

DC Pass, High Power

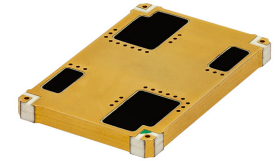
Dual-Directional Coupler

DDCH-50-521+

50Ω 50dB Coupling 300W 20 to 520 MHz

The Big Deal

- High power handling, up to 300W
- Low insertion loss, 0.07 dB Typ
- Excellent return loss, 35 dB Typ (In/Out)
- High directivity, 21 dB Typ



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 0.07 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 21 dB provides accurate sampling from the coupled port, and typical input/output return loss of 35 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
Low mainline loss, 0.07 dB typ.	Used primarily in high power transmission applications, the excellent through-path signal loss maximizes the power transmitted to the antenna.
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.
Excellent return loss, 35 dB typ. (input and output)	Provides excellent matching for 50Ω systems.
High directivity, 21 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.



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Maximum Ratings

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

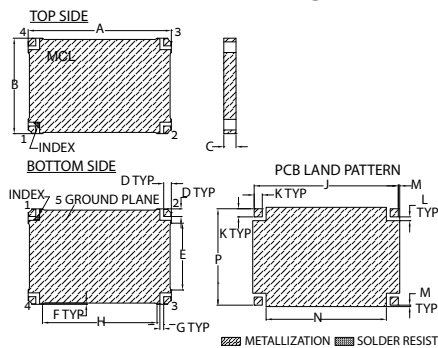
*Case temperature is defined as temperature on ground leads.
Permanent damage may occur if any of these limits are exceeded.

Pad Connections**

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

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

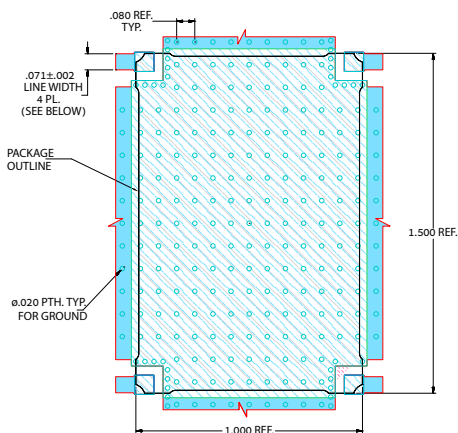
Outline Drawing



Base material: Printed wiring laminate.
Termination Finish: 2-5 μinch (0.05-0.13 microns) Gold over 120-240 μinch (3.05-6.10 microns) Nickel

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

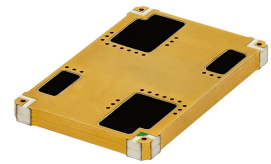
Demo Board MCL P/N: TB-865
Suggested PCB Layout (PL-471)

Features

- high power, up to 300W
- low insertion loss, 0.07 dB Typ.
- excellent in/out return loss, 35 dB typ
- high directivity, 21 dB Typ.
- DC current pass through input to output

Applications

- GSM
- Research and Development Labs
- Defense and Military



CASE STYLE: PQ2100

+RoHS Compliant

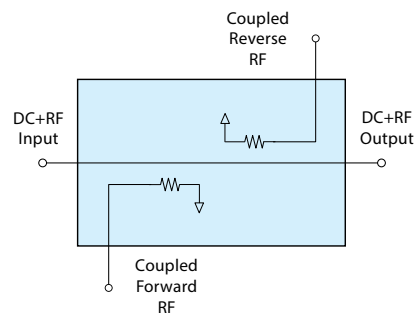
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Electrical Specifications @ +25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		20		520	MHz
Insertion Loss	20 - 150	—	0.05	0.1	dB
	150 - 520	—	0.10	0.2	
Coupling	20 - 520	—	50±0.35	—	dB
Coupling Flatness	20 - 520	—	±0.65	—	dB
Directivity	20 - 520	20	21	—	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(Main line)	20 - 520	—	—	300	W

Electrical Schematic

Dual-Directional Coupler (DC THRU)*



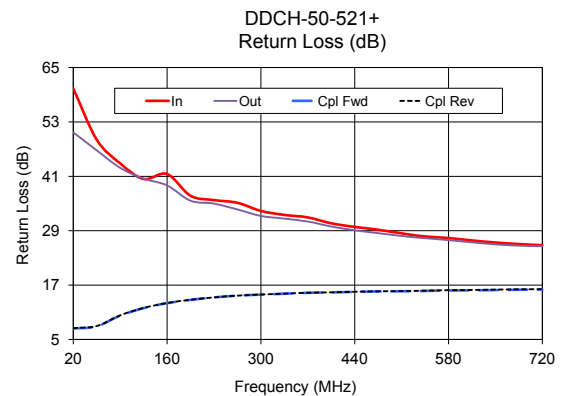
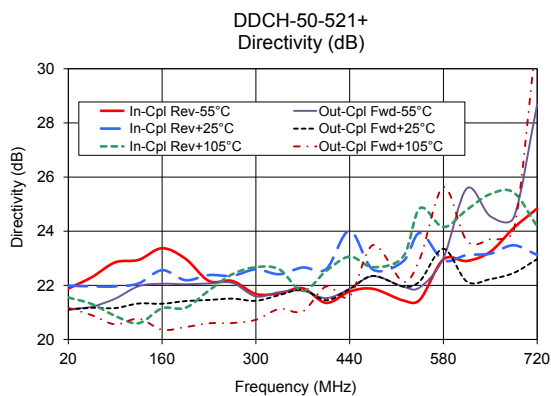
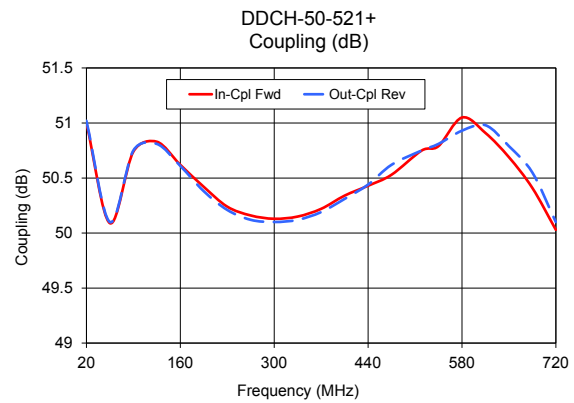
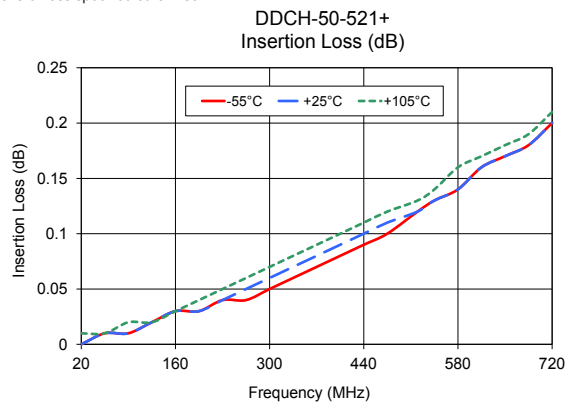
*Mainline is DC coupled.

*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 -	Out -	In - Cpl Rev			Out - Cpl Fwd			In	Out	Cpl	Cpl
	-55°C	+25°C	+105°C	Cpl Fwd	Cpl Rev	-55°C	+25°C	+105°C	-55°C	+25°C	+105°C			Fwd	Rev
20.0	0.00	0.00	0.01	51.00	51.02	21.88	21.99	21.55	21.12	21.10	21.17	60.41	50.70	7.41	7.50
55.0	0.01	0.01	0.01	50.09	50.10	22.30	21.96	21.31	21.21	21.17	20.90	49.09	46.73	7.88	7.96
90.0	0.01	0.01	0.02	50.74	50.75	22.85	21.96	20.87	21.51	21.16	20.56	43.86	42.87	10.26	10.33
125.0	0.02	0.02	0.02	50.83	50.81	22.94	22.07	20.60	21.97	21.33	20.77	40.42	40.49	11.92	11.96
160.0	0.03	0.03	0.03	50.62	50.61	23.37	22.56	21.15	22.06	21.32	20.36	41.51	39.00	13.02	13.05
195.0	0.03	0.03	0.04	50.42	50.38	22.98	22.19	21.17	22.04	21.42	20.46	36.72	35.62	13.74	13.77
230.0	0.04	0.04	0.05	50.24	50.21	22.16	22.38	21.81	22.07	21.46	20.60	35.76	34.98	14.29	14.29
265.0	0.04	0.05	0.06	50.16	50.12	22.16	22.35	22.41	22.09	21.51	20.61	35.16	33.69	14.68	14.68
400.0	0.05	0.06	0.07	50.13	50.10	21.68	22.59	22.67	21.59	21.43	20.73	33.37	32.26	14.90	14.92
335.0	0.06	0.07	0.08	50.15	50.12	21.70	22.41	22.59	21.75	21.64	21.13	32.49	31.67	15.10	15.12
370.0	0.07	0.08	0.09	50.22	50.19	21.89	22.66	21.79	21.80	21.84	21.04	31.94	31.02	15.31	15.31
405.0	0.08	0.09	0.10	50.34	50.31	21.35	22.60	22.53	21.53	21.45	21.96	30.64	29.93	15.40	15.41
440.0	0.09	0.10	0.11	50.43	50.44	21.77	24.02	23.06	21.87	21.87	21.59	29.84	29.10	15.51	15.54
475.0	0.10	0.11	0.12	50.53	50.62	21.87	22.58	22.67	22.34	22.35	23.49	29.22	28.46	15.61	15.64
520.0	0.12	0.12	0.13	50.75	50.75	21.44	22.89	23.06	21.95	21.96	22.13	28.20	27.68	15.66	15.70
545.0	0.13	0.13	0.14	50.79	50.81	21.47	23.94	24.85	21.93	22.16	23.00	27.74	27.36	15.72	15.78
580.0	0.14	0.14	0.16	51.05	50.93	22.96	22.93	24.15	23.01	23.35	25.63	27.39	26.92	15.82	15.89
615.0	0.16	0.16	0.17	50.91	50.98	22.90	23.12	24.79	25.58	22.14	23.64	26.86	26.43	15.85	15.93
650.0	0.17	0.17	0.18	50.69	50.79	23.24	23.17	25.37	24.55	22.23	23.71	26.40	25.99	15.91	16.01
685.0	0.18	0.18	0.19	50.41	50.55	24.12	23.48	25.43	24.51	22.46	24.03	26.06	25.70	15.98	16.08
720.0	0.20	0.20	0.21	50.03	50.10	24.84	23.12	24.18	28.69	22.97	31.37	25.81	25.58	16.03	16.11

* 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.
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