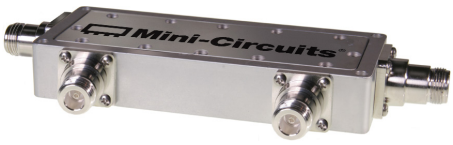
NON-CATALOG

20dB DC Pass High Power Bi-Directional Coupler ZGBDC20-33HP+

50Ω Up to 250W 300 to 3000 MHz

The Big Deal

- High Power Handling: 250W
- Low Insertion Loss: 0.15 dB*
- Rugged IP67 Weatherproof case



CASE STYLE: HT1761

Product Overview

Mini-Circuits ZGBDC20-33HP+ broadband high power bi-directional coupler offers excellent performance across a wide range of popular frequency bands. Built using low loss suspended substrate construction, the ZGBDC20-33HP+ can pass up to 3A of DC current from input to output and handle up to 250W CW. Rugged sealed construction makes this coupler ideal for use in field applications or remote monitoring sites; however, it is also ideal for high power lab testing.

Key Features

Feature	Advantages
Excellent Insertion Loss , 0.15 dB Typ*	With extremely low insertion loss, this coupler is ideal for critical high power applications.
Ultra High Return Loss, 28 dB Typ	Outstanding Return loss makes this coupler ideal for sensitive power measurement and other signal distribution applications.
High Power Handling, 250W	Up to 250W CW power handling, combined with low insertion loss and excellent VSWR support operation in high power applications such as transmitters, base stations and high power device characterization.
Wide bandwidth	300-3000 MHz coverage includes many popular cellular, WiMAX, LTE, ISM, satellite, P2P, aviation, maritime, defense,and radar bands
Excellent Directivity and Coupling Flatness	Typical 23 dB directivity and ±0.2 dB of Coupling flatness provides accurate signal sampling of forward or reflected power.
Passes DC Current, 3A	Capable of passing 3A current, input to output; this coupler is suited for application using remote antenna control or other remote motorized requirements.
IP67 Weatherproof Case	With an Ingress Protection rating of IP67, the ZGBDC20-33HP+ is designed to operate in harsh outdoor applications.

*Does not include coupling loss

Notes
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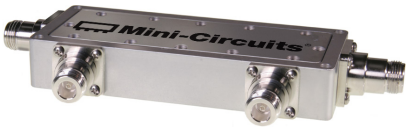


CASE STYLE: HT1761

Connectors	Model
N-Type	ZGBDC20-33HP+

+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

Permanent damage may occur if any of these limits are exceeded

Features

- wide frequency range, 300-3000 MHz
- good coupling flatness, ±0.2 dB typ. full band
- high directivity, 25 dB typ.
- good VSWR, 1.10:1 typ.
- high power, up to 250W
- DC current pass through input to output
- IP67 weather proof case

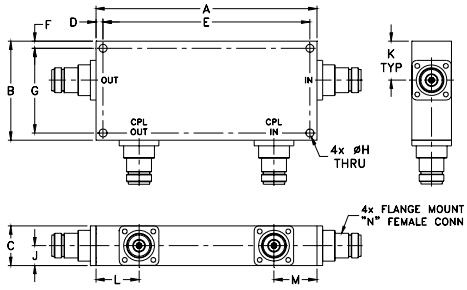
Coaxial Connections

INPUT	IN
OUTPUT	OUT
COUPLED IN	CPL IN
COUPLED OUT	CPL OUT

Applications

- cellular
- PCN
- lab use
- GSM
- WiMAX
- ISM

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
5.58	2.50	1.00	.18	5.215	.18	2.140
141.73	63.50	25.40	4.57	132.46	4.57	54.36

H	J	K	L	M	wt
.200	.50	.99	1.09	1.09	grams
5.08	12.70	25.15	27.69	27.69	700.0

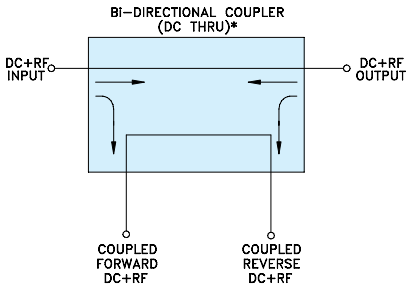
IP protection classification: IP67

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Operating Frequency		**300**		**3000**	MHz
Coupling	300-700	—	22.9±2.7	—	dB
	700-2700	—	20.4±0.6	—	
	2700-3000	—	20.2±0.4	—	
Coupling Flatness	300-700	—	—	±3.0	dB
	700-2700	—	—	±0.75	
	2700-3000	—	—	±0.5	
Mainline Loss[1]	300-700	—	0.08	0.2	dB
	700-2700	—	0.15	0.3	
	2700-3000	—	0.2	0.35	
Directivity	300-700	20	28	—	dB
	700-2700	14	23	—	
	2000-3000	14	21	—	
Return Loss	300-700	—	32.2	—	dB
	700-2700	—	30.7	—	
	2700-3000	—	23.6	—	
Input Power [2]	300-700	—	—	250	W
	700-2700	—	—	250	
	2700-3000	—	—	160	

1. Does not include coupling loss.
2. At 25°C with no DC current. Derate linearly to 100W (380-2700 MHz) and to 64W (2700-3600 MHz) from 25°C to 100°C. Output load VSWR 2.0:1 max.

Electrical Schematic



* ELECTRICAL SCHEMATIC IS FOR BI-DIRECTIONAL COUPLER WITHOUT INTERNAL TRANSFORMERS AND RESISTORS.

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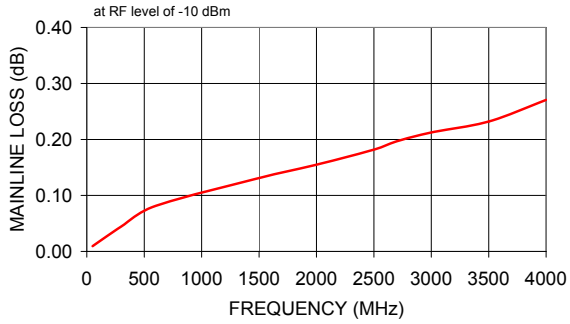
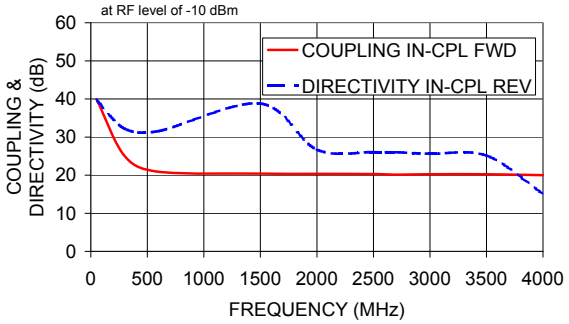
Typical Performance Data

Frequency (MHz)	Mainline Loss (dB)	Coupling (dB)		Directivity (dB)		Return Loss (dB)			
	In-Out	In-Cpl Fwd	Out-Cpl Rev	Out-Cpl Fwd	In-Cpl Rev	In	Out	Cpl Fwd	Cpl Rev
50.00	0.01	39.91	39.93	38.30	39.71	42.00	41.93	41.19	41.44
300.00	0.04	25.02	25.04	28.93	32.19	33.92	34.01	32.25	32.61
600.00	0.08	20.91	20.93	27.13	31.58	33.63	34.97	37.80	35.06
1500.00	0.13	20.41	20.52	27.67	38.81	32.27	32.89	32.08	31.10
2000.00	0.15	20.35	20.52	21.92	26.70	34.81	34.23	28.28	28.10
2500.00	0.18	20.29	20.50	23.00	26.06	36.63	38.11	33.64	31.90
2700.00	0.20	20.14	20.37	20.92	26.03	33.61	32.67	26.62	25.43
3000.00	0.21	20.23	20.50	21.01	25.61	36.48	39.39	25.19	24.94
3500.00	0.23	20.25	20.50	21.90	25.13	30.51	30.83	51.04	44.79
4000.00	0.27	20.01	20.38	13.22	15.11	23.85	24.19	20.91	20.73

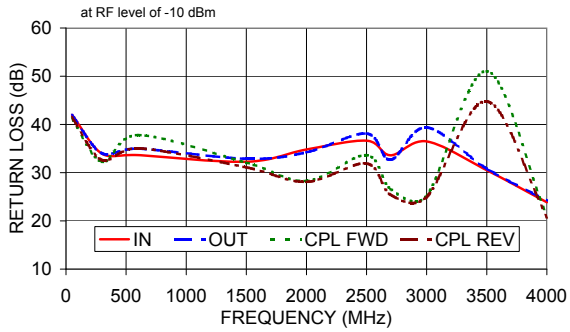
ZGBDC20-33HP+
MAINLINE LOSS



ZGBDC20-33HP+
COUPLING & DIRECTIVITY



ZGBDC20-33HP+
RETURN LOSS



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DC PASS

Bi-Directional Coupler ZGBDC20-33HP+

Typical Performance Data

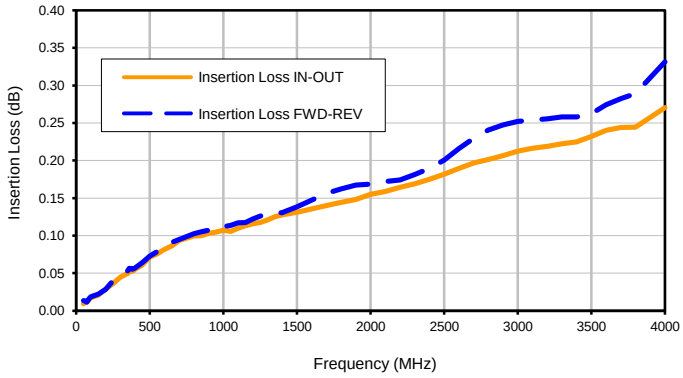
FREQ. (MHz)	INSERTION LOSS [1] (dB)		COUPLING (dB)		DIRECTIVITY (dB)		RETURN LOSS (dB)			
	IN-OUT	FWD-REV	IN-FWD	OUT-REV	IN-REV	OUT-FWD	IN	OUT	FWD	REV
50.0	0.01	0.01	39.91	39.93	39.71	38.30	42.00	41.93	41.19	41.44
60.0	0.01	0.01	38.35	38.36	40.54	37.62	40.55	40.35	39.75	40.00
70.0	0.01	0.01	37.03	37.04	38.98	37.45	39.32	39.02	38.62	38.79
80.0	0.01	0.01	35.88	35.89	38.64	36.64	38.33	37.99	37.64	37.78
90.0	0.02	0.02	34.85	34.88	38.12	36.41	37.51	37.11	36.78	36.93
100.0	0.02	0.02	33.96	33.98	37.99	35.73	36.77	36.40	36.02	36.19
150.0	0.02	0.02	30.53	30.56	35.67	32.85	34.37	34.00	33.60	33.71
200.0	0.03	0.03	28.17	28.18	34.19	31.28	33.43	33.11	32.63	32.87
250.0	0.04	0.04	26.39	26.42	33.32	29.89	33.44	33.29	32.09	32.47
300.0	0.04	0.05	25.02	25.04	32.19	28.93	33.92	34.01	32.25	32.61
350.0	0.05	0.05	23.91	23.93	31.59	28.28	35.75	36.10	33.44	33.74
360.0	0.05	0.06	23.71	23.74	31.48	28.15	36.25	36.66	33.67	33.99
370.0	0.05	0.06	23.53	23.56	31.37	28.09	36.76	37.25	33.94	34.27
380.0	0.05	0.06	23.35	23.38	31.32	27.93	37.29	37.86	34.23	34.53
390.0	0.05	0.06	23.18	23.21	31.20	27.83	37.86	38.52	34.59	34.84
400.0	0.06	0.06	23.01	23.04	31.09	27.75	38.56	39.25	34.99	35.19
450.0	0.06	0.06	22.30	22.32	30.81	27.33	42.47	46.04	37.66	37.23
500.0	0.07	0.07	21.72	21.75	30.79	27.14	41.21	45.50	40.04	38.42
550.0	0.08	0.08	21.26	21.29	30.94	27.03	36.93	39.15	40.11	37.19
600.0	0.08	0.08	20.91	20.93	31.58	27.13	33.63	34.97	37.80	35.06
650.0	0.09	0.09	20.64	20.67	32.26	27.41	31.71	32.81	35.39	33.09
700.0	0.09	0.09	20.45	20.48	33.35	27.70	30.40	31.29	33.99	32.03
800.0	0.10	0.10	20.24	20.29	36.08	28.64	30.07	30.78	33.49	31.57
850.0	0.10	0.11	20.22	20.27	37.24	29.09	30.94	31.58	34.42	32.19
900.0	0.10	0.11	20.23	20.28	36.83	29.18	32.33	32.96	35.48	33.19
950.0	0.10	0.11	20.26	20.33	35.24	28.98	35.04	35.81	36.79	34.88
1000.0	0.11	0.11	20.32	20.40	33.57	28.45	38.62	39.76	36.87	35.68
1050.0	0.11	0.11	20.39	20.47	31.88	28.01	43.21	48.55	35.61	35.74
1100.0	0.11	0.12	20.45	20.54	30.63	27.43	40.08	43.02	33.99	34.34
1150.0	0.11	0.12	20.50	20.59	29.76	26.86	35.53	37.29	32.39	32.87
1200.0	0.12	0.12	20.54	20.65	29.38	26.70	32.95	34.30	31.45	31.53
1250.0	0.12	0.13	20.56	20.67	29.35	26.54	31.22	32.48	30.82	30.77
1300.0	0.12	0.13	20.57	20.68	29.68	26.76	30.33	31.52	30.70	30.42
1350.0	0.12	0.13	20.55	20.65	30.60	26.94	29.97	31.02	31.02	30.45
1400.0	0.13	0.13	20.51	20.62	32.20	27.45	30.27	31.31	31.51	30.64
1500.0	0.13	0.14	20.41	20.52	38.81	27.67	32.27	32.89	32.08	31.10
1700.0	0.14	0.16	20.24	20.37	33.76	24.47	44.58	42.04	27.99	28.18
1800.0	0.14	0.16	20.22	20.37	29.34	22.91	43.37	43.47	26.90	27.04
1900.0	0.15	0.17	20.26	20.43	27.39	22.01	37.79	37.80	26.99	27.02
2000.0	0.15	0.17	20.35	20.52	26.70	21.92	34.81	34.23	28.28	28.10
2100.0	0.16	0.17	20.44	20.60	27.10	22.63	33.00	32.19	30.72	30.34
2200.0	0.16	0.17	20.49	20.65	27.89	24.06	32.57	31.99	34.72	33.95
2300.0	0.17	0.18	20.47	20.64	28.03	25.18	33.67	34.04	42.47	42.22
2400.0	0.18	0.19	20.40	20.58	27.14	24.54	35.87	38.31	43.86	40.95
2500.0	0.18	0.20	20.29	20.50	26.06	23.00	36.63	38.11	33.64	31.90
2600.0	0.19	0.22	20.20	20.42	25.66	21.68	34.58	34.13	29.14	27.63
2700.0	0.20	0.23	20.14	20.37	26.03	20.92	33.61	32.67	26.62	25.43
2800.0	0.20	0.24	20.13	20.37	26.82	20.75	34.99	34.09	25.45	24.46
2900.0	0.21	0.25	20.17	20.42	26.83	20.85	38.08	38.57	25.13	24.52
3000.0	0.21	0.25	20.23	20.50	25.61	21.01	36.48	39.39	25.19	24.94
3100.0	0.22	0.25	20.30	20.58	23.98	20.97	32.76	34.34	25.50	25.82
3200.0	0.22	0.26	20.34	20.62	23.20	21.05	31.57	32.75	26.28	27.01
3300.0	0.22	0.26	20.31	20.57	23.93	21.77	32.64	33.85	28.28	29.57
3400.0	0.22	0.26	20.39	20.64	24.13	21.19	32.85	33.77	33.43	36.07
3500.0	0.23	0.26	20.25	20.50	25.13	21.90	30.51	30.83	51.04	44.79
3600.0	0.24	0.27	20.10	20.34	22.96	20.37	28.70	28.87	34.86	32.31
3700.0	0.24	0.28	20.19	20.46	18.80	17.95	30.00	29.90	30.32	28.38
3800.0	0.24	0.29	19.98	20.32	16.83	15.68	37.26	35.14	28.15	26.48
4000.0	0.27	0.33	20.01	20.38	15.11	13.22	23.85	24.19	20.91	20.73

[1] Does not include coupling loss

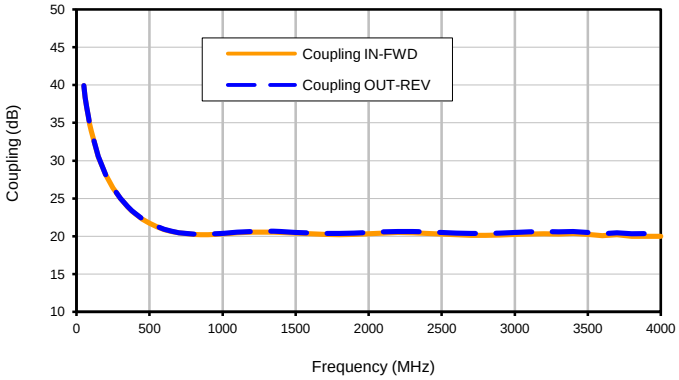
Bi-Directional Coupler ZGBDC20-33HP+

Typical Performance Curves

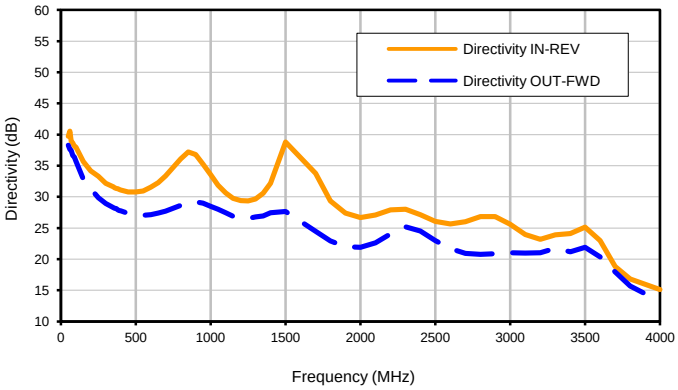
Insertion Loss



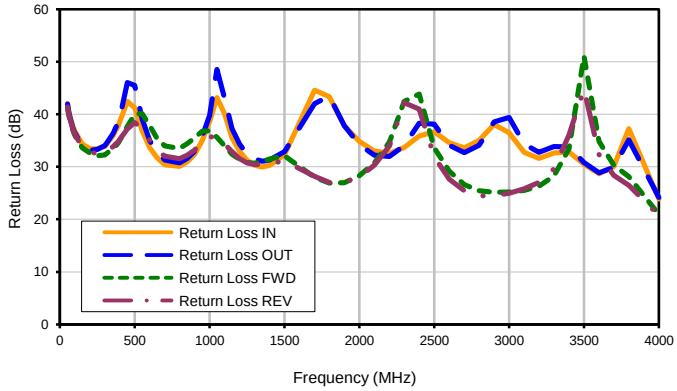
Coupling



Directivity

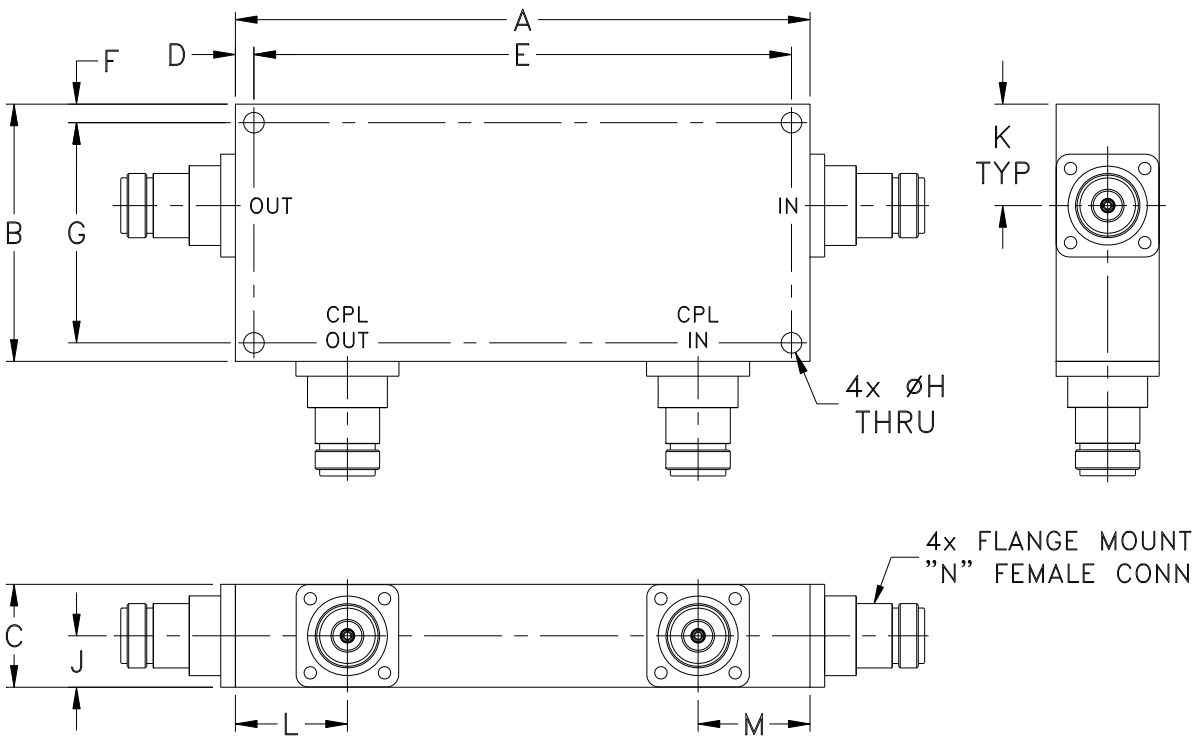


Return Loss



Case Style HT

Outline Dimensions HT1761



CASE #	A	B	C	D	E	F	G	H	J	K
HT1761	5.58 (141.73)	2.50 (63.50)	1.00 (25.40)	.18 (4.57)	5.215 (132.46)	.18 (4.57)	2.140 (54.36)	.200 (5.08)	.50 (12.70)	.99 (25.15)

CASE #	L	M	WT. GRAM
HT1761	1.09 (27.69)	1.09 (27.69)	700.0

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

Notes:

1. Case material: Aluminum alloy.
2. Case finish:
   For RoHS Case Styles: Clear Chemical conversion coating, non-chrome or trivalent chrome based.

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RF/IF MICROWAVE COMPONENTS

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Mini-Circuits

Environmental Specifications ENV49

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
Liquid Ingress	Immersion in 1 meter water, 1/2 hour	IP67, IEC60529
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°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

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