

# Coaxial Directional Coupler

50Ω

1 to 500 MHz

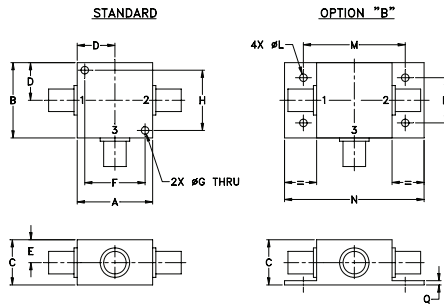
## Maximum Ratings

|                       |                |
|-----------------------|----------------|
| Operating Temperature | -55°C to 100°C |
| Storage Temperature   | -55°C to 100°C |

## Coaxial Connections

|         |   |
|---------|---|
| INPUT   | 1 |
| OUTPUT  | 2 |
| COUPLED | 3 |

## Outline Drawing



## Outline Dimensions (inch)

| A     | B     | C     | D     | E     | F     | G    | H     |
|-------|-------|-------|-------|-------|-------|------|-------|
| 1.25  | 1.25  | .75   | .63   | .38   | 1.00  | .125 | 1.000 |
| 31.75 | 31.75 | 19.05 | 16.00 | 9.65  | 25.40 | 3.18 | 25.40 |
| J     | K     | L     | M     | N     | P     | Q    | wt    |
| --    | --    | .125  | 1.688 | 2.18  | .75   | .07  | grams |
| --    | --    | 3.18  | 42.88 | 55.37 | 19.05 | 1.78 | 70.0  |

## Features

- excellent directivity, 33 dB typ.
- excellent mainline loss, 0.8 dB typ.
- rugged shielded case

## Applications

- VHF/UHF
- instrumentation
- communication receivers & transmitters
- amateur radio

ZFDC-10-1+



Generic photo used for illustration purposes only

CASE STYLE: K18

| Connectors           | Model        |
|----------------------|--------------|
| BNC                  | ZFDC-10-1+   |
| SMA                  | ZFDC-10-1-S+ |
| N-TYPE               | ZFDC-10-1-N+ |
| BRACKET (OPTION "B") |              |

+RoHS Compliant

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

## Electrical Specifications

| FREQ.<br>RANGE<br>(MHz) | COUPLING<br>(dB)               |      | MAINLINE LOSS <sup>1</sup><br>(dB) |      |      |      |      |      | DIRECTIVITY<br>(dB) |      |      |      |      |      | VSWR<br>(:1) | POWER<br>INPUT<br>(W) |      |
|-------------------------|--------------------------------|------|------------------------------------|------|------|------|------|------|---------------------|------|------|------|------|------|--------------|-----------------------|------|
|                         |                                |      | L                                  |      | M    |      | U    |      | L                   |      | M    |      | U    |      |              |                       |      |
|                         | f <sub>L</sub> -f <sub>U</sub> | Nom. | Flatness                           | Typ. | Max. | Typ. | Max. | Typ. | Max.                | Typ. | Min. | Typ. | Min. | Typ. | Min.         | Typ.                  | Max. |
| 1-500                   | 10.5±0.25                      | ±0.6 | 1.0                                | 1.3  | 0.8  | 1.1  | 1.0  | 1.3  | 32                  | 25   | 33   | 25   | 22   | 15   | 1.2          | 1.5                   | 3.0  |

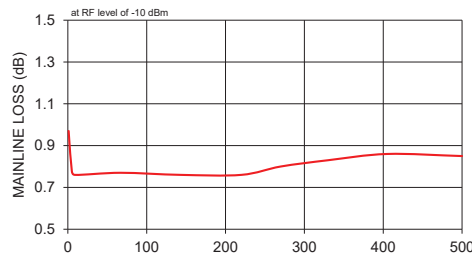
L = low range [ $f_L$  to  $10 f_L$ ] M = mid range [ $10 f_L$  to  $f_U/2$ ] U = upper range [ $f_U/2$  to  $f_U$ ]

1. Mainline loss includes theoretical power loss at coupled port.

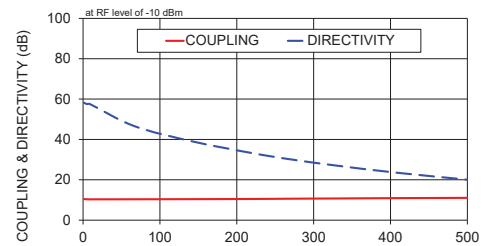
## Typical Performance Data

| Frequency (MHz) | Mainline Loss (dB) In-Out | Coupling (dB) In-Cpl | Directivity (dB) | Return Loss (dB) |       |       |
|-----------------|---------------------------|----------------------|------------------|------------------|-------|-------|
|                 |                           |                      |                  | In               | Out   | Cpl   |
| 1.00            | 0.97                      | 10.47                | 58.25            | 25.76            | 18.55 | 19.10 |
| 5.00            | 0.78                      | 10.32                | 57.52            | 32.88            | 20.94 | 21.28 |
| 9.00            | 0.76                      | 10.31                | 57.51            | 33.62            | 21.25 | 21.54 |
| 67.00           | 0.77                      | 10.34                | 46.55            | 30.69            | 21.30 | 21.61 |
| 143.00          | 0.76                      | 10.40                | 38.96            | 26.28            | 20.66 | 21.32 |
| 220.00          | 0.76                      | 10.49                | 33.22            | 23.55            | 19.85 | 20.86 |
| 270.00          | 0.80                      | 10.62                | 30.12            | 22.35            | 19.32 | 20.45 |
| 330.00          | 0.83                      | 10.74                | 27.02            | 21.34            | 18.68 | 19.89 |
| 405.00          | 0.86                      | 10.90                | 23.63            | 20.56            | 18.03 | 19.15 |
| 500.00          | 0.85                      | 11.04                | 20.05            | 20.16            | 17.44 | 18.20 |

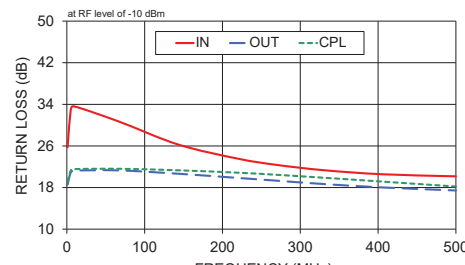
ZFDC-10-1-S+  
MAINLINE LOSS



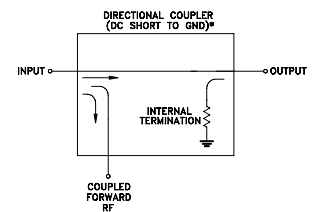
ZFDC-10-1-S+  
COUPLING & DIRECTIVITY



ZFDC-10-1-S+  
RETURN LOSS



## Electrical Schematic



\* ELECTRICAL SCHEMATIC IS FOR DIRECTIONAL COUPLER WITH INTERNAL TRANSFORMERS THAT ROUTES DC FROM RF PORTS TO GROUND.

## Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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REV. E  
M151107  
ZFDC-10-1  
WZ/TD/CP/AM  
200811

# Directional Coupler

## ZFDC-10-1+

### Typical Performance Data

| FREQUENCY<br>(MHz) | INSERTION<br>LOSS<br>(dB) | COUPLING<br>(dB) | DIRECTIVITY<br>(dB) | RETURN LOSS |       |       |
|--------------------|---------------------------|------------------|---------------------|-------------|-------|-------|
|                    |                           |                  |                     | IN          | OUT   | CPL   |
| 1.0                | 0.97                      | 10.47            | 58.25               | 25.76       | 18.55 | 19.10 |
| 2.0                | 0.85                      | 10.38            | 58.49               | 29.42       | 19.89 | 20.37 |
| 3.0                | 0.81                      | 10.35            | 58.56               | 31.31       | 20.46 | 20.86 |
| 4.0                | 0.79                      | 10.33            | 58.41               | 32.31       | 20.75 | 21.12 |
| 5.0                | 0.78                      | 10.32            | 57.52               | 32.88       | 20.94 | 21.28 |
| 6.0                | 0.78                      | 10.32            | 58.53               | 33.23       | 21.05 | 21.38 |
| 7.0                | 0.77                      | 10.31            | 58.33               | 33.41       | 21.13 | 21.44 |
| 8.0                | 0.76                      | 10.31            | 56.96               | 33.53       | 21.19 | 21.49 |
| 9.0                | 0.76                      | 10.31            | 57.51               | 33.62       | 21.25 | 21.54 |
| 10.0               | 0.76                      | 10.31            | 56.53               | 33.67       | 21.27 | 21.56 |
| 29.0               | 0.76                      | 10.31            | 52.81               | 33.14       | 21.43 | 21.67 |
| 48.0               | 0.76                      | 10.33            | 49.84               | 32.05       | 21.37 | 21.63 |
| 67.0               | 0.77                      | 10.34            | 46.55               | 30.69       | 21.30 | 21.61 |
| 86.0               | 0.76                      | 10.34            | 44.39               | 29.38       | 21.21 | 21.59 |
| 105.0              | 0.77                      | 10.37            | 42.35               | 28.17       | 21.08 | 21.53 |
| 124.0              | 0.77                      | 10.40            | 40.51               | 27.15       | 20.86 | 21.41 |
| 143.0              | 0.76                      | 10.40            | 38.96               | 26.28       | 20.66 | 21.32 |
| 162.0              | 0.76                      | 10.42            | 37.31               | 25.51       | 20.47 | 21.21 |
| 181.0              | 0.78                      | 10.47            | 36.09               | 24.81       | 20.31 | 21.11 |
| 200.0              | 0.78                      | 10.50            | 34.55               | 24.17       | 20.10 | 21.00 |
| 210.0              | 0.77                      | 10.50            | 33.78               | 23.84       | 19.98 | 20.94 |
| 220.0              | 0.76                      | 10.49            | 33.22               | 23.55       | 19.85 | 20.86 |
| 230.0              | 0.76                      | 10.50            | 32.53               | 23.28       | 19.74 | 20.78 |
| 240.0              | 0.76                      | 10.53            | 31.96               | 23.02       | 19.63 | 20.70 |
| 250.0              | 0.79                      | 10.57            | 31.32               | 22.80       | 19.53 | 20.61 |
| 260.0              | 0.81                      | 10.61            | 30.81               | 22.56       | 19.42 | 20.52 |
| 270.0              | 0.80                      | 10.62            | 30.12               | 22.35       | 19.32 | 20.45 |
| 280.0              | 0.78                      | 10.62            | 29.55               | 22.16       | 19.20 | 20.36 |
| 290.0              | 0.77                      | 10.61            | 29.13               | 21.96       | 19.08 | 20.28 |
| 300.0              | 0.76                      | 10.61            | 28.53               | 21.80       | 18.96 | 20.19 |
| 315.0              | 0.79                      | 10.68            | 27.81               | 21.57       | 18.81 | 20.04 |
| 330.0              | 0.83                      | 10.74            | 27.02               | 21.34       | 18.68 | 19.89 |
| 345.0              | 0.80                      | 10.75            | 26.29               | 21.17       | 18.56 | 19.76 |
| 360.0              | 0.78                      | 10.73            | 25.59               | 20.98       | 18.40 | 19.61 |
| 375.0              | 0.80                      | 10.77            | 24.94               | 20.82       | 18.25 | 19.46 |
| 390.0              | 0.86                      | 10.86            | 24.28               | 20.68       | 18.13 | 19.31 |
| 405.0              | 0.86                      | 10.90            | 23.63               | 20.56       | 18.03 | 19.15 |
| 420.0              | 0.81                      | 10.88            | 22.99               | 20.47       | 17.93 | 19.00 |
| 435.0              | 0.82                      | 10.89            | 22.45               | 20.36       | 17.82 | 18.85 |
| 450.0              | 0.89                      | 10.98            | 21.87               | 20.30       | 17.69 | 18.71 |
| 500.0              | 0.85                      | 11.04            | 20.05               | 20.16       | 17.44 | 18.20 |

REV. X1  
ZFDC-10-1+  
060718  
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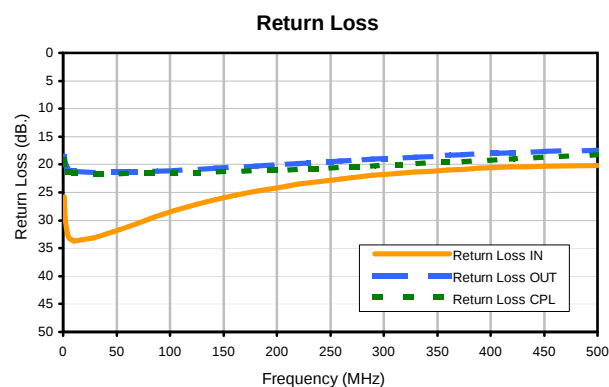
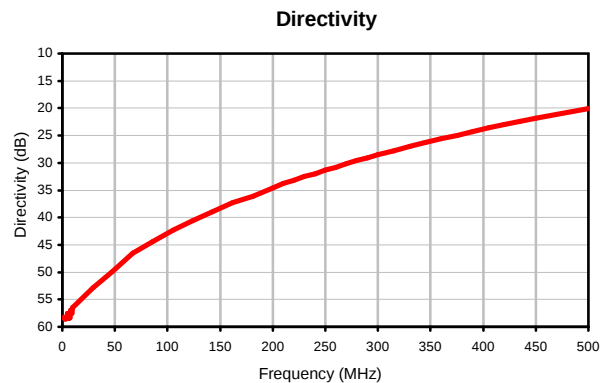
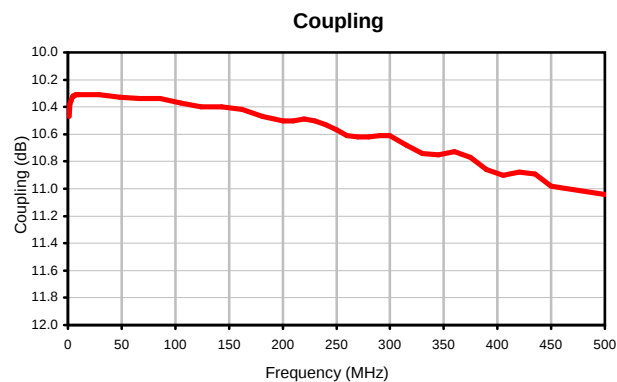
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# Directional Coupler

ZFDC-10-1+

## Typical Performance Curves



REV. X1  
ZFDC-10-1+  
060718  
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### Outline Dimensions



| CASE# | A               | B               | C              | D              | E             | F                | G              | H                | J  | K  | L              | M                | N               |
|-------|-----------------|-----------------|----------------|----------------|---------------|------------------|----------------|------------------|----|----|----------------|------------------|-----------------|
| K18   | 1.25<br>(31.75) | 1.25<br>(31.75) | .75<br>(19.05) | .63<br>(16.00) | .38<br>(9.65) | 1.000<br>(25.40) | .125<br>(3.18) | 1.000<br>(25.40) | -- | -- | .125<br>(3.18) | 1.688<br>(42.88) | 2.18<br>(55.37) |

| CASE# | P              | Q             | WT. GRAMS |
|-------|----------------|---------------|-----------|
| K18   | .75<br>(19.05) | .07<br>(1.78) | 70.0      |

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

#### Notes:

- Case material: Aluminum alloy.
- Case finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
- Mounting bracket available on request. Add suffix B to part number.
- For port marking 1, 2, and 3 see specifications data sheet.
- For bracket version, option B, dimension "C" changes from .75 to .94 inches when connectors are type N.
- Refer to the individual model data sheet for the type of connectors available.



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| Specification              | Test/Inspection Condition                                                              | Reference/Spec                       |
|----------------------------|----------------------------------------------------------------------------------------|--------------------------------------|
| Operating Temperature      | -55° to 100°C<br>Ambient Environment                                                   | Individual Model Data Sheet          |
| Storage Temperature        | -55° to 100° C<br>Ambient Environment                                                  | Individual Model Data Sheet          |
| Barometric Pressure        | 100,000 Feet                                                                           | MIL-STD-202, Method 105, Condition D |
| Humidity                   | 90% RH, 65°C<br>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 |