

Power Splitter/Combiner

LRPS-2-11J

2 Way-0° 50Ω 20 to 2000 MHz

Maximum Ratings

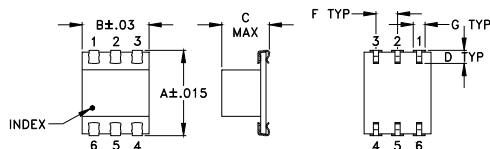
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Internal Dissipation	0.125W max.

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

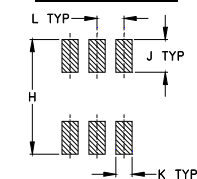
Pin Connections

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

Outline Drawing

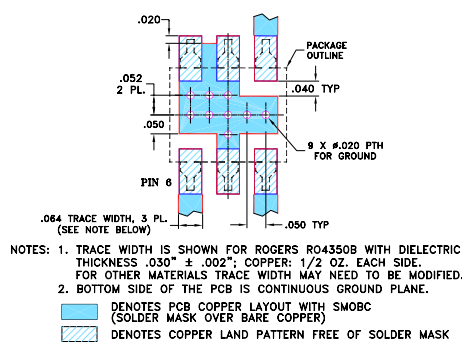


PCB Land Pattern

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-100
Suggested PCB Layout (PL-057)

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.
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Features

- very wideband, 20 to 2000 MHz
- low insertion loss, 0.7 dB typ.
- good isolation, 21 dB typ.
- aqueous washable
- J-leads for strain relief and excellent solderability

Applications

- cellular
- GPS
- communications systems

Electrical Specifications

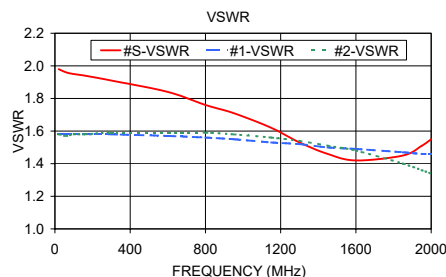
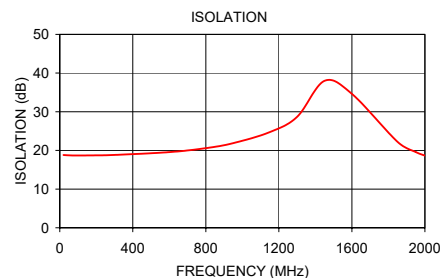
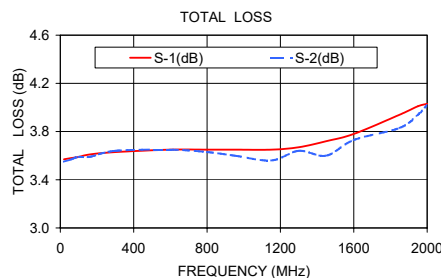
FREQ. RANGE (MHz)	ISOLATION (dB)						INSERTION LOSS (dB) ABOVE 3.0 dB						PHASE UNBALANCE (Degrees)			AMPLITUDE UNBALANCE (dB)		
	L		M		U		L		M		U		L		M		U	
f_L - f_U	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Max.	Max.	Max.	Max.	Max.	Max.
20-2000	19	15	21	15	30	15	0.6	0.8	0.7	1.0	0.8	1.5	2.0	3.0	5.0	0.2	0.3	0.7

L = 20-200 MHz M = 200-1000 MHz U = 1000-2000 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						
20.00	3.57	3.55	0.01	18.82	0.10	1.98	1.58	1.58
60.00	3.58	3.57	0.01	18.71	0.18	1.96	1.58	1.57
100.00	3.59	3.59	0.01	18.70	0.29	1.95	1.58	1.58
160.00	3.61	3.59	0.02	18.72	0.45	1.94	1.58	1.58
300.00	3.63	3.64	0.01	18.84	0.77	1.91	1.58	1.59
600.00	3.65	3.65	0.00	19.55	1.46	1.84	1.57	1.59
800.00	3.65	3.63	0.02	20.59	1.76	1.76	1.56	1.59
950.00	3.65	3.60	0.05	21.89	1.90	1.71	1.55	1.58
1150.00	3.65	3.56	0.09	24.73	1.89	1.62	1.53	1.56
1300.00	3.67	3.64	0.03	28.68	1.70	1.53	1.52	1.54
1450.00	3.72	3.60	0.12	37.99	1.45	1.46	1.50	1.51
1600.00	3.78	3.73	0.05	34.62	1.03	1.42	1.49	1.48
1850.00	3.94	3.83	0.11	22.22	0.16	1.45	1.47	1.40
1950.00	4.01	3.94	0.07	19.58	0.70	1.51	1.46	1.36
2000.00	4.03	4.02	0.01	18.65	0.98	1.55	1.46	1.34

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



electrical schematic



2 Way-0° Power Splitter/Combiner

LRPS-2-11J

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		
	S-1	S-2				S	(:1) 1	2
10	3.54	3.54	0.00	0.03	18.03	1.99	1.54	1.53
20	3.55	3.55	0.00	0.08	18.11	1.98	1.54	1.53
30	3.55	3.55	0.00	0.12	18.10	1.98	1.54	1.54
40	3.56	3.56	0.00	0.15	18.10	1.98	1.54	1.54
50	3.57	3.57	0.00	0.18	18.12	1.97	1.54	1.54
100	3.59	3.59	0.00	0.36	18.25	1.96	1.55	1.55
150	3.61	3.60	0.01	0.56	18.38	1.95	1.56	1.56
200	3.61	3.61	0.00	0.75	18.50	1.94	1.57	1.57
250	3.63	3.62	0.01	0.94	18.65	1.93	1.57	1.57
300	3.64	3.62	0.02	1.11	18.84	1.92	1.58	1.58
350	3.65	3.63	0.02	1.28	19.03	1.92	1.58	1.58
400	3.66	3.63	0.03	1.43	19.22	1.91	1.59	1.59
450	3.67	3.63	0.04	1.56	19.44	1.90	1.59	1.59
500	3.68	3.63	0.05	1.71	19.70	1.90	1.60	1.60
550	3.69	3.64	0.05	1.85	19.98	1.89	1.60	1.60
600	3.70	3.64	0.06	2.00	20.28	1.88	1.61	1.60
650	3.71	3.63	0.08	2.08	20.63	1.87	1.62	1.61
700	3.72	3.63	0.09	2.17	20.99	1.87	1.63	1.61
750	3.73	3.63	0.10	2.27	21.46	1.86	1.63	1.62
800	3.74	3.63	0.11	2.33	21.93	1.85	1.64	1.62
850	3.75	3.62	0.13	2.46	22.48	1.83	1.65	1.63
900	3.76	3.61	0.15	2.45	23.06	1.82	1.66	1.63
950	3.77	3.60	0.17	2.42	23.74	1.81	1.66	1.64
1000	3.79	3.60	0.19	2.48	24.51	1.80	1.67	1.64
1050	3.79	3.59	0.20	2.46	25.38	1.78	1.68	1.65
1100	3.80	3.58	0.22	2.44	26.35	1.76	1.69	1.65
1150	3.82	3.57	0.25	2.39	27.48	1.75	1.69	1.65
1200	3.83	3.55	0.28	2.33	28.75	1.73	1.70	1.66
1250	3.83	3.55	0.28	2.27	30.38	1.71	1.71	1.66
1300	3.84	3.53	0.31	2.13	32.15	1.69	1.71	1.65
1350	3.85	3.53	0.32	2.05	34.11	1.67	1.71	1.65
1400	3.86	3.52	0.34	1.92	35.37	1.65	1.72	1.65
1450	3.87	3.52	0.35	1.82	35.00	1.62	1.72	1.65
1500	3.87	3.50	0.37	1.55	33.60	1.60	1.72	1.64
1550	3.88	3.50	0.38	1.35	31.55	1.58	1.72	1.64
1600	3.89	3.49	0.40	1.07	29.57	1.55	1.72	1.63
1650	3.89	3.48	0.41	0.85	27.62	1.53	1.72	1.63
1700	3.90	3.47	0.43	0.52	26.09	1.50	1.72	1.62
1750	3.93	3.47	0.46	0.25	24.71	1.48	1.70	1.61
1800	3.92	3.48	0.44	0.06	23.28	1.46	1.70	1.60
1850	3.93	3.48	0.45	0.40	22.13	1.44	1.70	1.59
1900	3.95	3.47	0.48	0.89	21.18	1.42	1.69	1.58
1950	3.95	3.49	0.46	1.20	20.15	1.40	1.68	1.56
2000	3.96	3.51	0.45	1.48	19.20	1.39	1.66	1.55
2050	3.97	3.53	0.44	2.11	18.40	1.39	1.66	1.53
2100	3.97	3.55	0.42	2.54	17.59	1.39	1.64	1.52
2150	4.00	3.58	0.42	3.02	16.84	1.39	1.62	1.50
2200	4.00	3.62	0.38	3.77	16.17	1.41	1.62	1.48
2250	4.04	3.66	0.38	4.52	15.49	1.43	1.60	1.46
2300	4.06	3.70	0.36	4.86	14.84	1.46	1.58	1.44
2400	4.17	3.82	0.35	6.10	13.70	1.53	1.54	1.40
2500	4.22	3.96	0.26	7.04	12.64	1.63	1.51	1.36
2600	4.29	4.16	0.13	8.71	11.63	1.77	1.51	1.32

¹Total Loss = Insertion Loss + 3dB Splitter Loss

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100624
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2 Way-0° Power Splitter/Combiner

LRPS-2-11J

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) 1-2	VSWR (:1)		
	S-1	S-2				S	1	2
10	3.53	3.53	0.00	0.04	17.18	1.99	1.55	1.54
20	3.54	3.54	0.00	0.11	18.68	1.99	1.58	1.58
30	3.54	3.54	0.00	0.15	19.13	1.99	1.59	1.60
40	3.55	3.55	0.00	0.20	19.38	1.99	1.60	1.61
50	3.56	3.56	0.00	0.25	19.53	1.98	1.61	1.62
100	3.57	3.56	0.01	0.50	19.84	1.96	1.62	1.62
150	3.58	3.57	0.01	0.79	19.93	1.95	1.63	1.62
200	3.59	3.58	0.01	1.06	19.93	1.95	1.63	1.64
250	3.60	3.57	0.03	1.33	19.99	1.94	1.63	1.63
300	3.60	3.57	0.03	1.61	20.16	1.93	1.63	1.64
350	3.61	3.57	0.04	1.87	20.37	1.92	1.64	1.64
400	3.61	3.57	0.04	2.12	20.52	1.92	1.64	1.64
450	3.63	3.57	0.06	2.37	20.70	1.91	1.65	1.65
500	3.64	3.57	0.07	2.60	20.92	1.91	1.65	1.65
550	3.64	3.56	0.08	2.85	21.23	1.90	1.65	1.65
600	3.65	3.56	0.09	3.09	21.52	1.89	1.66	1.65
650	3.66	3.55	0.11	3.29	21.87	1.88	1.66	1.66
700	3.67	3.54	0.13	3.45	22.24	1.87	1.67	1.66
750	3.67	3.53	0.14	3.67	22.74	1.87	1.68	1.67
800	3.68	3.53	0.15	3.83	23.27	1.86	1.68	1.67
850	3.69	3.51	0.18	4.05	23.84	1.84	1.69	1.67
900	3.70	3.51	0.19	4.18	24.49	1.83	1.70	1.68
950	3.71	3.49	0.22	4.33	25.23	1.82	1.70	1.68
1000	3.72	3.49	0.23	4.41	26.18	1.80	1.71	1.69
1050	3.73	3.47	0.26	4.58	27.11	1.79	1.72	1.69
1100	3.73	3.45	0.28	4.59	28.35	1.78	1.72	1.69
1150	3.75	3.45	0.30	4.79	29.71	1.76	1.73	1.70
1200	3.74	3.44	0.30	4.78	31.66	1.74	1.74	1.70
1250	3.76	3.42	0.34	4.81	33.49	1.73	1.74	1.70
1300	3.76	3.41	0.35	4.78	35.92	1.71	1.75	1.70
1350	3.77	3.40	0.37	4.86	37.51	1.69	1.75	1.69
1400	3.77	3.39	0.38	4.81	36.84	1.67	1.75	1.69
1450	3.78	3.37	0.41	4.71	34.51	1.65	1.76	1.68
1500	3.79	3.36	0.43	4.66	31.99	1.62	1.76	1.68
1550	3.79	3.35	0.44	4.58	29.69	1.60	1.76	1.67
1600	3.79	3.34	0.46	4.41	27.79	1.57	1.76	1.67
1650	3.80	3.32	0.48	4.26	26.21	1.55	1.76	1.66
1700	3.80	3.32	0.48	4.13	24.63	1.53	1.75	1.66
1750	3.82	3.30	0.52	3.81	23.51	1.50	1.74	1.65
1800	3.80	3.31	0.49	3.78	22.10	1.47	1.74	1.64
1850	3.83	3.30	0.52	3.80	21.06	1.45	1.71	1.63
1900	3.82	3.30	0.52	3.28	20.20	1.43	1.72	1.62
1950	3.83	3.32	0.51	3.18	19.28	1.41	1.69	1.61
2000	3.85	3.33	0.52	3.07	18.44	1.39	1.68	1.59
2050	3.81	3.34	0.47	2.38	17.60	1.39	1.69	1.57
2100	3.85	3.36	0.49	1.85	16.91	1.39	1.68	1.55
2150	3.84	3.39	0.45	1.66	16.19	1.39	1.65	1.54
2200	3.87	3.42	0.45	0.96	15.56	1.40	1.64	1.52
2250	3.91	3.45	0.46	0.64	14.87	1.42	1.61	1.49
2300	3.91	3.50	0.42	0.30	14.21	1.44	1.60	1.47
2400	3.98	3.60	0.38	1.12	13.04	1.50	1.57	1.42
2500	4.01	3.73	0.27	2.07	12.08	1.59	1.54	1.38
2600	4.12	3.89	0.23	3.28	11.23	1.71	1.52	1.34

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
10	3.54	3.54	0.00	0.03	15.75	1.98	1.42	1.42
20	3.55	3.55	0.00	0.10	15.80	1.98	1.42	1.42
30	3.55	3.55	0.00	0.13	15.79	1.97	1.42	1.42
40	3.56	3.57	0.01	0.18	15.80	1.97	1.43	1.42
50	3.57	3.57	0.00	0.21	15.81	1.97	1.43	1.42
100	3.60	3.60	0.00	0.41	15.93	1.96	1.44	1.44
150	3.62	3.62	0.00	0.57	16.09	1.95	1.44	1.45
200	3.63	3.63	0.00	0.75	16.28	1.93	1.45	1.45
250	3.64	3.64	0.00	0.92	16.49	1.93	1.46	1.47
300	3.65	3.65	0.00	1.08	16.69	1.92	1.47	1.47
350	3.66	3.67	0.01	1.24	16.89	1.91	1.48	1.48
400	3.68	3.67	0.01	1.38	17.09	1.91	1.49	1.49
450	3.69	3.68	0.01	1.51	17.33	1.90	1.50	1.50
500	3.70	3.69	0.01	1.63	17.59	1.89	1.50	1.50
550	3.72	3.69	0.03	1.75	17.91	1.89	1.51	1.51
600	3.72	3.70	0.02	1.86	18.23	1.88	1.52	1.52
650	3.73	3.70	0.03	1.93	18.60	1.87	1.53	1.52
700	3.75	3.70	0.05	1.97	18.97	1.86	1.54	1.53
750	3.76	3.70	0.06	2.08	19.41	1.85	1.55	1.54
800	3.77	3.71	0.06	2.10	19.85	1.84	1.56	1.55
850	3.78	3.70	0.08	2.19	20.34	1.82	1.57	1.55
900	3.79	3.70	0.09	2.18	20.86	1.81	1.58	1.56
950	3.80	3.70	0.10	2.20	21.44	1.79	1.59	1.57
1000	3.81	3.70	0.11	2.17	22.09	1.78	1.60	1.57
1050	3.83	3.69	0.14	2.17	22.75	1.76	1.60	1.58
1100	3.84	3.69	0.15	2.06	23.54	1.74	1.61	1.58
1150	3.85	3.68	0.16	2.10	24.45	1.72	1.62	1.59
1200	3.85	3.69	0.16	2.02	25.41	1.70	1.62	1.59
1250	3.86	3.67	0.19	1.90	26.45	1.68	1.63	1.59
1300	3.87	3.67	0.20	1.75	27.72	1.66	1.63	1.59
1350	3.88	3.67	0.21	1.73	29.13	1.63	1.64	1.58
1400	3.89	3.67	0.22	1.58	30.79	1.61	1.64	1.58
1450	3.90	3.65	0.25	1.37	32.50	1.58	1.64	1.57
1500	3.92	3.64	0.28	1.20	34.21	1.56	1.64	1.57
1550	3.92	3.65	0.27	1.04	35.03	1.53	1.64	1.56
1600	3.93	3.65	0.29	0.76	34.52	1.51	1.64	1.56
1650	3.94	3.64	0.30	0.50	32.79	1.48	1.64	1.55
1700	3.94	3.65	0.29	0.30	30.62	1.45	1.63	1.54
1750	3.97	3.64	0.33	0.09	29.10	1.43	1.62	1.54
1800	3.96	3.66	0.30	0.22	27.02	1.41	1.62	1.53
1850	3.97	3.67	0.30	0.32	25.30	1.38	1.61	1.52
1900	3.99	3.66	0.33	0.89	24.34	1.37	1.61	1.51
1950	4.00	3.69	0.31	1.19	23.04	1.35	1.59	1.50
2000	4.04	3.70	0.34	1.21	22.02	1.33	1.56	1.49
2050	4.00	3.73	0.27	1.87	20.92	1.33	1.57	1.47
2100	4.03	3.76	0.27	2.38	20.04	1.32	1.56	1.46
2150	4.06	3.78	0.27	2.77	19.24	1.33	1.54	1.44
2200	4.06	3.81	0.25	3.37	18.41	1.34	1.54	1.43
2250	4.09	3.85	0.24	3.57	17.63	1.35	1.50	1.41
2300	4.12	3.89	0.22	4.18	16.96	1.37	1.50	1.40
2400	4.15	4.02	0.13	5.58	15.60	1.44	1.49	1.37
2500	4.20	4.14	0.06	6.53	14.45	1.51	1.47	1.34
2600	4.26	4.30	0.04	7.68	13.42	1.60	1.45	1.31

¹Total Loss = Insertion Loss + 3dB Splitter Loss

REV. X2
LRPS-2-11J
100624
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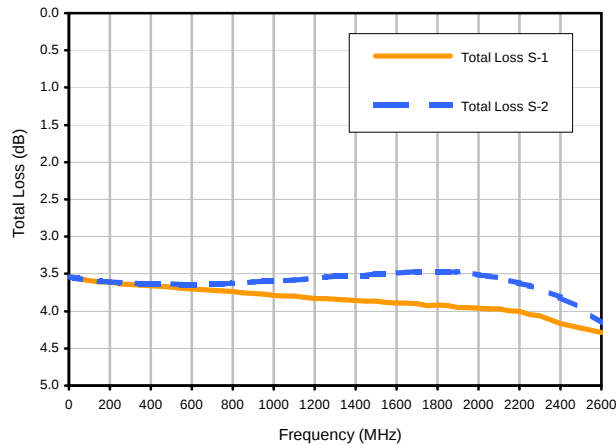


2 Way-0° Power Splitter/Combiner

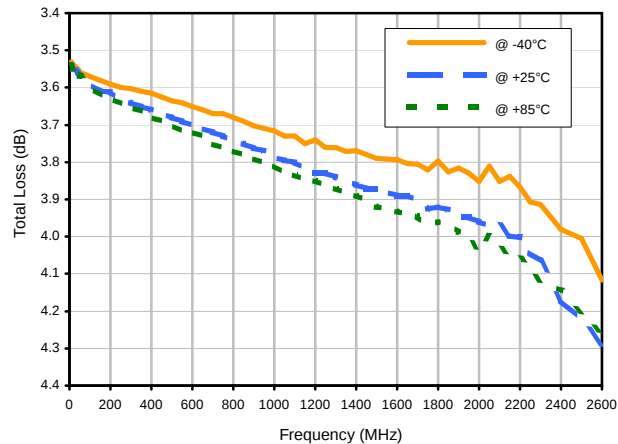
LRPS-2-11J

Typical Performance Curves

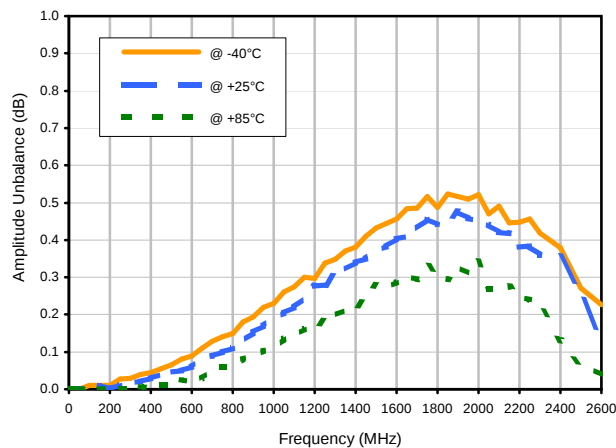
Total Loss



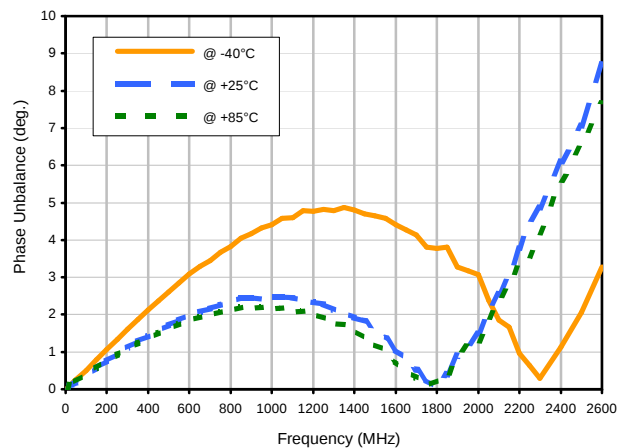
Total Loss S-1 vs. TEMPERATURE



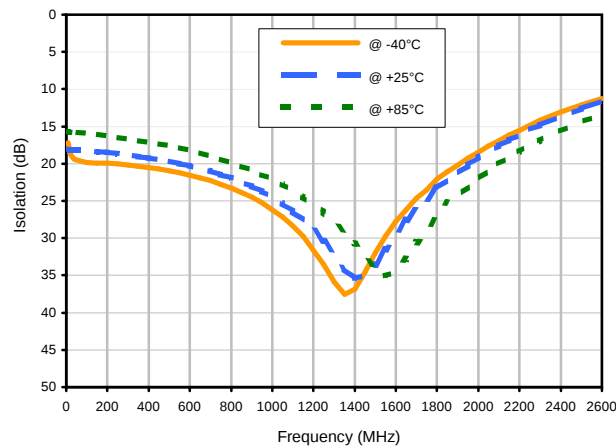
Amplitude Unbalance vs. TEMPERATURE



Phase Unbalance vs. TEMPERATURE



Isolation 1-2 vs. TEMPERATURE



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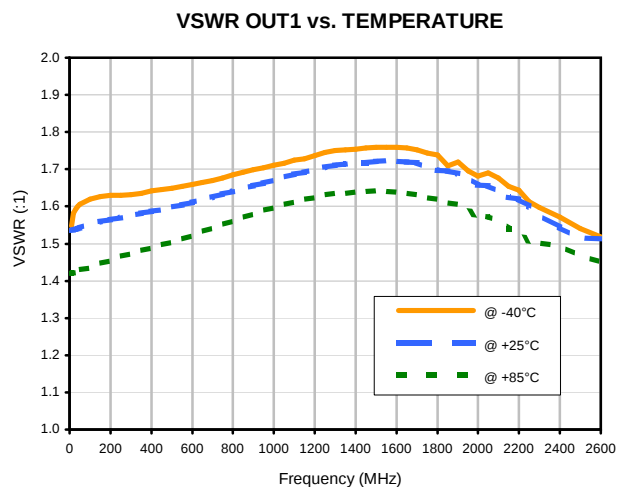
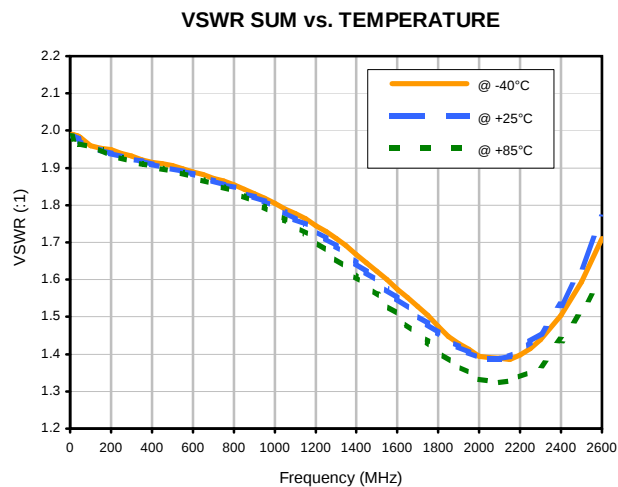
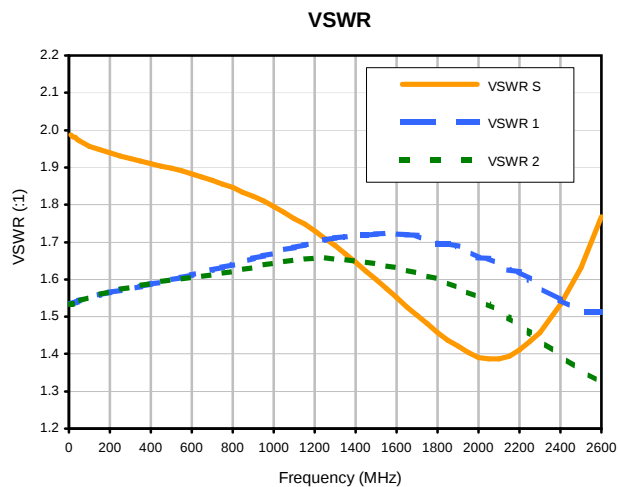


REV. X2
LRPS-2-11J
100624
Page 1 of 2

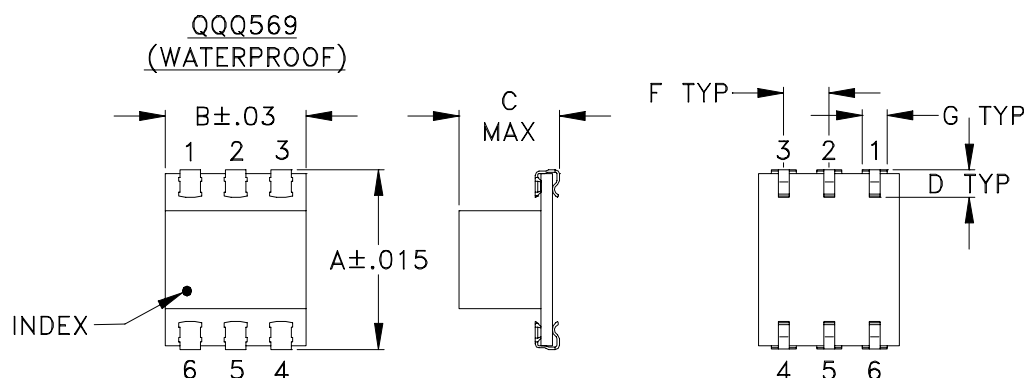
2 Way-0° Power Splitter/Combiner

LRPS-2-11J

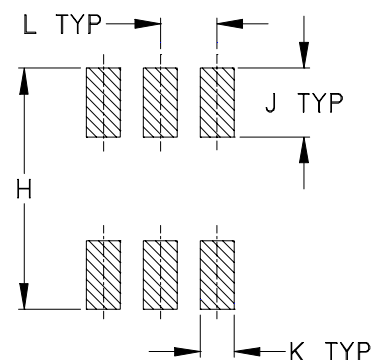
Typical Performance Curves



Outline Dimensions



PCB Land Pattern



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

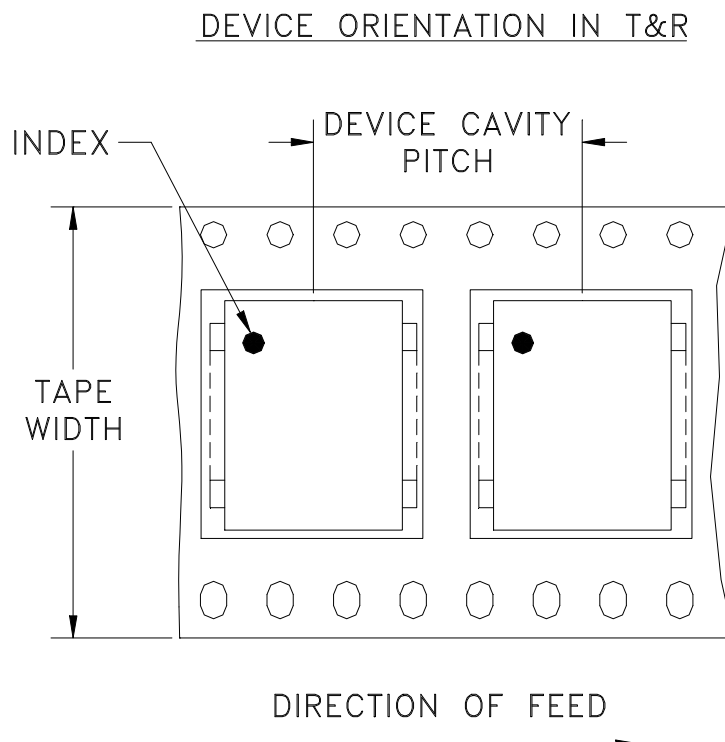
CASE#	A	B	C	D	E	F	G	H	J	K	L	M	WT, GRAM
QQQ569	.390 (9.90)	.31 (7.87)	.225 (5.72)	.060 (1.52)	-	.100 (2.54)	.045 (1.14)	.420 (10.67)	.120 (3.05)	.060 (1.52)	.100 (2.54)	-	.50

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.

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



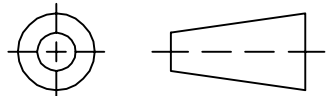
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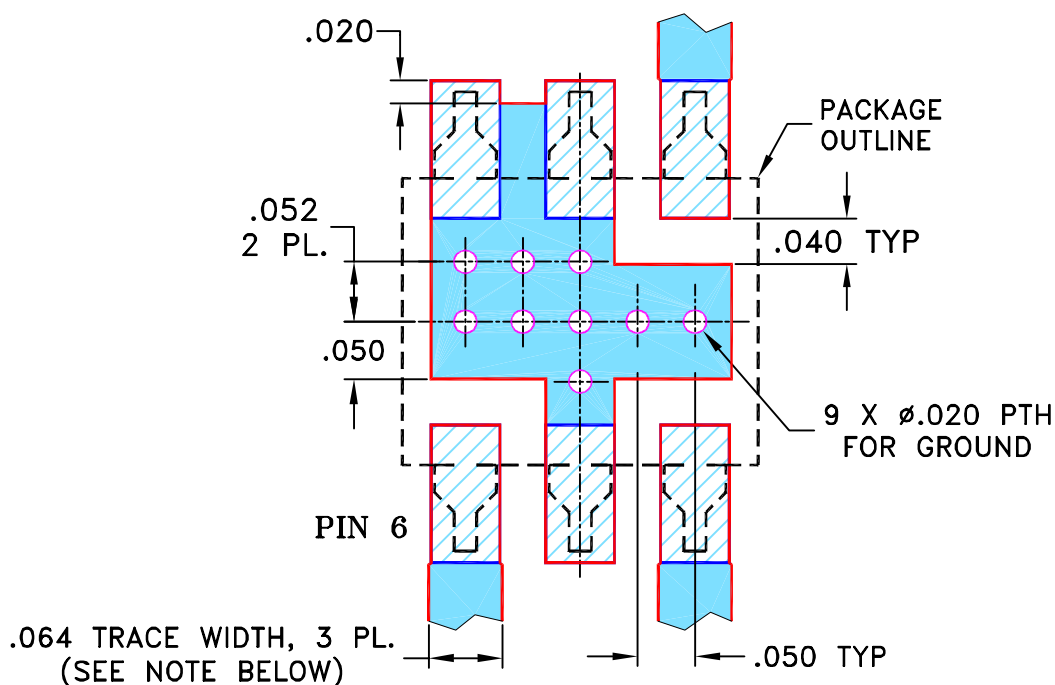
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82272	NEW RELEASE	08/05/02	GF	DJ
A	M102713	ADDED NOTE 2 & "...WITH SMOBC", QQQ130/828 WAS QQQ569/828 CASE STYLE	01/18/06	MMG	LC

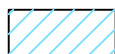
SUGGESTED MOUNTING CONFIGURATION FOR QQQ130/828 CASE STYLE, "gn" PIN CONNECTION



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B 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 $\pm$.005ANGLES $\pm$ FRACTIONS $\pm$

DRAWN

GF

07/17/02

CHECKED

HY

08/01/02

APPROVED

DJ

08/05/02



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, gn, QQQ130/828, LRPS/SCL, TB-100

SIZE
A

CODE IDENT
15542

DRAWING NO:

98-PL-057

REV:

A

FILE:

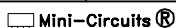
98PL057

SCALE:

6:1

SHEET:

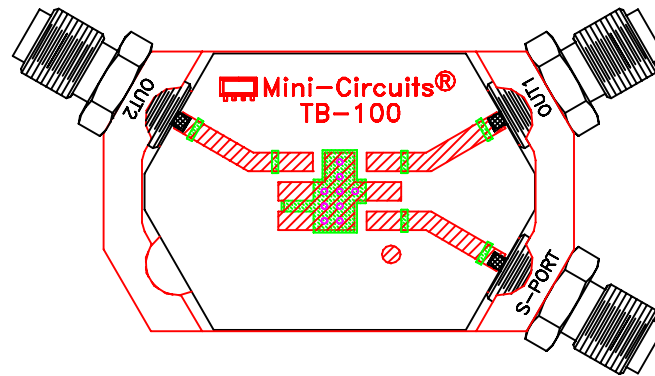
1 OF 1



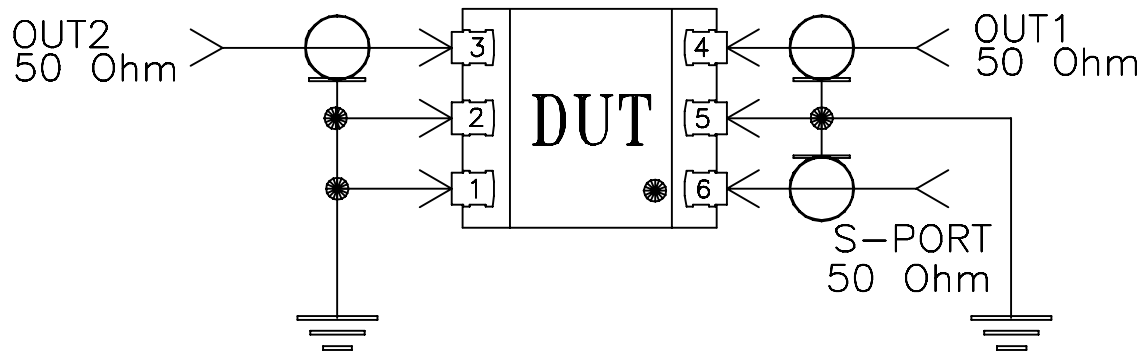
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ASHEETA1.DWG REV:A DATE:01/12/95

Evaluation Board and Circuit



TB-100



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