

# High Power Bi-Directional Coupler

## MBD-20-63HP+

50Ω 20dB Coupling DC Pass 5000 to 6000 MHz



CASE STYLE: JM1360  
PRICE: \$2.05 ea. QTY (1-24)

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

### Maximum Ratings

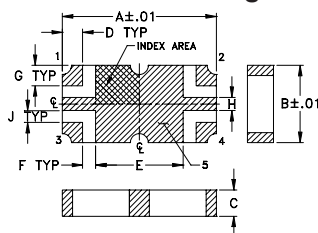
*Operating Temperature, Case	-55°C to 100°C
Storage Temperature	-55°C to 100°C
DC Current	1A

\* Case temperature is defined as temperature on ground leads. Permanent damage may occur if any of these limits are exceeded.

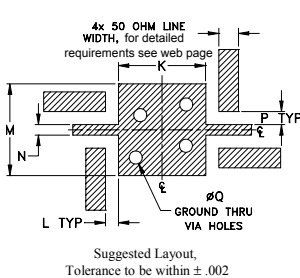
### Pin Connections

INPUT	1
OUTPUT	2
COUPLED (forward)	3
COUPLED (reverse)	4
GROUND	5

### Outline Drawing



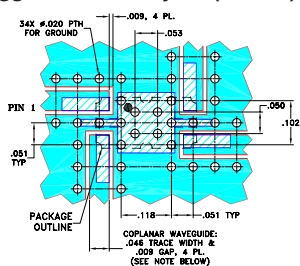
### PCB Land Pattern



### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
.236	.118	.040	.031	.134	.020	.031	.020
5.99	3.00	1.02	0.79	3.40	0.51	0.79	0.51
J	K	L	M	N	P	Q	wt
.018	.134	.020	.140	.016	.020	.020	grams
0.46	3.40	0.51	3.56	0.41	0.51	0.51	0.04

### Demo Board MCL P/N: TB-482+ Suggested PCB Layout (PL-291)



- NOTES:
- TRACE WIDTH IS SHOWN FOR OAK-602 WITH DIELECTRIC THICKNESS .022" ± .0015"; 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.
  - DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
  - DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

### 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.
- The parts covered by this specification document are subject to Mini-Circuit's 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-Circuit's website at [www.minicircuits.com/WCLStore/terms.jsp](http://www.minicircuits.com/WCLStore/terms.jsp)

### Features

- high power handling, 20 watts typ.
- low mainline loss, 0.18 dB typ.
- excellent VSWR, 1.10:1 typ.
- excellent directivity, 20 dB typ.
- wideband frequency, 4000 to 7000 MHz

### Applications

- instrumentation
- ISM, WiMAX
- defense communications
- federal communications
- fixed satellite

### Bi-Directional Coupler Electrical Specifications at 25°C

FREQ. (MHz)	COUPLING (dB)		MAINLINE LOSS <sup>1</sup> (dB)		DIRECTIVITY (dB)		VSWR (:1)	POWER <sup>2</sup> INPUT (W)
	Nom.	Flatness	Typ.	Max.	Typ.	Min.		
$f_L$ - $f_U$								
5000-6000	20±0.5	±0.4	0.18	0.25	20	14	1.10	20

1. Mainline loss includes theoretical power loss at coupled port and does not include test fixture thru loss.

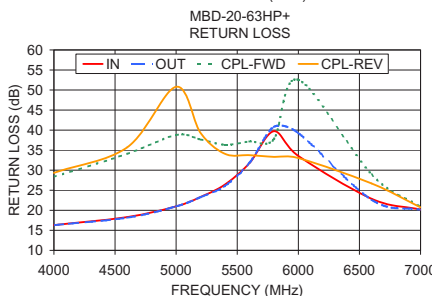
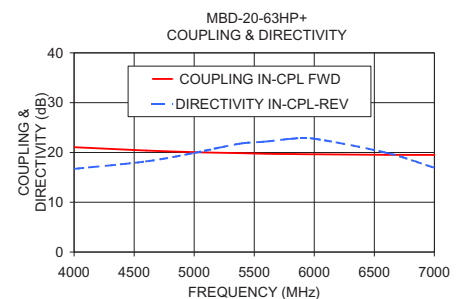
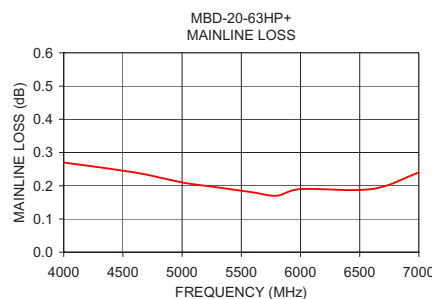
2. The user must provide adequate means of heat removal to limit the temperature of ground connection 5 to 100°C, in order to ensure proper performance. At 25°C ambient temperature this requires thermal resistance of the user's PC board heat sink to be 70°C/W or less when the unit is driven at maximum specified RF input power, 20W. At higher ambient temperature, with the same heat sink, input power in watts must not exceed 20W x (100°C - T\_ambient) ÷ 75°C.

All measurements done with Agilent 4-port PNA Analyzer (Model N5230A), with calibration done using E-CAL (Model N4433A) with port extension.

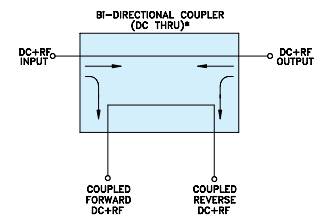
### Typical Performance Data

Frequency (MHz)	Mainline Loss* (dB)		Coupling (dB)		Directivity (dB)		Return Loss (dB)			
	In-Out	In-Cpl Fwd	Out-Cpl Rev	Out-Cpl Fwd	In-Cpl Rev	In	Out	Cpl Fwd	Cpl Rev	
4000.00	0.27	21.06	21.10	20.20	16.70	16.30	16.28	28.35	29.32	
4600.00	0.24	20.39	20.45	24.73	18.19	18.30	18.14	34.08	35.71	
5000.00	0.21	20.06	20.10	27.03	19.91	20.98	20.96	38.78	50.81	
5200.00	0.20	19.94	19.94	27.05	20.91	23.32	23.28	37.66	39.28	
5400.00	0.19	19.85	19.84	26.30	21.84	26.43	26.07	36.34	34.07	
5600.00	0.18	19.73	19.72	23.89	22.19	31.76	31.82	37.16	33.74	
5800.00	0.17	19.68	19.65	21.76	22.72	39.73	40.80	37.76	33.32	
6000.00	0.19	19.63	19.61	20.27	22.76	33.56	39.28	52.55	33.03	
6600.00	0.19	19.52	19.41	16.62	19.93	22.87	22.61	28.93	26.69	
7000.00	0.24	19.51	19.41	14.18	16.94	20.19	20.12	20.85	20.72	

\*Data shown includes test fixture thru loss.



### Electrical Schematic



\* ELECTRICAL SCHEMATIC IS FOR BI-DIRECTIONAL COUPLER WITHOUT INTERNAL TRANSFORMERS AND RESISTORS.



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REV. OR  
M120038  
ED-13558  
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WZ/HL/CP/AM  
120914