SURFACE MOUNT top hat

Directional Coupler RDC-20-252-5WX+

50Ω 20dB 30 to 2500 MHz

THE BIG DEAL

- Wideband 30-2500 MHz
- Low mainline loss, 0.6 dB typ. at 2000 MHz
- Good Directivity, 16 dB typ.
- Good Return Loss, 22 dB typ.

Generic photo used for illustration purposes only

CASE STYLE: TT2315

+RoHS Compliant
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

APPLICATIONS

- VHF/UHF
- Cable tv
- Cellular
- Defense / Military
- Military / Radio Application

PRODUCT OVERVIEW

Mini-Circuits RDC-20-252-5WX+ surface-mount directional coupler provides 20 dB coupling with high directivity, low mainline loss, and good return loss for 50Ω applications from 30 to 2500 MHz, supporting a variety of broadband applications including VHF/UHF, CATV, cellular and more. This model features core and wire construction with wrap-around terminations for good solderability and easy visual inspection.

KEY FEATURES

Feature	Advantages
Broadband, 30 to 2500 MHz	Supports bandwidth requirements.
Low mainline loss, 0.6 dB at 2000 MHz	Provides excellent through-path signal transmission and maintains low heat dissipation, avoiding the need for special heat sinking methods.
Power handling, up to 5W	Usable in systems with a variety of signal power requirements.
Good return loss, 22 dB typ.	Provides excellent matching for 50Ω systems.
Top Hat® feature	Improves speed and accuracy of pick and place assembly.

REV. OR
ECO-011662
RDC-20-252-5WX+
YL/CP/AM
221006

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ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		30		2500	MHz
Mainline Loss[1]	30-1000	—	0.4	0.8	dB
	1000-2000	—	0.6	1.1	
	2000-2500	—	1.1	1.6	
Nominal Coupling	30-2500	—	±20.5	—	dB
Coupling Flatness(±)	30-2500	—	1.2	2.0	dB
Directivity	30-1000	—	20	—	dB
	1000-2000	—	16	—	
	2000-2500	—	14	—	
Return Loss (Input)	30-1000	17	22	—	dB
	1000-2000	16	20	—	
	2000-2500	14	18	—	
Return Loss (Output)	30-1000	17	22	—	dB
	1000-2000	14	20	—	
	2000-2500	11	15	—	
Return Loss (Coupled)	30-1000	13	18	—	dB
	1000-2000	11	14	—	
	2000-2500	10	13	—	
Input Power	30-2500	—	—	5	W

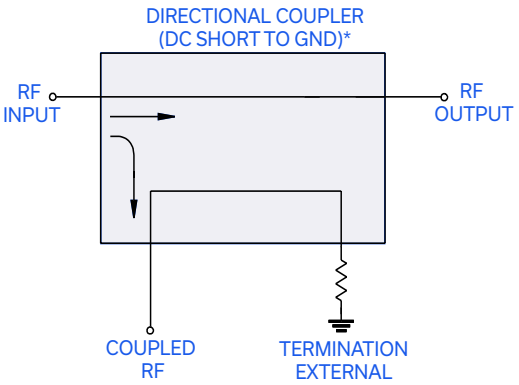
1. Mainline loss includes theoretical power loss at coupled port.

MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C

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

ELECTRICAL SCHEMATIC



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

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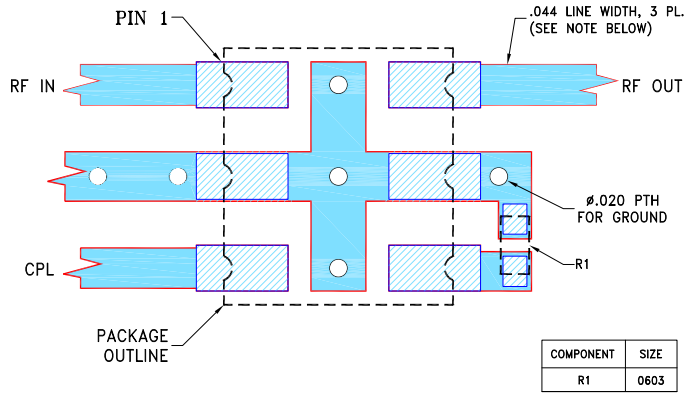
PAD CONNECTIONS

Function	Pad Number
INPUT	1
OUTPUT	6
COUPLED	3
GROUND	2
50Ω TERM EXTERNAL	4
ISOLATE (DO NOT USE)	5

PRODUCT MARKING: YK

DEMO BOARD MCL P/N: TB-RDC202525WX+

SUGGESTED PCB LAYOUT (PL-710)



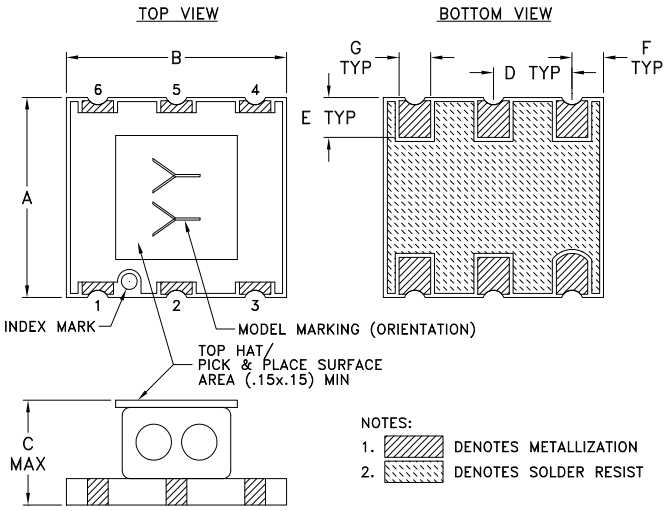
COMPONENT	SIZE
R1	0603

NOTES:
1. TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020±.0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS LINE WIDTH MAY NEED TO BE MODIFIED.
2. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-1178+.
3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

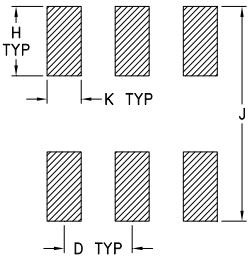
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

OUTLINE DRAWING



PCB Land Pattern



Suggested Layout,
Tolerance to be within±.002

OUTLINE DIMENSIONS (Inches / mm)

A	B	C	D	E	F	G	H	J	K
.250	.280	.140	.100	.050	.040	.040	.100	.310	.050
6.35	7.11	3.56	2.54	1.27	1.02	1.02	2.54	7.87	1.27

Weight: 0.35 grams

TAPE & REEL INFORMATION: F34

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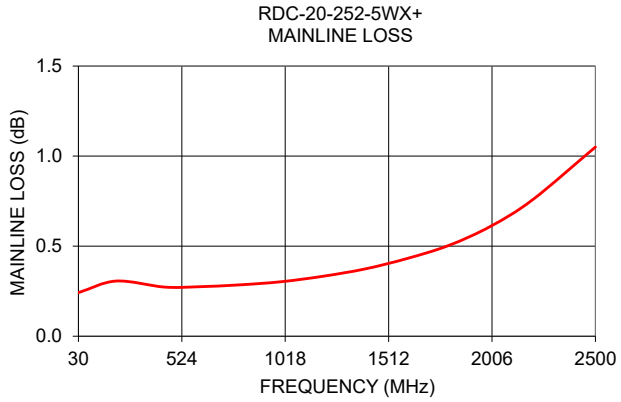
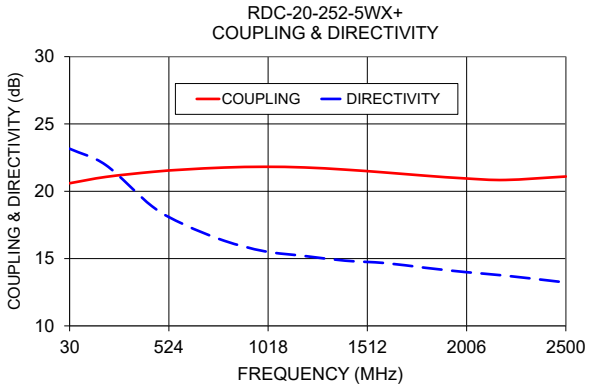
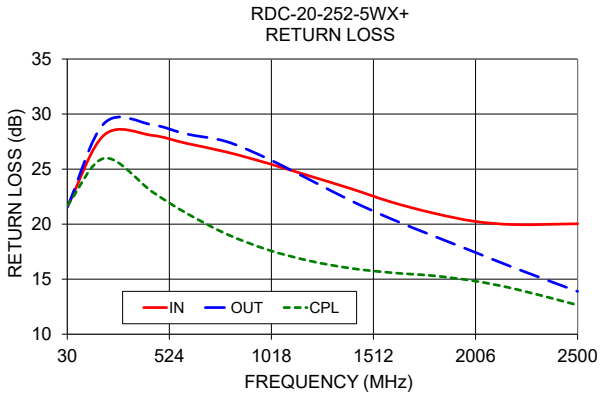
TYPICAL PERFORMANCE DATA

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss(dB) In	Out	Cpl
30	0.24	20.60	23.16	21.57	21.55	21.69
210	0.31	21.07	21.95	28.12	29.18	25.99
440	0.27	21.44	18.89	28.07	29.04	22.96
600	0.27	21.61	17.53	27.37	28.22	21.07
800	0.29	21.76	16.32	26.56	27.50	19.11
1000	0.30	21.82	15.54	25.53	25.95	17.68
1200	0.33	21.77	15.19	24.39	24.07	16.68
1400	0.37	21.61	14.85	23.24	22.15	16.00
1600	0.43	21.40	14.67	22.00	20.46	15.59
1800	0.50	21.16	14.32	21.01	18.95	15.31
2000	0.61	20.95	14.00	20.26	17.47	14.84
2200	0.76	20.84	13.73	19.96	15.98	14.10
2500	1.05	21.10	13.22	20.03	13.89	12.65







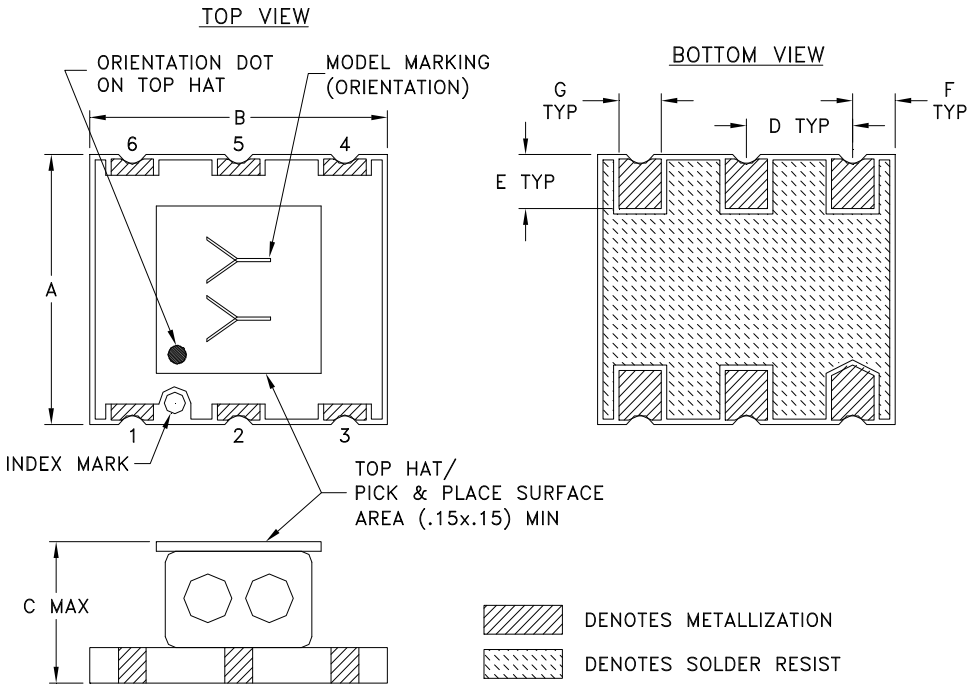
NOTES

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

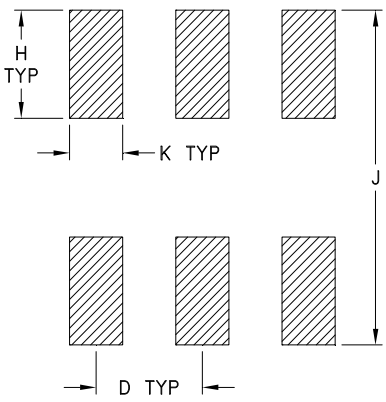
Case Style TT

TT2315

Outline Dimensions



PCB Land Pattern



SUGGESTED LAYOUT
TOLERANCE TO BE WITHIN ±.002

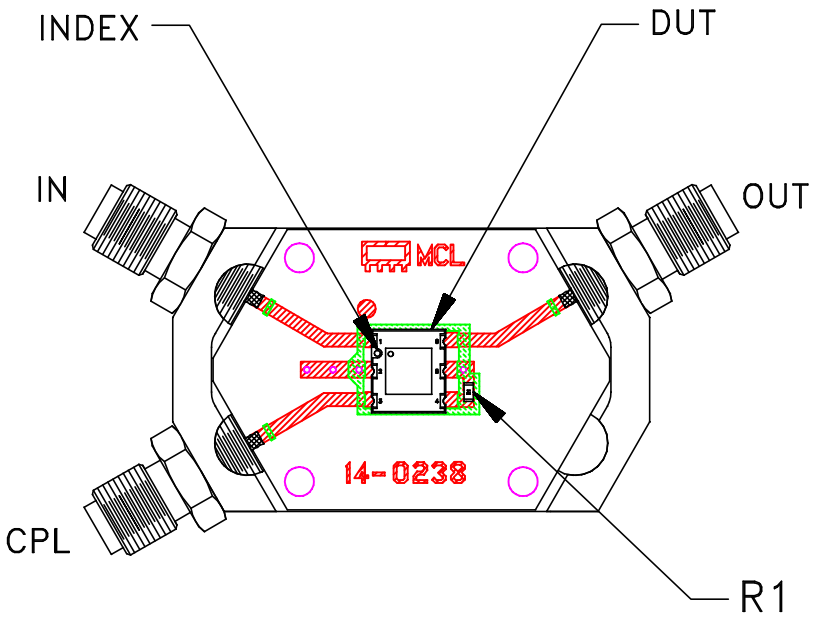
CASE #	A		B	C	D	E	F	G	H	J	K	WT. GRAMS
TT2315	.250 (6.35)		.280 (7.11)	.140 (3.56)	.100 (2.54)	.050 (1.27)	.040 (1.02)	.040 (1.02)	.100 (2.54)	.310 (7.87)	.050 (1.27)	.35

Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3 Pl. ± .005

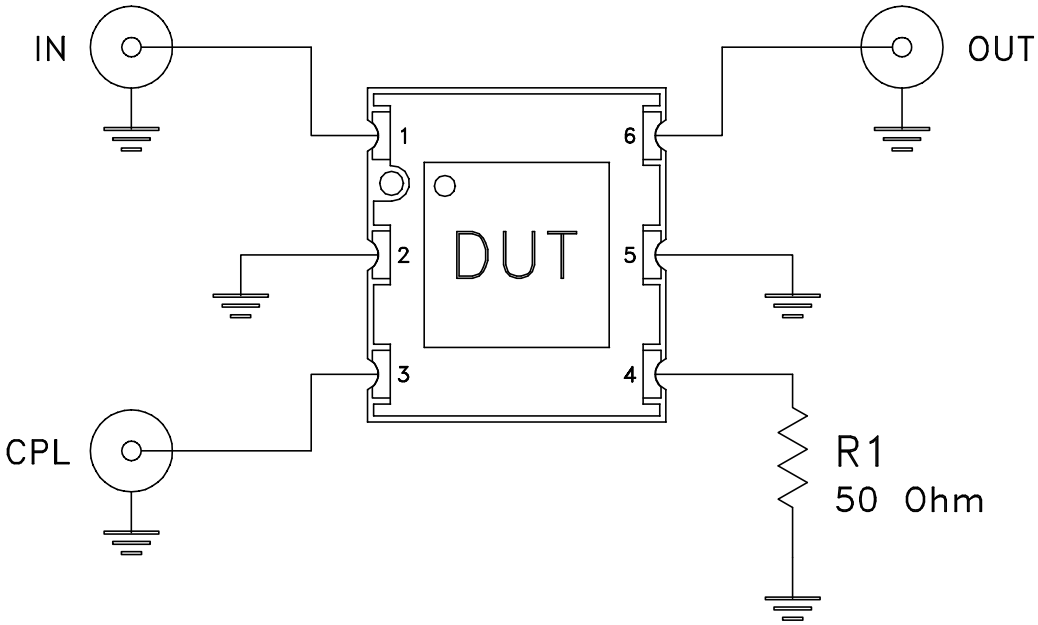
Notes:

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.
3. Top-Hat total thickness: .013 inches MAX.
4. Orientation Dot on Top Hat & PCB corresponds to Pin #1.

Evaluation Board and Circuit



TB-RDC202525WX+



Schematic Diagram

Notes:

1. 50 Ohm SMA connectors.

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