

DC Pass, High Power

Dual-Directional Coupler

ZDDC-50-521+

50Ω 50dB Coupling 400W* 20 to 520 MHz

The Big Deal

- High power handling, up to 400W
- Low insertion loss, 0.1 dB Typ
- Excellent return loss, 28 dB Typ (In/Out)
- High directivity, 26 dB Typ
- Water resistant, IP67



CASE STYLE: RC2504

Product Overview

Mini-Circuits ZDDC-50-521+ is a coaxial high-power (400W) wide band (20-520 MHz) dual-directional coupler which features low insertion loss (0.1 dB), 50 dB coupling and excellent mainline return loss (28 dB). The Dual directional design allows monitoring forward and reverse power and guarantees good directivity, flatness and coupling accuracy.

The ZDDC-50-521+ supports a wide variety of applications from military to commercial, including GSM transmitters and more. The coupler is constructed in a rugged, compact metal case (3.0 x 2.154 x 0.975") and is splash and water resistant, meeting IP67 immersion standard.

Key Features

Feature	Advantages
High power handling: 400W @ +85°C 300W @ +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 mainline loss, 0.1 dB typ.	Used primarily in high power transmission applications, the excellent through-path signal loss maximizes the power transmitted to the antenna.
Excellent return loss, 28 dB typ. (input and output)	Provides excellent matching for 50Ω systems.
High directivity, 26 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.
Meets IP67 immersion standard	Model can handle immersion in water of up to 1m (3.3 ft) for up to 30 minutes.

*See power derating on page 2



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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 Power Input*	400W @ +85°C, case

*Derate to 350W at +95°C and 300W 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.

Coaxial Connections***

INPUT	4 (N-Type)
OUTPUT	2 (N-Type)
COUPLED FORWARD	1 (SMA)
COUPLED REVERSE	3 (SMA)

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

Features

- high power, up to 400W
- low insertion loss, 0.1 dB Typ.
- excellent in/out return loss, 28 dB typ
- high directivity, 26 dB Typ.
- DC current pass through input to output
- Water resistant, IP67 standard

Applications

- GSM
- Research and Development Labs
- Defense and Military



CASE STYLE: RC2504

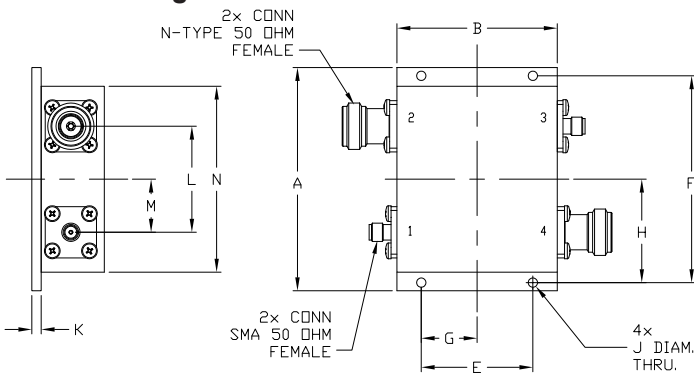
+RoHS Compliant

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

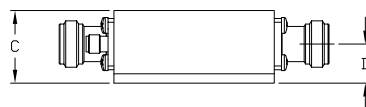
Electrical Specifications @ +25°C

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	0.25		
Coupling	20 - 520	—	50±1	—	dB	
Coupling Flatness	20 - 520	—	±0.95	—	dB	
Directivity	20 - 150	20	23	—	dB	
	150 - 520	20	26	—		
Return Loss (Input)	20 - 150	30	38	—	dB	
	150 - 520	22	28	—		
Return Loss (Output)	20 - 150	30	38	—	dB	
	150 - 520	22	28	—		
Return Loss (Coupling)	20 - 150	—	8	—	dB	
	150 - 520	10	14	—		
Input RF Power (Main line)	20 - 520	@ +85°C, Case	—	—	400	W
		@ +95°C, Case	—	—	350	
		@ +105°C, Case	—	—	300	
Thermal Resistance	20 - 520	—	0.2	—	°C/W	

Outline Drawing



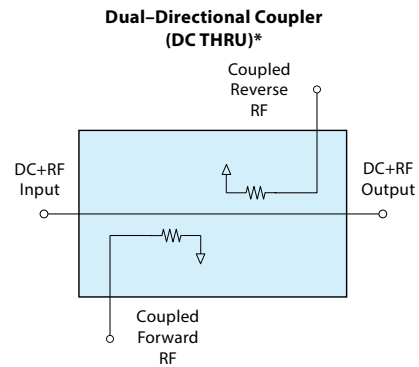
Case material - Aluminum alloy.
 Case finish - Nickel Plate.



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	wt.
3.000	2.154	.975	.525	1.500	2.780	.750	1.390	.125	.125	1.425	.713	2.500	grams
76.20	54.71	24.76	13.33	38.10	70.61	19.05	35.31	3.18	3.18	36.19	18.11	63.50	230

Electrical Schematic



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

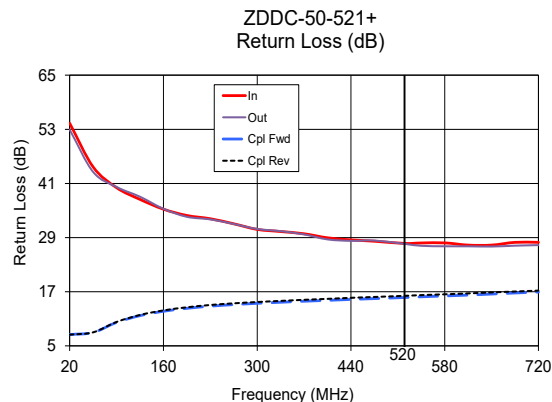
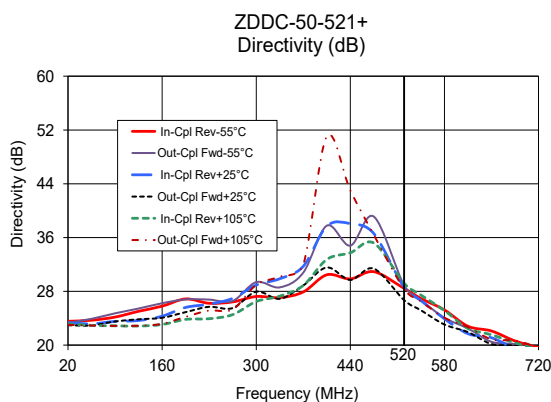
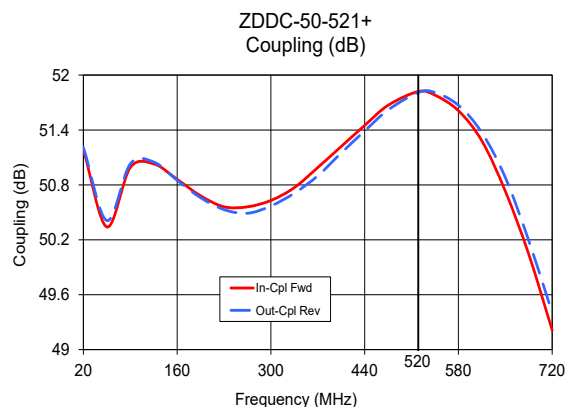
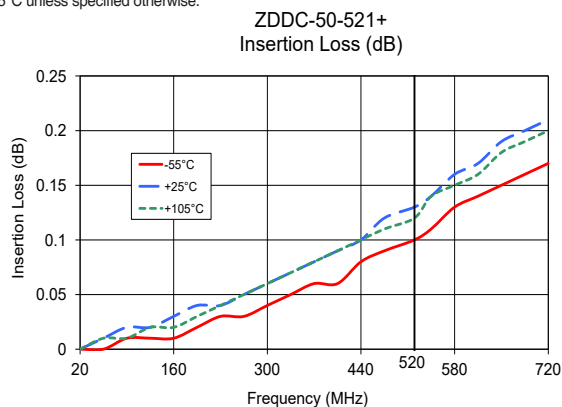


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Typical Performance Data *

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	0.00	0.00	0.00	51.18	51.21	23.54	23.31	23.16	23.33	22.95	23.02	54.35	52.93	7.50	7.48
55.0	0.00	0.01	0.01	50.34	50.41	23.70	23.17	22.94	23.91	22.92	22.91	44.66	43.56	7.95	8.00
90.0	0.01	0.02	0.01	50.99	51.03	24.17	23.52	22.88	24.73	23.51	22.86	40.07	40.22	10.19	10.30
125.0	0.01	0.02	0.02	51.03	51.05	25.03	23.66	22.84	25.44	23.83	22.88	37.47	38.05	11.69	11.85
160.0	0.01	0.03	0.02	50.86	50.85	25.79	24.30	23.07	26.23	24.06	23.17	35.30	35.38	12.66	12.86
195.0	0.02	0.04	0.03	50.68	50.66	26.87	25.60	23.83	26.80	24.90	24.21	33.90	33.60	13.31	13.55
230.0	0.03	0.04	0.04	50.56	50.53	26.22	26.09	23.93	26.77	25.69	25.15	33.18	33.03	13.79	14.06
265.0	0.03	0.05	0.05	50.56	50.49	26.43	26.95	24.54	26.57	25.50	25.31	32.06	32.01	14.14	14.43
300.0	0.04	0.06	0.06	50.63	50.57	27.23	28.93	26.49	29.37	27.94	28.96	30.82	30.90	14.42	14.72
335.0	0.05	0.07	0.07	50.77	50.71	27.06	29.87	27.29	28.59	26.88	30.18	30.35	30.42	14.66	14.97
370.0	0.06	0.08	0.08	50.99	50.90	27.91	31.72	28.88	30.78	28.86	31.97	29.85	29.70	14.89	15.21
405.0	0.06	0.09	0.09	51.22	51.15	30.46	37.69	32.75	37.77	31.54	51.03	28.95	28.59	15.08	15.42
440.0	0.08	0.10	0.10	51.45	51.39	29.85	38.06	33.74	34.80	29.69	43.04	28.50	28.27	15.29	15.65
475.0	0.09	0.12	0.11	51.67	51.62	30.92	36.58	35.19	39.12	31.37	36.40	28.20	28.35	15.47	15.84
520.0	0.10	0.13	0.12	51.82	51.81	28.43	28.57	29.21	28.91	26.68	28.33	27.71	27.60	15.71	16.09
545.0	0.11	0.14	0.14	51.78	51.81	26.94	26.62	27.45	26.72	25.18	26.52	27.81	27.17	15.87	16.25
580.0	0.13	0.16	0.15	51.61	51.67	25.23	23.91	25.15	24.07	23.06	24.07	27.83	27.07	16.06	16.43
615.0	0.14	0.17	0.16	51.28	51.37	22.80	21.69	22.48	22.48	21.93	22.69	27.34	27.06	16.25	16.63
650.0	0.15	0.19	0.18	50.73	50.88	22.10	21.09	21.54	20.49	20.15	20.86	27.34	27.01	16.48	16.85
685.0	0.16	0.20	0.19	50.04	50.19	20.61	19.53	20.34	20.13	19.92	20.68	27.95	27.20	16.72	17.05
720.0	0.17	0.21	0.20	49.21	49.40	19.59	18.84	19.38	19.05	19.23	19.67	27.95	27.33	16.93	17.25

* 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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