

DC Pass, High Power

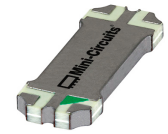
Bi-Directional Coupler

BDCH-10-63

50 Ω 10 dB Coupling 100 W 2000 to 6000 MHz

The Big Deal

- Ultra wide band, 2000 to 6000 MHz range.
- High power handling, up to 100 W.
- Low insertion loss, 0.1 dB Typ.
- Excellent return loss, 25 dB Typ. (all ports).
- Good directivity, 22 dB Typ.



CASE STYLE: PQ2099-1

Product Overview

Mini-Circuits BDCH-10-63 ultra wide band high-power bi-directional coupler covers frequencies from 2000 to 6000 MHz with high power handling up to 100 W and insertion loss of 0.1 dB Typ. The ultra wide band supports a wide variety of applications from S band and C band radar through various cellular base station applications, UHF and SHF power monitoring up to 6000 MHz.

The coupler is designed into an open printed laminate (0.2 x 0.56 x 0.08") with wrap-around terminations for good solderability and easy visual inspection.

Key Features

Feature	Advantages
High power handling, up to 100 W	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, 0.1 dB typ	Used primarily in high power transmission applications, the excellent through-path signal loss maximizes the power transmitted to the antenna.
Excellent return loss, 25 dB typ. (all ports)	Provides excellent matching for 50 Ω systems.
Good directivity, 22 dB Typ.	Good directivity allows accurate signal sampling through the coupled port with minimal measurement error.
DC current passing up to 2 A	Suitable for use in systems requiring DC voltage on the RF line, such as supplying bias to remote circuit via the antenna cable.



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Maximum Ratings

Operating Temperature, case*	-55°C to 105°C
Storage Temperature	-55°C to 105°C
DC Current	2 A
RF power	100 W

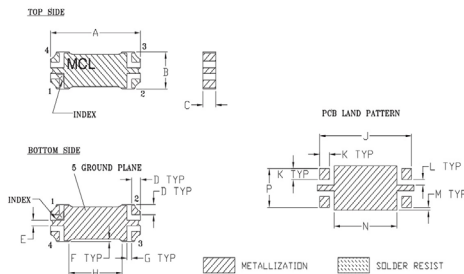
*Case temperature is defined as temperature on base plate.
Permanent damage may occur if any of these limits are exceeded.

Pad Connections**

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

**Model is Bi-directional and all ports are interchangeable, see port function table.

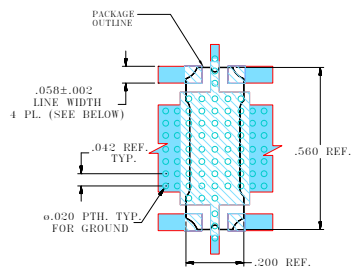
Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
0.560	0.200	0.080	0.055	0.030	0.013	0.030	0.330
14.22	5.08	2.03	1.40	0.76	0.33	0.76	8.38
J	K	L	M	N	P	wt.	
0.570	0.060	0.030	0.015	0.390	0.210	grams	
14.48	1.52	0.76	0.38	9.91	5.33		1.5

Demo Board MCL P/N: TB-864 Suggested PCB Layout (PL-470)



- NOTES:
- TRACE WIDTH IS SHOWN FOR ROGERS R05880 WITH DIELECTRIC THICKNESS, 0.020 ± 0.015". COPPER: 1 OZ. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 - 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 SOLDERMASK

Features

- ultra wide band 2000 - 6000 MHz.
- high power, up to 100 W.
- low insertion loss, 0.1 dB Typ.
- excellent return loss, 25 dB Typ.(all Ports).
- good directivity, 22 dB Typ.
- DC current pass through input to output.

Applications

- transmission signal monitoring
- antenna reflection monitoring
- wireless transmitters
- distributed antenna systems (DAS)



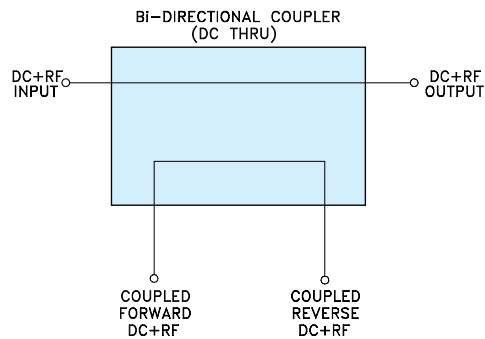
CASE STYLE: PQ2099-1

Electrical Specifications @ +25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		2000		6000	MHz
Insertion Loss ¹	2000 - 6000	—	0.1	0.25	dB
Coupling	2000 - 6000	—	10±1	—	dB
Coupling Flatness	2000 - 6000	—	±1.5	—	dB
Directivity	2000 - 6000	18	22	—	dB
Return Loss (Input)	2000 - 6000	18	25	—	dB
Return Loss (Output)	2000 - 6000	18	25	—	dB
Return Loss (Coupling)	2000 - 6000	18	25	—	dB
Input RF Power	2000 - 6000	—	—	100	W

1. Does not include theoretical loss, nominal theoretical loss 0.46 dB

Electrical Schematic



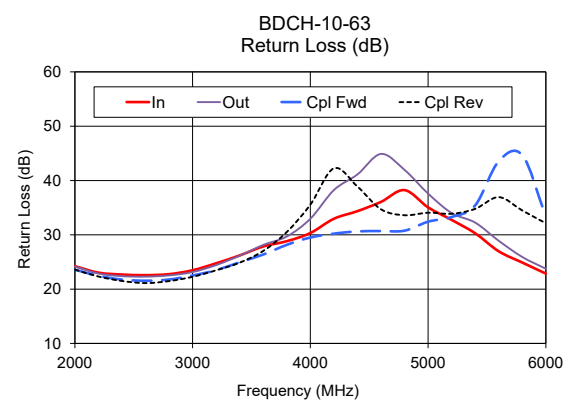
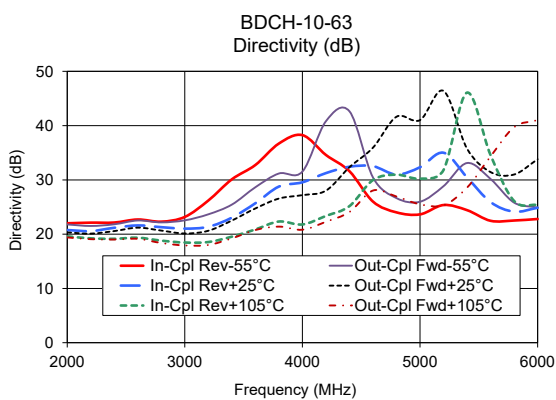
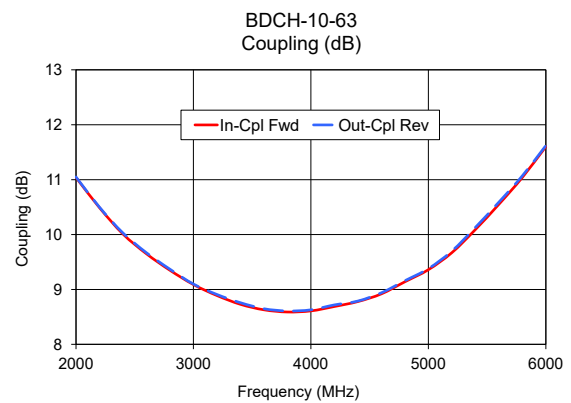
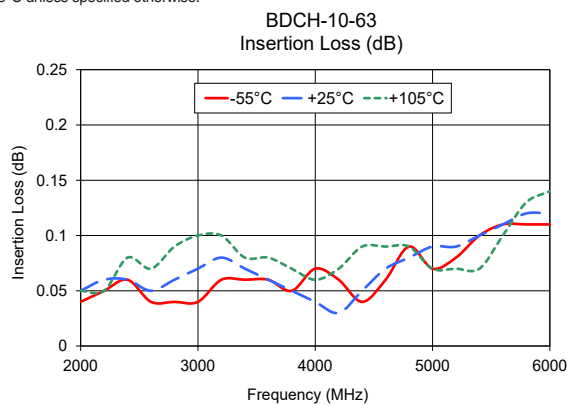
Port Function Configurations

Input	Output	Coupled Forward	Coupled Reverse
1	2	4	3
2	1	3	4
3	4	2	1
4	3	1	2

Typical Performance Data *

FREQUENCY (MHz)	Insertion Loss (dB)			Coupling (dB)		Directivity (dB)						Return Loss (dB)			
	In - Out			In - Cpl Fwd	Out - Cpl Rev	In-Cpl Rev			Out-Cpl Fwd			In	Out	Cpl Fwd	Cpl Rev
	-55°C	+25°C	+105°C			-55°C	+25°C	+105°C	-55°C	+25°C	+105°C				
2000.0	0.04	0.05	0.05	11.04	11.05	22.01	20.77	19.61	21.80	20.32	19.41	24.24	24.19	23.60	23.60
2200.0	0.05	0.06	0.05	10.49	10.50	22.13	20.58	19.24	21.52	20.10	19.09	23.04	22.88	22.47	22.33
2400.0	0.06	0.06	0.08	10.01	10.03	22.15	21.19	19.16	21.83	20.57	19.02	22.69	22.40	21.77	21.51
2600.0	0.04	0.05	0.07	9.65	9.67	22.71	21.62	19.36	22.53	21.20	19.15	22.58	22.31	21.56	21.12
2800.0	0.04	0.06	0.09	9.35	9.37	22.31	21.30	18.82	22.18	20.66	18.38	22.76	22.54	21.78	21.49
3000.0	0.04	0.07	0.10	9.09	9.10	23.18	21.03	18.47	22.56	20.13	17.93	23.48	23.15	22.52	22.28
3200.0	0.06	0.08	0.10	8.89	8.91	26.20	21.37	18.56	23.67	20.63	18.02	24.76	24.44	23.51	23.48
3400.0	0.06	0.07	0.08	8.73	8.76	30.10	23.05	19.55	25.46	22.51	19.24	26.21	26.17	24.96	24.89
3600.0	0.06	0.06	0.08	8.63	8.65	32.74	25.70	20.88	28.66	24.74	20.78	27.86	28.15	26.38	27.05
3800.0	0.05	0.05	0.07	8.59	8.61	36.69	28.77	22.34	31.19	26.56	21.40	28.83	29.70	28.16	30.53
4000.0	0.07	0.04	0.06	8.61	8.63	38.24	29.56	21.80	31.55	27.19	20.83	30.33	32.97	29.51	35.57
4200.0	0.06	0.03	0.07	8.69	8.72	34.59	31.25	23.37	40.83	28.02	22.30	32.96	38.25	30.22	42.25
4400.0	0.04	0.05	0.09	8.78	8.79	31.60	32.42	25.17	42.64	32.34	24.10	34.36	41.13	30.64	38.88
4600.0	0.06	0.07	0.09	8.92	8.94	26.01	32.52	29.97	30.45	35.94	28.05	36.06	44.90	30.70	34.70
4800.0	0.09	0.08	0.09	9.14	9.16	24.02	30.99	30.97	26.65	41.63	26.94	38.23	41.95	30.77	33.61
5000.0	0.07	0.09	0.07	9.36	9.38	23.65	32.33	30.22	25.99	41.01	25.51	35.06	37.59	32.42	34.07
5200.0	0.08	0.09	0.07	9.67	9.70	25.37	35.00	31.82	28.86	46.38	25.35	32.75	34.01	33.28	33.88
5400.0	0.10	0.10	0.07	10.09	10.13	24.43	30.47	46.07	33.12	35.74	28.59	30.29	32.25	35.42	34.78
5600.0	0.11	0.11	0.10	10.55	10.59	22.47	25.92	34.58	30.17	31.43	34.34	26.97	28.90	43.55	36.94
5800.0	0.11	0.12	0.13	11.04	11.07	22.52	24.15	26.13	25.82	30.99	39.72	24.90	25.92	44.68	34.48
6000.0	0.11	0.12	0.14	11.60	11.62	22.80	24.87	25.38	24.92	33.80	41.02	22.87	23.76	33.42	32.13

* Data at +25°C unless specified otherwise.



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.
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