

# Power Splitter/Combiner

2 Way-0° 50Ω

20 to 2000 MHz

ADP-2-20+



Generic photo used for illustration purposes only

CASE STYLE: CD542

+RoHS Compliant

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

Available Tape and Reel at no extra cost

| Reel Size | Devices/Reel              |
|-----------|---------------------------|
| 7"        | 10, 20, 50, 100, 200, 500 |
| 13"       | 1000                      |

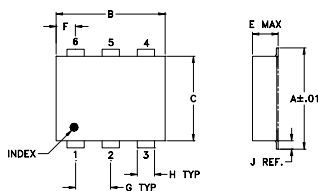
## Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| Operating Temperature                                           | -40°C to 85°C  |
| Storage Temperature                                             | -55°C to 100°C |
| Power Input (as a splitter)                                     | 1W max.        |
| Internal Dissipation                                            | 0.125W max.    |
| Permanent damage may occur if any of these limits are exceeded. |                |

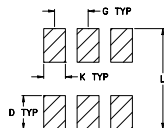
## Pin Connections

|          |     |
|----------|-----|
| SUM PORT | 1   |
| PORT 1   | 3   |
| PORT 2   | 4   |
| GROUND   | 6   |
| NOT USED | 2,5 |

## Outline Drawing



### PCB Land Pattern



Suggested Layout, Tolerance to be within ±0.02

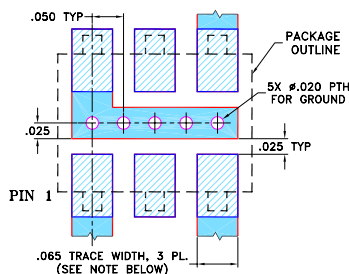
## Outline Dimensions (inch/mm)

| A    | B    | C    | D    | E    | F    | G    |
|------|------|------|------|------|------|------|
| .272 | .310 | .220 | .100 | .112 | .055 | .100 |
| 6.91 | 7.87 | 5.59 | 2.54 | 2.84 | 1.40 | 2.54 |

| H    | J    | K    | L    | wt    |
|------|------|------|------|-------|
| .030 | .026 | .065 | .300 | grams |
| 0.76 | 0.66 | 1.65 | 7.62 | 0.20  |

## Demo Board MCL P/N: TB-48+ Suggested PCB Layout (PL-035)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.  
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
■ DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## 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-Circuit's 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-Circuit's website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

## Features

- low insertion loss, 0.7 dB typ.
- excellent insertion loss flatness, 0.4 dB peak to peak
- excellent amplitude unbalance, 0.1 dB typ.
- good phase unbalance, 1.1 deg. typ.
- aqueous washable
- protected under U.S. Patent 6,133,525

## Applications

- instrumentation
- PCS/cellular
- GPS

## Electrical Specifications

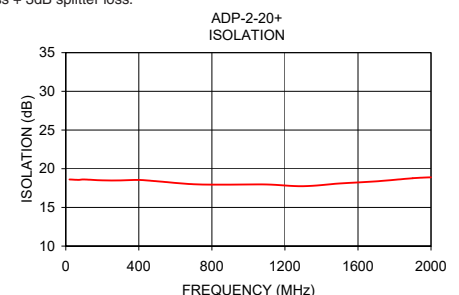
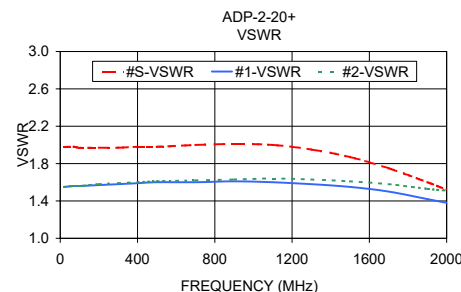
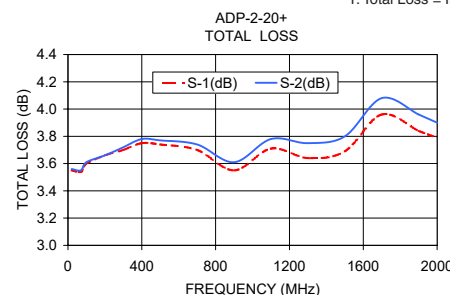
| FREQ. RANGE (MHz)              | ISOLATION (dB) |     |      | INSERTION LOSS (dB) ABOVE 3.0 dB |      |     | PHASE UNBALANCE (Degrees) |      |      | AMPLITUDE UNBALANCE (dB) |      |      |
|--------------------------------|----------------|-----|------|----------------------------------|------|-----|---------------------------|------|------|--------------------------|------|------|
|                                | L              | M   | U    | L                                | M    | U   | L                         | M    | U    | L                        | M    | U    |
| f <sub>c</sub> -f <sub>u</sub> | Typ.           | Min | Typ. | Min                              | Typ. | Min | Typ.                      | Max. | Typ. | Max.                     | Typ. | Max. |
| 20-2000                        | 18             | 15  | 18   | 15                               | 18   | 15  | 0.5                       | 0.8  | 0.7  | 1.0                      | 0.8  | 1.5  |

L = 20-200 MHz M = 200-1000 MHz U = 1000-2000 MHz

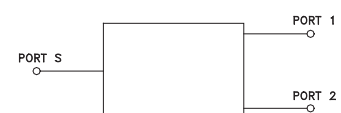
## Typical Performance Data

| Frequency (MHz) | Total Loss <sup>1</sup> (dB) |      | Amplitude Unbalance (dB) | Isolation (dB) | Phase Unbalance (deg.) | VSWR S | VSWR 1 | VSWR 2 |
|-----------------|------------------------------|------|--------------------------|----------------|------------------------|--------|--------|--------|
|                 | S-1                          | S-2  |                          |                |                        |        |        |        |
| 20.00           | 3.55                         | 3.56 | 0.00                     | 18.61          | 0.00                   | 1.98   | 1.55   | 1.55   |
| 70.00           | 3.54                         | 3.55 | 0.01                     | 18.56          | 0.18                   | 1.98   | 1.56   | 1.56   |
| 100.00          | 3.60                         | 3.61 | 0.01                     | 18.61          | 0.19                   | 1.97   | 1.56   | 1.56   |
| 200.00          | 3.66                         | 3.66 | 0.00                     | 18.50          | 0.45                   | 1.97   | 1.57   | 1.58   |
| 300.00          | 3.70                         | 3.72 | 0.02                     | 18.49          | 0.59                   | 1.97   | 1.58   | 1.59   |
| 400.00          | 3.75                         | 3.78 | 0.02                     | 18.55          | 0.68                   | 1.98   | 1.59   | 1.60   |
| 500.00          | 3.74                         | 3.77 | 0.03                     | 18.38          | 0.88                   | 1.98   | 1.60   | 1.61   |
| 700.00          | 3.70                         | 3.74 | 0.03                     | 17.99          | 1.04                   | 2.00   | 1.60   | 1.62   |
| 900.00          | 3.55                         | 3.61 | 0.06                     | 17.94          | 1.35                   | 2.01   | 1.61   | 1.63   |
| 1100.00         | 3.71                         | 3.78 | 0.06                     | 17.96          | 1.43                   | 2.00   | 1.60   | 1.64   |
| 1300.00         | 3.64                         | 3.75 | 0.11                     | 17.74          | 1.43                   | 1.95   | 1.58   | 1.63   |
| 1500.00         | 3.69                         | 3.80 | 0.11                     | 18.09          | 1.32                   | 1.87   | 1.55   | 1.61   |
| 1700.00         | 3.96                         | 4.08 | 0.12                     | 18.37          | 1.26                   | 1.75   | 1.50   | 1.58   |
| 1900.00         | 3.84                         | 3.96 | 0.12                     | 18.77          | 1.05                   | 1.60   | 1.42   | 1.53   |
| 2000.00         | 3.79                         | 3.90 | 0.11                     | 18.89          | 0.78                   | 1.52   | 1.38   | 1.51   |

1. Total Loss = Insertion Loss + 3dB splitter loss.



## electrical schematic



# 2 Way-0° Power Splitter/Combiner

ADP-2-20+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER = -10 dBm @Temperature = +25°C

| FREQ.<br>(MHz) | TOTAL LOSS <sup>(1)</sup><br>(dB) |      | AMP.<br>UNBAL.<br>(dB) | PHASE<br>UNBAL.<br>(deg.) | ISOLATION<br>(dB) | VSWR<br>(:1) |      |      |
|----------------|-----------------------------------|------|------------------------|---------------------------|-------------------|--------------|------|------|
|                | S-1                               | S-2  |                        |                           |                   | S            | 1    | 2    |
| 5              | 3.51                              | 3.51 | 0.00                   | 0.03                      | 17.38             | 2.02         | 1.52 | 1.52 |
| 6              | 3.50                              | 3.51 | 0.00                   | 0.01                      | 17.63             | 2.02         | 1.52 | 1.52 |
| 7              | 3.50                              | 3.51 | 0.00                   | 0.01                      | 17.79             | 2.02         | 1.52 | 1.52 |
| 8              | 3.51                              | 3.51 | 0.00                   | 0.02                      | 17.90             | 2.02         | 1.53 | 1.53 |
| 9              | 3.51                              | 3.51 | 0.00                   | 0.04                      | 17.97             | 2.01         | 1.53 | 1.53 |
| 10             | 3.51                              | 3.51 | 0.00                   | 0.02                      | 18.01             | 2.01         | 1.53 | 1.53 |
| 11             | 3.51                              | 3.51 | 0.00                   | 0.02                      | 18.01             | 2.01         | 1.53 | 1.53 |
| 12             | 3.51                              | 3.51 | 0.00                   | 0.02                      | 18.01             | 2.01         | 1.53 | 1.53 |
| 13             | 3.51                              | 3.51 | 0.00                   | 0.02                      | 18.01             | 2.01         | 1.53 | 1.53 |
| 14             | 3.51                              | 3.51 | 0.00                   | 0.02                      | 18.01             | 2.01         | 1.53 | 1.53 |
| 15             | 3.51                              | 3.51 | 0.00                   | 0.02                      | 18.01             | 2.01         | 1.53 | 1.53 |
| 16             | 3.51                              | 3.51 | 0.00                   | 0.02                      | 18.01             | 2.01         | 1.53 | 1.53 |
| 17             | 3.51                              | 3.51 | 0.00                   | 0.02                      | 18.01             | 2.01         | 1.53 | 1.53 |
| 18             | 3.51                              | 3.51 | 0.00                   | 0.02                      | 18.01             | 2.01         | 1.53 | 1.53 |
| 19             | 3.51                              | 3.51 | 0.00                   | 0.02                      | 18.01             | 2.01         | 1.53 | 1.53 |
| 20             | 3.51                              | 3.51 | 0.00                   | 0.04                      | 18.08             | 2.01         | 1.53 | 1.53 |
| 30             | 3.52                              | 3.52 | 0.00                   | 0.06                      | 18.00             | 2.01         | 1.52 | 1.53 |
| 40             | 3.52                              | 3.52 | 0.00                   | 0.08                      | 17.94             | 2.00         | 1.52 | 1.52 |
| 50             | 3.52                              | 3.52 | 0.00                   | 0.10                      | 17.89             | 2.00         | 1.52 | 1.52 |
| 60             | 3.52                              | 3.53 | 0.00                   | 0.12                      | 17.88             | 1.99         | 1.52 | 1.52 |
| 70             | 3.53                              | 3.53 | 0.00                   | 0.14                      | 17.89             | 1.99         | 1.52 | 1.52 |
| 80             | 3.53                              | 3.53 | 0.00                   | 0.17                      | 17.87             | 1.99         | 1.53 | 1.53 |
| 90             | 3.53                              | 3.54 | 0.00                   | 0.20                      | 17.89             | 1.98         | 1.53 | 1.53 |
| 100            | 3.54                              | 3.54 | 0.00                   | 0.20                      | 17.91             | 1.98         | 1.53 | 1.53 |
| 200            | 3.56                              | 3.56 | 0.00                   | 0.41                      | 17.97             | 1.97         | 1.54 | 1.54 |
| 300            | 3.58                              | 3.58 | 0.00                   | 0.60                      | 18.16             | 1.97         | 1.54 | 1.54 |
| 400            | 3.60                              | 3.59 | 0.01                   | 0.80                      | 18.24             | 1.95         | 1.55 | 1.55 |
| 500            | 3.62                              | 3.60 | 0.02                   | 0.98                      | 18.37             | 1.95         | 1.55 | 1.55 |
| 600            | 3.63                              | 3.61 | 0.02                   | 1.15                      | 18.49             | 1.94         | 1.54 | 1.55 |
| 700            | 3.65                              | 3.62 | 0.03                   | 1.29                      | 18.53             | 1.92         | 1.55 | 1.56 |
| 800            | 3.66                              | 3.62 | 0.05                   | 1.46                      | 18.76             | 1.91         | 1.54 | 1.55 |
| 900            | 3.68                              | 3.62 | 0.06                   | 1.59                      | 18.86             | 1.89         | 1.53 | 1.55 |
| 1000           | 3.69                              | 3.61 | 0.08                   | 1.68                      | 19.05             | 1.85         | 1.54 | 1.55 |
| 1100           | 3.72                              | 3.62 | 0.10                   | 1.79                      | 19.28             | 1.84         | 1.53 | 1.55 |
| 1200           | 3.75                              | 3.62 | 0.12                   | 1.86                      | 19.40             | 1.81         | 1.53 | 1.54 |
| 1300           | 3.77                              | 3.62 | 0.15                   | 1.87                      | 19.55             | 1.78         | 1.53 | 1.55 |
| 1400           | 3.79                              | 3.62 | 0.17                   | 1.88                      | 19.69             | 1.75         | 1.51 | 1.53 |
| 1500           | 3.81                              | 3.62 | 0.19                   | 1.87                      | 19.69             | 1.69         | 1.51 | 1.52 |
| 1600           | 3.83                              | 3.61 | 0.22                   | 1.84                      | 19.86             | 1.64         | 1.49 | 1.52 |
| 1700           | 3.86                              | 3.62 | 0.24                   | 1.72                      | 19.87             | 1.58         | 1.47 | 1.50 |
| 1800           | 3.88                              | 3.61 | 0.27                   | 1.55                      | 19.76             | 1.51         | 1.45 | 1.49 |
| 1900           | 3.90                              | 3.60 | 0.30                   | 1.37                      | 19.58             | 1.44         | 1.42 | 1.46 |
| 2000           | 3.95                              | 3.65 | 0.30                   | 0.99                      | 18.86             | 1.39         | 1.37 | 1.45 |
| 2100           | 4.04                              | 3.69 | 0.35                   | 0.55                      | 18.01             | 1.39         | 1.34 | 1.42 |
| 2200           | 4.19                              | 3.79 | 0.39                   | 0.13                      | 16.56             | 1.48         | 1.31 | 1.39 |
| 2300           | 4.44                              | 4.02 | 0.43                   | 0.46                      | 14.84             | 1.70         | 1.28 | 1.37 |
| 2400           | 4.89                              | 4.43 | 0.46                   | 1.25                      | 12.97             | 2.15         | 1.32 | 1.41 |
| 2500           | 5.63                              | 5.14 | 0.50                   | 2.38                      | 11.12             | 2.86         | 1.43 | 1.51 |

<sup>(1)</sup>Total Loss = Insertion Loss + 3dB splitter loss.



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IF/RF MICROWAVE COMPONENTS



REV. OR  
ADP-2-20+  
5/1/2020  
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# 2 Way-0° Power Splitter/Combiner

ADP-2-20+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER = -10 dBm @Temperature = -45 °C

| FREQ.<br>(MHz) | TOTAL LOSS <sup>(1)</sup><br>(dB) |      | AMP.<br>UNBAL.<br>(dB) | PHASE<br>UNBAL.<br>(deg.) | ISOLATION<br>(dB) | VSWR<br>(:1) |      |      |
|----------------|-----------------------------------|------|------------------------|---------------------------|-------------------|--------------|------|------|
|                | S-1                               | S-2  |                        |                           |                   | S            | 1    | 2    |
| 5              | 3.51                              | 3.50 | 0.00                   | 0.03                      | 13.58             | 2.02         | 1.46 | 1.46 |
| 6              | 3.50                              | 3.50 | 0.00                   | 0.05                      | 14.24             | 2.02         | 1.49 | 1.49 |
| 7              | 3.50                              | 3.51 | 0.01                   | 0.02                      | 14.86             | 2.02         | 1.51 | 1.51 |
| 8              | 3.50                              | 3.51 | 0.01                   | 0.04                      | 15.43             | 2.02         | 1.53 | 1.53 |
| 9              | 3.50                              | 3.50 | 0.00                   | 0.01                      | 15.93             | 2.02         | 1.54 | 1.55 |
| 10             | 3.50                              | 3.50 | 0.00                   | 0.02                      | 16.38             | 2.02         | 1.56 | 1.56 |
| 11             | 3.50                              | 3.50 | 0.00                   | 0.02                      | 16.38             | 2.02         | 1.56 | 1.56 |
| 12             | 3.50                              | 3.50 | 0.00                   | 0.02                      | 16.38             | 2.02         | 1.56 | 1.56 |
| 13             | 3.50                              | 3.50 | 0.00                   | 0.02                      | 16.38             | 2.02         | 1.56 | 1.56 |
| 14             | 3.50                              | 3.50 | 0.00                   | 0.02                      | 16.38             | 2.02         | 1.56 | 1.56 |
| 15             | 3.50                              | 3.50 | 0.00                   | 0.02                      | 16.38             | 2.02         | 1.56 | 1.56 |
| 16             | 3.50                              | 3.50 | 0.00                   | 0.02                      | 16.38             | 2.02         | 1.56 | 1.56 |
| 17             | 3.50                              | 3.50 | 0.00                   | 0.02                      | 16.38             | 2.02         | 1.56 | 1.56 |
| 18             | 3.50                              | 3.50 | 0.00                   | 0.02                      | 16.38             | 2.02         | 1.56 | 1.56 |
| 19             | 3.50                              | 3.50 | 0.00                   | 0.02                      | 16.38             | 2.02         | 1.56 | 1.56 |
| 20             | 3.51                              | 3.51 | 0.00                   | 0.03                      | 18.91             | 2.01         | 1.61 | 1.61 |
| 30             | 3.51                              | 3.51 | 0.00                   | 0.05                      | 19.72             | 2.01         | 1.62 | 1.62 |
| 40             | 3.51                              | 3.51 | 0.00                   | 0.06                      | 20.08             | 2.01         | 1.62 | 1.62 |
| 50             | 3.51                              | 3.51 | 0.00                   | 0.08                      | 20.26             | 2.00         | 1.63 | 1.63 |
| 60             | 3.51                              | 3.51 | 0.00                   | 0.09                      | 20.37             | 1.99         | 1.63 | 1.63 |
| 70             | 3.51                              | 3.51 | 0.00                   | 0.11                      | 20.47             | 1.99         | 1.63 | 1.63 |
| 80             | 3.52                              | 3.52 | 0.00                   | 0.13                      | 20.50             | 1.98         | 1.64 | 1.63 |
| 90             | 3.52                              | 3.52 | 0.00                   | 0.16                      | 20.54             | 1.98         | 1.64 | 1.64 |
| 100            | 3.53                              | 3.53 | 0.00                   | 0.16                      | 20.59             | 1.98         | 1.64 | 1.64 |
| 200            | 3.54                              | 3.55 | 0.00                   | 0.32                      | 20.37             | 1.98         | 1.65 | 1.65 |
| 300            | 3.54                              | 3.54 | 0.00                   | 0.45                      | 20.45             | 1.97         | 1.64 | 1.64 |
| 400            | 3.56                              | 3.56 | 0.01                   | 0.63                      | 20.31             | 1.96         | 1.66 | 1.65 |
| 500            | 3.57                              | 3.55 | 0.02                   | 0.76                      | 20.35             | 1.96         | 1.64 | 1.64 |
| 600            | 3.57                              | 3.55 | 0.02                   | 0.90                      | 20.33             | 1.96         | 1.63 | 1.64 |
| 700            | 3.58                              | 3.55 | 0.03                   | 0.98                      | 20.22             | 1.95         | 1.64 | 1.65 |
| 800            | 3.59                              | 3.54 | 0.05                   | 1.10                      | 20.34             | 1.94         | 1.63 | 1.63 |
| 900            | 3.60                              | 3.53 | 0.07                   | 1.26                      | 20.23             | 1.93         | 1.62 | 1.62 |
| 1000           | 3.59                              | 3.51 | 0.08                   | 1.28                      | 20.25             | 1.89         | 1.61 | 1.63 |
| 1100           | 3.61                              | 3.50 | 0.11                   | 1.35                      | 20.24             | 1.88         | 1.60 | 1.61 |
| 1200           | 3.62                              | 3.49 | 0.13                   | 1.41                      | 20.14             | 1.84         | 1.60 | 1.60 |
| 1300           | 3.64                              | 3.48 | 0.15                   | 1.38                      | 20.03             | 1.82         | 1.60 | 1.61 |
| 1400           | 3.64                              | 3.47 | 0.18                   | 1.34                      | 19.92             | 1.79         | 1.57 | 1.58 |
| 1500           | 3.65                              | 3.45 | 0.20                   | 1.31                      | 19.71             | 1.74         | 1.56 | 1.57 |
| 1600           | 3.66                              | 3.43 | 0.22                   | 1.29                      | 19.65             | 1.68         | 1.54 | 1.56 |
| 1700           | 3.67                              | 3.42 | 0.24                   | 1.01                      | 19.30             | 1.62         | 1.51 | 1.54 |
| 1800           | 3.68                              | 3.40 | 0.28                   | 0.80                      | 18.97             | 1.55         | 1.48 | 1.53 |
| 1900           | 3.68                              | 3.38 | 0.30                   | 0.70                      | 18.54             | 1.48         | 1.45 | 1.49 |
| 2000           | 3.72                              | 3.41 | 0.30                   | 0.08                      | 17.59             | 1.43         | 1.39 | 1.47 |
| 2100           | 3.79                              | 3.45 | 0.34                   | 0.44                      | 16.59             | 1.43         | 1.36 | 1.43 |
| 2200           | 3.94                              | 3.54 | 0.40                   | 0.80                      | 15.17             | 1.52         | 1.32 | 1.40 |
| 2300           | 4.17                              | 3.76 | 0.41                   | 1.51                      | 13.55             | 1.76         | 1.29 | 1.38 |
| 2400           | 4.62                              | 4.18 | 0.44                   | 2.43                      | 11.81             | 2.23         | 1.33 | 1.41 |
| 2500           | 5.34                              | 4.89 | 0.45                   | 3.89                      | 10.11             | 3.00         | 1.44 | 1.51 |

<sup>(1)</sup>Total Loss = Insertion Loss + 3dB splitter loss.



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IF/RF MICROWAVE COMPONENTS

REV. OR  
ADP-2-20+  
5/1/2020  
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# 2 Way-0° Power Splitter/Combiner

ADP-2-20+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER = -10 dBm @Temperature = +85 °C

| FREQ.<br>(MHz) | TOTAL LOSS <sup>(1)</sup><br>(dB) |      | AMP.<br>UNBAL.<br>(dB) | PHASE<br>UNBAL.<br>(deg.) | ISOLATION<br>(dB) | VSWR<br>(:1) |      |      |
|----------------|-----------------------------------|------|------------------------|---------------------------|-------------------|--------------|------|------|
|                | S-1                               | S-2  |                        |                           |                   | S            | 1    | 2    |
| 5              | 3.51                              | 3.51 | 0.00                   | 0.01                      | 15.20             | 2.02         | 1.38 | 1.38 |
| 6              | 3.51                              | 3.51 | 0.00                   | 0.02                      | 15.26             | 2.01         | 1.39 | 1.39 |
| 7              | 3.51                              | 3.51 | 0.00                   | 0.03                      | 15.31             | 2.01         | 1.39 | 1.39 |
| 8              | 3.51                              | 3.51 | 0.00                   | 0.06                      | 15.34             | 2.01         | 1.39 | 1.39 |
| 9              | 3.51                              | 3.51 | 0.00                   | 0.04                      | 15.36             | 2.01         | 1.39 | 1.39 |
| 10             | 3.51                              | 3.51 | 0.00                   | 0.03                      | 15.38             | 2.01         | 1.39 | 1.39 |
| 11             | 3.51                              | 3.51 | 0.00                   | 0.03                      | 15.38             | 2.01         | 1.39 | 1.39 |
| 12             | 3.51                              | 3.51 | 0.00                   | 0.03                      | 15.38             | 2.01         | 1.39 | 1.39 |
| 13             | 3.51                              | 3.51 | 0.00                   | 0.03                      | 15.38             | 2.01         | 1.39 | 1.39 |
| 14             | 3.51                              | 3.51 | 0.00                   | 0.03                      | 15.38             | 2.01         | 1.39 | 1.39 |
| 15             | 3.51                              | 3.51 | 0.00                   | 0.03                      | 15.38             | 2.01         | 1.39 | 1.39 |
| 16             | 3.51                              | 3.51 | 0.00                   | 0.03                      | 15.38             | 2.01         | 1.39 | 1.39 |
| 17             | 3.51                              | 3.51 | 0.00                   | 0.03                      | 15.38             | 2.01         | 1.39 | 1.39 |
| 18             | 3.51                              | 3.51 | 0.00                   | 0.03                      | 15.38             | 2.01         | 1.39 | 1.39 |
| 19             | 3.51                              | 3.51 | 0.00                   | 0.03                      | 15.38             | 2.01         | 1.39 | 1.39 |
| 20             | 3.52                              | 3.52 | 0.00                   | 0.05                      | 15.37             | 2.01         | 1.39 | 1.39 |
| 30             | 3.53                              | 3.53 | 0.00                   | 0.08                      | 15.31             | 2.00         | 1.39 | 1.39 |
| 40             | 3.53                              | 3.53 | 0.00                   | 0.10                      | 15.28             | 2.00         | 1.39 | 1.39 |
| 50             | 3.53                              | 3.54 | 0.00                   | 0.12                      | 15.25             | 2.00         | 1.39 | 1.39 |
| 60             | 3.54                              | 3.54 | 0.00                   | 0.14                      | 15.24             | 2.00         | 1.39 | 1.39 |
| 70             | 3.54                              | 3.54 | 0.00                   | 0.17                      | 15.26             | 1.99         | 1.39 | 1.40 |
| 80             | 3.55                              | 3.55 | 0.00                   | 0.21                      | 15.26             | 1.99         | 1.40 | 1.40 |
| 90             | 3.55                              | 3.55 | 0.00                   | 0.24                      | 15.28             | 1.99         | 1.40 | 1.40 |
| 100            | 3.56                              | 3.56 | 0.00                   | 0.22                      | 15.32             | 1.99         | 1.40 | 1.40 |
| 200            | 3.57                              | 3.58 | 0.00                   | 0.49                      | 15.65             | 1.96         | 1.41 | 1.41 |
| 300            | 3.60                              | 3.61 | 0.00                   | 0.72                      | 15.91             | 1.97         | 1.43 | 1.43 |
| 400            | 3.63                              | 3.63 | 0.00                   | 0.95                      | 16.10             | 1.94         | 1.44 | 1.45 |
| 500            | 3.65                              | 3.64 | 0.00                   | 1.14                      | 16.32             | 1.93         | 1.44 | 1.45 |
| 600            | 3.67                              | 3.67 | 0.00                   | 1.35                      | 16.61             | 1.93         | 1.44 | 1.46 |
| 700            | 3.70                              | 3.68 | 0.01                   | 1.50                      | 16.84             | 1.89         | 1.46 | 1.48 |
| 800            | 3.72                              | 3.69 | 0.03                   | 1.65                      | 17.20             | 1.88         | 1.46 | 1.48 |
| 900            | 3.75                              | 3.70 | 0.05                   | 1.84                      | 17.50             | 1.86         | 1.46 | 1.48 |
| 1000           | 3.77                              | 3.71 | 0.06                   | 1.92                      | 17.81             | 1.82         | 1.47 | 1.50 |
| 1100           | 3.81                              | 3.73 | 0.08                   | 2.03                      | 18.21             | 1.80         | 1.47 | 1.50 |
| 1200           | 3.85                              | 3.74 | 0.11                   | 2.11                      | 18.47             | 1.77         | 1.47 | 1.50 |
| 1300           | 3.89                              | 3.75 | 0.13                   | 2.16                      | 18.78             | 1.74         | 1.48 | 1.51 |
| 1400           | 3.92                              | 3.76 | 0.15                   | 2.19                      | 19.14             | 1.70         | 1.47 | 1.49 |
| 1500           | 3.95                              | 3.77 | 0.18                   | 2.20                      | 19.35             | 1.65         | 1.46 | 1.49 |
| 1600           | 3.98                              | 3.78 | 0.21                   | 2.22                      | 19.83             | 1.59         | 1.45 | 1.49 |
| 1700           | 4.02                              | 3.79 | 0.23                   | 2.12                      | 20.21             | 1.53         | 1.43 | 1.48 |
| 1800           | 4.05                              | 3.79 | 0.26                   | 2.04                      | 20.61             | 1.46         | 1.41 | 1.47 |
| 1900           | 4.07                              | 3.79 | 0.28                   | 1.94                      | 21.12             | 1.39         | 1.39 | 1.44 |
| 2000           | 4.12                              | 3.82 | 0.30                   | 1.55                      | 21.00             | 1.32         | 1.34 | 1.42 |
| 2100           | 4.20                              | 3.87 | 0.33                   | 1.22                      | 20.59             | 1.32         | 1.31 | 1.40 |
| 2200           | 4.34                              | 3.96 | 0.38                   | 0.96                      | 19.18             | 1.40         | 1.28 | 1.38 |
| 2300           | 4.58                              | 4.16 | 0.42                   | 0.43                      | 17.15             | 1.61         | 1.25 | 1.36 |
| 2400           | 5.00                              | 4.55 | 0.45                   | 0.17                      | 14.83             | 2.03         | 1.30 | 1.40 |
| 2500           | 5.69                              | 5.22 | 0.47                   | 1.42                      | 12.57             | 2.69         | 1.41 | 1.51 |

<sup>(1)</sup>Total Loss = Insertion Loss + 3dB splitter loss.



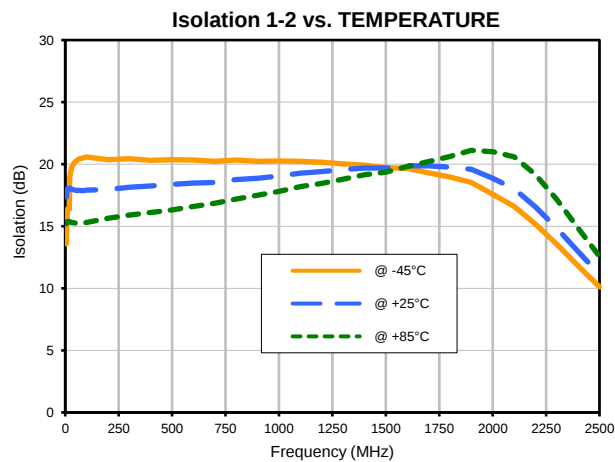
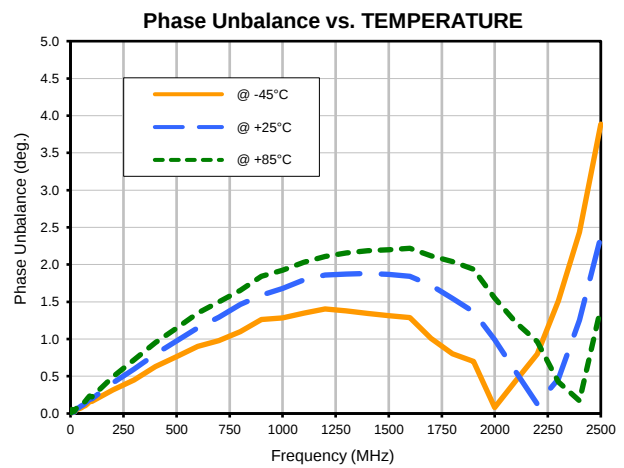
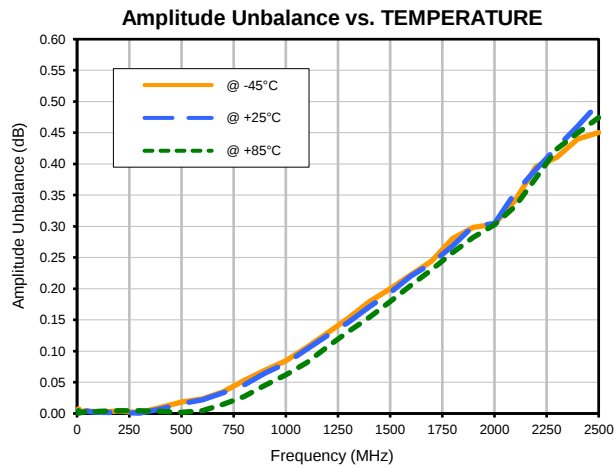
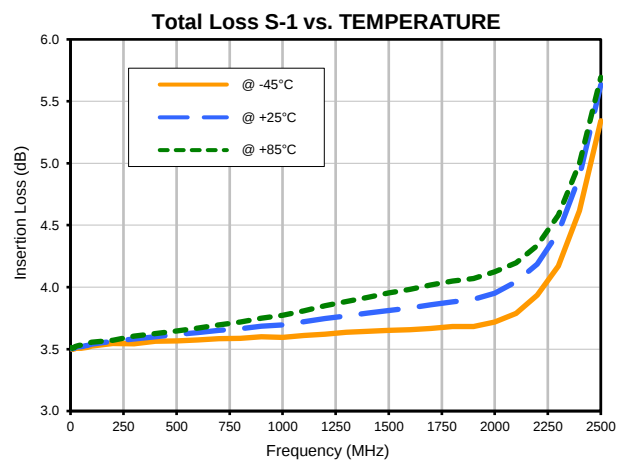
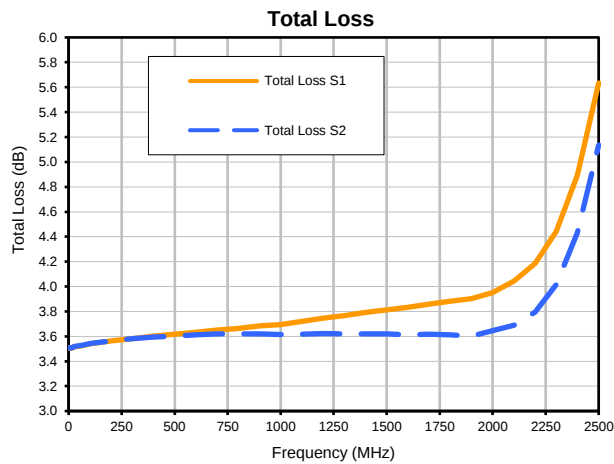
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site  
 The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

IF/RF MICROWAVE COMPONENTS

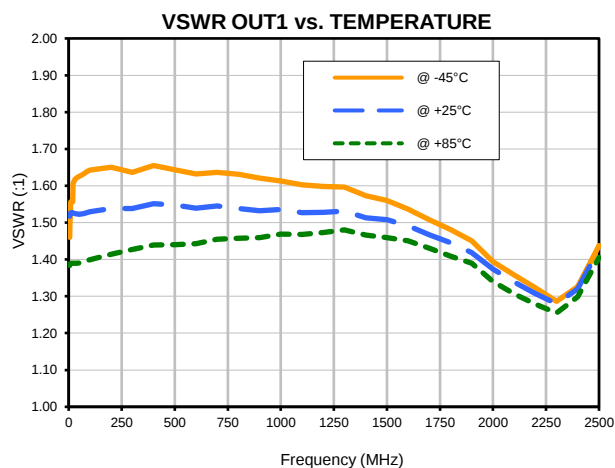
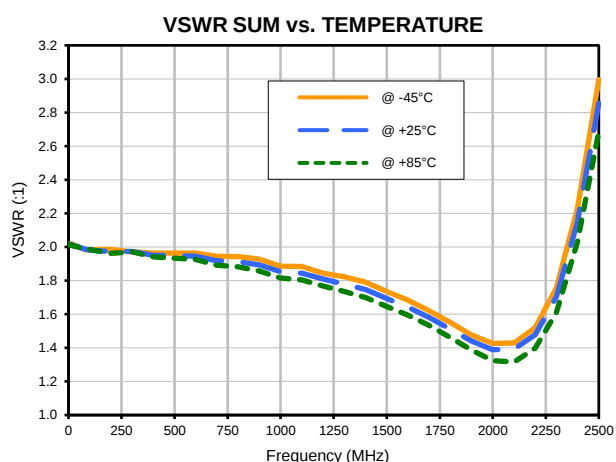
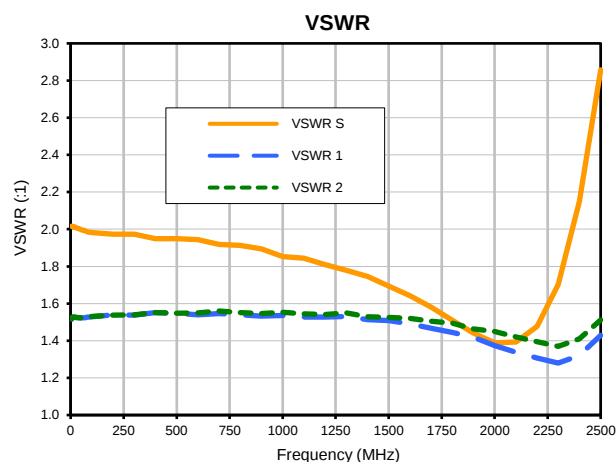


REV. OR  
 ADP-2-20+  
 5/1/2020  
 Page 3 of 3

## Typical Performance Curves

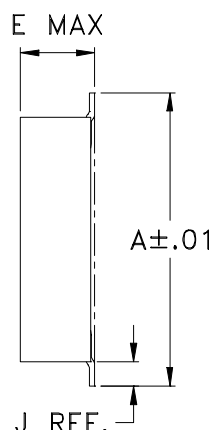


## Typical Performance Curves



CD541  
CD542  
CD636  
CD637

## Outline Dimensions



## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

| CASE# | A              | B              | C              | D              | E              | F              | G              | H              | J              | K              | L              | WT,<br>GRAM |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------|
| CD541 |                |                |                |                | .082<br>(2.08) |                |                |                |                |                |                | .15         |
| CD542 | .272<br>(6.91) | .310<br>(7.87) | .220<br>(5.58) | .100<br>(2.54) | .112<br>(2.84) | .055<br>(1.40) | .100<br>(2.54) | .030<br>(0.76) | .026<br>(0.66) | .065<br>(1.65) | .300<br>(7.62) | .20         |
| CD636 |                |                |                |                | .162<br>(4.11) |                |                |                |                |                |                | .25         |
| CD637 |                |                |                |                | .206<br>(5.23) |                |                |                |                |                |                | .40         |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .01$ ; 3 Pl.  $\pm .005$

### Notes:

- Case material: Plastic.
- Termination finish:  
For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.  
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



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# Tape & Reel Packaging TR-F34



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel<br>see note                |      |
|-------------------|----------------------------|----------------------|---------------------------------------------|------|
| 16                | 12                         | 7                    | Small<br>quantity<br>standard<br>(see note) | 20   |
|                   |                            |                      |                                             | 50   |
|                   |                            |                      |                                             | 100  |
|                   |                            |                      |                                             | 200  |
|                   |                            | 13                   | Standard                                    | 500  |
|                   |                            |                      |                                             | 1000 |

Note: Availability of small reel quantity varies by model.  
Refer to pricing and availability on individual model dashboard.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



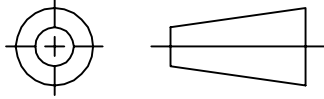
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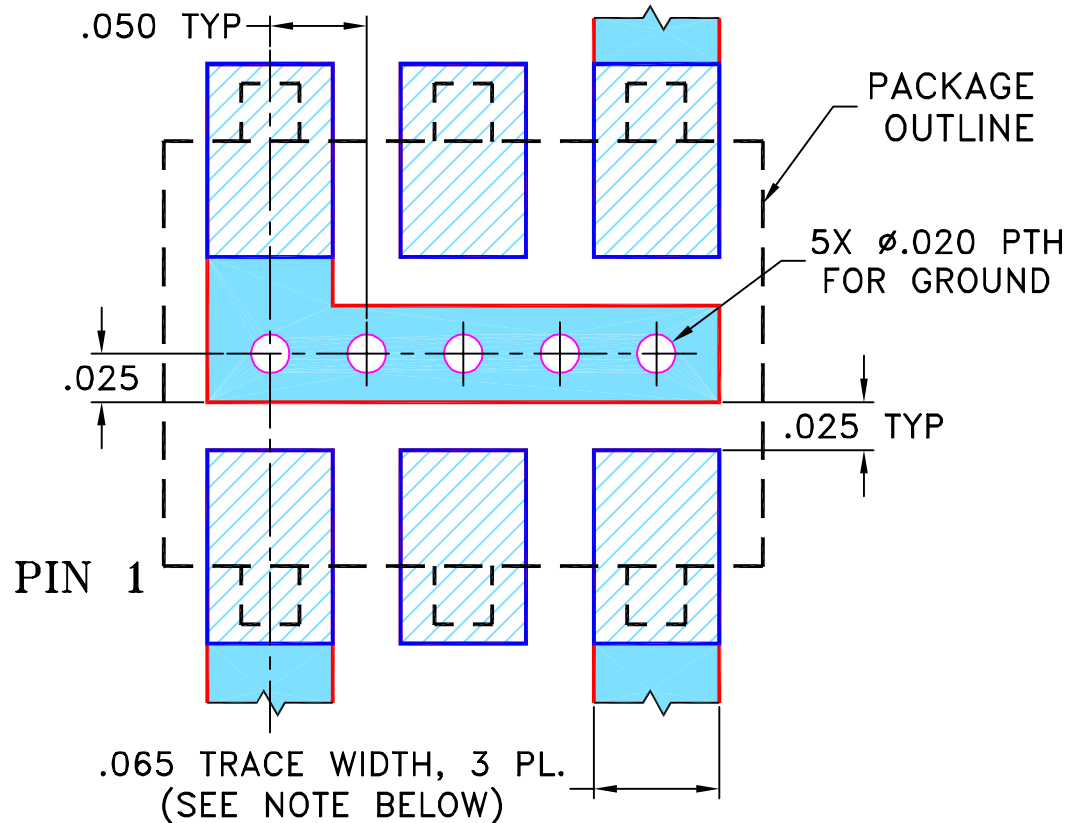
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION                              | DATE     | DR  | AUTH |
|-----|---------|------------------------------------------|----------|-----|------|
| OR  | M77049  | NEW RELEASE                              | 05/01    | AV  | CT   |
| A   | M82377  | UPDATED DRAWING                          | 07/31/02 | AV  | HY   |
| B   | M82846  | UPDATED DRAWING                          | 05/13/03 | MMG | HY   |
| C   | M102713 | ADDED BK292 CASE STYLE & "...WITH SMOBC" | 01/17/06 | MMG | IL   |

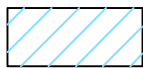
**SUGGESTED MOUNTING CONFIGURATION  
FOR BK292/CD542/CD636 CASE STYLES,  
"hv" PIN CONNECTION**



- NOTES:** 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030"  $\pm$  .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.  
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC  
(SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS  $\pm$ 3 PL DECIMALS  $\pm$  .005ANGLES  $\pm$ FRACTIONS  $\pm$ 

DRAWN

AV

05/30/01

CHECKED

DY

06/11/01

APPROVED

CT

06/11/01

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ASHEETA1.DWG REV:A DATE:01/12/95



# Mini-Circuits®

13 Neptune Avenue  
Brooklyn NY 11235

PL, hv, BK292/CD542/CD636, ADP/JPS, TB-48

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-035

REV:

C

FILE: 98PL035

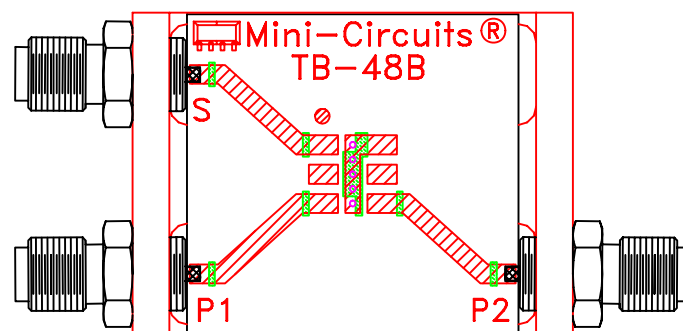
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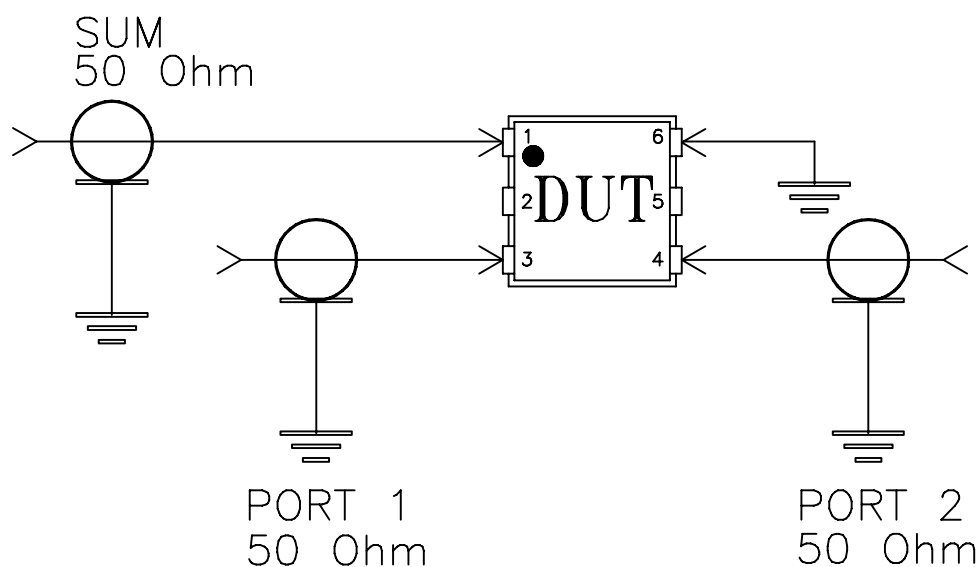
SHEET:

1 OF 1

# Evaluation Board and Circuit



TB-48+



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



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<br>Ambient Environment                                                                                                                             | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                                                          |
| Humidity                       | 90 to 95% RH, 240 hours, 50°C                                                                                                                                   | MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                                                                       | MIL-STD-202, Method 107, Condition A-3, except +100°C                                                |
| Solder Reflow Heat             | Sn-Pb Eutetic Process: 225°C peak<br>Pb-Free Process 245° - 250°C peak                                                                                          | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1                                                        |
| Solderability                  | 10X Magnification                                                                                                                                               | J-STD-002, 95% Coverage                                                                              |
| 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               | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes                                                                                               | MIL-STD-202, Method 213, Condition A                                                                 |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                                                                              |