

Power Splitter/Combiner

LRPS-2-1J

2 Way-0° 50Ω 5 to 500 MHz

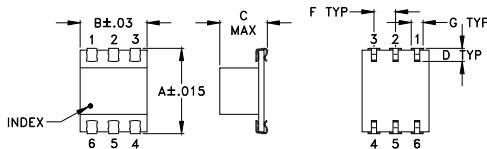
Maximum Ratings

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.	

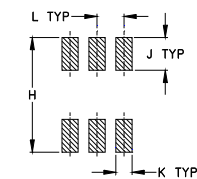
Pin Connections

SUM PORT	6
PORT 1	4
PORT 2	3
GROUND	1
NOT USED	2,5

Outline Drawing



PCB Land Pattern

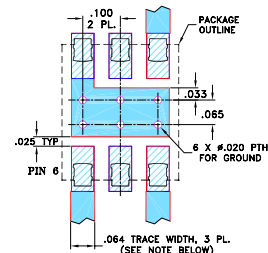


Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch/mm)

A	B	C	D	E	F	G
.390	.31	.225	.060	--	.100	.045
9.91	7.87	5.72	1.52	--	2.54	1.14
H	J	K	L	M		wt
.420	.120	.060	.100	--		grams
10.67	3.05	1.52	2.54	--		0.50

Demo Board MCL P/N: TB-94
Suggested PCB Layout (PL-058)



- 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

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

Features

- low insertion loss, 0.3 dB typ.
- high isolation, 33 dB typ.
- aqueous washable
- J-leads for strain relief and excellent solderability

Applications

- VHF/UHF
- instrumentation
- communications systems



Generic photo used for illustration purposes only

CASE STYLE: QQQ569

Electrical Specifications

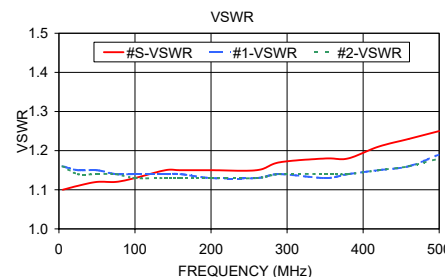
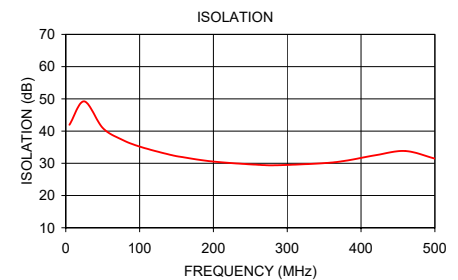
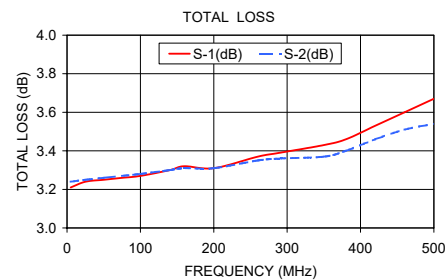
FREQ. RANGE (MHz)	ISOLATION (dB)						INSERTION LOSS (dB) ABOVE 3.0 dB						PHASE UNBALANCE (Degrees)			AMPLITUDE UNBALANCE (dB)		
	L		M		U		L		M		U		L		M		U	
f_L - f_U	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Max.	Max.	Max.	Max.	Max.	Max.
5-500	50	25	33	24	30	23	0.25	0.5	0.3	0.6	0.5	1.2	1.0	2.0	3.0	0.15	0.2	0.3

L = 5-50 MHz M = 50-250 MHz U = 250-500 MHz

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						
5.00	3.21	3.24	0.02	41.95	0.05	1.10	1.16	1.16
25.00	3.24	3.25	0.01	49.21	0.01	1.11	1.15	1.14
50.00	3.25	3.26	0.01	40.99	0.08	1.12	1.15	1.14
75.00	3.26	3.27	0.01	37.46	0.11	1.12	1.14	1.14
100.00	3.27	3.28	0.00	35.20	0.11	1.13	1.14	1.13
140.00	3.30	3.30	0.00	32.73	0.14	1.15	1.14	1.13
160.00	3.32	3.31	0.00	31.85	0.20	1.15	1.14	1.13
200.00	3.31	3.31	0.01	30.54	0.22	1.15	1.13	1.13
260.00	3.37	3.35	0.03	29.54	0.18	1.15	1.13	1.13
290.00	3.39	3.36	0.03	29.42	0.26	1.17	1.14	1.14
350.00	3.43	3.37	0.06	30.05	0.38	1.18	1.13	1.14
380.00	3.46	3.40	0.05	30.83	0.40	1.18	1.14	1.14
420.00	3.53	3.46	0.07	32.52	0.37	1.21	1.15	1.15
460.00	3.60	3.51	0.09	33.81	0.28	1.23	1.16	1.16
500.00	3.67	3.54	0.13	31.45	0.23	1.25	1.19	1.18

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



electrical schematic



2 Way-0° Power Splitter/Combiner

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Typical Performance Data

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

FREQ. (MHz)	TOTAL LOSS ¹ (dB)		AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB) 1-2	VSWR (:1)		
	S-1	S-2				S	1	2
5	3.21	3.22	0.00	0.01	44.75	1.09	1.17	1.17
10	3.24	3.23	0.01	0.02	63.34	1.09	1.16	1.17
15	3.24	3.24	0.01	0.04	49.68	1.09	1.16	1.17
20	3.24	3.23	0.01	0.01	45.53	1.09	1.16	1.17
25	3.24	3.24	0.00	0.02	43.15	1.09	1.16	1.17
30	3.24	3.24	0.00	0.01	41.65	1.09	1.15	1.17
35	3.24	3.24	0.00	0.05	40.42	1.09	1.15	1.17
40	3.25	3.25	0.00	0.05	39.49	1.10	1.15	1.16
45	3.26	3.25	0.01	0.06	38.72	1.10	1.15	1.16
50	3.26	3.26	0.00	0.05	38.00	1.10	1.15	1.16
55	3.26	3.26	0.00	0.07	37.36	1.10	1.15	1.16
60	3.27	3.26	0.00	0.09	36.74	1.10	1.15	1.16
65	3.27	3.27	0.00	0.09	36.21	1.10	1.15	1.16
70	3.27	3.27	0.00	0.10	35.71	1.11	1.15	1.16
75	3.28	3.27	0.01	0.11	35.28	1.11	1.15	1.16
100	3.29	3.29	0.00	0.15	33.64	1.11	1.15	1.16
125	3.31	3.31	0.00	0.19	32.32	1.12	1.15	1.16
150	3.33	3.32	0.01	0.17	31.13	1.12	1.14	1.15
175	3.35	3.34	0.01	0.23	30.23	1.12	1.14	1.15
200	3.37	3.35	0.01	0.27	29.63	1.13	1.14	1.15
225	3.39	3.37	0.02	0.28	29.16	1.13	1.14	1.14
250	3.40	3.38	0.02	0.33	28.76	1.13	1.14	1.14
275	3.42	3.39	0.03	0.33	28.45	1.14	1.13	1.14
300	3.44	3.40	0.03	0.34	28.27	1.14	1.13	1.13
325	3.46	3.42	0.04	0.36	28.33	1.14	1.13	1.14
350	3.48	3.44	0.04	0.36	28.55	1.15	1.13	1.14
375	3.51	3.46	0.05	0.38	28.87	1.15	1.13	1.14
400	3.53	3.48	0.05	0.36	29.37	1.16	1.13	1.14
425	3.57	3.50	0.06	0.35	29.99	1.17	1.14	1.14
450	3.60	3.53	0.07	0.29	30.73	1.18	1.15	1.15
475	3.65	3.57	0.07	0.24	31.16	1.21	1.16	1.16
500	3.70	3.62	0.08	0.19	30.91	1.24	1.18	1.18
525	3.77	3.68	0.09	0.09	29.67	1.27	1.21	1.20
550	3.85	3.76	0.09	0.01	27.66	1.32	1.24	1.22
575	3.96	3.86	0.10	0.15	25.35	1.39	1.28	1.26
600	4.10	3.99	0.11	0.31	23.05	1.47	1.33	1.30
625	4.28	4.15	0.13	0.51	20.94	1.56	1.38	1.35
650	4.50	4.36	0.14	0.71	18.98	1.69	1.45	1.40
675	4.78	4.63	0.15	1.03	17.21	1.83	1.52	1.47
700	5.14	4.97	0.17	1.36	15.59	2.01	1.60	1.54
725	5.59	5.40	0.19	1.75	14.15	2.23	1.70	1.62
730	5.69	5.50	0.19	1.81	13.88	2.27	1.72	1.64

¹Total Loss = Insertion Loss + 3dB Splitter Loss

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Typical Performance Data

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

FREQ. (MHz)	TOTAL LOSS ¹ (dB)		AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB)	VSWR (:1)		
	S-1	S-2				S	1	2
5	3.25	3.26	0.01	0.03	29.53	1.09	1.24	1.25
10	3.21	3.21	0.00	0.07	34.42	1.09	1.17	1.18
15	3.19	3.19	0.00	0.11	37.42	1.10	1.14	1.16
20	3.18	3.18	0.00	0.10	38.86	1.10	1.13	1.15
25	3.17	3.18	0.01	0.11	39.28	1.10	1.12	1.15
30	3.17	3.17	0.00	0.12	39.01	1.11	1.12	1.14
35	3.17	3.17	0.00	0.12	38.45	1.11	1.11	1.14
40	3.17	3.18	0.00	0.14	37.79	1.11	1.11	1.14
45	3.18	3.18	0.01	0.14	37.13	1.12	1.11	1.14
50	3.18	3.19	0.01	0.20	36.49	1.12	1.11	1.14
55	3.18	3.19	0.01	0.20	35.89	1.12	1.11	1.14
60	3.18	3.19	0.01	0.19	35.32	1.13	1.11	1.13
65	3.19	3.19	0.01	0.22	34.82	1.13	1.11	1.13
70	3.19	3.20	0.00	0.24	34.38	1.13	1.11	1.13
75	3.19	3.20	0.00	0.25	34.04	1.13	1.11	1.13
100	3.20	3.21	0.00	0.34	33.22	1.13	1.12	1.11
125	3.21	3.22	0.01	0.41	32.90	1.12	1.12	1.11
150	3.23	3.23	0.01	0.53	31.69	1.13	1.11	1.11
175	3.24	3.25	0.01	0.62	30.01	1.15	1.11	1.11
200	3.26	3.26	0.00	0.74	28.91	1.16	1.12	1.11
225	3.27	3.27	0.00	0.82	28.71	1.16	1.12	1.11
250	3.28	3.27	0.01	0.91	28.81	1.15	1.11	1.11
275	3.30	3.29	0.01	1.03	28.51	1.16	1.11	1.12
300	3.31	3.30	0.01	1.14	27.89	1.17	1.11	1.12
325	3.33	3.32	0.02	1.27	27.74	1.17	1.12	1.12
350	3.34	3.32	0.02	1.37	28.20	1.16	1.11	1.11
375	3.36	3.34	0.03	1.49	28.85	1.16	1.11	1.11
400	3.38	3.35	0.03	1.63	29.16	1.17	1.11	1.12
425	3.41	3.37	0.04	1.76	29.22	1.18	1.12	1.12
450	3.44	3.40	0.05	1.95	29.59	1.19	1.14	1.13
475	3.48	3.42	0.05	2.09	30.00	1.20	1.15	1.14
500	3.52	3.46	0.06	2.26	29.65	1.23	1.17	1.16
525	3.58	3.52	0.06	2.47	28.35	1.27	1.19	1.18
550	3.66	3.58	0.07	2.70	26.45	1.32	1.23	1.21
575	3.76	3.68	0.08	2.91	24.28	1.40	1.28	1.25
600	3.89	3.80	0.09	3.17	22.11	1.48	1.32	1.29
625	4.06	3.95	0.11	3.43	20.12	1.59	1.38	1.34
650	4.28	4.16	0.12	3.75	18.26	1.72	1.45	1.40
675	4.56	4.42	0.13	4.11	16.53	1.89	1.53	1.47
700	4.90	4.76	0.14	4.48	14.92	2.09	1.61	1.55
725	5.35	5.19	0.16	4.91	13.50	2.34	1.70	1.64
730	5.45	5.28	0.17	5.00	13.24	2.39	1.72	1.65

¹Total Loss = Insertion Loss + 3dB Splitter Loss

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Typical Performance Data

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

FREQ. (MHz)	TOTAL LOSS ¹ (dB)		AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB) 1-2	VSWR (:1)		
	S-1	S-2				S	1	2
5	3.30	3.30	0.01	0.00	37.27	1.07	1.22	1.22
10	3.33	3.32	0.01	0.01	37.80	1.07	1.21	1.22
15	3.33	3.33	0.01	0.00	37.07	1.07	1.21	1.22
20	3.33	3.32	0.01	0.07	36.19	1.07	1.21	1.22
25	3.33	3.33	0.01	0.10	35.34	1.07	1.21	1.21
30	3.34	3.33	0.01	0.14	34.65	1.07	1.21	1.21
35	3.34	3.33	0.01	0.22	34.04	1.08	1.21	1.21
40	3.35	3.34	0.01	0.23	33.54	1.08	1.21	1.21
45	3.35	3.34	0.01	0.29	33.17	1.08	1.21	1.21
50	3.36	3.35	0.01	0.30	32.82	1.08	1.22	1.20
55	3.36	3.35	0.01	0.36	32.58	1.07	1.21	1.20
60	3.36	3.35	0.01	0.40	32.38	1.07	1.21	1.20
65	3.36	3.36	0.01	0.47	32.25	1.07	1.21	1.20
70	3.37	3.36	0.01	0.48	32.14	1.07	1.21	1.20
75	3.37	3.37	0.01	0.50	32.09	1.07	1.21	1.20
100	3.38	3.39	0.00	0.66	31.99	1.08	1.19	1.21
125	3.40	3.41	0.01	0.81	31.08	1.10	1.19	1.22
150	3.43	3.43	0.00	0.88	29.59	1.11	1.19	1.21
175	3.44	3.44	0.00	1.06	28.65	1.10	1.19	1.20
200	3.46	3.45	0.01	1.22	28.51	1.10	1.18	1.20
225	3.48	3.47	0.01	1.35	28.58	1.10	1.17	1.19
250	3.50	3.48	0.02	1.47	28.27	1.11	1.17	1.19
275	3.52	3.50	0.02	1.58	27.76	1.12	1.17	1.18
300	3.54	3.51	0.03	1.72	27.51	1.12	1.17	1.17
325	3.57	3.54	0.04	1.89	27.81	1.12	1.16	1.17
350	3.59	3.55	0.04	2.01	28.38	1.12	1.15	1.17
375	3.63	3.58	0.05	2.11	28.91	1.14	1.16	1.17
400	3.66	3.61	0.05	2.20	29.39	1.15	1.16	1.17
425	3.70	3.64	0.06	2.32	30.12	1.16	1.17	1.18
450	3.74	3.67	0.07	2.35	31.40	1.18	1.18	1.18
475	3.80	3.72	0.08	2.40	32.89	1.21	1.19	1.19
500	3.86	3.78	0.09	2.45	33.39	1.24	1.21	1.21
525	3.94	3.85	0.09	2.43	32.04	1.28	1.23	1.23
550	4.03	3.93	0.11	2.41	29.77	1.33	1.27	1.25
575	4.15	4.03	0.12	2.38	27.13	1.39	1.30	1.28
600	4.30	4.16	0.14	2.29	24.51	1.47	1.35	1.31
625	4.49	4.33	0.16	2.16	22.14	1.56	1.40	1.36
650	4.72	4.54	0.19	2.01	20.03	1.68	1.46	1.41
675	5.01	4.80	0.21	1.78	18.18	1.81	1.53	1.46
700	5.36	5.13	0.23	1.54	16.50	1.97	1.61	1.53
725	5.80	5.54	0.27	1.19	15.01	2.17	1.70	1.60
730	5.90	5.63	0.27	1.12	14.73	2.21	1.72	1.62

¹Total Loss = Insertion Loss + 3dB Splitter Loss

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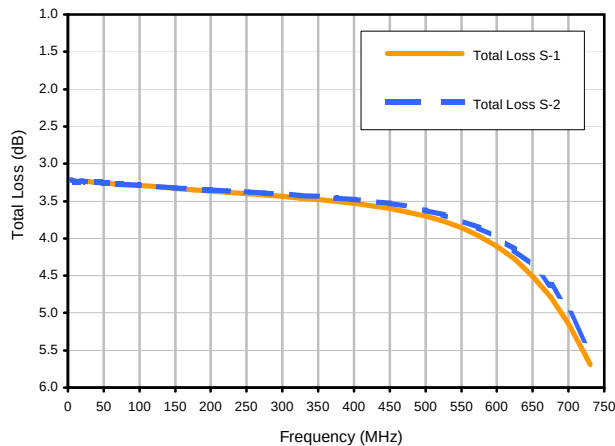


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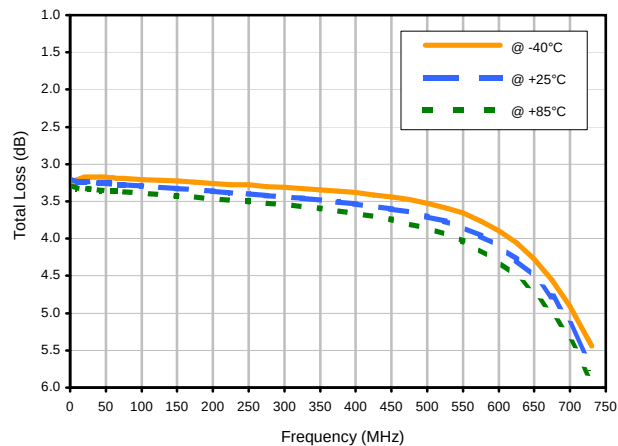
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Typical Performance Curves

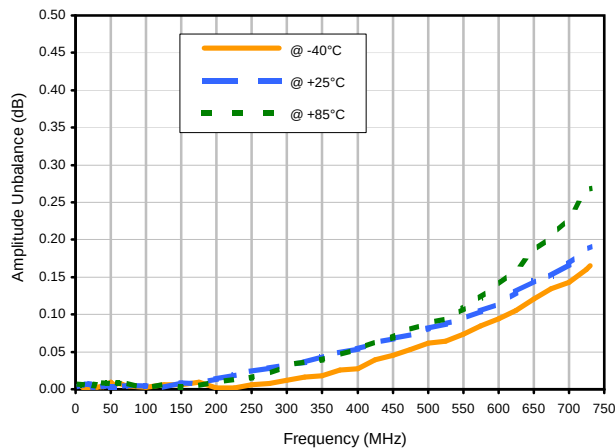
Total Loss



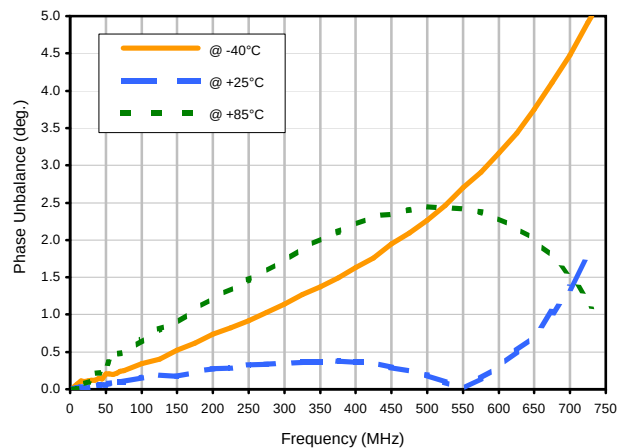
Total Loss S-1 vs. TEMPERATURE



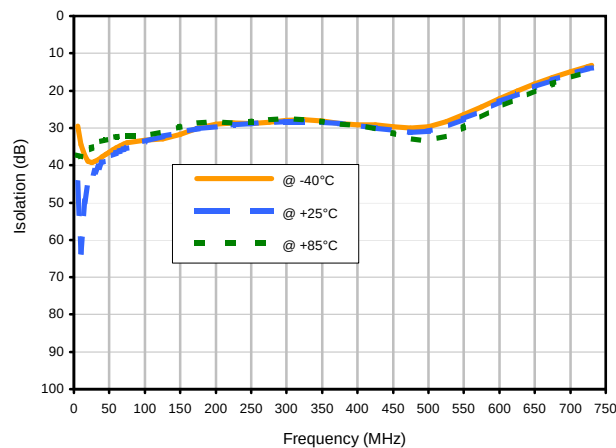
Amplitude Unbalance vs. TEMPERATURE



Phase Unbalance vs. TEMPERATURE



Isolation 1-2 vs. TEMPERATURE



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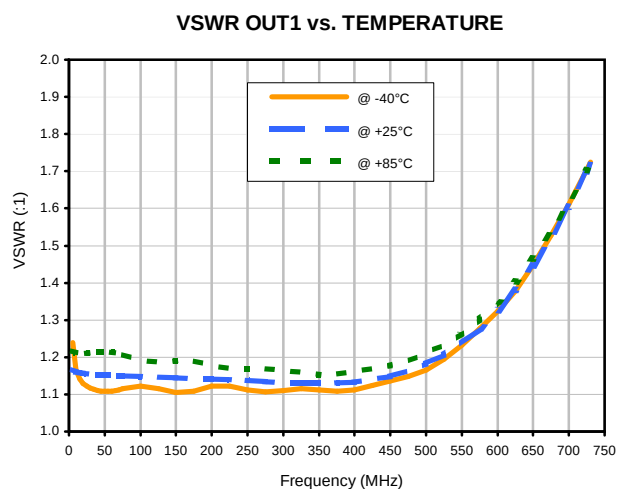
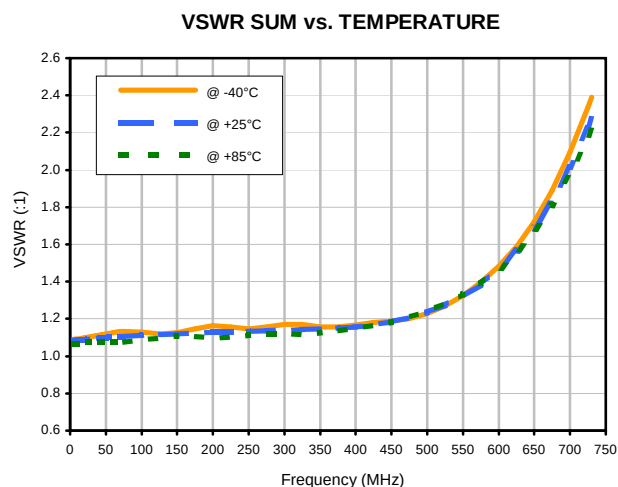
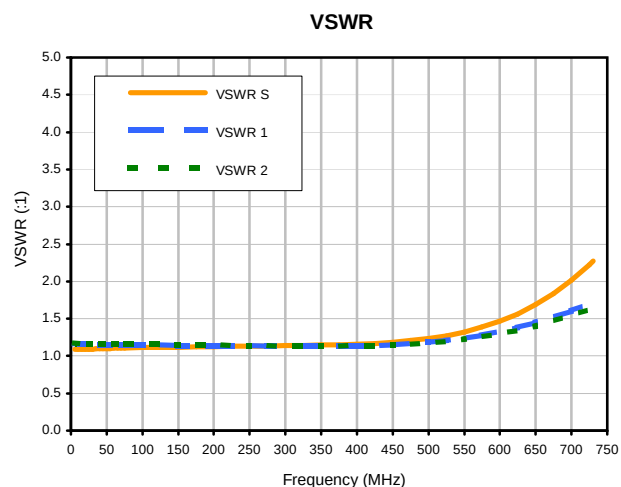


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Typical Performance Curves



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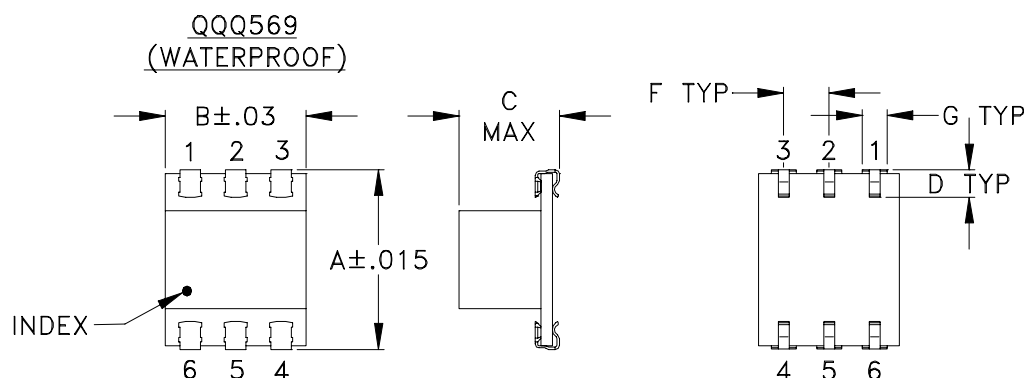
REV. X2
LRPS-2-1J
100623
Page 2 of 2

Case Style

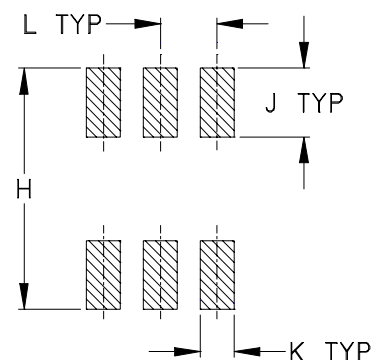
QQQ

QQQ569 (waterproof)

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	M	WT, GRAM
QQQ569	.390 (9.90)	.31 (7.87)	.225 (5.72)	.060 (1.52)	-	.100 (2.54)	.045 (1.14)	.420 (10.67)	.120 (3.05)	.060 (1.52)	.100 (2.54)	-	.50

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

Notes:

- Case material: Ceramic.
- Termination finish:
 - For RoHS Case Styles: Tin plate over Nickel plate.
 - For RoHS-5 Case Styles: Tin-Lead plate.



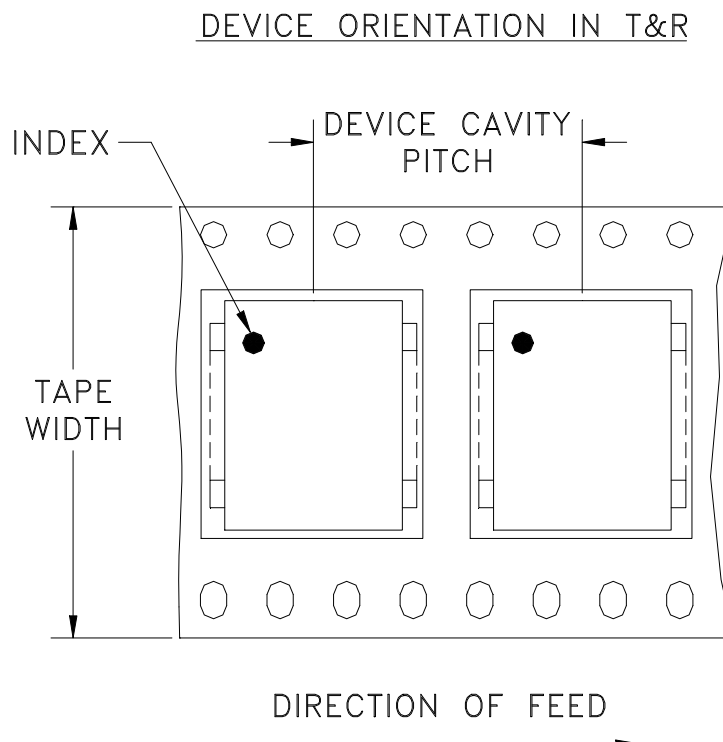
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Tape & Reel Packaging TR-F5



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



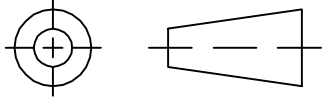
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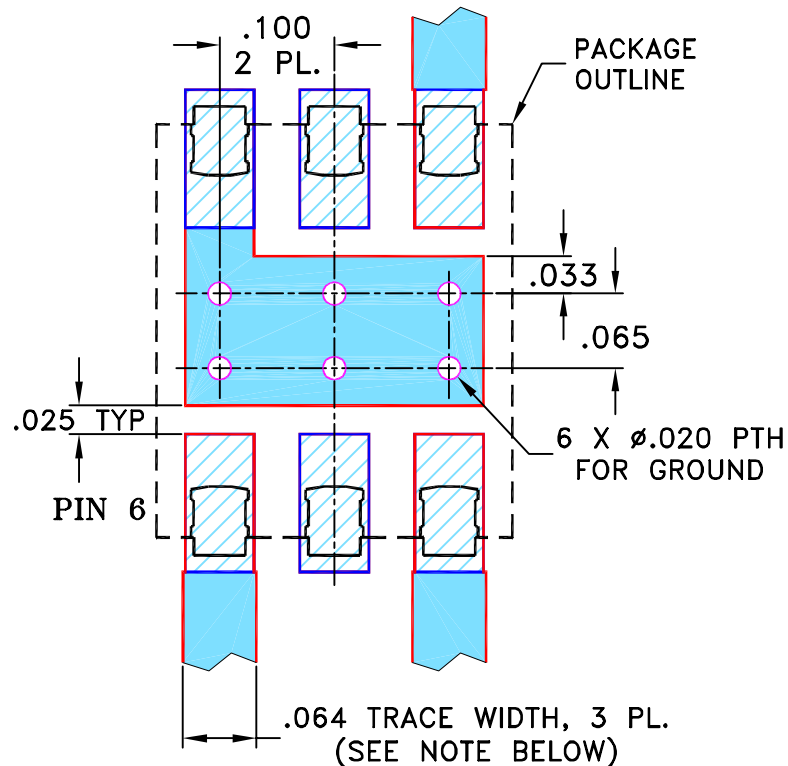
THIRD ANGLE PROJECTION



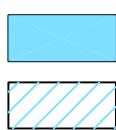
REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82272	NEW RELEASE	08/08/02	GF	DJ
A	M102713	ADDED NOTE 2 & "...WITH SMOBC"	01/18/06	MMG	IL

SUGGESTED MOUNTING CONFIGURATION FOR QQQ569 CASE STYLE, "am" PIN CONNECTION



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS $.030'' \pm .002''$; 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

TOLERANCES ON:

2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm .005$ ANGLES $\pm$ FRACTIONS $\pm$

DRAWN

GF

07/18/02

CHECKED

HY

08/08/02

APPROVED

DJ

08/08/02



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13 Neptune Avenue
Brooklyn NY 11235

PL, am, QQQ569, LRPS-J, TB-94

SIZE
A

CODE IDENT
15542

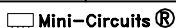
DRAWING NO:
98-PL-058

REV:
A

FILE: 98PL058

SCALE: 6:1

SHEET: 1 OF 1

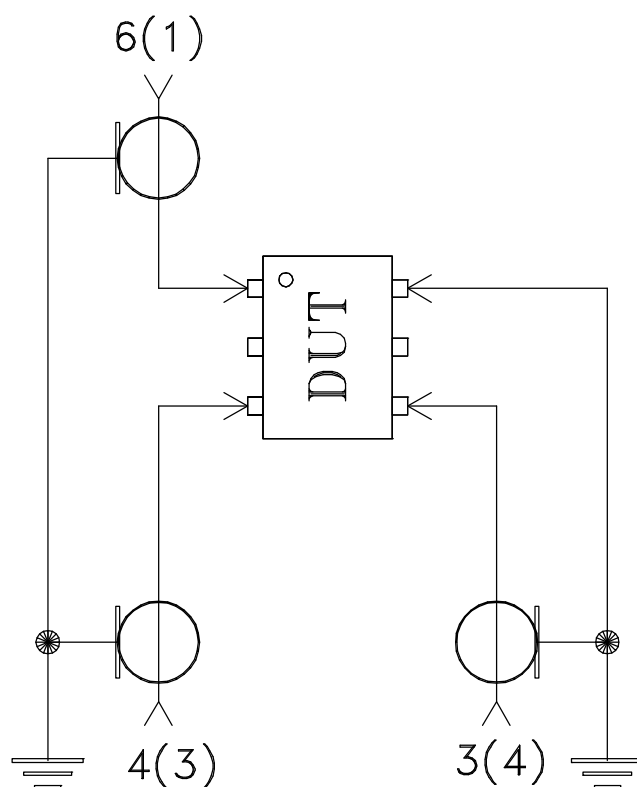
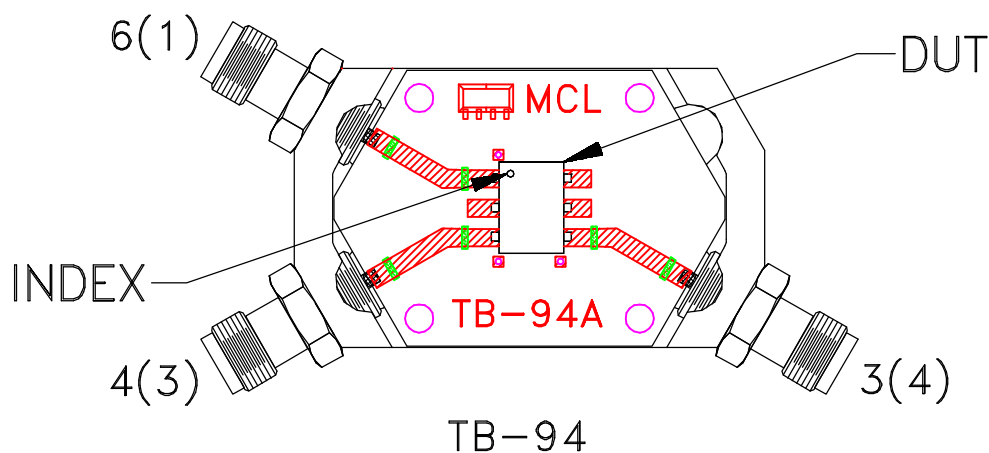


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ASHEETA1.DWG REV:A DATE:01/12/95

Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.
3. Port Identifications are given for Case Styles QQQ130/569 and CD542 (in parenthesis).

 **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