

Coaxial, High Directivity

# Directional Coupler

ZHDC-Model Series

50Ω 10 and 16 dB Coupling 50 to 6000 MHz

## The Big Deal

- High directivity, up to 33 dB
- Wideband, 50 to 6000 MHz
- Excellent coupling flatness



CASE STYLE: FM1918

## Product Overview

Mini-Circuits' ZHDC-series high-directivity directional couplers provide outstanding directivity and excellent coupling flatness from 50 to 6000 MHz, making them low cost solutions for S-parameter measurements and intermodulation measurements as well as other test and system applications. Available in different coupling values to meet different requirements, they come housed in an aluminum alloy case (2.5 x 1.4 x 0.88") with SMA connectors at all ports.

Feature	Advantages
High directivity, up to 33 dB	High directivity allows accurate signal sampling through the coupled port with minimal measurement error.
Wideband, 50 to 6000 MHz	One device supports a broad range of system and test lab applications.
Flat coupling, $\pm 0.45$ dB	Provides consistent coupling performance across frequency.
Good VSWR. 1.2:1 typ.	Well-matched for 50Ω systems.
Small size, 2.5 x 1.4 x 0.88"	Saves space in crowded spaces and dense system layouts.

### 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](http://www.minicircuits.com/MCLStore/terms.jsp)



# Coaxial High Directivity Directional Coupler

## ZHDC-16-63-S+

50Ω 16 dB Coupling 50 to 6000 MHz

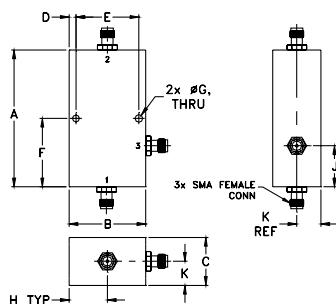
### Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C

### Coaxial Connections

INPUT	1
OUTPUT	2
COUPLED	3

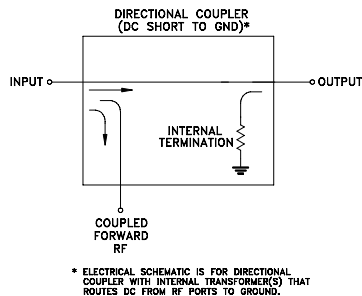
### Outline Drawing



### Outline Dimensions (inch/mm)

A	B	C	D	E	F
2.50	1.4	0.88	0.13	1.15	1.25
63.50	35.56	22.35	3.30	29.21	31.75
G	H	J	K		wt
0.14	0.7	0.75	0.44		grams
3.56	17.78	19.05	11.18		100.0

### Electrical Schematic



### Features

- wideband, 50 to 6000 MHz
- high directivity, 32 dB typ.
- flat coupling, ±0.45 dB typ.
- good VSWR, 1.20:1 typ.

### Applications

- military defense
- test and measurement
- laboratory use



Generic photo used for illustration purposes only  
CASE STYLE: FM1918

Connectors	Model
SMA	ZHDC-16-63-S+

### +RoHS Compliant

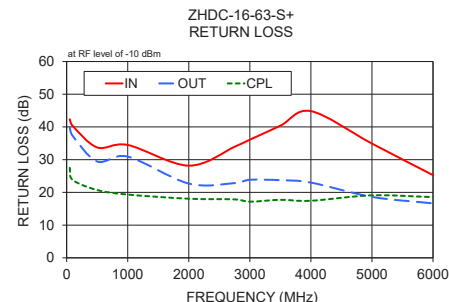
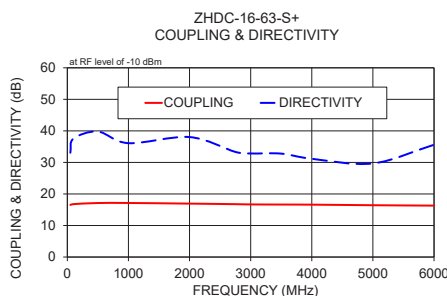
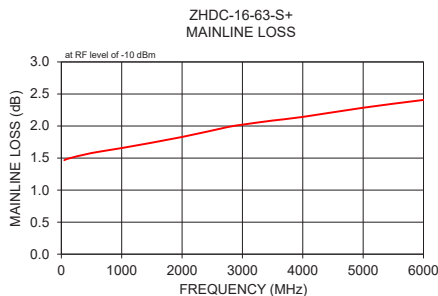
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

### Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		50	—	6000	MHz
Mainline Loss	50 - 6000	—	2.0	3.0	dB
Coupling	50 - 6000	15.5	16.7	17.5	dB
Coupling Flatness(±)	50 - 6000	—	0.45	0.9	dB
Directivity	50-3000 3000-6000	26 24	32 30	—	dB
Return Loss (Input)	50 - 3000 3000-6000	—	24 22	—	dB
Return Loss (Output)	50 - 3000 3000-6000	—	21 18	—	dB
Return Loss (Coupling)	50 - 3000 3000-6000	—	18 17	—	dB
Input Power	50 - 6000	—	—	0.5	W

### Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB)		
				In	Out	Cpl
50	1.47	16.54	33.07	42.34	39.93	27.52
100	1.49	16.78	37.54	40.29	37.22	23.79
500	1.58	17.13	39.79	33.74	29.44	20.72
1000	1.66	17.14	36.11	34.49	30.93	19.34
2000	1.83	16.94	38.05	28.16	22.70	18.07
2750	1.98	16.77	33.34	33.94	22.85	17.86
3000	2.02	16.69	32.84	36.11	23.85	17.17
3500	2.09	16.65	32.79	40.38	23.72	17.73
4000	2.14	16.61	31.16	44.83	22.99	17.44
5000	2.29	16.43	29.68	34.91	18.62	19.10
6000	2.41	16.31	35.60	25.26	16.64	18.56



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# Directional Coupler

# ZHDC-16-63+

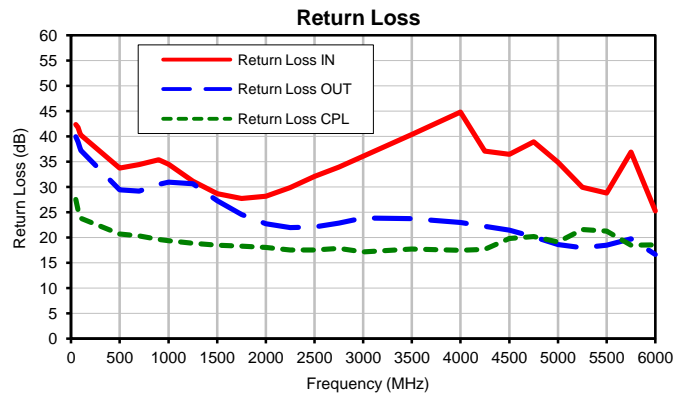
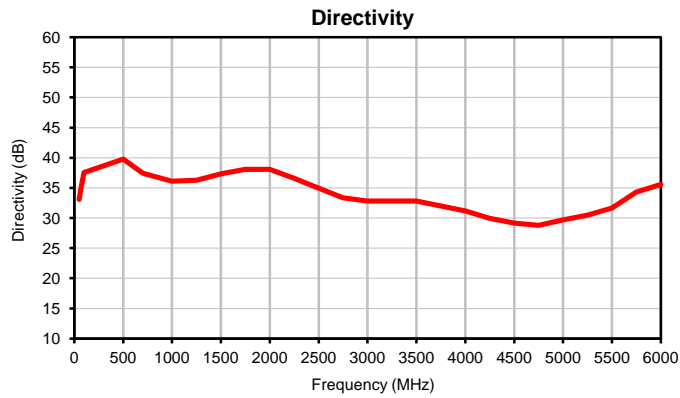
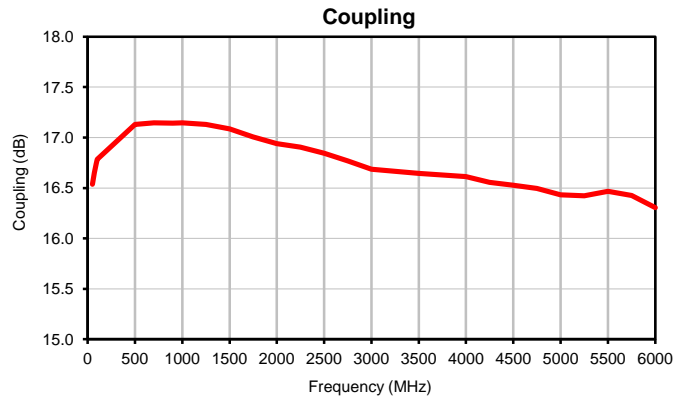
## Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB)		
				IN	OUT	CPL
50.0	1.47	16.54	33.07	42.34	39.93	27.52
70.0	1.48	16.65	34.97	41.79	38.92	25.43
90.0	1.48	16.74	36.61	40.66	37.73	24.22
100.0	1.49	16.78	37.54	40.29	37.22	23.79
500.0	1.58	17.13	39.79	33.74	29.44	20.72
700.0	1.61	17.15	37.46	34.45	29.17	20.32
900.0	1.64	17.14	36.52	35.40	30.49	19.60
1000.0	1.66	17.14	36.11	34.49	30.93	19.34
1250.0	1.69	17.13	36.29	31.12	30.63	18.86
1500.0	1.74	17.09	37.33	28.65	27.31	18.47
1750.0	1.78	17.01	38.10	27.70	24.53	18.26
2000.0	1.83	16.94	38.05	28.16	22.70	18.07
2250.0	1.88	16.91	36.60	29.91	21.96	17.52
2500.0	1.94	16.85	34.92	32.07	22.07	17.51
2750.0	1.98	16.77	33.34	33.94	22.85	17.86
3000.0	2.02	16.69	32.84	36.11	23.85	17.17
3500.0	2.09	16.65	32.79	40.38	23.72	17.73
4000.0	2.14	16.61	31.16	44.83	22.99	17.44
4250.0	2.17	16.56	29.97	37.11	22.20	17.65
4500.0	2.21	16.53	29.15	36.48	21.49	19.84
4750.0	2.27	16.50	28.78	38.91	20.16	20.20
5000.0	2.29	16.43	29.68	34.91	18.62	19.10
5250.0	2.31	16.42	30.46	29.96	17.98	21.57
5500.0	2.31	16.47	31.67	28.80	18.51	21.26
5750.0	2.32	16.43	34.31	36.92	19.72	18.47
6000.0	2.41	16.31	35.60	25.26	16.64	18.56

# Directional Coupler

# ZHDC-16-63+

## Typical Performance Curves



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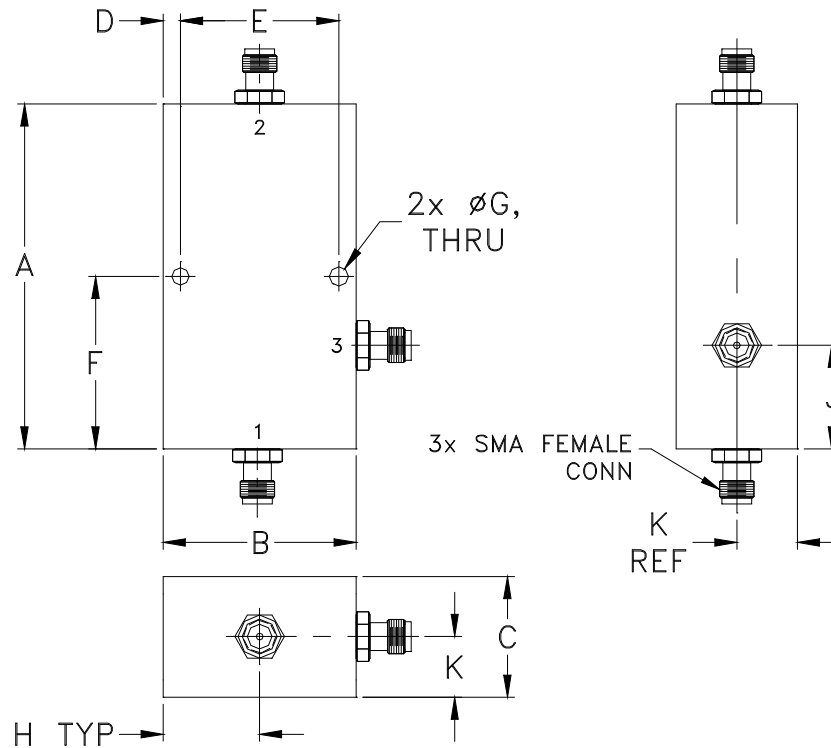


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IF/RF MICROWAVE COMPONENTS

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ZHDC-16-63+  
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### Outline Dimensions



CASE #.	A	B	C	D	E	F	G	H	J	K	WT, GRAM
FM1918	2.50 (63.50)	1.40 (35.56)	.88 (22.35)	.13 (3.30)	1.150 (29.21)	1.25 (31.75)	.125 (3.175)	.70 (17.78)	.75 (19.05)	.44 (11.18)	100

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

#### Notes:

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



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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	-40° to 85°C	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D
Humidity	90% RH, 65°C Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103
Thermal Shock	-65° to 125°C, 5 cycles	MIL-STD-202, Method 107, Condition B
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