

Surface Mount

Power Splitter/Combiner

SCQ-4-1650+

4 Way Quadrifilar 50Ω 1150 to 1650 MHz

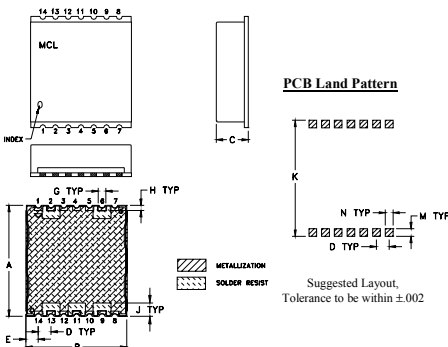
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Internal Dissipation	0.20W max.
Permanent damage may occur if any of these limits are exceeded.	

Pin Connections

SUM PORT	11
PORT 1 (0°)	9
PORT 2 (90°)	6
PORT 3 (180°)	2
PORT 4 (270°)	13
GROUND	1,3,4,5,7,8,10,12,14

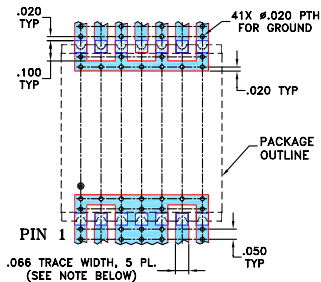
Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
.870	.800	.250	.100	.097	--	.060	.040
22.10	20.32	6.35	2.54	2.46	--	1.52	1.02
J	K	L	M	N	P	wt	
.105	.910	--	.060	.060	--	grams	
2.67	23.11	--	1.52	1.52	--	2.85	

Demo Board MCL P/N: TB-490+ Suggested PCB Layout (PL-292)



- 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

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

Features

- good isolation, 22 dB typ.
- good phase unbalance, 1 deg.
- good matching VSWR, 1.15:1 typ.

Applications

- GPS phase array antenna



CASE STYLE: HU1374

+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 6dB		PHASE* UNBALANCE (Degrees)		AMPLITUDE UNBALANCE (dB)	VSWR (:1)	
$f_L - f_U$	Typ.	Min.	Typ.	Max.	Typ.	Max.	Max.	S Typ.	OUT Typ.
1150-1650	22	18	1.5	2.0	3.0	8.0	1.0	1.2	1.1

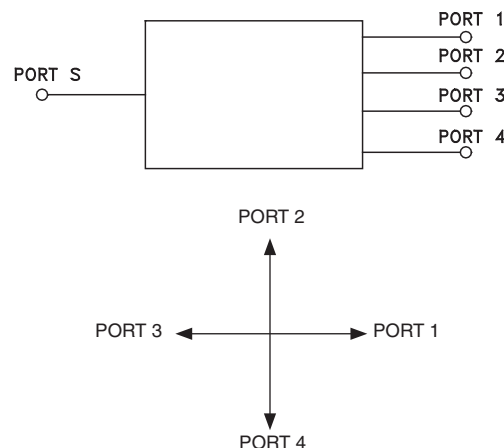
*Phase Unbalance is referenced insertion phase at 0° port.

Typical Performance Data

Freq. (MHz)	Total Loss ¹ (dB)	Amp. Unbal. (dB)	Insertion Phase (deg)	Phase Unbalance (deg.)				Isolation (dB)			VSWR S	VSWR 1	VSWR 2	VSWR 3	VSWR 4
	S-1	S-1	0°	90°	180°	270°		1-2	2-3	3-4					
1150.00	6.98	0.32	160.79	0.00	88.03	179.66	267.65	22.35	31.34	25.42	1.09	1.03	1.04	1.07	1.02
1200.00	7.10	0.18	144.77	0.00	88.25	179.80	267.68	22.07	30.71	25.20	1.10	1.03	1.06	1.07	1.02
1225.00	7.16	0.26	136.76	0.00	88.37	179.89	267.72	21.94	30.39	25.11	1.11	1.03	1.06	1.07	1.03
1250.00	7.21	0.33	128.75	0.00	88.49	179.96	267.76	21.82	30.06	25.02	1.11	1.03	1.07	1.07	1.03
1275.00	7.26	0.38	120.75	0.00	88.62	180.02	267.82	21.72	29.69	24.95	1.11	1.03	1.07	1.08	1.04
1300.00	7.31	0.43	112.75	0.00	88.76	180.07	267.88	21.65	29.32	24.90	1.11	1.04	1.08	1.08	1.04
1350.00	7.38	0.51	96.73	0.00	89.04	180.18	268.04	21.54	28.55	24.88	1.11	1.04	1.09	1.09	1.05
1400.00	7.44	0.54	80.72	0.00	89.32	180.28	268.21	21.52	27.81	24.98	1.12	1.05	1.10	1.10	1.06
1450.00	7.48	0.54	64.73	0.00	89.60	180.32	268.38	21.59	27.08	25.19	1.12	1.06	1.10	1.11	1.07
1500.00	7.50	0.53	48.73	0.00	89.83	180.35	268.57	21.73	26.33	25.50	1.14	1.06	1.11	1.12	1.07
1525.00	7.50	0.51	40.73	0.00	89.96	180.35	268.67	21.83	26.00	25.70	1.15	1.07	1.11	1.13	1.08
1550.00	7.50	0.48	32.73	0.00	90.07	180.33	268.76	21.94	25.67	25.91	1.16	1.07	1.11	1.13	1.08
1575.00	7.49	0.44	24.73	0.00	90.18	180.30	268.87	22.07	25.33	26.16	1.18	1.07	1.11	1.14	1.08
1600.00	7.48	0.39	16.75	0.00	90.28	180.25	268.98	22.23	25.02	26.43	1.20	1.08	1.11	1.14	1.09
1650.00	7.46	0.30	0.72	0.00	90.48	180.20	269.22	22.57	24.40	26.99	1.23	1.08	1.11	1.14	1.10

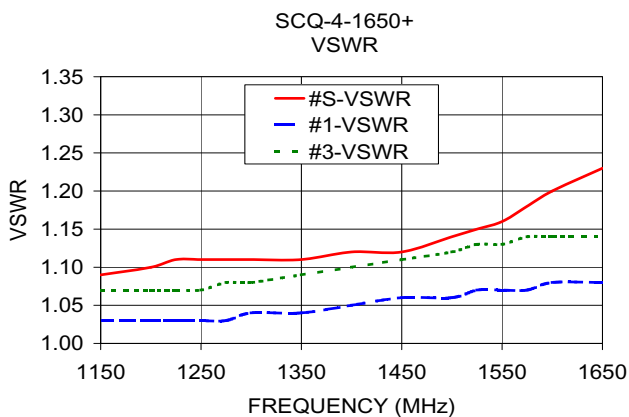
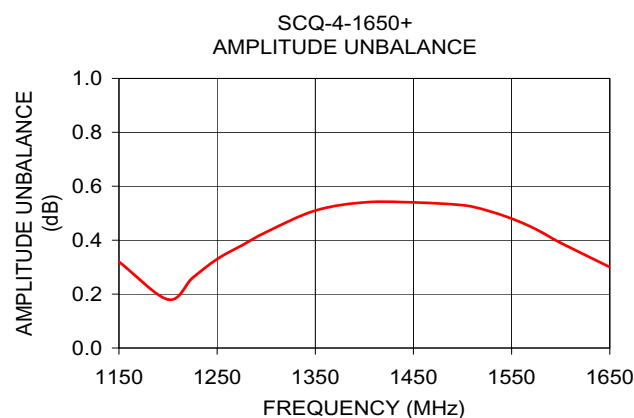
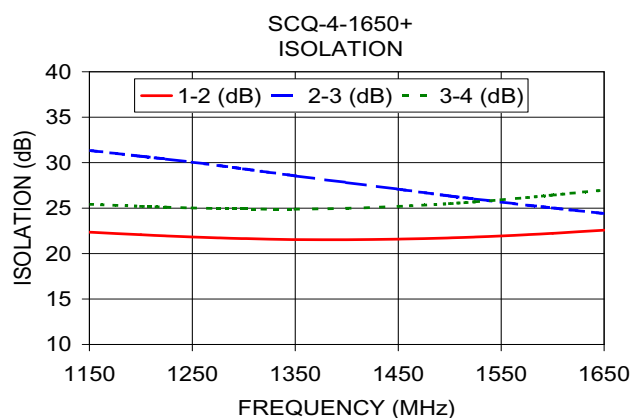
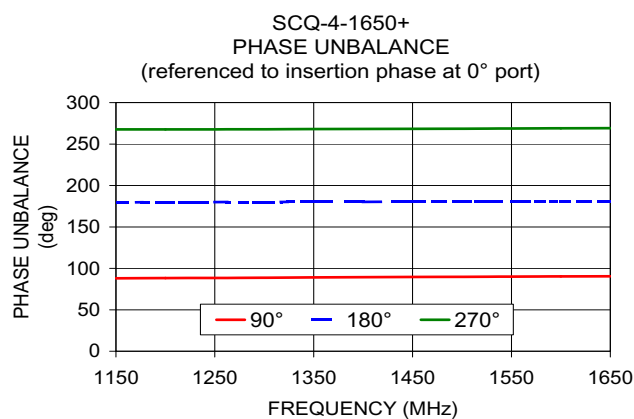
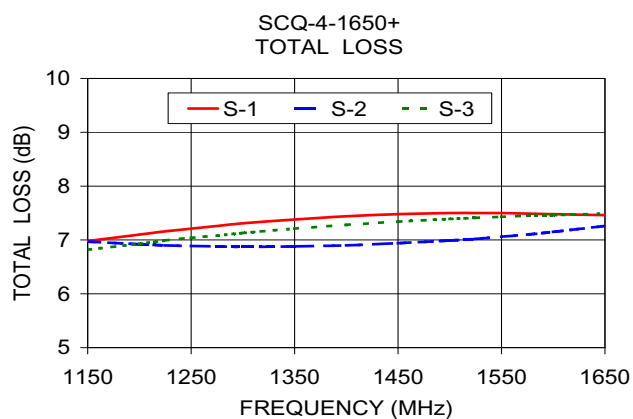
1. Total Loss = Insertion Loss + 6dB splitter loss.

Electrical Configuration



Performance Charts

SCQ-4-1650+



Notes

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4 Way-Quadrifilar Power Splitter/Combiner

SCQ-4-1650+

Typical Performance Data

FREQ. (MHz)	TOTAL LOSS ¹				AMP. UNBAL. (dB) S-4	INSERTION PHASE (Deg.) S-1	ISOLATION			PHASE UNBALANCE				FREQ. (MHz)	VSWR				
	(dB)						(dB)			(Deg.)					(:1)				
	S-1	S-2	S-3	S-4			1-2	2-3	3-4	@ 0° Port	@ 90° Port	@ 180° Port	@ 270° Port		S	1	2	3	4
1150.0	6.98	6.97	6.82	7.14	0.32	160.79	22.35	31.34	25.42	0.00	88.03	179.66	267.65	1150.0	1.09	1.03	1.04	1.07	1.02
1175.0	7.04	6.94	6.88	7.10	0.22	152.78	22.20	31.05	25.31	0.00	88.13	179.73	267.65	1175.0	1.10	1.03	1.05	1.07	1.02
1200.0	7.10	6.92	6.93	7.06	0.18	144.77	22.07	30.71	25.20	0.00	88.25	179.80	267.68	1200.0	1.10	1.03	1.06	1.07	1.02
1225.0	7.16	6.90	6.99	7.03	0.26	136.76	21.94	30.39	25.11	0.00	88.37	179.89	267.72	1225.0	1.11	1.03	1.06	1.07	1.03
1250.0	7.21	6.89	7.04	7.01	0.33	128.75	21.82	30.06	25.02	0.00	88.49	179.96	267.76	1250.0	1.11	1.03	1.07	1.07	1.03
1275.0	7.26	6.88	7.08	6.98	0.38	120.75	21.72	29.69	24.95	0.00	88.62	180.02	267.82	1275.0	1.11	1.03	1.07	1.08	1.04
1300.0	7.31	6.87	7.13	6.97	0.43	112.75	21.65	29.32	24.90	0.00	88.76	180.07	267.88	1300.0	1.11	1.04	1.08	1.08	1.04
1350.0	7.38	6.88	7.21	6.94	0.51	96.73	21.54	28.55	24.88	0.00	89.04	180.18	268.04	1350.0	1.11	1.04	1.09	1.09	1.05
1400.0	7.44	6.90	7.28	6.93	0.54	80.72	21.52	27.81	24.98	0.00	89.32	180.28	268.21	1400.0	1.12	1.05	1.10	1.10	1.06
1450.0	7.48	6.94	7.34	6.94	0.54	64.73	21.59	27.08	25.19	0.00	89.60	180.32	268.38	1450.0	1.12	1.06	1.10	1.11	1.07
1500.0	7.50	6.99	7.39	6.97	0.53	48.73	21.73	26.33	25.50	0.00	89.83	180.35	268.57	1500.0	1.14	1.06	1.11	1.12	1.07
1525.0	7.50	7.02	7.41	6.99	0.51	40.73	21.83	26.00	25.70	0.00	89.96	180.35	268.67	1525.0	1.15	1.07	1.11	1.13	1.08
1550.0	7.50	7.06	7.43	7.02	0.48	32.73	21.94	25.67	25.91	0.00	90.07	180.33	268.76	1550.0	1.16	1.07	1.11	1.13	1.08
1575.0	7.49	7.10	7.45	7.05	0.44	24.73	22.07	25.33	26.16	0.00	90.18	180.30	268.87	1575.0	1.18	1.07	1.11	1.14	1.08
1600.0	7.48	7.15	7.46	7.09	0.39	16.75	22.23	25.02	26.43	0.00	90.28	180.25	268.98	1600.0	1.20	1.08	1.11	1.14	1.09
1625.0	7.47	7.20	7.48	7.14	0.34	8.72	22.39	24.71	26.71	0.00	90.39	180.24	269.11	1625.0	1.21	1.08	1.11	1.14	1.09
1650.0	7.46	7.26	7.49	7.19	0.30	0.72	22.57	24.40	26.99	0.00	90.48	180.20	269.22	1650.0	1.23	1.08	1.11	1.14	1.10

¹Total Loss = Insertion Loss + 6dB Splitter Loss



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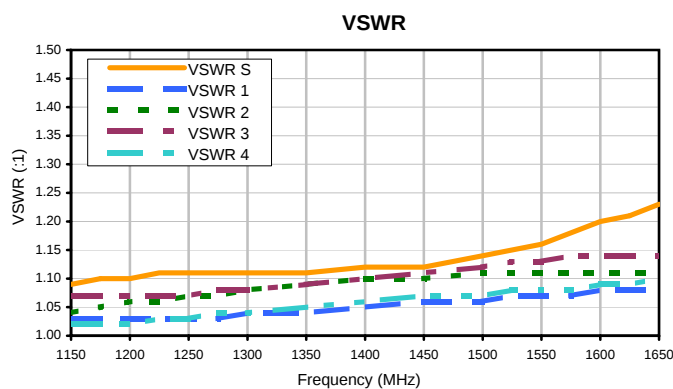
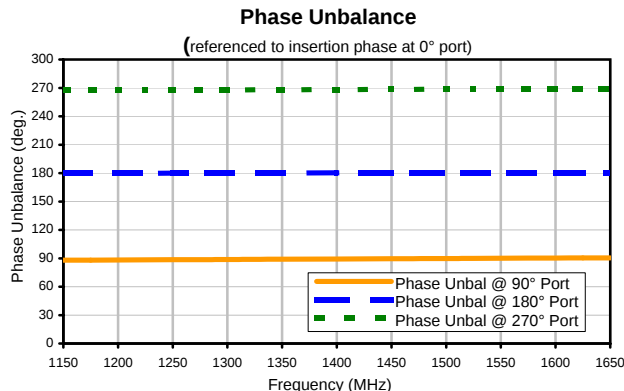
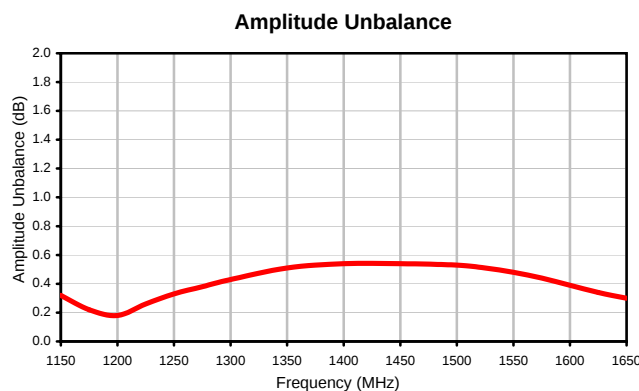
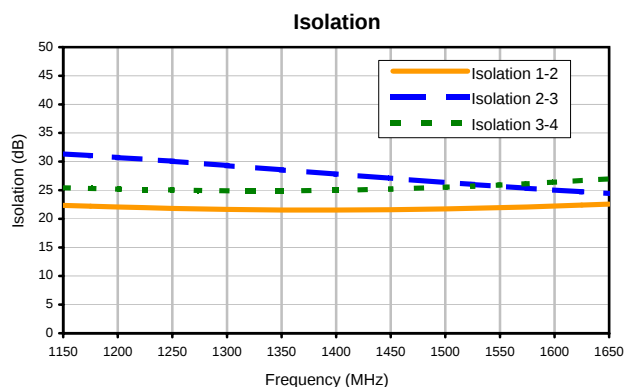
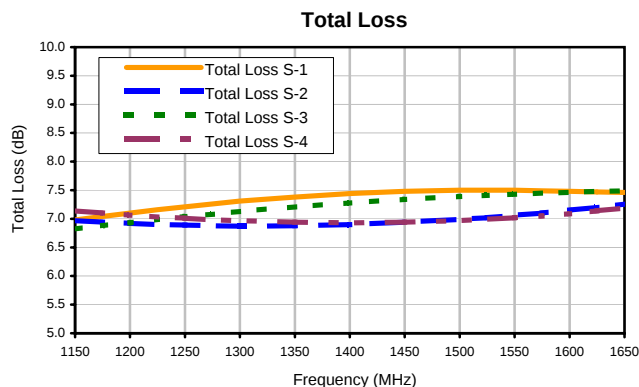


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IF/RF MICROWAVE COMPONENTS

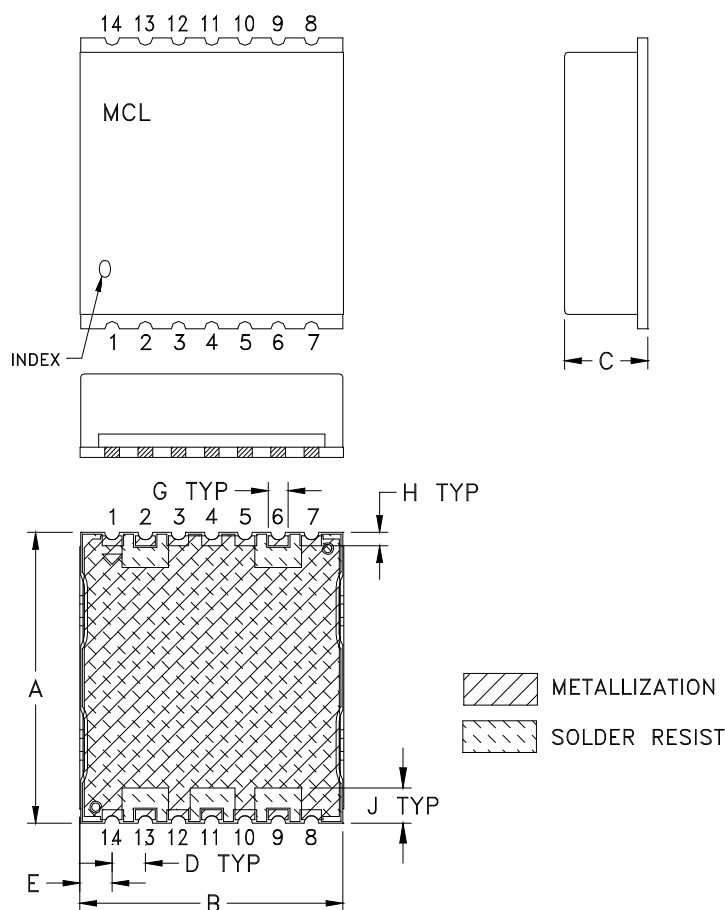
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SCQ-4-1650+
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Page 1 of 1

Typical Performance Curves

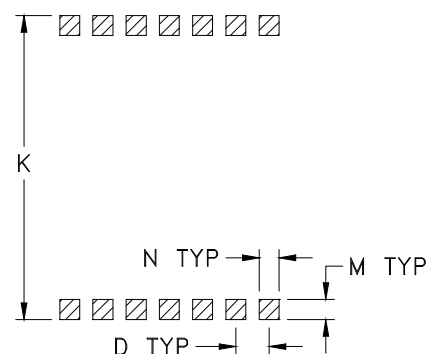


Outline Dimensions

HU1374



PCB Land Pattern



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

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT, GRAM
HU1374	.870 (22.10)	.800 (20.32)	.25 (6.35)	.100 (2.54)	.097 (2.46)	-	.060 (1.52)	.040 (1.02)	.105 (2.67)	.910 (23.11)	-	.060 (1.52)	.060 (1.52)	-	2.85

Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .015

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:

For RoHS Case Styles: 2-5 μ inch (.05-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate. All models (+) suffix.

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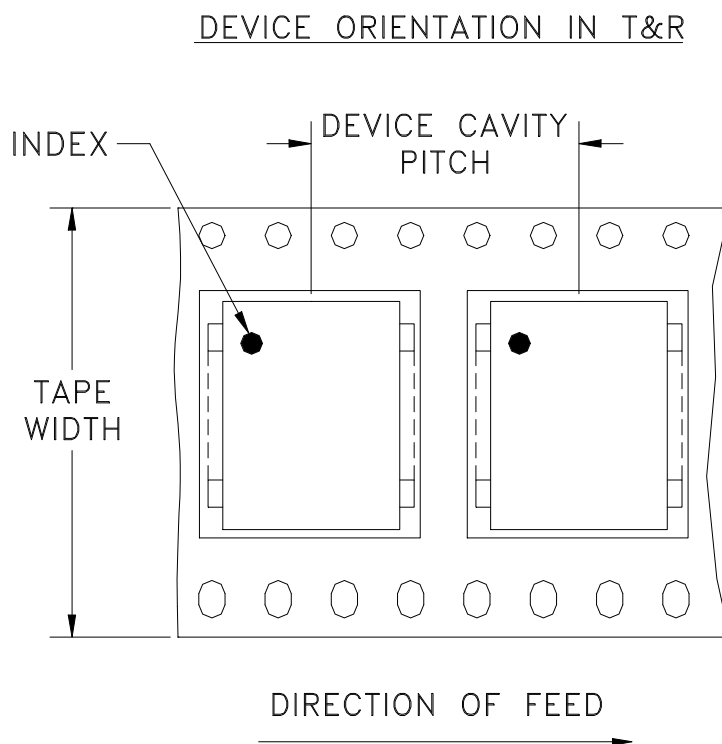
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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F21



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	32	13	200

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.

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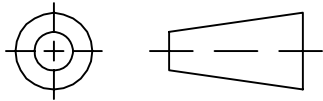
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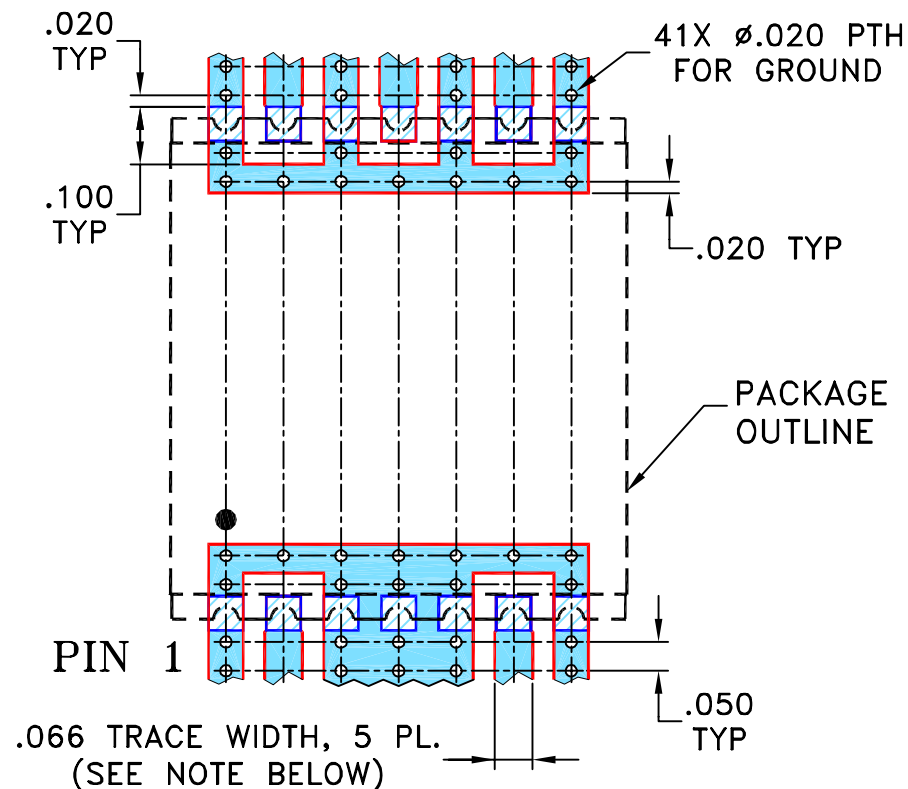
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M119547	NEW RELEASE	09/17/08	AV	HY

SUGGESTED MOUNTING CONFIGURATION FOR HU1374 CASE STYLE, "14SQ05" PIN CODE



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B 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 $\pm$.005
ANGLES $\pm$
FRACTIONS $\pm$

DRAWN

AY

09/12/08

CHECKED

PW

09/17/08

APPROVED

HY

09/17/08

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


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PL, 14SQ05, HU1374, SCPSQJ-4+, TB-490+

 SIZE
A

 CODE IDENT
15542

 DRAWING NO:
98-PL-292

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OR

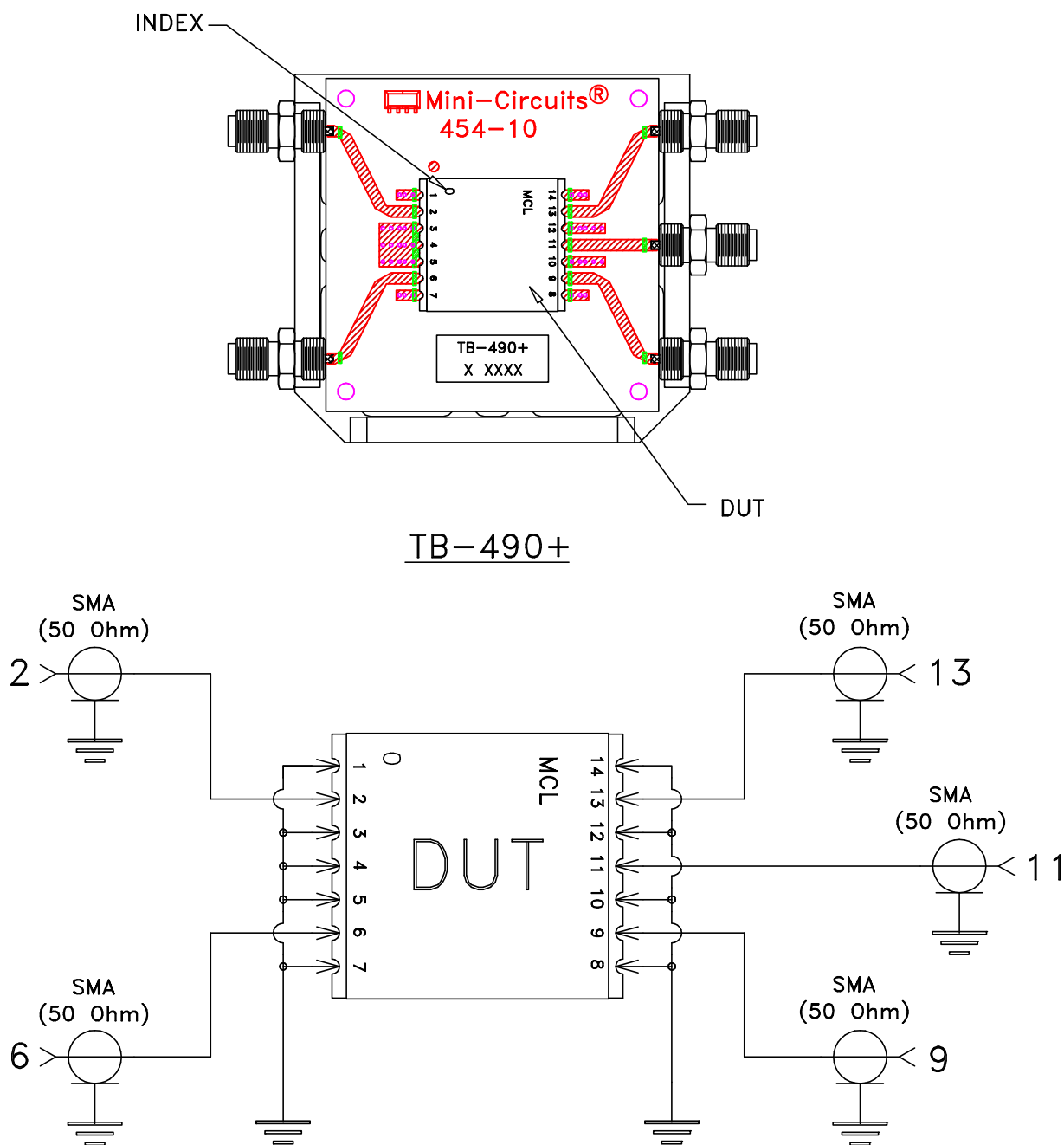
FILE: 98PL292

SCALE: 6:1

SHEET: 1 OF 1

Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



Schematic Diagram

Notes:

1. 50 Ohm 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