Ultra-Wideband, DC Pass

Directional Coupler ZUDC20-83-S+

50Ω 20dB Up to 20W 0.3 to 8 GHz

The Big Deal

- Ultra-Wideband, 0.3 to 8 GHz
- Excellent coupling flatness, ±0.6 dB
- Low mainline loss, 0.7 dB
- Good directivity, 24 dB typ.
- High power handling, up to 20W

CASE STYLE: HT1967-1

Product Overview

Mini-Circuits' ZUDC20-83-S+ is a coaxial directional coupler which provides 20 dB coupling with outstanding flatness across the 0.3 to 8 GHz frequency range. This model is capable of handling up to 20W RF input power and passing up to 1A DC current from input to output. 24 dB typical directivity allows accurate sampling of signal through the coupled port, and low mainline loss (0.7 dB typical) provides excellent transmission of signal power from input to output. The coupler comes housed in a rugged, compact aluminum alloy case (6.0 x 0.73 x 0.50") with SMA connectors and supplied termination for the coupled port on the return path.

Key Features

Feature	Advantages
Wideband, 0.3 to 8 GHz	One device supports a variety of system and test lab applications.
Good directivity, 24 dB	High directivity allows accurate signal sampling through the coupled port with minimal measurement error.
RF input power handling up to 20W	Usable in systems with high power requirements.
Flat coupling, ±0.6 dB	Provides consistent coupling performance across frequency.
Low mainline loss, 0.7 dB typ.	Provides excellent through-path signal power transmission.
Excellent return loss, 20 dB typ.	Well-matched for 50Ω systems with minimal signal reflection.
DC current passing up to 1.0A	Suitable for use in systems where DC power is needed through the RF line.

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

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Directional Coupler

ZUDC20-83-S+

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Generic photo used for illustration purposes only

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Connectors	Model
SMA	ZUDC20-83-S+

+RoHS Compliant

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

Maximum Ratings

Operating Temperature	-55°C to 85°C
Storage Temperature	-55°C to 100°C
DC Current	1A

Permanent damage may occur if any of these limits are exceeded

Coaxial Connections

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

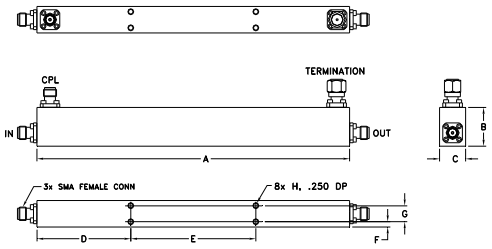
Features

- ultra wide frequency range, 0.3 to 8 GHz
- excellent directivity, 24dB typ.
- low VSWR, 1.15 typ.
- DC current pass through input to output

Applications

- test and measurement
- cellular/GSM/PCS
- ISM
- extended WiFi (7.25 GHz)
- zigbee
- bluetooth

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E
6.00	0.73	0.50	1.8	2.4
152.4	18.54	12.70	45.72	60.96

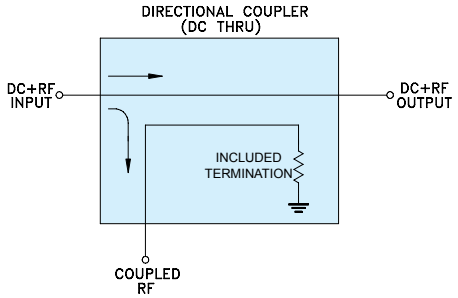
F	G	H	wt
0.10	0.3	#4-40	grams
2.54	7.62	UNC-2B	120

Electrical Specifications at 25°C

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Units
Operating Frequency		0.3		8	GHz
Nominal Coupling	0.3 - 8	—	20±1.0	—	dB
Coupling Flatness	0.3 - 8	—	±0.6	±1.0	dB
Mainline Loss[1,2]	0.3 - 6 6 - 8	— —	0.5 0.7	0.8 1.1	dB
Directivity[3]	0.3 - 6 6 - 8	19 17	24 22	— —	dB
Return Loss (All ports)	0.3 - 6 6 - 8	19 17	22 20	— —	dB
Input Power[4]	0.3 - 8	—	—	20	W

1. Does not include theoretical coupling loss.
2. Mainline loss max. degrades to 1.5 dB at 85°C
3. Directivity min. degrades to 16 dB a 85°C from 0.3 - 8 GHz.
4. Peak power max. 3kw (1µ, 2% duty)

Electrical Schematic



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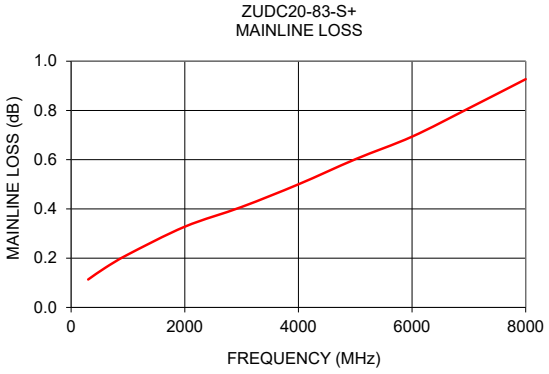
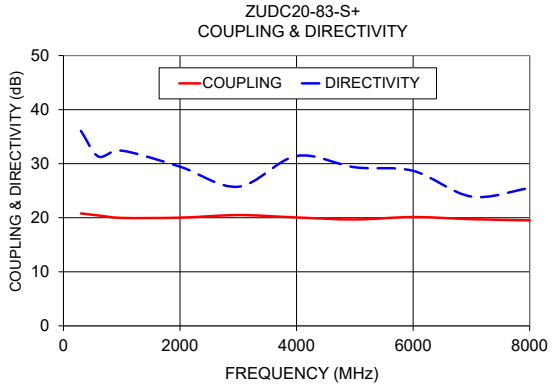
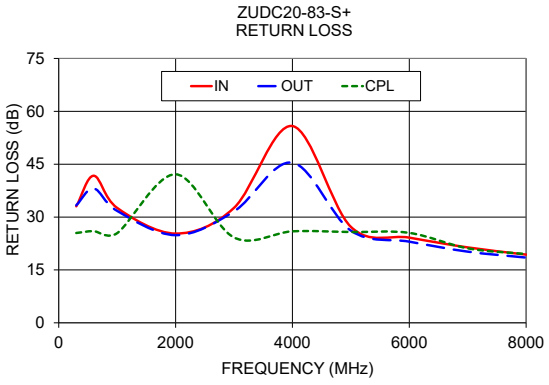
Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB) In	Return Loss (dB) Out	Return Loss (dB) Cpl
300	0.11	20.80	36.06	33.05	33.35	25.48
600	0.16	20.42	31.33	41.71	38.11	26.01
1000	0.21	19.98	32.41	32.60	31.75	25.44
2000	0.33	20.02	29.45	25.32	24.87	42.14
3000	0.41	20.50	25.74	32.61	31.60	24.21
4000	0.50	20.06	31.43	55.82	45.44	25.96
5000	0.60	19.69	29.34	27.23	26.16	25.76
6000	0.69	20.14	28.68	24.17	23.02	25.51
7000	0.81	19.74	23.93	21.39	20.19	21.13
8000	0.93	19.52	25.49	19.35	18.50	19.50

1. Does not include theoretical coupling loss. Mainline loss= insertion loss - theoretical loss (0.044 dB).







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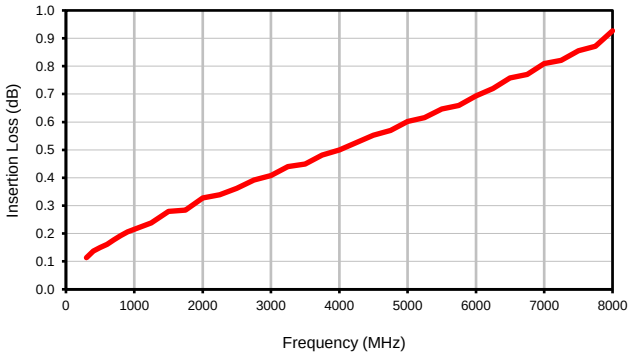
Directional Coupler ZUDC20-83-S+

Typical Performance Data

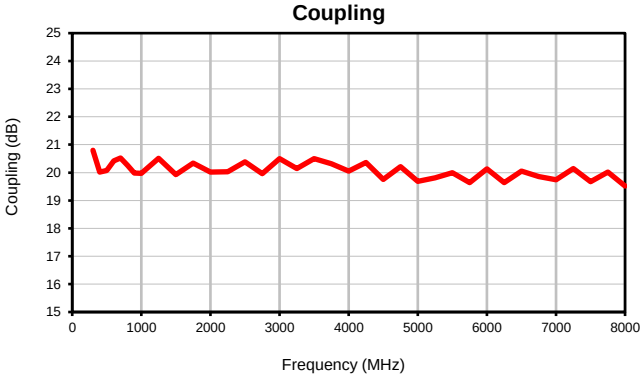
FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB)		
				IN	OUT	CPL
300	0.11	20.80	36.06	33.05	33.35	25.48
400	0.14	20.02	32.97	34.93	34.23	24.15
500	0.15	20.08	31.84	40.61	37.38	24.14
600	0.16	20.42	31.33	41.71	38.11	26.01
700	0.18	20.53	32.42	33.77	33.10	31.28
800	0.19	20.26	35.19	30.23	30.09	40.74
900	0.21	19.98	35.18	29.81	29.54	29.47
1000	0.21	19.98	32.41	32.60	31.75	25.44
1250	0.24	20.52	27.87	31.47	31.42	26.94
1500	0.28	19.92	32.51	25.37	25.22	34.11
1750	0.28	20.34	29.18	39.84	43.36	27.01
2000	0.33	20.02	29.45	25.32	24.87	42.14
2250	0.34	20.03	32.10	30.14	29.24	29.48
2500	0.36	20.39	24.71	28.39	28.08	29.19
2750	0.39	19.96	32.97	27.71	27.31	42.81
3000	0.41	20.50	25.74	32.61	31.60	24.21
3250	0.44	20.15	25.78	27.30	26.36	28.30
3500	0.45	20.50	29.67	47.08	43.97	23.85
3750	0.48	20.31	24.10	30.30	28.45	20.96
4000	0.50	20.06	31.43	55.82	45.44	25.96
4250	0.53	20.37	23.00	29.22	27.71	19.90
4500	0.55	19.76	27.84	31.29	29.83	24.12
4750	0.57	20.22	26.78	30.43	28.67	19.91
5000	0.60	19.69	29.34	27.23	26.16	25.76
5250	0.62	19.81	37.20	30.53	28.83	20.37
5500	0.65	20.00	38.42	24.99	23.95	23.67
5750	0.66	19.64	28.15	32.46	29.86	23.60
6000	0.69	20.14	28.68	24.17	23.02	25.51
6250	0.72	19.64	25.89	25.44	23.84	26.98
6500	0.76	20.05	25.69	21.66	20.65	23.61
6750	0.77	19.86	24.50	23.60	21.98	33.00
7000	0.81	19.74	23.93	21.39	20.19	21.13
7250	0.82	20.14	23.87	22.23	20.86	29.80
7500	0.86	19.67	24.68	21.72	20.34	19.14
7750	0.87	20.02	22.31	22.17	20.46	23.32
8000	0.93	19.52	25.49	19.35	18.50	19.50

Typical Performance Curves

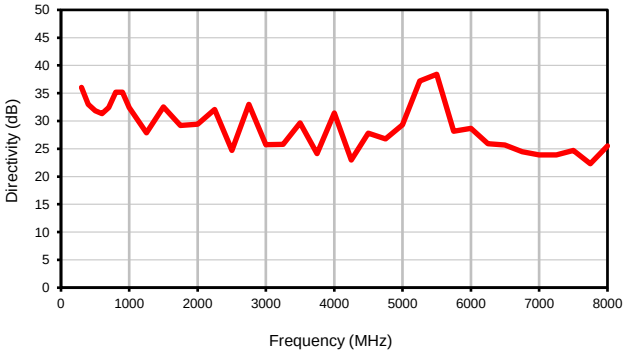
Insertion Loss



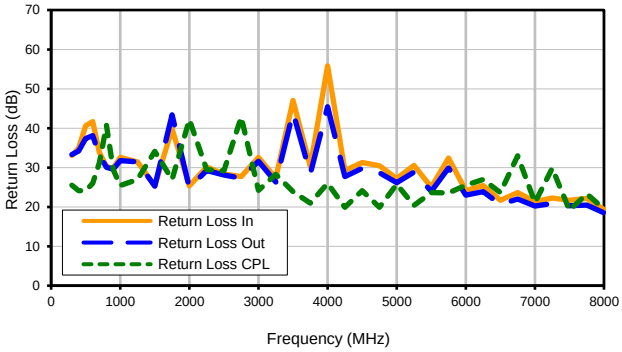
Coupling



Directivity

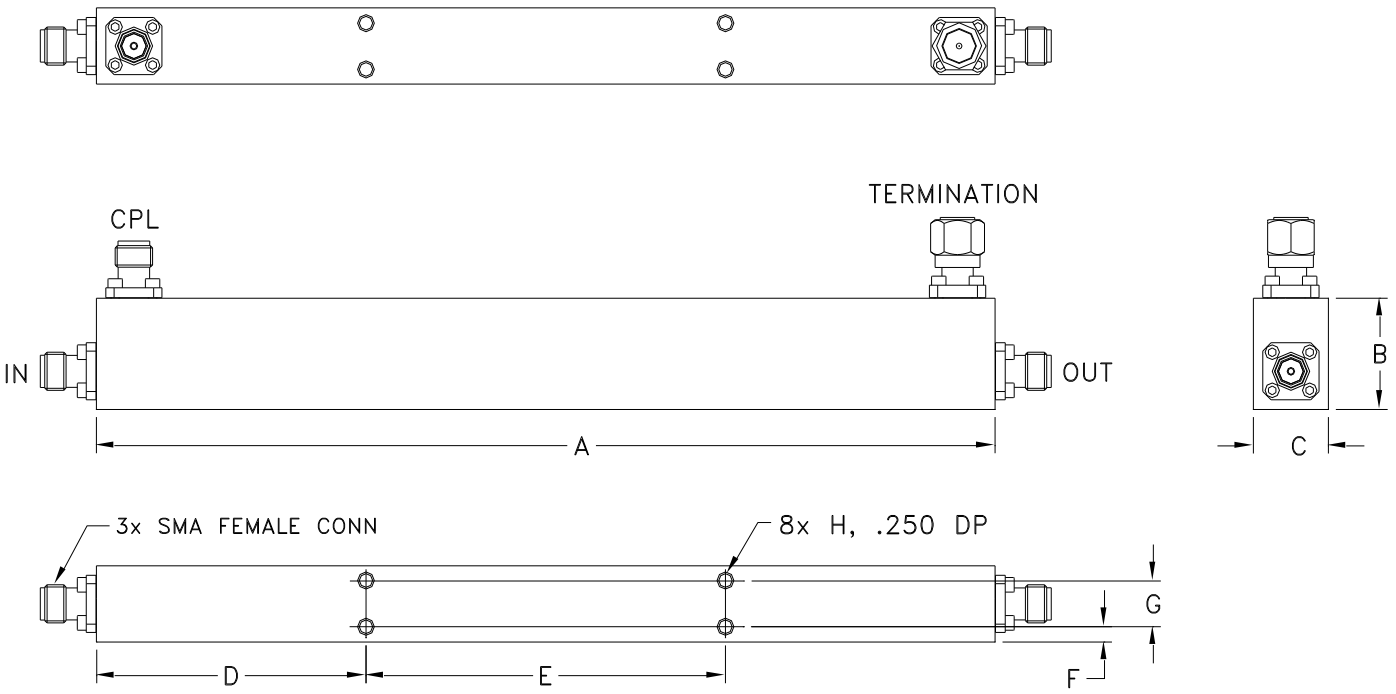


Return Loss



Case Style HT

Outline Dimensions HT1967-1



CASE #	A	B	C	D	E	F	G	H	J	K
HT1967-1	6.00 (152.40)	.73 (18.54)	.50 (12.70)	1.80 (45.72)	2.400 (60.96)	.10 (2.54)	.300 (7.62)	#4-40 UNC-2B	-- --	-- --

CASE #	L	M	WT. GRAM
HT1967-1	-- --	-- --	120.0

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

Notes:

1. Case material: Aluminum alloy.
2. Case finish: Painting. Color: Blue, Pantone 286.

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Mini-Circuits

Environmental Specifications ENV03T3

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 85° C Ambient Environment	Individual Model Data Sheet
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 20-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-883, Method 2007.3, Condition A
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215

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