

# Power Splitter/Combiner

JPS-2-4-75+

2 Way-0° 75Ω 20 to 1000 MHz



CASE STYLE: BH292

## Maximum Ratings

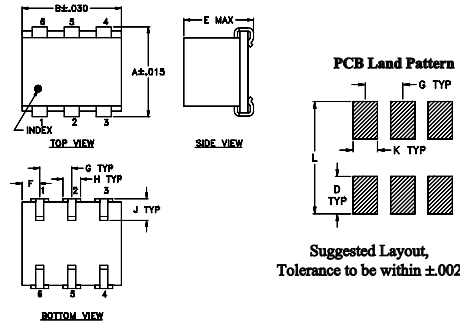
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Internal Dissipation	0.125W max.

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

## Pin Connections

SUM PORT	1
PORT 1	3
PORT 2	4
GROUND	2,5,6

## Outline Drawing



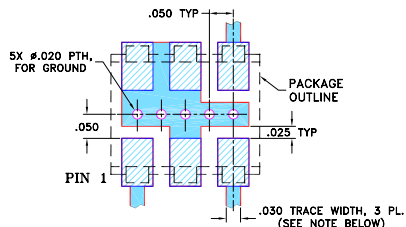
## Outline Dimensions (inch/mm)

A	B	C	D	E	F	G
.280	.310	--	.100	.225	.055	.100
7.11	7.87	--	2.54	5.72	1.40	2.54

H	J	K	L	wt
.047	.065	.065	.300	grams
1.19	1.65	1.65	7.62	0.45

## Demo Board MCL P/N: TB-169 Suggested PCB Layout (PL-054)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" ± 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

## 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-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](http://www.minicircuits.com/MCLStore/terms.jsp)

## Features

- low insertion loss, 0.4 dB typ.
- excellent insertion loss flatness, 0.2 dB peak to peak typ.
- excellent amplitude unbalance, 0.05 dB typ.
- good phase unbalance, 0.2 deg. typ.
- J-leads for excellent solderability and strain relief

## Applications

- cable tv
- cellular

## +RoHS Compliant

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

## Electrical Specifications

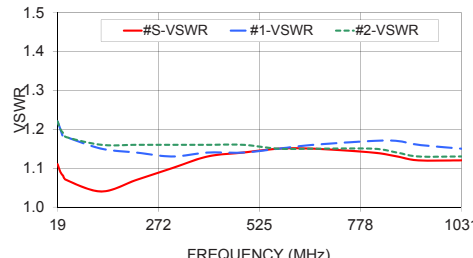
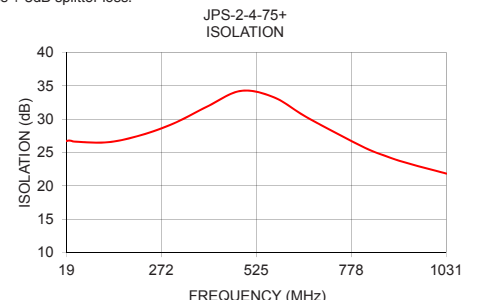
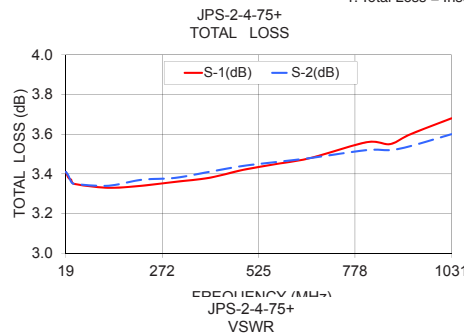
FREQ. RANGE (MHz)	ISOLATION (dB)						INSERTION LOSS (dB) ABOVE 3.0 dB						PHASE UNBALANCE (Degrees)			AMPLITUDE UNBALANCE (dB)		
	L		M		U		L		M		U		L	M	U	L	M	U
$f_L$ - $f_U$	Typ.	Min	Typ.	Min	Typ.	Min	Typ.	Max.	Typ.	Max.	Typ.	Max.	Max.	Max.	Max.	Max.	Max.	Max.
20-1000	27	20	29	20	27	16	0.35	0.7	0.4	0.8	0.45	1.0	2.0	2.0	3.0	0.2	0.2	0.3

L = low range [ $f_L$  to 10  $f_L$ ] M = mid range [10  $f_L$  to  $f_U/2$ ] U = upper range [ $f_U/2$  to  $f_U$ ]

## Typical Performance Data

Frequency (MHz)	Total Loss <sup>1</sup> (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
19.00	3.41	3.41	0.00	26.71	0.06	1.11	1.22	1.22
26.00	3.38	3.39	0.01	26.79	0.06	1.09	1.20	1.20
33.00	3.37	3.36	0.00	26.73	0.10	1.08	1.18	1.19
40.00	3.35	3.35	0.00	26.63	0.10	1.07	1.18	1.18
128.75	3.33	3.34	0.01	26.53	0.13	1.04	1.15	1.16
217.50	3.34	3.37	0.03	27.59	0.18	1.07	1.14	1.16
306.25	3.36	3.38	0.02	29.39	0.12	1.10	1.13	1.16
395.00	3.38	3.41	0.03	31.91	0.04	1.13	1.14	1.16
483.75	3.42	3.44	0.02	34.23	0.01	1.14	1.14	1.16
572.50	3.45	3.46	0.01	33.25	0.10	1.15	1.15	1.15
661.25	3.48	3.48	0.00	30.22	0.15	1.15	1.16	1.15
810.00	3.56	3.52	0.04	25.82	0.38	1.14	1.17	1.15
870.00	3.55	3.52	0.03	24.46	0.53	1.13	1.17	1.14
923.75	3.60	3.54	0.06	23.46	0.59	1.12	1.16	1.13
1031.25	3.68	3.60	0.08	21.84	0.68	1.12	1.15	1.13

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



## electrical schematic



# 2 Way-0° Power Splitter/Combiner

# JPS-2-4-75+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER =0dBm @Temperature = +25°C

FREQ. (MHz)	TOTAL LOSS <sup>1</sup> (dB)		AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB)	VSWR (:1)		
	S-1	S-2				S	1	2
10	3.39	3.40	0.01	0.03	28.58	1.15	1.22	1.22
15	3.39	3.40	0.01	0.07	28.83	1.12	1.19	1.19
20	3.38	3.39	0.01	0.09	28.63	1.10	1.18	1.18
25	3.37	3.39	0.02	0.09	28.35	1.09	1.17	1.17
30	3.36	3.38	0.02	0.12	28.14	1.08	1.17	1.17
40	3.35	3.37	0.02	0.14	27.79	1.06	1.16	1.16
50	3.34	3.36	0.02	0.20	27.57	1.05	1.16	1.16
75	3.33	3.36	0.03	0.26	27.33	1.04	1.15	1.15
100	3.33	3.35	0.02	0.32	27.40	1.04	1.14	1.15
125	3.33	3.36	0.03	0.33	27.48	1.05	1.14	1.14
150	3.33	3.36	0.03	0.43	27.80	1.06	1.14	1.14
175	3.34	3.37	0.03	0.47	28.04	1.07	1.14	1.14
200	3.35	3.37	0.02	0.52	28.48	1.08	1.14	1.14
225	3.35	3.38	0.03	0.59	28.86	1.09	1.13	1.14
250	3.36	3.39	0.03	0.61	29.54	1.10	1.14	1.14
275	3.37	3.39	0.02	0.66	29.83	1.11	1.14	1.15
300	3.37	3.40	0.03	0.69	30.63	1.12	1.14	1.15
350	3.39	3.42	0.03	0.76	31.73	1.14	1.15	1.15
400	3.41	3.43	0.02	0.84	32.74	1.15	1.16	1.16
450	3.43	3.45	0.02	0.91	33.08	1.16	1.17	1.16
500	3.45	3.46	0.01	0.94	32.60	1.17	1.18	1.17
550	3.48	3.48	0.00	0.98	31.43	1.17	1.20	1.17
600	3.50	3.49	0.01	1.04	29.81	1.16	1.21	1.17
650	3.54	3.51	0.03	1.11	28.36	1.15	1.22	1.17
700	3.57	3.52	0.05	1.17	26.87	1.14	1.21	1.17
750	3.60	3.54	0.06	1.16	25.37	1.12	1.22	1.17
800	3.64	3.55	0.09	1.17	23.96	1.11	1.23	1.17
850	3.67	3.57	0.10	1.21	22.69	1.09	1.25	1.18
900	3.70	3.58	0.12	1.27	21.76	1.07	1.26	1.19
950	3.74	3.61	0.13	1.30	21.14	1.06	1.27	1.20
1000	3.78	3.63	0.15	1.31	20.56	1.04	1.28	1.21
1050	3.82	3.65	0.17	1.31	20.07	1.04	1.31	1.22
1100	3.86	3.68	0.18	1.22	19.87	1.03	1.32	1.24
1150	3.89	3.71	0.18	1.18	19.86	1.04	1.32	1.26
1200	3.93	3.75	0.18	1.21	20.19	1.06	1.33	1.28
1250	3.97	3.78	0.19	1.18	20.83	1.08	1.36	1.30
1300	4.03	3.83	0.20	1.12	21.32	1.11	1.38	1.32
1350	4.13	3.90	0.23	1.02	21.39	1.16	1.40	1.34
1400	4.25	4.00	0.25	0.90	20.15	1.23	1.41	1.37
1450	4.43	4.16	0.27	0.68	18.13	1.32	1.43	1.40
1500	4.70	4.41	0.30	0.36	15.96	1.44	1.45	1.43
1600	5.57	5.25	0.31	0.11	12.11	1.78	1.48	1.48
1700	6.78	6.45	0.32	0.32	9.59	2.27	1.53	1.53
1800	8.27	7.98	0.29	0.31	7.73	2.95	1.59	1.55

<sup>1</sup>Total Loss = Insertion Loss + 3dB Splitter Loss



# 2 Way-0° Power Splitter/Combiner

# JPS-2-4-75+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER =0dBm @Temperature = -40°C

FREQ. (MHz)	TOTAL LOSS <sup>1</sup> (dB)		AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB)	VSWR (:1)		
	S-1	S-2				S	1	2
10	3.24	3.25	0.01	0.03	25.99	1.17	1.29	1.29
15	3.27	3.29	0.02	0.01	28.83	1.11	1.20	1.20
20	3.29	3.31	0.02	0.03	30.63	1.08	1.16	1.16
25	3.30	3.32	0.02	0.05	31.68	1.06	1.14	1.14
30	3.30	3.31	0.01	0.07	32.39	1.05	1.13	1.13
40	3.29	3.32	0.03	0.10	33.08	1.03	1.11	1.11
50	3.28	3.31	0.03	0.15	33.25	1.02	1.10	1.10
75	3.27	3.30	0.03	0.22	32.98	1.02	1.08	1.08
100	3.27	3.29	0.02	0.25	32.83	1.02	1.07	1.07
125	3.26	3.29	0.03	0.27	32.76	1.03	1.07	1.07
150	3.26	3.29	0.03	0.36	33.07	1.04	1.06	1.07
175	3.26	3.29	0.03	0.42	33.19	1.04	1.07	1.07
200	3.27	3.30	0.03	0.46	33.45	1.04	1.07	1.08
225	3.27	3.30	0.03	0.52	33.55	1.06	1.08	1.08
250	3.27	3.30	0.03	0.54	34.17	1.08	1.09	1.09
275	3.28	3.31	0.03	0.61	34.03	1.10	1.10	1.11
300	3.28	3.31	0.03	0.63	34.60	1.10	1.11	1.12
350	3.29	3.32	0.03	0.72	34.61	1.13	1.14	1.14
400	3.30	3.32	0.02	0.79	34.25	1.16	1.16	1.15
450	3.32	3.33	0.01	0.85	33.27	1.17	1.17	1.17
500	3.33	3.35	0.02	0.88	31.57	1.18	1.20	1.18
550	3.36	3.35	0.01	0.92	29.93	1.18	1.22	1.19
600	3.37	3.36	0.01	0.98	28.20	1.20	1.25	1.21
650	3.40	3.37	0.03	1.04	26.67	1.19	1.26	1.22
700	3.43	3.38	0.05	1.09	25.28	1.17	1.26	1.22
750	3.46	3.39	0.07	1.07	23.89	1.15	1.27	1.23
800	3.48	3.39	0.09	1.07	22.56	1.12	1.28	1.23
850	3.50	3.39	0.11	1.09	21.35	1.09	1.30	1.23
900	3.52	3.40	0.12	1.17	20.47	1.06	1.31	1.23
950	3.55	3.42	0.13	1.21	19.90	1.04	1.31	1.24
1000	3.58	3.42	0.16	1.19	19.39	1.03	1.31	1.25
1050	3.62	3.44	0.18	1.18	19.01	1.04	1.32	1.25
1100	3.64	3.45	0.19	1.12	18.87	1.06	1.32	1.25
1150	3.66	3.47	0.19	1.10	18.93	1.10	1.32	1.26
1200	3.69	3.50	0.19	1.17	19.36	1.12	1.33	1.27
1250	3.72	3.53	0.19	1.12	20.08	1.14	1.35	1.29
1300	3.76	3.56	0.20	1.10	20.77	1.19	1.37	1.31
1350	3.83	3.61	0.22	1.00	20.99	1.28	1.40	1.34
1400	3.94	3.68	0.27	0.88	19.79	1.38	1.43	1.38
1450	4.11	3.83	0.28	0.66	17.60	1.48	1.47	1.44
1500	4.39	4.09	0.30	0.32	15.39	1.57	1.52	1.49
1600	5.29	4.96	0.33	0.06	11.52	1.93	1.59	1.59
1700	6.52	6.16	0.35	0.44	9.06	2.25	1.63	1.63
1800	8.01	7.67	0.34	0.45	7.29	2.78	1.63	1.59

<sup>1</sup>Total Loss = Insertion Loss + 3dB Splitter Loss

REV. X2  
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# 2 Way-0° Power Splitter/Combiner

# JPS-2-4-75+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER =0dBm @Temperature = +85°C

FREQ. (MHz)	TOTAL LOSS <sup>1</sup> (dB)		AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB)	VSWR (:1)		
	S-1	S-2				S	1	2
10	3.52	3.53	0.01	0.01	24.67	1.17	1.29	1.29
15	3.49	3.51	0.02	0.07	24.73	1.14	1.26	1.26
20	3.47	3.49	0.02	0.08	24.53	1.12	1.25	1.25
25	3.45	3.48	0.03	0.12	24.30	1.12	1.24	1.24
30	3.44	3.46	0.02	0.14	24.12	1.11	1.24	1.24
40	3.43	3.45	0.02	0.18	23.90	1.10	1.23	1.23
50	3.42	3.45	0.03	0.22	23.78	1.10	1.23	1.23
75	3.41	3.44	0.03	0.30	23.70	1.09	1.23	1.23
100	3.41	3.45	0.04	0.38	23.86	1.08	1.23	1.23
125	3.41	3.46	0.05	0.41	24.05	1.07	1.22	1.23
150	3.42	3.47	0.05	0.50	24.38	1.07	1.21	1.22
175	3.42	3.48	0.06	0.54	24.64	1.08	1.20	1.22
200	3.43	3.48	0.05	0.59	25.07	1.11	1.20	1.21
225	3.44	3.49	0.05	0.65	25.48	1.12	1.19	1.20
250	3.45	3.50	0.05	0.67	26.08	1.13	1.18	1.20
275	3.46	3.52	0.06	0.73	26.44	1.13	1.17	1.19
300	3.47	3.52	0.05	0.75	27.04	1.13	1.17	1.18
350	3.49	3.55	0.06	0.82	27.94	1.15	1.17	1.17
400	3.52	3.57	0.05	0.88	28.93	1.14	1.16	1.16
450	3.54	3.59	0.05	0.98	29.91	1.13	1.16	1.15
500	3.57	3.61	0.04	0.97	30.14	1.13	1.16	1.15
550	3.61	3.64	0.03	1.00	30.30	1.13	1.17	1.14
600	3.64	3.65	0.01	1.07	29.85	1.12	1.18	1.14
650	3.68	3.67	0.01	1.17	29.21	1.12	1.18	1.13
700	3.72	3.70	0.02	1.25	28.19	1.12	1.17	1.13
750	3.76	3.72	0.04	1.23	26.86	1.12	1.18	1.13
800	3.80	3.74	0.06	1.26	25.54	1.12	1.19	1.13
850	3.83	3.76	0.07	1.32	24.28	1.11	1.21	1.14
900	3.88	3.79	0.09	1.37	23.34	1.09	1.23	1.14
950	3.92	3.82	0.10	1.42	22.76	1.10	1.23	1.16
1000	3.97	3.86	0.11	1.41	22.10	1.09	1.25	1.17
1050	4.03	3.89	0.14	1.38	21.57	1.07	1.28	1.19
1100	4.07	3.92	0.15	1.32	21.38	1.07	1.29	1.21
1150	4.12	3.97	0.15	1.27	21.39	1.06	1.30	1.24
1200	4.17	4.01	0.16	1.29	21.82	1.06	1.32	1.27
1250	4.22	4.06	0.16	1.25	22.65	1.06	1.34	1.29
1300	4.30	4.12	0.18	1.24	23.27	1.08	1.36	1.31
1350	4.41	4.21	0.20	1.15	23.30	1.11	1.38	1.33
1400	4.54	4.31	0.24	1.01	21.84	1.16	1.38	1.35
1450	4.74	4.48	0.26	0.83	19.39	1.25	1.38	1.37
1500	5.02	4.75	0.27	0.53	17.02	1.35	1.38	1.37
1600	5.87	5.58	0.29	0.30	12.93	1.71	1.39	1.40
1700	7.05	6.76	0.29	0.12	10.28	2.27	1.47	1.46
1800	8.51	8.27	0.24	0.23	8.31	3.05	1.59	1.53

<sup>1</sup>Total Loss = Insertion Loss + 3dB Splitter Loss

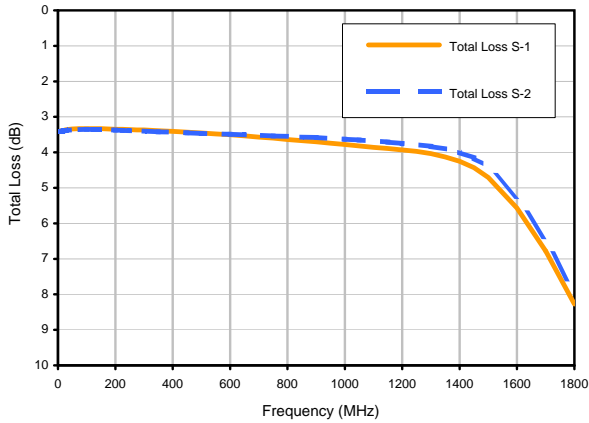


# 2 Way-0° Power Splitter/Combiner

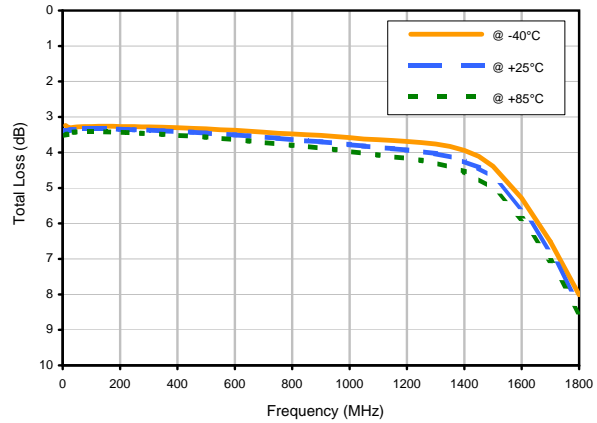
# JPS-2-4-75+

## Typical Performance Curves

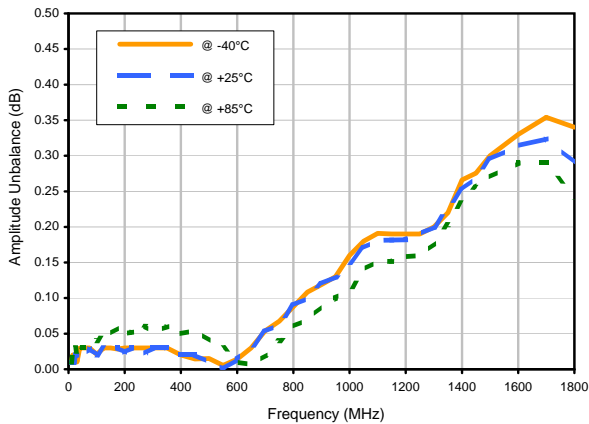
**Total Loss**



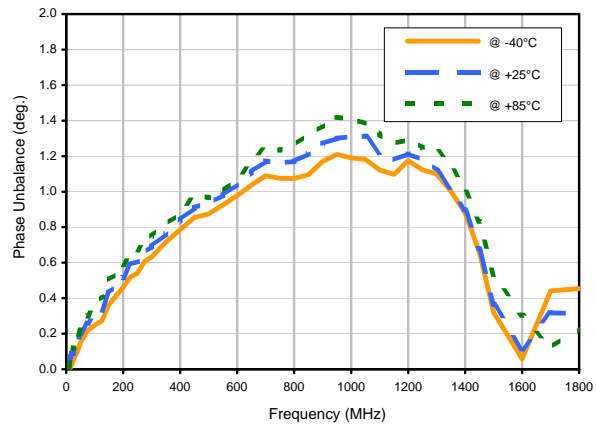
**Total Loss S-1 vs. TEMPERATURE**



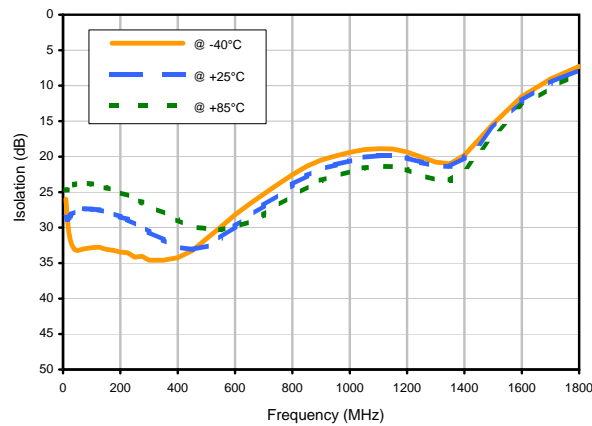
**Amplitude Unbalance vs. TEMPERATURE**



**Phase Unbalance vs. TEMPERATURE**



**Isolation 1-2 vs. TEMPERATURE**



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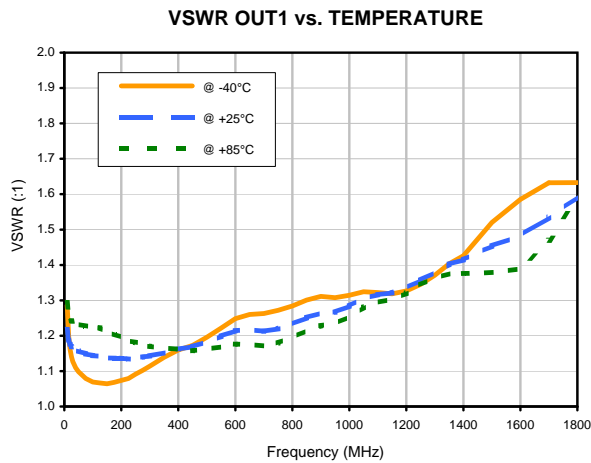
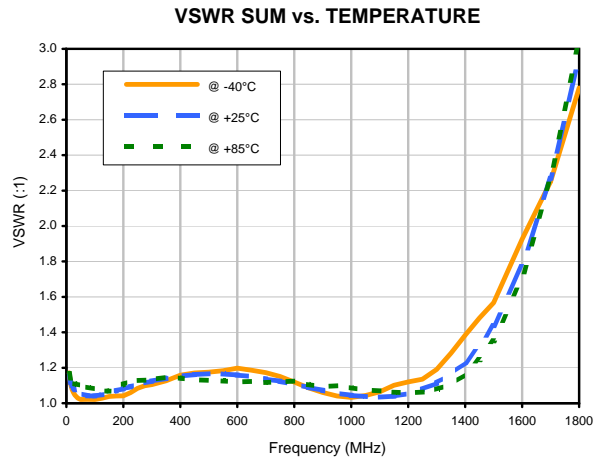
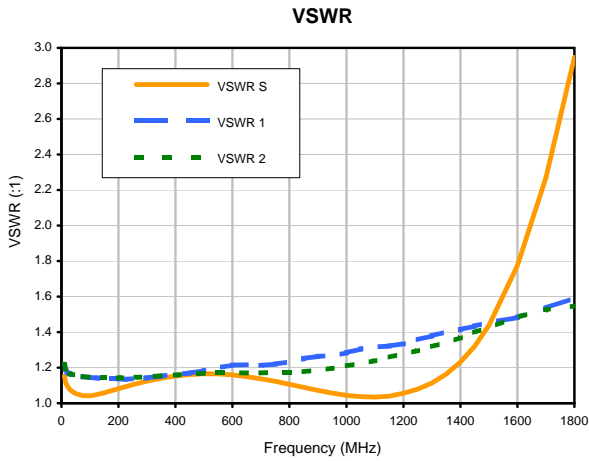
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



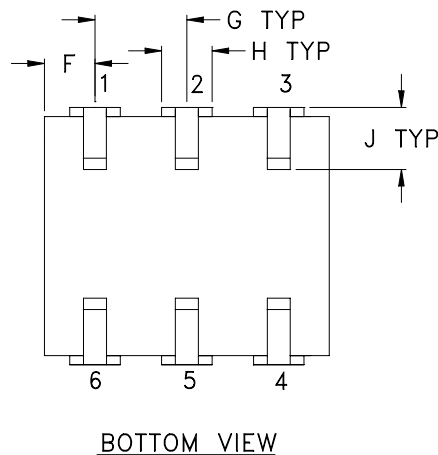
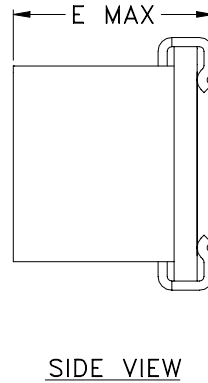
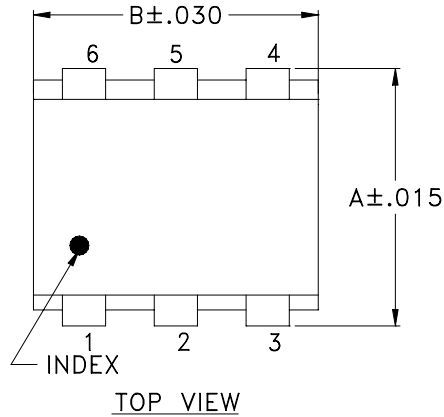
# 2 Way-0° Power Splitter/Combiner

# JPS-2-4-75+

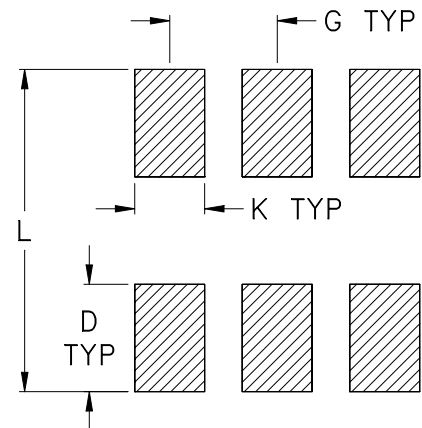
## Typical Performance Curves



### Outline Dimensions



### PCB Land Pattern



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

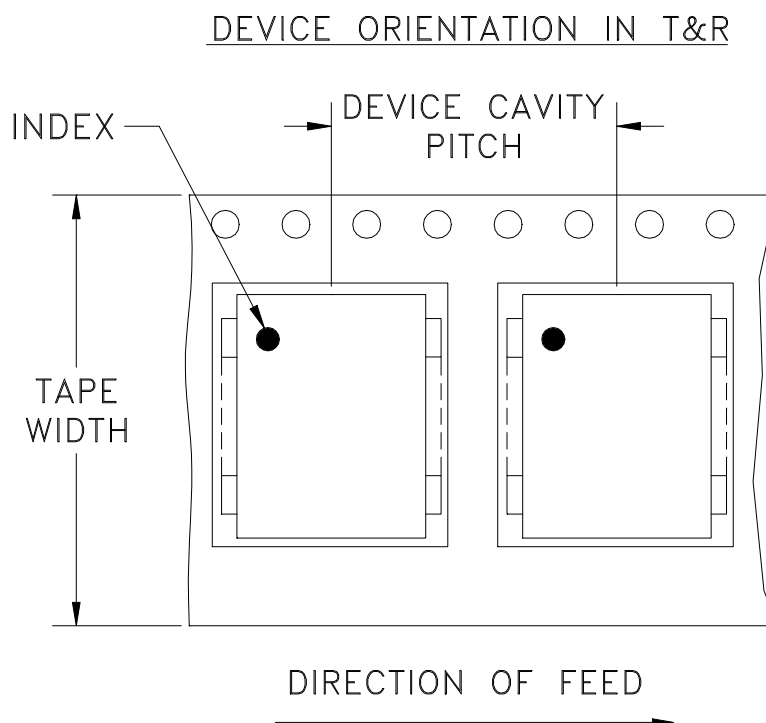
CASE #	A	B	C	D	E	F	G	H	J	K	L	WT. GRAM
BH292	.280 (7.11)	.310 (7.87)	- -	.100 (2.54)	.225 (5.72)	.055 (1.40)	.100 (2.54)	.047 (1.19)	.065 (1.65)	.065 (1.65)	.300 (7.62)	.45

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

#### Notes:

- Case material: Ceramic.
- Termination finish:
  - For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
  - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

# Tape & Reel Packaging TR-F24



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
16	12	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)



INTERNET <http://www.minicircuits.com>

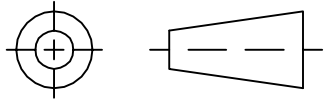
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

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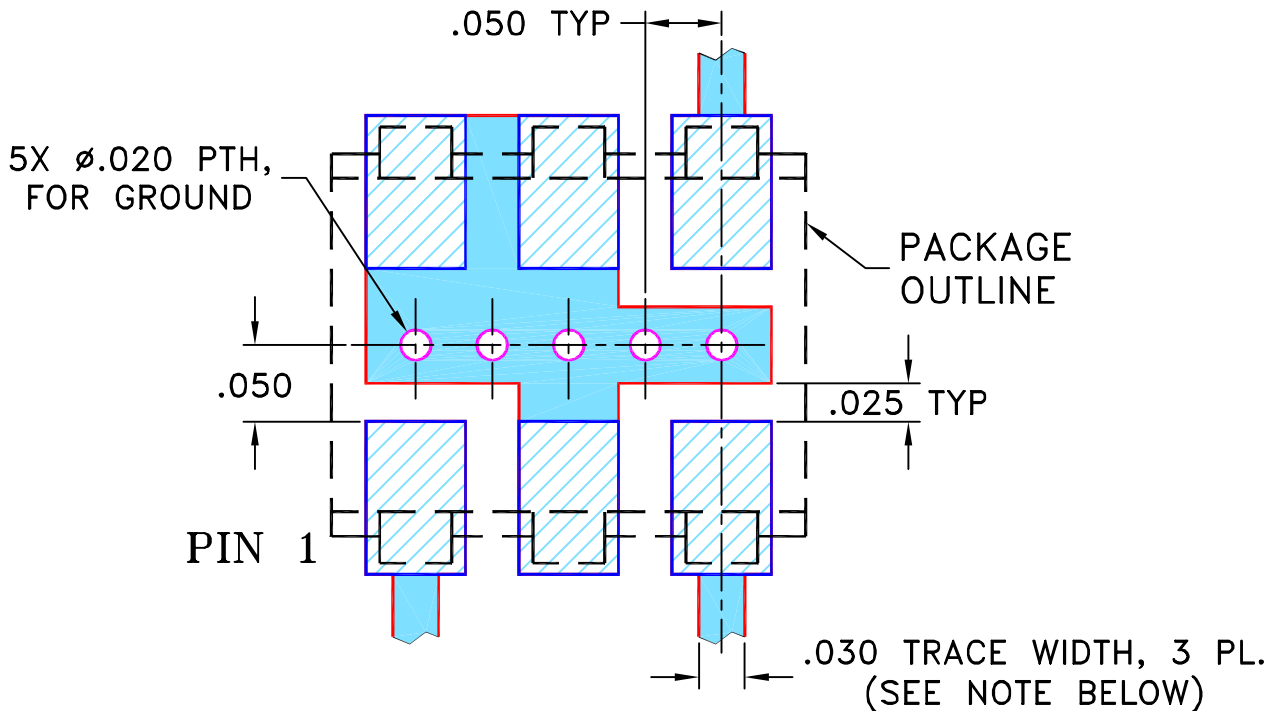
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82272	NEW RELEASE	08/05/02	GF	DJ
A	M101117	UPDATED DWG.	11/21/05	MMG	HY
B	M102713	ADDED "...WITH SMOBC"	01/17/06	MMG	IL

SUGGESTED MOUNTING CONFIGURATION  
FOR BH292 CASE STYLE, "me" PIN CONNECTION



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS 0.030" ± 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	GF	07/18/02
TOLERANCES ON:	HY	08/01/02
2 PL DECIMALS ±	DJ	08/05/02
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

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

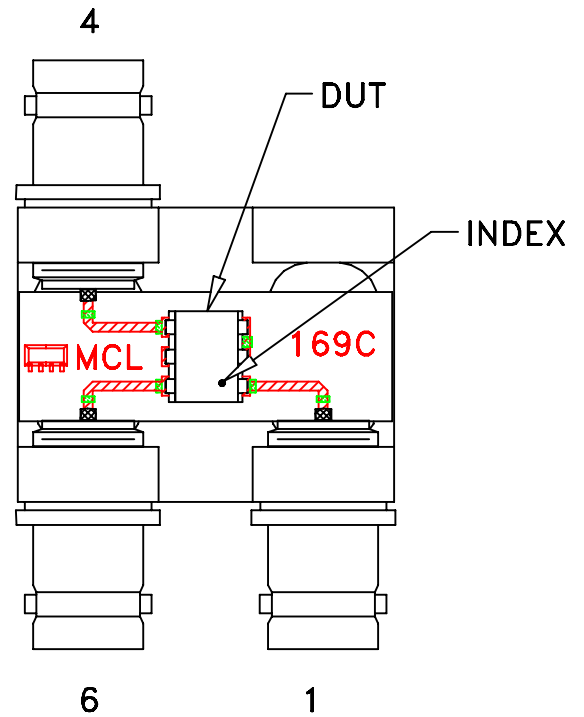
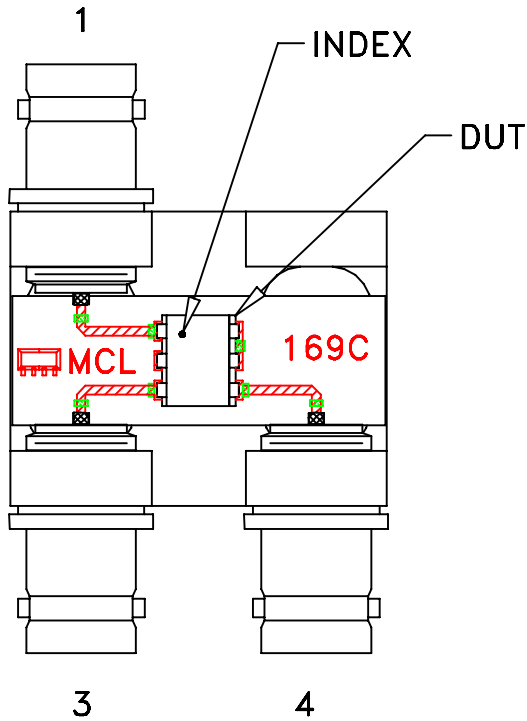
PL, me, 75, BH292, JPS, TB-169

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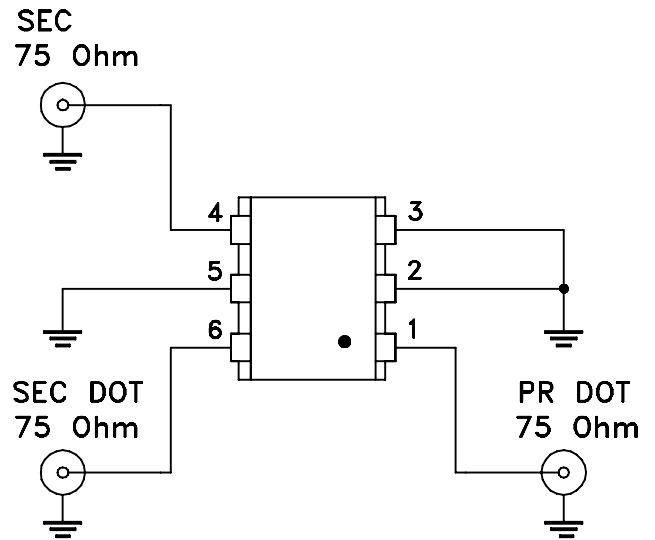
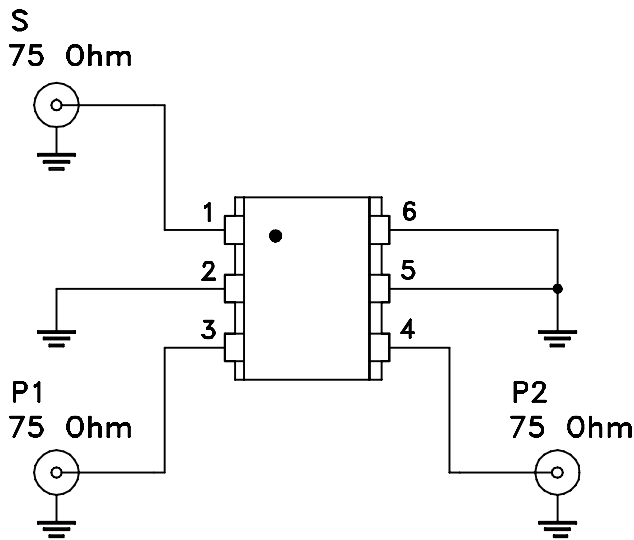
SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-054	REV: B
FILE:	98PL054	SCALE: 8:1	SHEET: 1 OF 1

# Evaluation Board and Circuit

For Pin Connections and DUT Orientation Refer to  
Data Sheet of the DUT



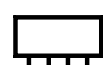
TB-169



Schematic Diagram

## Notes:

1. BNC 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