

Ultra-Wideband

Directional Coupler

ZUDC-Series

50Ω Up to 50W 10, 20, and 30 dB 0.5 to 18 GHz

The Big Deal

- Ultra-wideband, 0.5 to 18 GHz
- Excellent Coupling Flatness, ± 0.4 dB typ.
- Power Handling up to 50W



CASE STYLE: HT1967

Product Overview

The Mini-Circuits ZUDC family of ultra-wideband directional couplers offers exceptional performance spanning frequencies from 0.5 to 18 GHz. Available in models with 10, 20, and 30 dB coupling, these couplers provide excellent coupling flatness, good directivity, and power handling up to 50W. They are ideal for lab testing applications as well as for power monitoring over wide bands, among other applications.

Key Features

Feature	Advantages
Ultra-wide bandwidth	With a bandwidth spanning 0.5 to 18 GHz, ZUDC couplers are ideal for most lab testing applications, avoiding the need to switch components for different frequency bands.
Excellent Directivity • 22 dB at 4 GHz • 12 dB at 18 GHz	High directivity allows sampling of input powers with minimal detrimental effects due to output mismatches.
Excellent coupling flatness, ± 0.4 dB typ.	Excellent coupling flatness over the entire frequency range eliminates the need for compensation circuits in most cases.
Good Return Loss, 15 dB typ.	Good return loss over 0.5 to 18 GHz minimizes undesired reflections and resulting amplitude ripple.

Notes

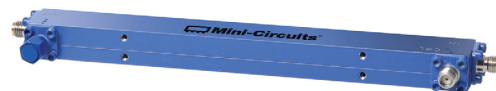
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B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document 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



Ultra-Wideband, DC Pass Directional Coupler

50Ω 10dB Up to 50W 0.5 to 18 GHz

ZUDC10-183+



Generic photo used for illustration purposes only

CASE STYLE: HT1967

Connectors	Model
SMA	ZUDC10-183+

+RoHS Compliant

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

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
DC Current	3A
Supplied Termination*	1W

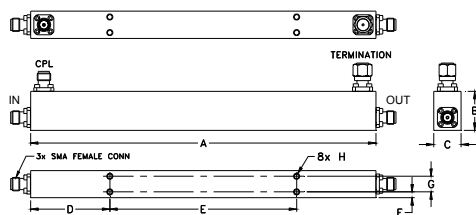
* With load at coupled port (<2.0:1 VSWR)

Permanent damage may occur if any of these limits are exceeded

Coaxial Connections

INPUT	IN
OUTPUT	OUT
COUPLED	CPL
TERMINATION (50Ω) INCLUDED	—

Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E
6.47	.73	.51	1.48	3.500
164.34	18.54	12.95	37.59	88.90
F	G	H		wt
.11	.293	#4-40		grams
2.79	7.44	UNC-2B		120.0

Features

- ultra wide frequency range, 0.5 to 18 GHz
- good coupling flatness, ± 0.6 dB typ.
- good directivity, 22dB typ up to 4 GHz
- good VSWR, 1.4 typ up to 18 GHz, 1:15 up to 4 GHz
- DC current pass through input to output

Applications

- cellular
- lab use
- WiMax
- ISM
- GSM
- PCN

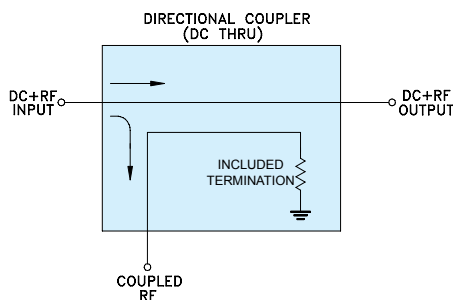
Electrical Specifications at 25°C

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Units
Operating Frequency		0.5		18	GHz
Nominal Coupling (include flatness)	0.5 - 18	—	10 $\pm$ 1.5	—	dB
Coupling Flatness	0.5 - 4	—	± 0.3	± 0.6	dB
	4 - 12.4	—	± 0.3	± 0.6	
	12.4 - 18	—	± 0.4	± 0.9	
Mainline Loss	0.5 - 4	—	0.8	1.1	dB
	4 - 12.4	—	1.4	1.9	
	12.4 - 18	—	1.8	2.9	
Directivity	0.5 - 4	20	22	—	dB
	4 - 12.4	14	17	—	
	12.4 - 18	—	12	—	
Return Loss (In & Out)	0.5 - 4	—	23	—	dB
	4 - 12.4	—	17	—	
	12.4 - 18	—	15	—	
Return Loss (Coupling)	0.5 - 4	—	21	—	dB
	4 - 12.4	—	18	—	
	12.4 - 18	—	16	—	
Input Power ^{1,2}	0.5 - 4	—	—	50	W
	4 - 12.4	—	—	25	
	12.4 - 18	—	—	10	

1. At 25°C with no DC current. Derate linearly to 20, 10, 4W at 100°C

2. Peak power 1.5 KW

Electrical Schematic



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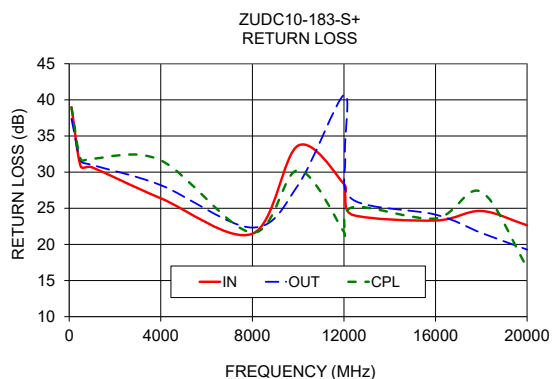
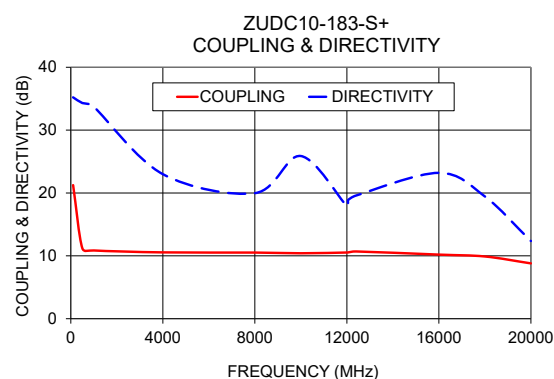
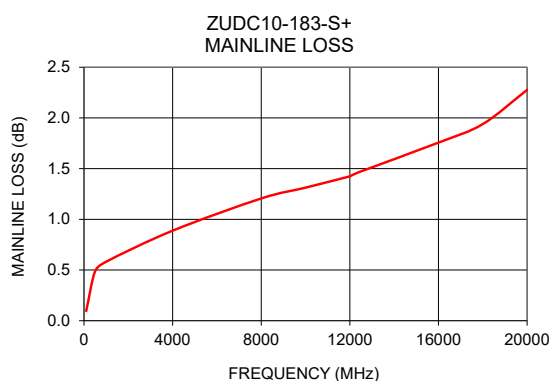


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ZUDC10-183+
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Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	In	Return Loss (dB) Out	Cpl
100	0.10	21.25	35.21	38.98	37.36	38.94
500	0.49	11.22	34.31	30.82	31.59	31.80
1000	0.58	10.86	33.70	30.66	30.99	31.87
4000	0.89	10.55	23.00	26.38	28.20	31.63
8000	1.21	10.52	19.97	21.48	22.33	21.63
10000	1.31	10.41	25.88	33.67	28.22	30.27
12000	1.42	10.53	17.92	28.36	40.68	21.72
12050	1.43	10.54	18.87	26.81	32.23	21.13
12400	1.46	10.70	19.60	24.06	26.17	25.16
16000	1.76	10.20	23.20	23.30	24.12	23.58
18000	1.94	9.90	19.44	24.62	21.59	27.27
20000	2.28	8.80	12.36	22.64	19.28	16.83



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Ultra-Wideband, DC Pass Directional Coupler

ZUDC10-183+

Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB)		
				IN	OUT	CPL
100.0	0.10	21.25	35.21	38.98	37.36	38.94
500.0	0.49	11.22	34.31	30.82	31.59	31.80
1000.0	0.58	10.86	33.70	30.66	30.99	31.87
1500.0	0.64	10.80	35.08	28.80	29.40	30.57
2000.0	0.69	10.71	29.85	32.05	35.59	30.87
2500.0	0.75	10.56	29.47	30.84	33.10	27.64
3000.0	0.80	10.60	31.24	25.54	26.93	26.78
3500.0	0.86	10.59	27.57	21.71	22.54	24.38
4000.0	0.89	10.55	23.00	26.38	28.20	31.63
4500.0	0.93	10.42	25.61	46.71	34.12	25.98
5000.0	0.99	10.49	30.18	24.44	24.76	21.26
5500.0	1.01	10.68	22.54	21.28	21.57	20.96
6000.0	1.09	10.63	19.70	19.10	19.02	23.12
6500.0	1.08	10.69	22.88	22.57	22.02	26.52
7000.0	1.09	10.76	31.08	27.70	28.05	32.75
7500.0	1.14	10.63	21.78	27.03	27.92	29.74
8000.0	1.21	10.52	19.97	21.48	22.33	21.63
8500.0	1.24	10.53	26.01	20.32	21.04	19.36
9000.0	1.26	10.60	31.92	21.05	21.16	18.50
9500.0	1.28	10.47	27.09	26.68	27.59	21.05
10000.0	1.31	10.41	25.88	33.67	28.22	30.27
10500.0	1.35	10.52	23.08	34.48	34.16	29.32
11000.0	1.34	10.71	28.17	32.62	30.75	21.80
11500.0	1.37	10.74	28.21	29.36	30.12	19.46
12000.0	1.42	10.53	17.92	28.36	40.68	21.72
12400.0	1.46	10.70	19.60	24.06	26.17	15.16
12500.0	1.46	10.62	16.42	27.20	37.28	22.03
13000.0	1.54	10.80	24.17	22.28	23.15	22.12
13500.0	1.59	10.53	20.48	19.85	21.36	25.11
14000.0	1.64	10.26	16.34	19.44	22.08	31.34
14500.0	1.67	10.28	16.94	20.71	22.40	22.03
15000.0	1.67	10.23	24.81	22.98	25.94	21.15
15500.0	1.72	10.18	26.47	22.68	25.18	21.86
16000.0	1.76	10.20	23.20	23.30	24.12	23.58
16500.0	1.79	10.23	22.47	25.24	23.67	26.72
17000.0	1.83	10.08	20.88	28.70	29.71	26.92
17500.0	1.89	9.90	19.44	25.44	24.96	33.04
18000.0	1.94	9.90	19.44	24.62	21.59	27.27
18500.0	1.94	9.86	22.67	35.10	25.61	20.27
19000.0	2.00	9.74	19.93	32.43	32.51	17.33
19500.0	2.11	9.42	15.48	22.20	24.12	16.07
20000.0	2.28	8.80	12.36	22.64	19.28	16.83

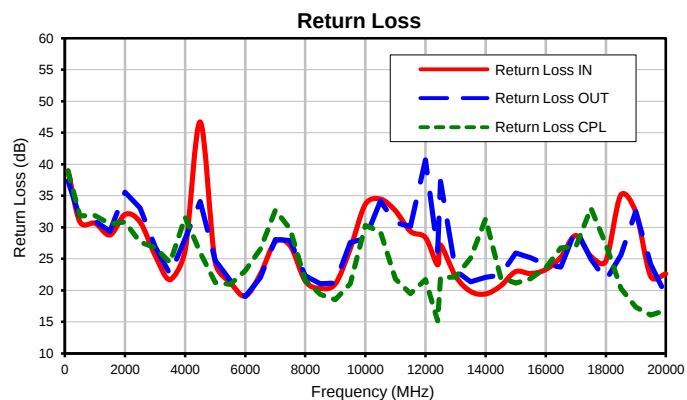
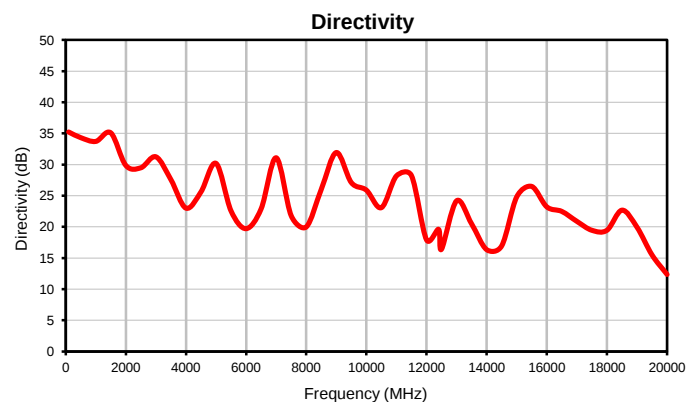
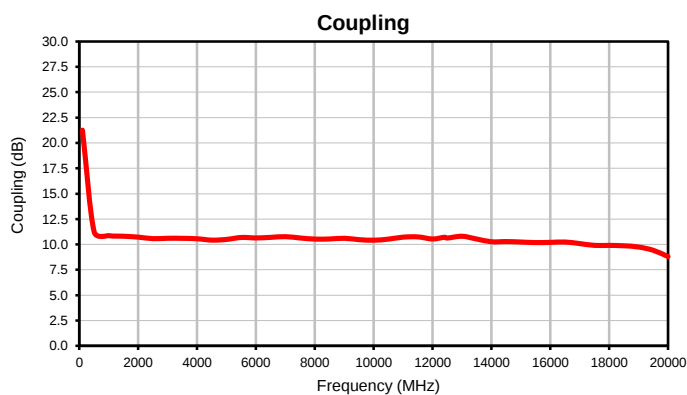
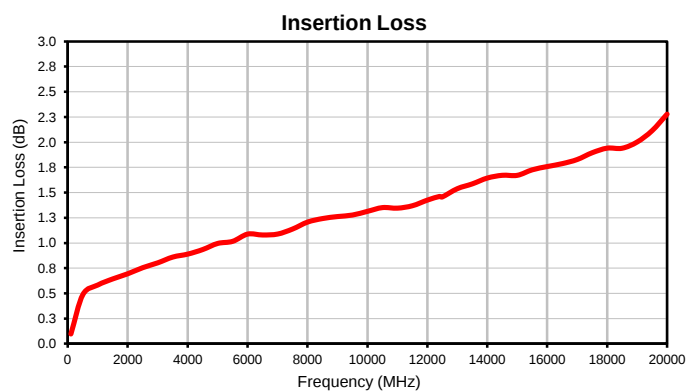


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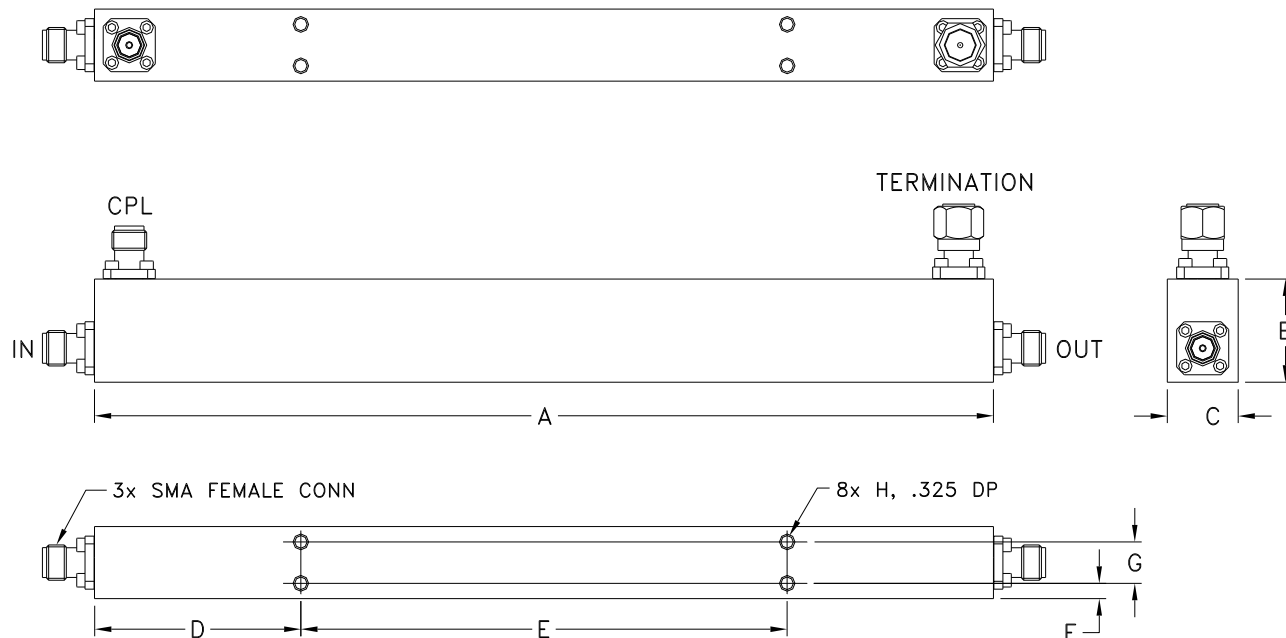
IF/RF MICROWAVE COMPONENTS

REV. OR
ZUDC10-183+
10/28/2014
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Typical Performance Curves

Outline Dimensions

HT1967



CASE #	A	B	C	D	E	F	G	H	J	K
HT1967	6.47 (164.34)	.73 (18.54)	.51 (12.95)	1.48 (37.59)	3.500 (88.90)	.11 (2.76)	.293 (7.44)	#4-40 UNC-2B	-- --	-- --

CASE #	L	M	WT. GRAM
HT1967	-- --	-- --	120.0

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

Notes:

- Case material: Aluminum alloy.
- Case finish: Painted Blue, Pantone 286 crinkle.

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RF/IF MICROWAVE COMPONENTS



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 +85 °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, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C