

# Surface Mount Power Splitter/Combiner

## LRPS-3-1+

3 Way-0° 50Ω 10 to 300 MHz

### Maximum Ratings

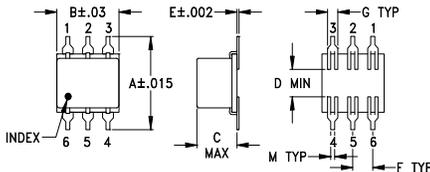
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Internal Dissipation	0.375W max.

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

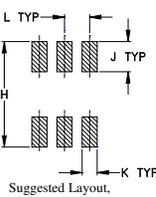
### Pin Connections

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

### Outline Drawing



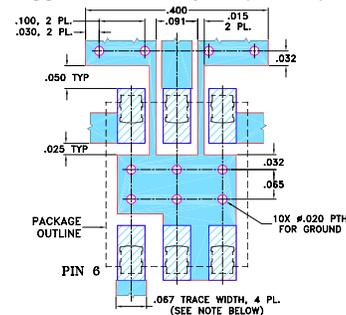
### PCB Land Pattern



### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	
.400	.31	.200	.10	.010	.100	.050	
10.16	7.87	5.08	2.54	0.25	2.54	1.27	
H	J	K	L	M		wt	
.420	.120	.060	.100	.020		grams	
10.67	3.05	1.52	2.54	0.51		0.55	

### Demo Board MCL P/N: TB-225 Suggested PCB Layout (PL-170)



- NOTES:
- 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.
  - 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

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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, 0.3 dB typ.
- good isolation, 25 dB typ.

### Applications

- VHF/UHF
- defense & federal communications



Generic photo used for illustration purposes only

CASE STYLE: QQQ130

### +RoHS Compliant

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

### Electrical Specifications

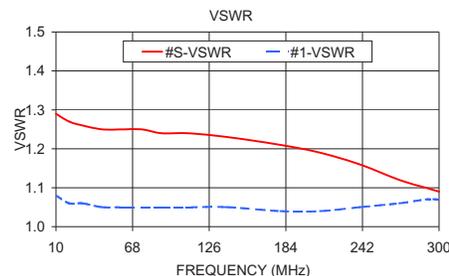
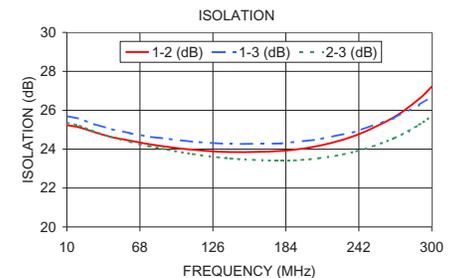
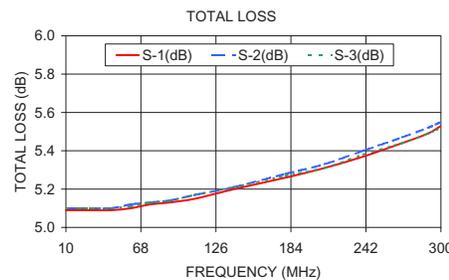
FREQ. RANGE (MHz)	ISOLATION (dB)						INSERTION LOSS (dB) ABOVE 4.8 dB						PHASE UNBALANCE (Degrees)			AMPLITUDE UNBALANCE (dB)			
	L		M		U		L		M		U		L	M	U	L	M	U	
	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Max.	Max.	Max.	Max.	Max.	Max.	
$f_L$ - $f_U$																			
10-300	25	20	25	20	25	20	0.2	0.6	0.3	0.8	0.5	1.2	2	3	4	0.1	0.3	0.7	

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  $f_U$ ]

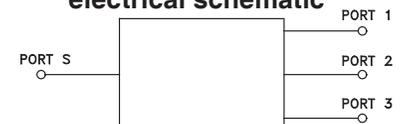
### Typical Performance Data

Freq. (MHz)	Total Loss <sup>1</sup> (dB)			Amp. Unbal. (dB)	Isolation (dB)			Phase Unbal. (deg.)	VSWR S	VSWR 1	VSWR 2	VSWR 3
	S-1	S-2	S-3		1-2	1-3	2-3					
10.00	5.09	5.10	5.10	0.01	25.23	25.70	25.35	0.12	1.29	1.08	1.09	1.08
20.00	5.09	5.10	5.10	0.01	25.12	25.56	25.20	0.21	1.27	1.06	1.07	1.07
30.00	5.09	5.10	5.10	0.01	24.91	25.32	24.94	0.31	1.26	1.06	1.06	1.06
45.00	5.09	5.10	5.10	0.01	24.63	25.03	24.63	0.42	1.25	1.05	1.06	1.06
60.00	5.10	5.12	5.11	0.01	24.44	24.82	24.38	0.58	1.25	1.05	1.06	1.06
75.00	5.12	5.13	5.13	0.01	24.26	24.64	24.15	0.69	1.25	1.05	1.05	1.06
90.00	5.13	5.14	5.14	0.01	24.12	24.53	23.97	0.82	1.24	1.05	1.05	1.06
110.00	5.15	5.17	5.17	0.01	23.97	24.38	23.75	1.00	1.24	1.05	1.05	1.06
140.00	5.20	5.21	5.21	0.02	23.85	24.26	23.52	1.18	1.23	1.05	1.05	1.06
180.00	5.26	5.28	5.27	0.02	23.91	24.29	23.41	1.48	1.21	1.04	1.04	1.06
210.00	5.31	5.33	5.31	0.02	24.17	24.50	23.53	1.70	1.19	1.04	1.04	1.06
240.00	5.37	5.40	5.38	0.03	24.72	24.91	23.89	1.84	1.16	1.05	1.04	1.06
270.00	5.44	5.47	5.44	0.03	25.65	25.60	24.56	2.00	1.12	1.06	1.05	1.06
290.00	5.49	5.52	5.49	0.03	26.59	26.28	25.26	2.06	1.10	1.07	1.05	1.06
300.00	5.53	5.55	5.52	0.04	27.22	26.71	25.71	2.09	1.09	1.07	1.06	1.06

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



### electrical schematic



# 3 Way-0° Power Splitter/Combiner

# LRPS-3-1+

## 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-3			1-2	1-3	2-3	S	1	2	3
10	5.03	5.04	5.04	0.01	0.12	24.43	24.59	24.42	1.27	1.10	1.11	1.11
20	5.04	5.05	5.05	0.01	0.17	24.36	24.55	24.37	1.25	1.08	1.08	1.08
30	5.04	5.05	5.05	0.01	0.27	24.20	24.39	24.18	1.25	1.08	1.08	1.08
40	5.04	5.05	5.05	0.01	0.33	24.08	24.30	24.06	1.24	1.07	1.07	1.07
50	5.06	5.06	5.06	0.00	0.43	23.99	24.21	23.95	1.24	1.07	1.07	1.07
60	5.07	5.08	5.07	0.01	0.50	23.91	24.14	23.84	1.24	1.07	1.07	1.07
70	5.07	5.08	5.08	0.01	0.57	23.84	24.08	23.76	1.23	1.07	1.07	1.07
80	5.09	5.09	5.09	0.00	0.65	23.78	24.03	23.68	1.23	1.06	1.06	1.07
90	5.10	5.10	5.10	0.00	0.74	23.73	23.99	23.60	1.23	1.06	1.06	1.06
100	5.11	5.11	5.11	0.00	0.81	23.70	23.95	23.53	1.23	1.06	1.06	1.06
110	5.12	5.13	5.12	0.01	0.90	23.66	23.91	23.46	1.22	1.06	1.06	1.06
120	5.13	5.14	5.13	0.01	0.97	23.61	23.88	23.40	1.22	1.06	1.05	1.06
130	5.15	5.15	5.14	0.01	1.04	23.59	23.85	23.34	1.22	1.06	1.05	1.05
140	5.16	5.16	5.14	0.02	1.13	23.58	23.85	23.31	1.22	1.06	1.05	1.05
150	5.17	5.17	5.15	0.02	1.20	23.59	23.85	23.28	1.22	1.05	1.05	1.05
160	5.19	5.18	5.16	0.03	1.26	23.60	23.84	23.26	1.21	1.05	1.05	1.05
170	5.19	5.19	5.17	0.02	1.35	23.61	23.83	23.24	1.21	1.05	1.05	1.05
180	5.21	5.21	5.18	0.03	1.43	23.66	23.85	23.25	1.21	1.05	1.05	1.04
190	5.23	5.22	5.19	0.04	1.49	23.72	23.87	23.27	1.20	1.05	1.05	1.04
200	5.24	5.23	5.20	0.04	1.56	23.80	23.91	23.32	1.20	1.06	1.05	1.04
210	5.25	5.24	5.21	0.04	1.63	23.92	23.97	23.39	1.19	1.06	1.05	1.04
220	5.27	5.26	5.22	0.05	1.68	24.04	24.04	23.48	1.19	1.06	1.05	1.04
230	5.29	5.27	5.23	0.06	1.74	24.20	24.12	23.59	1.18	1.06	1.06	1.04
240	5.30	5.28	5.24	0.06	1.81	24.38	24.21	23.72	1.18	1.07	1.06	1.04
250	5.32	5.30	5.25	0.07	1.84	24.61	24.31	23.89	1.17	1.07	1.06	1.04
260	5.34	5.32	5.27	0.07	1.91	24.89	24.45	24.10	1.17	1.08	1.07	1.04
270	5.36	5.34	5.27	0.09	1.97	25.20	24.60	24.35	1.16	1.08	1.08	1.04
280	5.38	5.35	5.29	0.09	2.01	25.57	24.78	24.64	1.16	1.09	1.08	1.05
290	5.40	5.36	5.30	0.10	2.06	26.00	24.95	24.98	1.16	1.09	1.09	1.05
300	5.43	5.38	5.31	0.12	2.11	26.49	25.15	25.38	1.16	1.10	1.10	1.05
310	5.46	5.41	5.33	0.13	2.14	27.12	25.38	25.87	1.16	1.11	1.10	1.06
320	5.49	5.44	5.35	0.14	2.17	27.83	25.64	26.43	1.17	1.12	1.11	1.07
330	5.52	5.46	5.37	0.15	2.21	28.69	25.90	27.13	1.18	1.13	1.12	1.07
340	5.54	5.48	5.39	0.15	2.25	29.73	26.17	27.95	1.19	1.14	1.13	1.08
350	5.58	5.51	5.41	0.17	2.26	31.01	26.41	28.92	1.21	1.15	1.14	1.09
375	5.70	5.61	5.50	0.20	2.31	36.10	26.94	32.73	1.28	1.18	1.17	1.12
400	5.85	5.74	5.60	0.25	2.35	40.83	27.02	42.24	1.37	1.22	1.20	1.14
425	6.05	5.92	5.76	0.28	2.33	32.24	26.31	38.65	1.51	1.26	1.23	1.18
450	6.31	6.14	5.96	0.35	2.25	26.66	24.79	29.55	1.69	1.30	1.26	1.21
475	6.67	6.46	6.26	0.41	2.16	22.85	22.91	24.72	1.93	1.35	1.30	1.25
500	7.13	6.88	6.65	0.48	2.02	20.00	20.99	21.38	2.24	1.41	1.33	1.30
525	7.73	7.43	7.16	0.57	2.24	17.75	19.24	18.84	2.63	1.46	1.36	1.34
550	8.46	8.10	7.79	0.67	2.60	15.95	17.72	16.85	3.14	1.51	1.39	1.38
575	9.37	8.94	8.57	0.80	3.00	14.49	16.43	15.27	3.76	1.56	1.42	1.42

<sup>1</sup>Total Loss = Insertion Loss + 4.8dB Splitter Loss



# 3 Way-0° Power Splitter/Combiner

# LRPS-3-1+

## 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-3			1-2	1-3	2-3	S	1	2	3
10	4.91	4.92	4.92	0.01	0.11	24.39	24.86	24.69	1.28	1.17	1.16	1.16
20	4.98	4.99	4.99	0.01	0.16	25.44	25.74	25.48	1.25	1.08	1.08	1.08
30	4.99	5.00	5.01	0.02	0.25	25.52	25.76	25.48	1.25	1.06	1.05	1.06
40	5.00	5.01	5.02	0.02	0.31	25.45	25.69	25.38	1.24	1.04	1.04	1.05
50	5.01	5.01	5.03	0.02	0.44	25.38	25.61	25.28	1.24	1.04	1.03	1.04
60	5.02	5.02	5.03	0.01	0.51	25.32	25.55	25.18	1.24	1.03	1.02	1.03
70	5.03	5.03	5.04	0.01	0.59	25.26	25.50	25.10	1.23	1.03	1.02	1.03
80	5.04	5.03	5.05	0.02	0.70	25.21	25.45	25.03	1.23	1.02	1.02	1.03
90	5.05	5.04	5.05	0.01	0.77	25.15	25.41	24.94	1.23	1.02	1.02	1.03
100	5.05	5.05	5.06	0.01	0.85	25.11	25.37	24.86	1.23	1.02	1.02	1.02
110	5.07	5.06	5.06	0.01	0.95	25.05	25.32	24.77	1.23	1.01	1.02	1.02
120	5.07	5.07	5.07	0.00	1.04	25.00	25.28	24.69	1.22	1.01	1.01	1.02
130	5.09	5.07	5.08	0.01	1.12	24.95	25.23	24.61	1.22	1.01	1.01	1.02
140	5.09	5.08	5.08	0.01	1.21	24.93	25.20	24.56	1.22	1.01	1.01	1.02
150	5.10	5.09	5.09	0.01	1.27	24.91	25.19	24.51	1.22	1.01	1.02	1.02
160	5.12	5.09	5.10	0.03	1.35	24.90	25.18	24.47	1.22	1.01	1.02	1.01
170	5.13	5.10	5.11	0.03	1.45	24.89	25.14	24.42	1.22	1.01	1.02	1.01
180	5.14	5.12	5.11	0.03	1.53	24.92	25.13	24.40	1.21	1.01	1.02	1.01
190	5.15	5.12	5.12	0.03	1.60	24.97	25.14	24.41	1.21	1.02	1.03	1.01
200	5.16	5.13	5.13	0.03	1.69	25.04	25.17	24.44	1.21	1.02	1.03	1.01
210	5.18	5.14	5.13	0.05	1.75	25.15	25.22	24.50	1.20	1.02	1.03	1.00
220	5.19	5.15	5.14	0.05	1.87	25.27	25.28	24.59	1.20	1.03	1.04	1.00
230	5.20	5.16	5.15	0.05	1.93	25.44	25.35	24.70	1.19	1.03	1.04	1.00
240	5.22	5.17	5.15	0.07	2.00	25.63	25.43	24.83	1.18	1.04	1.05	1.01
250	5.23	5.17	5.16	0.07	2.06	25.88	25.52	25.03	1.18	1.04	1.05	1.01
260	5.25	5.19	5.17	0.08	2.12	26.20	25.67	25.26	1.17	1.05	1.06	1.01
270	5.27	5.21	5.18	0.09	2.21	26.56	25.84	25.55	1.17	1.06	1.07	1.02
280	5.29	5.22	5.18	0.11	2.26	27.00	26.02	25.89	1.16	1.06	1.08	1.02
290	5.30	5.22	5.19	0.11	2.32	27.51	26.20	26.30	1.16	1.07	1.08	1.03
300	5.32	5.24	5.20	0.12	2.39	28.12	26.41	26.77	1.16	1.08	1.09	1.04
310	5.35	5.27	5.22	0.13	2.45	28.89	26.64	27.37	1.16	1.09	1.10	1.04
320	5.37	5.28	5.23	0.14	2.51	29.79	26.89	28.07	1.16	1.10	1.11	1.05
330	5.40	5.30	5.25	0.15	2.55	30.91	27.15	28.95	1.17	1.11	1.12	1.06
340	5.43	5.32	5.26	0.17	2.60	32.34	27.38	30.00	1.18	1.12	1.12	1.07
350	5.46	5.34	5.28	0.18	2.63	34.13	27.58	31.31	1.20	1.13	1.13	1.07
375	5.57	5.43	5.35	0.22	2.74	41.64	27.79	37.00	1.26	1.16	1.16	1.10
400	5.70	5.55	5.45	0.25	2.89	36.65	27.32	49.23	1.36	1.19	1.19	1.13
425	5.88	5.70	5.59	0.30	2.86	29.56	25.98	33.43	1.49	1.23	1.22	1.16
450	6.13	5.91	5.77	0.36	2.87	24.99	24.09	27.20	1.68	1.28	1.25	1.19
475	6.47	6.21	6.05	0.42	2.82	21.66	22.08	23.21	1.92	1.32	1.29	1.23
500	6.90	6.61	6.42	0.48	2.73	19.07	20.16	20.25	2.24	1.38	1.32	1.27
525	7.48	7.14	6.91	0.57	3.07	16.96	18.45	17.91	2.66	1.43	1.36	1.32
550	8.19	7.80	7.54	0.65	3.45	15.26	16.98	16.06	3.19	1.48	1.39	1.37
575	9.08	8.62	8.31	0.77	3.90	13.87	15.75	14.56	3.87	1.53	1.42	1.41

<sup>1</sup>Total Loss = Insertion Loss + 4.8dB Splitter Loss



# 3 Way-0° Power Splitter/Combiner

# LRPS-3-1+

## 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-3			1-2	1-3	2-3	S	1	2	3
10	5.08	5.09	5.09	0.01	0.14	23.10	23.30	23.19	1.27	1.15	1.15	1.15
20	5.08	5.10	5.09	0.02	0.21	22.95	23.17	23.05	1.26	1.14	1.14	1.13
30	5.09	5.11	5.10	0.02	0.31	22.83	23.06	22.91	1.25	1.13	1.13	1.13
40	5.10	5.12	5.11	0.02	0.37	22.75	23.00	22.82	1.25	1.13	1.13	1.13
50	5.11	5.13	5.12	0.02	0.49	22.68	22.93	22.73	1.24	1.13	1.13	1.13
60	5.12	5.15	5.13	0.03	0.56	22.62	22.87	22.64	1.24	1.12	1.13	1.12
70	5.13	5.16	5.15	0.03	0.62	22.56	22.83	22.57	1.24	1.12	1.13	1.12
80	5.15	5.17	5.16	0.02	0.73	22.52	22.79	22.51	1.23	1.12	1.12	1.12
90	5.16	5.18	5.17	0.02	0.80	22.48	22.76	22.44	1.23	1.12	1.12	1.12
100	5.17	5.20	5.18	0.03	0.88	22.45	22.73	22.38	1.23	1.12	1.11	1.11
110	5.19	5.21	5.19	0.02	0.99	22.42	22.71	22.33	1.23	1.11	1.11	1.11
120	5.20	5.23	5.20	0.03	1.08	22.40	22.69	22.28	1.23	1.11	1.10	1.11
130	5.22	5.24	5.22	0.03	1.16	22.39	22.67	22.24	1.22	1.11	1.10	1.11
140	5.23	5.26	5.23	0.03	1.25	22.40	22.68	22.23	1.22	1.11	1.09	1.10
150	5.24	5.27	5.24	0.03	1.33	22.42	22.69	22.21	1.22	1.11	1.09	1.10
160	5.26	5.29	5.25	0.04	1.38	22.45	22.70	22.21	1.21	1.10	1.09	1.10
170	5.28	5.30	5.26	0.04	1.49	22.47	22.71	22.20	1.21	1.10	1.09	1.09
180	5.29	5.32	5.28	0.04	1.56	22.52	22.73	22.22	1.20	1.10	1.09	1.09
190	5.31	5.33	5.29	0.04	1.62	22.59	22.76	22.25	1.20	1.10	1.08	1.09
200	5.32	5.35	5.30	0.05	1.68	22.68	22.81	22.31	1.19	1.10	1.08	1.09
210	5.34	5.37	5.31	0.06	1.73	22.79	22.88	22.38	1.19	1.10	1.08	1.08
220	5.36	5.39	5.33	0.06	1.82	22.91	22.96	22.46	1.18	1.10	1.08	1.08
230	5.38	5.40	5.34	0.06	1.85	23.05	23.04	22.57	1.18	1.10	1.08	1.08
240	5.39	5.42	5.35	0.07	1.92	23.21	23.12	22.69	1.18	1.10	1.08	1.08
250	5.42	5.44	5.36	0.08	1.96	23.41	23.21	22.83	1.17	1.10	1.08	1.08
260	5.44	5.46	5.38	0.08	2.01	23.65	23.34	23.01	1.17	1.11	1.08	1.07
270	5.47	5.49	5.40	0.09	2.07	23.91	23.49	23.23	1.16	1.11	1.09	1.07
280	5.49	5.51	5.42	0.09	2.11	24.21	23.65	23.47	1.16	1.12	1.09	1.08
290	5.51	5.52	5.42	0.10	2.16	24.56	23.80	23.76	1.16	1.12	1.10	1.08
300	5.54	5.55	5.44	0.11	2.21	24.96	23.98	24.07	1.16	1.13	1.10	1.08
310	5.57	5.58	5.47	0.11	2.23	25.46	24.19	24.47	1.17	1.13	1.11	1.08
320	5.61	5.61	5.49	0.12	2.26	26.01	24.42	24.92	1.18	1.14	1.12	1.09
330	5.64	5.64	5.52	0.12	2.28	26.68	24.68	25.47	1.19	1.15	1.13	1.10
340	5.67	5.67	5.54	0.13	2.30	27.46	24.94	26.10	1.20	1.16	1.13	1.10
350	5.72	5.70	5.57	0.15	2.30	28.38	25.19	26.82	1.22	1.17	1.14	1.11
375	5.85	5.82	5.67	0.18	2.34	31.78	25.85	29.49	1.29	1.20	1.17	1.13
400	6.01	5.96	5.79	0.22	2.35	37.70	26.31	34.46	1.39	1.24	1.19	1.16
425	6.23	6.15	5.95	0.27	2.31	36.34	26.26	47.49	1.52	1.28	1.23	1.19
450	6.50	6.40	6.18	0.32	2.22	29.18	25.34	33.66	1.69	1.32	1.26	1.23
475	6.89	6.74	6.48	0.41	2.11	24.60	23.78	27.10	1.92	1.37	1.29	1.27
500	7.36	7.17	6.89	0.47	1.94	21.33	21.95	23.06	2.21	1.43	1.33	1.31
525	7.98	7.73	7.41	0.57	2.18	18.83	20.19	20.16	2.57	1.48	1.36	1.35
550	8.74	8.43	8.06	0.68	2.52	16.86	18.61	17.95	3.03	1.53	1.39	1.40
575	9.66	9.27	8.84	0.82	2.93	15.30	17.26	16.22	3.57	1.58	1.41	1.43

<sup>1</sup>Total Loss = Insertion Loss + 4.8dB Splitter Loss

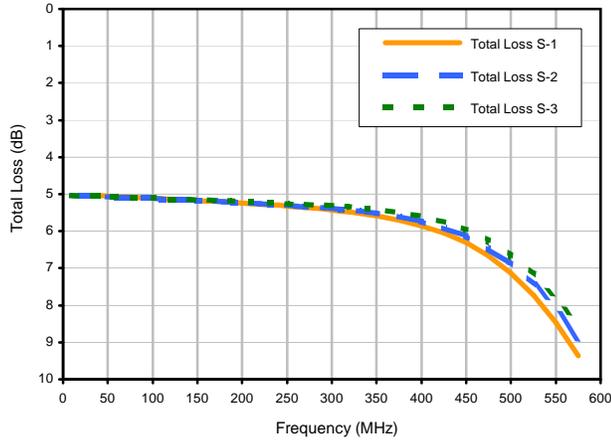


# 3 Way-0° Power Splitter/Combiner

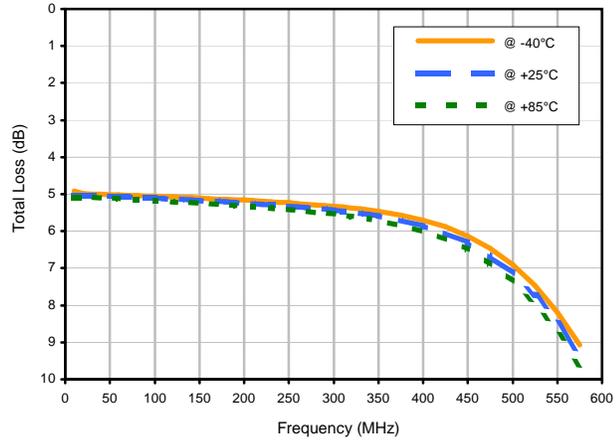
# LRPS-3-1+

## Typical Performance Curves

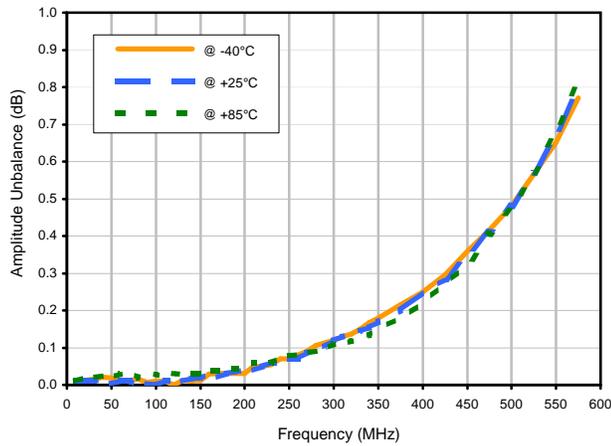
Total Loss



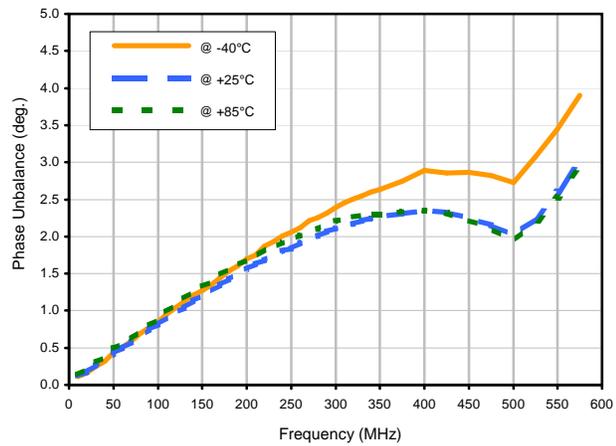
Total Loss S-1 vs. TEMPERATURE



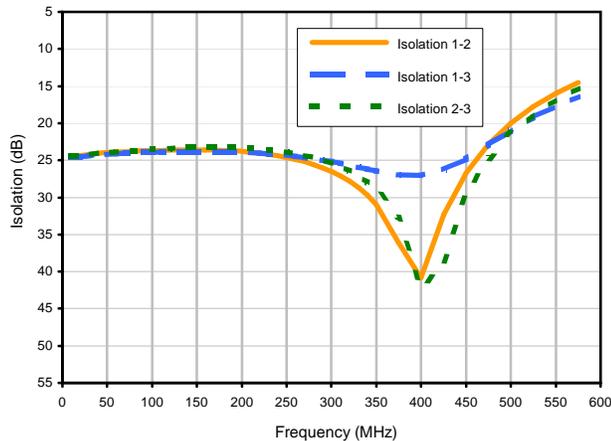
Amplitude Unbalance vs. TEMPERATURE



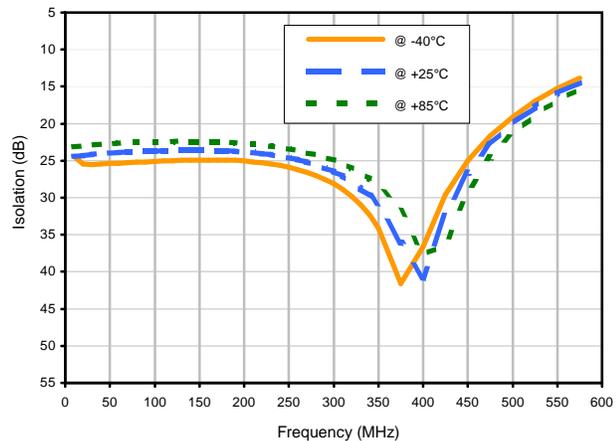
Phase Unbalance vs. TEMPERATURE



Isolation



Isolation 1-2 vs. TEMPERATURE



REV. X2  
LRPS-3-1+  
100624  
Page 1 of 2



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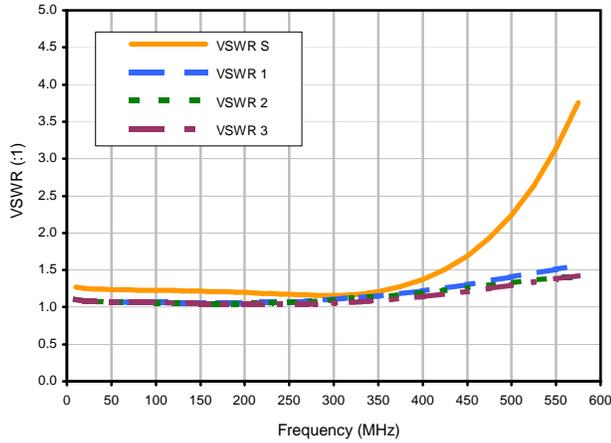


# 3 Way-0° Power Splitter/Combiner

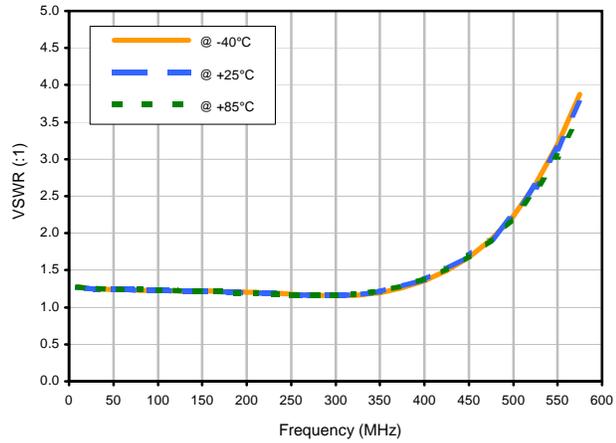
# LRPS-3-1+

## Typical Performance Curves

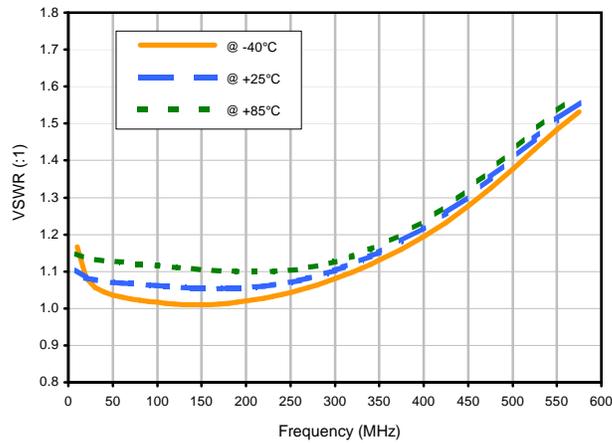
VSWR



VSWR SUM vs. TEMPERATURE



VSWR OUT1 vs. TEMPERATURE



REV. X2  
LRPS-3-1+  
100624  
Page 2 of 2



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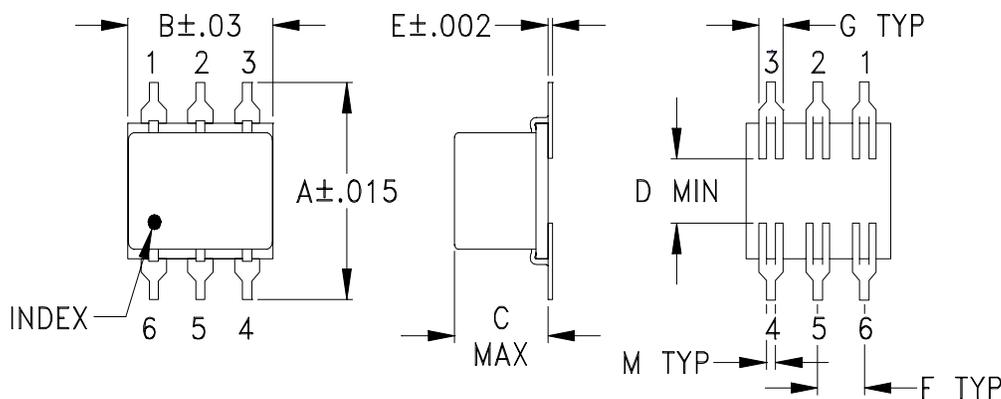


# Case Style

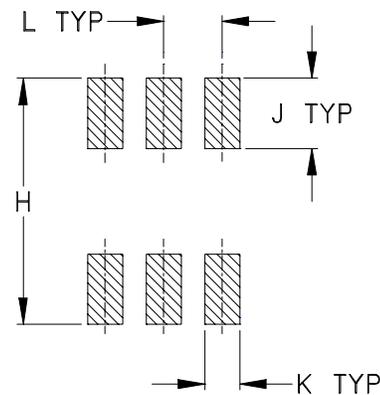
# QQQ

QQQ130 (non-waterproof)  
QQQ828 (washable)

## 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
QQQ130	.400 (10.16)	.31 (7.87)	.200 (5.08)	.10 (2.54)	.010 (.25)	.100 (2.54)	.050 (1.27)	.420 (10.67)	.120 (3.05)	.060 (1.52)	.100 (2.54)	.020 (.51)	.55
QQQ828			.050 (1.27)										.20

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.



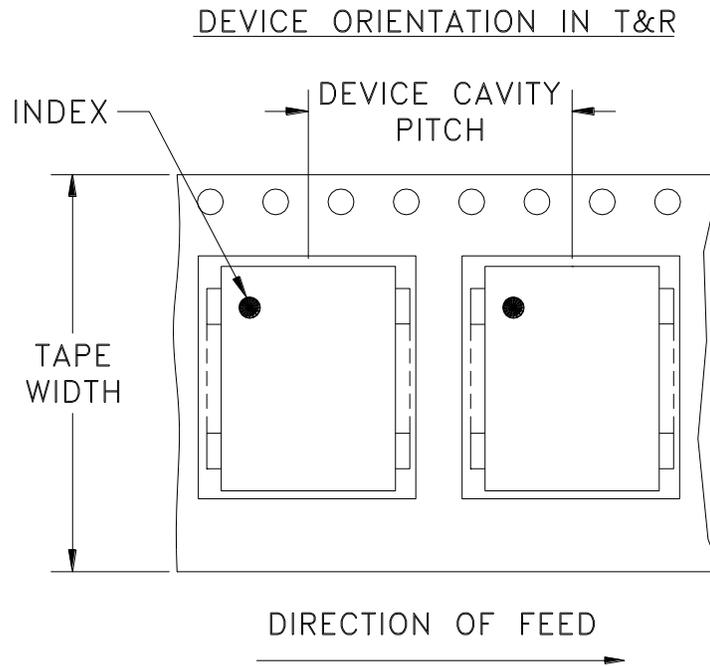
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# Tape & Reel Packaging TR-F10



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	16	7	10,20,50,100
		13	200,500

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)

Note: Please consult individual model data sheet to determine device per reel availability.



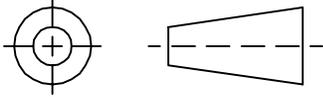
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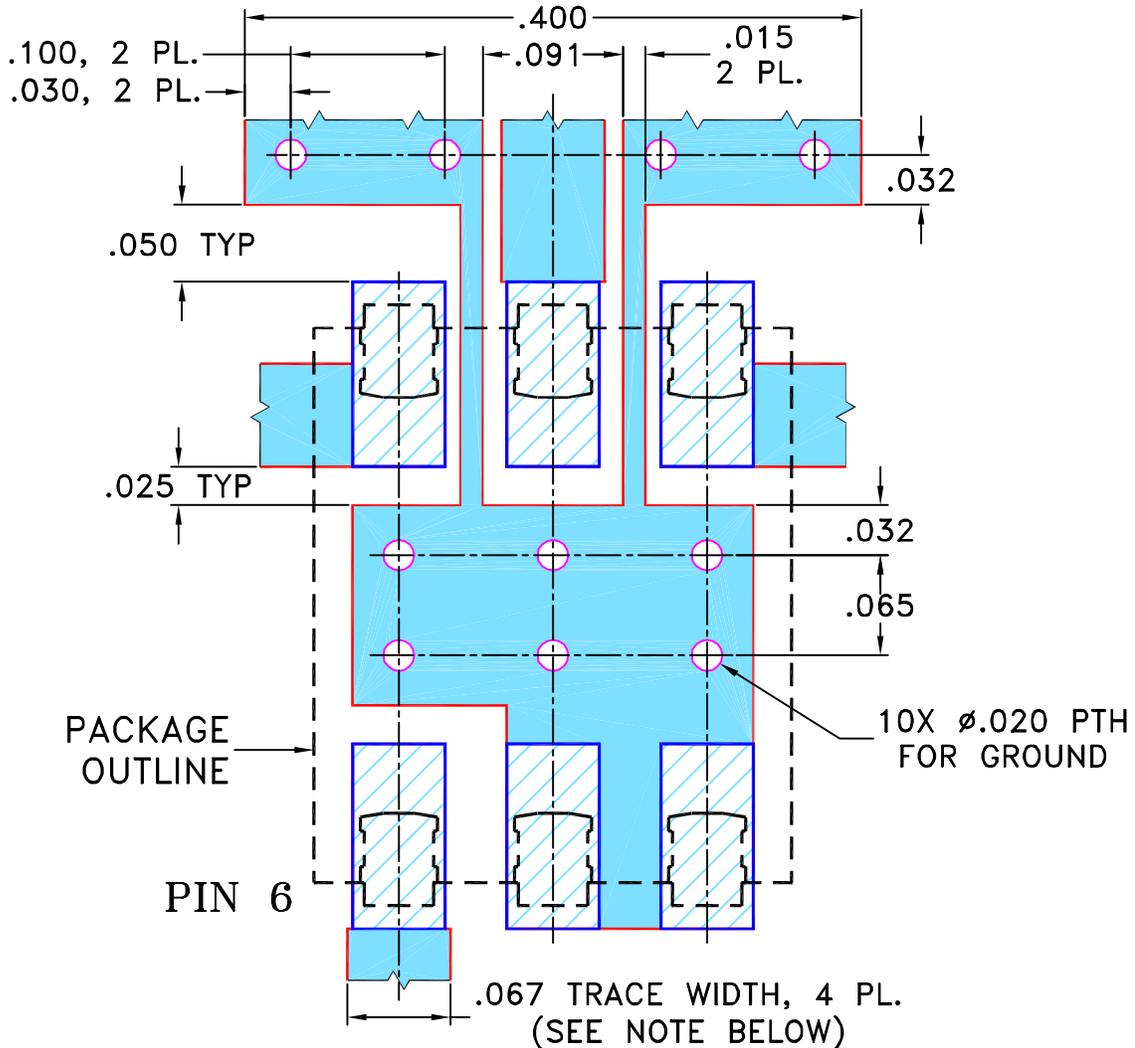
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M94650	NEW RELEASE	10/11/04	MMG	HY
A	M100924	CHANGED ORIENTATION PIN 1 TO PIN 6	09/23/05	GT	HY
B	M102713	ADDED "...WITH SMOBC"	01/17/06	MMG	IL

**SUGGESTED MOUNTING CONFIGURATION  
FOR QQQ569 CASE STYLE, "gt" 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.



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 10/07/04

TOLERANCES ON:

CHECKED AV 10/11/04

2 PL DECIMALS ±

APPROVED HY 10/11/04

3 PL DECIMALS ± .005

ANGLES ±

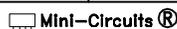
FRACTIONS ±



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Brooklyn NY 11235

PL, gt, QQQ569, LRPS-3-1J, TB-225

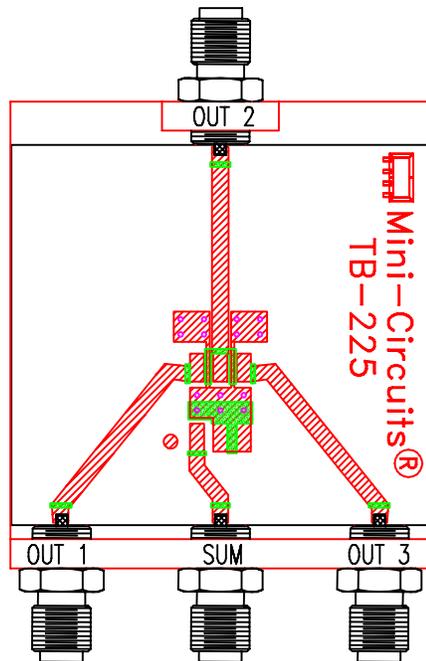


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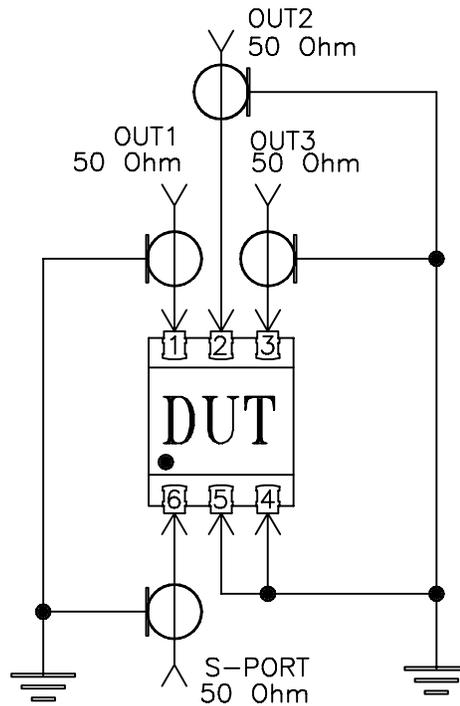
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-170	B
FILE:	98PL170	SCALE:	8:1
		SHEET:	1 OF 1

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

# Evaluation Board and Circuit



TB-225



Schematic Diagram

## 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