COAXIAL

# Bi-Directional Coupler ZFBDC20-61HP+

50Ω Up to 25W 1 to 60 MHz

## FEATURES

- Excellent mainline loss, 0.1 dB typ.
- Excellent directivity, 30 dB typ.
- Rugged shielded case

*Generic photo used for illustration purposes only*

CASE STYLE: JD1252

| Connectors | Model |
|---|---|
| BNC | ZFBDC20-61HP+ |
| SMA | ZFBDC20-61HP-S+ |
| N-TYPE | ZFBDC20-61HP-N+ |

**+RoHS Compliant**
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

## APPLICATIONS

- Military mobile
- Instrumentation
- Communication receivers & transmitters

## ELECTRICAL SPECIFICATIONS

| Parameter | Frequency (MHz) | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Frequency Range | | 1 | | 60 | MHz |
| Mainline Loss[1] | 1-60<br>10-60 | | 0.1<br>0.1 | 0.25<br>0.25 | dB |
| Coupling Nominal | 1-60<br>10-60 | | 20±0.6<br>20±0.3 | | dB |
| Coupling Flatness (±) | 1-60<br>10-60 | | ±0.3<br>±0.3 | | dB |
| Directivity | 1-60<br>10-60 | 20<br>20 | 30<br>30 | | dB |
| VSWR | 1-60<br>10-60 | | 1.07<br>1.07 | | :1 |
| Input Power[2] | 1-60<br>10-60 | | | 15<br>25 | W |

1. Mainline loss includes theoretical power loss at coupled port.
2. Power rating is specified up to +55°C. Power Input Specifications at +100°C is 50% value at +55°C. For specifications limits between +55°C and +100°C, derate linearly.

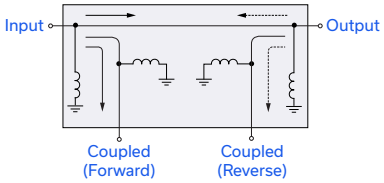
## MAXIMUM RATINGS

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

Permanent damage may occur if any of these limits are exceeded.

## ELECTRICAL SCHEMATIC

BI-DIRECTIONAL COUPLER*




*Electrical schematic is for Bi-Directional coupler with internal transformer(s) that routes DC from all ports to ground

REV. E
ECO-015496
ZFBDC20-61HP+
MCL NY
221019

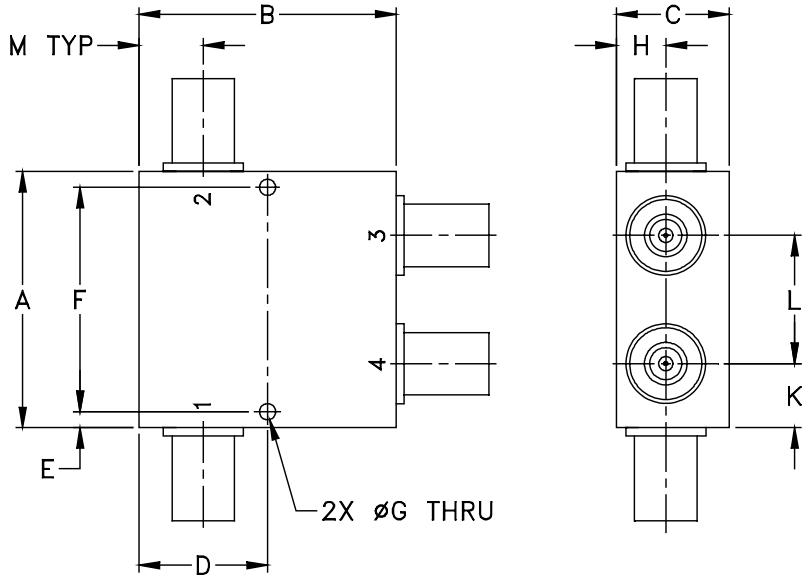
# Bi-Directional Coupler ZFBDC20-61HP+

50Ω Up to 25W 1 to 60 MHz

## COAXIAL CONNECTIONS

| | |
|---|---|
| Input | 1 |
| Output | 2 |
| Coupled (Forward) | 4 |
| Coupled (Reverse) | 3 |

## OUTLINE DRAWING




## OUTLINE DIMENSIONS (Inch / mm)

| A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|
| 2.00 | 2.00 | .88 | 1.000 | 0.13 | 1.750 | 0.125 |
| 50.80 | 50.80 | 22.35 | 25.40 | 3.30 | 44.45 | 3.18 |

| H | J | K | L | M | wt |
|---|---|---|---|---|---|
| 0.38 | -- | 0.50 | 1.00 | 0.50 | grams |
| 9.65 | -- | 12.70 | 25.40 | 12.70 | 250.0 |

COAXIAL

# Bi-Directional Coupler ZFBDC20-61HP+

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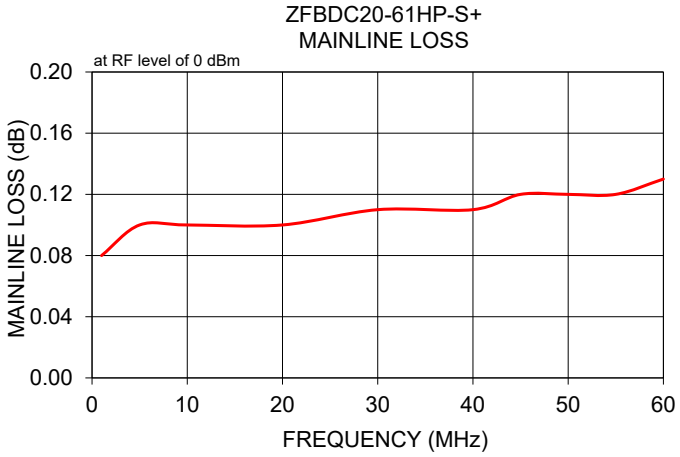
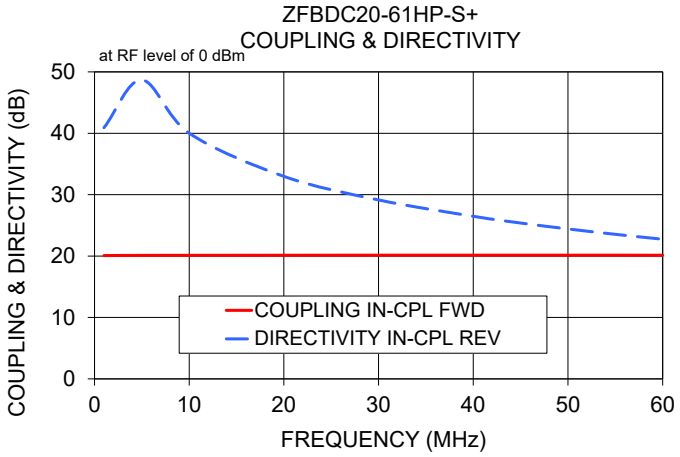
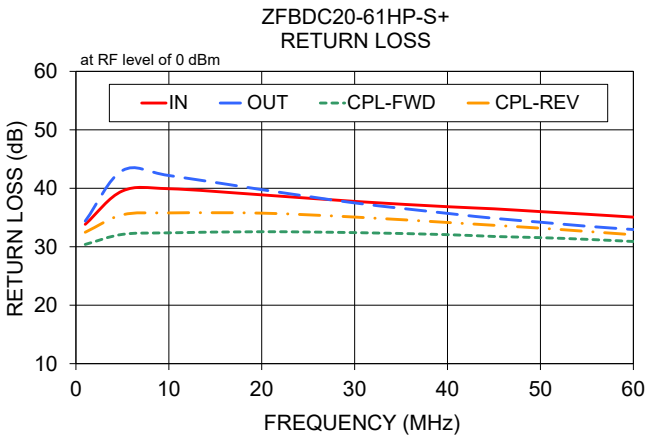
## TYPICAL PERFORMANCE DATA AND CHARTS

| 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 |
| 1.00 | 0.08 | 20.08 | 20.03 | 40.68 | 40.91 | 33.84 | 34.40 | 30.40 | 32.48 |
| 5.00 | 0.10 | 20.11 | 20.03 | 47.05 | 48.68 | 39.54 | 43.04 | 32.12 | 35.46 |
| 10.00 | 0.10 | 20.12 | 20.05 | 39.21 | 40.02 | 39.93 | 42.19 | 32.38 | 35.79 |
| 20.00 | 0.10 | 20.13 | 20.06 | 32.28 | 32.98 | 38.88 | 39.77 | 32.57 | 35.75 |
| 30.00 | 0.11 | 20.14 | 20.08 | 28.66 | 29.14 | 37.76 | 37.50 | 32.42 | 35.08 |
| 40.00 | 0.11 | 20.14 | 20.09 | 26.16 | 26.48 | 36.85 | 35.71 | 32.07 | 34.15 |
| 45.00 | 0.12 | 20.14 | 20.10 | 25.16 | 25.38 | 36.49 | 34.87 | 31.76 | 33.67 |
| 50.00 | 0.12 | 20.14 | 20.11 | 24.21 | 24.42 | 36.01 | 34.20 | 31.56 | 33.18 |
| 55.00 | 0.12 | 20.14 | 20.11 | 23.38 | 23.54 | 35.56 | 33.51 | 31.27 | 32.62 |
| 60.00 | 0.13 | 20.13 | 20.12 | 22.58 | 22.74 | 35.07 | 32.95 | 30.90 | 32.05 |




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/terms/viewterm.html

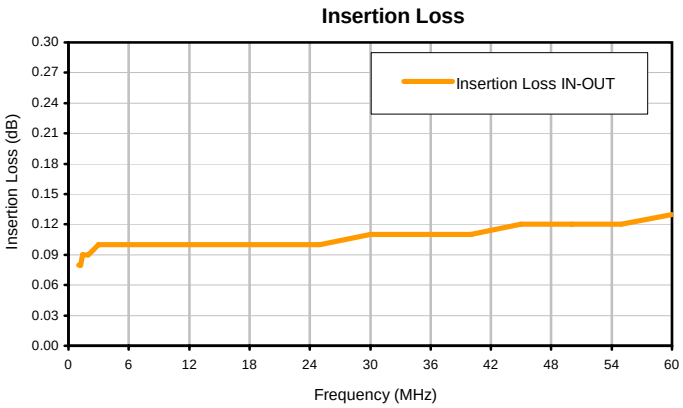
# Bi-Directional Coupler ZFBDC20-61HP+

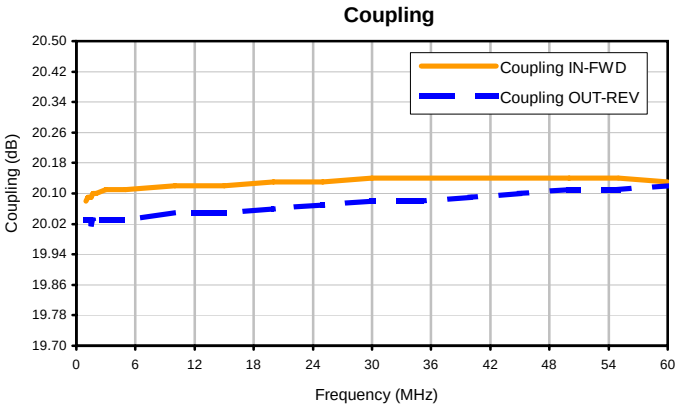
## *Typical Performance Data*

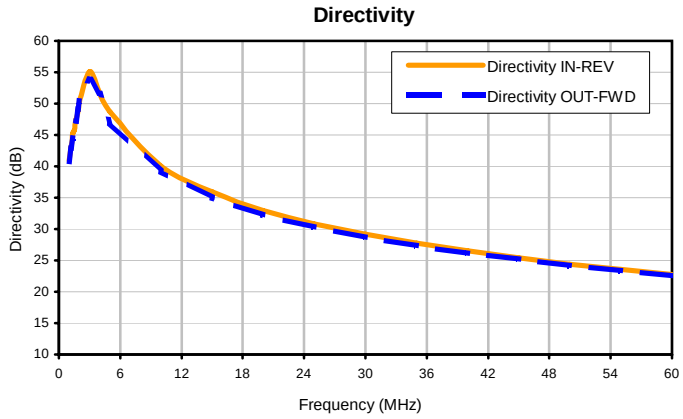
| FREQ. (MHz) | INSERTION LOSS (dB) | COUPLING (dB) | | DIRECTIVITY (dB) | | RETURN LOSS (dB) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | IN-OUT | IN-FWD | OUT-REV | IN-REV | OUT-FWD | IN | OUT | FWD | REV |
| 1.0 | 0.08 | 20.08 | 20.03 | 40.91 | 40.68 | 33.84 | 34.40 | 30.40 | 32.48 |
| 1.2 | 0.08 | 20.09 | 20.03 | 43.04 | 42.83 | 36.16 | 37.29 | 31.22 | 33.89 |
| 1.4 | 0.09 | 20.09 | 20.03 | 45.26 | 44.48 | 37.30 | 39.17 | 31.54 | 34.46 |
| 1.5 | 0.09 | 20.09 | 20.02 | 45.74 | 45.51 | 37.58 | 39.58 | 31.57 | 34.49 |
| 1.7 | 0.09 | 20.10 | 20.03 | 47.57 | 47.17 | 37.55 | 39.84 | 31.46 | 34.46 |
| 1.9 | 0.09 | 20.10 | 20.02 | 48.86 | 49.04 | 37.46 | 39.77 | 31.54 | 34.35 |
| 2.0 | 0.09 | 20.10 | 20.03 | 50.24 | 50.38 | 37.37 | 39.79 | 31.53 | 34.31 |
| 3.0 | 0.10 | 20.11 | 20.03 | 55.14 | 53.73 | 38.59 | 41.68 | 31.76 | 34.85 |
| 4.0 | 0.10 | 20.11 | 20.03 | 51.62 | 51.67 | 39.06 | 42.62 | 32.02 | 35.19 |
| 5.0 | 0.10 | 20.11 | 20.03 | 48.68 | 47.05 | 39.54 | 43.04 | 32.12 | 35.46 |
| 10.0 | 0.10 | 20.12 | 20.05 | 40.02 | 39.21 | 39.93 | 42.19 | 32.38 | 35.79 |
| 15.0 | 0.10 | 20.12 | 20.05 | 35.87 | 35.01 | 39.54 | 40.85 | 32.54 | 35.88 |
| 20.0 | 0.10 | 20.13 | 20.06 | 32.98 | 32.28 | 38.88 | 39.77 | 32.57 | 35.75 |
| 25.0 | 0.10 | 20.13 | 20.07 | 30.86 | 30.27 | 38.35 | 38.54 | 32.51 | 35.45 |
| 30.0 | 0.11 | 20.14 | 20.08 | 29.14 | 28.66 | 37.76 | 37.50 | 32.42 | 35.08 |
| 35.0 | 0.11 | 20.14 | 20.08 | 27.72 | 27.33 | 37.34 | 36.56 | 32.15 | 34.64 |
| 40.0 | 0.11 | 20.14 | 20.09 | 26.48 | 26.16 | 36.85 | 35.71 | 32.07 | 34.15 |
| 45.0 | 0.12 | 20.14 | 20.10 | 25.38 | 25.16 | 36.49 | 34.87 | 31.76 | 33.67 |
| 50.0 | 0.12 | 20.14 | 20.11 | 24.42 | 24.21 | 36.01 | 34.20 | 31.56 | 33.18 |
| 55.0 | 0.12 | 20.14 | 20.11 | 23.54 | 23.38 | 35.56 | 33.51 | 31.27 | 32.62 |
| 60.0 | 0.13 | 20.13 | 20.12 | 22.74 | 22.58 | 35.07 | 32.95 | 30.90 | 32.05 |

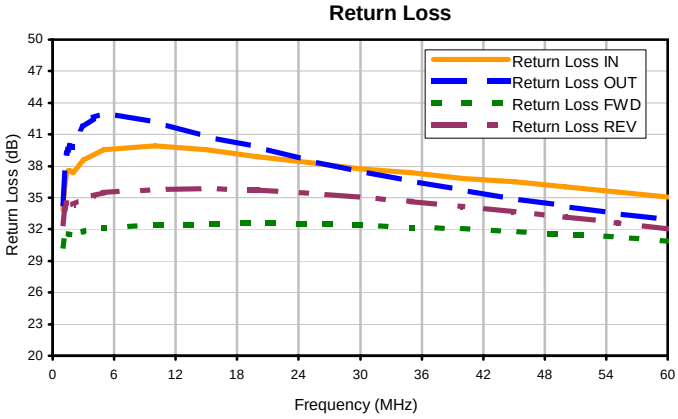
# Bi-Directional Coupler ZFBDC20-61HP+

## *Typical Performance Curves*



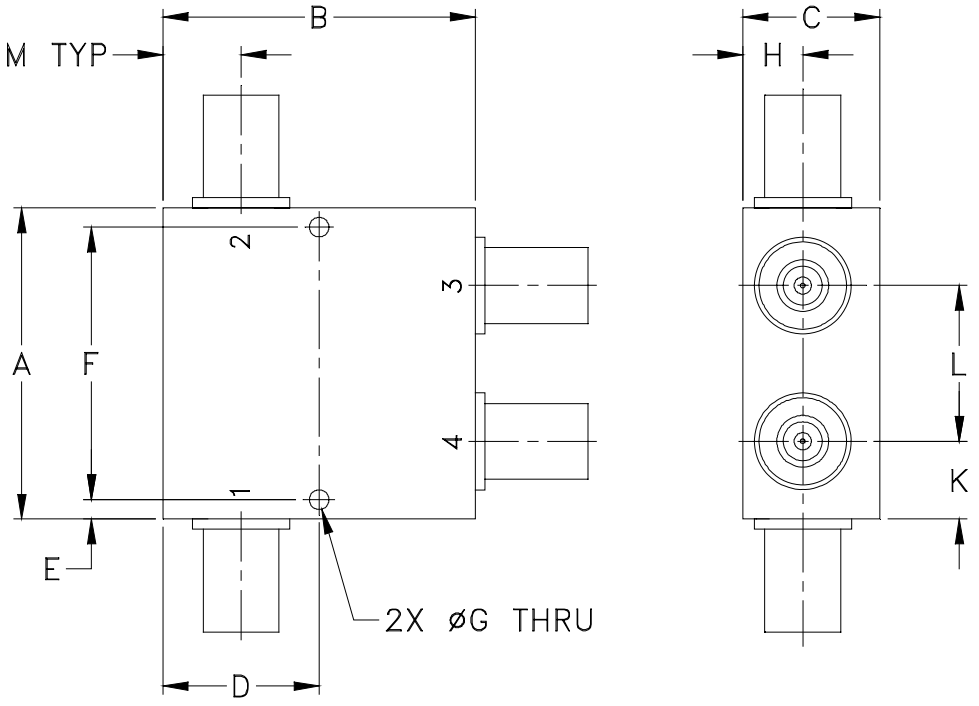



# Case Style JD

**JD1252**

## Outline Dimensions




| CASE# | A | B | C | D | E | F | G | H | J | K | L | M | WT, GRAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JD1252 | 2.00 (50.80) | 2.00 (50.80) | 0.88 (22.35) | 1.000 (25.40) | 0.13 (3.18) | 1.750 (44.45) | 0.125 (3.18) | 0.38 (9.65) | -- -- | 0.50 (12.70) | 1.00 (25.40) | 0.50 (12.70) | 250.00 |

**Dimensions are in inches (mm). Tolerances: 2 Pl. ± .03; 3 Pl. ± .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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# Environmental Specifications ENV28

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<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 |


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