

# Wideband, DC Pass Directional Coupler

## ZCDC20-V1854+

50Ω   20dB   Up to 16W   18 to 50 GHz

### The Big Deal

- Wideband, 18 to 50 GHz
- Excellent Coupling Flatness,  $\pm 0.3$  dB typ.
- Power Handling up to 16W



CASE STYLE: HT2536-1

### Product Overview

The Mini-Circuits ZCDC20-V1854+ wideband directional coupler offers exceptional performance operating over 18 to 50 GHz. This coupler has excellent coupling flatness, good directivity, and power handling. It is ideal for lab testing applications as well as for power monitoring over wide bands, among other applications.

### Key Features

| Feature                                                                                                    | Advantages                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wide bandwidth                                                                                             | With a bandwidth spanning 18 to 50 GHz, ZCDC20-V1854+ coupler is ideal for most lab testing applications, avoiding the need to switch components for different frequency bands. |
| Excellent Directivity <ul style="list-style-type: none"><li>• 15 dB typ. up to 50 GHz</li></ul>            | High directivity allows sampling of input powers with minimal detrimental effects due to output mismatches.                                                                     |
| Excellent coupling flatness, $\pm 0.3$ dB typ                                                              | Excellent coupling flatness over the entire frequency range minimizes the need for compensation circuits in most cases.                                                         |
| Excellent Return Loss (In & Out) <ul style="list-style-type: none"><li>• 17 dB typ. up to 50 GHz</li></ul> | Excellent return loss over 18 to 50 GHz minimizes undesired reflections and resulting amplitude ripple.                                                                         |

#### 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)



# Wideband, DC Pass Directional Coupler

50Ω 20dB Up to 16W 18 to 50 GHz

## ZCDC20-V1854+

### Maximum Ratings

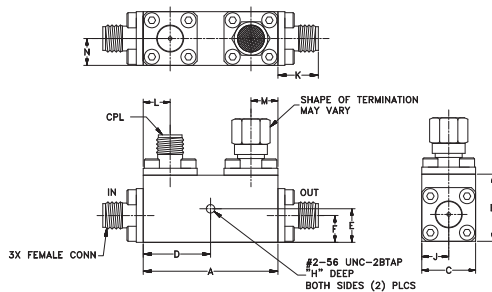
|                       |                |
|-----------------------|----------------|
| Operating Temperature | -55°C to 100°C |
| Storage Temperature   | -55°C to 100°C |
| Supplied Termination* | 1 W            |
| DC Current            | 0.56A          |

Permanent damage may occur if any of these limits are exceeded  
\* up to 25°C, derates linearly to 325mW at 100°C.

### Coaxial Connections

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

### Outline Drawing



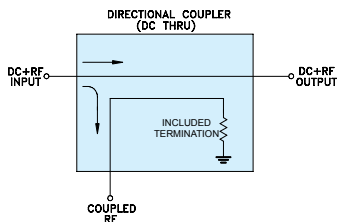
### Outline Dimensions (inch)

| A     | B    | C    | D     | E     | F    | G |
|-------|------|------|-------|-------|------|---|
| 1.25  | 0.63 | 0.50 | 0.63  | 0.313 | 0.25 | — |
| 31.75 | 16.0 | 12.7 | 15.88 | 7.95  | 6.35 | — |

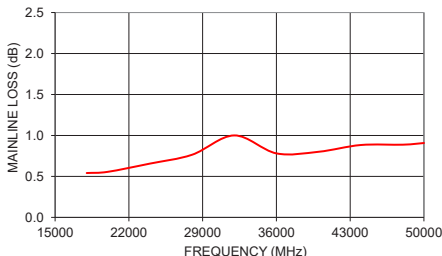
  

| H     | J    | K     | L    | M    | N    | wt    |
|-------|------|-------|------|------|------|-------|
| 0.120 | 0.25 | 0.47  | 0.25 | 0.25 | 0.25 | grams |
| 3.05  | 6.35 | 11.94 | 6.35 | 6.35 | 6.35 | 45    |

### Electrical Schematic



ZCDC20-V1854+  
MAINLINE LOSS



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### Features

- Wide frequency range, 18 to 50 GHz
- Excellent coupling flatness,  $\pm 0.3$  dB typ.
- Good directivity, 15 dB typ. up to 50 GHz
- Excellent return loss, 17 dB typ. up to 50 GHz
- DC current pass through input to output

### Applications

- 5G
- mobile
- fixed satellite
- lab use



Generic photo used for illustration purposes only

CASE STYLE: HT2536-1

| Connectors   | Model         |
|--------------|---------------|
| 2.4mm Female | ZCDC20-V1854+ |

#### +RoHS Compliant

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

### Electrical Specifications at 25°C

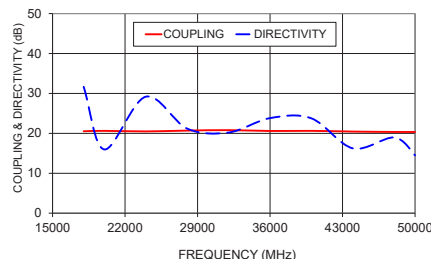
| Parameter                  | Frequency (GHz) | Min. | Typ.         | Max.      | Units |
|----------------------------|-----------------|------|--------------|-----------|-------|
| Operating Frequency        |                 | 18   |              | 50        | GHz   |
| Nominal Coupling           | 18 - 50         |      | 20 $\pm$ 1.2 |           | dB    |
| Coupling Flatness          | 18 - 50         |      | $\pm 0.3$    | $\pm 0.7$ | dB    |
| Mainline Loss <sup>1</sup> | 18 - 40         |      | 0.7          | 1.2       | dB    |
|                            | 40 - 50         |      | 0.9          | 1.5       | dB    |
| Directivity                | 18 - 40         | 10   | 23           |           | dB    |
|                            | 40 - 50         | 8    | 20           |           | dB    |
| Return Loss (In & Out)     | 18 - 40         | 11.7 | 25           |           | dB    |
|                            | 40 - 50         | 10.8 | 25           |           | dB    |
| Return Loss (Coupling)     | 18 - 40         | 11.7 | 22           |           | dB    |
|                            | 40 - 50         | 10.8 | 21           |           | dB    |
| Input Power <sup>2</sup>   | 18 - 50         |      |              | 16        | W     |

1. Mainline loss includes coupling loss.
2. Up to 25°C, derates linearly to 8W at 100°C.

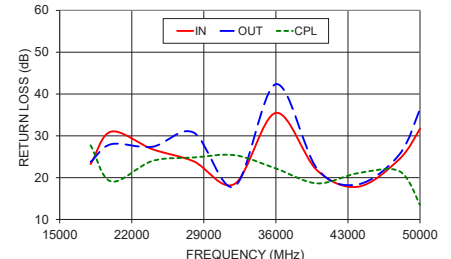
### Typical Performance Data

| Frequency (MHz) | Mainline Loss (dB) In-Out | Coupling (dB) In-Cpl | Directivity (dB) | Return Loss (dB) In | Return Loss (dB) Out | Cpl   |
|-----------------|---------------------------|----------------------|------------------|---------------------|----------------------|-------|
| 18000           | 0.54                      | 20.52                | 31.66            | 23.25               | 23.77                | 27.73 |
| 20000           | 0.56                      | 20.62                | 15.97            | 31.01               | 28.00                | 19.08 |
| 24000           | 0.66                      | 20.49                | 29.18            | 26.80               | 27.38                | 23.99 |
| 28000           | 0.76                      | 20.69                | 21.19            | 23.91               | 30.79                | 24.82 |
| 32000           | 1.00                      | 20.80                | 20.20            | 18.51               | 17.91                | 25.36 |
| 36000           | 0.78                      | 20.59                | 23.82            | 35.49               | 42.35                | 22.19 |
| 40000           | 0.80                      | 20.63                | 23.75            | 21.74               | 22.15                | 18.63 |
| 44000           | 0.88                      | 20.44                | 16.24            | 17.83               | 18.40                | 21.08 |
| 48000           | 0.89                      | 20.35                | 18.96            | 24.45               | 25.55                | 21.54 |
| 50000           | 0.91                      | 20.35                | 14.49            | 31.69               | 36.44                | 13.48 |

ZCDC20-V1854+  
COUPLING & DIRECTIVITY



ZCDC20-V1854+  
RETURN LOSS



**Mini-Circuits®**

[www.minicircuits.com](http://www.minicircuits.com) P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 [sales@minicircuits.com](mailto:sales@minicircuits.com)

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ECO-005198  
ZCDC20-V1854+  
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# Directional Coupler

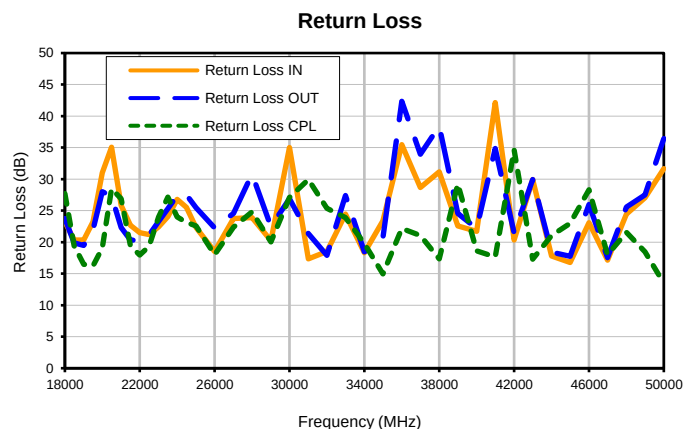
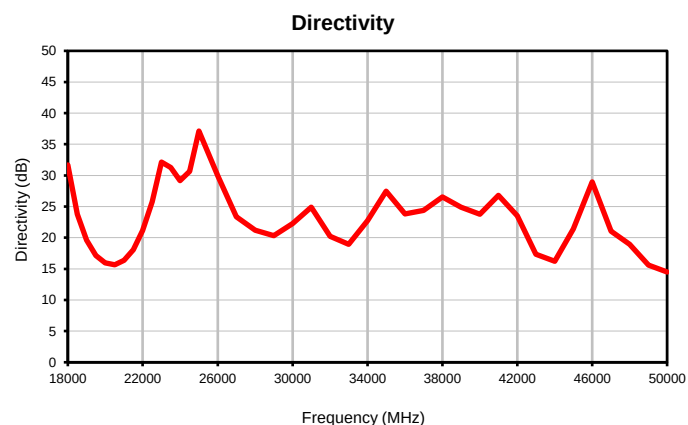
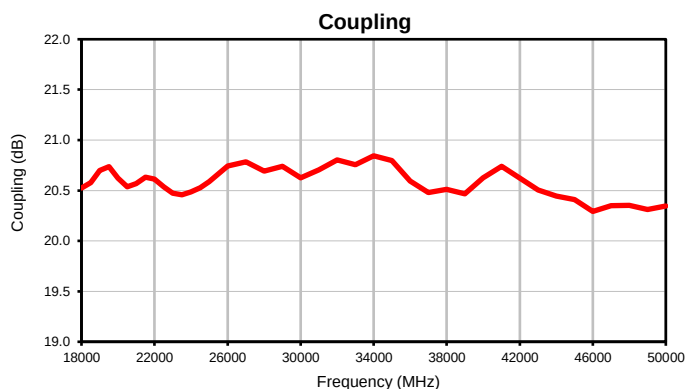
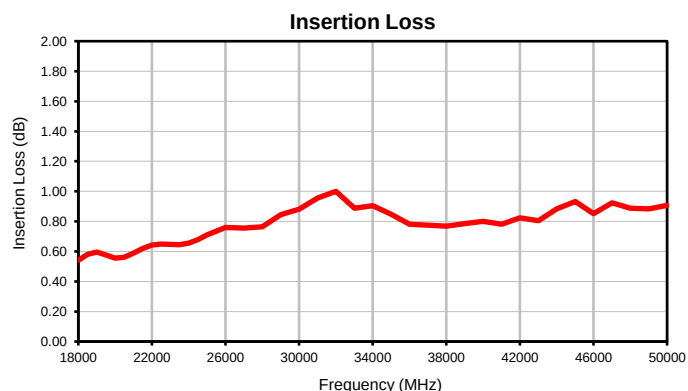
## ZCDC20-V1854+

### Typical Performance Data

| FREQ.<br>(MHz) | INSERTION<br>LOSS <sup>(1)</sup><br>(dB) | COUPLING<br>(dB) | DIRECTIVITY<br>(dB) | RETURN LOSS |       |       |
|----------------|------------------------------------------|------------------|---------------------|-------------|-------|-------|
|                |                                          |                  |                     | (dB)        |       |       |
|                |                                          |                  |                     | IN          | OUT   | CPL   |
| 18000          | 0.54                                     | 20.52            | 31.66               | 23.25       | 23.77 | 27.73 |
| 18500          | 0.58                                     | 20.58            | 23.74               | 20.36       | 19.87 | 19.43 |
| 19000          | 0.59                                     | 20.70            | 19.61               | 20.35       | 19.47 | 16.50 |
| 19500          | 0.58                                     | 20.74            | 17.13               | 23.26       | 21.99 | 16.24 |
| 20000          | 0.56                                     | 20.62            | 15.97               | 31.01       | 28.00 | 19.08 |
| 20500          | 0.56                                     | 20.54            | 15.67               | 35.07       | 27.30 | 28.45 |
| 21000          | 0.59                                     | 20.57            | 16.35               | 25.82       | 22.31 | 26.89 |
| 21500          | 0.62                                     | 20.63            | 18.05               | 22.66       | 20.32 | 19.41 |
| 22000          | 0.64                                     | 20.61            | 21.13               | 21.49       | 20.22 | 17.96 |
| 22500          | 0.65                                     | 20.54            | 25.76               | 21.22       | 21.13 | 19.34 |
| 23000          | 0.65                                     | 20.47            | 32.15               | 22.43       | 23.30 | 23.99 |
| 23500          | 0.65                                     | 20.46            | 31.27               | 24.07       | 25.34 | 27.15 |
| 24000          | 0.66                                     | 20.49            | 29.18               | 26.80       | 27.38 | 23.99 |
| 24500          | 0.68                                     | 20.53            | 30.67               | 25.54       | 27.48 | 23.13 |
| 25000          | 0.71                                     | 20.59            | 37.13               | 22.33       | 25.48 | 22.56 |
| 26000          | 0.76                                     | 20.74            | 29.94               | 18.54       | 22.26 | 18.00 |
| 27000          | 0.76                                     | 20.78            | 23.35               | 23.73       | 24.55 | 22.40 |
| 28000          | 0.76                                     | 20.69            | 21.19               | 23.91       | 30.79 | 24.82 |
| 29000          | 0.85                                     | 20.74            | 20.30               | 20.24       | 22.46 | 20.06 |
| 30000          | 0.88                                     | 20.63            | 22.30               | 34.99       | 26.90 | 27.12 |
| 31000          | 0.96                                     | 20.71            | 24.90               | 17.35       | 21.36 | 29.96 |
| 32000          | 1.00                                     | 20.80            | 20.20               | 18.51       | 17.91 | 25.36 |
| 33000          | 0.89                                     | 20.76            | 18.95               | 24.45       | 27.41 | 23.91 |
| 34000          | 0.90                                     | 20.84            | 22.76               | 18.33       | 18.46 | 19.76 |
| 35000          | 0.85                                     | 20.80            | 27.48               | 23.37       | 20.69 | 14.95 |
| 36000          | 0.78                                     | 20.59            | 23.82               | 35.49       | 42.35 | 22.19 |
| 37000          | 0.78                                     | 20.48            | 24.40               | 28.69       | 33.97 | 21.07 |
| 38000          | 0.77                                     | 20.51            | 26.56               | 31.18       | 38.41 | 17.37 |
| 39000          | 0.79                                     | 20.47            | 24.92               | 22.58       | 24.55 | 29.23 |
| 40000          | 0.80                                     | 20.63            | 23.75               | 21.74       | 22.15 | 18.63 |
| 41000          | 0.78                                     | 20.74            | 26.80               | 42.15       | 34.87 | 17.67 |
| 42000          | 0.82                                     | 20.62            | 23.52               | 20.35       | 21.48 | 34.64 |
| 43000          | 0.80                                     | 20.51            | 17.32               | 29.92       | 29.96 | 17.32 |
| 44000          | 0.88                                     | 20.44            | 16.24               | 17.83       | 18.40 | 21.08 |
| 45000          | 0.93                                     | 20.41            | 21.42               | 16.77       | 17.76 | 23.01 |
| 46000          | 0.85                                     | 20.29            | 28.95               | 23.10       | 25.99 | 28.32 |
| 47000          | 0.92                                     | 20.35            | 21.06               | 17.13       | 17.54 | 18.01 |
| 48000          | 0.89                                     | 20.35            | 18.96               | 24.45       | 25.55 | 21.54 |
| 49000          | 0.88                                     | 20.31            | 15.61               | 27.05       | 27.48 | 18.48 |
| 50000          | 0.91                                     | 20.35            | 14.49               | 31.69       | 36.44 | 13.48 |

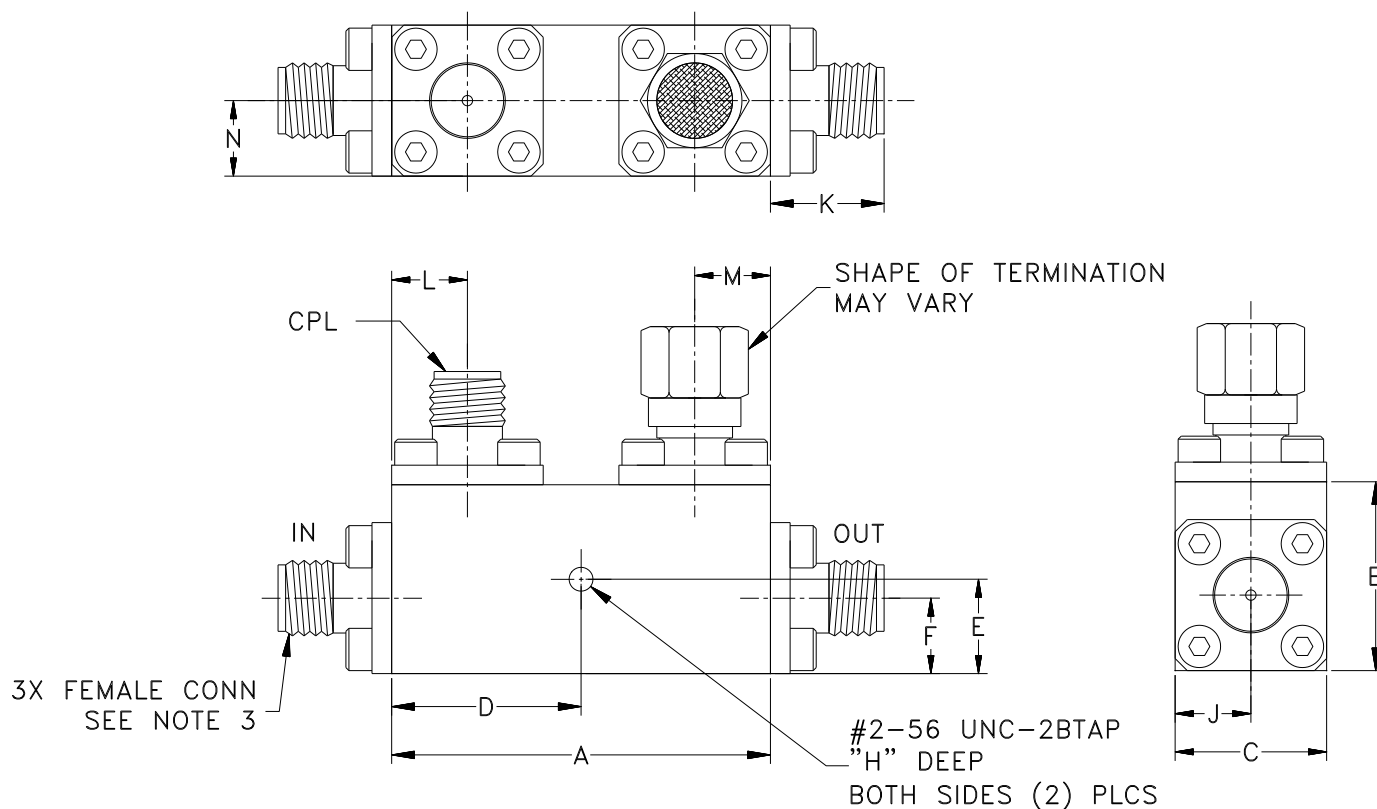
<sup>(1)</sup> Mainline loss includes coupling loss

## Typical Performance Curves



## Outline Dimensions

HT2536-1



| CASE #   | A               | B             | C             | D               | E              | F             | G      | H              | J             | K             |
|----------|-----------------|---------------|---------------|-----------------|----------------|---------------|--------|----------------|---------------|---------------|
| HT2536-1 | 1.25<br>(31.75) | .63<br>(15.9) | .50<br>(12.7) | .625<br>(15.88) | .313<br>(7.94) | .25<br>(6.35) | -<br>- | .120<br>(3.05) | .25<br>(6.35) | .47<br>(12.0) |

| CASE #   | L             | M             | N             | WT. GRAM |
|----------|---------------|---------------|---------------|----------|
| HT2536-1 | .25<br>(6.35) | .25<br>(6.35) | .25<br>(6.35) | 45       |

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

### Notes:

1. Case material: Aluminum alloy.
2. Case finish: Blue Painting, Pantone 286.
3. Refer to the individual model data sheet for the types of connectors available.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

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      | -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 |