



SURFACE MOUNT DC PASS

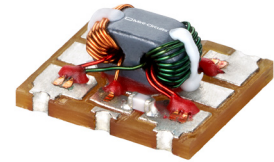
Directional Coupler

RDC20-92DC-5W+

50Ω 150 to 900 MHz 20 dB 5 Watts

KEY FEATURES

- DC Passthrough Input to Output 750 mA
- Wideband 150 to 900 MHz
- Low Mainline loss 0.5 typ at 900 MHz
- Coupling Flatness ± 0.4 dB typ.
- Good Return Loss 20 dB typ.

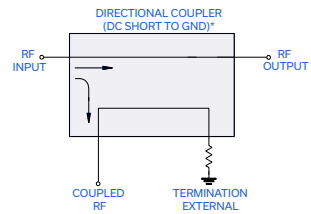


Generic photo used for illustration purposes only

APPLICATIONS

- VHF/UHF
- Cable TV
- Defense /Military
- Radio Application

ELECTRICAL SCHEMATIC



*Electrical schematic is for Directional coupler with internal transformer(s) and external termination

PRODUCT OVERVIEW

Mini-Circuits' RDC20-92DC-5W+ surface mount directional coupler provides 20 dB coupling with DC current pass from input to output. Low mainline loss and good return loss for 50 ohms applications from 150 to 900 MHz, supporting a variety of broadband applications including VHF/UHF, cellular and more. This model features core and wire construction for good solderability and easy visual inspection.

ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Frequency Range		150		900	MHz
Mainline Loss ¹	150 - 400	-	0.25	0.40	dB
	400 - 700	-	0.30	0.50	
	700 - 900	-	0.45	0.80	
Coupling Nominal	150 - 900	-	20 \pm 1	-	dB
Coupling Flatness (\pm)	150 - 400	-	-	1	dB
	400 - 700	-	-	1	
	700 - 900	-	-	1	
Directivity	150 - 400	20	-	-	dB
	400 - 700	18	-	-	
	700 - 900	15	-	-	
Return Loss (Input)	150 - 900	17.7	24	-	dB
Return Loss (Output)	150 - 900	17.7	24	-	dB
Return Loss (Coupled)	150 - 900	17.7	21	-	dB
Input Power	150 - 900	-	-	5	W
DC Voltage	150 - 900	-	28	36	V
DC Current	150 - 900	-	-	750	mA

1. Mainline Loss includes coupling loss.

ABSOLUTE MAXIMUM RATINGS²

Operating Case Temperature	-40 °C to +85 °C
Storage Temperature	-55 °C to +100 °C
Input Power	5 W
DC Current	750 mA

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





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Directional Coupler

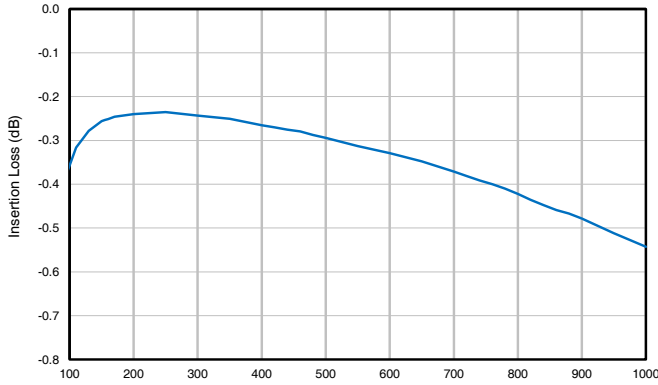
RDC20-92DC-5W+

Mini-Circuits

50Ω 150 to 900 MHz 20 dB 5 Watts

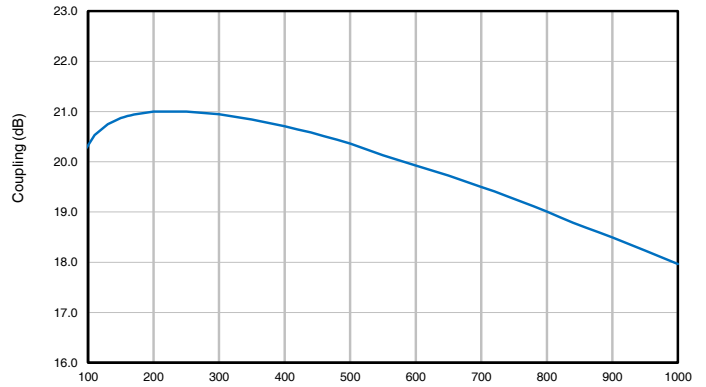
TYPICAL PERFORMANCE GRAPHS

INSERTION LOSS



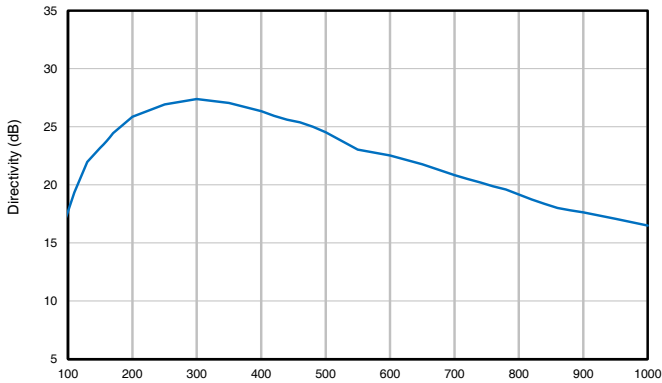
Frequency (GHz)

COUPLING



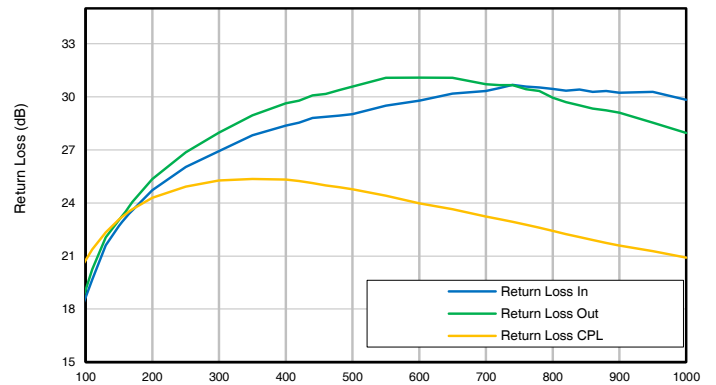
Frequency (GHz)

DIRECTIVITY



Frequency (GHz)

RETURN LOSS



Frequency (GHz)



ELECTRICAL SCHEMATIC

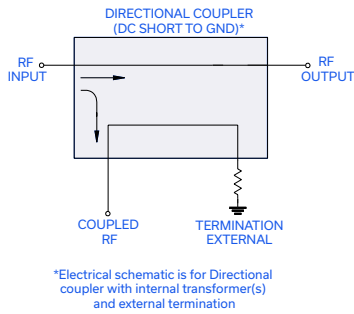
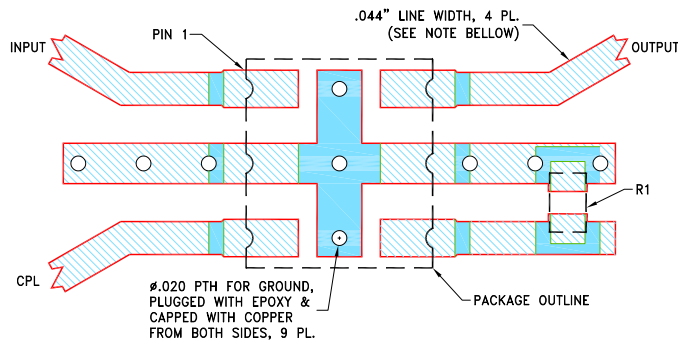


Figure 1. RDC20-92DC-5W+ Electrical Schematic

PAD DESCRIPTION/CONFIGURATION

Function	Pad Number	Description
Input RF+DC	1	Connects to RF Input Port
Output RF+DC	6	Connects to RF Output Port
Coupled RF	3	Connects to Coupled Port
Ground	2	Connects to Ground
50 Ohm Term	4	Connects to external 50 ohm
Isolate (Do not use)	5	

SUGGESTED PCB LAYOUT (PL-786)



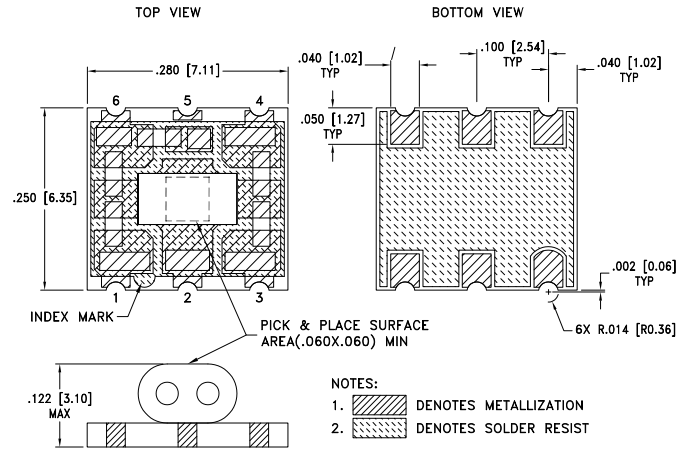
COMPONENT	SIZE
R1	0805

NOTES:

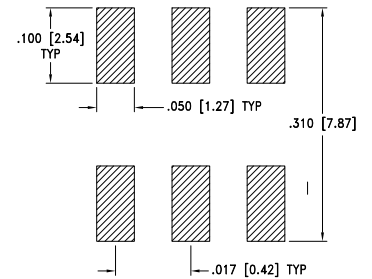
- LINE WIDTH IS SHOWN FOR ROGERS R04350B, DIELECTRIC THICKNESS: .020±.0015"; COPPER: 1/2 Oz EACH SIDE. FOR OTHER MATERIALS LINE WIDTH MAY NEED TO BE MODIFIED.
 - CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-RDC2092DC5W+.
 - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
 - DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

Figure 2. Suggested PCB Layout PL-786

CASE STYLE DRAWING



PCB Land Pattern



Weight: 472 grams
 Dimensions are in inches [mm].
 Tolerances: 2 Pl.±.01; 3 Pl. ±.005 Inch

SUGGESTED LAYOUT FOR PC PATTERN
 TOLERANCE TO BE WITHIN ±.002

PRODUCT MARKING*: N/A

*Marking may contain other features or characters for internal lot control.



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Directional Coupler

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50Ω 150 to 900 MHz 20 dB 5 Watts

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD.

[CLICK HERE](#)

Performance Data & Graphs	Data Graphs S-Parameter (S4P Files) Data Set (.zip file) De-embedded to device pads
Case Style	TT1491-10 Lead Finish: 3-5 μ inch (.08-.13 μm)
RoHS Status	Compliant
Tape and Reel	F2
Suggested Layout for PCB Design	PL-786
Evaluation Board	TB-RDC2092DC5W+ Gerber File
Environmental Rating	ENV02T1

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/terms/viewterm.html



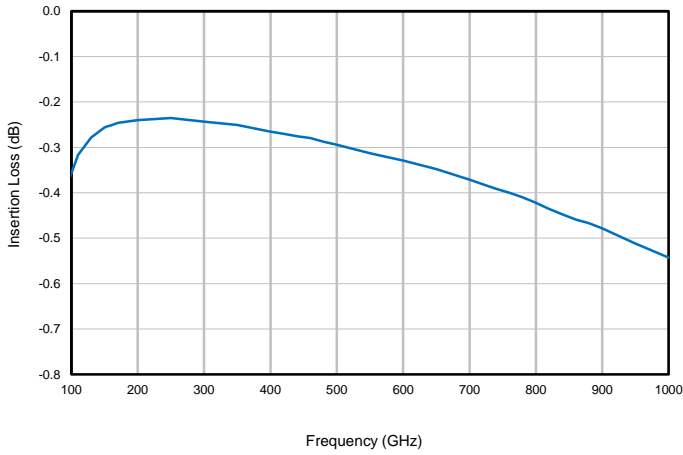
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS ⁽¹⁾ (dB)	COUPLING (dB)	DIRECTIVITY (dB)	RETURN LOSS		
				IN	OUT (dB)	CPL
90	0.40	20.12	16.06	17.64	17.90	20.13
110	0.32	20.53	19.35	19.67	20.24	21.38
130	0.28	20.75	21.98	21.61	22.05	22.33
150	0.26	20.87	23.18	22.70	23.03	23.06
155	0.25	20.89	23.48	22.93	23.26	23.22
160	0.25	20.91	23.78	23.16	23.51	23.37
165	0.25	20.93	24.11	23.38	23.78	23.51
170	0.25	20.94	24.45	23.58	24.07	23.64
200	0.24	21.00	25.87	24.72	25.36	24.29
250	0.24	21.00	26.92	26.03	26.87	24.93
300	0.24	20.95	27.39	26.93	27.97	25.27
350	0.25	20.84	27.05	27.83	28.95	25.36
400	0.27	20.71	26.35	28.38	29.63	25.31
420	0.27	20.65	25.94	28.54	29.79	25.24
440	0.28	20.58	25.60	28.81	30.08	25.13
460	0.28	20.51	25.39	28.86	30.16	24.99
480	0.29	20.44	25.01	28.94	30.37	24.88
500	0.29	20.36	24.53	29.02	30.59	24.78
550	0.31	20.13	23.03	29.50	31.08	24.40
600	0.33	19.93	22.52	29.78	31.08	23.98
650	0.35	19.72	21.78	30.19	31.08	23.64
700	0.37	19.50	20.85	30.34	30.71	23.23
720	0.38	19.41	20.51	30.49	30.66	23.09
740	0.39	19.31	20.22	30.68	30.66	22.93
760	0.40	19.21	19.89	30.58	30.43	22.76
780	0.41	19.11	19.60	30.54	30.32	22.60
800	0.42	19.01	19.18	30.45	29.94	22.42
820	0.44	18.90	18.74	30.34	29.70	22.24
840	0.45	18.78	18.37	30.41	29.51	22.07
860	0.46	18.68	18.03	30.29	29.33	21.90
880	0.47	18.59	17.80	30.33	29.24	21.74
900	0.48	18.50	17.64	30.23	29.11	21.59
950	0.51	18.23	17.07	30.28	28.53	21.27
1000	0.54	17.96	16.50	29.84	27.95	20.91

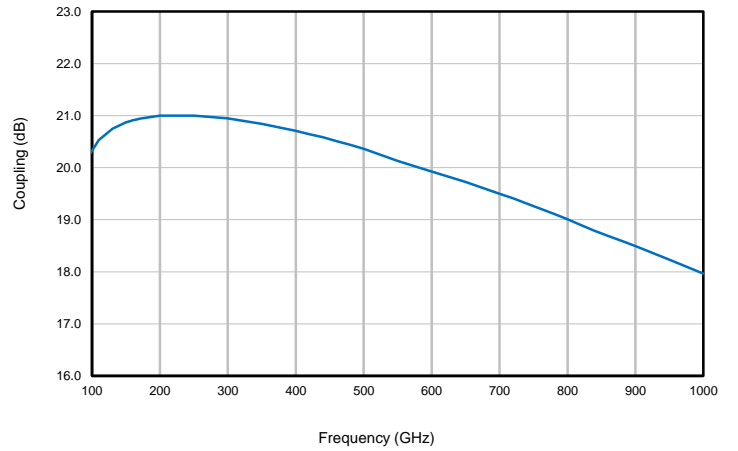
⁽¹⁾Mainline loss includes coupling loss.

Typical Performance Curves

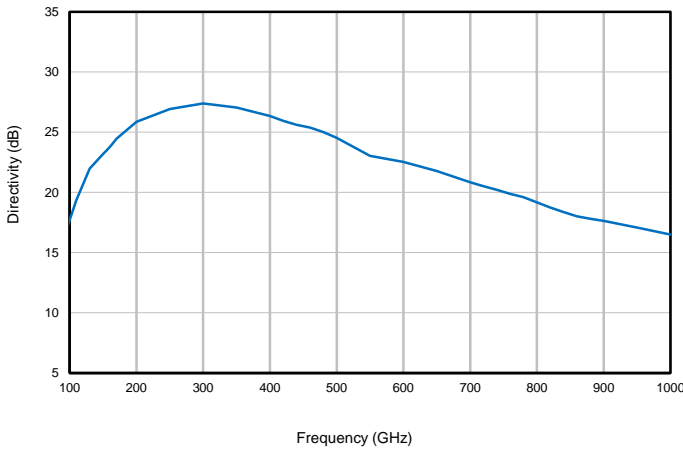
INSERTION LOSS



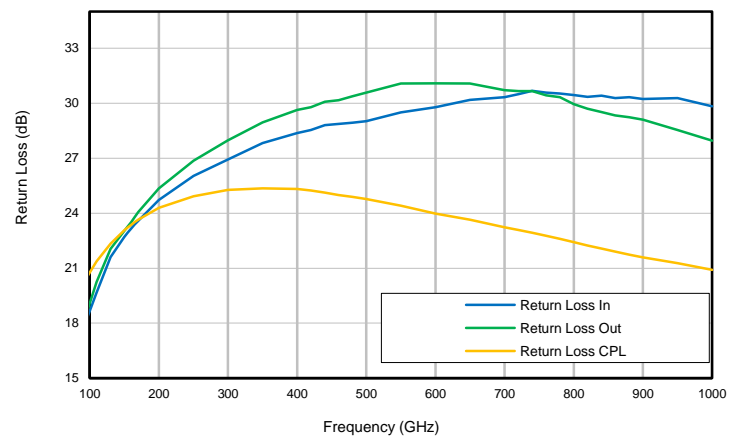
COUPLING



DIRECTIVITY



RETURN LOSS

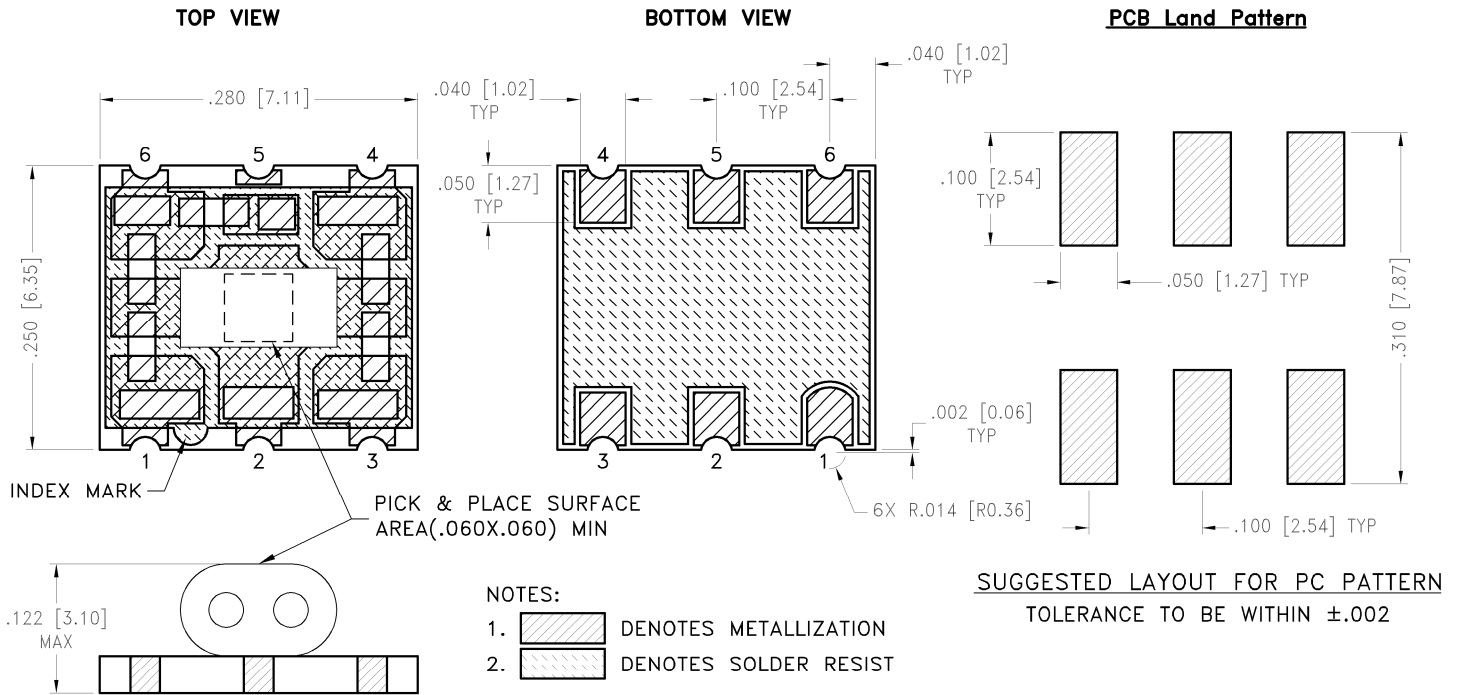


Case Style

Outline Dimensions

TT

TT1491-10



Weight: .472 grams

Dimensions are in inches [mm]. Tolerances: 2 Pl. $\pm .01$ [.254]; 3 Pl. $\pm .005$ [.127]

Notes:

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

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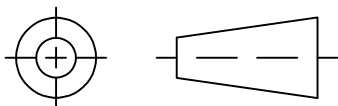
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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RF/IF MICROWAVE COMPONENTS

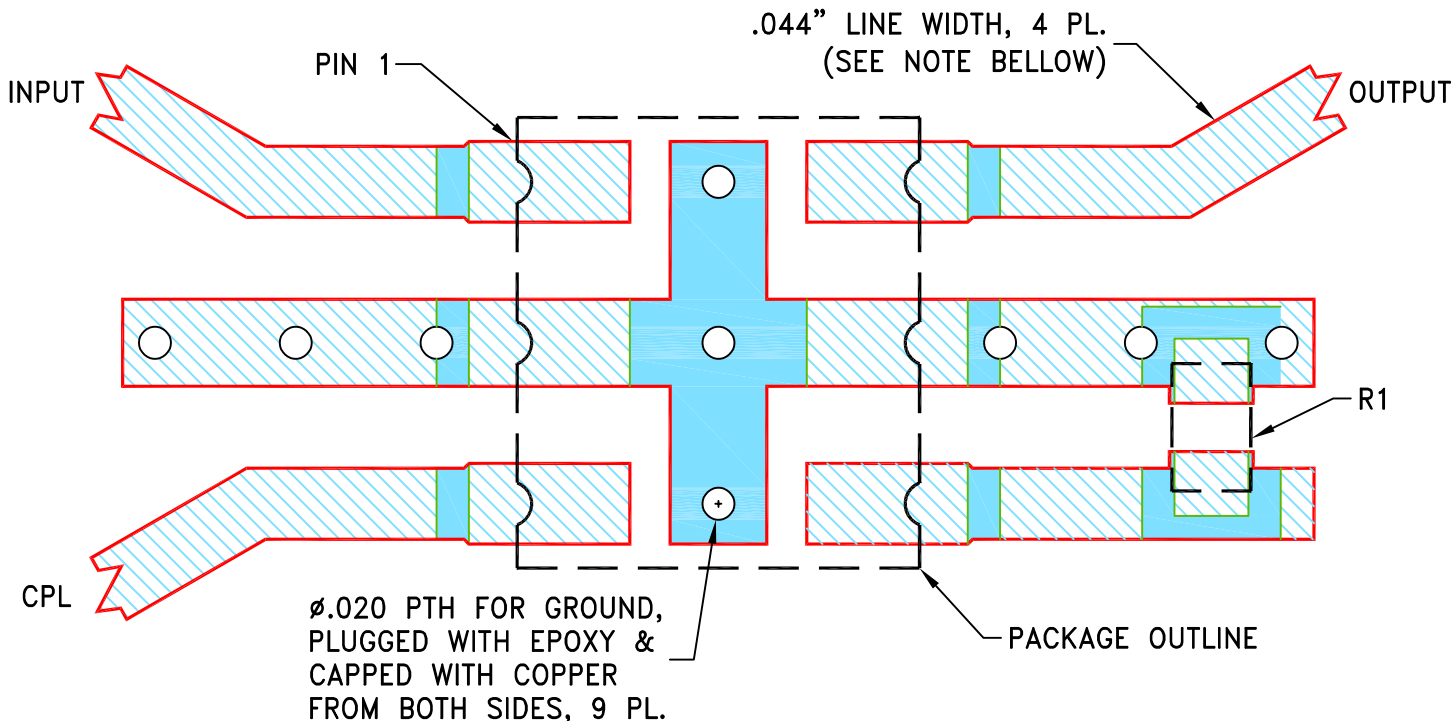
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-022146	NEW RELEASE	08/16/24	ITG	IL

SUGGESTED MOUNTING CONFIGURATION
FOR TT1491-10 CASE STYLE



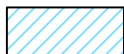
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3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



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	ITG	08/16/24
TOLERANCES ON:	GF	08/16/24
2 PL DECIMALS ±	IL	08/16/24
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

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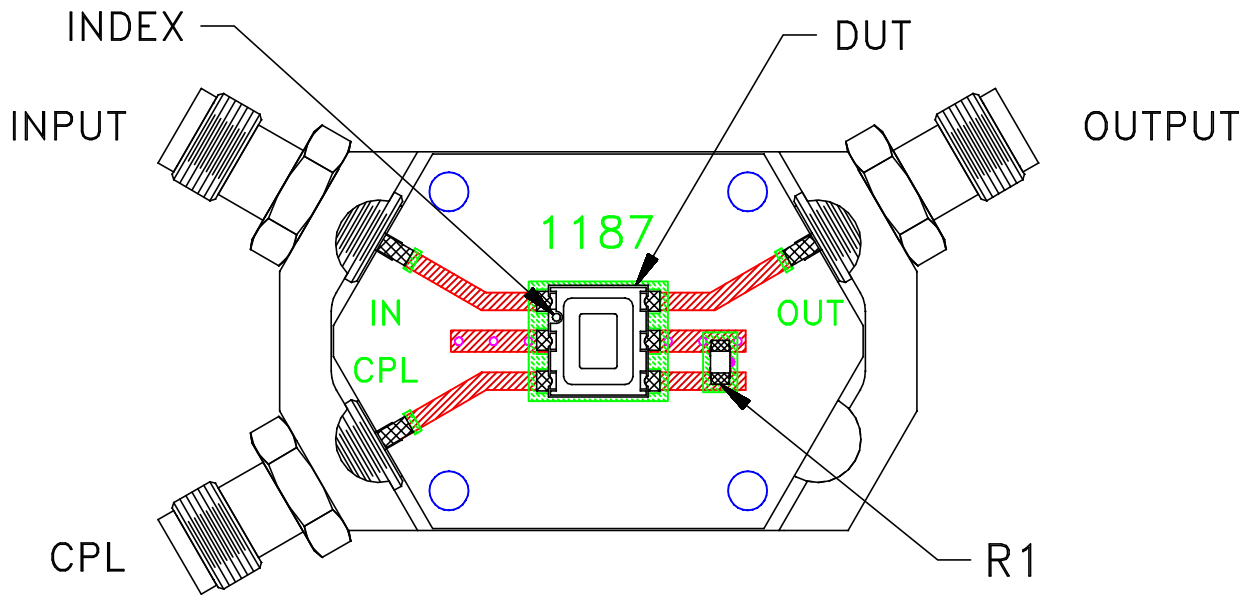
13 Neptune Avenue
Brooklyn NY 11235

PL, TT1491-10, TB-RDC2092DC5W+

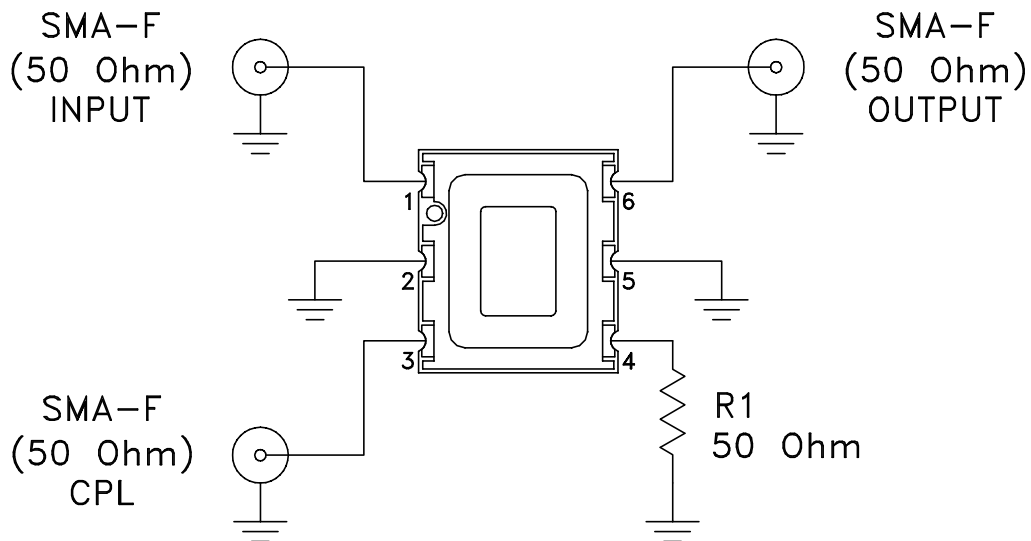
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-786	OR
FILE:	98PL786	SCALE: 8:1	SHEET: 1 OF 1

Evaluation Board and Circuit

TB-RDC2092DC5W+




Schematic diagram



COMPONENT	DESCRIPTION/VALUE	SIZE
DUT	DIRECTIONAL COUPLER RDC20-92DC-5W+	.280X.250 INCHES
R1	RESISTOR 49.9 Ohm	0805

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: ROGERS (R04350B) or equivalent,
Dielectric Constant=3.48, Thickness=.020 inch.

 **Mini-Circuits®**

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