DC Pass, High Power

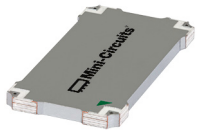
Bi-Directional Coupler

BDCH-25-33+

50Ω 25dB Coupling 150W 800 to 3000 MHz

The Big Deal

- High power handling, up to 150W
- Ultra wideband, 800 to 3000 MHz
- Low insertion loss, 0.2 dB
- High directivity, 28 dB



CASE STYLE: PQ2098

Product Overview

Mini-Circuits BDCH-25-33+ high-power bi-directional coupler provides high power handling up to 150W and low insertion loss of 0.2 dB. Covering frequencies from 800 to 3000 MHz, it supports a wide variety of applications from power amplifiers and antenna feeds to various digital communications and more. High directivity of 28 dB provides accurate sampling from the coupled port, and 31 dB return loss provides excellent matching over full frequency range. The coupler is designed into an open printed laminate (1.00 x 0.50 x 0.051") with wrap-around terminations for good solderability and easy visual inspection.

Key Features

Feature	Advantages
High power handling: 150W @ 85°C 90W @ 105°C	Usable in many systems with high-power requirements such as antenna feeds, power amplifiers, and others that require sampling a high power RF signal.
Low insertion loss, 0.2 dB	Used primarily in high power transmission applications, the excellent through-path signal loss maximizes the power transmitted to the antenna.
Good coupling flatness, ±0.6 dB	Flat coupling values across the frequency range allows accurate signal sampling through the coupled port with minimal measurement error.
High directivity, 28 dB	Good directivity allows accurate signal sampling through the coupled port with minimal measurement error
Excellent return loss, 31 dB	Provides good matching for 50Ω systems.

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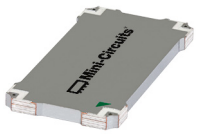


CASE STYLE: PQ2098

Maximum Ratings

Operating Temperature, case**	-55°C to 105°C
Storage Temperature	-55°C to 105°C
DC Current	2A
Power Input*	150W @+85°C, case

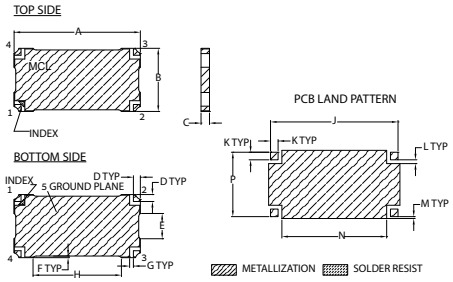
*Derate to 120W at +95°C and 90W at +105°C case temperature
**Case temperature is defined as temperature on base plate.
Permanent damage may occur if any of these limits are exceeded.

Pad Connections***

INPUT	1
OUTPUT	2
COUPLED FORWARD	4
COUPLED REVERSE	3
GROUND	5

***Model is symmetrical and all ports are interchangeable, see port configuration table.

Outline Drawing



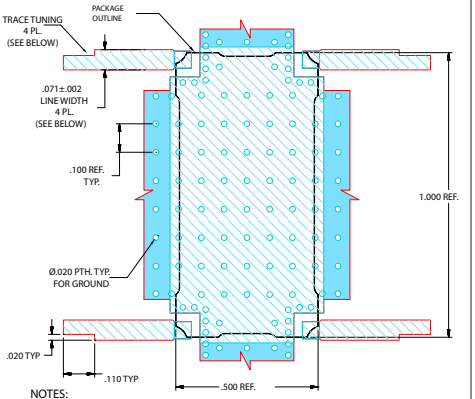
Base material: Printed wiring laminate.
Termination Finish: 2-5 µinch (0.05-0.13 microns) Immersion Gold.

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H
1.000	**0.500**	**.051**	**.055**	**.200**	**.013**	**.030**	**0.700**
25.40	12.70	1.30	1.40	5.08	0.33	0.76	17.78

J	K	L	M	N	P	wt.
1.010	**.060**	**.030**	**.015**	**.830**	**.510**	grams
25.65	1.52	0.76	0.38	21.08	12.95	2.0

Demo Board MCL P/N: TB-863-1
Suggested PCB Layout (PL-538)



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4003C WITH DIELECTRIC THICKNESS. 0.032"±.0015". COPPER: 1 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
3. TRACE TUNING IN RF LINES MAY BE NEEDED TO ACHIEVE SPECIFIED PERFORMANCE.

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

Features

- High power, up to 150W
- Ultra wideband, 800 - 3000 MHz
- Low insertion loss, 0.2 dB
- DC current pass through input to output

Applications

- VHF/UHF high power radio
- Transmission signal monitoring
- Antenna reflection monitoring
- Wireless transmitters
- Distributed antenna systems (DAS)

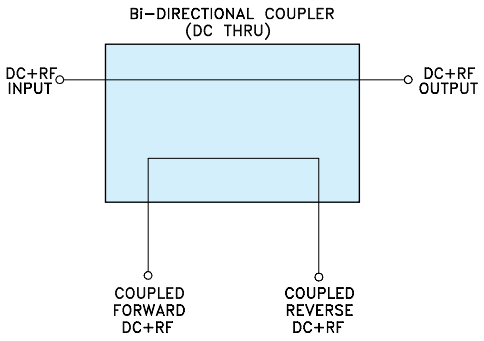
+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Electrical Specifications @ +25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		800		3000	MHz
Insertion Loss *	800 - 3000	—	0.2	0.3	dB
Coupling	800 - 3000	—	25±1.0	—	dB
Coupling Flatness	800 - 3000	—	±0.6	—	dB
Directivity	800 - 3000	21	28	—	dB
Return Loss (Input)	800 - 3000	22	31	—	dB
Return Loss (Output)	800 - 3000	22	31	—	dB
Return Loss (Coupling)	800 - 3000	22	31	—	dB
Input RF Power **@+85°C, case**	800 - 3000	—	—	150	W
@+95°C, case	800 - 3000	—	—	120	
@+105°C, case	800 - 3000	—	—	90	
Thermal Resistance	800 - 3000	—	0.3	—	°C/W

* Does not include theoretical loss. Nominal theoretical loss 0.01 dB.

Electrical Schematic



Port Function Configurations

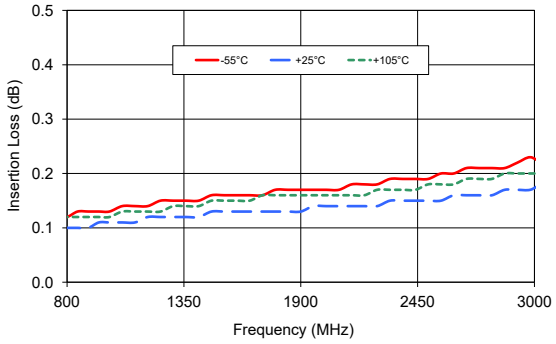
Config.	Input	Output	Coupled Forward	Coupled Reverse
A	1	2	4	3
B	2	1	3	4
C	3	4	2	1
D	4	3	1	2

Typical Performance Data *

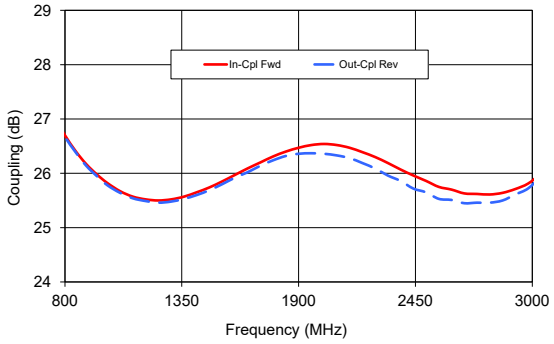
FREQUENCY (MHz)	Insertion Loss (dB) In - Out			Coupling (dB)		Directivity (dB)						Return Loss (dB)			
						In-Cpl Fwd			Out-Cpl Rev						
	-55°C	+25°C	+105°C	In-Cpl Fwd	Out-Cpl Rev	-55°C	+25°C	+105°C	-55°C	+25°C	+105°C	In	Out	Cpl Fwd	Cpl Rev
800	0.12	0.10	0.12	26.70	26.67	28.49	28.27	29.25	27.72	28.09	29.03	36.14	36.06	34.33	34.27
900	0.13	0.10	0.12	26.17	26.14	28.19	28.18	29.30	27.69	27.66	28.44	43.00	42.23	38.47	37.30
1000	0.13	0.11	0.12	25.82	25.78	28.41	28.10	29.13	28.12	27.67	28.18	48.38	42.98	43.39	39.27
1100	0.14	0.11	0.13	25.60	25.57	28.61	28.27	28.27	28.40	27.64	27.59	38.26	36.59	38.30	35.82
1200	0.14	0.12	0.13	25.51	25.47	28.92	28.80	28.34	29.01	28.08	27.43	34.04	32.95	33.80	32.42
1320	0.15	0.12	0.14	25.53	25.50	29.58	29.57	28.73	29.85	28.45	27.37	31.84	31.13	31.07	30.59
1440	0.16	0.12	0.14	25.68	25.63	30.02	30.40	28.19	29.99	29.22	27.40	30.99	30.18	29.73	29.39
1560	0.16	0.13	0.15	25.89	25.84	29.85	31.26	29.23	29.59	29.88	28.24	30.88	30.22	29.12	29.04
1680	0.16	0.13	0.15	26.13	26.06	30.90	32.33	29.84	29.92	30.34	28.97	31.93	31.17	29.61	29.46
1800	0.17	0.13	0.16	26.35	26.26	29.30	32.08	31.46	28.01	29.62	29.15	33.89	33.63	31.29	30.92
1920	0.17	0.13	0.16	26.49	26.37	29.51	30.19	29.58	27.69	28.36	28.23	36.38	37.63	33.91	33.74
2040	0.17	0.14	0.16	26.54	26.36	27.91	28.10	27.37	26.59	26.82	26.94	38.47	46.16	39.74	38.79
2160	0.18	0.14	0.16	26.44	26.26	27.17	26.97	25.77	26.26	26.15	25.51	40.32	52.28	51.47	41.83
2280	0.19	0.14	0.17	26.26	26.05	27.02	26.49	25.51	26.33	25.74	24.82	42.60	47.31	42.54	39.29
2400	0.19	0.15	0.17	26.04	25.81	26.78	26.63	25.59	27.37	25.91	25.43	50.17	46.47	37.46	37.56
2500	0.19	0.15	0.18	25.86	25.65	27.26	27.88	25.79	28.14	26.84	25.64	50.33	44.33	35.84	36.60
2600	0.20	0.16	0.18	25.75	25.52	27.11	28.63	26.17	28.08	27.59	26.28	41.41	40.30	35.06	36.77
2700	0.21	0.16	0.19	25.62	25.43	27.27	27.72	26.40	28.22	27.45	26.87	36.59	37.47	34.33	37.17
2800	0.21	0.16	0.19	25.61	25.46	26.94	27.19	26.21	27.09	28.22	26.88	33.23	34.78	33.91	37.42
2900	0.21	0.17	0.20	25.69	25.59	25.21	26.28	25.72	25.37	27.96	26.96	31.34	32.76	33.50	37.08
3000	0.22	0.17	0.20	25.86	25.78	25.51	25.26	25.00	25.68	26.28	26.56	31.15	31.81	33.20	35.34

* Data corresponds to Configuration A at +25°C unless specified otherwise.

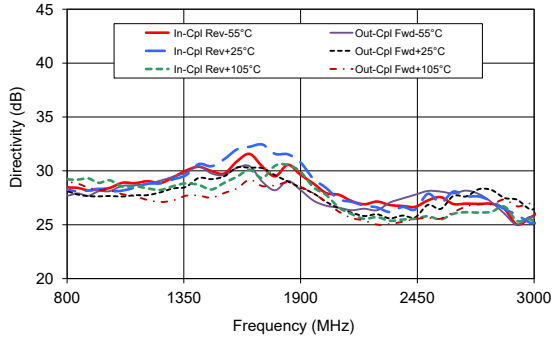
BDCH-25-33+
Insertion Loss (dB)



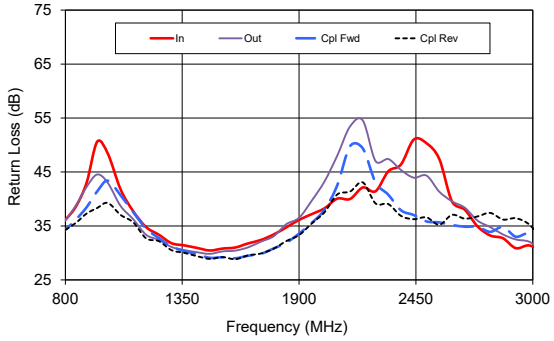
BDCH-25-33+
Coupling (dB)



BDCH-25-33+
Directivity (dB)



BDCH-25-33+
Return Loss (dB)



Additional 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