

DC Pass, High Power

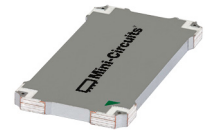
Bi-Directional Coupler

BDCH-15-33+

50Ω 15 dB Coupling 100W 500 to 3000 MHz

The Big Deal

- High power handling, up to 100W
- Ultra wideband, 500 to 3000 MHz
- Low insertion loss, 0.25 dB
- High directivity, 25 dB



Generic photo used for illustration purposes only
CASE STYLE: PQ2098

Product Overview

Mini-Circuits' BDCH-15-33+ high-power bi-directional coupler provides high power handling up to 100W and low insertion loss of 0.25 dB. Covering frequencies from 500 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 25 dB provides accurate sampling from the coupled port, and 30 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: 100W @ 85°C 70W @ 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, 0.25 dB	Used primarily in high power transmission applications, the excellent through-path signal loss maximizes the power transmitted to the antenna.
Excellent coupling flatness, ±0.55 dB	Flat coupling values across the frequency range allows accurate signal sampling through the coupled port with minimal measurement error.
High directivity, 25 dB	Good directivity allows accurate signal sampling through the coupled port with minimal measurement error.
Excellent return loss, 30 dB	Provides excellent matching for 50Ω systems.



Bi-Directional Coupler

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BDCH-15-33+

Maximum Ratings

Operating Temperature, case**	-55°C to 105°C
Storage Temperature	-55°C to 105°C
DC Current	2A
Power Input*	100W @ +85°C, case

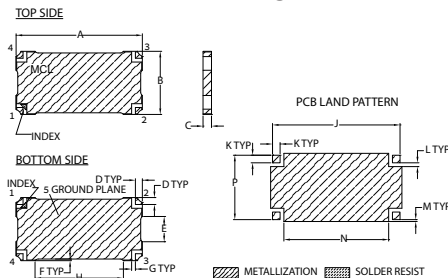
*Derate to 85W at +95°C and 70W at +105°C case temperature
 **Case temperature is defined as temperature on base plate.
 Permanent damage may occur if any of these limits are exceeded.

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

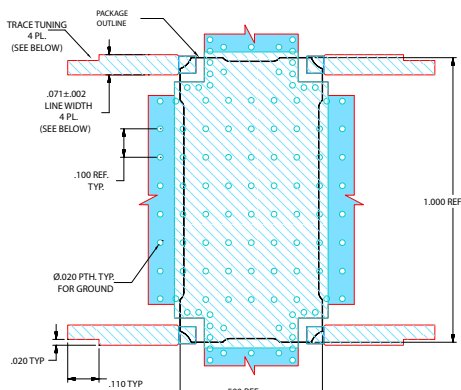


Base material: Printed wiring laminate.
 Termination Finish: 2-5 μinch (0.05-0.13 microns) Immersion Gold.

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 100W
- Ultra wideband, 500 - 3000 MHz
- Low insertion loss, 0.25 dB
- DC current pass through input to output

Applications

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



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+RoHS Compliant

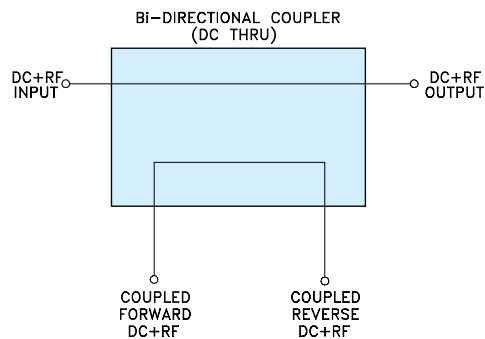
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Electrical Specifications @ +25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		500		3000	MHz
Insertion Loss ¹	500 - 3000	—	0.25	0.45	dB
Coupling	500 - 3000	—	15.5±1.0	—	dB
Coupling Flatness	500 - 3000	—	±0.85	—	dB
	600 - 3000	—	±0.55	—	
Directivity	500 - 3000	19	25	—	dB
Return Loss (Input)	500 - 3000	20	30	—	dB
Return Loss (Output)	500 - 3000	20	30	—	dB
Return Loss (Coupling)	500 - 3000	20	30	—	dB
Input RF Power	@+85°C, case	500 - 3000	—	100	W
	@+95°C, case	500 - 3000	—	85	
	@+105°C, case	500 - 3000	—	70	
Thermal Resistance	500 - 3000	—	0.65	—	°C/W

¹ Does not include theoretical loss. Nominal theoretical loss is 0.12 dB.

Electrical Schematic



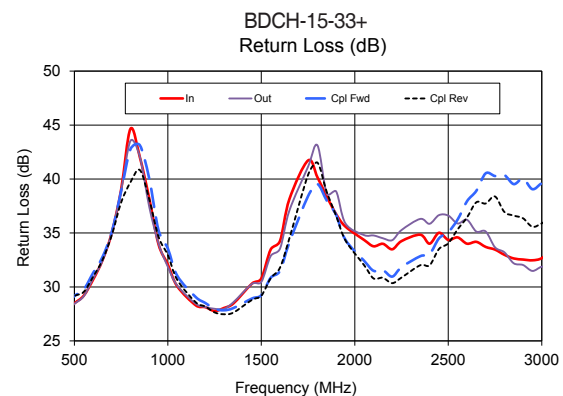
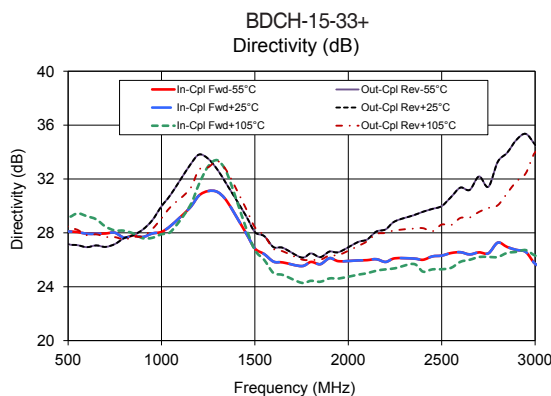
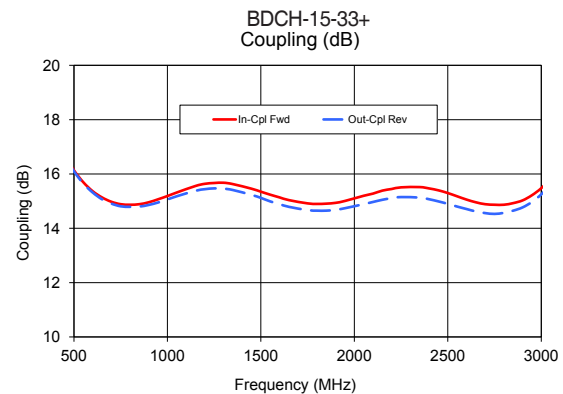
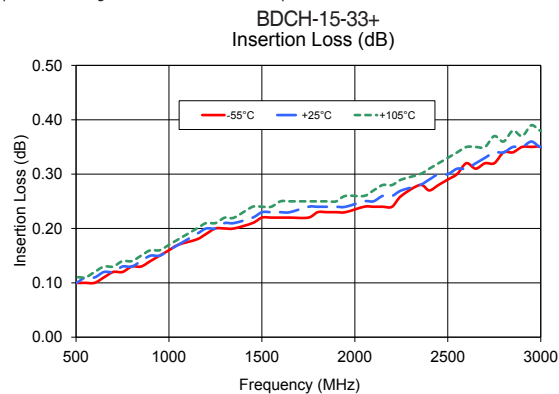
Port Function Configurations

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 ²

FREQUENCY (MHz)	Insertion Loss (dB)			Coupling (dB)		Directivity (dB)						Return Loss (dB)			
	In - Out			In-Cpl Fwd	Out-Cpl Rev	In-Cpl Fwd			Out-Cpl Rev			In	Out	Cpl Fwd	Cpl Rev
	-55°C	+25°C	+105°C			-55°C	+25°C	+105°C	-55°C	+25°C	+105°C				
500	0.10	0.10	0.11	16.14	16.10	28.10	28.10	29.16	27.17	27.17	28.45	28.49	28.43	29.14	29.16
600	0.10	0.11	0.12	15.37	15.32	27.93	27.93	29.24	26.94	26.94	27.83	30.67	30.78	30.94	31.29
700	0.12	0.12	0.13	14.98	14.91	27.95	27.95	28.47	26.96	26.96	27.70	35.02	35.06	34.80	35.08
800	0.13	0.13	0.14	14.87	14.79	27.64	27.64	28.16	27.61	27.61	27.51	44.65	43.54	39.70	42.76
900	0.14	0.15	0.16	14.96	14.86	27.69	27.69	27.60	28.25	28.25	27.75	38.25	37.45	38.15	40.08
1000	0.16	0.16	0.17	15.19	15.06	28.07	28.07	27.90	29.98	29.98	29.08	32.08	31.86	32.95	33.56
1150	0.18	0.19	0.20	15.56	15.38	29.83	29.83	29.95	32.98	32.98	31.22	28.29	28.43	28.56	29.05
1300	0.20	0.21	0.22	15.68	15.46	31.03	31.03	33.39	32.68	32.68	33.33	28.05	27.96	27.47	27.84
1450	0.21	0.22	0.24	15.46	15.23	28.04	28.04	28.47	29.32	29.32	29.87	30.31	30.28	28.80	28.93
1600	0.22	0.23	0.25	15.14	14.89	25.86	25.86	25.01	26.94	26.94	26.81	34.27	33.55	31.79	31.49
1750	0.22	0.24	0.25	14.92	14.67	25.53	25.53	24.29	26.17	26.17	26.03	41.72	41.14	40.38	38.42
1900	0.23	0.24	0.25	14.94	14.68	26.12	26.12	24.62	26.62	26.62	26.33	36.75	38.85	36.61	36.68
2050	0.24	0.25	0.26	15.20	14.89	25.95	25.95	24.89	27.31	27.31	27.01	34.35	34.80	32.01	32.42
2200	0.24	0.26	0.28	15.45	15.11	25.84	25.84	25.29	28.26	28.26	28.00	33.49	34.33	30.35	30.96
2350	0.28	0.28	0.30	15.52	15.13	26.09	26.09	25.69	29.31	29.31	28.32	34.84	36.30	32.01	32.85
2500	0.29	0.30	0.33	15.30	14.90	26.31	26.31	25.30	29.99	29.99	28.62	34.36	36.61	34.04	35.08
2600	0.32	0.31	0.35	15.06	14.71	26.56	26.56	25.85	31.36	31.36	29.11	34.01	36.22	36.43	37.94
2700	0.32	0.33	0.35	14.89	14.56	26.55	26.55	26.21	32.19	32.19	29.56	33.71	35.14	37.73	40.53
2800	0.34	0.34	0.36	14.87	14.57	27.27	27.27	26.21	33.27	33.27	30.05	32.98	33.21	36.95	40.36
2900	0.35	0.35	0.37	15.03	14.77	26.73	26.73	26.59	34.90	34.90	31.82	32.54	32.03	36.36	40.03
3000	0.35	0.35	0.38	15.48	15.25	25.70	25.70	26.31	34.55	34.55	33.97	32.67	31.87	35.89	39.63

² Data corresponds to Configuration A at +25°C unless specified otherwise.



Additional 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.
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