DC Pass, High Power

Bi-Directional Coupler

MBDA-30-451HP

50Ω 30dB Coupling 200W 225 to 450 MHz

The Big Deal

- High power handling, up to 200W
- Low insertion loss, 0.15 dB
- High directivity, 28 dB
- Excellent return loss, 30 dB

CASE STYLE: PQ2074

Product Overview

Mini-Circuits MBDA-30-451HP high-power bi-directional coupler provides high power handling up to 200W and mainline loss of 0.15 dB. Covering frequencies from 225 to 450 MHz, it supports a wide variety of applications from power amplifiers and antenna feeds to military applications and more. High directivity of 28 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 (1.0 x 1.0 x 0.051") with wrap-around terminations for good solderability and easy visual inspection.

Key Features

Feature	Advantages
High power handling: 200W @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, 28 dB	Good directivity allows accurate signal sampling through the coupled port with minimal measurement error
Excellent return loss, 30 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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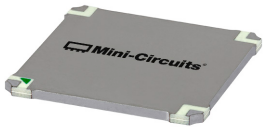


CASE STYLE: PQ2074

Maximum Ratings

Operating Temperature, case*	-55°C to 105°C
Storage Temperature	-55°C to 105°C
DC Current	2A
Power Input	200W @+105°C, case

*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.

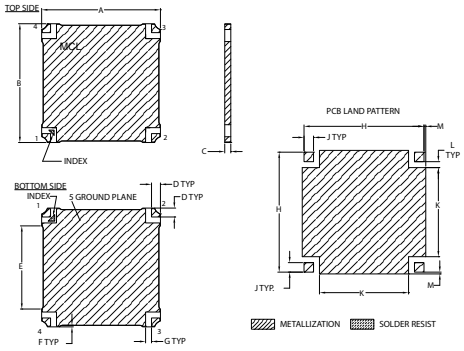
Features

- High power, up to 200W
- Low insertion loss, 0.15 dB
- High directivity, 28 dB
- Excellent return loss, 30 dB
- DC current pass through input to output

Applications

- Power Amplifiers
- Antenna Feeds
- VHF/UHF radios
- Defense and military

Outline Drawing



Outline Dimensions (inch / mm)

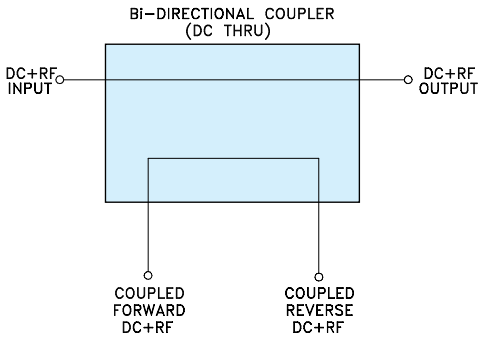
A	B	C	D	E	F	G
1.000	1.000	.051	.075	.700	.013	.050
25.40	25.40	1.30	1.90	17.78	0.33	1.27

H	J	K	L	M	wt.
1.010	.080	.750	.050	.015	grams
26.65	2.03	19.05	1.27	0.38	4.0

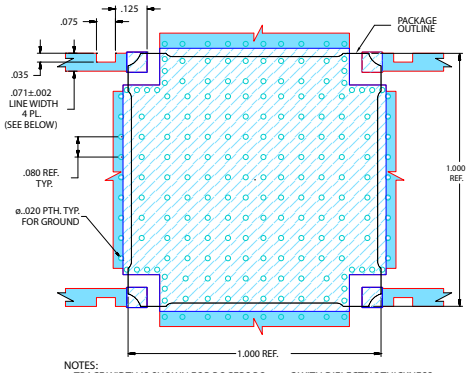
Electrical Specifications @ +25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		225		450	MHz
Insertion Loss	225 - 450	—	0.15	0.25	dB
Coupling	225 - 450	—	30.5±1.5	—	dB
Coupling Flatness	225 - 450	—	±0.85	±1.00	dB
Directivity	225 - 450	18	28	—	dB
Return Loss (Input)	225 - 450	20	30	—	dB
Return Loss (Output)	225 - 450	20	30	—	dB
Return Loss (Coupling)	225 - 450	20	30	—	dB
Input RF Power @+105°C, case	225 - 450	—	—	200	W

Electrical Schematic



Demo Board MCL P/N: TB-861
Suggested PCB Layout (PL-468)



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. CUTOUTS IN RF LINES ARE REQUIRED TO ACHIEVE SPECIFIED DIRECTIVITY.

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

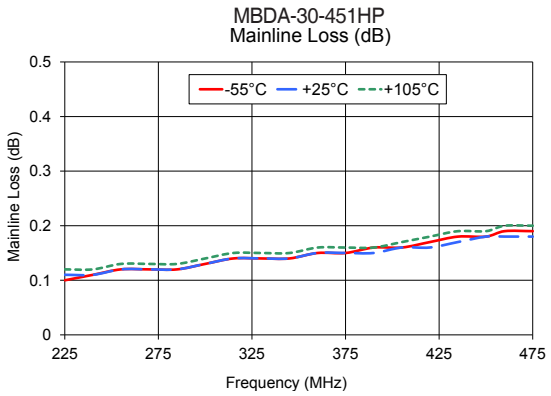
Port Function Configurations

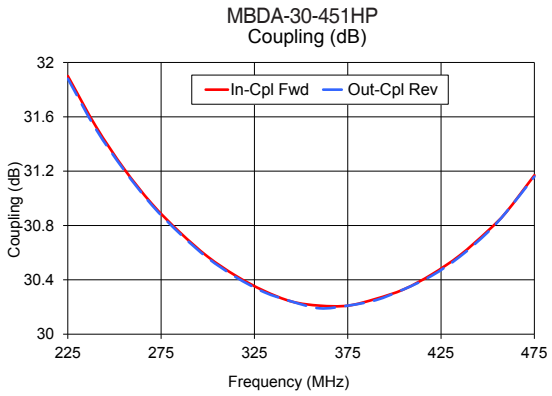
Config.	Input	Output	Coupled Forward	Coupled Reverse
A	1	2	4	3
B	2	1	3	4
C	3	4	2	1
D	4	3	1	2

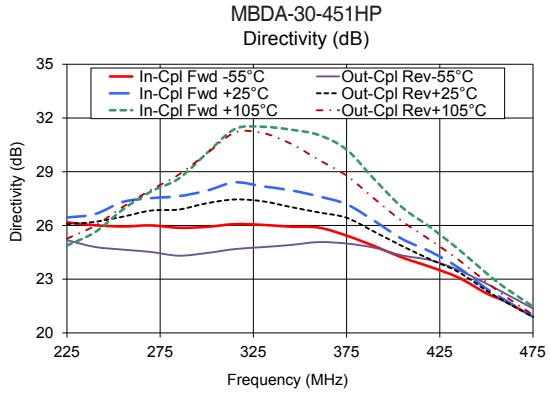
Typical Performance Data *

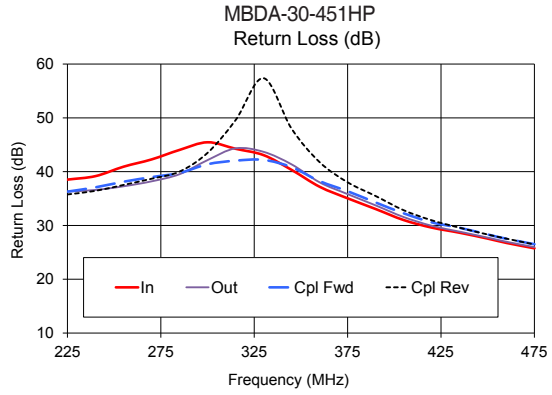
FREQUENCY (MHz)	Insertion Loss (dB) In - Out			Coupling (dB)		Directivity (dB)						Return Loss (dB)			
				In-Cpl Fwd	Out-Cpl Rev	In-Cpl Fwd			Out-Cpl Rev			In	Out	Cpl Fwd	Cpl Rev
	-55°C	+25°C	+105°C			-55°C	+25°C	+105°C	-55°C	+25°C	+105°C				
225.00	0.10	0.11	0.12	31.90	31.88	26.17	26.44	24.88	25.18	26.08	25.26	38.52	36.29	36.29	35.76
240.00	0.11	0.11	0.12	31.53	31.51	26.01	26.63	25.62	24.80	26.20	25.98	39.17	36.60	37.09	36.43
255.00	0.12	0.12	0.13	31.22	31.21	25.94	27.31	26.89	24.65	26.49	27.04	40.92	37.28	38.13	37.53
270.00	0.12	0.12	0.13	30.96	30.95	26.00	27.52	27.89	24.52	26.83	27.98	42.27	38.20	38.98	38.68
285.00	0.12	0.12	0.13	30.75	30.74	25.87	27.63	28.62	24.31	26.89	28.84	44.04	39.53	39.76	40.01
300.00	0.13	0.13	0.14	30.57	30.56	25.92	27.94	30.03	24.46	27.24	30.01	45.46	42.15	41.38	43.49
315.00	0.14	0.14	0.15	30.43	30.42	26.07	28.40	31.38	24.68	27.45	31.18	44.25	44.34	42.04	49.57
330.00	0.14	0.14	0.15	30.32	30.31	26.03	28.18	31.51	24.79	27.35	31.16	43.07	43.69	42.19	57.38
345.00	0.14	0.14	0.15	30.24	30.24	25.93	27.96	31.35	24.91	27.03	30.57	40.32	41.36	40.82	47.99
360.00	0.15	0.15	0.16	30.21	30.19	25.88	27.62	31.05	25.07	26.73	29.67	37.19	38.02	38.24	41.77
375.00	0.15	0.15	0.16	30.21	30.21	25.43	27.18	30.23	24.99	26.43	28.78	35.04	35.83	36.36	38.02
390.00	0.16	0.15	0.16	30.26	30.25	24.84	26.24	28.56	24.75	25.64	27.48	33.05	33.73	34.27	35.47
405.00	0.16	0.16	0.17	30.33	30.33	24.20	25.23	26.99	24.32	24.84	26.22	31.00	31.56	32.26	32.83
420.00	0.17	0.16	0.18	30.44	30.43	23.68	24.53	25.89	24.06	24.10	25.18	29.60	29.94	30.58	30.96
435.00	0.18	0.17	0.19	30.58	30.57	23.09	23.64	24.67	23.51	23.40	24.09	28.64	28.84	29.57	29.57
450.00	0.18	0.18	0.19	30.76	30.75	22.21	22.47	23.33	22.75	22.37	22.84	27.55	27.73	28.32	28.31
460.00	0.19	0.18	0.20	30.90	30.90	21.76	21.83	22.52	22.20	21.75	22.05	26.75	26.96	27.53	27.55
475.00	0.19	0.18	0.20	31.17	31.16	20.91	20.90	21.47	21.36	20.89	21.02	25.75	25.97	26.52	26.46

* Data corresponds to Configuration A 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.

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