Surface Mount

Power Splitter/Combiner

SC4PS-33+

4 Way-0° 50Ω 300 to 3000 MHz

Generic photo used for illustration purposes only

CASE STYLE: CK1704

+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	0.20W max.

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

Pin Connections

SUM PORT	10
PORT 1	1
PORT 2	2
PORT 3	3
PORT 4	4
GROUND	ALL OTHER

Features

- wideband, 300 to 3000 MHz, useable from 100 to 3600 MHz
- low insertion loss, 1.6 dB typ.
- good isolation, 17 dB typ.
- good amplitude unbalance, 0.4 dB typ.

Applications

- communication systems
- CATV
- cellular, GPS, PCS
- VHF/UHF/receivers/transmitters

Electrical Specifications at 25°C

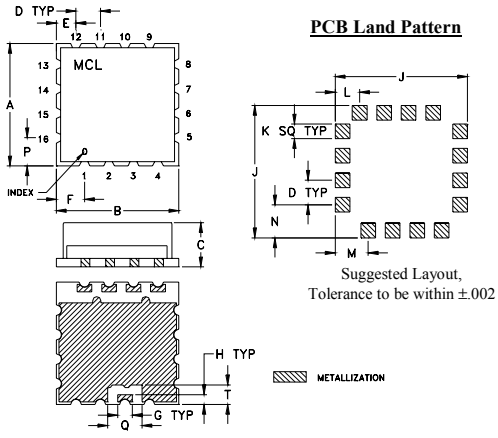
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		300	—	3000	MHz
Insertion Loss Above 6.0 dB	300 - 2700 2700 - 3000	—	1.6 2.6	3.1 3.8	dB
Isolation	300 - 3000	12	17	—	dB
Phase Unbalance	300 - 2700 2700 - 3000	— —	7 12	15 20	Degree
Amplitude Unbalance	300 - 2700 2700 - 3000	—	0.4 0.7	0.9 1.2	dB
VSWR (Port S)	300 - 3000	—	2.1	—	:1
VSWR (Port 1-4)	300 - 3000	—	1.5	—	:1

Typical Performance Data

Freq. (MHz)	Total Loss[1] (dB) S-1	S-2	S-3	S-4	Amp. Unbal. (dB)	Isolation (dB) 1-2	2-3	2-4	Phase Unbal. (deg.)	VSWR S	VSWR 1	VSWR 2	VSWR 3	VSWR 4
300.0	7.20	7.22	7.09	7.09	0.13	15.56	19.89	16.67	1.15	2.46	1.28	1.28	1.29	1.27
500.0	7.18	7.20	7.06	7.04	0.17	15.90	21.83	17.28	1.71	2.32	1.31	1.31	1.33	1.31
700.0	7.26	7.28	7.11	7.07	0.21	16.14	24.40	17.66	2.06	2.29	1.38	1.38	1.41	1.38
900.0	7.43	7.44	7.27	7.21	0.23	16.28	27.19	17.78	2.29	2.34	1.47	1.47	1.52	1.48
1100.0	7.60	7.60	7.42	7.36	0.25	16.48	30.54	17.90	2.55	2.39	1.57	1.57	1.62	1.58
1300.0	7.71	7.67	7.49	7.43	0.28	17.02	34.52	18.43	2.93	2.35	1.65	1.65	1.71	1.66
1500.0	7.62	7.58	7.40	7.33	0.29	18.04	29.99	19.63	3.31	2.16	1.70	1.67	1.74	1.70
1700.0	7.48	7.33	7.18	7.13	0.35	20.26	23.77	22.45	3.84	1.82	1.66	1.62	1.71	1.67
1900.0	7.32	7.06	6.96	6.90	0.41	24.66	19.55	28.42	4.71	1.41	1.57	1.52	1.60	1.56
2100.0	7.29	6.94	6.90	6.84	0.45	35.91	16.89	31.12	5.70	1.12	1.48	1.41	1.50	1.45
2300.0	7.54	7.12	7.14	7.08	0.46	32.14	15.43	24.09	7.01	1.37	1.46	1.34	1.45	1.39
2500.0	7.96	7.46	7.52	7.48	0.51	25.62	14.83	20.89	8.66	1.71	1.46	1.33	1.44	1.38
2700.0	8.48	7.89	7.95	7.89	0.59	22.85	14.80	19.22	10.64	2.00	1.47	1.32	1.43	1.36
2900.0	8.95	8.25	8.26	8.18	0.77	21.31	15.32	18.31	12.58	2.21	1.47	1.29	1.40	1.33
3000.0	9.14	8.39	8.38	8.28	0.86	20.49	15.86	17.91	13.44	2.26	1.48	1.28	1.39	1.33

1. Total Loss = Insertion Loss + 6dB splitter loss.

Outline Drawing

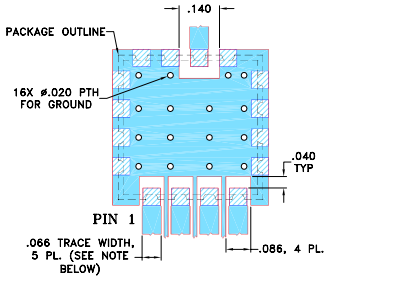


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J
.500 12.70	.500 12.70	.180 4.57	.100 2.54	.080 2.03	.115 2.92	.060 1.52	.040 1.02	.540 13.72

K	L	M	N	P	Q	T	wt.
.060 1.52	.100 2.54	.135 3.43	.135 3.43	.115 2.92	.140 3.56	.080 2.03	grams 1.0

Demo Board MCL P/N: TB-652+
Suggested PCB Layout (PL-368)

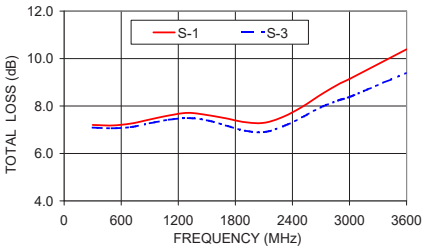


NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

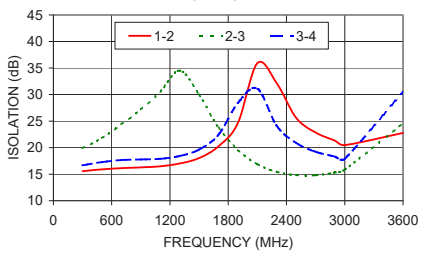
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

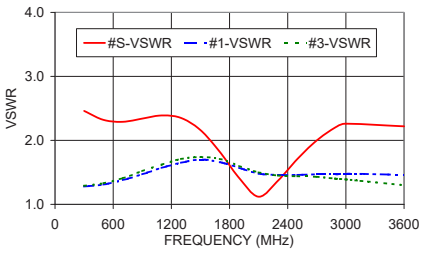
SC4PS-33+
TOTAL LOSS



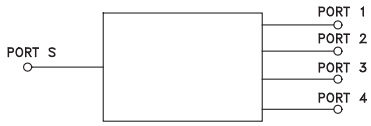
SC4PS-33+
ISOLATION



SC4PS-33+
VSWR



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

4 Way-0° Power Splitter/Combiner SC4PS-33+

Typical Performance Data

FREQ. (MHz)	TOTAL LOSS[1] (dB)				AMP. UNBAL. (dB)	ISOLATION (dB)			PHASE UNBAL. (deg.)
	S-1	S-2	S-3	S-4		1-2	2-3	3-4	
300.0	7.20	7.22	7.09	7.09	0.13	15.56	19.89	16.67	1.15
350.0	7.18	7.20	7.07	7.06	0.14	15.66	20.30	16.84	1.33
400.0	7.17	7.19	7.06	7.04	0.15	15.75	20.77	16.99	1.50
450.0	7.18	7.20	7.06	7.03	0.16	15.83	21.28	17.15	1.59
500.0	7.18	7.20	7.06	7.04	0.17	15.90	21.83	17.28	1.71
550.0	7.19	7.22	7.06	7.03	0.18	15.99	22.44	17.43	1.83
600.0	7.21	7.23	7.07	7.03	0.20	16.04	23.07	17.53	1.88
650.0	7.24	7.26	7.09	7.06	0.20	16.06	23.70	17.56	1.96
700.0	7.26	7.28	7.11	7.07	0.21	16.14	24.40	17.66	2.06
750.0	7.29	7.32	7.14	7.09	0.22	16.20	25.10	17.74	2.10
800.0	7.35	7.36	7.19	7.14	0.22	16.19	25.73	17.72	2.12
850.0	7.38	7.40	7.23	7.18	0.22	16.21	26.46	17.71	2.18
900.0	7.43	7.44	7.27	7.21	0.23	16.28	27.19	17.78	2.29
950.0	7.49	7.49	7.31	7.25	0.24	16.33	27.88	17.81	2.31
1000.0	7.53	7.53	7.35	7.29	0.24	16.35	28.63	17.79	2.36
1050.0	7.55	7.56	7.38	7.32	0.23	16.38	29.56	17.79	2.45
1100.0	7.60	7.60	7.42	7.36	0.25	16.48	30.54	17.90	2.55
1150.0	7.66	7.65	7.46	7.40	0.26	16.61	31.45	18.02	2.58
1200.0	7.68	7.66	7.47	7.42	0.26	16.69	32.52	18.10	2.67
1250.0	7.68	7.66	7.47	7.42	0.27	16.80	33.75	18.21	2.83
1300.0	7.71	7.67	7.49	7.43	0.28	17.02	34.52	18.43	2.93
1350.0	7.72	7.68	7.49	7.43	0.29	17.33	34.41	18.80	3.02
1400.0	7.69	7.65	7.47	7.41	0.28	17.52	33.35	19.06	3.20
1450.0	7.66	7.62	7.45	7.38	0.28	17.68	31.74	19.24	3.22
1500.0	7.62	7.58	7.40	7.33	0.29	18.04	29.99	19.63	3.31
1550.0	7.57	7.52	7.36	7.28	0.28	18.60	28.23	20.32	3.37
1600.0	7.55	7.47	7.31	7.24	0.31	19.20	26.61	21.10	3.51
1650.0	7.52	7.40	7.24	7.19	0.33	19.65	25.13	21.72	3.68
1700.0	7.48	7.33	7.18	7.13	0.35	20.26	23.77	22.45	3.84
1750.0	7.43	7.26	7.12	7.07	0.36	21.20	22.54	23.64	3.99
1800.0	7.38	7.18	7.05	7.01	0.37	22.25	21.45	25.10	4.27
1850.0	7.34	7.12	7.01	6.95	0.39	23.29	20.45	26.59	4.49
1900.0	7.32	7.06	6.96	6.90	0.41	24.66	19.55	28.42	4.71
1950.0	7.31	7.01	6.92	6.86	0.44	26.51	18.80	30.63	4.92
2000.0	7.29	6.97	6.91	6.84	0.45	28.72	18.06	32.92	5.12
2050.0	7.27	6.95	6.90	6.83	0.44	31.56	17.39	33.46	5.40
2100.0	7.29	6.94	6.90	6.84	0.45	35.91	16.89	31.12	5.70
2150.0	7.32	6.95	6.94	6.87	0.45	42.26	16.45	28.79	5.98
2200.0	7.37	6.99	7.00	6.93	0.44	39.72	16.03	27.03	6.32
2250.0	7.45	7.05	7.06	7.00	0.45	35.05	15.66	25.49	6.65
2300.0	7.54	7.12	7.14	7.08	0.46	32.14	15.43	24.09	7.01
2350.0	7.63	7.19	7.22	7.16	0.46	29.64	15.23	23.01	7.40
2400.0	7.74	7.27	7.32	7.27	0.47	27.71	15.03	22.15	7.76
2450.0	7.85	7.37	7.42	7.37	0.49	26.60	14.91	21.51	8.19
2500.0	7.96	7.46	7.52	7.48	0.51	25.62	14.83	20.89	8.66
2550.0	8.09	7.57	7.63	7.58	0.52	24.58	14.76	20.29	9.18
2600.0	8.23	7.69	7.75	7.70	0.54	23.74	14.73	19.83	9.64
2650.0	8.37	7.80	7.86	7.81	0.57	23.27	14.76	19.55	10.14
2700.0	8.48	7.89	7.95	7.89	0.59	22.85	14.80	19.22	10.64
2750.0	8.59	7.98	8.03	7.97	0.62	22.23	14.88	18.79	11.07
2800.0	8.71	8.07	8.11	8.03	0.67	21.78	15.00	18.59	11.61
2850.0	8.83	8.15	8.18	8.10	0.73	21.52	15.12	18.51	12.12
2900.0	8.95	8.25	8.26	8.18	0.77	21.31	15.32	18.31	12.58
2950.0	9.04	8.32	8.32	8.22	0.82	20.89	15.56	18.04	13.01
3000.0	9.14	8.39	8.38	8.28	0.86	20.49	15.86	17.91	13.44

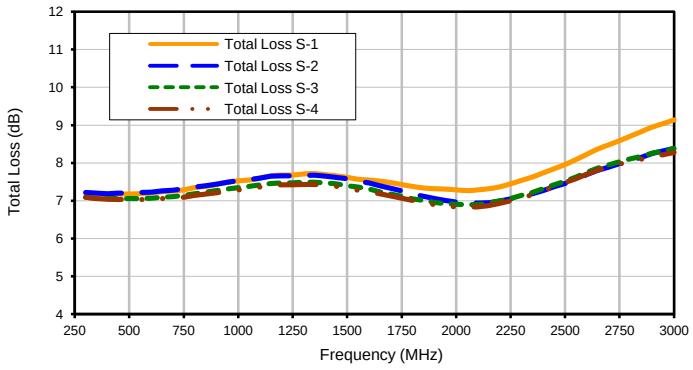
FREQ. (MHz)	VSWR (:1)				
	S	1	2	3	4
300.0	2.46	1.28	1.28	1.29	1.27
350.0	2.40	1.28	1.28	1.29	1.27
400.0	2.36	1.28	1.28	1.30	1.28
450.0	2.34	1.30	1.29	1.31	1.29
500.0	2.32	1.31	1.31	1.33	1.31
550.0	2.30	1.32	1.32	1.35	1.32
600.0	2.30	1.34	1.34	1.37	1.34
650.0	2.30	1.36	1.36	1.39	1.36
700.0	2.29	1.38	1.38	1.41	1.38
750.0	2.30	1.40	1.40	1.44	1.40
800.0	2.32	1.43	1.43	1.46	1.43
850.0	2.33	1.45	1.45	1.49	1.46
900.0	2.34	1.47	1.47	1.52	1.48
950.0	2.37	1.51	1.50	1.54	1.51
1000.0	2.38	1.53	1.52	1.57	1.54
1050.0	2.37	1.54	1.55	1.59	1.56
1100.0	2.39	1.57	1.57	1.62	1.58
1150.0	2.40	1.61	1.59	1.65	1.61
1200.0	2.39	1.63	1.61	1.67	1.62
1250.0	2.36	1.63	1.63	1.69	1.64
1300.0	2.35	1.65	1.65	1.71	1.66
1350.0	2.32	1.68	1.66	1.73	1.67
1400.0	2.28	1.68	1.67	1.74	1.68
1450.0	2.22	1.67	1.67	1.74	1.69
1500.0	2.16	1.70	1.67	1.74	1.70
1550.0	2.07	1.73	1.67	1.74	1.70
1600.0	2.00	1.69	1.65	1.74	1.68
1650.0	1.92	1.65	1.64	1.73	1.67
1700.0	1.82	1.66	1.62	1.71	1.67
1750.0	1.72	1.68	1.60	1.69	1.65
1800.0	1.62	1.63	1.57	1.67	1.61
1850.0	1.52	1.57	1.55	1.64	1.58
1900.0	1.41	1.57	1.52	1.60	1.56
1950.0	1.31	1.58	1.49	1.58	1.53
2000.0	1.23	1.55	1.46	1.55	1.50
2050.0	1.16	1.50	1.43	1.52	1.47
2100.0	1.12	1.48	1.41	1.50	1.45
2150.0	1.14	1.49	1.38	1.48	1.43
2200.0	1.20	1.47	1.36	1.47	1.41
2250.0	1.29	1.45	1.35	1.45	1.40
2300.0	1.37	1.46	1.34	1.45	1.39
2350.0	1.45	1.47	1.34	1.44	1.39
2400.0	1.55	1.46	1.33	1.44	1.39
2450.0	1.63	1.46	1.33	1.44	1.39
2500.0	1.71	1.46	1.33	1.44	1.38
2550.0	1.79	1.47	1.33	1.44	1.37
2600.0	1.87	1.47	1.32	1.43	1.38
2650.0	1.93	1.47	1.32	1.43	1.38
2700.0	2.00	1.47	1.32	1.43	1.36
2750.0	2.07	1.47	1.31	1.42	1.35
2800.0	2.10	1.47	1.31	1.41	1.35
2850.0	2.15	1.46	1.30	1.40	1.35
2900.0	2.21	1.47	1.29	1.40	1.33
2950.0	2.24	1.48	1.29	1.39	1.33
3000.0	2.26	1.48	1.28	1.39	1.33

[1]Total Loss = Insertion Loss+ 6dB Splitter Loss

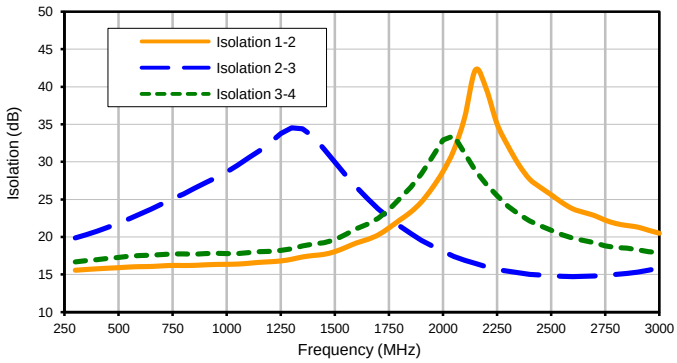
4 Way-0° Power Splitter/Combiner SC4PS-33+

Typical Performance Curves

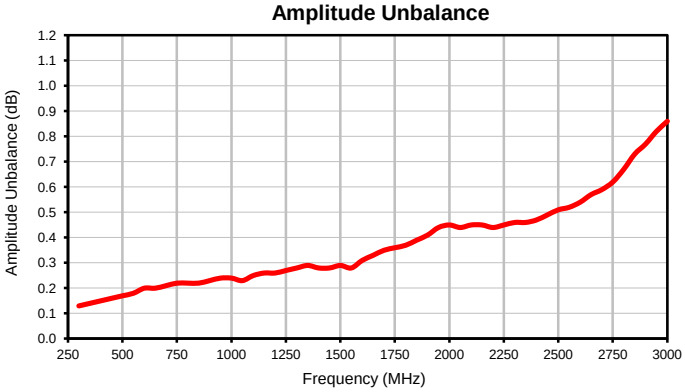
Total Loss



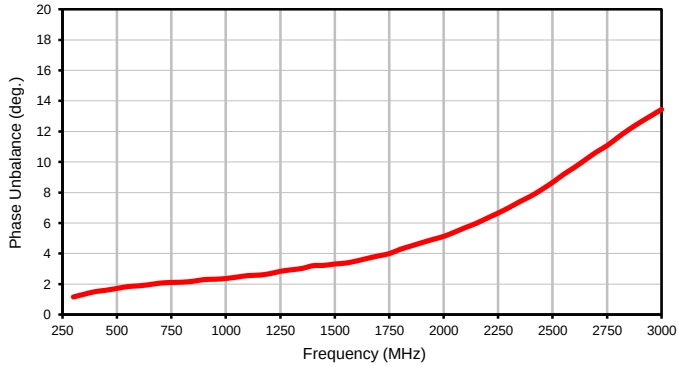
Isolation



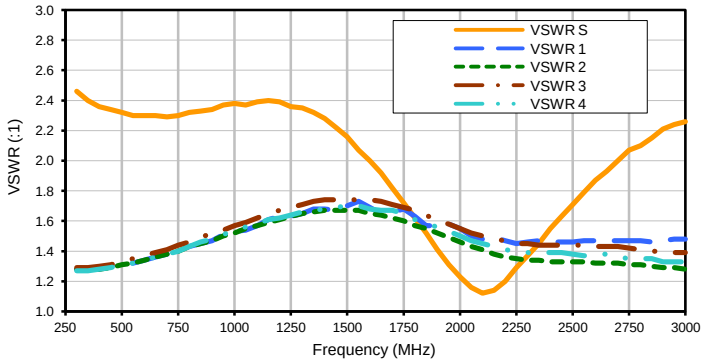
Amplitude Unbalance



Phase Unbalance



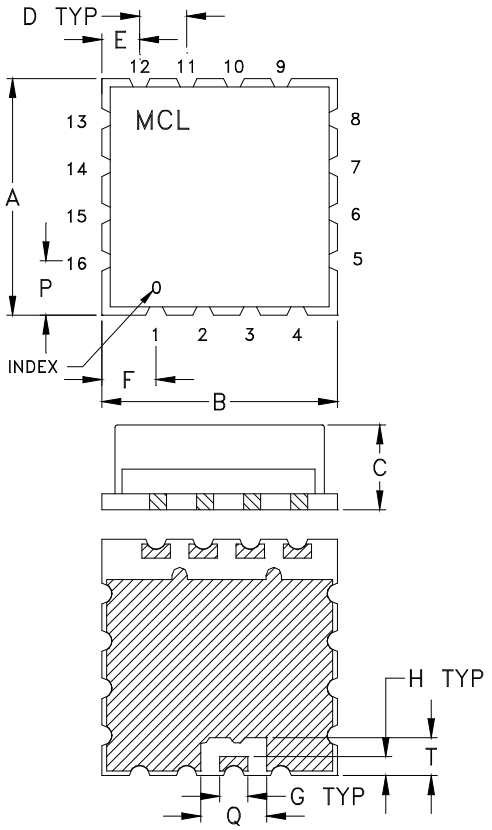
VSWR



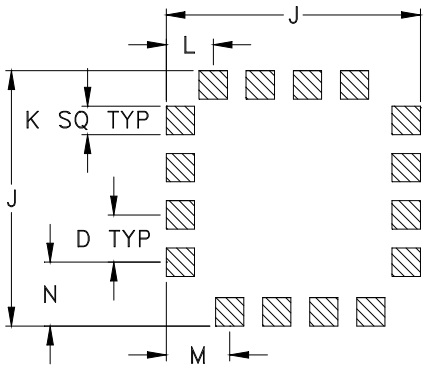
Case Style CK

Outline Dimensions

CK1704



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

METALLIZATION

CASE #	A	B	C	D	E	F	G	H	J	K
CK1704	.500 (12.70)	.500 (12.70)	.180 (4.57)	.100 (2.54)	.080 (2.03)	.115 (2.92)	.060 (1.52)	.040 (1.02)	.540 (13.72)	.060 (1.52)

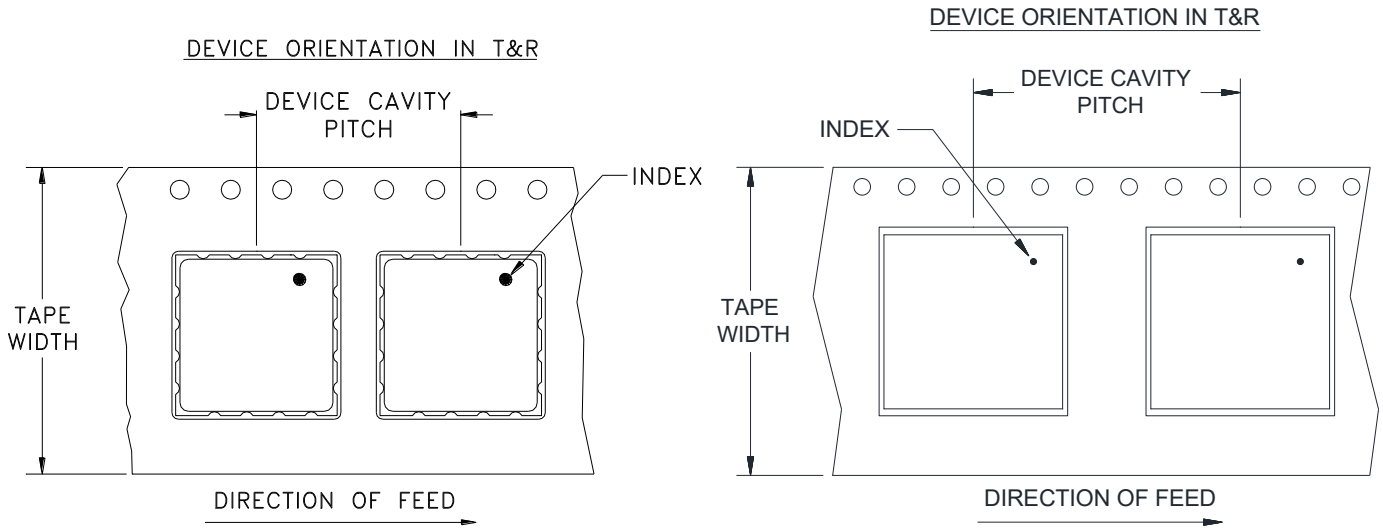
CASE #	L	M	N	P	Q	R	S	T	WT. GRAM
CK1704	.100 (2.54)	.135 (3.43)	.135 (3.43)	.115 (2.92)	.140 (3.56)	- -	- -	.080 (2.03)	1.0

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .03; 3Pl. ± .015

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 3-5 µ inch (.08-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate.
   All models, (+) suffix.

Tape & Reel Packaging TR-F37



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
24	16	7	Small quantity standards (see note)	10
				20
				50
				100
		13	Standard	200
				500

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

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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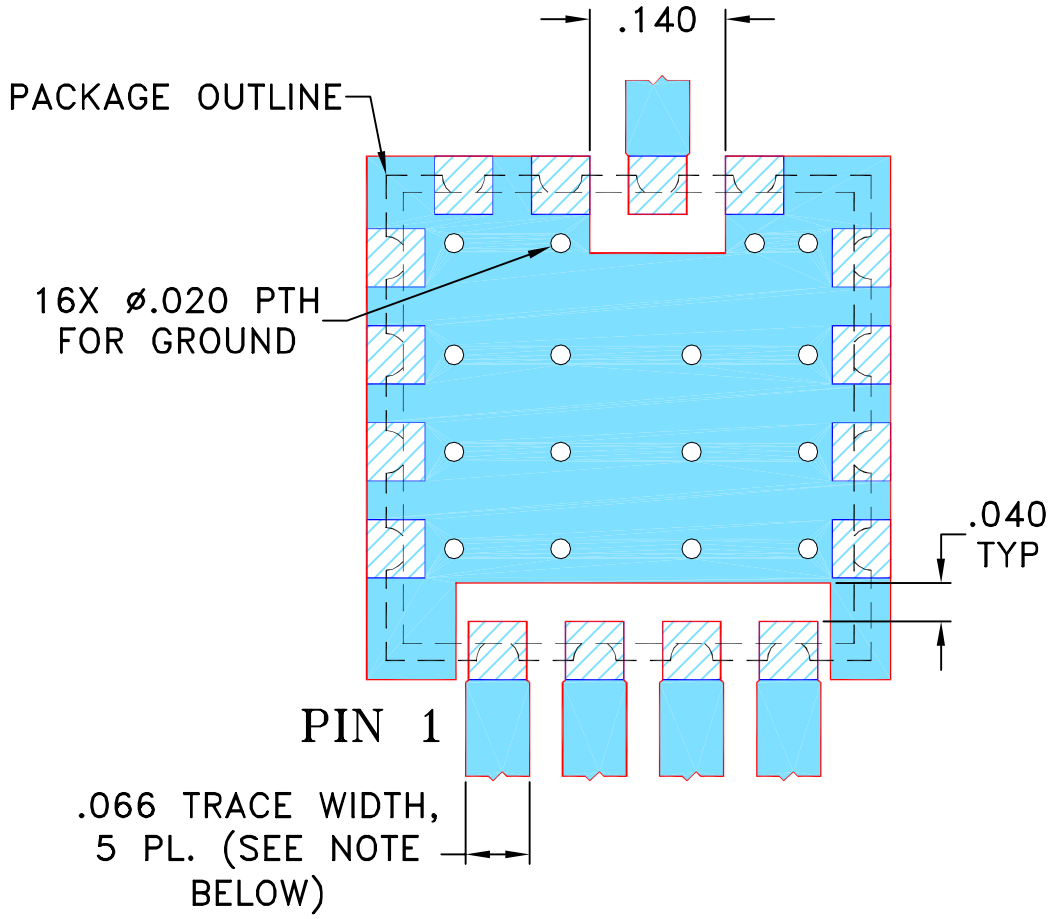
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M136731	NEW RELEASE	05/14/12	AV	ABD
A	M145165	UPDATED PCB PATTERN	02/28/14	AV	JC

SUGGESTED MOUNTING CONFIGURATION FOR CK1704 CASE STYLE, "16SP01" 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	AV	04/17/12
TOLERANCES ON:	CHECKED	IL	05/14/12
2 PL DECIMALS ±	APPROVED	ABD	05/14/12
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

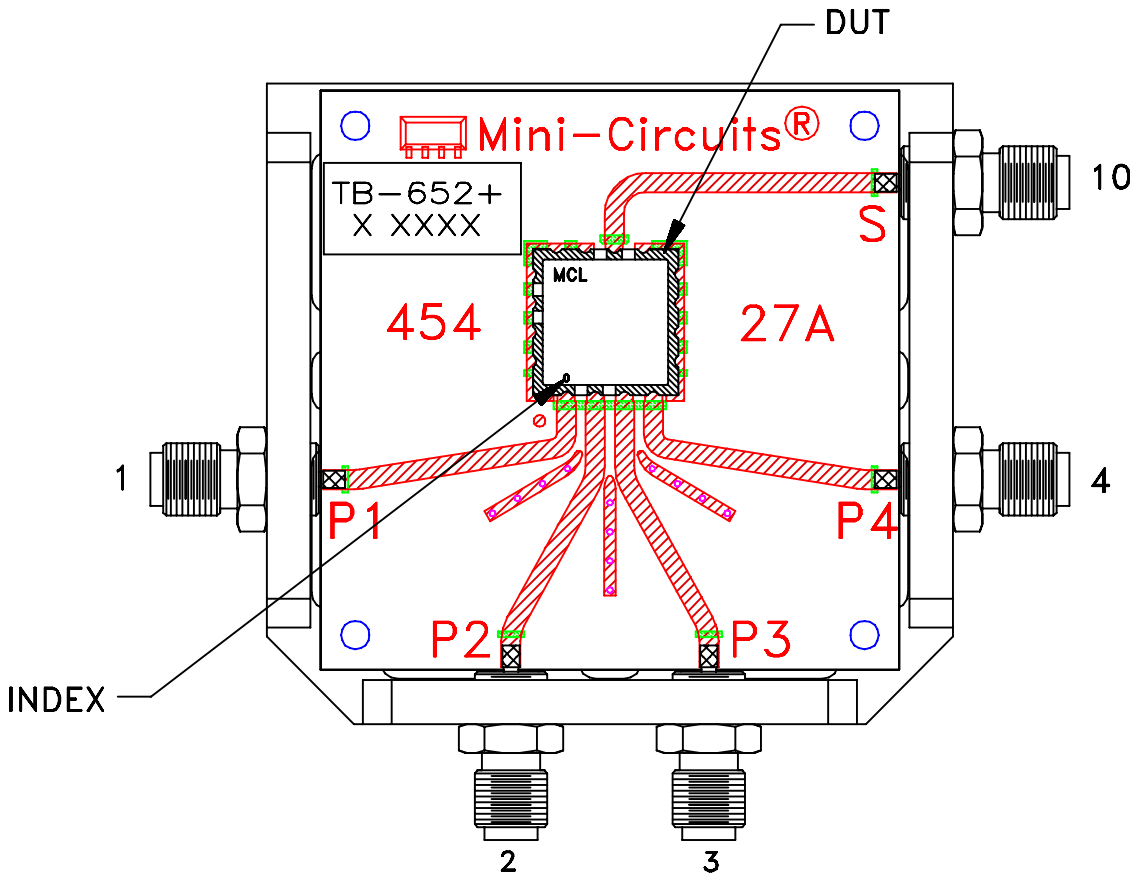
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 16SP01, CK1704, TB-652+

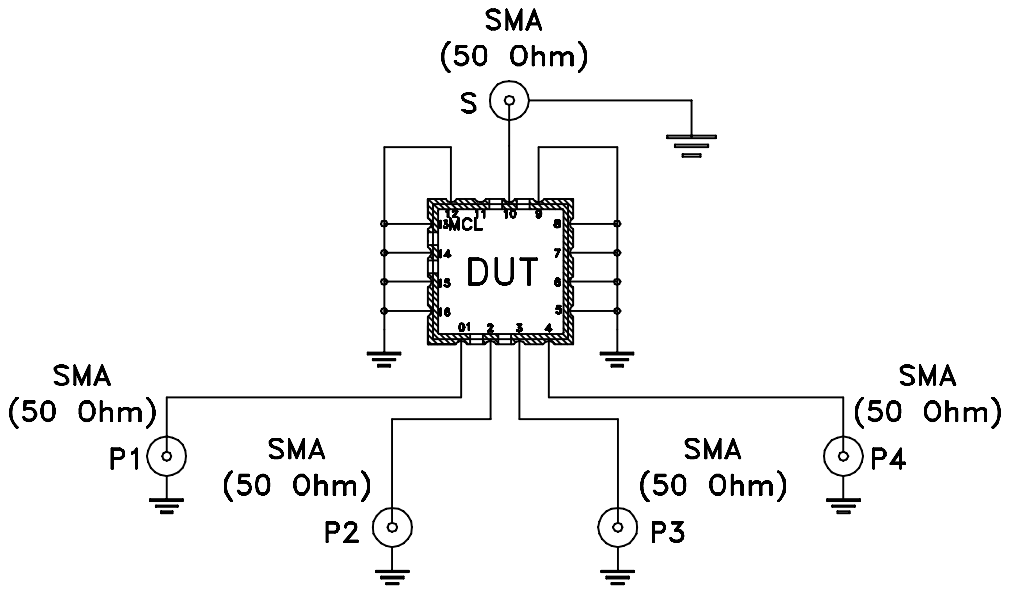
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-368	A

FILE:	SCALE:	SHEET:
98PL368	5:1	1 OF 1

Evaluation Board and Circuit



TB-652+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: 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