Surface Mount

Power Splitter/Combiner

ADP-2-4

2 Way-0° 50Ω 10 to 1000 MHz

Generic photo used for illustration purposes only

CASE STYLE: CD636

Maximum Ratings

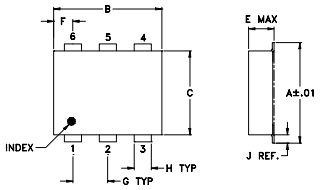
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Internal Dissipation	0.125W max.

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

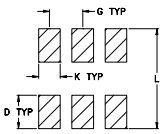
Pin Connections

SUM PORT	1
PORT 1	3
PORT 2	4
GROUND	6
Externally connect together & isolate	2,5

Outline Drawing



PCB Land Pattern



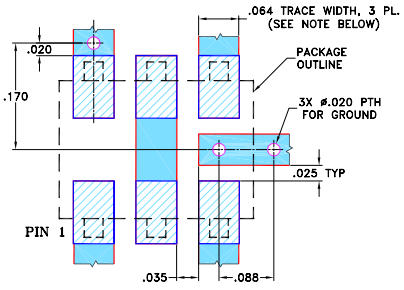
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.272	.310	.220	.100	.162	.055	.100
6.91	7.87	5.59	2.54	4.11	1.40	2.54

H	J	K	L	wt
.030	.026	.065	.300	grams
0.76	0.66	1.65	7.62	0.25

Demo Board MCL P/N: TB-208
Suggested PCB Layout (PL-116)



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

Features

- low insertion loss, 0.4 dB typ.
- excellent amplitude unbalance, 0.10 dB typ.
- very good phase unbalance, 0.5 deg. typ.
- aqueous washable
- protected under U.S. Patent 6,133,525

Applications

- instrumentation
- cellular

Electrical Specifications

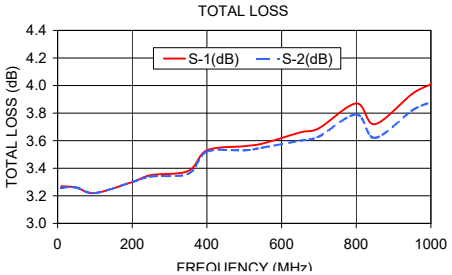
FREQ. RANGE (MHz)	ISOLATION (dB)						INSERTION LOSS (dB) ABOVE 3.0 dB						PHASE UNBALANCE (Degrees)			AMPLITUDE UNBALANCE (dB)		
	L		M		U		L		M		U		L	M	U	L	M	U
f_L-f_U	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Max.	Max.	Max.	Max.	Max.	Max.
10-1000	25	20	23	16	19	14	0.3	0.5	0.4	0.9	0.8	1.5	1.0	3.0	5.0	0.15	0.2	0.4

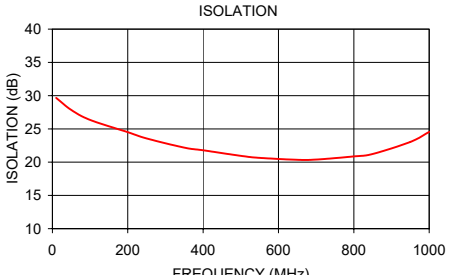
L = 10-100 MHz M = 100-500 MHz U = 500-1000 MHz

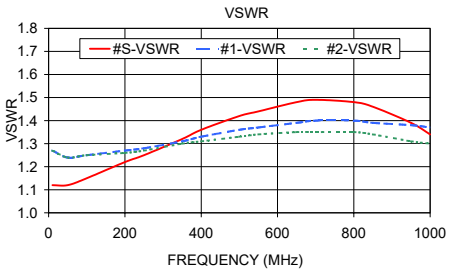
Typical Performance Data

Frequency (MHz)	Total Loss[1] (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
10.00	3.27	3.26	0.01	29.66	0.03	1.12	1.27	1.27
50.00	3.26	3.26	0.00	27.85	0.05	1.12	1.24	1.24
100.00	3.22	3.22	0.00	26.35	0.13	1.15	1.25	1.25
200.00	3.30	3.30	0.00	24.51	0.21	1.22	1.27	1.26
250.00	3.35	3.34	0.01	23.57	0.21	1.25	1.28	1.27
350.00	3.38	3.36	0.02	22.19	0.32	1.32	1.31	1.30
400.00	3.53	3.52	0.01	21.78	0.36	1.36	1.33	1.31
500.00	3.56	3.53	0.03	20.95	0.44	1.42	1.36	1.33
550.00	3.58	3.55	0.03	20.65	0.50	1.44	1.37	1.34
650.00	3.66	3.60	0.05	20.35	0.54	1.48	1.39	1.35
700.00	3.69	3.63	0.07	20.39	0.62	1.49	1.40	1.35
800.00	3.87	3.79	0.08	20.86	0.70	1.48	1.40	1.35
850.00	3.72	3.62	0.10	21.23	0.76	1.46	1.39	1.34
950.00	3.94	3.82	0.12	23.04	0.78	1.39	1.38	1.31
1000.00	4.01	3.88	0.13	24.55	0.90	1.34	1.37	1.30

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







electrical schematic

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

2 Way-0° Power Splitter/Combiner ADP-2-4

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			1-2	S	1	2
10	3.31	3.32	0.01	0.19	29.25	1.11	1.28	1.29
20	3.28	3.30	0.02	0.23	28.99	1.09	1.26	1.28
30	3.27	3.29	0.02	0.25	28.48	1.10	1.26	1.27
40	3.27	3.29	0.02	0.25	28.06	1.10	1.26	1.27
50	3.27	3.29	0.02	0.25	27.73	1.10	1.25	1.27
60	3.27	3.29	0.02	0.22	27.47	1.11	1.25	1.26
70	3.27	3.29	0.02	0.22	27.21	1.11	1.25	1.26
80	3.28	3.29	0.01	0.23	27.01	1.12	1.25	1.26
90	3.28	3.29	0.01	0.23	26.80	1.12	1.25	1.26
100	3.29	3.30	0.01	0.23	26.61	1.13	1.25	1.26
150	3.32	3.32	0.00	0.21	25.83	1.14	1.25	1.25
200	3.35	3.34	0.01	0.17	25.17	1.16	1.25	1.25
250	3.37	3.36	0.01	0.08	24.53	1.19	1.25	1.25
300	3.40	3.38	0.02	0.08	23.94	1.21	1.26	1.25
350	3.43	3.41	0.02	0.03	23.48	1.22	1.26	1.25
400	3.46	3.43	0.03	0.01	23.03	1.24	1.26	1.26
450	3.50	3.45	0.05	0.02	22.62	1.26	1.26	1.26
500	3.53	3.47	0.06	0.00	22.36	1.28	1.26	1.26
550	3.56	3.50	0.06	0.00	22.16	1.29	1.26	1.26
600	3.60	3.52	0.08	0.02	22.04	1.30	1.26	1.26
650	3.63	3.55	0.08	0.01	22.06	1.30	1.25	1.25
700	3.66	3.56	0.10	0.01	22.24	1.30	1.25	1.24
750	3.70	3.59	0.11	0.06	22.55	1.29	1.24	1.23
800	3.74	3.61	0.13	0.05	23.05	1.27	1.22	1.22
850	3.78	3.63	0.15	0.04	23.82	1.24	1.20	1.20
900	3.83	3.67	0.16	0.01	24.91	1.20	1.18	1.17
950	3.90	3.71	0.19	0.02	26.17	1.15	1.14	1.13
1000	4.01	3.79	0.22	0.00	26.73	1.10	1.10	1.09
1050	4.17	3.92	0.25	0.02	25.03	1.13	1.07	1.03
1100	4.43	4.15	0.29	0.00	21.70	1.26	1.09	1.06
1150	4.89	4.54	0.35	0.00	18.21	1.48	1.18	1.16
1200	5.63	5.21	0.41	0.04	15.09	1.84	1.32	1.30

[1]Total Loss = Insertion Loss + 3 dB Splitter Loss

2 Way-0° Power Splitter/Combiner ADP-2-4

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			1-2	S	1	2
10	3.22	3.22	0.00	0.20	25.97	1.13	1.32	1.33
20	3.22	3.24	0.01	0.25	30.45	1.09	1.25	1.26
30	3.22	3.23	0.01	0.25	32.50	1.09	1.23	1.24
40	3.21	3.23	0.02	0.24	33.44	1.10	1.22	1.23
50	3.21	3.23	0.02	0.26	33.74	1.11	1.21	1.22
60	3.22	3.24	0.02	0.22	33.44	1.11	1.21	1.22
70	3.22	3.24	0.02	0.22	32.71	1.12	1.20	1.22
80	3.23	3.24	0.01	0.24	31.84	1.13	1.20	1.22
90	3.23	3.24	0.01	0.23	30.93	1.14	1.20	1.22
100	3.24	3.25	0.01	0.23	30.11	1.15	1.21	1.22
150	3.26	3.26	0.00	0.20	28.00	1.16	1.22	1.22
200	3.27	3.27	0.00	0.17	27.42	1.17	1.21	1.21
250	3.30	3.29	0.01	0.10	25.80	1.22	1.23	1.23
300	3.33	3.31	0.02	0.09	24.72	1.24	1.24	1.24
350	3.35	3.32	0.03	0.05	24.24	1.25	1.24	1.24
400	3.37	3.35	0.02	0.01	23.46	1.28	1.24	1.25
450	3.40	3.36	0.04	0.00	22.95	1.30	1.25	1.25
500	3.43	3.37	0.06	0.04	22.69	1.31	1.25	1.25
550	3.45	3.39	0.06	0.07	22.47	1.31	1.25	1.25
600	3.47	3.40	0.07	0.04	22.42	1.31	1.25	1.25
650	3.50	3.42	0.08	0.05	22.44	1.31	1.24	1.24
700	3.53	3.43	0.10	0.04	22.57	1.31	1.24	1.23
750	3.56	3.44	0.12	0.00	22.93	1.29	1.22	1.22
800	3.59	3.46	0.13	0.02	23.40	1.27	1.21	1.21
850	3.62	3.47	0.15	0.04	24.17	1.24	1.19	1.19
900	3.67	3.50	0.17	0.08	25.33	1.20	1.17	1.16
950	3.72	3.53	0.19	0.06	26.63	1.15	1.14	1.13
1000	3.82	3.59	0.23	0.06	27.01	1.10	1.10	1.09
1050	3.97	3.70	0.26	0.12	24.96	1.13	1.06	1.03
1100	4.21	3.90	0.30	0.12	21.38	1.27	1.09	1.07
1150	4.64	4.27	0.37	0.10	17.77	1.52	1.19	1.18
1200	5.38	4.94	0.44	0.07	14.67	1.91	1.35	1.33

[1]Total Loss = Insertion Loss + 3 dB Splitter Loss

2 Way-0° Power Splitter/Combiner ADP-2-4

Typical Performance Data

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

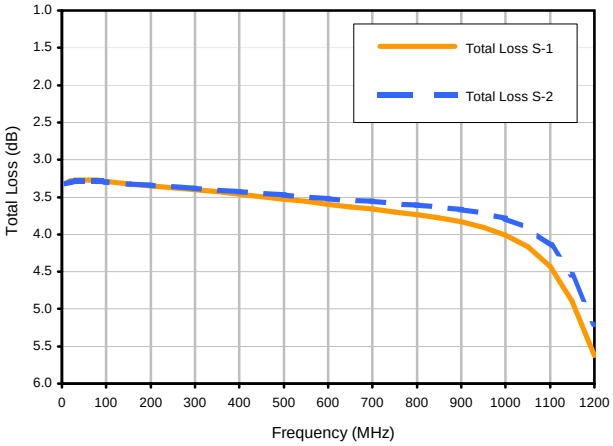
FREQ. (MHz)	TOTAL LOSS[1] (dB)		AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION (dB)	VSWR (:1)		
	S-1	S-2			1-2	S	1	2
10	3.43	3.43	0.00	0.20	25.45	1.12	1.36	1.37
20	3.37	3.39	0.03	0.26	24.95	1.10	1.34	1.35
30	3.35	3.37	0.02	0.26	24.51	1.10	1.34	1.35
40	3.34	3.37	0.03	0.27	24.16	1.10	1.33	1.35
50	3.34	3.37	0.03	0.29	23.89	1.10	1.33	1.35
60	3.35	3.37	0.02	0.25	23.71	1.10	1.33	1.35
70	3.35	3.38	0.03	0.24	23.57	1.10	1.33	1.34
80	3.35	3.38	0.03	0.25	23.48	1.10	1.33	1.34
90	3.36	3.38	0.02	0.24	23.45	1.10	1.33	1.34
100	3.36	3.38	0.02	0.23	23.46	1.10	1.33	1.34
150	3.39	3.40	0.01	0.20	23.41	1.12	1.31	1.32
200	3.43	3.42	0.01	0.17	22.81	1.15	1.31	1.31
250	3.45	3.44	0.01	0.05	22.48	1.16	1.31	1.31
300	3.47	3.46	0.01	0.04	22.35	1.17	1.30	1.30
350	3.51	3.48	0.03	0.00	22.12	1.19	1.29	1.29
400	3.54	3.51	0.03	0.06	21.84	1.21	1.29	1.29
450	3.57	3.53	0.04	0.11	21.66	1.23	1.29	1.29
500	3.60	3.55	0.05	0.08	21.58	1.24	1.28	1.28
550	3.64	3.58	0.06	0.08	21.51	1.26	1.28	1.28
600	3.68	3.61	0.07	0.11	21.46	1.27	1.27	1.28
650	3.72	3.64	0.08	0.11	21.60	1.28	1.27	1.27
700	3.75	3.66	0.09	0.12	21.86	1.28	1.26	1.26
750	3.79	3.69	0.10	0.17	22.14	1.28	1.25	1.25
800	3.84	3.73	0.11	0.15	22.55	1.27	1.24	1.24
850	3.89	3.75	0.14	0.16	23.32	1.25	1.22	1.22
900	3.95	3.80	0.15	0.15	24.26	1.21	1.19	1.19
950	4.02	3.85	0.17	0.16	25.37	1.17	1.16	1.16
1000	4.14	3.94	0.20	0.13	26.20	1.13	1.13	1.11
1050	4.31	4.09	0.22	0.09	25.40	1.14	1.09	1.06
1100	4.57	4.32	0.26	0.11	22.59	1.24	1.09	1.05
1150	5.00	4.69	0.31	0.11	19.18	1.43	1.16	1.13
1200	5.71	5.34	0.37	0.11	16.08	1.74	1.29	1.26

[1]Total Loss = Insertion Loss + 3 dB Splitter Loss

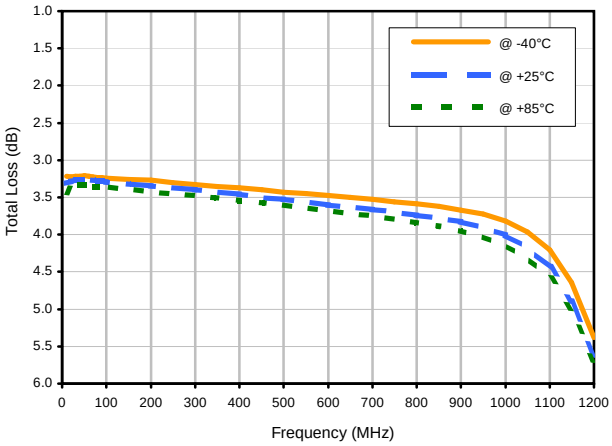
2 Way-0° Power Splitter/Combiner ADP-2-4

Typical Performance Curves

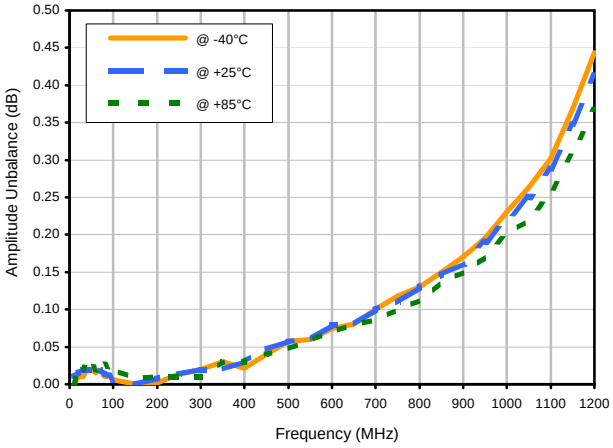
Total Loss



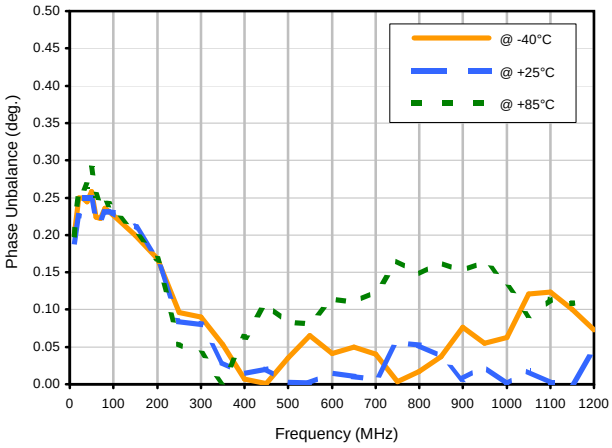
Total Loss S-1 vs. TEMPERATURE



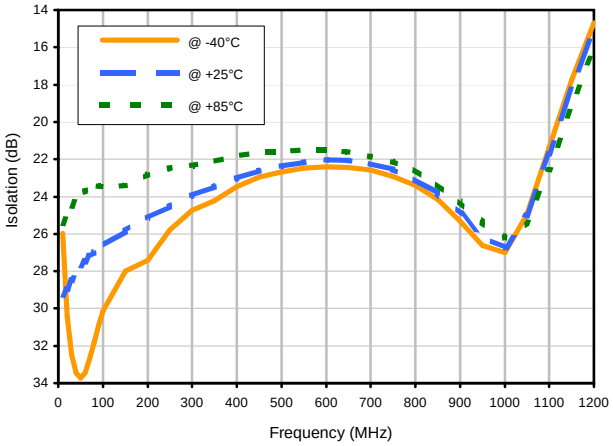
Amplitude Unbalance vs. TEMPERATURE



Phase Unbalance vs. TEMPERATURE



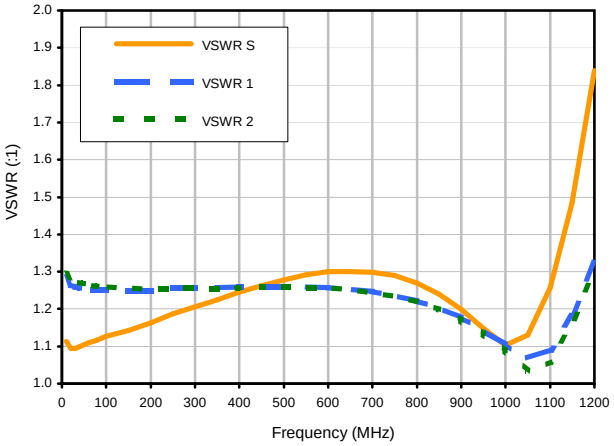
Isolation 1-2 vs. TEMPERATURE



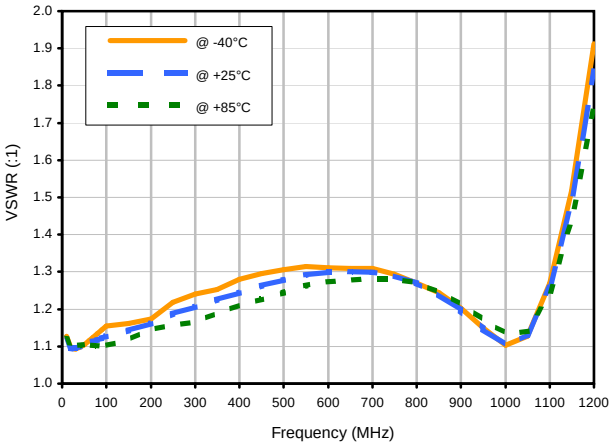
2 Way-0° Power Splitter/Combiner ADP-2-4

Typical Performance Curves

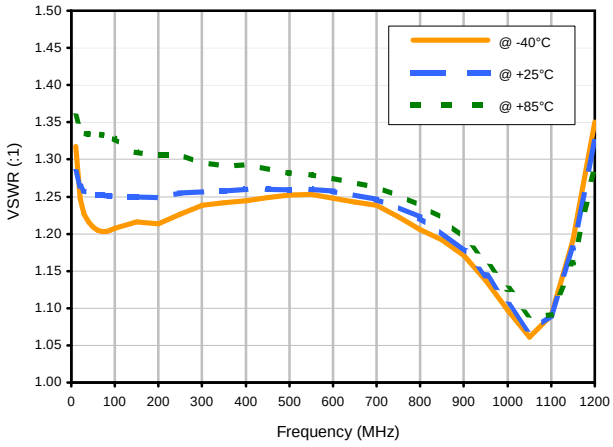
VSWR



VSWR SUM vs. TEMPERATURE



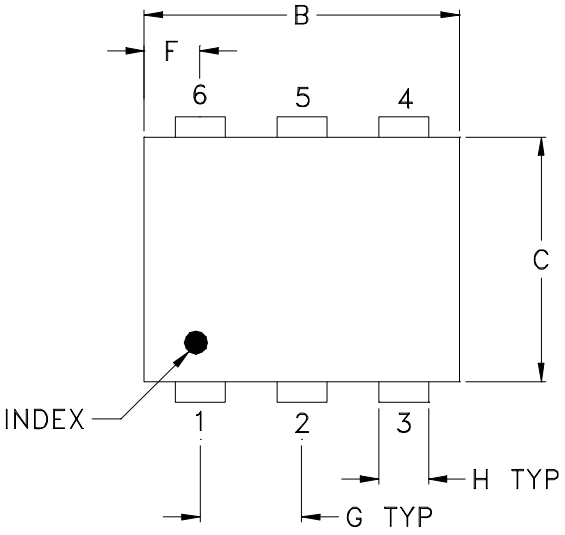
VSWR OUT1 vs. TEMPERATURE

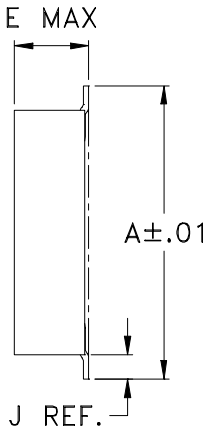


Case Style CD

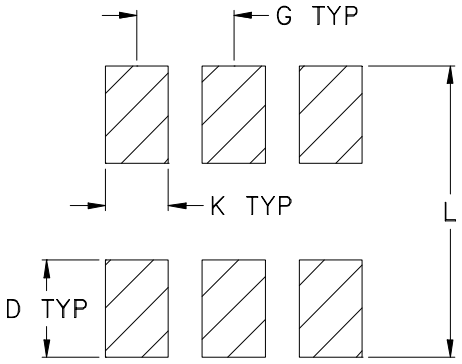
CD541
CD542
CD636
CD637

Outline Dimensions





PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	WT, GRAM
CD541	.272 (6.91)	.310 (7.87)	.220 (5.58)	.100 (2.54)	.082 (2.08)	.055 (1.40)	.100 (2.54)	.030 (0.76)	.026 (0.66)	.065 (1.65)	.300 (7.62)	.15
CD542					.112 (2.84)							.20
CD636					.162 (4.11)							.25
CD637					.206 (5.23)							.40

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

Notes:

1. Case material: Plastic.
2. 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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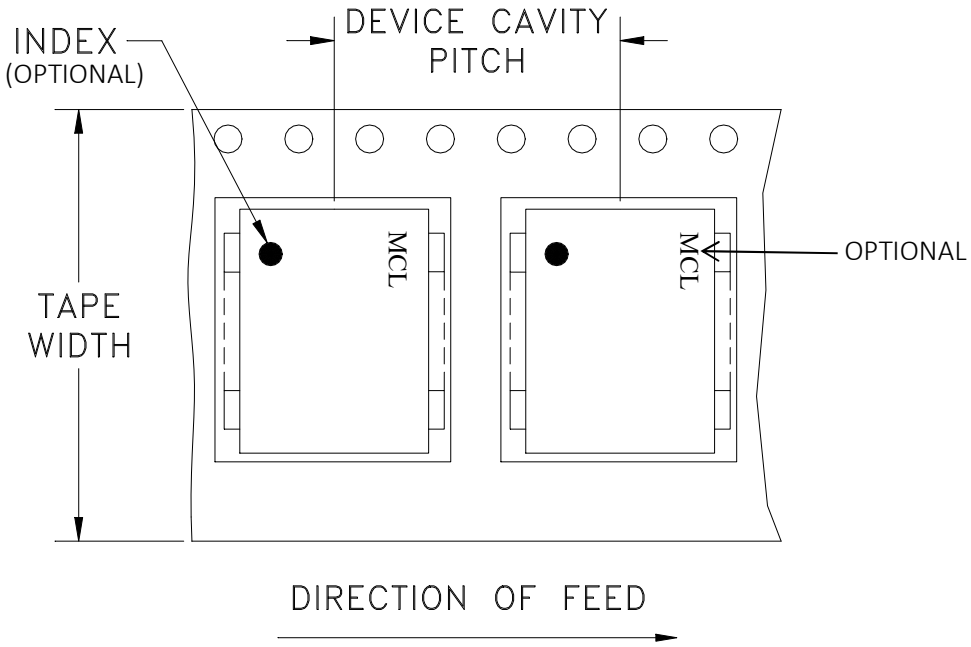
Tape & Reel Packaging TR-F34

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
16	12	7	Small quantity standard (see note)	20
				50
				100
				200
		13	Standard	500
				1000

Note: Availability of small reel quantity varies by model.
Refer to pricing and availability on individual model dashboard.

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

Mini-Circuits®
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P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
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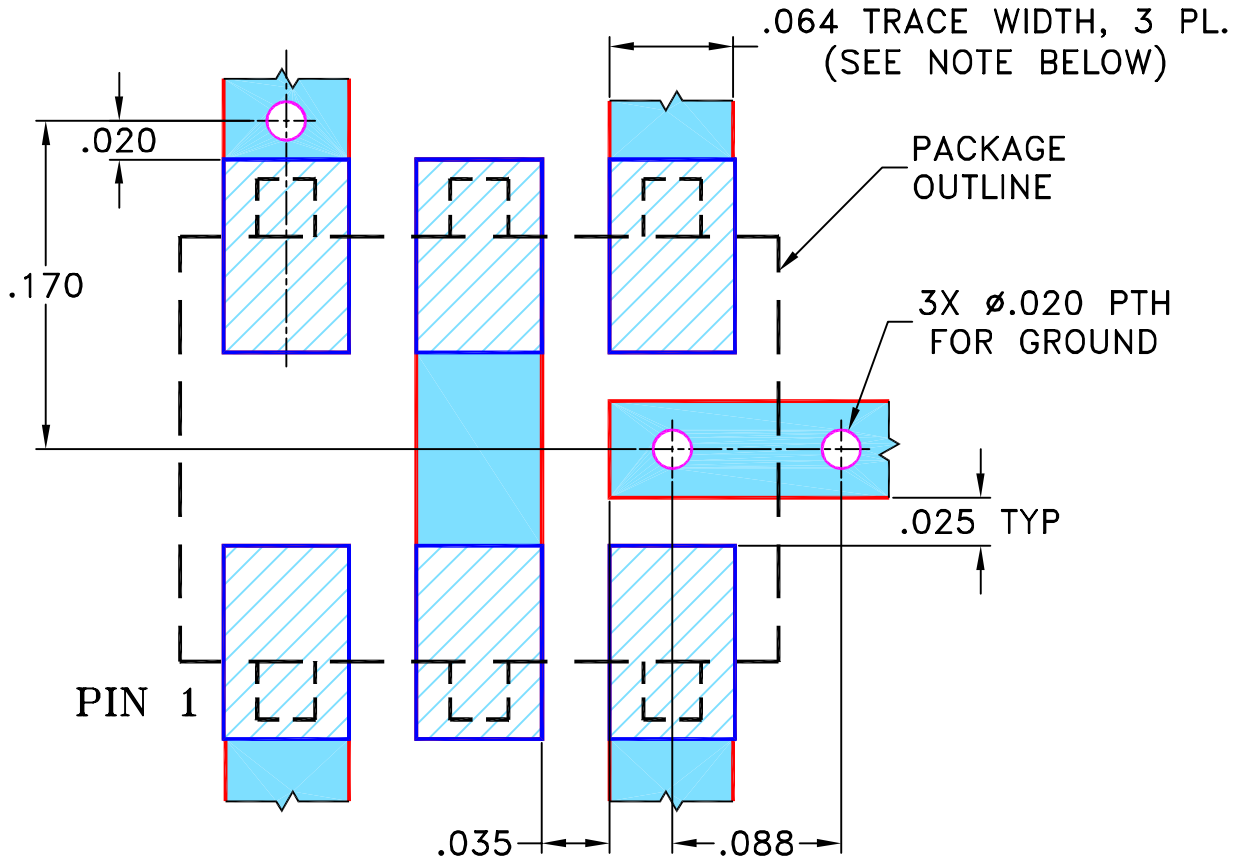
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82448	NEW RELEASE	12/06/02	MMG	HY
A	M102713	ADDED "...WITH SMOBC"	01/17/06	MMG	IL

SUGGESTED MOUNTING CONFIGURATION
FOR CD636 CASE STYLE, "mp" PIN CONNECTION



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

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	MMG	11/19/02
TOLERANCES ON:	CHECKED	AV	12/05/02
2 PL DECIMALS ±	APPROVED	HY	12/06/02
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

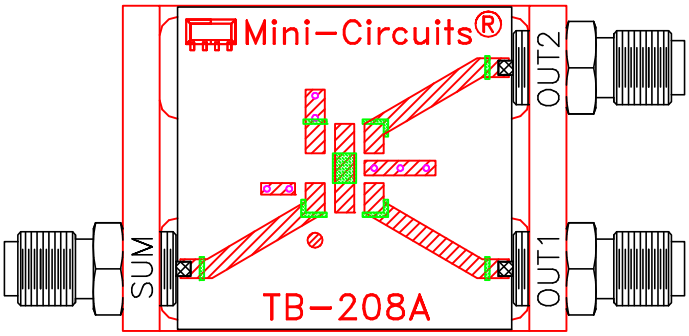
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, mp, CD636, ADP, TB-208

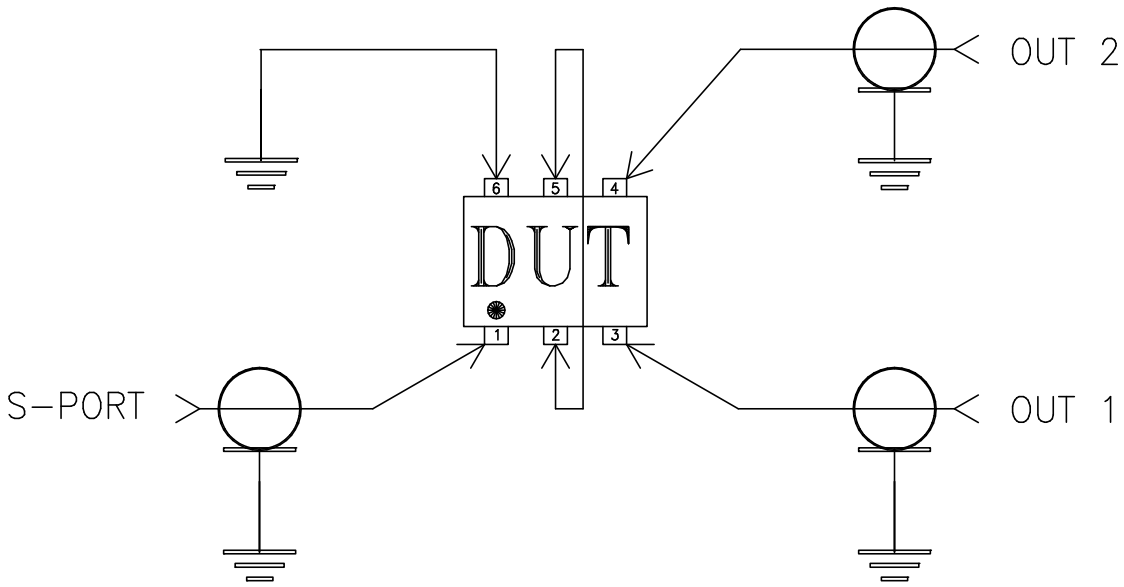
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-116	A

FILE:	SCALE:	SHEET:
98PL116	10:1	1 OF 1

Evaluation Board and Circuit



TB-208



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

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Environmental Specifications ENV02T1

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