

DC Pass, High Power

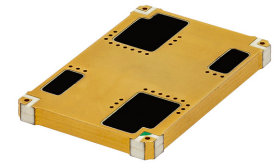
Dual-Directional Coupler

DDCH-50-521+

50Ω 50dB Coupling 300W 20 to 520 MHz

The Big Deal

- High power handling, up to 300W
- Low insertion loss, 0.10 dB Typ
- Good coupling flatness, ± 0.25 dB Typ
- High directivity, 25 dB Typ



Generic photo used for illustration purposes only
CASE STYLE: PQ2100

Product Overview

Mini-Circuits DDCH-50-521+ high-power dual-directional coupler provides high power handling up to 300W and insertion loss of 0.10 dB Typ with 50 dB coupling. Covering frequencies from 20 to 520 MHz, it supports a wide variety of applications from military to commercial, including GSM transmitters and more.

High directivity of 25 dB provides accurate sampling from the coupled port, and typical input/output return loss of 30 dB provides excellent matching over full frequency range. The coupler is designed into an open printed laminate (1.0 x 1.5 x 0.128") with wrap-around terminations for good solderability and easy visual inspection.

Key Features

Feature	Advantages
High power handling, up to 300W	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 mainline loss, 0.10 dB Typ.	Used primarily in high power transmission applications, the excellent through-path signal loss maximizes the power transmitted to the antenna.
Good coupling flatness, ± 0.25 dB	Flat coupling values across the frequency range allows accurate signal sampling through the coupled port with minimal measurement error.
High directivity, 25 dB Typ.	High directivity with 50 dB coupling allows accurate signal sampling through the coupled port with minimal measurement error.
DC current passing up to 4 A	Suitable for use in systems requiring DC voltage on the RF line, such as supplying bias to antenna circuitry via the antenna cable.



Dual-Directional Coupler

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50Ω 50dB Coupling 300W 20 to 520 MHz

Maximum Ratings

Operating Temperature, case**	-55°C to 105°C
Storage Temperature	-55°C to 105°C
DC Current	4A
RF power *	300W @ +85°C, case

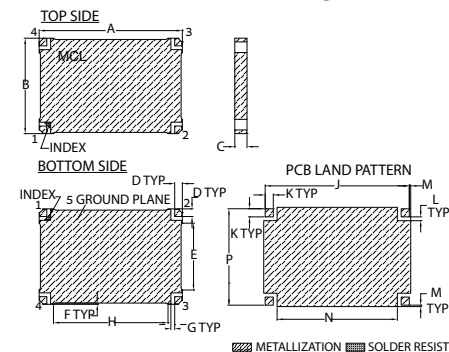
*Derates to 240W at 95°C and 200W @ 105°C case temperature
 **Case temperature is defined as temperature on base plate.
 Permanent damage may occur if any of these limits are exceeded.

Pad Connections**

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

**Model is Dual-directional input and output are interchangeable.

Outline Drawing

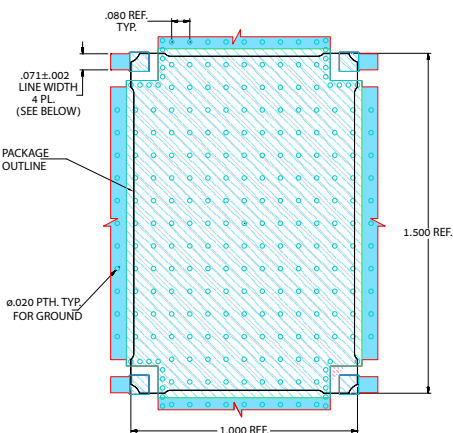


Base material: Printed wiring laminate.
 Termination Finish: 2-5 µinch (0.05-0.13 microns) immersion Gold.

Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
1.500	1.000	.128	.080	.700	.013	.040	1.200
38.10	25.40	3.25	2.03	17.78	0.33	1.02	30.48
J	K	L	M	N	P		wt.
1.510	.085	.040	.015	1.260	1.010		grams
38.35	2.16	1.02	0.38	32.00	25.65		12.0

Demo Board MCL P/N: TB-865+ Suggested PCB Layout (PL-471)



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

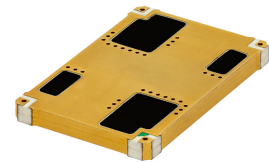
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Features

- high power, up to 300W
- low insertion loss, 0.10 dB Typ.
- good coupling flatness, ±0.25 dB Typ.
- high directivity, 25 dB Typ.
- DC current pass through input to output

Applications

- GSM
- Research and Development Labs
- Defense and Military



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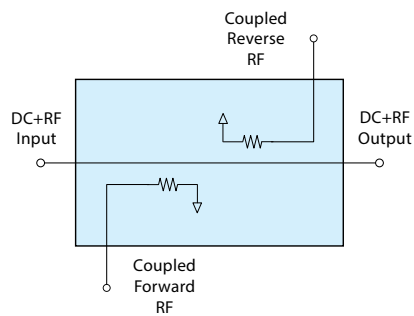
+RoHS Compliant

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.	Units
Frequency Range		20		520	MHz
Insertion Loss	20 - 150	—	0.05	0.10	dB
	150 - 520	—	0.10	0.20	
Coupling	20 - 520	—	50±0.35	—	dB
Coupling Flatness	20 - 520	—	±0.65	—	dB
	30 - 520	—	±0.25	—	
Directivity	20 - 520	20	25	—	dB
Return Loss (Input)	20 - 150	30	35	—	dB
	150 - 520	21	30	—	
Return Loss (Output)	20 - 150	30	35	—	dB
	150 - 520	21	30	—	
Return Loss (Coupling)	20 - 150	—	9	—	dB
	150 - 520	10	13	—	
Input RF Power	@+85°C, case	20 - 520	—	300	W
	@+95°C, case	20 - 520	—	240	
	@+105°C, case	20 - 520	—	200	
Thermal Resistance	20 - 520	—	0.2	—	°C/W

Dual-Directional Coupler (DC THRU)*



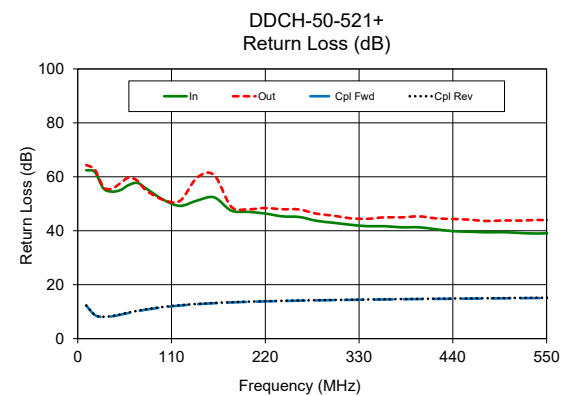
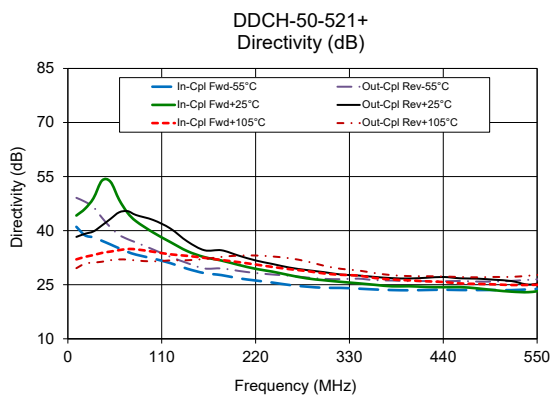
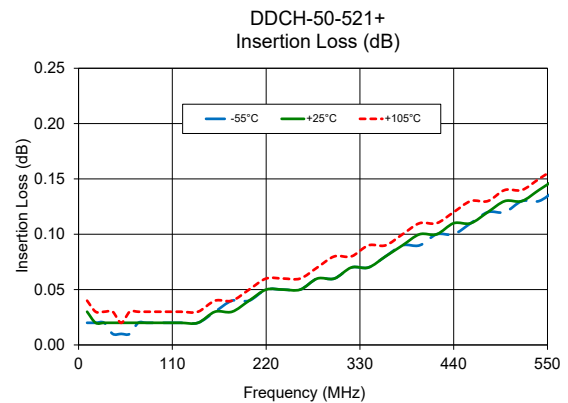
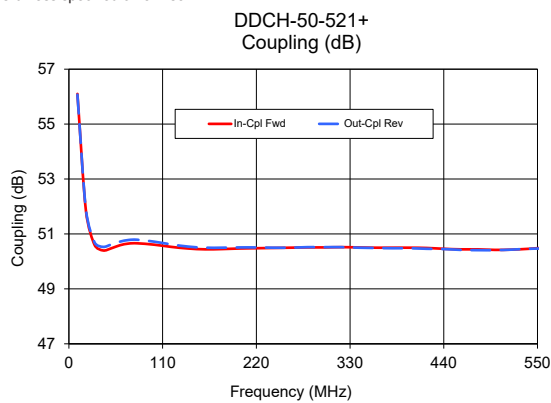
*Mainline is DC coupled.
 *Coupling ports are DC coupled to internal terminations.



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				
20	0.02	0.02	0.03	51.84	51.89	38.72	46.06	32.73	48.04	39.13	30.86	61.82	62.73	8.78	8.85
30	0.02	0.02	0.03	50.61	50.70	38.14	48.99	33.22	46.53	39.79	31.14	55.77	56.28	7.98	8.08
40	0.01	0.02	0.03	50.40	50.53	37.18	53.89	33.83	43.58	41.47	31.38	54.52	55.58	8.25	8.39
50	0.01	0.02	0.02	50.48	50.62	36.17	53.55	34.20	40.90	43.27	31.81	55.08	57.66	8.87	9.02
60	0.01	0.02	0.03	50.59	50.72	35.11	48.63	34.59	38.84	45.08	32.02	56.99	59.75	9.55	9.71
80	0.02	0.02	0.03	50.66	50.79	33.34	42.60	34.82	36.72	44.33	31.73	55.74	55.04	10.74	10.89
100	0.02	0.02	0.03	50.61	50.72	32.26	39.49	34.15	34.77	42.96	31.47	51.58	51.50	11.62	11.76
140	0.02	0.02	0.03	50.47	50.54	29.43	34.32	33.01	31.00	37.02	31.79	51.20	59.72	12.77	12.88
160	0.03	0.03	0.04	50.44	50.50	28.22	32.66	32.46	29.51	34.57	32.16	52.39	60.67	13.14	13.23
200	0.04	0.04	0.05	50.47	50.51	26.79	30.51	31.27	28.84	33.09	33.08	47.02	47.99	13.64	13.72
220	0.05	0.05	0.06	50.48	50.51	26.17	29.42	30.61	28.25	31.74	33.11	46.38	48.42	13.82	13.89
260	0.05	0.05	0.06	50.50	50.50	24.92	27.64	29.31	27.48	29.75	32.34	45.10	47.89	14.09	14.16
280	0.06	0.06	0.07	50.51	50.52	24.47	26.77	28.80	27.02	29.07	31.47	43.71	46.34	14.20	14.26
320	0.07	0.07	0.08	50.52	50.52	24.12	25.80	27.75	26.54	27.83	29.41	42.23	44.62	14.38	14.44
340	0.07	0.07	0.09	50.51	50.50	23.92	25.40	27.55	26.69	27.57	28.97	41.70	44.43	14.45	14.52
380	0.09	0.09	0.10	50.50	50.48	23.52	24.56	26.44	26.17	26.83	27.65	41.27	44.97	14.61	14.69
400	0.09	0.10	0.11	50.50	50.48	23.46	24.58	26.22	25.99	26.73	27.40	41.29	45.35	14.68	14.76
440	0.10	0.11	0.12	50.46	50.45	23.61	24.32	25.76	25.95	27.15	27.30	39.86	44.37	14.79	14.88
460	0.11	0.11	0.13	50.44	50.42	23.53	24.34	25.36	26.05	26.78	27.13	39.63	44.11	14.84	14.93
500	0.12	0.13	0.14	50.42	50.41	23.54	23.48	25.10	25.88	26.38	27.16	39.48	43.84	14.95	15.05
520	0.13	0.13	0.14	50.43	50.43	23.50	23.08	24.92	26.07	26.02	27.17	39.16	43.77	15.01	15.11

* Data 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.
- 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-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