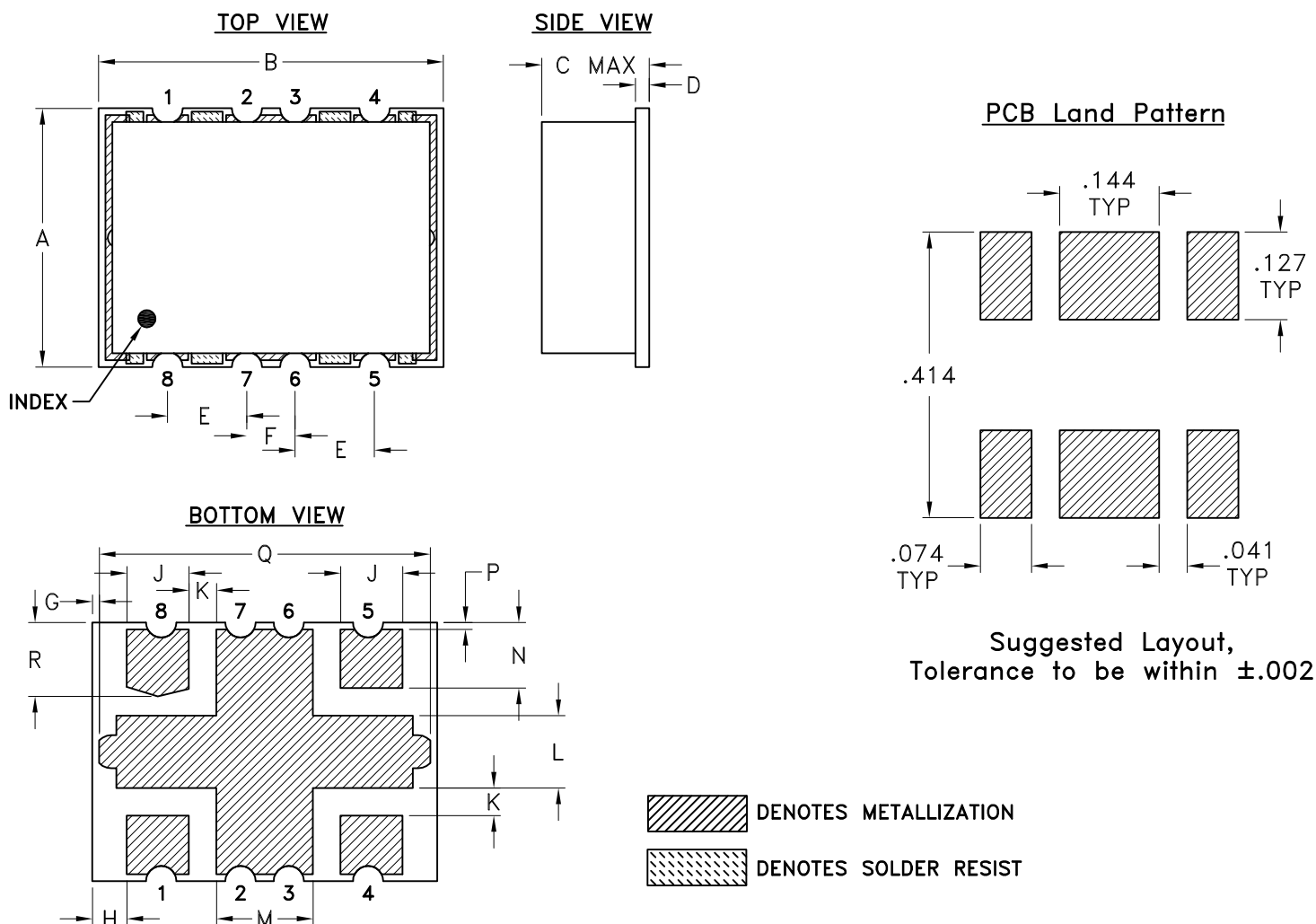
IF/RF MICROWAVE COMPONENTS



REV. OR
SYPQ-181+
2/24/2014
Page 1 of 1

Outline Dimensions

AH1415



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
AH1415	.375 (9.53)	.500 (12.70)	.156 (3.96)	.020 (.51)	.115 (2.92)	.070 (1.78)	.010 (0.25)	.050 (1.27)	.090 (2.29)	.040 (1.02)	.105 (2.67)	.140 (3.56)	.095 (2.41)

CASE #	P	Q	R	WT, GRAM
AH1415	.010 (0.25)	.480 (12.19)	.107 (2.72)	.80

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

Notes:

- Case material: Nickel Silver alloy.
- Base material: Printed wiring laminate.
- Termination finish: 3-5 μ inch (.08-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.
All models, (+) suffix.

Mini-Circuits
ISO 9001 ISO 14001 CERTIFIED

ALL NEW
minicircuits.com

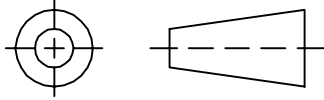
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

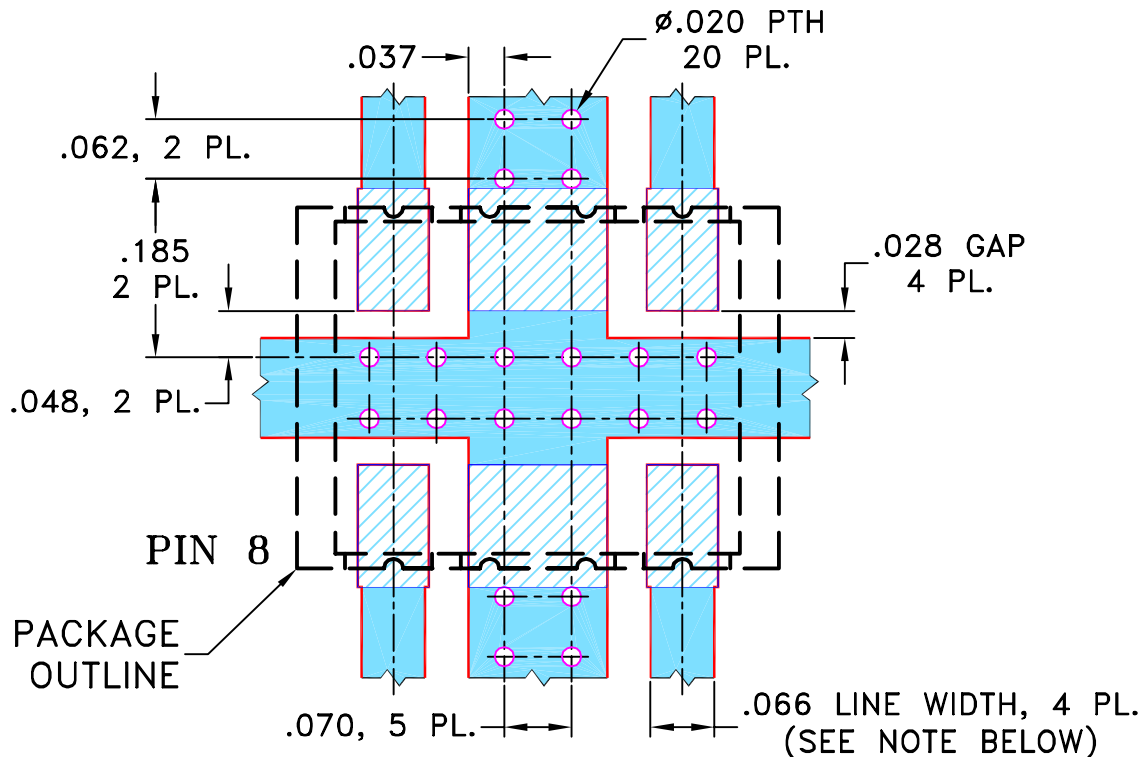
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M88784	NEW RELEASE	10/20/03	GF	HY
A	M93261	PIN 8 WAS PIN 1	07/19/04	MMG	HY
B	M102713	ADDED "...WITH SMOBC"	01/16/06	GF	IL

**SUGGESTED MOUNTING CONFIGURATION
FOR AH202 CASE STYLE, "av" PIN CONNECTION.**



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" $\pm$ 0.002"; 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

GF

09/18/03

TOLERANCES ON:

CHECKED

IL

10/20/03

2 PL DECIMALS $\pm$

APPROVED

HY

10/20/03

3 PL DECIMALS $\pm$.005

ANGLES $\pm$

FRACTIONS $\pm$

Mini-Circuits®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE, MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

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



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, av, AH202, SYPQ-70, TB-265

SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-138

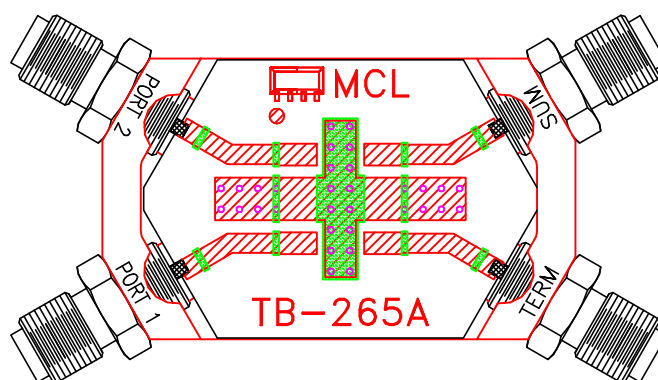
REV:
B

FILE: 98PL138

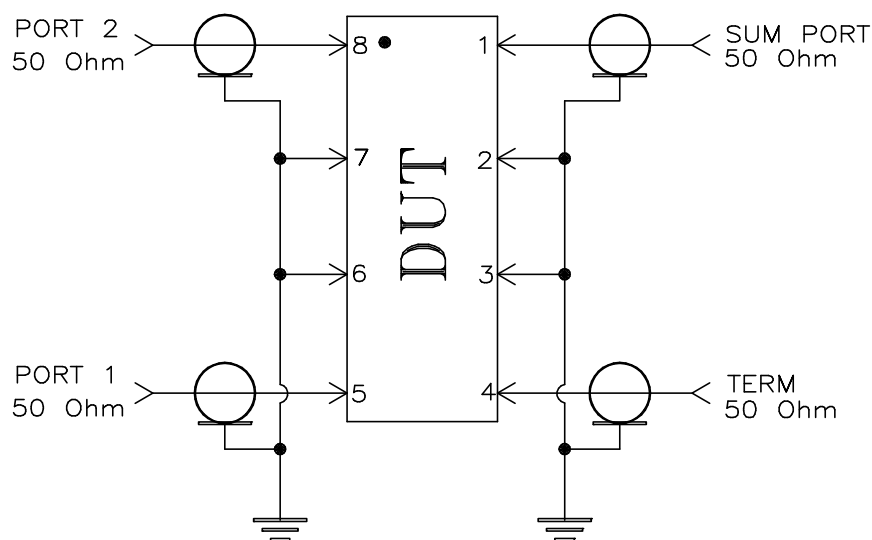
SCALE: 5:1

SHEET: 1 OF 1

Evaluation Board and Circuit



TB-265



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



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