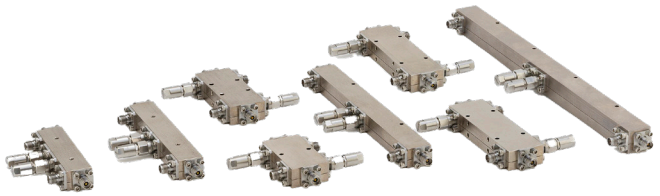
Wideband, DC Pass

Dual Directional Couplers ZDDC-Series

50Ω 10, 20 and 30 dB Up to 20W 0.5 to 40 GHz

The Big Deal

- Wideband, 0.5, 1, 2, 6, or 18 to 40 GHz
- Excellent Coupling Flatness, ±0.3 to ±1.0 dB typ.
- Power Handling up to 20W



ZDDC Model Series

Product Overview

The Mini-Circuits ZDDC family of wideband Dual-Directional Couplers offers exceptional performance spanning frequencies from 0.5, 1, 2, 6, or 18 to 40 GHz. Available in models with 10, 20, and 30 dB coupling, these couplers provide excellent coupling flatness, good directivity, and power handling up to 20 W. They are ideal for lab testing applications as well as for power monitoring over wide bands, among other applications

Key Features

Feature	Advantages
Family of models Wide bandwidth and choice of coupling • Up to 40 GHz • 10, 20, or 30 dB coupling	10 dB coupling: ZDDC10-K5R44W+ (0.5-40 GHz), ZDDC10-K0144+ (1-40 GHz), ZDDC10-K0244+ (2-40 GHz), ZDDC10-K0644+ (6-40 GHz), ZDDC10-K1844+ (18-40 GHz) 20 dB coupling: ZDDC20-K0144+ (1-40 GHz), ZDDC20-K0244+ (2-40 GHz), ZDDC20-K0644+ (6-40 GHz), ZDDC20-K1844+ (18-40 GHz) 30 dB coupling: ZDDC30-K0144+ (1-40 GHz), ZDDC30-K0244+ (2-40 GHz), ZDDC30-K0644+ (6-40 GHz), ZDDC30-K1844+ (18-40 GHz)
Dual-Directional Coupler	Ideally suited for simultaneous monitoring of both forward and reverse power of a system and reflectometer measurements.
Good Directivity • 13 to 22 dB typ. up to 40 GHz	High directivity allows sampling of input powers with minimal detrimental effects due to output mismatches.
Excellent coupling flatness • ±0.3 to ±1.0 dB typ.	Excellent coupling flatness over the entire frequency range minimizes the need for compensation circuits in most cases.
Great Return Loss (In & Thru) • 17 to 23 dB typ. up to 40 GHz	Good return loss over operating band minimizes undesired reflections and resulting amplitude ripple.

Wideband, DC Pass

Dual Directional Coupler ZDDC10-K0244+

50Ω 10 dB Up to 16W 2 to 40 GHz

Features

- Wide frequency range, 2 to 40 GHz
- Excellent coupling flatness, ±0.6 dB typ.
- Good directivity, 13 dB typ. up to 40 GHz
- Great return loss, 17 dB typ. up to 40 GHz
- DC current pass through input to output

Applications

- 5G
- Mobile
- Fixed satellite
- Lab use

Generic photo used for illustration purposes only

CASE STYLE: HT3104-2

Connectors	Model
2.92mm Female	ZDDC10-K0244+

+RoHS Compliant

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

Electrical Specifications at 25°C

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Units
Frequency Range		2		40	GHz
Coupling	2 - 40	-	10±1.9	-	dB
Coupling Flatness (±)	2 - 40	-	±0.6	±1.0	dB
Mainline Loss[1]	2 - 8	-	1.4	1.9	dB
	8 - 18	-	1.7	2.4	
	18 - 26.5	-	2.0	2.8	
	26.5 - 40	-	2.4	3.3	
Directivity[2]	2 - 8	16	31	-	dB
	8 - 18	14	27	-	
	18 - 26.5	12	23	-	
	26.5 - 40	11	20	-	
Return Loss (In & Thru)	2 - 8	15.5	32	-	dB
	8 - 18	13.9	29	-	
	18 - 26.5	12.7	27	-	
	26.5 - 40	11.7	23	-	
Return Loss (Coupling)	2 - 8	15.5	32	-	dB
	8 - 18	13.9	29	-	
	18 - 26.5	12.7	23	-	
	26.5 - 40	11.7	24	-	
Input Power[3]	2 - 40	-	-	16	W

1. Mainline loss includes coupling loss
2. Directivity (dB) = -RF-OUT to COUP1 (dBm) + RF-IN to COUP1 (dBm) or -RF-IN to COUP2 (dBm) + RF-OUT to COUP2 (dBm)
3. Up to 25°C, derates linearly to 6W at 100°C.

Maximum Ratings

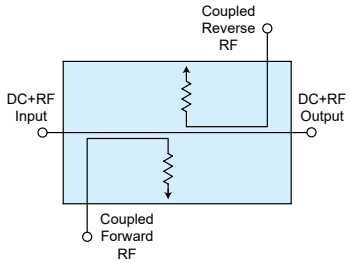
Parameter	Ratings
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
Supplied Termination[4]	1W
DC Current	0.56A

4. Up to 25°C, derates linearly to 325mW at 100°C.
Permanent damage may occur if any of these limits are exceeded.

Configuration

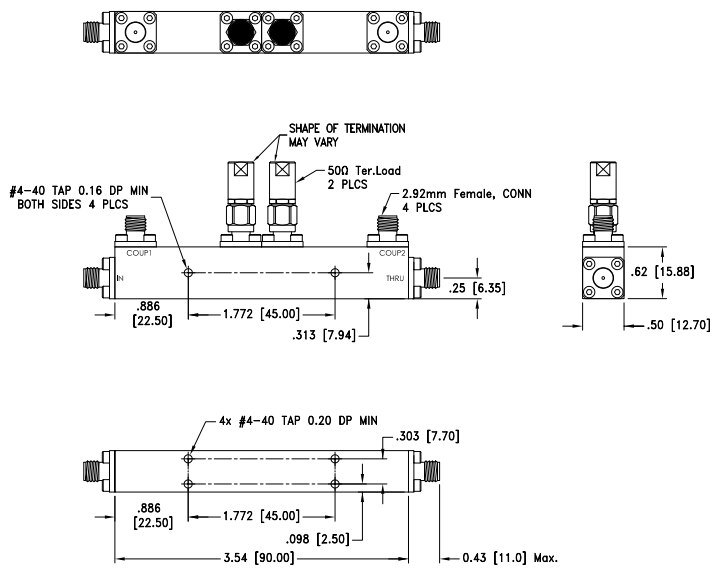
Port Markings	Function
IN	RF-IN
THRU	RF-OUT
COUP1	Couples power applied at RF-IN
COUP2	Couples power applied at RF-OUT

Electrical Schematic



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

Outline Drawing

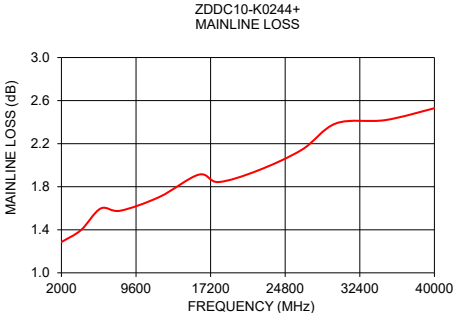


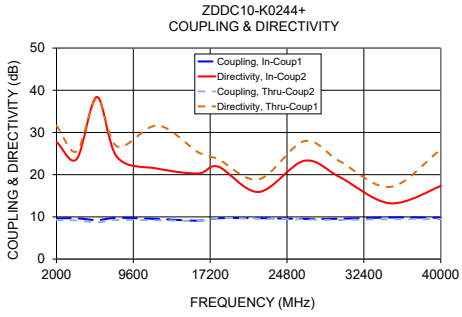
Weight: 95 grams;
Dimensions are in inches (mm). Tolerances: 2 Pl.±.03; 3 Pl. ± .015

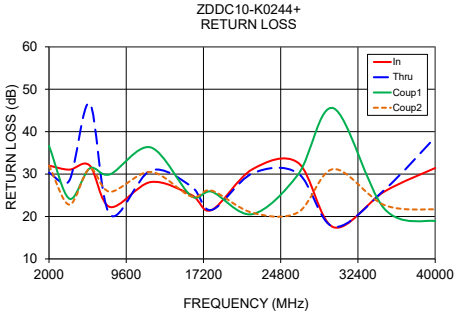
Typical Performance Data

Frequency (MHz)	Mainline Loss[1] (dB)	Coupling (dB)		Directivity (dB)		Return Loss (dB)			
	In-Thru1	In-Coup1	Thru-Coup2	Thru-Coup1	In-Coup2	In	Thru	Coup1	Coup2
2000	1.29	9.64	9.26	31.63	27.75	31.99	30.31	36.65	31.99
4000	1.40	9.67	9.17	25.53	23.72	31.05	28.47	24.20	22.79
6000	1.60	9.25	8.72	38.10	38.41	32.04	46.69	31.33	31.27
8000	1.58	9.77	9.27	26.68	24.14	22.24	20.41	29.95	25.84
12000	1.71	9.50	9.19	31.66	21.44	28.12	30.86	36.30	30.50
16000	1.91	9.10	9.07	25.33	20.29	25.10	27.11	24.79	24.73
18000	1.84	9.68	9.73	23.65	21.89	21.52	21.55	25.86	26.10
22000	1.95	9.70	9.57	18.89	15.90	31.12	30.14	20.55	20.89
26500	2.14	9.54	9.41	27.93	23.29	32.69	30.19	29.88	20.97
30000	2.39	9.55	9.27	23.20	19.45	17.47	17.59	45.52	31.18
35000	2.42	9.86	9.48	17.10	13.21	25.88	26.27	21.82	22.69
40000	2.53	9.78	9.47	25.93	17.33	31.43	38.68	18.91	21.67

1. Mainline loss includes coupling loss







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

Dual-Directional Coupler ZDDC10-K0244+

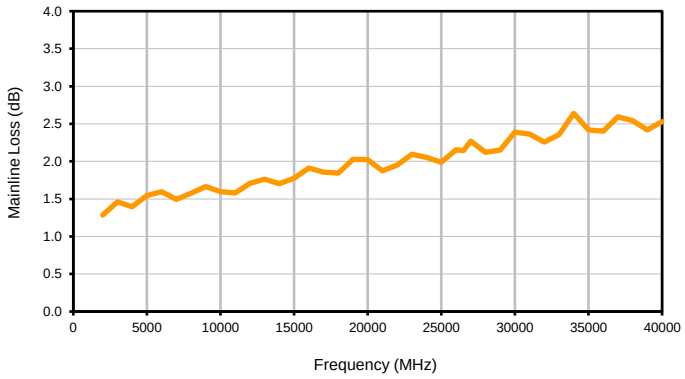
Typical Performance Data

FREQ. (MHz)	MAINLINE LOSS[1] (dB)	COUPLING (dB)		DIRECTIVITY (dB)		RETURN LOSS (dB)			
	IN-THRU	IN-COUP 1	THRU-COUP 2	THRU-COUP 1	IN-COUP 2	IN	THRU	COUP 1	COUP 2
2000	1.29	9.64	9.26	31.63	27.75	31.99	30.31	36.65	31.99
3000	1.46	9.32	8.89	38.02	35.57	23.53	22.89	32.32	30.51
4000	1.40	9.67	9.17	25.53	23.72	31.05	28.47	24.20	22.79
5000	1.54	9.29	8.76	28.59	25.70	34.67	33.14	33.92	30.66
6000	1.60	9.25	8.72	38.10	38.41	32.04	46.69	31.33	31.27
7000	1.50	9.76	9.24	29.32	27.71	29.72	29.22	32.65	29.06
8000	1.58	9.77	9.27	26.68	24.14	22.24	20.41	29.95	25.84
9000	1.66	9.47	9.01	30.19	31.59	30.70	22.06	29.59	34.43
10000	1.60	9.74	9.34	19.58	20.56	28.37	20.66	33.72	26.79
11000	1.58	9.96	9.56	22.18	20.15	22.14	23.83	30.37	28.34
12000	1.71	9.50	9.19	31.66	21.44	28.12	30.86	36.30	30.50
13000	1.76	9.38	9.11	29.59	20.34	53.48	39.29	26.33	25.98
14000	1.70	9.65	9.50	27.30	20.82	42.00	46.79	33.02	46.70
15000	1.77	9.48	9.47	31.89	25.73	24.37	25.97	26.07	23.91
16000	1.91	9.10	9.07	25.33	20.29	25.10	27.11	24.79	24.73
17000	1.86	9.33	9.40	38.78	36.63	39.30	33.13	39.38	36.31
18000	1.84	9.68	9.73	23.65	21.89	21.52	21.55	25.86	26.10
19000	2.02	9.47	9.43	21.12	18.77	16.57	17.04	20.45	20.50
20000	2.02	9.39	9.38	28.84	24.49	18.86	19.17	24.14	25.26
21000	1.87	9.85	9.82	19.11	16.17	27.95	28.05	20.77	18.59
22000	1.95	9.70	9.57	18.89	15.90	31.12	30.14	20.55	20.89
23000	2.10	9.41	9.30	24.20	19.71	23.14	23.26	26.20	22.57
24000	2.05	9.60	9.47	22.24	19.32	28.72	27.86	25.61	24.18
25000	1.99	9.94	9.77	19.69	16.76	28.34	35.40	21.02	19.24
26000	2.16	9.61	9.44	24.83	22.77	20.05	22.36	29.64	31.10
26500	2.14	9.54	9.41	27.93	23.29	32.69	30.19	29.88	20.97
27000	2.27	9.65	9.36	19.86	17.30	16.85	17.96	22.11	20.37
28000	2.12	9.91	9.65	20.94	21.41	26.63	27.24	28.11	34.62
29000	2.15	9.92	9.64	18.37	15.39	32.99	31.55	23.67	22.89
30000	2.39	9.55	9.27	23.20	19.45	17.47	17.59	45.52	31.18
31000	2.36	9.85	9.41	16.43	13.31	17.40	17.28	21.44	22.10
32000	2.26	10.06	9.83	24.61	19.57	22.00	20.79	28.12	25.03
33000	2.35	9.78	9.40	16.53	11.99	30.08	27.03	21.27	19.31
34000	2.64	9.47	9.18	20.84	18.33	17.00	16.78	24.53	30.91
35000	2.42	9.86	9.48	17.10	13.21	25.88	26.27	21.82	22.69
36000	2.40	10.03	9.82	22.23	16.53	23.65	20.98	30.90	26.72
37000	2.59	9.44	9.02	16.55	13.93	19.03	21.06	15.42	17.47
38000	2.54	9.61	9.45	32.40	22.28	20.51	20.34	23.47	24.89
39000	2.42	10.18	9.66	19.59	14.73	28.36	34.39	14.96	16.02
40000	2.53	9.78	9.47	25.93	17.33	31.43	38.68	18.91	21.67

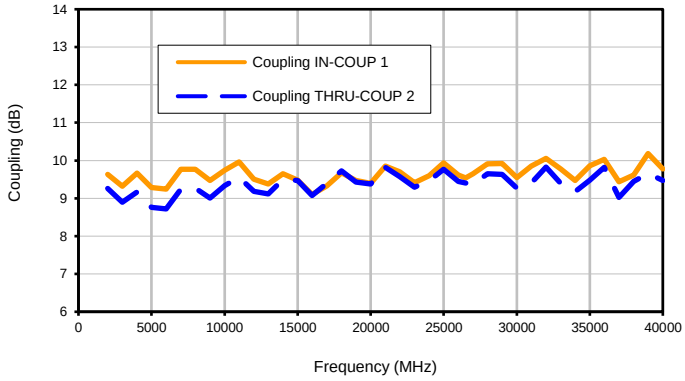
[1] Mainline loss includes coupling loss

Typical Performance Curves

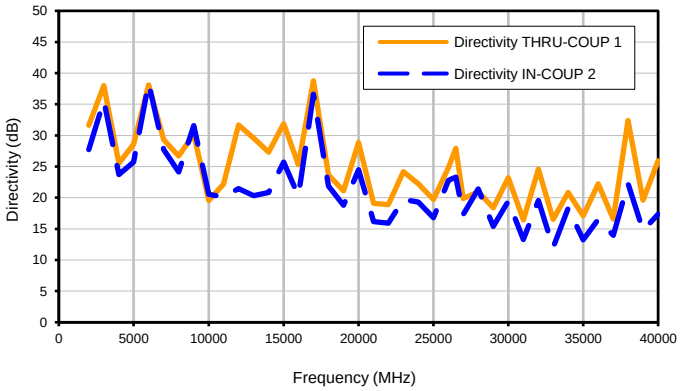
Mainline Loss



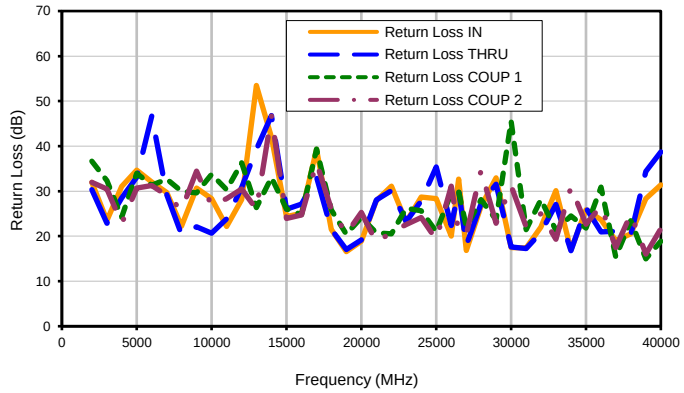
Coupling



Directivity



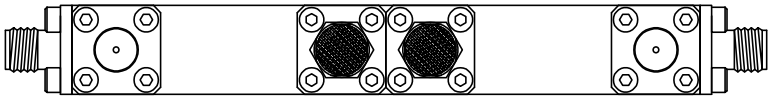
Return Loss

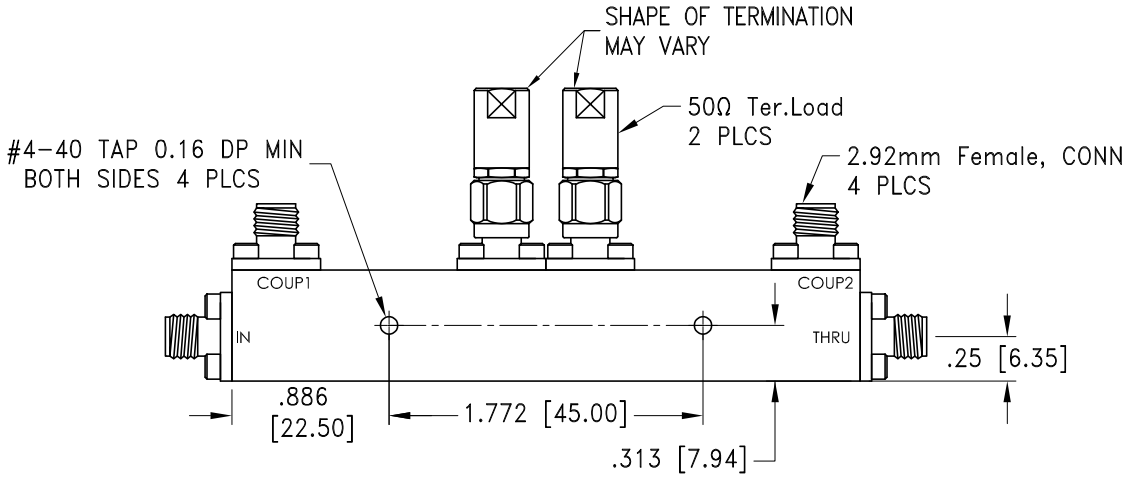


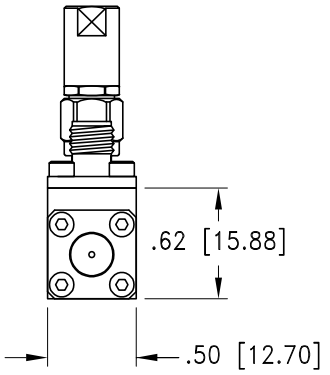
Case Style HT

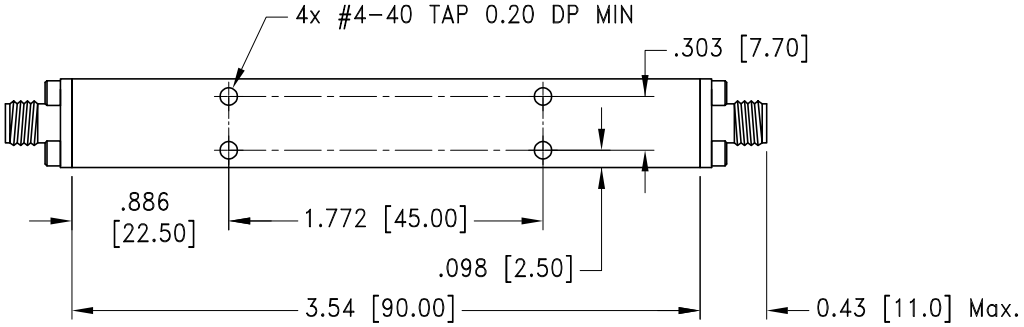
Outline Dimensions

HT3104-2









Weight: 95 grams;

Dimensions are in inches (mm). Tolerances: 2 Pl.±.03; 3 Pl. ± .015

Notes:

1. Case material: Aluminum Alloy
2. Case Finish: Nickel Plating

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RF/IF MICROWAVE COMPONENTS

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Mini-Circuits

Environmental Specifications **ENV102**

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 25 cycles	MIL-STD-202, Method 107, Condition A-1 except +100°C instead of 85°C
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I
Connector Durability	500 mating/unmating cycles	MIL-PRF-39012E, PARAGRAPH 4.6.12

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