

# NON-CATALOG

# Surface Mount Power Splitter/Combiner

## SCP-4-122-75+

4 Way-0° 75Ω 5 to 1250 MHz



CASE STYLE: YY161

### Features

- wideband, 5 to 1250 MHz
- high isolation, 25 dB typ
- excellent amplitude unbalance, 0.4 dB typ.

### Applications

- DOCSIS® 3.1 Systems
- cellular
- CATV
- receivers/transmitters

**+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"	500

### Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		5		1250	MHz
Insertion Loss, above 6.0 dB	5-100	—	0.6	1.0	dB
	100-1000	—	1.1	1.9	
Isolation	1000-1250	—	2.0	2.9	dB
	5-1000	16	25	—	
Phase Unbalance	1000-1250	14	18	—	dB
	5-100	—	1.0	3.0	
Amplitude Unbalance	100-1000	—	6.0	12.0	Degree
	1000-1250	—	9.0	16.0	
VSWR (Port S)	5-1000	—	0.5	0.9	dB
	1000-1250	—	0.9	1.5	
VSWR (Port 1 - 4)	5-1000	—	1.22	1.32	:1
	1000-1250	—	1.28	1.49	
VSWR (Port 1 - 4)	5-1000	—	1.28	1.57	:1
	1000-1250	—	1.57	2.32	

### Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Internal Dissipation	0.375W max.

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

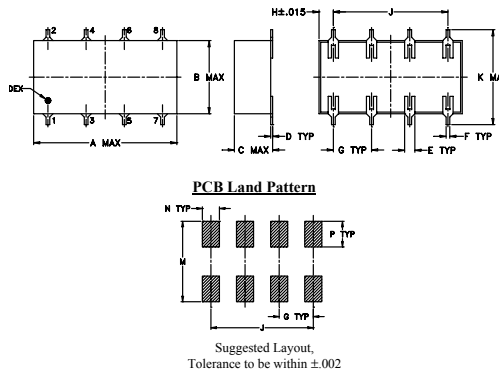
### Pin Connections

Function	Pin Number
SUM PORT	3
PORT 1	2
PORT 2	4
PORT 3	6
PORT 4	8
GND	1,5,7

### Electrical Schematic



### Outline Drawing



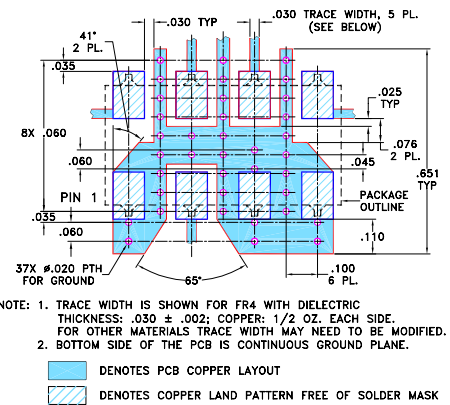
### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G
0.75	0.38	0.28	0.01	0.05	0.02	0.2
19.05	9.65	7.11	0.25	1.27	0.51	5.08

H	J	K	M	N	P	wt
0.075	0.6	0.45	0.47	0.1	0.15	grams
1.91	15.24	11.43	11.94	2.54	3.81	1.60

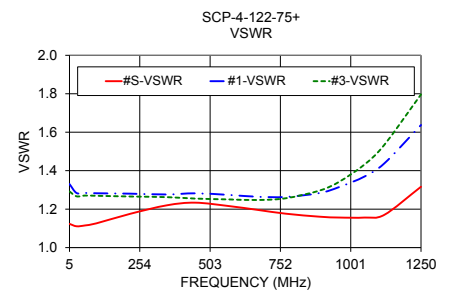
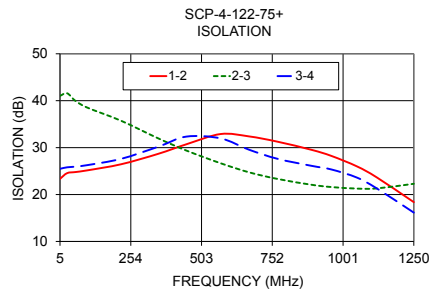
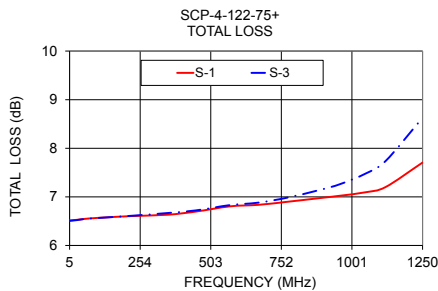
### Demo Board MCL P/N: TB-184 Suggested PCB Layout (PL-175)



### Typical Performance Data

Freq. (MHz)	Total Loss <sup>1</sup> (dB)				Amp. Unbal. (dB)	Isolation (dB)			Phase Unbal. (deg.)	VSWR S	VSWR 1	VSWR 2	VSWR 3	VSWR 4
	S-1	S-2	S-3	S-4		1-2	2-3	3-4						
5	6.51	6.52	6.51	6.51	0.01	23.35	41.04	25.49	0.04	1.12	1.33	1.33	1.29	1.29
30	6.53	6.52	6.52	6.52	0.01	24.56	41.58	25.80	0.21	1.11	1.28	1.28	1.27	1.26
60	6.55	6.55	6.55	6.55	0.00	24.80	39.92	25.94	0.43	1.12	1.28	1.29	1.27	1.27
100	6.57	6.57	6.56	6.57	0.01	25.14	38.55	26.26	0.69	1.13	1.28	1.29	1.27	1.27
220	6.60	6.62	6.61	6.61	0.02	26.46	35.72	27.61	1.54	1.18	1.28	1.29	1.27	1.27
350	6.63	6.69	6.67	6.67	0.06	28.67	31.99	30.18	2.29	1.22	1.28	1.29	1.26	1.28
450	6.70	6.77	6.72	6.72	0.07	30.72	29.37	32.35	2.87	1.23	1.28	1.29	1.25	1.28
570	6.80	6.90	6.83	6.83	0.10	32.89	26.67	31.97	3.65	1.22	1.27	1.28	1.25	1.29
670	6.84	6.97	6.88	6.86	0.13	32.39	24.74	29.56	4.45	1.20	1.26	1.28	1.25	1.29
770	6.90	7.08	6.98	6.95	0.19	31.27	23.33	27.62	5.21	1.18	1.26	1.30	1.26	1.30
890	6.98	7.24	7.15	7.09	0.26	29.53	22.08	26.12	6.22	1.16	1.28	1.33	1.30	1.34
960	7.02	7.34	7.26	7.19	0.31	28.23	21.60	25.34	6.90	1.16	1.31	1.36	1.34	1.39
1050	7.10	7.49	7.48	7.37	0.40	26.00	21.27	23.61	7.81	1.16	1.37	1.42	1.43	1.48
1120	7.20	7.66	7.74	7.59	0.54	23.64	21.31	21.29	8.47	1.17	1.44	1.50	1.53	1.59
1250	7.71	8.31	8.63	8.39	0.92	18.38	22.30	16.15	9.57	1.32	1.64	1.68	1.80	1.85

1. Total Loss = Insertion Loss + 6dB splitter loss.



### Additional 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.
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# 4 Way-0° Power Splitter/Combiner

# SCP-4-122-75+

## Typical Performance Data

FREQ. (MHz)	TOTAL LOSS <sup>1</sup> (dB)				AMP. UNBAL. (dB)	ISOLATION (dB)			PHASE UNBAL. (deg.)	FREQ. (MHz)	VSWR (:1)				
	S-1	S-2	S-3	S-4		1-2	2-3	3-4			S	1	2	3	4
5	6.51	6.52	6.51	6.51	0.06	23.35	41.04	25.49	0.17	5	1.12	1.33	1.33	1.29	1.29
30	6.53	6.52	6.52	6.52	0.06	24.56	41.58	25.80	0.44	30	1.11	1.28	1.28	1.27	1.26
60	6.55	6.55	6.55	6.55	0.04	24.80	39.92	25.94	0.81	60	1.12	1.28	1.29	1.27	1.27
100	6.57	6.57	6.56	6.57	0.03	25.14	38.55	26.26	1.22	100	1.13	1.28	1.29	1.27	1.27
130	6.58	6.58	6.58	6.58	0.04	25.42	37.82	26.52	1.49	130	1.13	1.29	1.29	1.27	1.27
160	6.59	6.59	6.59	6.59	0.05	25.73	37.18	26.82	1.74	160	1.15	1.29	1.29	1.27	1.27
190	6.60	6.61	6.60	6.60	0.07	26.07	36.42	27.19	1.97	190	1.16	1.28	1.29	1.27	1.27
220	6.60	6.62	6.61	6.61	0.09	26.46	35.72	27.61	2.19	220	1.18	1.28	1.29	1.27	1.27
260	6.61	6.64	6.62	6.63	0.12	27.04	34.57	28.28	2.48	260	1.19	1.28	1.29	1.27	1.27
290	6.61	6.66	6.64	6.64	0.13	27.54	33.74	28.85	2.71	290	1.20	1.27	1.29	1.26	1.27
320	6.62	6.67	6.65	6.65	0.16	28.07	32.87	29.49	2.90	320	1.21	1.27	1.29	1.26	1.28
350	6.63	6.69	6.67	6.67	0.20	28.67	31.99	30.18	3.05	350	1.22	1.28	1.29	1.26	1.28
380	6.65	6.72	6.68	6.68	0.24	29.25	31.20	30.89	3.10	380	1.23	1.28	1.29	1.26	1.28
420	6.68	6.74	6.70	6.70	0.27	30.09	30.12	31.78	3.05	420	1.23	1.28	1.29	1.25	1.28
450	6.70	6.77	6.72	6.72	0.28	30.72	29.37	32.35	3.04	450	1.23	1.28	1.29	1.25	1.28
480	6.72	6.79	6.74	6.74	0.28	31.39	28.67	32.79	3.07	480	1.23	1.28	1.28	1.25	1.28
510	6.74	6.82	6.76	6.76	0.28	32.03	28.02	32.92	3.14	510	1.23	1.28	1.28	1.25	1.29
540	6.78	6.87	6.81	6.79	0.29	32.60	27.35	32.69	3.20	540	1.22	1.28	1.29	1.25	1.29
570	6.80	6.90	6.83	6.83	0.29	32.89	26.67	31.97	3.32	570	1.22	1.27	1.28	1.25	1.29
610	6.82	6.92	6.84	6.83	0.30	32.80	25.79	30.93	3.46	610	1.21	1.27	1.28	1.25	1.29
640	6.82	6.94	6.85	6.84	0.31	32.65	25.24	30.24	3.57	640	1.20	1.27	1.28	1.24	1.29
670	6.84	6.97	6.88	6.86	0.31	32.39	24.74	29.56	3.68	670	1.20	1.26	1.28	1.25	1.29
700	6.85	7.00	6.90	6.88	0.32	32.09	24.29	28.90	3.83	700	1.19	1.26	1.28	1.25	1.29
730	6.87	7.03	6.93	6.91	0.32	31.78	23.86	28.31	3.96	730	1.18	1.26	1.29	1.25	1.29
770	6.90	7.08	6.98	6.95	0.32	31.27	23.33	27.62	4.20	770	1.18	1.26	1.30	1.26	1.30
800	6.91	7.12	7.02	6.98	0.33	30.87	22.98	27.16	4.44	800	1.17	1.27	1.30	1.26	1.30
830	6.94	7.16	7.06	7.02	0.34	30.41	22.64	26.78	4.66	830	1.17	1.27	1.30	1.27	1.31
860	6.96	7.20	7.10	7.05	0.36	29.97	22.36	26.43	4.96	860	1.16	1.28	1.31	1.28	1.32
890	6.98	7.24	7.15	7.09	0.38	29.53	22.08	26.12	5.32	890	1.16	1.28	1.33	1.30	1.34
930	7.00	7.30	7.21	7.15	0.41	28.81	21.79	25.71	5.79	930	1.16	1.30	1.34	1.32	1.36
960	7.02	7.34	7.26	7.19	0.43	28.23	21.60	25.34	6.22	960	1.16	1.31	1.36	1.34	1.39
990	7.04	7.38	7.33	7.24	0.47	27.59	21.45	24.90	6.69	990	1.16	1.33	1.38	1.37	1.41
1020	7.07	7.44	7.40	7.30	0.52	26.85	21.34	24.34	7.15	1020	1.15	1.35	1.40	1.40	1.44
1050	7.10	7.49	7.48	7.37	0.57	26.00	21.27	23.61	7.67	1050	1.16	1.37	1.42	1.43	1.48
1090	7.15	7.58	7.61	7.49	0.68	24.70	21.24	22.38	8.38	1090	1.16	1.41	1.46	1.49	1.54
1120	7.20	7.66	7.74	7.59	0.76	23.64	21.31	21.29	8.90	1120	1.17	1.44	1.50	1.53	1.59
1150	7.27	7.77	7.89	7.72	0.87	22.48	21.40	20.13	9.48	1150	1.19	1.48	1.54	1.58	1.65
1180	7.37	7.89	8.06	7.87	0.99	21.28	21.58	18.93	10.01	1180	1.21	1.52	1.57	1.64	1.70
1210	7.49	8.05	8.27	8.07	1.11	20.04	21.83	17.72	10.54	1210	1.25	1.56	1.62	1.71	1.76
1250	7.71	8.31	8.63	8.39	1.31	18.38	22.30	16.15	11.24	1250	1.32	1.64	1.68	1.80	1.85

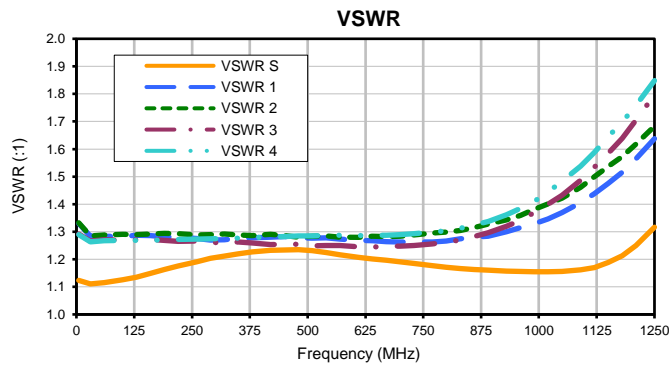
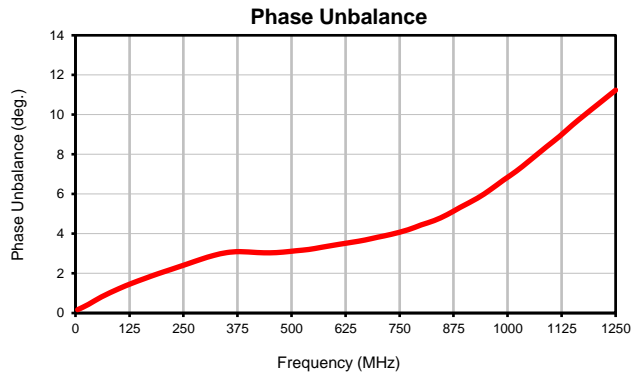
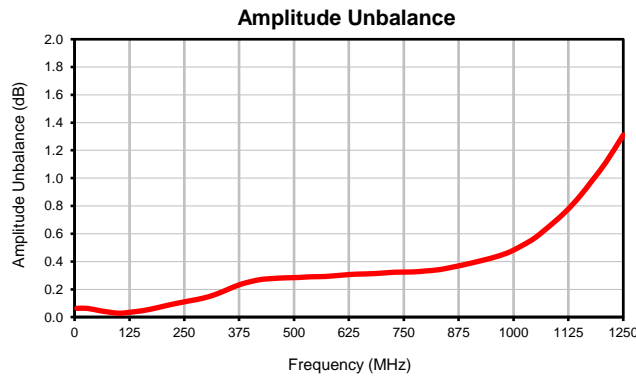
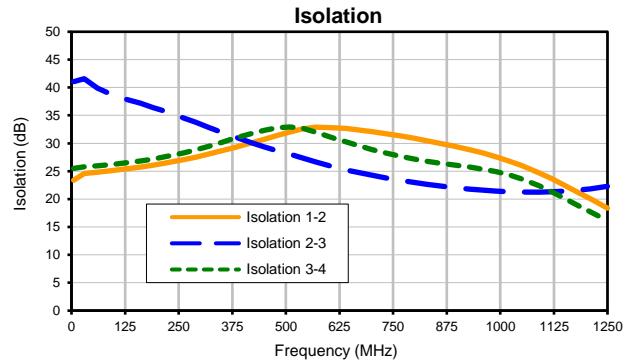
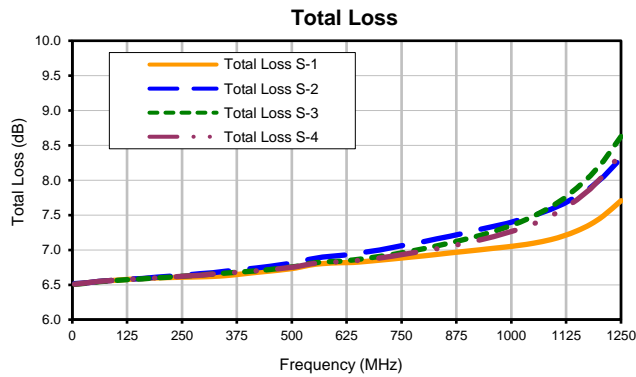
<sup>1</sup>Total Loss = Insertion Loss + 6dB Splitter Loss



# 4 Way-0° Power Splitter/Combiner

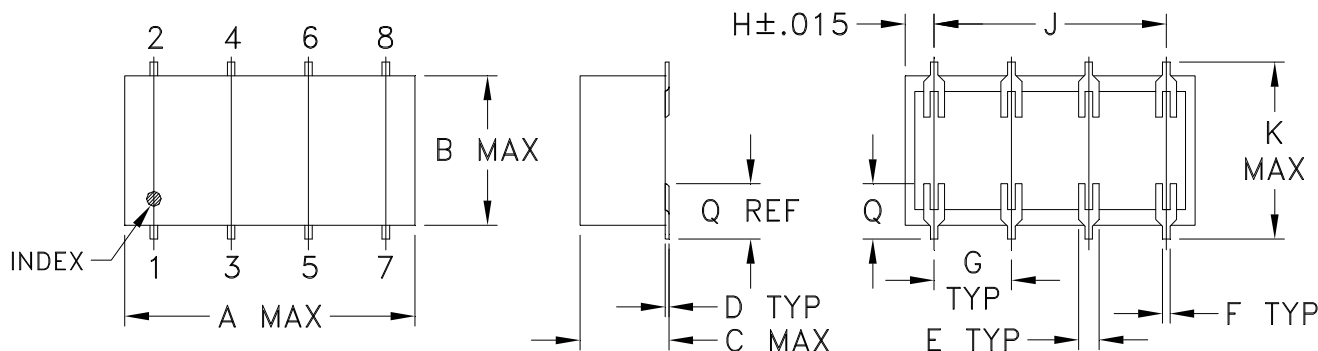
# SCP-4-122-75+

## Typical Performance Curves

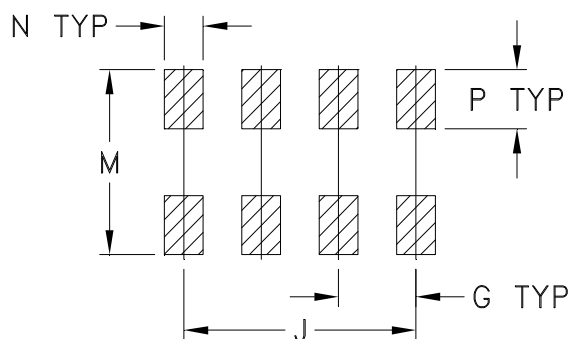


## Outline Dimensions

YY101  
YY109  
YY161



## PCB Land Pattern



Suggested Layout  
Tolerance to be within  $\pm .002$

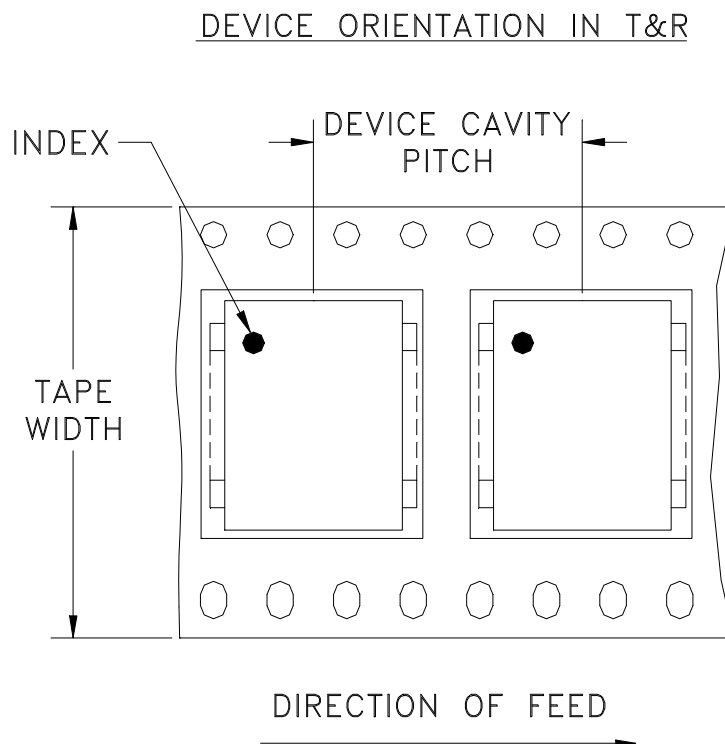
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YY101*			.20 (5.08)							.450 (11.43)	-- (11.94)	.470 (11.94)				1.6
YY109*	.75 (19.05)	.38 (9.65)	.20 (5.08)	.010 (0.25)	.050 (1.27)	.020 (0.51)	.200 (5.08)	.075 (1.91)	.600 (15.24)	.720 (18.29)	-- (18.80)	.740 (18.80)	.100 (2.54)	.150 (3.81)	.148 (3.76)	1.6
YY161			.28 (7.11)							.450 (11.43)	-- (11.94)	.470 (11.94)				1.6

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

### Notes:

- Case material: Plastic.
- Termination finish:  
For RoHS Case Styles: Tin plate over Nickel plate.  
For RoHS-5 Case Styles: Tin-Lead plate.
- Special Tolerances: Termination thickness  $\pm .003$  inch.
- \* Denotes: For SCM mixers, long termination version (case YY109) is available upon request, consult factory. To order short termination version (case YY101) add -NL suffix.

# Tape & Reel Packaging TR-F5



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	16	13	500

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](http://www.minicircuits.com/pages/pdfs/tape.pdf)



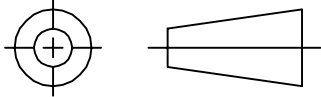
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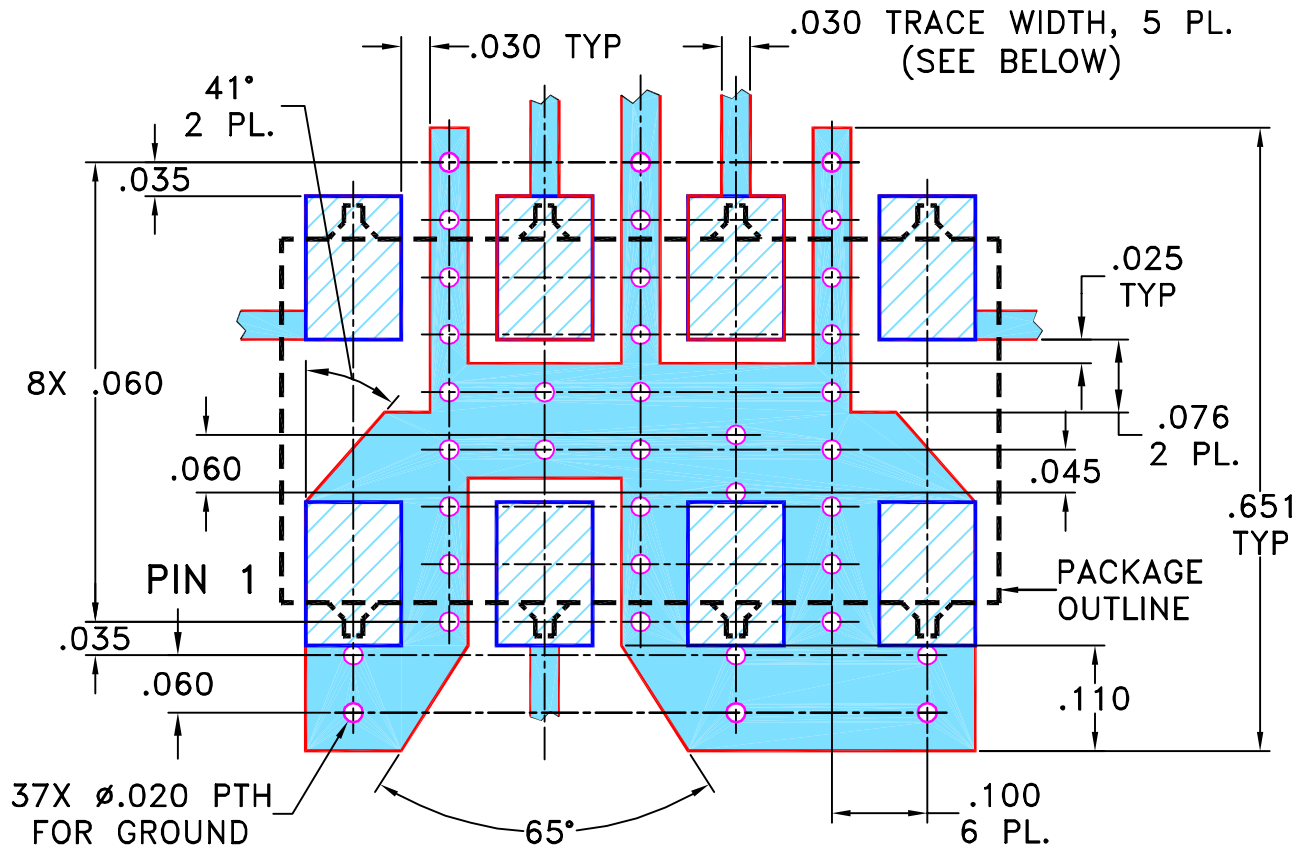
THIRD ANGLE PROJECTION



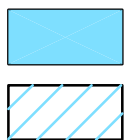
REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M96392	NEW RELEASE	01/27/05	MMG	HY
A	M102713	UPDATED NOTES, ADDED "...WITH SMOBC"	01/20/06	GT	IL

**SUGGESTED MOUNTING CONFIGURATION FOR YY161 CASE STYLE, "bv" PIN CONNECTION**



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B 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.



SOLID BLUE DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
 HATCHED DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

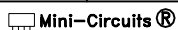
UNLESS OTHERWISE SPECIFIED

INITIALS DATE

DIMENSIONS ARE IN INCHES

DRAWN	MMG	01/24/05
CHECKED	AV	01/27/05
APPROVED	HY	01/27/05

TOLERANCES ON:  
 2 PL DECIMALS ±  
 3 PL DECIMALS ± .005  
 ANGLES ±  
 FRACTIONS ±



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

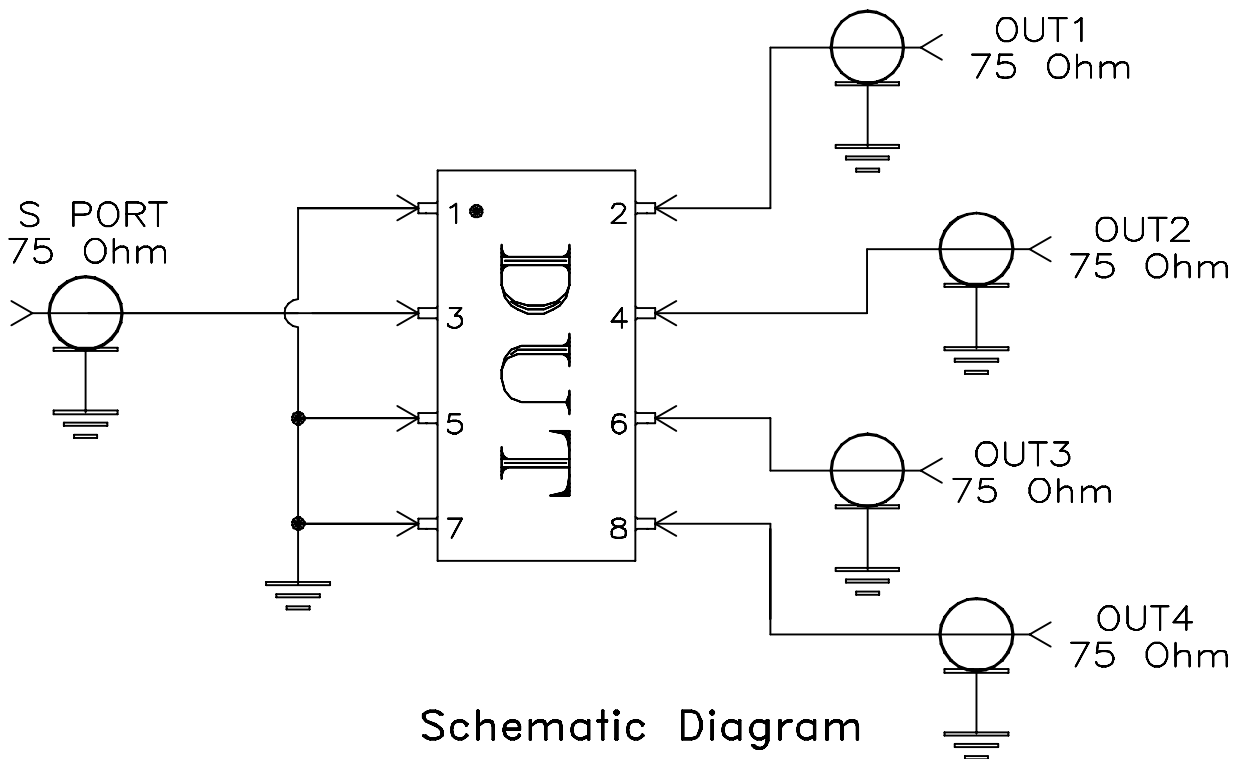
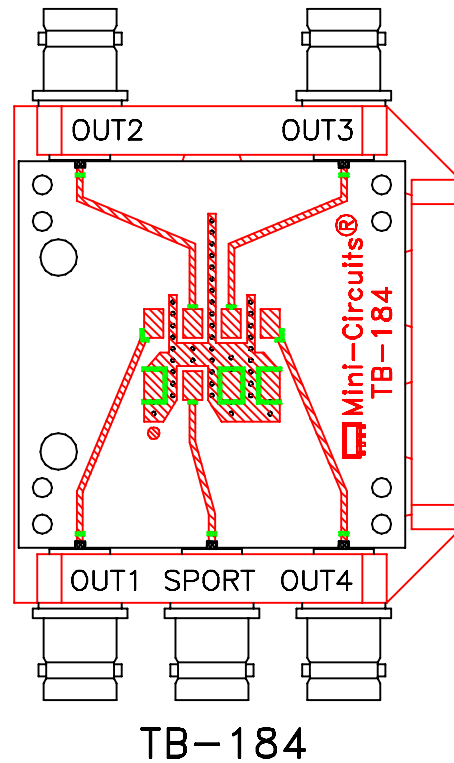


**Mini-Circuits®** 13 Neptune Avenue  
 Brooklyn NY 11235

PL, bv, 75, YY161, SCP, TB-184

SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-175	REV: A
FILE: 98PL175	SCALE: 5:1	SHEET: 1 OF 1	

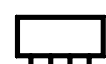
# Evaluation Board and Circuit



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