

Power Splitter/Combiner

JSPQ-1875W

2 Way-90° 50Ω 1325 to 1875 MHz

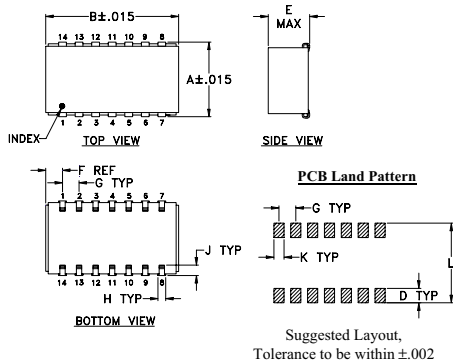
Maximum Ratings

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

Pin Connections

SUM PORT	1
PORT 1 (0°)	8
PORT 2 (+90°)	14
GROUND	2,3,4,5,6,9,10,11,12,13
50 OHM TERM EXTERNAL	7

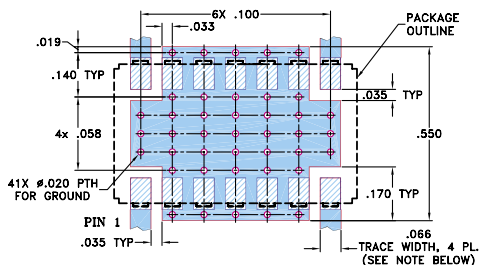
Outline Drawing



Outline Dimensions (inch)

A	B	C	D	E	F	G
.460	.768	--	.100	.115	.084	.100
11.68	19.51	--	2.54	2.92	2.13	2.54
H	J	K	L			wt
.047	.065	.065	.480			grams
1.19	1.65	1.65	12.19			1.5

Demo Board MCL P/N: TB-214
Suggested PCB Layout (PL-102)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B 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

Features

- low insertion loss, 0.2 dB typ.
- excellent isolation, 28 dB typ.
- aqueous washable

Applications

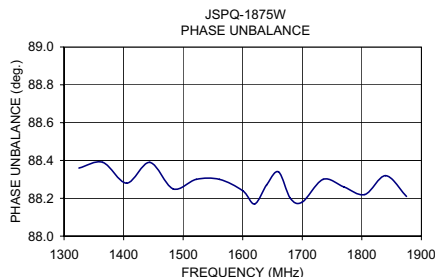
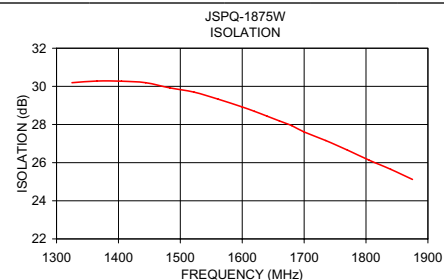
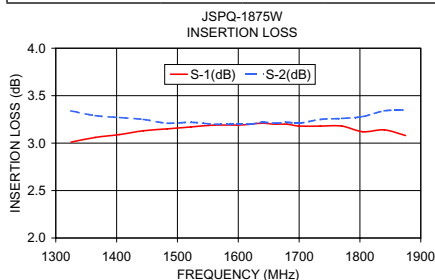
- GPS
- balanced amplifiers
- modulators

Splitter Electrical Specifications

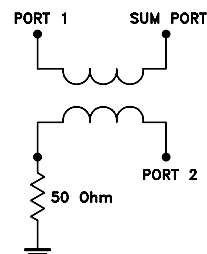
FREQ. RANGE (MHz)	ISOLATION (dB)	INSERTION LOSS (dB) Avg. of Coupled Outputs less 3 dB	PHASE UNBALANCE (Degrees)	AMPLITUDE UNBALANCE (dB)
$f_i - f_0$	Typ. Min.	Typ. Max.	Max.	Max.
1325-1875	28 18	0.2 0.5	6	1.0

Typical Performance Data

Frequency (MHz)	Insertion Loss (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
1325	3.01	3.34	0.34	30.19	88.36	1.07	1.02	1.05
1365	3.06	3.29	0.23	30.28	88.39	1.07	1.02	1.05
1405	3.09	3.27	0.17	30.27	88.28	1.07	1.03	1.05
1444	3.13	3.25	0.11	30.19	88.39	1.08	1.03	1.05
1483	3.15	3.21	0.06	29.92	88.25	1.08	1.03	1.04
1522	3.17	3.22	0.04	29.70	88.30	1.08	1.04	1.04
1561	3.19	3.20	0.01	29.33	88.30	1.09	1.04	1.04
1600	3.19	3.20	0.01	28.92	88.24	1.09	1.05	1.04
1620	3.20	3.20	0.00	28.69	88.17	1.09	1.05	1.04
1640	3.21	3.22	0.01	28.44	88.27	1.09	1.05	1.04
1660	3.20	3.21	0.01	28.19	88.34	1.10	1.06	1.04
1680	3.20	3.22	0.02	27.94	88.20	1.10	1.06	1.04
1700	3.18	3.21	0.02	27.61	88.18	1.10	1.06	1.04
1735	3.18	3.25	0.07	27.16	88.30	1.11	1.07	1.05
1770	3.18	3.26	0.08	26.66	88.26	1.11	1.07	1.05
1805	3.12	3.28	0.16	26.13	88.22	1.12	1.08	1.05
1840	3.14	3.34	0.20	25.65	88.32	1.12	1.09	1.05
1875	3.08	3.35	0.27	25.12	88.21	1.12	1.10	1.06



electrical schematic



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RF/IF MICROWAVE COMPONENTS

REV. A
M102713
JSPQ-1875W
LC/TD/CP
070423

2 Way-90° Power Splitter/Combiner

JSPQ-1875W

Typical Performance Data

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

FREQ. (MHz)	TOTAL LOSS ¹ (dB)		AMP. UNBAL. (dB)	PHASE UNBAL. From 90° (deg.)	ISOLATION (dB) 1-2	VSWR (:1)		
	S-1	S-2				S	1	2
500	1.20	6.87	5.67	1.00	24.23	1.15	1.14	1.13
600	1.55	5.83	4.28	0.99	23.93	1.16	1.14	1.13
700	1.88	5.07	3.18	0.92	23.99	1.16	1.14	1.12
800	2.21	4.47	2.26	0.86	24.30	1.15	1.13	1.12
900	2.52	4.02	1.50	0.80	24.80	1.14	1.13	1.11
1000	2.77	3.69	0.91	0.71	25.42	1.14	1.12	1.09
1100	3.00	3.43	0.43	0.65	26.12	1.13	1.11	1.08
1200	3.18	3.24	0.05	0.62	26.77	1.12	1.09	1.07
1225	3.22	3.20	0.01	0.61	26.95	1.11	1.09	1.07
1250	3.26	3.17	0.09	0.57	27.06	1.11	1.09	1.06
1275	3.29	3.14	0.15	0.57	27.19	1.11	1.09	1.06
1300	3.32	3.12	0.20	0.53	27.26	1.11	1.08	1.06
1325	3.35	3.10	0.25	0.54	27.31	1.10	1.08	1.05
1350	3.38	3.08	0.30	0.41	27.31	1.10	1.08	1.05
1375	3.42	3.06	0.35	0.39	27.32	1.10	1.07	1.05
1400	3.43	3.04	0.39	0.43	27.48	1.10	1.07	1.05
1425	3.45	3.03	0.42	0.43	27.53	1.09	1.07	1.05
1450	3.47	3.01	0.45	0.41	27.59	1.09	1.07	1.04
1475	3.47	3.00	0.47	0.46	27.64	1.09	1.07	1.04
1500	3.48	3.00	0.48	0.42	27.56	1.09	1.06	1.04
1525	3.49	2.99	0.50	0.42	27.52	1.09	1.06	1.04
1550	3.49	2.99	0.50	0.41	27.55	1.09	1.06	1.04
1575	3.49	3.00	0.49	0.43	27.48	1.09	1.06	1.04
1600	3.48	3.01	0.47	0.35	27.31	1.09	1.06	1.04
1625	3.49	3.02	0.47	0.32	27.08	1.09	1.05	1.05
1650	3.48	3.03	0.45	0.33	26.96	1.09	1.05	1.05
1675	3.47	3.04	0.43	0.31	26.80	1.09	1.05	1.05
1700	3.45	3.06	0.39	0.29	26.60	1.09	1.05	1.05
1725	3.44	3.08	0.35	0.29	26.46	1.09	1.06	1.05
1750	3.41	3.10	0.31	0.27	26.21	1.09	1.06	1.06
1775	3.40	3.13	0.27	0.24	25.96	1.09	1.06	1.06
1800	3.38	3.16	0.22	0.24	25.78	1.10	1.06	1.06
1825	3.35	3.20	0.16	0.19	25.54	1.10	1.07	1.07
1850	3.32	3.23	0.09	0.17	25.31	1.10	1.07	1.07
1875	3.30	3.26	0.03	0.14	25.07	1.10	1.07	1.08
1900	3.25	3.31	0.06	0.10	24.79	1.10	1.08	1.08
1925	3.22	3.36	0.14	0.10	24.52	1.11	1.08	1.09
1950	3.19	3.41	0.22	0.05	24.24	1.11	1.09	1.09
1975	3.14	3.46	0.32	0.01	23.94	1.11	1.09	1.10
2000	3.10	3.53	0.43	0.07	23.66	1.12	1.10	1.10
2100	2.91	3.80	0.88	0.19	22.58	1.13	1.12	1.13
2200	2.69	4.15	1.46	0.34	21.44	1.14	1.13	1.15
2300	2.44	4.63	2.19	0.70	20.36	1.15	1.15	1.18
2400	2.17	5.22	3.04	1.03	19.27	1.16	1.16	1.20
2500	1.90	5.99	4.09	1.60	18.19	1.16	1.17	1.23
2600	1.62	6.99	5.37	2.41	17.13	1.15	1.17	1.25
2700	1.37	8.30	6.92	3.43	16.02	1.13	1.16	1.26

¹ Total Loss = Insertion Loss+ 3dB Splitter Loss

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100705
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2 Way-90° Power Splitter/Combiner

JSPQ-1875W

Typical Performance Data

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

FREQ. (MHz)	TOTAL LOSS ¹ (dB)		AMP. UNBAL. (dB)	PHASE UNBAL. From 90° (deg.)	ISOLATION (dB) 1-2	VSWR (:1)		
	S-1	S-2				S	1	2
500	1.17	6.72	5.55	1.28	23.77	1.14	1.14	1.14
600	1.52	5.69	4.17	1.29	23.43	1.16	1.14	1.15
700	1.85	4.93	3.07	1.26	23.47	1.16	1.14	1.15
800	2.18	4.33	2.15	1.18	23.72	1.16	1.14	1.14
900	2.48	3.88	1.40	1.19	24.30	1.15	1.13	1.13
1000	2.74	3.54	0.80	1.10	24.87	1.14	1.12	1.11
1100	2.96	3.27	0.31	1.06	25.57	1.13	1.11	1.09
1200	3.14	3.08	0.07	1.08	26.35	1.12	1.10	1.08
1225	3.18	3.03	0.14	1.08	26.52	1.12	1.09	1.07
1250	3.21	3.00	0.21	1.05	26.71	1.11	1.09	1.07
1275	3.25	2.98	0.28	1.03	26.84	1.11	1.09	1.07
1300	3.28	2.94	0.33	1.04	26.99	1.11	1.08	1.06
1325	3.30	2.92	0.38	1.09	27.05	1.11	1.08	1.06
1350	3.33	2.92	0.41	0.86	26.82	1.10	1.07	1.05
1375	3.39	2.87	0.52	0.84	26.93	1.10	1.07	1.05
1400	3.39	2.86	0.53	0.97	27.21	1.10	1.07	1.05
1425	3.40	2.85	0.55	0.90	27.26	1.09	1.06	1.05
1450	3.42	2.82	0.60	0.97	27.45	1.09	1.06	1.04
1475	3.43	2.82	0.61	0.98	27.40	1.09	1.06	1.04
1500	3.43	2.81	0.62	1.00	27.34	1.09	1.06	1.04
1525	3.45	2.80	0.65	0.95	27.24	1.09	1.06	1.04
1550	3.44	2.80	0.64	1.01	27.34	1.09	1.05	1.04
1575	3.45	2.80	0.64	0.99	27.23	1.09	1.05	1.04
1600	3.43	2.82	0.61	1.01	27.13	1.09	1.05	1.04
1625	3.43	2.83	0.60	0.87	26.78	1.09	1.05	1.05
1650	3.44	2.83	0.62	0.89	26.63	1.09	1.05	1.04
1675	3.41	2.84	0.58	0.94	26.54	1.09	1.06	1.05
1700	3.40	2.86	0.54	0.77	26.17	1.09	1.07	1.05
1725	3.39	2.87	0.52	0.92	26.18	1.09	1.07	1.05
1750	3.37	2.89	0.48	0.90	25.95	1.09	1.07	1.05
1775	3.35	2.91	0.44	0.99	25.77	1.10	1.07	1.06
1800	3.32	2.94	0.37	0.97	25.56	1.10	1.08	1.06
1825	3.30	2.98	0.32	0.89	25.34	1.10	1.08	1.07
1850	3.27	3.00	0.27	0.85	25.10	1.10	1.08	1.07
1875	3.24	3.03	0.20	0.88	24.92	1.10	1.09	1.07
1900	3.20	3.09	0.12	0.84	24.52	1.11	1.09	1.08
1925	3.16	3.13	0.03	0.81	24.22	1.11	1.09	1.09
1950	3.13	3.17	0.05	0.76	23.95	1.12	1.10	1.10
1975	3.09	3.23	0.14	0.70	23.70	1.12	1.10	1.10
2000	3.04	3.29	0.25	0.59	23.32	1.12	1.11	1.11
2100	2.85	3.54	0.68	0.59	22.37	1.14	1.13	1.13
2200	2.64	3.88	1.24	0.48	21.03	1.16	1.16	1.16
2300	2.36	4.33	1.97	0.15	19.93	1.17	1.18	1.19
2400	2.08	4.91	2.83	0.19	18.74	1.19	1.18	1.21
2500	1.81	5.63	3.82	0.74	17.55	1.19	1.19	1.24
2600	1.53	6.60	5.07	1.48	16.29	1.20	1.20	1.27
2700	1.25	7.83	6.58	2.31	15.39	1.17	1.19	1.29

¹ Total Loss = Insertion Loss+ 3dB Splitter Loss

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2 Way-90° Power Splitter/Combiner

JSPQ-1875W

Typical Performance Data

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

FREQ. (MHz)	TOTAL LOSS ¹ (dB)		AMP. UNBAL. (dB)	PHASE UNBAL. From 90° (deg.)	ISOLATION (dB) 1-2	VSWR (:1)		
	S-1	S-2				S	1	2
500	1.22	6.94	5.72	0.91	24.52	1.14	1.14	1.11
600	1.58	5.91	4.33	0.86	24.19	1.15	1.14	1.11
700	1.91	5.15	3.23	0.79	24.19	1.15	1.13	1.10
800	2.25	4.55	2.30	0.69	24.58	1.15	1.13	1.10
900	2.56	4.10	1.55	0.67	25.18	1.14	1.12	1.09
1000	2.82	3.78	0.95	0.55	25.72	1.13	1.11	1.08
1100	3.05	3.52	0.47	0.52	26.53	1.12	1.10	1.07
1200	3.23	3.34	0.10	0.49	27.26	1.11	1.09	1.07
1225	3.27	3.30	0.03	0.49	27.40	1.11	1.09	1.07
1250	3.31	3.27	0.04	0.45	27.51	1.11	1.08	1.07
1275	3.35	3.25	0.11	0.41	27.52	1.11	1.08	1.06
1300	3.38	3.22	0.16	0.41	27.63	1.11	1.08	1.06
1325	3.41	3.21	0.20	0.41	27.63	1.10	1.08	1.06
1350	3.46	3.21	0.25	0.05	27.32	1.10	1.07	1.06
1375	3.48	3.15	0.33	0.23	27.71	1.10	1.07	1.05
1400	3.50	3.14	0.36	0.25	27.79	1.10	1.07	1.05
1425	3.51	3.14	0.38	0.19	27.79	1.09	1.07	1.05
1450	3.54	3.12	0.42	0.22	27.89	1.09	1.07	1.05
1475	3.55	3.12	0.43	0.24	27.76	1.09	1.07	1.05
1500	3.55	3.11	0.44	0.28	27.75	1.09	1.07	1.05
1525	3.56	3.11	0.45	0.19	27.60	1.09	1.07	1.05
1550	3.56	3.11	0.45	0.26	27.61	1.09	1.06	1.05
1575	3.57	3.12	0.45	0.22	27.40	1.09	1.06	1.05
1600	3.56	3.13	0.43	0.21	27.22	1.09	1.06	1.05
1625	3.57	3.15	0.42	0.05	26.76	1.09	1.06	1.05
1650	3.56	3.15	0.41	0.15	26.80	1.09	1.06	1.05
1675	3.54	3.17	0.38	0.16	26.64	1.09	1.06	1.05
1700	3.53	3.19	0.34	0.06	26.15	1.09	1.06	1.05
1725	3.52	3.21	0.31	0.08	26.11	1.09	1.06	1.05
1750	3.51	3.23	0.28	0.06	25.85	1.09	1.06	1.06
1775	3.48	3.26	0.22	0.13	25.70	1.09	1.06	1.06
1800	3.46	3.29	0.16	0.10	25.47	1.09	1.06	1.06
1825	3.44	3.33	0.11	0.01	25.20	1.09	1.06	1.06
1850	3.41	3.37	0.04	0.07	24.90	1.10	1.07	1.07
1875	3.39	3.40	0.02	0.08	24.71	1.10	1.07	1.07
1900	3.35	3.46	0.11	0.14	24.39	1.10	1.07	1.08
1925	3.31	3.51	0.20	0.13	24.13	1.10	1.08	1.08
1950	3.28	3.56	0.28	0.22	23.82	1.11	1.08	1.08
1975	3.25	3.61	0.36	0.29	23.60	1.11	1.08	1.09
2000	3.21	3.68	0.47	0.45	23.25	1.11	1.09	1.09
2100	3.02	3.95	0.92	0.46	22.21	1.13	1.10	1.12
2200	2.81	4.32	1.51	0.62	21.26	1.14	1.12	1.15
2300	2.56	4.80	2.24	1.01	20.12	1.16	1.13	1.19
2400	2.30	5.40	3.11	1.36	19.31	1.16	1.15	1.21
2500	2.03	6.16	4.13	1.85	18.20	1.16	1.16	1.24
2600	1.77	7.17	5.40	2.56	17.31	1.15	1.16	1.25
2700	1.51	8.46	6.94	3.24	16.30	1.13	1.15	1.25

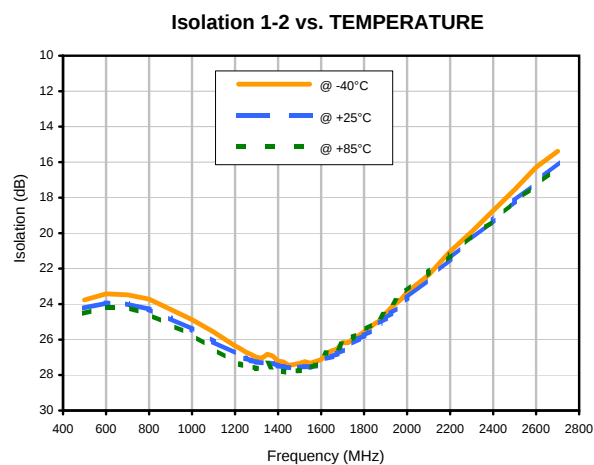
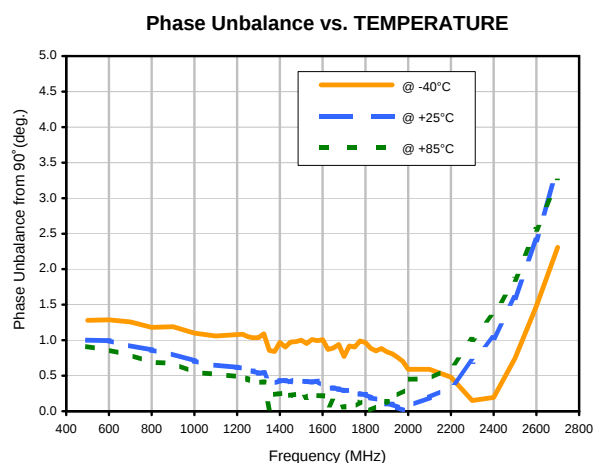
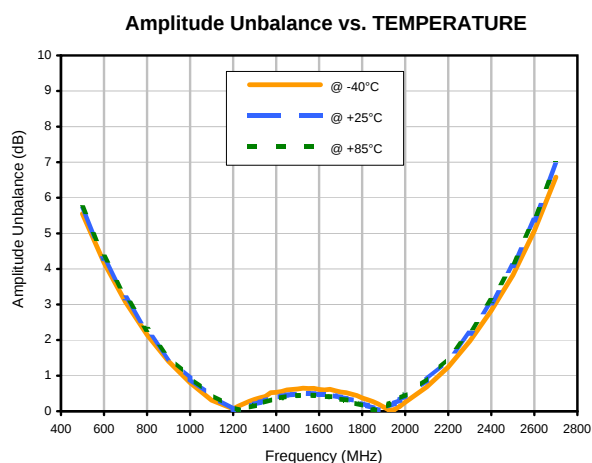
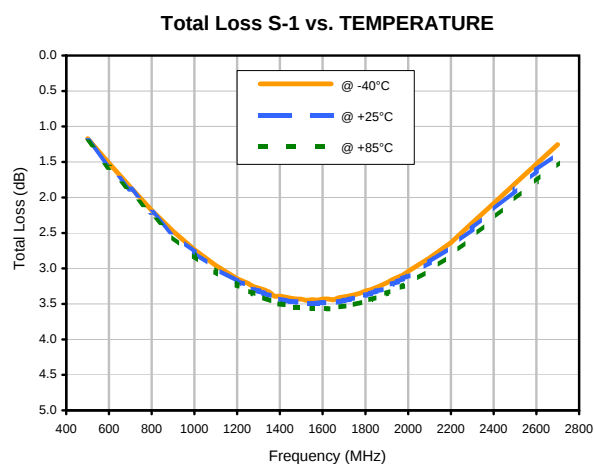
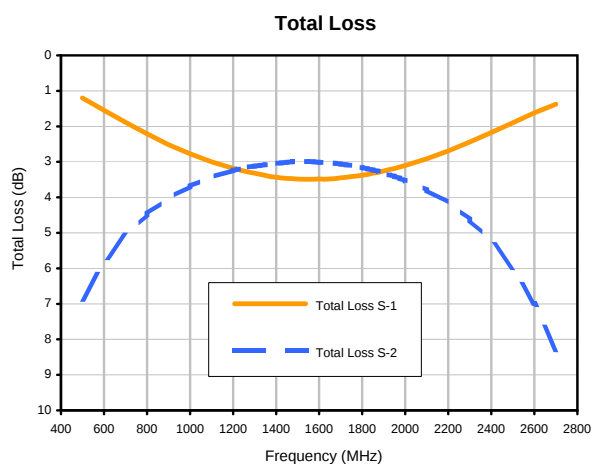
¹ Total Loss = Insertion Loss+ 3dB Splitter Loss

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2 Way-90° Power Splitter/Combiner

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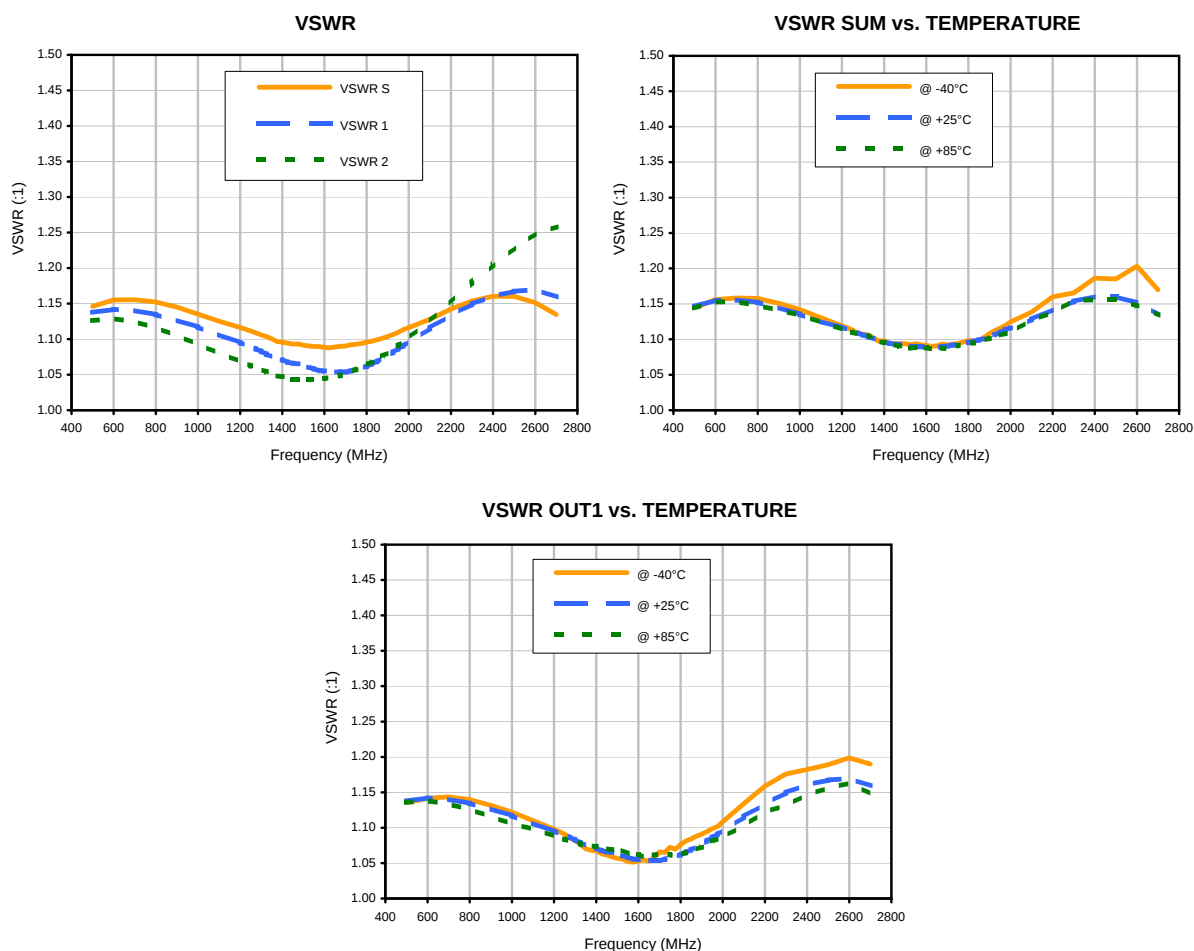
Typical Performance Curves



2 Way-90° Power Splitter/Combiner

JSPQ-1875W

Typical Performance Curves



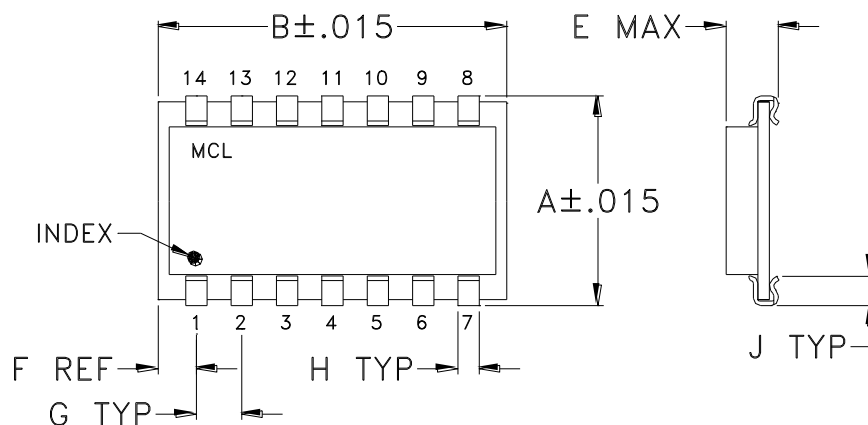
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100705
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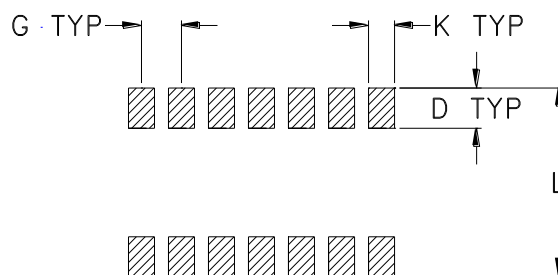
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Outline Dimensions



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
BK343	.460 (11.68)	.768 (19.51)	-- --	.100 (2.54)	.115 (2.92)	.084 (2.13)	.100 (2.54)	.047 (1.19)	.065 (1.65)	.065 (1.65)	.480 (12.19)	1.5

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

Notes:

- Base material: Printed wiring laminate.
- 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.



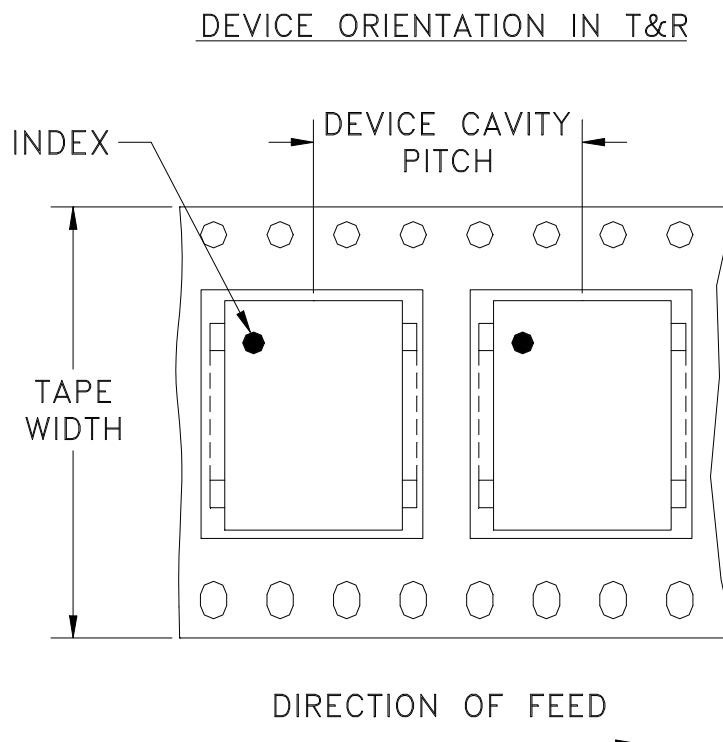
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Tape & Reel Packaging TR-F5



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



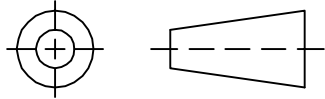
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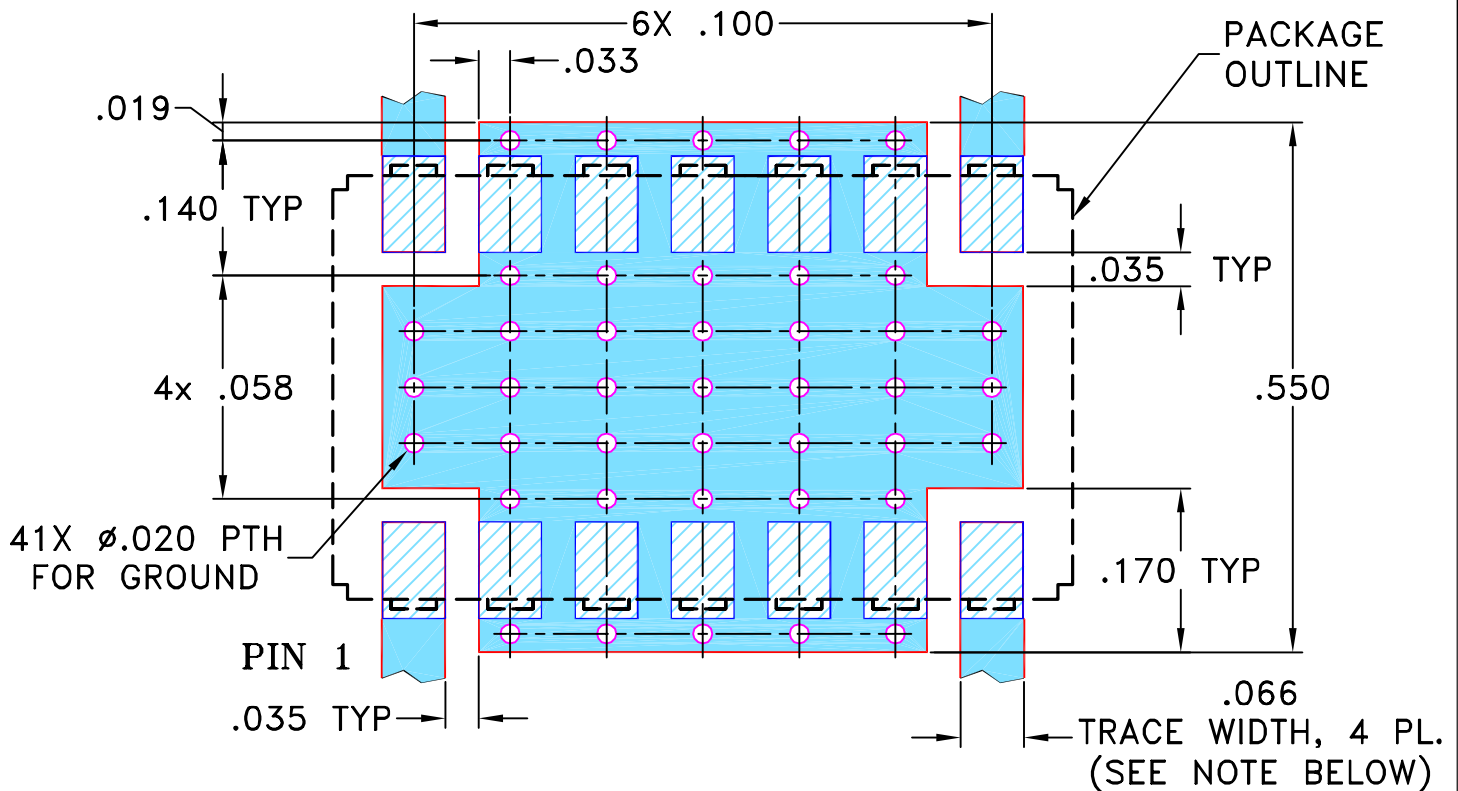
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82547	NEW RELEASE	11/15/02	MMG	HY
A	M102713	ADDED "...WITH SMOBC"	01/14/06	GF	IL

SUGGESTED MOUNTING CONFIGURATION FOR BK343 CASE STYLE, "ja" 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

MMG

11/05/02

TOLERANCES ON:
2 PL DECIMALS $\pm$
3 PL DECIMALS $\pm$.005

CHECKED

AV

11/14/02

APPROVED

HY

11/15/02

ANGLES $\pm$
FRACTIONS $\pm$

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



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, ja, BK343, JSPQ-1875W, TB-214

SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-102

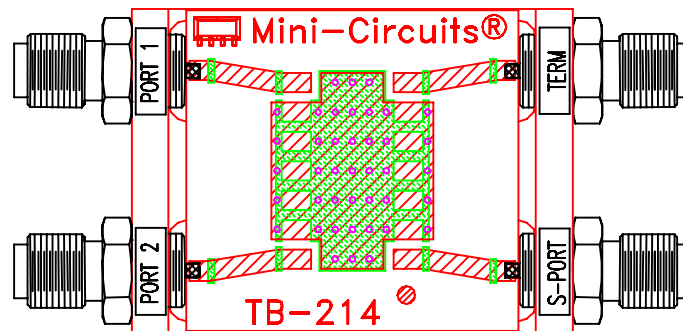
REV:
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FILE: 98PL102

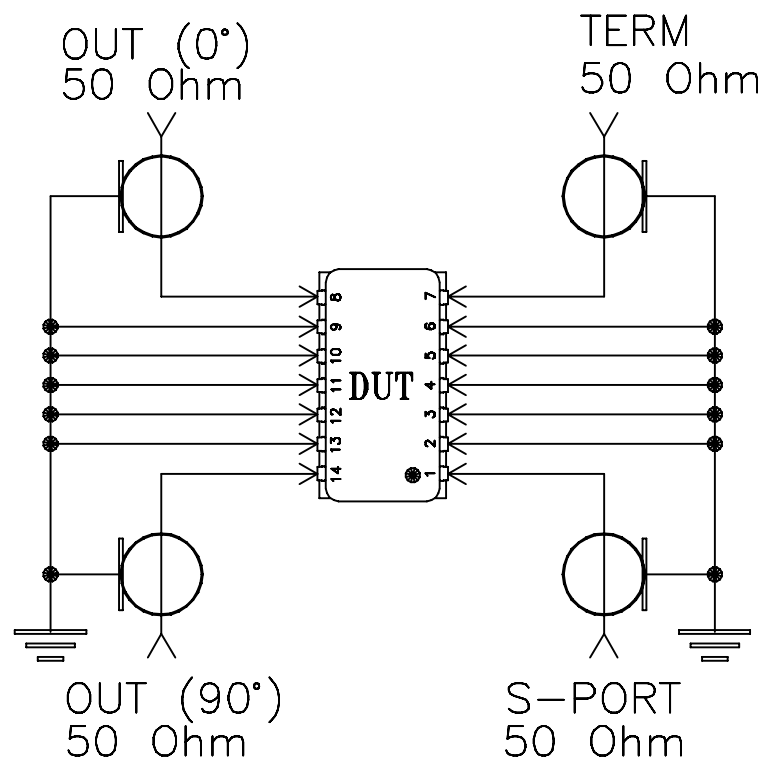
SCALE: 5:1

SHEET: 1 OF 1

Evaluation Board and Circuit



TB-214



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