

Surface Mount Power Splitter/Combiner

3 Way-0° 50Ω 500 to 850 MHz

LRPS-3-850J+
LRPS-3-850J



Generic photo used for illustration purposes only

CASE STYLE: QQQ569

+RoHS Compliant

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

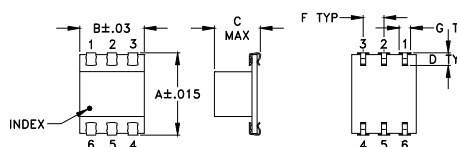
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Internal Dissipation	0.375W max.
Permanent damage may occur if any of these limits are exceeded.	

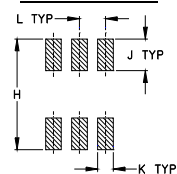
Pin Connections

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

Outline Drawing



PCB Land Pattern

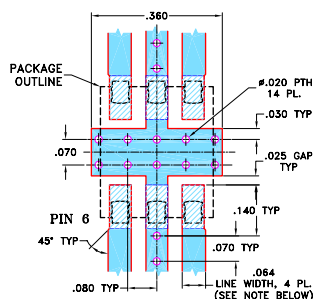


Suggested Layout,
Tolerance to be within ±.002

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-226 Suggested PCB Layout (PL-140)



- NOTE: 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-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

- low insertion loss, 0.7 dB typ.
- good isolation, 23 dB typ.
- aqueous washable
- J-leads for strain relief & excellent solderability

Applications

- UHF
- communication systems

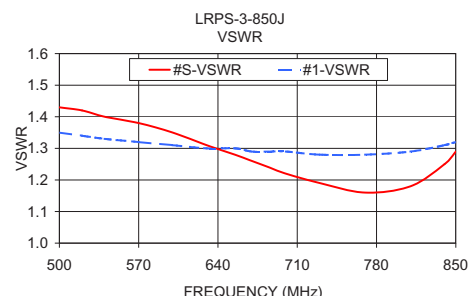
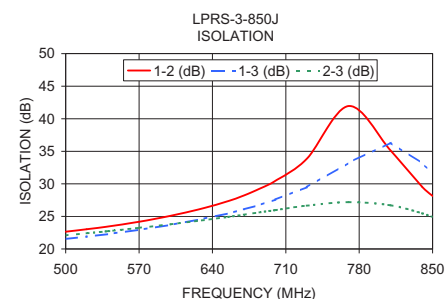
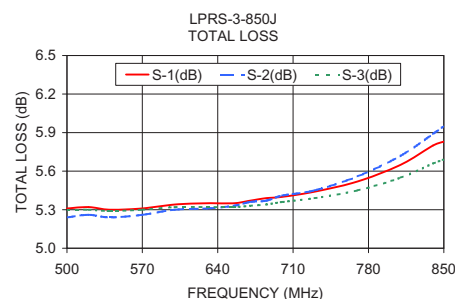
Electrical Specifications

FREQ. RANGE (MHz)	ISOLATION (dB)		INSERTION LOSS (dB) ABOVE 4.8 dB		PHASE UNBALANCE (Degrees)	AMPLITUDE UNBALANCE (dB)
f_L - f_U	Typ.	Min.	Typ.	Max.	Max.	Max.
500-850	23	16	0.7	1.6	8	0.9

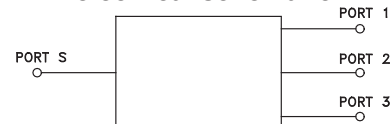
Typical Performance Data

Freq. (MHz)	Total Loss ¹ (dB)			Amp. Unbal. (dB)	Isolation (dB)			Phase Unbal. (deg.)	VSWR			
	S-1	S-2	S-3		1-2	1-3	2-3		S	1	2	3
500.00	5.31	5.24	5.30	0.08	22.65	21.54	22.09	0.35	1.43	1.35	1.30	1.35
520.00	5.32	5.26	5.30	0.07	23.03	21.90	22.41	0.29	1.42	1.34	1.29	1.34
540.00	5.30	5.24	5.29	0.06	23.44	22.28	22.73	0.40	1.40	1.33	1.28	1.32
570.00	5.31	5.26	5.30	0.05	24.18	22.94	23.24	0.45	1.38	1.32	1.27	1.31
600.00	5.34	5.30	5.32	0.05	25.09	23.70	23.79	0.54	1.35	1.31	1.26	1.29
630.00	5.35	5.31	5.32	0.03	26.20	24.60	24.38	0.69	1.31	1.30	1.25	1.27
655.00	5.35	5.33	5.32	0.03	27.35	25.46	24.93	0.79	1.28	1.30	1.24	1.26
670.00	5.37	5.36	5.33	0.04	28.21	26.08	25.26	0.88	1.26	1.29	1.24	1.25
685.00	5.39	5.37	5.34	0.05	29.25	26.76	25.62	0.99	1.24	1.29	1.23	1.25
700.00	5.40	5.41	5.36	0.05	30.46	27.58	25.97	1.10	1.22	1.29	1.23	1.24
730.00	5.44	5.45	5.39	0.06	33.85	29.49	26.65	1.39	1.19	1.28	1.23	1.23
770.00	5.52	5.56	5.45	0.11	41.96	33.24	27.20	1.76	1.16	1.28	1.23	1.21
810.00	5.65	5.72	5.55	0.17	35.11	36.31	26.71	2.31	1.18	1.29	1.24	1.20
840.00	5.80	5.89	5.66	0.23	29.55	33.17	25.47	2.69	1.25	1.31	1.26	1.20
850.00	5.83	5.95	5.69	0.25	28.14	31.70	24.92	2.83	1.29	1.32	1.27	1.20

1. Total Loss = Insertion Loss + 4.8dB splitter loss.



electrical schematic



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3 Way-0° Power Splitter/Combiner

LRPS-3-850J

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)			VSWR (:1)			
	S-1	S-2	S-3			1-2	1-3	2-3	S	1	2	3
40	6.00	6.12	6.10	0.12	0.51	12.82	11.47	11.21	2.88	4.91	5.05	5.24
50	5.68	5.80	5.80	0.13	0.58	13.11	11.53	11.24	2.45	4.07	4.19	4.42
75	5.34	5.47	5.49	0.15	0.72	14.29	12.27	11.93	1.99	2.98	3.06	3.30
100	5.22	5.35	5.39	0.17	0.78	15.49	13.21	12.89	1.82	2.44	2.50	2.71
125	5.16	5.29	5.35	0.19	0.82	16.51	14.15	13.89	1.72	2.12	2.16	2.34
150	5.13	5.26	5.34	0.20	0.77	17.33	15.00	14.84	1.67	1.92	1.95	2.10
175	5.12	5.25	5.32	0.20	0.78	18.00	15.77	15.70	1.63	1.78	1.80	1.93
200	5.11	5.24	5.33	0.21	0.78	18.55	16.47	16.51	1.61	1.68	1.69	1.80
225	5.11	5.24	5.33	0.21	0.79	18.99	17.07	17.21	1.59	1.61	1.61	1.70
250	5.11	5.24	5.33	0.21	0.77	19.40	17.63	17.84	1.57	1.55	1.54	1.63
275	5.12	5.24	5.33	0.21	0.76	19.73	18.12	18.41	1.56	1.50	1.49	1.57
300	5.12	5.24	5.33	0.21	0.77	20.05	18.59	18.92	1.55	1.46	1.45	1.52
325	5.13	5.25	5.34	0.20	0.76	20.34	19.00	19.35	1.54	1.43	1.41	1.48
350	5.14	5.25	5.34	0.20	0.72	20.63	19.40	19.75	1.53	1.41	1.38	1.44
375	5.15	5.25	5.34	0.20	0.70	20.89	19.76	20.08	1.52	1.38	1.35	1.41
400	5.15	5.26	5.34	0.19	0.68	21.17	20.14	20.40	1.50	1.36	1.33	1.38
425	5.16	5.27	5.35	0.18	0.63	21.44	20.48	20.65	1.50	1.35	1.31	1.36
450	5.17	5.27	5.35	0.18	0.65	21.75	20.82	20.89	1.48	1.33	1.29	1.34
475	5.18	5.27	5.35	0.17	0.62	22.07	21.18	21.09	1.47	1.32	1.27	1.32
500	5.19	5.28	5.35	0.16	0.62	22.40	21.52	21.29	1.45	1.31	1.26	1.30
525	5.20	5.29	5.36	0.15	0.60	22.82	21.95	21.50	1.44	1.29	1.24	1.28
550	5.21	5.30	5.35	0.14	0.57	23.21	22.32	21.65	1.42	1.28	1.23	1.27
575	5.23	5.30	5.36	0.13	0.55	23.73	22.79	21.85	1.40	1.27	1.22	1.25
600	5.24	5.31	5.36	0.11	0.50	24.23	23.21	21.96	1.38	1.26	1.20	1.24
625	5.25	5.32	5.36	0.10	0.58	24.91	23.77	22.18	1.36	1.25	1.19	1.23
650	5.27	5.34	5.36	0.09	0.70	25.64	24.33	22.31	1.34	1.24	1.18	1.22
675	5.29	5.35	5.36	0.07	0.85	26.57	25.01	22.55	1.31	1.23	1.17	1.21
700	5.30	5.36	5.36	0.06	1.02	27.67	25.81	22.73	1.28	1.22	1.16	1.19
725	5.33	5.39	5.37	0.06	1.17	29.09	26.71	22.97	1.25	1.21	1.15	1.18
750	5.35	5.41	5.38	0.06	1.34	31.05	27.89	23.16	1.21	1.20	1.14	1.17
775	5.38	5.45	5.39	0.07	1.62	33.80	29.17	23.40	1.18	1.19	1.13	1.16
800	5.42	5.48	5.40	0.08	2.03	38.74	31.07	23.58	1.15	1.18	1.13	1.15
825	5.47	5.54	5.43	0.11	2.46	52.16	33.06	23.70	1.12	1.18	1.13	1.14
850	5.52	5.60	5.46	0.14	3.00	41.16	35.39	23.72	1.12	1.17	1.13	1.12
875	5.59	5.68	5.51	0.17	3.53	33.90	35.93	23.51	1.14	1.17	1.13	1.11
900	5.69	5.79	5.57	0.22	4.23	29.44	33.33	23.14	1.19	1.18	1.14	1.10
925	5.81	5.92	5.66	0.26	5.03	26.36	30.25	22.44	1.27	1.19	1.16	1.09
950	5.97	6.09	5.78	0.31	5.90	23.82	27.29	21.57	1.37	1.21	1.18	1.08
975	6.17	6.32	5.94	0.38	6.92	21.71	24.87	20.46	1.50	1.24	1.20	1.07
1000	6.43	6.61	6.15	0.46	8.17	19.88	22.76	19.31	1.66	1.28	1.24	1.08

¹Total Loss = Insertion Loss + 4.8dB Splitter Loss

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3 Way-0° Power Splitter/Combiner

LRPS-3-850J

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-3			1-2	1-3	2-3	S	1	2	3
40	5.99	6.08	6.07	0.08	0.83	12.74	11.41	11.10	2.85	4.93	5.01	5.20
50	5.67	5.77	5.77	0.10	1.07	13.03	11.47	11.15	2.44	4.08	4.16	4.39
75	5.31	5.45	5.49	0.18	1.31	14.24	12.24	11.92	2.00	2.98	3.09	3.34
100	5.17	5.34	5.38	0.21	1.17	15.48	13.19	12.92	1.81	2.44	2.54	2.75
125	5.12	5.28	5.32	0.20	1.20	16.56	14.16	13.92	1.71	2.13	2.19	2.37
150	5.11	5.24	5.32	0.20	1.41	17.43	15.05	14.88	1.67	1.94	1.97	2.12
175	5.11	5.23	5.32	0.21	1.54	18.14	15.87	15.79	1.65	1.81	1.83	1.97
200	5.10	5.23	5.32	0.22	1.58	18.68	16.57	16.59	1.63	1.72	1.73	1.85
225	5.10	5.23	5.31	0.20	1.66	19.10	17.14	17.26	1.61	1.65	1.64	1.74
250	5.11	5.22	5.31	0.20	1.89	19.44	17.66	17.84	1.60	1.59	1.57	1.66
275	5.12	5.22	5.32	0.21	2.04	19.73	18.11	18.36	1.59	1.54	1.51	1.61
300	5.11	5.22	5.32	0.21	2.13	20.01	18.54	18.85	1.58	1.50	1.48	1.56
325	5.11	5.22	5.31	0.20	2.21	20.27	18.92	19.26	1.56	1.46	1.45	1.51
350	5.11	5.22	5.30	0.19	2.33	20.55	19.30	19.64	1.55	1.43	1.41	1.46
375	5.12	5.22	5.31	0.19	2.45	20.81	19.66	19.98	1.54	1.40	1.38	1.43
400	5.12	5.22	5.31	0.18	2.54	21.11	20.04	20.31	1.52	1.38	1.36	1.41
425	5.13	5.23	5.31	0.18	2.59	21.36	20.36	20.55	1.51	1.37	1.34	1.38
450	5.13	5.22	5.30	0.17	2.64	21.65	20.68	20.78	1.50	1.35	1.32	1.35
475	5.14	5.23	5.30	0.16	2.72	21.93	21.00	20.95	1.49	1.34	1.29	1.33
500	5.15	5.23	5.30	0.15	2.79	22.23	21.31	21.12	1.47	1.32	1.27	1.31
525	5.16	5.24	5.30	0.14	2.86	22.62	21.69	21.32	1.45	1.31	1.26	1.30
550	5.17	5.24	5.29	0.13	2.92	23.01	22.04	21.52	1.43	1.29	1.24	1.28
575	5.17	5.24	5.29	0.12	2.92	23.52	22.50	21.76	1.41	1.28	1.22	1.26
600	5.18	5.24	5.29	0.10	2.90	24.03	22.91	21.94	1.39	1.26	1.21	1.25
625	5.19	5.25	5.28	0.09	2.89	24.76	23.48	22.22	1.36	1.25	1.20	1.23
650	5.20	5.26	5.28	0.08	2.87	25.52	24.05	22.41	1.33	1.24	1.19	1.22
675	5.21	5.27	5.27	0.06	2.78	26.50	24.75	22.70	1.30	1.22	1.17	1.21
700	5.23	5.28	5.27	0.05	2.65	27.62	25.52	22.90	1.27	1.22	1.16	1.19
725	5.25	5.30	5.28	0.05	2.57	29.09	26.40	23.17	1.24	1.21	1.16	1.18
750	5.27	5.33	5.28	0.05	2.39	31.07	27.51	23.41	1.21	1.20	1.15	1.17
775	5.30	5.36	5.30	0.06	2.18	33.84	28.71	23.68	1.18	1.19	1.14	1.16
800	5.33	5.39	5.31	0.08	1.98	38.82	30.39	23.91	1.14	1.19	1.13	1.15
825	5.37	5.43	5.32	0.11	1.83	50.75	32.04	24.06	1.11	1.18	1.13	1.13
850	5.42	5.49	5.35	0.14	1.68	40.47	33.78	24.12	1.11	1.18	1.13	1.12
875	5.49	5.57	5.39	0.18	1.50	33.57	34.12	23.91	1.13	1.18	1.14	1.11
900	5.58	5.67	5.45	0.22	1.22	29.17	32.14	23.48	1.19	1.18	1.15	1.10
925	5.70	5.80	5.53	0.27	1.26	26.15	29.57	22.71	1.26	1.20	1.16	1.09
950	5.85	5.96	5.65	0.32	1.67	23.64	26.86	21.76	1.37	1.22	1.18	1.08
975	6.04	6.18	5.80	0.38	2.13	21.57	24.61	20.59	1.49	1.25	1.21	1.08
1000	6.28	6.46	6.00	0.46	3.05	19.76	22.57	19.39	1.65	1.29	1.25	1.08

¹Total Loss = Insertion Loss + 4.8dB Splitter Loss

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3 Way-0° Power Splitter/Combiner

LRPS-3-850J

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)			VSWR (:1)			
	S-1	S-2	S-3			1-2	1-3	2-3	S	1	2	3
40	5.98	6.17	6.16	0.18	0.35	12.91	11.55	11.34	2.90	4.91	5.12	5.31
50	5.67	5.84	5.84	0.17	0.46	13.19	11.61	11.36	2.47	4.07	4.24	4.46
75	5.36	5.47	5.49	0.14	0.63	14.34	12.31	11.96	1.99	2.99	3.05	3.28
100	5.25	5.34	5.39	0.14	0.70	15.48	13.22	12.85	1.82	2.45	2.45	2.67
125	5.19	5.30	5.37	0.19	0.63	16.46	14.14	13.86	1.73	2.13	2.14	2.33
150	5.14	5.27	5.36	0.22	0.52	17.21	14.95	14.78	1.67	1.91	1.94	2.10
175	5.11	5.25	5.33	0.21	0.70	17.84	15.68	15.61	1.62	1.76	1.78	1.90
200	5.11	5.24	5.33	0.21	0.84	18.37	16.35	16.38	1.58	1.65	1.65	1.76
225	5.11	5.24	5.34	0.23	0.92	18.84	16.97	17.10	1.57	1.57	1.57	1.67
250	5.10	5.24	5.34	0.24	1.01	19.28	17.55	17.78	1.55	1.51	1.51	1.61
275	5.11	5.24	5.35	0.24	1.17	19.67	18.08	18.39	1.53	1.46	1.47	1.54
300	5.11	5.24	5.34	0.22	1.33	20.04	18.58	18.93	1.51	1.43	1.42	1.48
325	5.13	5.25	5.35	0.21	1.48	20.37	19.03	19.40	1.50	1.40	1.38	1.44
350	5.14	5.25	5.35	0.21	1.58	20.69	19.47	19.83	1.50	1.38	1.35	1.41
375	5.15	5.26	5.36	0.21	1.71	20.97	19.85	20.18	1.49	1.36	1.33	1.39
400	5.16	5.27	5.36	0.20	1.84	21.28	20.25	20.52	1.48	1.34	1.31	1.36
425	5.18	5.28	5.37	0.19	2.03	21.55	20.59	20.76	1.47	1.33	1.29	1.33
450	5.19	5.28	5.37	0.18	2.17	21.87	20.96	21.02	1.46	1.31	1.27	1.31
475	5.20	5.29	5.38	0.18	2.36	22.19	21.33	21.22	1.45	1.30	1.25	1.30
500	5.21	5.30	5.38	0.17	2.50	22.54	21.70	21.42	1.43	1.28	1.24	1.28
525	5.23	5.31	5.39	0.16	2.68	22.98	22.14	21.62	1.42	1.27	1.23	1.26
550	5.24	5.32	5.39	0.15	2.87	23.41	22.55	21.78	1.40	1.26	1.21	1.25
575	5.26	5.33	5.40	0.14	3.11	23.95	23.07	21.98	1.38	1.26	1.20	1.24
600	5.28	5.35	5.40	0.12	3.30	24.44	23.50	22.07	1.37	1.25	1.19	1.23
625	5.30	5.36	5.40	0.10	3.53	25.15	24.09	22.26	1.35	1.24	1.18	1.21
650	5.32	5.38	5.41	0.09	3.74	25.87	24.68	22.35	1.33	1.23	1.17	1.21
675	5.33	5.39	5.41	0.08	4.00	26.80	25.40	22.54	1.30	1.22	1.16	1.19
700	5.36	5.41	5.42	0.06	4.36	27.87	26.21	22.65	1.28	1.21	1.16	1.19
725	5.39	5.44	5.43	0.05	4.72	29.31	27.17	22.83	1.25	1.20	1.15	1.18
750	5.42	5.47	5.44	0.05	5.14	31.20	28.41	22.96	1.22	1.20	1.14	1.17
775	5.45	5.51	5.46	0.06	5.61	33.90	29.85	23.13	1.19	1.19	1.13	1.16
800	5.49	5.55	5.48	0.07	6.14	38.38	31.97	23.25	1.16	1.18	1.13	1.15
825	5.54	5.60	5.51	0.10	6.76	45.34	34.50	23.29	1.14	1.17	1.13	1.14
850	5.60	5.67	5.54	0.13	7.39	40.05	38.02	23.26	1.13	1.17	1.12	1.13
875	5.68	5.76	5.59	0.17	8.12	33.84	39.23	23.03	1.15	1.17	1.13	1.12
900	5.78	5.87	5.66	0.21	8.96	29.56	35.13	22.68	1.20	1.17	1.13	1.10
925	5.91	6.01	5.75	0.26	9.88	26.53	31.24	22.05	1.27	1.18	1.15	1.09
950	6.08	6.18	5.88	0.31	10.93	24.00	27.91	21.27	1.36	1.20	1.17	1.08
975	6.28	6.41	6.04	0.37	12.10	21.90	25.33	20.26	1.49	1.23	1.20	1.08
1000	6.55	6.71	6.25	0.46	13.52	20.06	23.13	19.19	1.64	1.26	1.23	1.08

¹Total Loss = Insertion Loss + 4.8dB Splitter Loss

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100624
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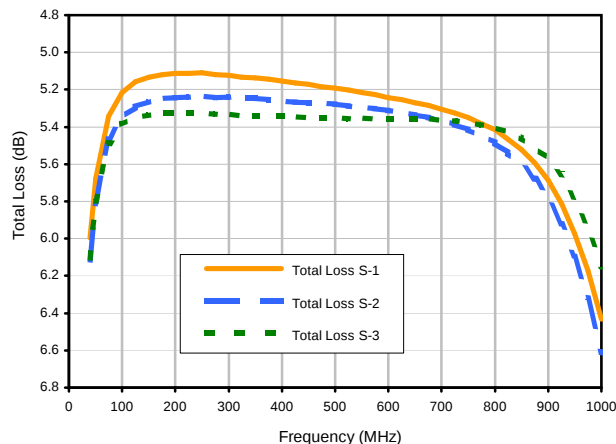


3 Way-0° Power Splitter/Combiner

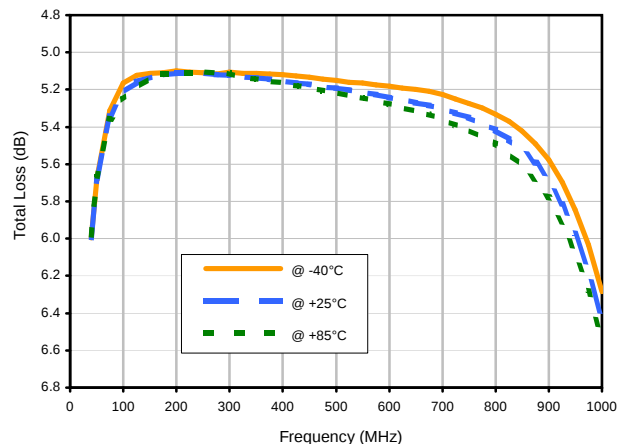
LRPS-3-850J

Typical Performance Curves

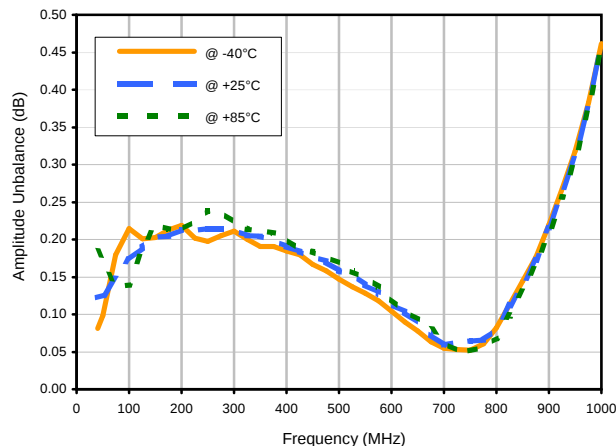
Total Loss



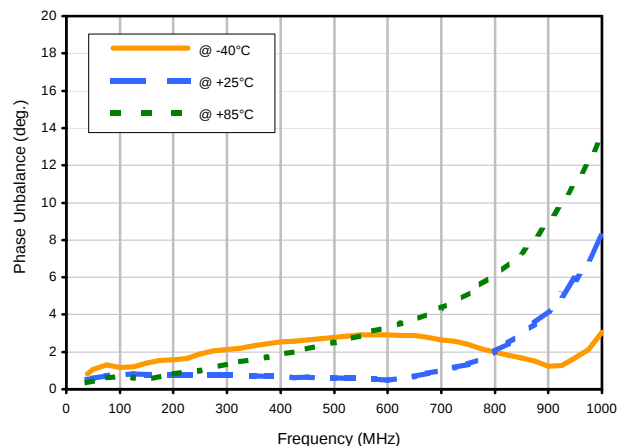
Total Loss S-1 vs. TEMPERATURE



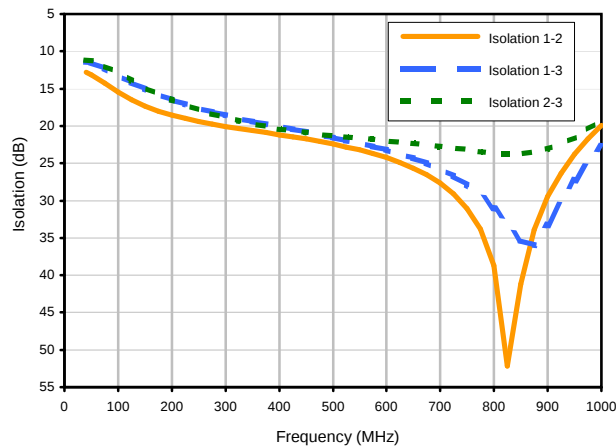
Amplitude Unbalance vs. TEMPERATURE



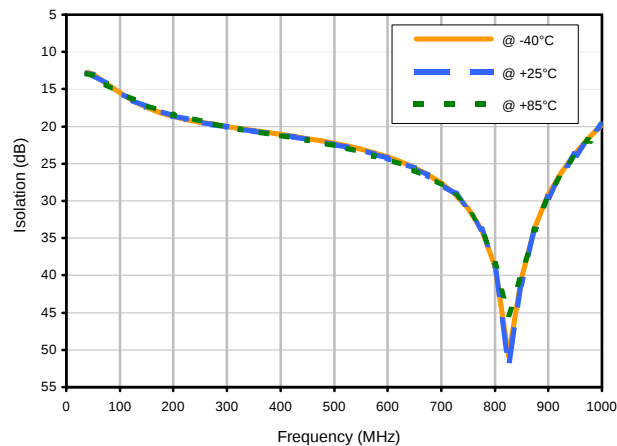
Phase Unbalance vs. TEMPERATURE



Isolation



Isolation 1-2 vs. TEMPERATURE



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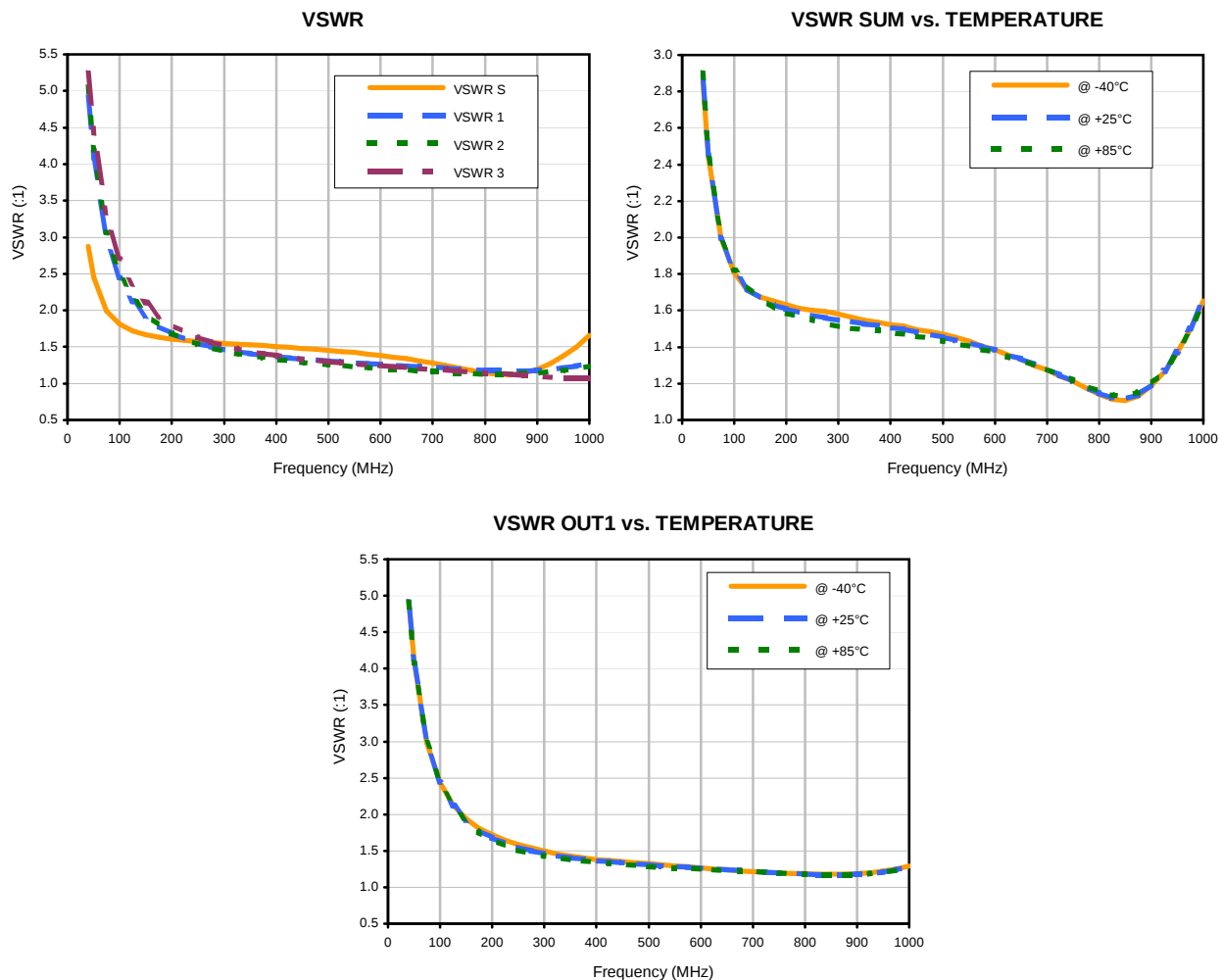
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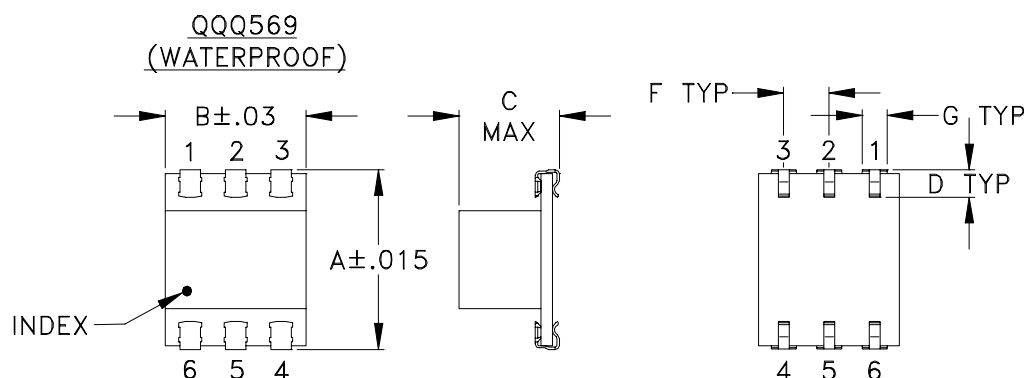


Case Style

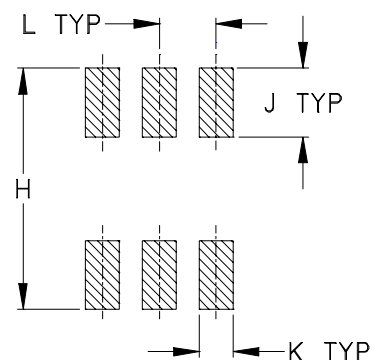
QQQ

QQQ569 (waterproof)

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.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. ± .01; 3 Pl. ± .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 Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	16	13	500

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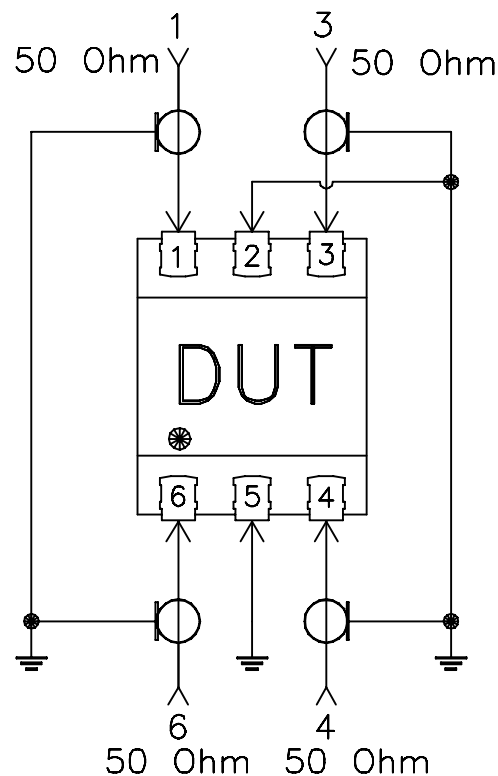
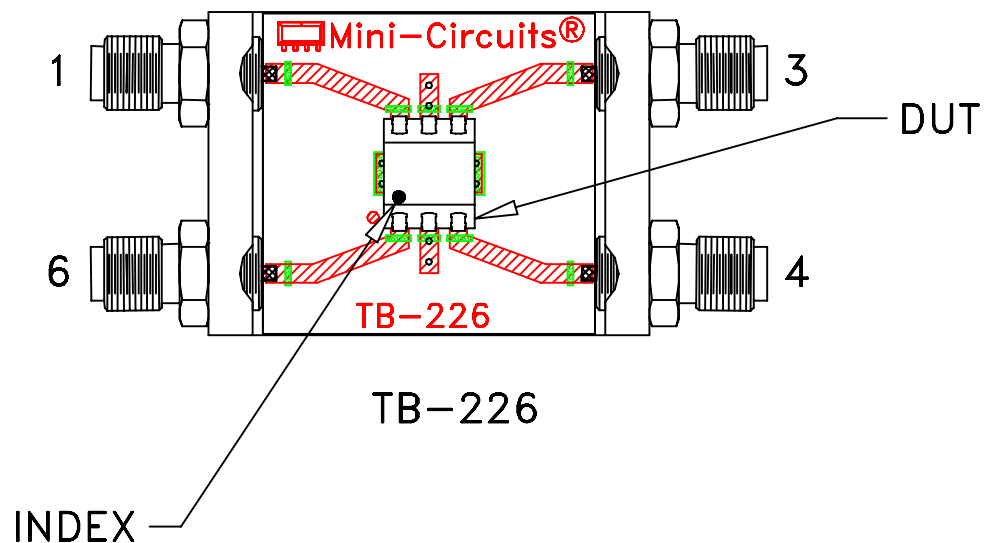
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Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



Notes:

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

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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