SURFACE MOUNT

Directional Coupler RDC16-182-75R+

75Ω 5 to 1800 MHz 16 dB Coupling Great Flatness

KEY FEATURES

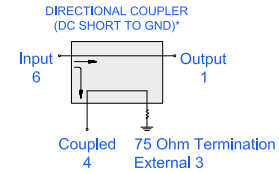
- Low Mainline Loss 0.8 dB Typ.
- Good Return Loss 20 dB Typ. up to 1800 MHz
- Great Coupling Flatness, ±0.3 dB Typ.

APPLICATIONS

- CATV / Broadband
- DOCSIS 4.0

Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



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

PRODUCT OVERVIEW

Mini-Circuits' RDC16-182-75R+ surface mount directional coupler provides 17 dB coupling with low mainline loss and excellent coupling flatness for 75Ω applications from 5 to 1800 MHz. This model features a core and wire design with an all welded construction.

ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Frequency Range		5		1800	MHz
Mainline Loss[1] (In-Out)	5 - 1225	—	0.8	1.5	dB
	1225 - 1800	—	1.0	1.6	
Coupling, Nominal	5 - 1225	—	16.5±0.8	—	dB
	1225 - 1800	—	16.3±0.5	—	
Coupling Flatness	5 - 1225	—	±0.5	±0.9	dB
	1225 - 1800	—	±0.3	±0.8	
Isolation (Out-CPL)	5 - 684	32	37	—	dB
	684 - 1225	26	30	—	
	1225 - 1800	23	27	—	
Return Loss (Input)	5 - 1225	—	18	—	dB
	1225 - 1800	—	20	—	
Return Loss (Output)	5 - 1225	—	19	—	dB
	1225 - 1800	—	20	—	
Return Loss (Coupled)	5 - 1225	—	18	—	dB
	1225 - 1800	—	20	—	

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[3]	2 W Max. at +25°C

2. Permanent damage may occur if any of these limits are exceeded.
3. Derate linearly to 0.1 W at 85°C ambient.

REV.OR
ECO-030128
RDC16-182-75R+
EDU5334
MCINU
260612

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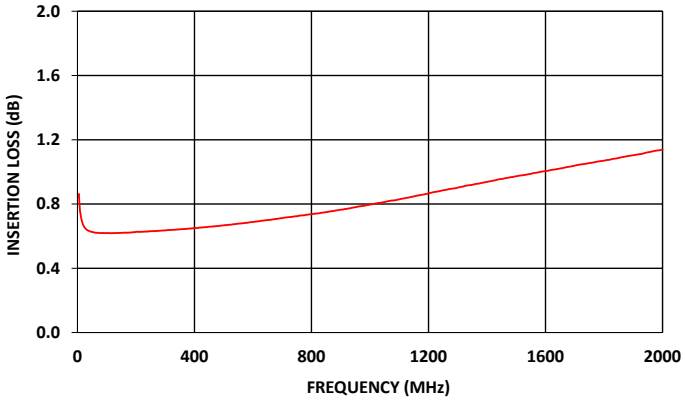
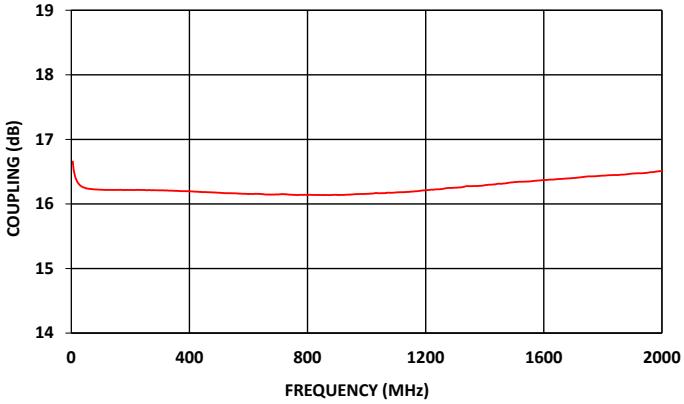
TYPICAL PERFORMANCE GRAPHS AT +25°C

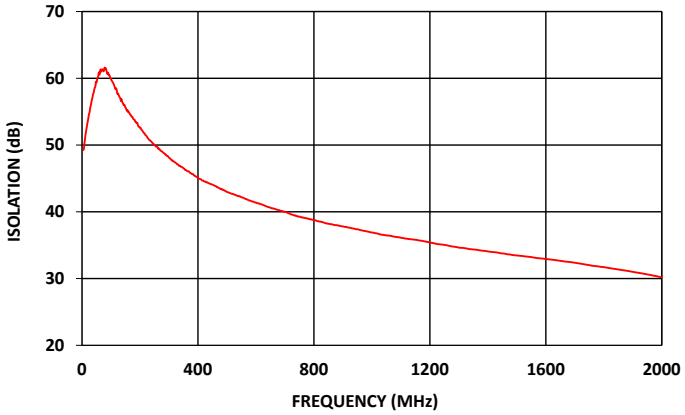
INSERTION LOSS



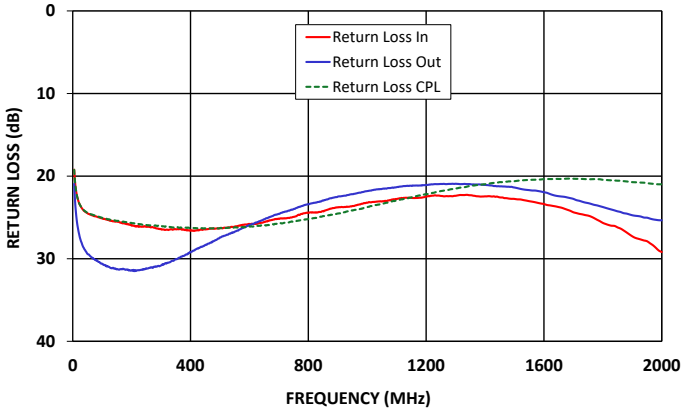
COUPLING



ISOLATION



RETURN LOSS



SURFACE MOUNT

Directional Coupler RDC16-182-75R+

75Ω 5 to 1800 MHz 16 dB Coupling Great Flatness

FUNCTIONAL DIAGRAM

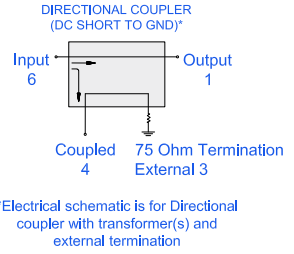
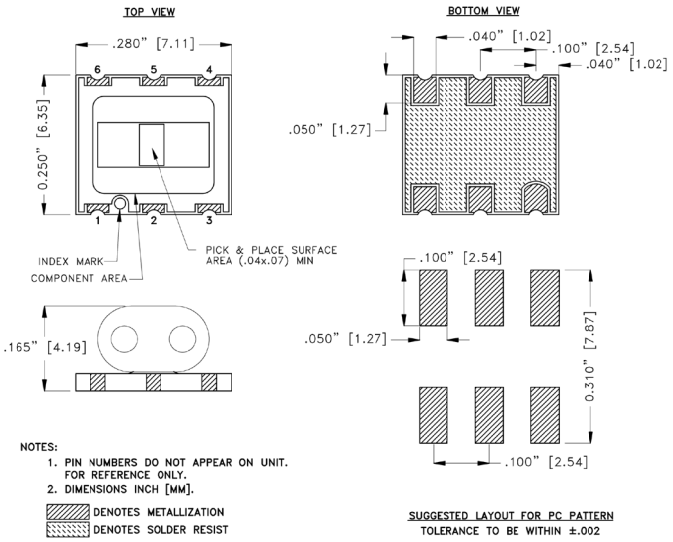


Figure 1. RDC16-182-75R+ Functional Diagram

PAD DESCRIPTION/CONFIGURATION

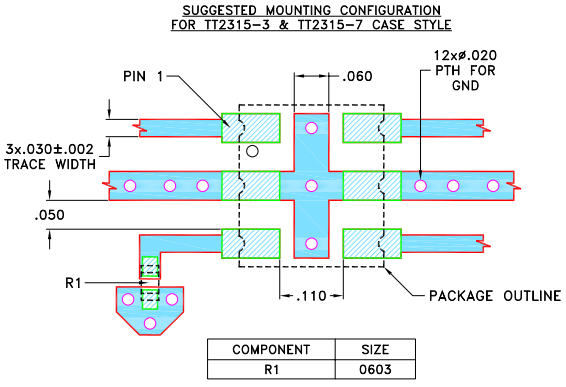
Function	Pad Number	Description
Input	6	Connects to RF Input Port
Output	1	Connects to RF Output Port
Coupled	4	Connects to Coupled Port
Ground	2,5	Connects to Ground
75 Ohm Termination External	3	Connects to External 75 Ohm

CASE STYLE DRAWING



Weight: 0.2 gram
Dimensions are in inches (mm). Tolerances: 2Pl. ± .01[.25]; 3Pl. ± .005[.127]

SUGGESTED PCB LAYOUT (PL-852)



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS ø.030±.002; COPPER: 1/2 Oz ON EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
3. CHIP COMPONENT FOOT PRINT SHOWN FOR REFERENCE. FOR COMPONENT VALUE REFER TO INDIVIDUAL MODEL EVALUATION BOARD.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

Figure 2. Suggested PCB Layout PL-852

PRODUCT MARKING*: N/A

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

SURFACE MOUNT

Directional Coupler RDC16-182-75R+

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ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD. CLICK HERE

Performance Data & Graphs	Data Graphs S-Parameter (S3P Files) Data Set (.zip file) De-embedded to device pads
Case Style	TT2315-3 Lead Finish: Gold over Nickel Plate
RoHS Status	Compliant
Tape and Reel	F34
Suggested Layout for PCB Design	PL-852
Evaluation Board	TB-RDC1618275R+
	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 RDC16-182-75R+

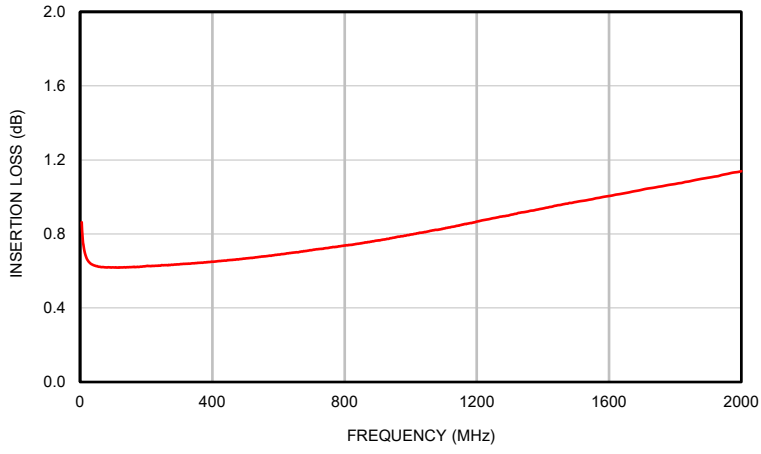
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS[1] (dB)	COUPLING (dB)	ISOLATION (dB)	RETURN LOSS (dB) IN	OUT	CPL
5	0.86	16.66	49.26	19.22	20.95	19.24
7	0.80	16.57	49.65	20.34	22.49	20.37
10	0.74	16.48	50.83	21.44	24.04	21.44
16	0.69	16.38	52.60	22.63	25.96	22.62
20	0.67	16.34	53.59	23.11	26.76	23.12
50	0.63	16.25	59.38	24.48	29.41	24.41
100	0.62	16.22	59.93	25.09	30.62	25.06
120	0.62	16.22	58.14	25.28	30.96	25.24
150	0.62	16.22	55.61	25.50	31.24	25.42
200	0.63	16.22	52.57	26.01	31.38	25.68
250	0.63	16.22	50.08	26.13	31.23	25.92
300	0.64	16.21	48.11	26.41	30.81	26.06
350	0.64	16.20	46.54	26.42	30.06	26.23
400	0.65	16.20	45.12	26.54	29.24	26.30
450	0.66	16.19	44.07	26.46	28.34	26.32
500	0.67	16.17	42.97	26.32	27.42	26.29
550	0.68	16.17	42.20	26.11	26.74	26.19
600	0.69	16.15	41.39	25.80	25.93	26.10
684	0.71	16.14	40.17	25.25	24.73	25.84
700	0.71	16.15	40.01	25.15	24.57	25.76
750	0.72	16.14	39.28	24.93	23.99	25.47
800	0.74	16.14	38.79	24.43	23.41	25.19
850	0.75	16.14	38.21	24.24	22.96	24.85
900	0.76	16.14	37.80	23.77	22.48	24.53
950	0.78	16.15	37.39	23.62	22.19	24.17
1000	0.80	16.16	36.89	23.22	21.81	23.74
1050	0.81	16.17	36.49	23.08	21.55	23.38
1100	0.83	16.18	36.12	22.78	21.34	22.95
1150	0.85	16.19	35.81	22.64	21.17	22.57
1200	0.87	16.21	35.41	22.49	21.07	22.19
1225	0.88	16.22	35.16	22.36	20.99	22.02
1300	0.90	16.25	34.64	22.39	20.92	21.49
1400	0.94	16.29	34.06	22.45	21.06	20.99
1450	0.96	16.31	33.78	22.57	21.24	20.72
1500	0.97	16.34	33.46	22.76	21.38	20.61
1550	0.99	16.35	33.21	23.04	21.70	20.46
1600	1.01	16.37	32.93	23.38	21.95	20.36
1650	1.02	16.39	32.66	23.75	22.43	20.34
1700	1.04	16.40	32.37	24.38	22.76	20.32
1800	1.07	16.44	31.71	25.67	23.74	20.45

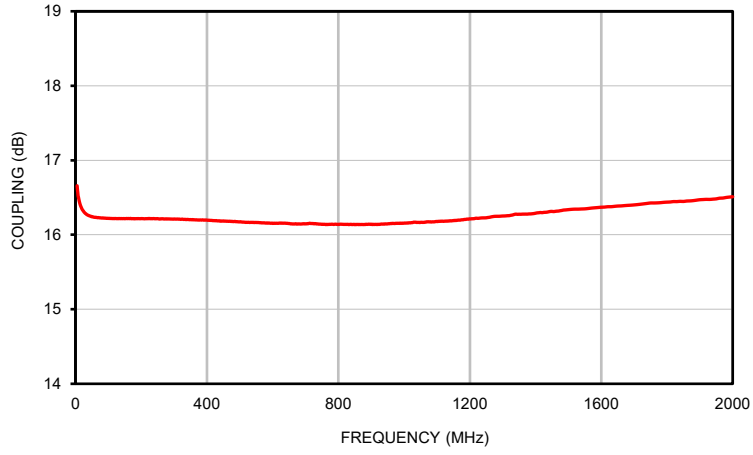
[1]Mainline loss includes coupling loss.

Typical Performance Curves

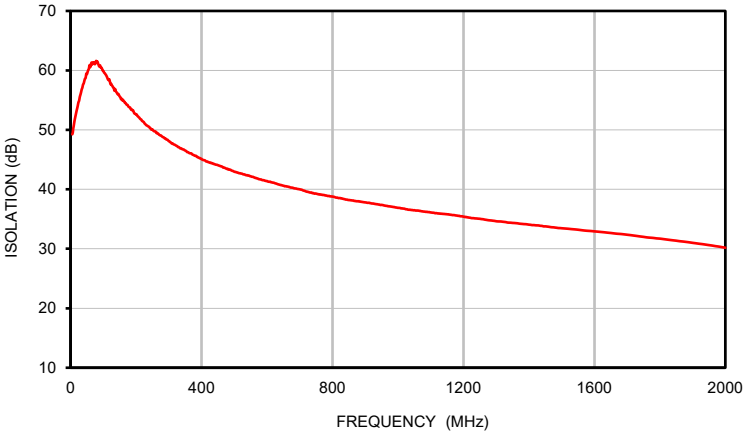
INSERTION LOSS



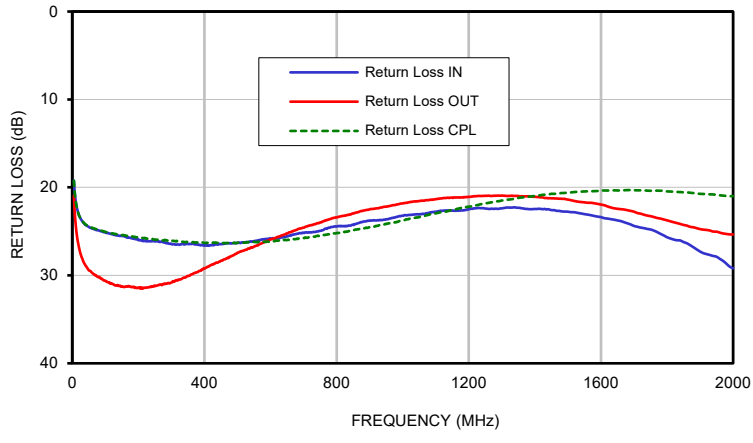
COUPLING



ISOLATION



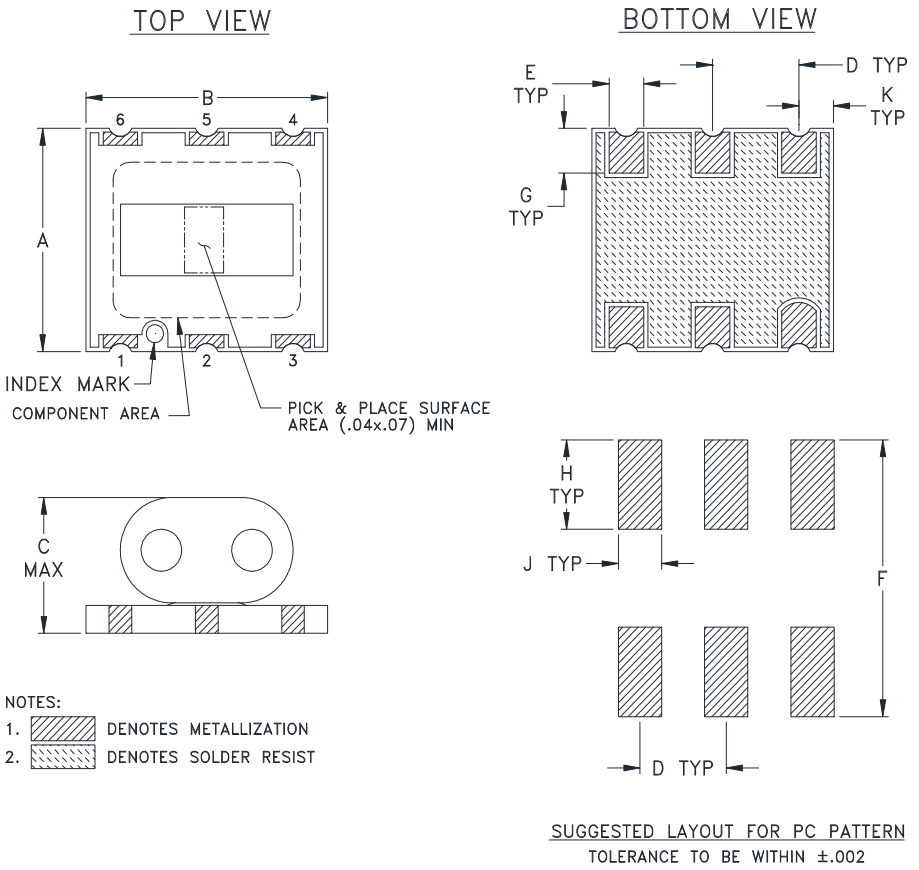
RETURN LOSS



Case Style TT

TT2315-3

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	WT. GRAMS
TT2315-3	.250 (6.35)	.280 (7.11)	.165 (4.19)	.100 (2.54)	.040 (1.02)	.310 (7.87)	.050 (1.27)	.100 (2.54)	.050 (1.27)	.040 (1.02)	0.2

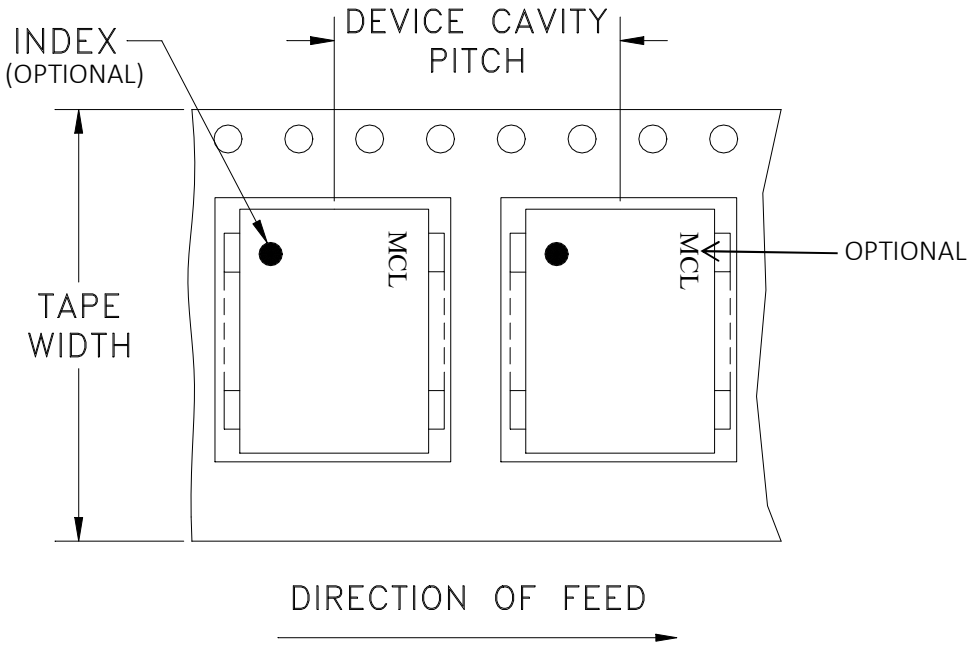
Dimensions are in (mm). Tolerances : 2 Pl.±.01[.25]; 3 Pl.±.005[0.127]

Notes:

1. Case material : Printed wiring laminate.
2. Termination finished : 3-5 µ inch (.08-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate. All models, (+) suffix.
3. Orientation dot on Core & PCB corresponds to Pin # 1.

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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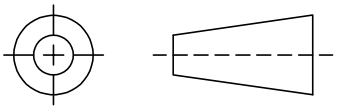
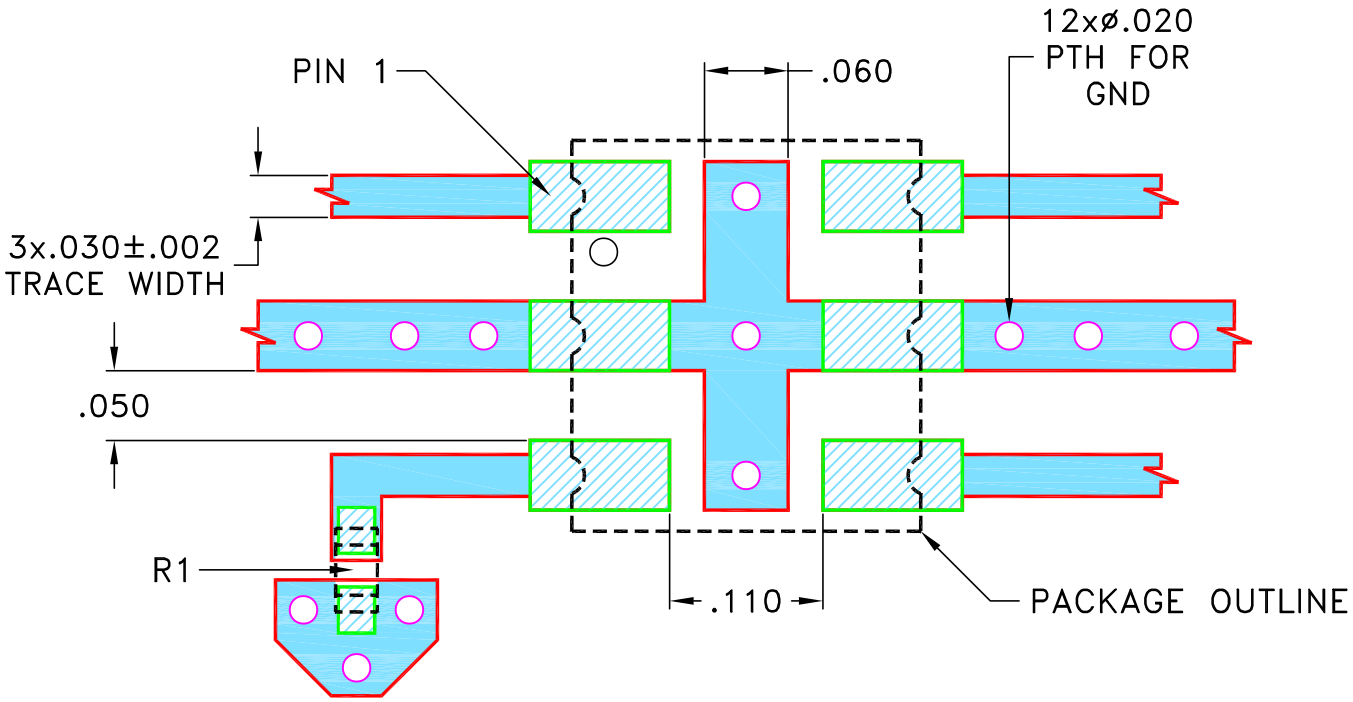
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	NPO-005960	NEW RELEASE	FEB 26	SKH	VR

SUGGESTED MOUNTING CONFIGURATION FOR TT2315-3 & TT2315-7 CASE STYLE



COMPONENT	SIZE
R1	0603

NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS ø.030±.002; COPPER: 1/2 Oz ON EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
3. CHIP COMPONENT FOOT PRINT SHOWN FOR REFERENCE.
   FOR COMPONENT VALUE REFER TO INDIVIDUAL MODEL EVALUATION BOARD.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	SKH	10 FEB 26
TOLERANCES ON:	CHECKED	MD	11 FEB 26
2 PL DECIMALS ±	APPROVED	MKS	11 FEB 26
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

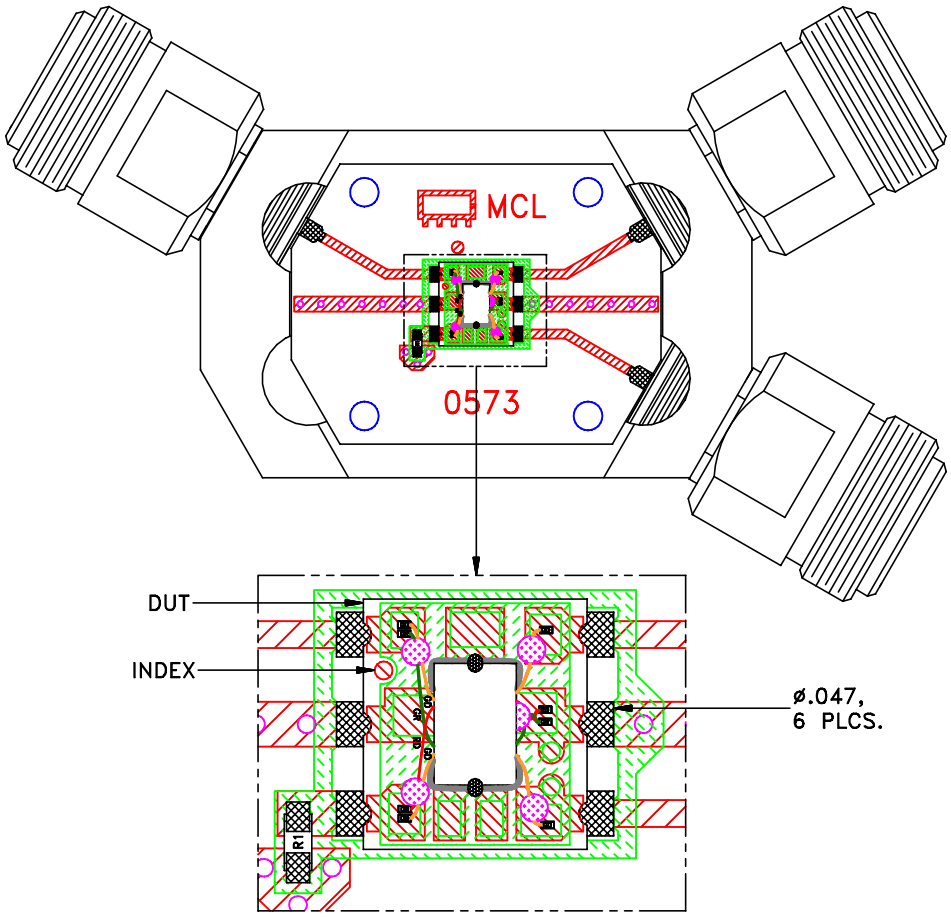
PL, 75, TT2315-7, TB-1236

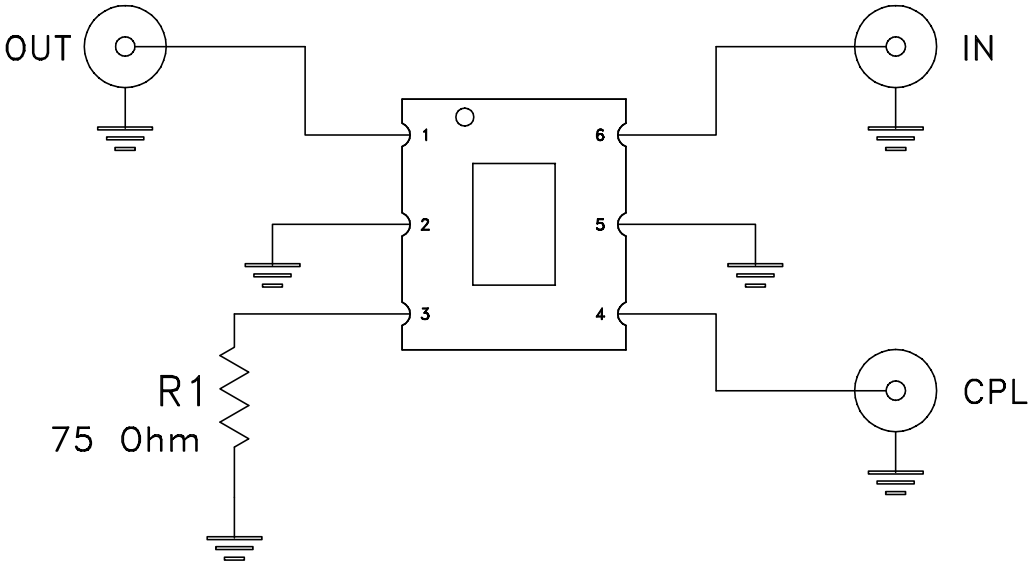
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-852	OR

FILE:	SCALE:	SHEET:
98-PL-852	7:1	1 OF 1

Evaluation Board and Circuit

TB-RDC1418275R+





Schematic Diagram

Notes:

1. 75 Ohm N-type connectors.
2. PCB Material: RO4350B or equivalent,
   Dielectric Constant=3.5, Thickness=.030 inch.

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