

DC Pass, High Power

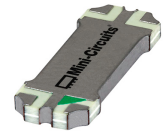
Bi-Directional Coupler

MBDC-20-63HP

50Ω 20dB Coupling 180W 2000 to 6000 MHz

The Big Deal

- High power handling, up to 180W
- Ultra wideband, 2000 to 6000 MHz
- Low insertion loss, 0.15 dB
- High directivity, 23 dB



CASE STYLE: PQ2099

Product Overview

Mini-Circuits MBDC-20-63HP high-power bi-directional coupler provides high power handling up to 180W and mainline loss of 0.15 dB. Covering frequencies from 2000 to 6000 MHz, it supports a wide variety of applications from power amplifiers to antenna feeds and more. High directivity of 23 dB provides accurate sampling from the coupled port, and 22 dB return loss provides excellent matching over full frequency range. The coupler is designed into an open printed laminate (0.56 x 0.2 x 0.051") with wrap-around terminations for good solderability and easy visual inspection.

Key Features

Feature	Advantages
High power handling: 180W @ 85°C 100W @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, 0.15 dB	Used primarily in high power transmission applications, the excellent through-path signal loss maximizes the power transmitted to the antenna.
High directivity, 23 dB	Good directivity allows accurate signal sampling through the coupled port with minimal measurement error
Good return loss, 22 dB	Provides good matching for 50Ω systems.
DC current passing, 2A max	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	2A

Power Input* 180W @ +85°C, case

*Derate to 130W at +95°C and 100W at +105°C case temperature

**Case temperature is defined as temperature on base plate.

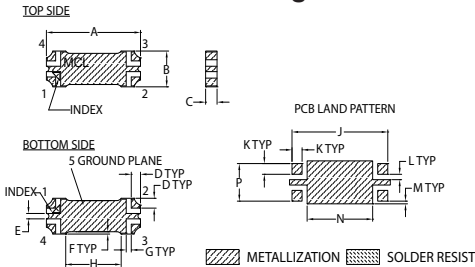
Permanent damage may occur if any of these limits are exceeded.

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.

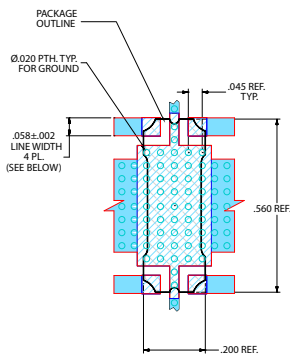
Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	
.560	.200	.051	.055	.030	.013	.030	.330	
14.22	5.08	1.30	1.40	0.76	0.33	0.76	8.38	
J	K	L	M	N	P			wt.
.570	.060	.030	.015	.390	.210			grams
14.48	1.52	0.76	0.38	9.91	5.33			1.0

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



- NOTES:
- TRACE WIDTH IS SHOWN FOR ROGERS RO5880 WITH DIELECTRIC THICKNESS .020"±.0015". 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

- High power, up to 180W
- Ultra wideband, 2000 - 6000 MHz
- Low insertion loss, 0.15 dB
- DC current pass through input to output

Applications

- Power Amplifiers
- Antenna Feeds



CASE STYLE: PQ2099

+RoHS Compliant

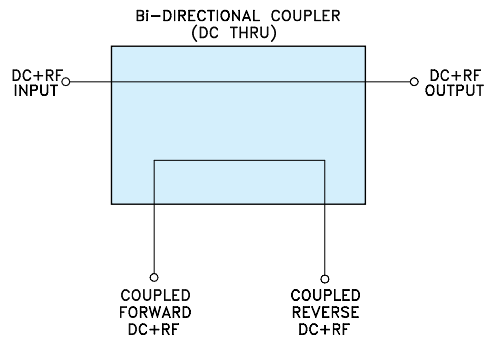
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Electrical Specifications @ +25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		2000		6000	MHz
Insertion Loss ¹	2000 - 6000	—	0.15	0.25	dB
Coupling	2000 - 6000	—	20.25±1.25	—	dB
Coupling Flatness	2000 - 6000	—	±2.0	—	dB
Directivity	2000 - 6000	16	23	—	dB
Return Loss (Input)	2000 - 6000	18	22	—	dB
Return Loss (Output)	2000 - 6000	18	22	—	dB
Return Loss (Coupling)	2000 - 6000	18	22	—	dB
Input RF Power	@+85°C, case	2000 - 6000	—	180	W
	@+95°C, case	2000 - 6000	—	130	
	@+105°C, case	2000 - 6000	—	100	
Thermal Resistance	2000 - 6000	—	0.25	—	°C/W

1. Does not include theoretical loss. Nominal theoretical loss 0.04 dB.

Electrical Schematic



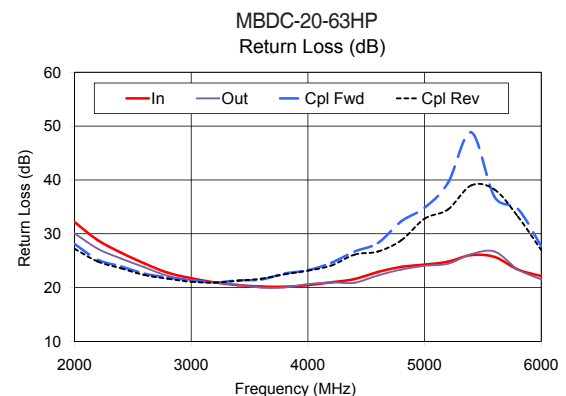
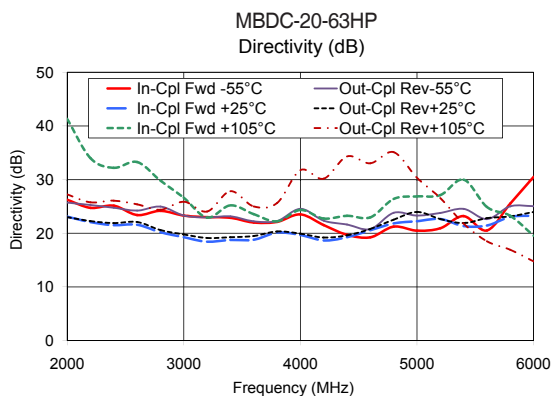
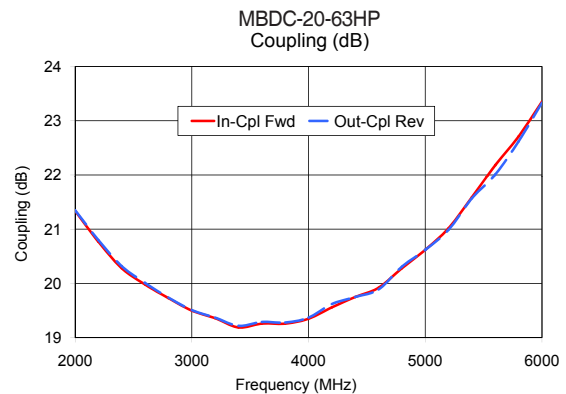
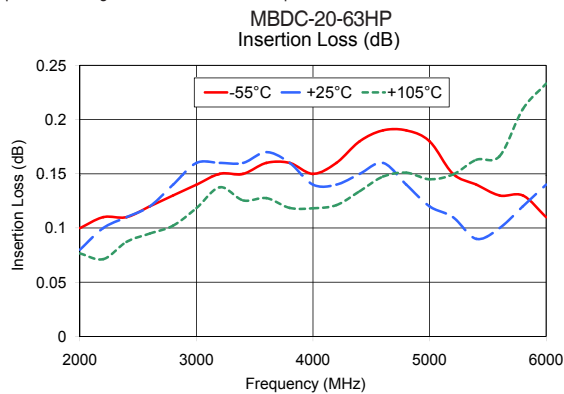
Port Function Configurations

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)			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				
2000.0	0.10	0.08	0.08	21.34	21.35	26.25	23.10	41.31	25.73	23.00	27.25	32.16	30.07	28.10	27.22
2200.0	0.11	0.10	0.07	20.77	20.80	24.74	22.09	34.00	25.27	22.27	25.77	28.79	27.21	25.18	24.83
2400.0	0.11	0.11	0.09	20.28	20.32	25.14	21.52	32.20	24.76	21.90	26.08	26.47	25.40	23.94	23.58
2600.0	0.12	0.12	0.09	19.98	20.01	23.40	21.60	33.28	24.23	22.10	25.39	24.48	23.77	22.59	22.33
2800.0	0.13	0.14	0.10	19.73	19.74	24.18	20.20	29.81	24.98	20.60	24.39	22.77	22.19	21.87	21.66
3000.0	0.14	0.16	0.12	19.50	19.51	23.29	19.28	26.63	23.32	19.78	25.88	21.75	21.37	21.36	21.07
3200.0	0.15	0.16	0.14	19.36	19.37	23.01	18.43	22.93	22.95	19.13	24.06	20.97	20.92	20.96	20.94
3400.0	0.15	0.16	0.13	19.19	19.22	22.88	18.75	25.21	23.16	19.27	27.84	20.46	20.54	21.34	21.29
3600.0	0.16	0.17	0.13	19.26	19.29	22.00	18.79	23.57	22.23	19.49	25.01	20.21	20.00	21.50	21.66
3800.0	0.16	0.16	0.12	19.26	19.28	22.13	20.12	22.23	22.28	20.34	25.64	20.17	20.03	22.62	22.47
4000.0	0.15	0.14	0.12	19.35	19.37	23.52	19.69	24.34	24.56	19.93	31.77	20.46	20.64	23.23	23.15
4200.0	0.16	0.14	0.12	19.56	19.62	21.54	18.67	22.75	22.35	19.22	30.18	21.00	20.96	24.61	24.09
4400.0	0.18	0.15	0.13	19.75	19.75	19.72	19.28	23.26	21.64	19.63	34.32	21.59	20.91	26.71	26.13
4600.0	0.19	0.16	0.15	19.92	19.89	19.26	20.56	22.97	20.79	20.82	33.05	22.91	22.27	28.28	26.70
4800.0	0.19	0.14	0.15	20.28	20.31	21.24	21.84	26.40	23.82	22.54	35.11	23.85	23.35	32.32	28.77
5000.0	0.18	0.12	0.14	20.62	20.62	20.49	22.26	26.87	23.30	23.98	30.35	24.29	24.06	34.83	32.81
5200.0	0.15	0.11	0.15	21.02	20.99	20.93	22.66	27.11	23.80	22.66	26.57	24.82	24.45	39.44	34.50
5400.0	0.14	0.09	0.16	21.59	21.57	23.20	21.34	29.99	24.55	21.90	21.80	26.05	26.21	48.84	38.98
5600.0	0.13	0.10	0.17	22.18	22.01	20.52	21.44	24.90	22.64	22.83	18.51	25.70	26.71	36.85	38.20
5800.0	0.13	0.12	0.21	22.71	22.62	25.53	23.05	23.26	25.03	23.16	16.93	23.36	23.38	34.62	33.20
6000.0	0.11	0.14	0.23	23.35	23.33	30.51	23.27	19.55	25.06	23.97	14.78	22.12	21.53	27.73	26.97

* 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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