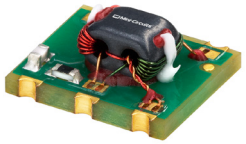
SURFACE MOUNT

Directional Coupler RDC14-182-75+

75Ω 5 to 1800 MHz 14 dB Coupling High Isolation

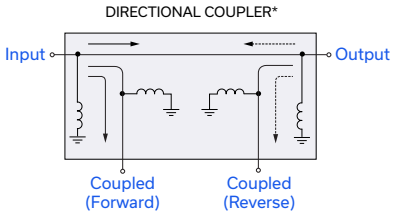
KEY FEATURES

- Low Mainline Loss 0.9 dB typ.
- High Isolation, above 39 dB up to 850 MHz
- Great Coupling Flatness, ±0.6 dB typ.



Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



*Electrical schematic is for Directional coupler with internal transformer(s) that routes DC from all ports to ground

APPLICATIONS

- DOCSIS® 4.0
- CATV /Broadband

PRODUCT OVERVIEW

Mini-Circuits' RDC14-182-75+ surface mount directional coupler provides 14 dB coupling with great flatness, low mainline loss, high isolation for 75Ω applications from 5 to 1800 MHz. This model features core and wire construction and good solderability and easy visual inspection.

ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Frequency Range		5		1800	MHz
Mainline Loss[1] (In-Out)	5 - 1800		0.9	1.3	dB
Coupling Nominal (In-CPLF)	5 – 850 5 - 1800		14.5 ± 0.7 15.5 ± 1.2		dB
Coupling Flatness (±) (In-CPLF)	5 – 850 5 - 1800		±0.3 ±0.8	±0.5 ±1.6	dB
Isolation (Out-CPLF)	5 – 850 850 - 1800	39 26	41 32		dB
Return Loss (Input)	5 – 50 50 - 850 850 - 1800	16 18 13	18 22 18		dB
Return Loss (Output)	5 – 50 50 - 850 850 - 1800	18 19 13	20 25 18		dB
Return Loss (CPLF)	5 – 50 50 - 850 850 - 1800	17 15 13	20 20 18		dB

1. Mainline Loss includes coupling loss.

ABSOLUTE MAXIMUM RATINGS[2]

Operating Case Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Input Power	2 W

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

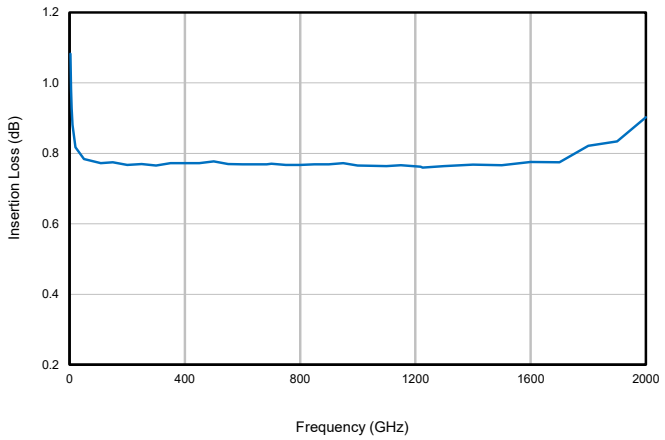
REV. OR
ECO-024767
RDC14-182-75+
MCL NY
250320

Directional Coupler RDC14-182-75+

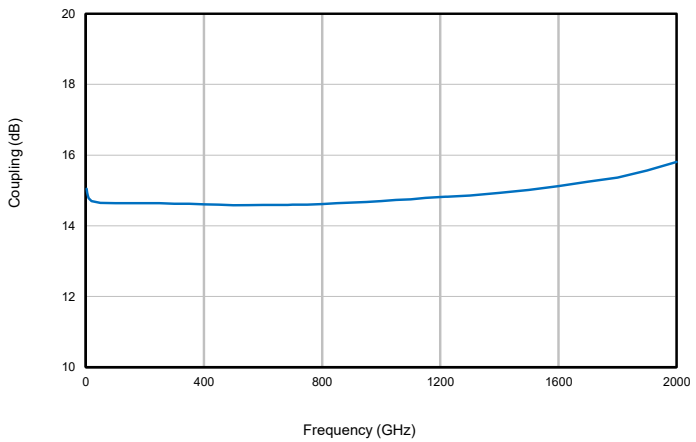
75Ω 5 to 1800 MHz 14 dB Coupling High Isolation

TYPICAL PERFORMANCE GRAPHS

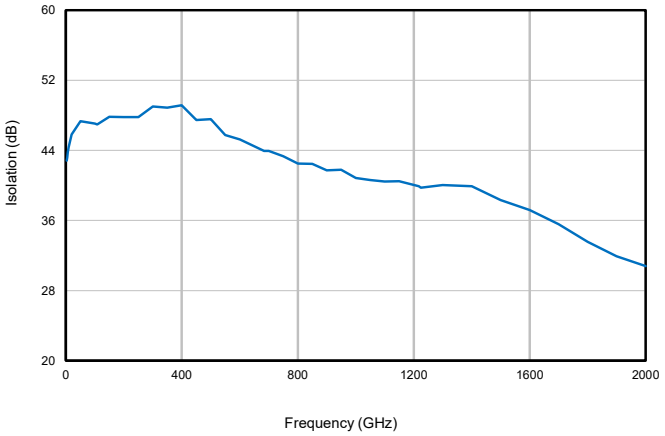
INSERTION LOSS



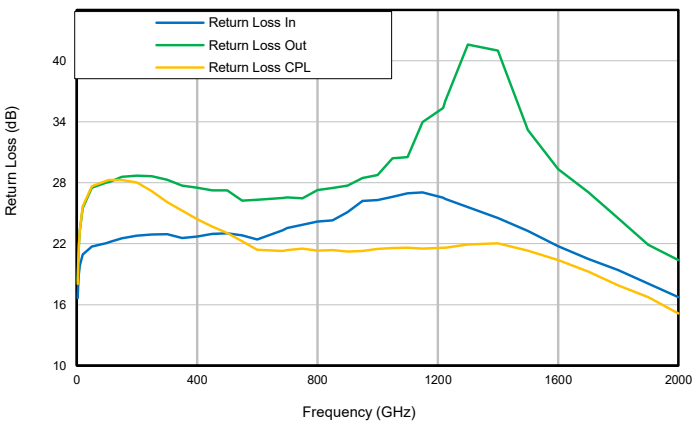
COUPLING



ISOLATION



RETURN LOSS

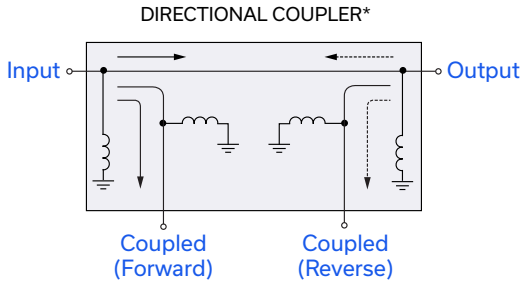


SURFACE MOUNT

Directional Coupler RDC14-182-75+

75Ω 5 to 1800 MHz 14 dB Coupling High Isolation

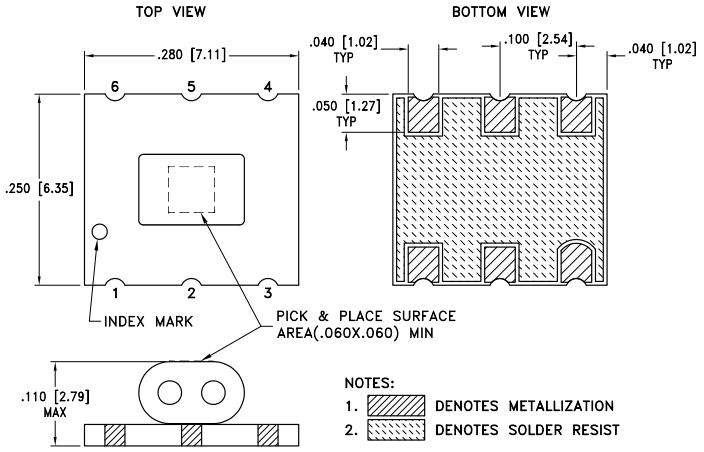
FUNCTIONAL DIAGRAM

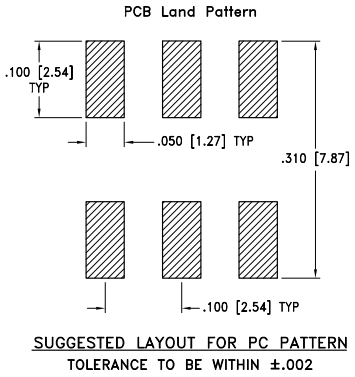


*Electrical schematic is for Directional coupler with internal transformer(s) that routes DC from all ports to ground

Figure 1. RDC14-182-75+ Electrical Schematic

CASE STYLE DRAWING



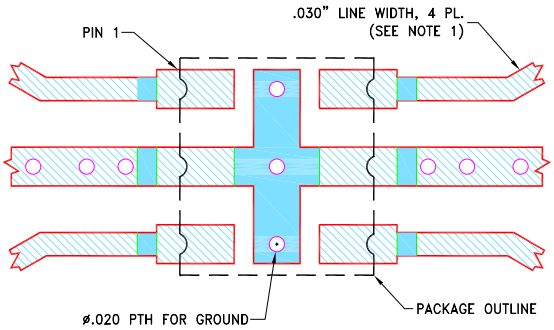


Weight: .361 grams
Dimensions are in inches [mm]. Tolerances: 2 Pl.±.01; 3 Pl. ±.005 Inch

PAD DESCRIPTION/CONFIGURATION

Function	Pad Number	Description
Input	1	Connects to Input Port
Output	6	Connects to RF Output Port
CPL F	3	Connect to CPLF Port
Ground	2,5	Connects to Ground
CPL R	4	75 Ohm External Termination

SUGGESTED PCB LAYOUT (PL-795)



NOTES:
1. LINE WIDTH IS SHOWN FOR ROGERS RO4350B, DIELECTRIC THICKNESS: .030±.002"; COPPER: 1/2 Oz EACH SIDE. FOR OTHER MATERIALS LINE 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.

Figure 2. Suggested PCB Layout PL-795

PRODUCT MARKING*: N/A

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

SURFACE MOUNT

Directional Coupler RDC14-182-75+

75Ω 5 to 1800 MHz 14 dB Coupling High Isolation

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	TT1491-8
RoHS Status	Compliant
Tape and Reel	F34
Suggested Layout for PCB Design	PL-795
Evaluation Board	TB-RDC14-18275+ 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-Circuits' 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

Directional Coupler RDC14-182-75+

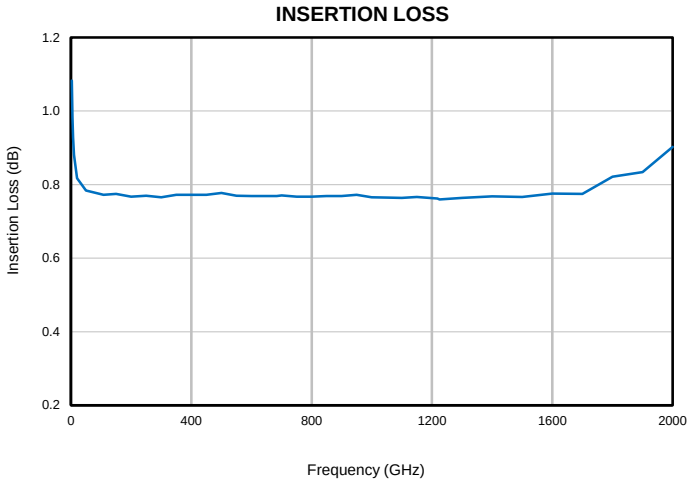
Typical Performance Data

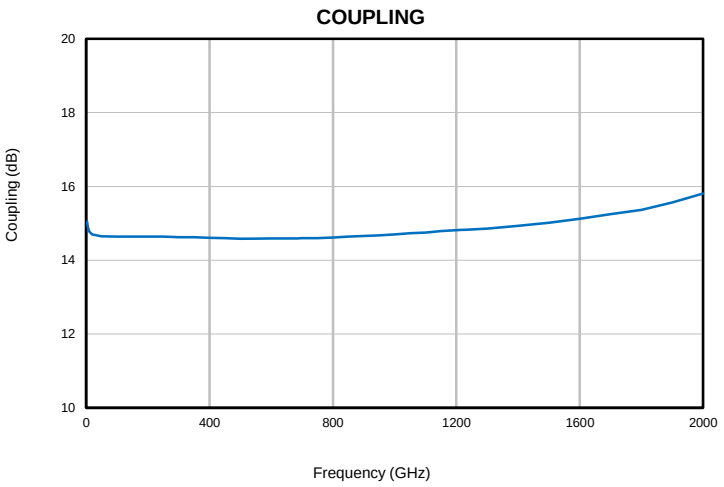
FREQUENCY (GHz)	INSERTION LOSS [1] (dB)	COUPLING (dB)	ISOLATION (dB)	RETURN LOSS (dB)		
				IN	OUT	CPL
3	1.08	15.05	42.82	16.65	18.33	18.03
5	0.98	14.94	43.18	18.19	20.58	20.40
7	0.93	14.86	43.81	19.06	21.95	21.86
10	0.88	14.78	44.36	19.83	23.25	23.30
20	0.82	14.70	45.81	20.95	25.50	25.68
50	0.78	14.65	47.35	21.72	27.50	27.66
100	0.77	14.64	47.08	22.08	28.04	28.21
108	0.77	14.64	46.95	22.14	28.07	28.27
150	0.78	14.64	47.84	22.53	28.57	28.27
200	0.77	14.64	47.80	22.80	28.71	28.02
250	0.77	14.64	47.80	22.90	28.64	27.17
300	0.77	14.63	49.02	22.94	28.29	26.11
350	0.77	14.62	48.87	22.56	27.71	25.26
400	0.77	14.61	49.15	22.69	27.52	24.41
450	0.77	14.60	47.48	22.96	27.24	23.68
500	0.78	14.59	47.58	23.01	27.24	23.07
550	0.77	14.58	45.76	22.81	26.24	22.24
600	0.77	14.59	45.23	22.42	26.31	21.41
684	0.77	14.59	43.94	23.31	26.49	21.29
700	0.77	14.60	43.93	23.55	26.54	21.37
750	0.77	14.60	43.35	23.86	26.47	21.53
800	0.77	14.62	42.50	24.17	27.27	21.33
850	0.77	14.64	42.46	24.30	27.48	21.36
900	0.77	14.65	41.72	25.10	27.71	21.23
950	0.77	14.68	41.80	26.20	28.48	21.30
1000	0.77	14.70	40.85	26.30	28.76	21.50
1050	0.76	14.73	40.60	26.61	30.41	21.58
1100	0.76	14.75	40.44	26.95	30.52	21.61
1150	0.77	14.79	40.49	27.05	33.96	21.52
1218	0.76	14.82	39.90	26.52	35.35	21.61
1225	0.76	14.82	39.74	26.41	36.01	21.62
1300	0.76	14.86	40.03	25.59	41.59	21.93
1400	0.77	14.93	39.90	24.53	41.00	22.03
1500	0.77	15.02	38.35	23.27	33.19	21.31
1600	0.78	15.13	37.18	21.76	29.32	20.38
1700	0.78	15.24	35.57	20.52	27.07	19.26
1800	0.82	15.36	33.56	19.39	24.49	17.91
1900	0.83	15.57	31.91	18.07	21.90	16.73
2000	0.90	15.81	30.80	16.73	20.38	15.14

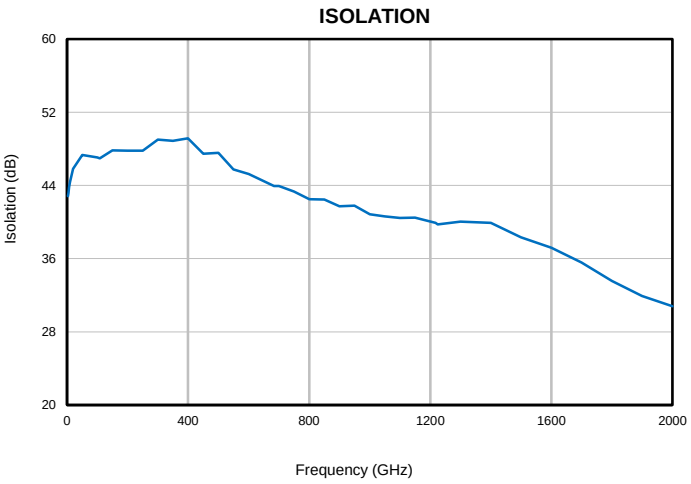
[1]Mainline loss includes coupling loss.

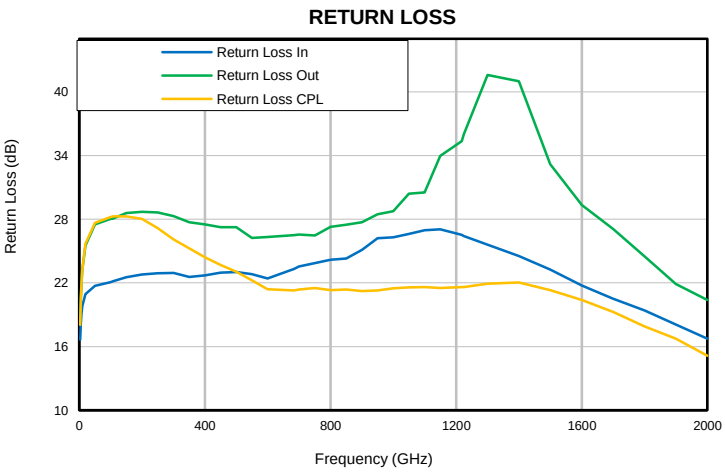
Directional Coupler RDC14-182-75+

Typical Performance Curves





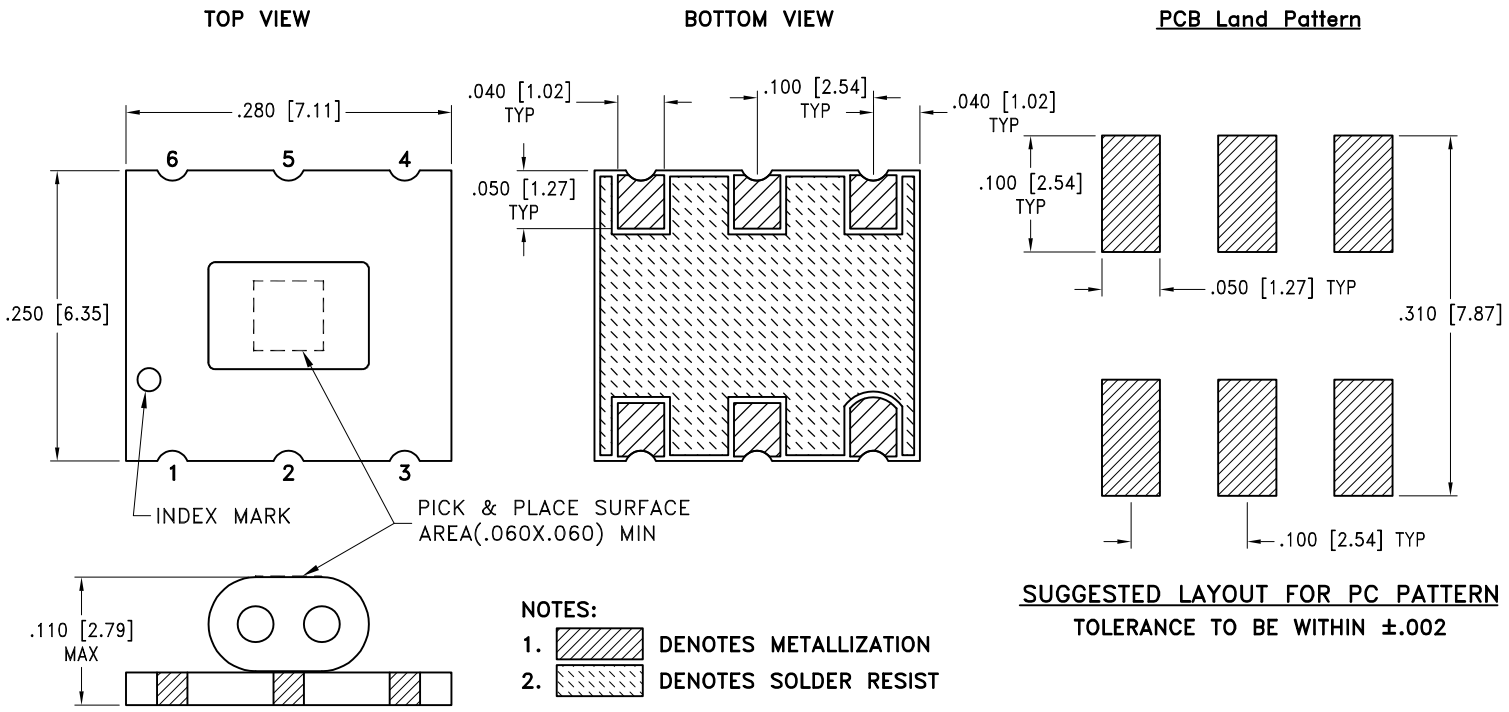




Case Style TT

Outline Dimensions

TT1491-8



Weight: .361 grams

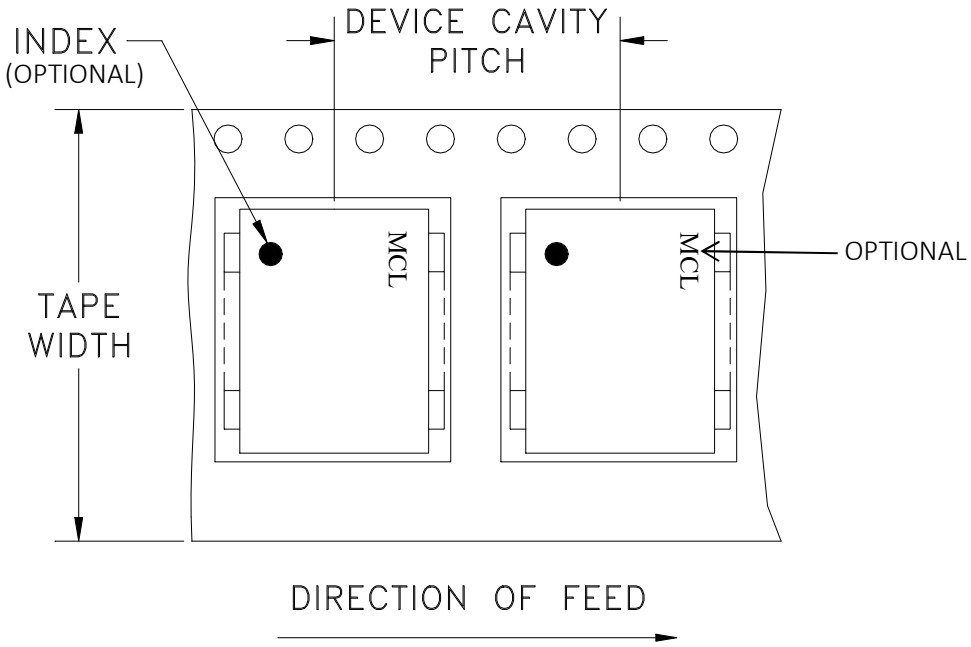
Dimensions are in inches [mm]. Tolerances: 2 Pl.±.01; 3 Pl. ±.005 Inch

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.

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

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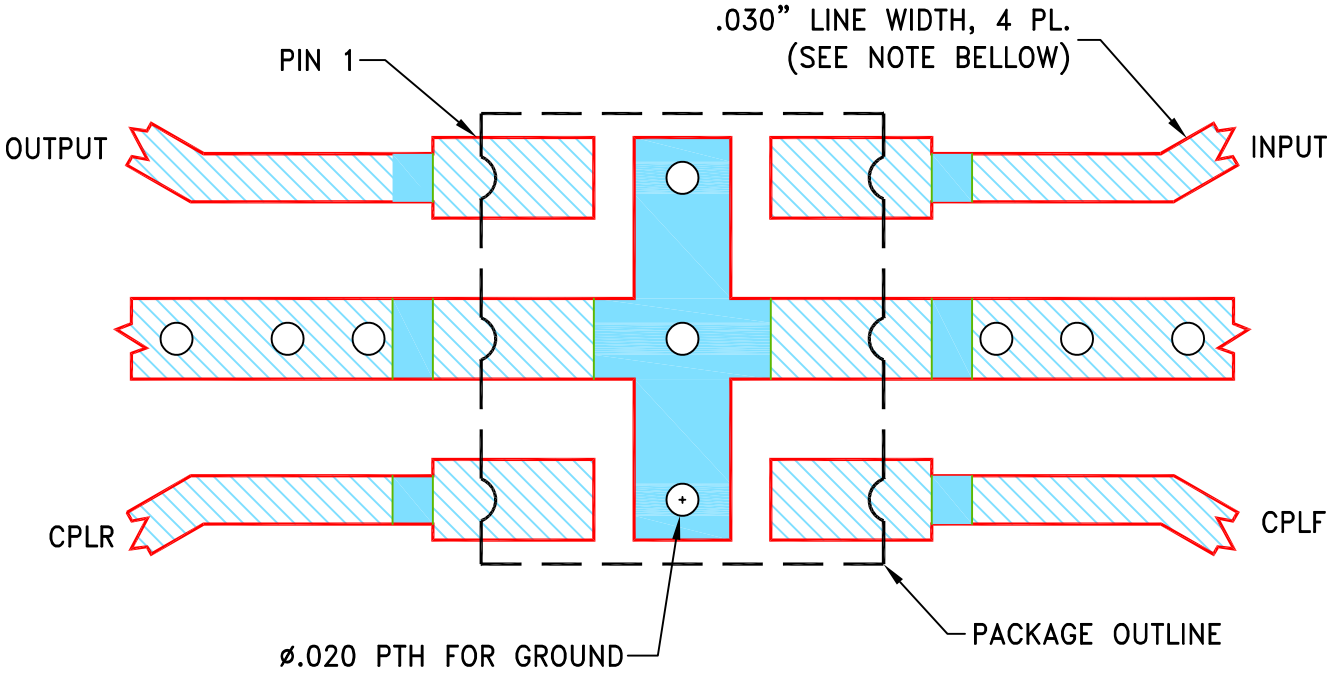
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-023000	NEW RELEASE	09/16/24	ITG	IL

SUGGESTED MOUNTING CONFIGURATION FOR TT1491-8 CASE STYLE



NOTES:

1. LINE WIDTH IS SHOWN FOR ROGERS RO4350B, DIELECTRIC THICKNESS: .030±.002"; COPPER: 1/2 Oz EACH SIDE. FOR OTHER MATERIALS LINE 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	ITG	09/10/24
TOLERANCES ON:	CHECKED	GF	09/10/24
2 PL DECIMALS ±	APPROVED	IL	09/10/24
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

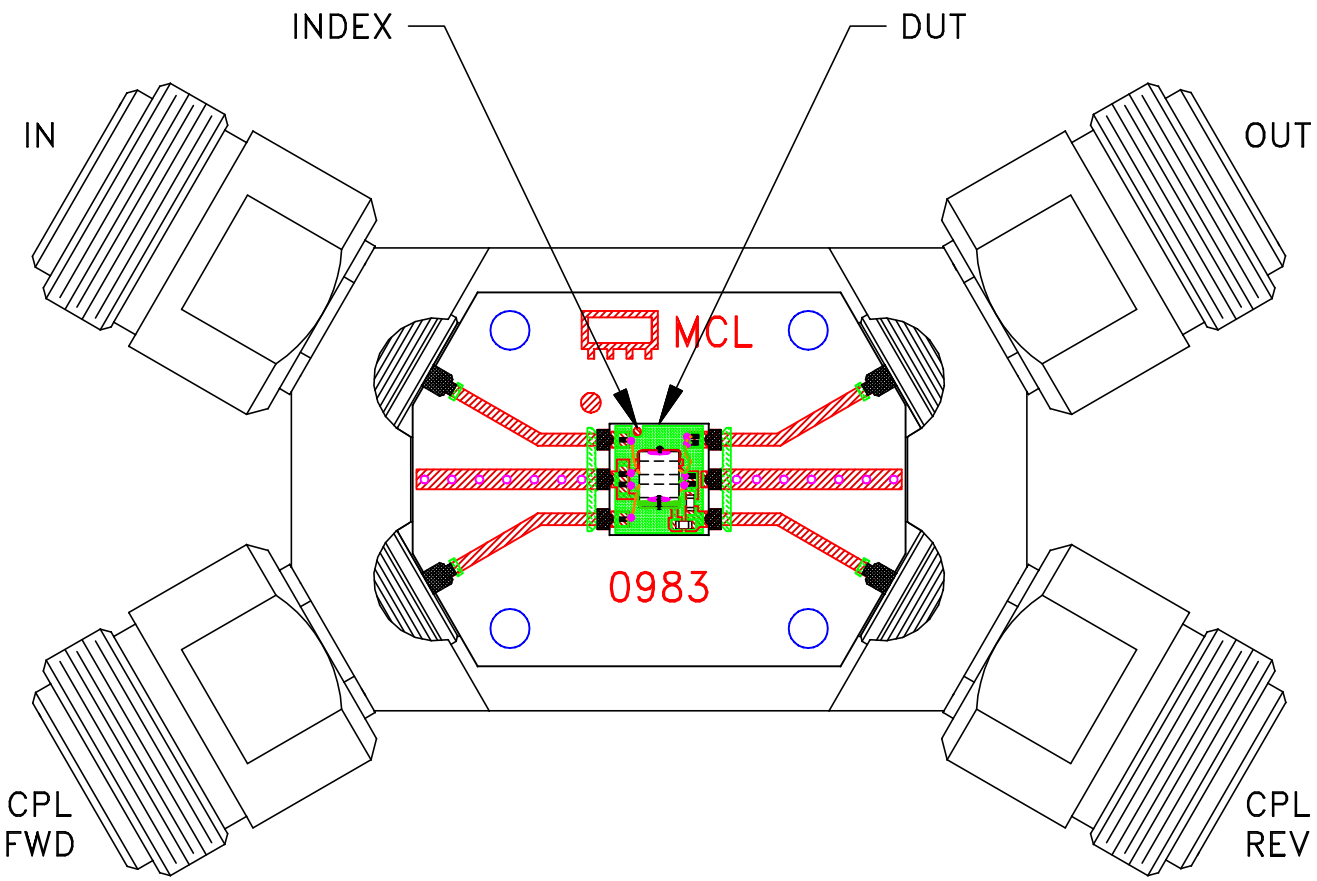
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, TT1491-8, TB-RBDC918275X+

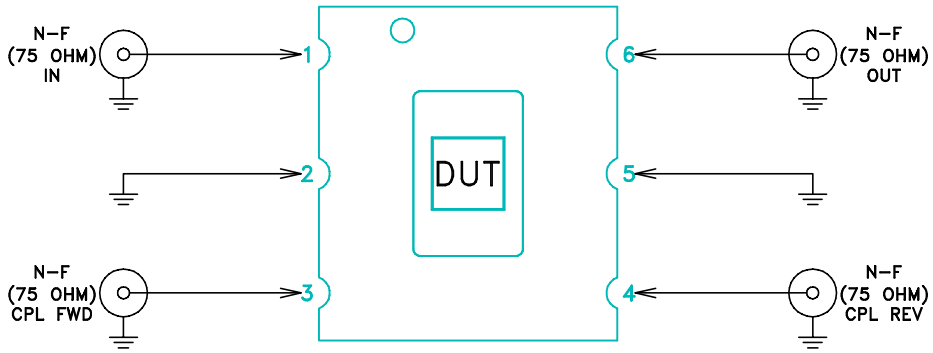
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-795	OR
FILE: 98PL795	SCALE: 8:1	SHEET: 1 OF 1	

Evaluation Board and Circuit

TB-RDC14-18275+



Schematic Diagram



Notes:

1. PCB Material: ROGERS (RO4350B) OR Equivalent, Dielectric Constant=3.48
   Thickness=.030±.002 inch
2. 75 Ohm N Female Connector.

Mini-Circuits®

Mini-Circuits

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