



Mini-Circuits

SURFACE MOUNT

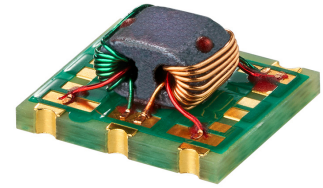
Bi-Directional Coupler

RDC-20-52-10W+

50 Ω 20dB 30 to 520 MHz 10 Watt

THE BIG DEAL

- Wideband 30 to 520 MHz
- Low Mainline Loss, 0.3 dB typ. at 520 MHz
- Flat Coupling, ± 0.5 dB
- Good Return Loss, 22 dB typ.



Generic photo used for illustration purposes only

CASE STYLE: TT1491-7

+RoHS Compliant

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

APPLICATIONS

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

PRODUCT OVERVIEW

Mini-Circuits' RDC-20-52-10W+ surface-mount directional coupler provides 20 dB coupling with high directivity, low mainline loss, and good return loss for 50 Ω applications from 30 to 520 MHz, supporting a variety of broadband applications including VHF/UHF, 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 520 MHz	Supports bandwidth requirements.
Low Mainline Loss, 0.3 dB at 520 MHz	Provides excellent through-path signal transmission and maintains low heat dissipation, avoiding the need for special heat sinking methods.
Power Handling, up to 10 W	Usable in systems with a variety of signal power requirements.
Good Return Loss, 22 dB typ.	Provides excellent matching for 50 Ω systems.

REV. A
ECO-021586
RDC-20-52-10W+
MCL NY
240430





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ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		30		520	MHz
Mainline Loss ¹	30-520	—	0.3	0.4	dB
Nominal Coupling	30-520	—	19.0 ± 0.5	—	dB
Coupling Flatness(±)	30-520	—	0.3	0.5	dB
Directivity	30-520	14	20	—	dB
Return Loss (Input)	30-520	18	28	—	dB
Return Loss (Output)	30-520	18	28	—	dB
Return Loss (Coupled)	30-520	18	28	—	dB
Input Power	30-520	—	—	10	W

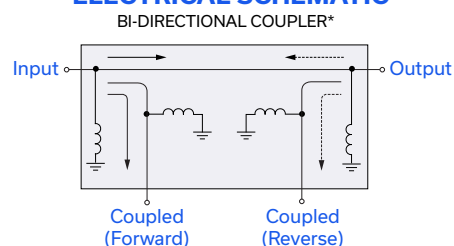
1. Mainline loss includes theoretical power loss at coupled port.

ABSOLUTE 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 Bi-Directional coupler with internal transformer(s) that routes DC from all ports to ground



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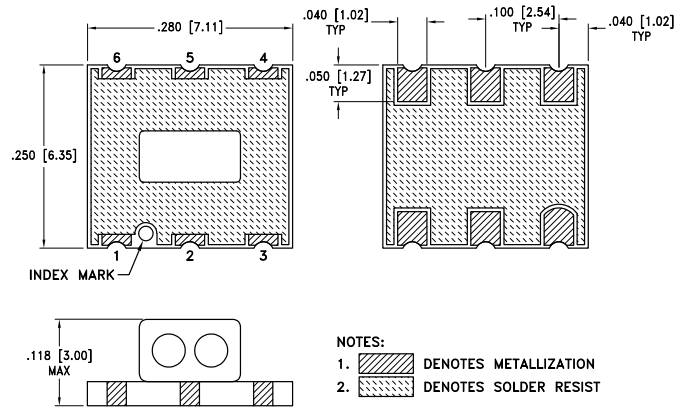
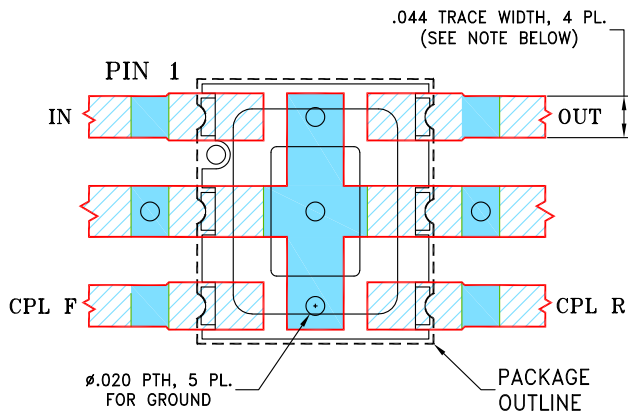
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PAD CONNECTIONS

Function	Pad Number
INPUT	1
OUTPUT	6
COUPLED (Fwd)	3
GROUND	2
COUPLED (Rev)	4
ISOLATE (DO NOT USE)	5

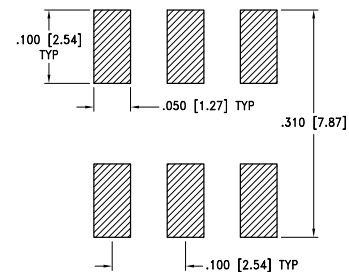
OUTLINE DRAWING


DEMO BOARD MCL P/N: TB-RDC205210W+
SUGGESTED PCB LAYOUT (PL-759)


NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .020". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- [Blue Fill] DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- [Hatched Pattern] DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK


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

OUTLINE DIMENSIONS (Inches mm)

A	B	C	D	E	F	G	H	J	K
.250	.280	0.118	.100	.050	.040	.040	.100	.310	.050
6.35	7.11	3.00	2.54	1.27	1.02	1.02	2.54	7.87	1.27

Weight: 0.35 grams

TAPE & REEL INFORMATION: F2



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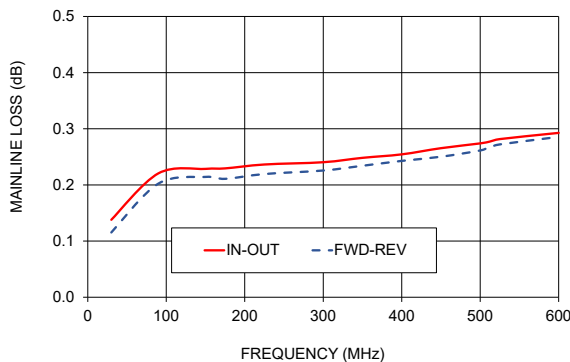
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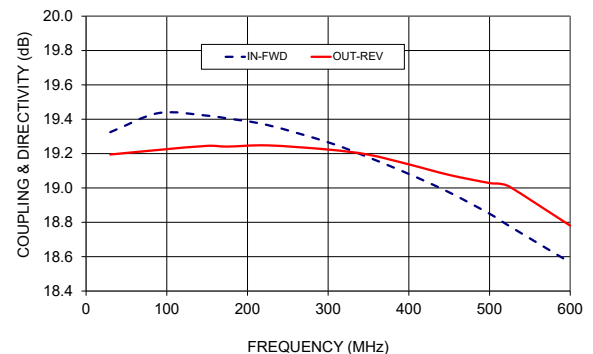
TYPICAL PERFORMANCE DATA

Frequency (MHz)	Insertion Loss (Db)		Coupling (Db)		Directivity (Db)		Return Loss (Db)			
	In-Out	Fwd-Rev	In-Fwd	Out-Rev	In-Fwd	Out-Rev	In	Out	Fwd	Rev
30	0.14	0.12	19.32	19.19	41.64	39.17	27.24	27.59	26.80	27.28
90	0.22	0.20	19.44	19.22	33.77	39.32	31.80	34.16	31.06	33.23
150	0.23	0.21	19.42	19.25	27.83	32.03	32.71	35.14	31.77	34.41
175	0.23	0.21	19.40	19.24	26.96	30.36	32.88	34.94	31.79	33.82
225	0.24	0.22	19.37	19.25	24.70	27.35	32.89	34.19	31.27	33.21
300	0.24	0.23	19.27	19.22	21.99	24.13	33.43	33.47	30.73	31.75
350	0.25	0.23	19.18	19.19	20.69	22.30	33.25	33.31	30.42	31.20
400	0.25	0.24	19.08	19.14	19.49	20.73	33.54	32.84	30.01	30.54
450	0.27	0.25	18.97	19.08	18.37	19.36	33.58	32.76	29.59	29.66
500	0.27	0.26	18.85	19.03	17.61	18.12	33.19	32.50	29.14	29.33
512	0.28	0.27	18.82	19.02	17.43	17.80	33.13	32.41	28.96	29.17
525	0.28	0.27	18.78	19.01	17.16	17.41	33.17	32.14	28.70	28.91
600	0.29	0.29	18.57	18.78	15.87	15.84	33.27	31.29	28.01	27.56

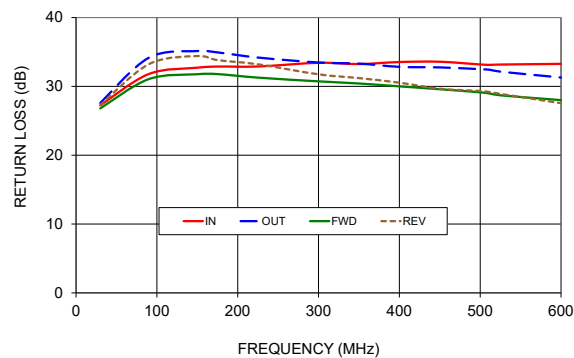
MAINLINE LOSS



COUPLING & DIRECTIVITY



RETURN LOSS



NOTES

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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