

## Power Splitter/Combiner

LRPS-2-11J

2 Way-0° 50Ω 20 to 2000 MHz

## Maximum Ratings

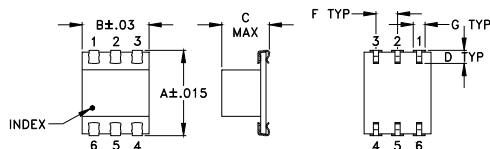
|                             |                |
|-----------------------------|----------------|
| Operating Temperature       | -40°C to 85°C  |
| Storage Temperature         | -55°C to 100°C |
| Power Input (as a splitter) | 1W max.        |
| Internal Dissipation        | 0.125W max.    |

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

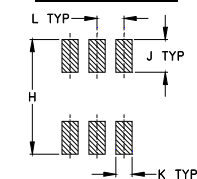
## Pin Connections

|          |       |
|----------|-------|
| SUM PORT | 6     |
| PORT 1   | 4     |
| PORT 2   | 3     |
| GROUND   | 1,2,5 |

## Outline Drawing

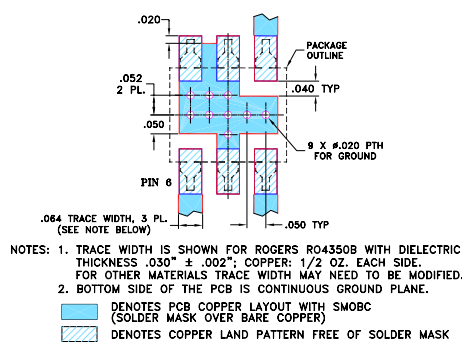


## PCB Land Pattern

Suggested Layout,  
Tolerance to be within ±.002

## Outline Dimensions (inch mm)

|       |      |      |      |    |      |       |
|-------|------|------|------|----|------|-------|
| A     | B    | C    | D    | E  | F    | G     |
| .390  | .31  | .225 | .060 | -- | .100 | .045  |
| 9.91  | 7.87 | 5.72 | 1.52 | -- | 2.54 | 1.14  |
| H     | J    | K    | L    | M  |      | wt    |
| .420  | .120 | .060 | .100 | -- |      | grams |
| 10.67 | 3.05 | 1.52 | 2.54 | -- |      | 0.50  |

Demo Board MCL P/N: TB-100  
Suggested PCB Layout (PL-057)

## 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.
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## Features

- very wideband, 20 to 2000 MHz
- low insertion loss, 0.7 dB typ.
- good isolation, 21 dB typ.
- aqueous washable
- J-leads for strain relief and excellent solderability

## Applications

- cellular
- GPS
- communications systems

## Electrical Specifications

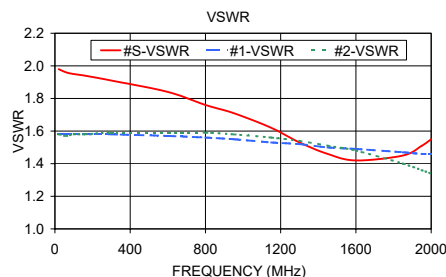
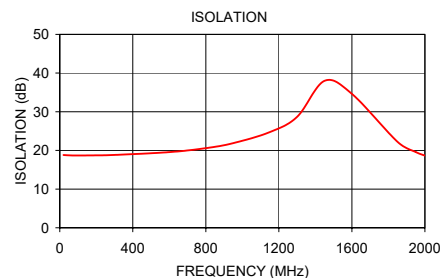
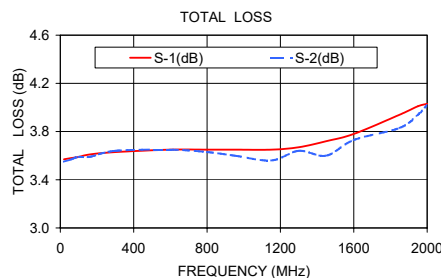
| FREQ. RANGE (MHz) | ISOLATION (dB) |      |      |      |      |      | INSERTION LOSS (dB) ABOVE 3.0 dB |      |      |      |      |      | PHASE UNBALANCE (Degrees) |      |      | AMPLITUDE UNBALANCE (dB) |      |      |
|-------------------|----------------|------|------|------|------|------|----------------------------------|------|------|------|------|------|---------------------------|------|------|--------------------------|------|------|
|                   | L              |      | M    |      | U    |      | L                                |      | M    |      | U    |      | L                         |      | M    |                          | U    |      |
| $f_L$ - $f_U$     | Typ.           | Min. | Typ. | Min. | Typ. | Min. | Typ.                             | Max. | Typ. | Max. | Typ. | Max. | Max.                      | Max. | Max. | Max.                     | Max. | Max. |
| 20-2000           | 19             | 15   | 21   | 15   | 30   | 15   | 0.6                              | 0.8  | 0.7  | 1.0  | 0.8  | 1.5  | 2.0                       | 3.0  | 5.0  | 0.2                      | 0.3  | 0.7  |

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           | 3.57                         | 3.55 | 0.01                     | 18.82          | 0.10                   | 1.98   | 1.58   | 1.58   |
| 60.00           | 3.58                         | 3.57 | 0.01                     | 18.71          | 0.18                   | 1.96   | 1.58   | 1.57   |
| 100.00          | 3.59                         | 3.59 | 0.01                     | 18.70          | 0.29                   | 1.95   | 1.58   | 1.58   |
| 160.00          | 3.61                         | 3.59 | 0.02                     | 18.72          | 0.45                   | 1.94   | 1.58   | 1.58   |
| 300.00          | 3.63                         | 3.64 | 0.01                     | 18.84          | 0.77                   | 1.91   | 1.58   | 1.59   |
| 600.00          | 3.65                         | 3.65 | 0.00                     | 19.55          | 1.46                   | 1.84   | 1.57   | 1.59   |
| 800.00          | 3.65                         | 3.63 | 0.02                     | 20.59          | 1.76                   | 1.76   | 1.56   | 1.59   |
| 950.00          | 3.65                         | 3.60 | 0.05                     | 21.89          | 1.90                   | 1.71   | 1.55   | 1.58   |
| 1150.00         | 3.65                         | 3.56 | 0.09                     | 24.73          | 1.89                   | 1.62   | 1.53   | 1.56   |
| 1300.00         | 3.67                         | 3.64 | 0.03                     | 28.68          | 1.70                   | 1.53   | 1.52   | 1.54   |
| 1450.00         | 3.72                         | 3.60 | 0.12                     | 37.99          | 1.45                   | 1.46   | 1.50   | 1.51   |
| 1600.00         | 3.78                         | 3.73 | 0.05                     | 34.62          | 1.03                   | 1.42   | 1.49   | 1.48   |
| 1850.00         | 3.94                         | 3.83 | 0.11                     | 22.22          | 0.16                   | 1.45   | 1.47   | 1.40   |
| 1950.00         | 4.01                         | 3.94 | 0.07                     | 19.58          | 0.70                   | 1.51   | 1.46   | 1.36   |
| 2000.00         | 4.03                         | 4.02 | 0.01                     | 18.65          | 0.98                   | 1.55   | 1.46   | 1.34   |

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



## electrical schematic



# 2 Way-0° Power Splitter/Combiner

LRPS-2-11J

## Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @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)<br>1-2 | VSWR<br>(:1) |      |      |
|----------------|---------------------------------|------|------------------------|---------------------------|--------------------------|--------------|------|------|
|                | S-1                             | S-2  |                        |                           |                          | S            | 1    | 2    |
| 10             | 3.54                            | 3.54 | 0.00                   | 0.03                      | 18.03                    | 1.99         | 1.54 | 1.53 |
| 20             | 3.55                            | 3.55 | 0.00                   | 0.08                      | 18.11                    | 1.98         | 1.54 | 1.53 |
| 30             | 3.55                            | 3.55 | 0.00                   | 0.12                      | 18.10                    | 1.98         | 1.54 | 1.54 |
| 40             | 3.56                            | 3.56 | 0.00                   | 0.15                      | 18.10                    | 1.98         | 1.54 | 1.54 |
| 50             | 3.57                            | 3.57 | 0.00                   | 0.18                      | 18.12                    | 1.97         | 1.54 | 1.54 |
| 100            | 3.59                            | 3.59 | 0.00                   | 0.36                      | 18.25                    | 1.96         | 1.55 | 1.55 |
| 150            | 3.61                            | 3.60 | 0.01                   | 0.56                      | 18.38                    | 1.95         | 1.56 | 1.56 |
| 200            | 3.61                            | 3.61 | 0.00                   | 0.75                      | 18.50                    | 1.94         | 1.57 | 1.57 |
| 250            | 3.63                            | 3.62 | 0.01                   | 0.94                      | 18.65                    | 1.93         | 1.57 | 1.57 |
| 300            | 3.64                            | 3.62 | 0.02                   | 1.11                      | 18.84                    | 1.92         | 1.58 | 1.58 |
| 350            | 3.65                            | 3.63 | 0.02                   | 1.28                      | 19.03                    | 1.92         | 1.58 | 1.58 |
| 400            | 3.66                            | 3.63 | 0.03                   | 1.43                      | 19.22                    | 1.91         | 1.59 | 1.59 |
| 450            | 3.67                            | 3.63 | 0.04                   | 1.56                      | 19.44                    | 1.90         | 1.59 | 1.59 |
| 500            | 3.68                            | 3.63 | 0.05                   | 1.71                      | 19.70                    | 1.90         | 1.60 | 1.60 |
| 550            | 3.69                            | 3.64 | 0.05                   | 1.85                      | 19.98                    | 1.89         | 1.60 | 1.60 |
| 600            | 3.70                            | 3.64 | 0.06                   | 2.00                      | 20.28                    | 1.88         | 1.61 | 1.60 |
| 650            | 3.71                            | 3.63 | 0.08                   | 2.08                      | 20.63                    | 1.87         | 1.62 | 1.61 |
| 700            | 3.72                            | 3.63 | 0.09                   | 2.17                      | 20.99                    | 1.87         | 1.63 | 1.61 |
| 750            | 3.73                            | 3.63 | 0.10                   | 2.27                      | 21.46                    | 1.86         | 1.63 | 1.62 |
| 800            | 3.74                            | 3.63 | 0.11                   | 2.33                      | 21.93                    | 1.85         | 1.64 | 1.62 |
| 850            | 3.75                            | 3.62 | 0.13                   | 2.46                      | 22.48                    | 1.83         | 1.65 | 1.63 |
| 900            | 3.76                            | 3.61 | 0.15                   | 2.45                      | 23.06                    | 1.82         | 1.66 | 1.63 |
| 950            | 3.77                            | 3.60 | 0.17                   | 2.42                      | 23.74                    | 1.81         | 1.66 | 1.64 |
| 1000           | 3.79                            | 3.60 | 0.19                   | 2.48                      | 24.51                    | 1.80         | 1.67 | 1.64 |
| 1050           | 3.79                            | 3.59 | 0.20                   | 2.46                      | 25.38                    | 1.78         | 1.68 | 1.65 |
| 1100           | 3.80                            | 3.58 | 0.22                   | 2.44                      | 26.35                    | 1.76         | 1.69 | 1.65 |
| 1150           | 3.82                            | 3.57 | 0.25                   | 2.39                      | 27.48                    | 1.75         | 1.69 | 1.65 |
| 1200           | 3.83                            | 3.55 | 0.28                   | 2.33                      | 28.75                    | 1.73         | 1.70 | 1.66 |
| 1250           | 3.83                            | 3.55 | 0.28                   | 2.27                      | 30.38                    | 1.71         | 1.71 | 1.66 |
| 1300           | 3.84                            | 3.53 | 0.31                   | 2.13                      | 32.15                    | 1.69         | 1.71 | 1.65 |
| 1350           | 3.85                            | 3.53 | 0.32                   | 2.05                      | 34.11                    | 1.67         | 1.71 | 1.65 |
| 1400           | 3.86                            | 3.52 | 0.34                   | 1.92                      | 35.37                    | 1.65         | 1.72 | 1.65 |
| 1450           | 3.87                            | 3.52 | 0.35                   | 1.82                      | 35.00                    | 1.62         | 1.72 | 1.65 |
| 1500           | 3.87                            | 3.50 | 0.37                   | 1.55                      | 33.60                    | 1.60         | 1.72 | 1.64 |
| 1550           | 3.88                            | 3.50 | 0.38                   | 1.35                      | 31.55                    | 1.58         | 1.72 | 1.64 |
| 1600           | 3.89                            | 3.49 | 0.40                   | 1.07                      | 29.57                    | 1.55         | 1.72 | 1.63 |
| 1650           | 3.89                            | 3.48 | 0.41                   | 0.85                      | 27.62                    | 1.53         | 1.72 | 1.63 |
| 1700           | 3.90                            | 3.47 | 0.43                   | 0.52                      | 26.09                    | 1.50         | 1.72 | 1.62 |
| 1750           | 3.93                            | 3.47 | 0.46                   | 0.25                      | 24.71                    | 1.48         | 1.70 | 1.61 |
| 1800           | 3.92                            | 3.48 | 0.44                   | 0.06                      | 23.28                    | 1.46         | 1.70 | 1.60 |
| 1850           | 3.93                            | 3.48 | 0.45                   | 0.40                      | 22.13                    | 1.44         | 1.70 | 1.59 |
| 1900           | 3.95                            | 3.47 | 0.48                   | 0.89                      | 21.18                    | 1.42         | 1.69 | 1.58 |
| 1950           | 3.95                            | 3.49 | 0.46                   | 1.20                      | 20.15                    | 1.40         | 1.68 | 1.56 |
| 2000           | 3.96                            | 3.51 | 0.45                   | 1.48                      | 19.20                    | 1.39         | 1.66 | 1.55 |
| 2050           | 3.97                            | 3.53 | 0.44                   | 2.11                      | 18.40                    | 1.39         | 1.66 | 1.53 |
| 2100           | 3.97                            | 3.55 | 0.42                   | 2.54                      | 17.59                    | 1.39         | 1.64 | 1.52 |
| 2150           | 4.00                            | 3.58 | 0.42                   | 3.02                      | 16.84                    | 1.39         | 1.62 | 1.50 |
| 2200           | 4.00                            | 3.62 | 0.38                   | 3.77                      | 16.17                    | 1.41         | 1.62 | 1.48 |
| 2250           | 4.04                            | 3.66 | 0.38                   | 4.52                      | 15.49                    | 1.43         | 1.60 | 1.46 |
| 2300           | 4.06                            | 3.70 | 0.36                   | 4.86                      | 14.84                    | 1.46         | 1.58 | 1.44 |
| 2400           | 4.17                            | 3.82 | 0.35                   | 6.10                      | 13.70                    | 1.53         | 1.54 | 1.40 |
| 2500           | 4.22                            | 3.96 | 0.26                   | 7.04                      | 12.64                    | 1.63         | 1.51 | 1.36 |
| 2600           | 4.29                            | 4.16 | 0.13                   | 8.71                      | 11.63                    | 1.77         | 1.51 | 1.32 |

<sup>1</sup>Total Loss = Insertion Loss + 3dB Splitter Loss

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# 2 Way-0° Power Splitter/Combiner

LRPS-2-11J

## Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = -40°C

| FREQ.<br>(MHz) | TOTAL LOSS <sup>1</sup><br>(dB) |      | AMP.<br>UNBAL.<br>(dB) | PHASE<br>UNBAL.<br>(deg.) | ISOLATION<br>(dB)<br>1-2 | VSWR<br>(:1) |      |      |
|----------------|---------------------------------|------|------------------------|---------------------------|--------------------------|--------------|------|------|
|                | S-1                             | S-2  |                        |                           |                          | S            | 1    | 2    |
| 10             | 3.53                            | 3.53 | 0.00                   | 0.04                      | 17.18                    | 1.99         | 1.55 | 1.54 |
| 20             | 3.54                            | 3.54 | 0.00                   | 0.11                      | 18.68                    | 1.99         | 1.58 | 1.58 |
| 30             | 3.54                            | 3.54 | 0.00                   | 0.15                      | 19.13                    | 1.99         | 1.59 | 1.60 |
| 40             | 3.55                            | 3.55 | 0.00                   | 0.20                      | 19.38                    | 1.99         | 1.60 | 1.61 |
| 50             | 3.56                            | 3.56 | 0.00                   | 0.25                      | 19.53                    | 1.98         | 1.61 | 1.62 |
| 100            | 3.57                            | 3.56 | 0.01                   | 0.50                      | 19.84                    | 1.96         | 1.62 | 1.62 |
| 150            | 3.58                            | 3.57 | 0.01                   | 0.79                      | 19.93                    | 1.95         | 1.63 | 1.62 |
| 200            | 3.59                            | 3.58 | 0.01                   | 1.06                      | 19.93                    | 1.95         | 1.63 | 1.64 |
| 250            | 3.60                            | 3.57 | 0.03                   | 1.33                      | 19.99                    | 1.94         | 1.63 | 1.63 |
| 300            | 3.60                            | 3.57 | 0.03                   | 1.61                      | 20.16                    | 1.93         | 1.63 | 1.64 |
| 350            | 3.61                            | 3.57 | 0.04                   | 1.87                      | 20.37                    | 1.92         | 1.64 | 1.64 |
| 400            | 3.61                            | 3.57 | 0.04                   | 2.12                      | 20.52                    | 1.92         | 1.64 | 1.64 |
| 450            | 3.63                            | 3.57 | 0.06                   | 2.37                      | 20.70                    | 1.91         | 1.65 | 1.65 |
| 500            | 3.64                            | 3.57 | 0.07                   | 2.60                      | 20.92                    | 1.91         | 1.65 | 1.65 |
| 550            | 3.64                            | 3.56 | 0.08                   | 2.85                      | 21.23                    | 1.90         | 1.65 | 1.65 |
| 600            | 3.65                            | 3.56 | 0.09                   | 3.09                      | 21.52                    | 1.89         | 1.66 | 1.65 |
| 650            | 3.66                            | 3.55 | 0.11                   | 3.29                      | 21.87                    | 1.88         | 1.66 | 1.66 |
| 700            | 3.67                            | 3.54 | 0.13                   | 3.45                      | 22.24                    | 1.87         | 1.67 | 1.66 |
| 750            | 3.67                            | 3.53 | 0.14                   | 3.67                      | 22.74                    | 1.87         | 1.68 | 1.67 |
| 800            | 3.68                            | 3.53 | 0.15                   | 3.83                      | 23.27                    | 1.86         | 1.68 | 1.67 |
| 850            | 3.69                            | 3.51 | 0.18                   | 4.05                      | 23.84                    | 1.84         | 1.69 | 1.67 |
| 900            | 3.70                            | 3.51 | 0.19                   | 4.18                      | 24.49                    | 1.83         | 1.70 | 1.68 |
| 950            | 3.71                            | 3.49 | 0.22                   | 4.33                      | 25.23                    | 1.82         | 1.70 | 1.68 |
| 1000           | 3.72                            | 3.49 | 0.23                   | 4.41                      | 26.18                    | 1.80         | 1.71 | 1.69 |
| 1050           | 3.73                            | 3.47 | 0.26                   | 4.58                      | 27.11                    | 1.79         | 1.72 | 1.69 |
| 1100           | 3.73                            | 3.45 | 0.28                   | 4.59                      | 28.35                    | 1.78         | 1.72 | 1.69 |
| 1150           | 3.75                            | 3.45 | 0.30                   | 4.79                      | 29.71                    | 1.76         | 1.73 | 1.70 |
| 1200           | 3.74                            | 3.44 | 0.30                   | 4.78                      | 31.66                    | 1.74         | 1.74 | 1.70 |
| 1250           | 3.76                            | 3.42 | 0.34                   | 4.81                      | 33.49                    | 1.73         | 1.74 | 1.70 |
| 1300           | 3.76                            | 3.41 | 0.35                   | 4.78                      | 35.92                    | 1.71         | 1.75 | 1.70 |
| 1350           | 3.77                            | 3.40 | 0.37                   | 4.86                      | 37.51                    | 1.69         | 1.75 | 1.69 |
| 1400           | 3.77                            | 3.39 | 0.38                   | 4.81                      | 36.84                    | 1.67         | 1.75 | 1.69 |
| 1450           | 3.78                            | 3.37 | 0.41                   | 4.71                      | 34.51                    | 1.65         | 1.76 | 1.68 |
| 1500           | 3.79                            | 3.36 | 0.43                   | 4.66                      | 31.99                    | 1.62         | 1.76 | 1.68 |
| 1550           | 3.79                            | 3.35 | 0.44                   | 4.58                      | 29.69                    | 1.60         | 1.76 | 1.67 |
| 1600           | 3.79                            | 3.34 | 0.46                   | 4.41                      | 27.79                    | 1.57         | 1.76 | 1.67 |
| 1650           | 3.80                            | 3.32 | 0.48                   | 4.26                      | 26.21                    | 1.55         | 1.76 | 1.66 |
| 1700           | 3.80                            | 3.32 | 0.48                   | 4.13                      | 24.63                    | 1.53         | 1.75 | 1.66 |
| 1750           | 3.82                            | 3.30 | 0.52                   | 3.81                      | 23.51                    | 1.50         | 1.74 | 1.65 |
| 1800           | 3.80                            | 3.31 | 0.49                   | 3.78                      | 22.10                    | 1.47         | 1.74 | 1.64 |
| 1850           | 3.83                            | 3.30 | 0.52                   | 3.80                      | 21.06                    | 1.45         | 1.71 | 1.63 |
| 1900           | 3.82                            | 3.30 | 0.52                   | 3.28                      | 20.20                    | 1.43         | 1.72 | 1.62 |
| 1950           | 3.83                            | 3.32 | 0.51                   | 3.18                      | 19.28                    | 1.41         | 1.69 | 1.61 |
| 2000           | 3.85                            | 3.33 | 0.52                   | 3.07                      | 18.44                    | 1.39         | 1.68 | 1.59 |
| 2050           | 3.81                            | 3.34 | 0.47                   | 2.38                      | 17.60                    | 1.39         | 1.69 | 1.57 |
| 2100           | 3.85                            | 3.36 | 0.49                   | 1.85                      | 16.91                    | 1.39         | 1.68 | 1.55 |
| 2150           | 3.84                            | 3.39 | 0.45                   | 1.66                      | 16.19                    | 1.39         | 1.65 | 1.54 |
| 2200           | 3.87                            | 3.42 | 0.45                   | 0.96                      | 15.56                    | 1.40         | 1.64 | 1.52 |
| 2250           | 3.91                            | 3.45 | 0.46                   | 0.64                      | 14.87                    | 1.42         | 1.61 | 1.49 |
| 2300           | 3.91                            | 3.50 | 0.42                   | 0.30                      | 14.21                    | 1.44         | 1.60 | 1.47 |
| 2400           | 3.98                            | 3.60 | 0.38                   | 1.12                      | 13.04                    | 1.50         | 1.57 | 1.42 |
| 2500           | 4.01                            | 3.73 | 0.27                   | 2.07                      | 12.08                    | 1.59         | 1.54 | 1.38 |
| 2600           | 4.12                            | 3.89 | 0.23                   | 3.28                      | 11.23                    | 1.71         | 1.52 | 1.34 |

<sup>1</sup>Total Loss = Insertion Loss + 3dB Splitter Loss

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# 2 Way-0° Power Splitter/Combiner

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## Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @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)<br>1-2 | VSWR<br>(:1) |      |      |
|----------------|---------------------------------|------|------------------------|---------------------------|--------------------------|--------------|------|------|
|                | S-1                             | S-2  |                        |                           |                          | S            | 1    | 2    |
| 10             | 3.54                            | 3.54 | 0.00                   | 0.03                      | 15.75                    | 1.98         | 1.42 | 1.42 |
| 20             | 3.55                            | 3.55 | 0.00                   | 0.10                      | 15.80                    | 1.98         | 1.42 | 1.42 |
| 30             | 3.55                            | 3.55 | 0.00                   | 0.13                      | 15.79                    | 1.97         | 1.42 | 1.42 |
| 40             | 3.56                            | 3.57 | 0.01                   | 0.18                      | 15.80                    | 1.97         | 1.43 | 1.42 |
| 50             | 3.57                            | 3.57 | 0.00                   | 0.21                      | 15.81                    | 1.97         | 1.43 | 1.42 |
| 100            | 3.60                            | 3.60 | 0.00                   | 0.41                      | 15.93                    | 1.96         | 1.44 | 1.44 |
| 150            | 3.62                            | 3.62 | 0.00                   | 0.57                      | 16.09                    | 1.95         | 1.44 | 1.45 |
| 200            | 3.63                            | 3.63 | 0.00                   | 0.75                      | 16.28                    | 1.93         | 1.45 | 1.45 |
| 250            | 3.64                            | 3.64 | 0.00                   | 0.92                      | 16.49                    | 1.93         | 1.46 | 1.47 |
| 300            | 3.65                            | 3.65 | 0.00                   | 1.08                      | 16.69                    | 1.92         | 1.47 | 1.47 |
| 350            | 3.66                            | 3.67 | 0.01                   | 1.24                      | 16.89                    | 1.91         | 1.48 | 1.48 |
| 400            | 3.68                            | 3.67 | 0.01                   | 1.38                      | 17.09                    | 1.91         | 1.49 | 1.49 |
| 450            | 3.69                            | 3.68 | 0.01                   | 1.51                      | 17.33                    | 1.90         | 1.50 | 1.50 |
| 500            | 3.70                            | 3.69 | 0.01                   | 1.63                      | 17.59                    | 1.89         | 1.50 | 1.50 |
| 550            | 3.72                            | 3.69 | 0.03                   | 1.75                      | 17.91                    | 1.89         | 1.51 | 1.51 |
| 600            | 3.72                            | 3.70 | 0.02                   | 1.86                      | 18.23                    | 1.88         | 1.52 | 1.52 |
| 650            | 3.73                            | 3.70 | 0.03                   | 1.93                      | 18.60                    | 1.87         | 1.53 | 1.52 |
| 700            | 3.75                            | 3.70 | 0.05                   | 1.97                      | 18.97                    | 1.86         | 1.54 | 1.53 |
| 750            | 3.76                            | 3.70 | 0.06                   | 2.08                      | 19.41                    | 1.85         | 1.55 | 1.54 |
| 800            | 3.77                            | 3.71 | 0.06                   | 2.10                      | 19.85                    | 1.84         | 1.56 | 1.55 |
| 850            | 3.78                            | 3.70 | 0.08                   | 2.19                      | 20.34                    | 1.82         | 1.57 | 1.55 |
| 900            | 3.79                            | 3.70 | 0.09                   | 2.18                      | 20.86                    | 1.81         | 1.58 | 1.56 |
| 950            | 3.80                            | 3.70 | 0.10                   | 2.20                      | 21.44                    | 1.79         | 1.59 | 1.57 |
| 1000           | 3.81                            | 3.70 | 0.11                   | 2.17                      | 22.09                    | 1.78         | 1.60 | 1.57 |
| 1050           | 3.83                            | 3.69 | 0.14                   | 2.17                      | 22.75                    | 1.76         | 1.60 | 1.58 |
| 1100           | 3.84                            | 3.69 | 0.15                   | 2.06                      | 23.54                    | 1.74         | 1.61 | 1.58 |
| 1150           | 3.85                            | 3.68 | 0.16                   | 2.10                      | 24.45                    | 1.72         | 1.62 | 1.59 |
| 1200           | 3.85                            | 3.69 | 0.16                   | 2.02                      | 25.41                    | 1.70         | 1.62 | 1.59 |
| 1250           | 3.86                            | 3.67 | 0.19                   | 1.90                      | 26.45                    | 1.68         | 1.63 | 1.59 |
| 1300           | 3.87                            | 3.67 | 0.20                   | 1.75                      | 27.72                    | 1.66         | 1.63 | 1.59 |
| 1350           | 3.88                            | 3.67 | 0.21                   | 1.73                      | 29.13                    | 1.63         | 1.64 | 1.58 |
| 1400           | 3.89                            | 3.67 | 0.22                   | 1.58                      | 30.79                    | 1.61         | 1.64 | 1.58 |
| 1450           | 3.90                            | 3.65 | 0.25                   | 1.37                      | 32.50                    | 1.58         | 1.64 | 1.57 |
| 1500           | 3.92                            | 3.64 | 0.28                   | 1.20                      | 34.21                    | 1.56         | 1.64 | 1.57 |
| 1550           | 3.92                            | 3.65 | 0.27                   | 1.04                      | 35.03                    | 1.53         | 1.64 | 1.56 |
| 1600           | 3.93                            | 3.65 | 0.29                   | 0.76                      | 34.52                    | 1.51         | 1.64 | 1.56 |
| 1650           | 3.94                            | 3.64 | 0.30                   | 0.50                      | 32.79                    | 1.48         | 1.64 | 1.55 |
| 1700           | 3.94                            | 3.65 | 0.29                   | 0.30                      | 30.62                    | 1.45         | 1.63 | 1.54 |
| 1750           | 3.97                            | 3.64 | 0.33                   | 0.09                      | 29.10                    | 1.43         | 1.62 | 1.54 |
| 1800           | 3.96                            | 3.66 | 0.30                   | 0.22                      | 27.02                    | 1.41         | 1.62 | 1.53 |
| 1850           | 3.97                            | 3.67 | 0.30                   | 0.32                      | 25.30                    | 1.38         | 1.61 | 1.52 |
| 1900           | 3.99                            | 3.66 | 0.33                   | 0.89                      | 24.34                    | 1.37         | 1.61 | 1.51 |
| 1950           | 4.00                            | 3.69 | 0.31                   | 1.19                      | 23.04                    | 1.35         | 1.59 | 1.50 |
| 2000           | 4.04                            | 3.70 | 0.34                   | 1.21                      | 22.02                    | 1.33         | 1.56 | 1.49 |
| 2050           | 4.00                            | 3.73 | 0.27                   | 1.87                      | 20.92                    | 1.33         | 1.57 | 1.47 |
| 2100           | 4.03                            | 3.76 | 0.27                   | 2.38                      | 20.04                    | 1.32         | 1.56 | 1.46 |
| 2150           | 4.06                            | 3.78 | 0.27                   | 2.77                      | 19.24                    | 1.33         | 1.54 | 1.44 |
| 2200           | 4.06                            | 3.81 | 0.25                   | 3.37                      | 18.41                    | 1.34         | 1.54 | 1.43 |
| 2250           | 4.09                            | 3.85 | 0.24                   | 3.57                      | 17.63                    | 1.35         | 1.50 | 1.41 |
| 2300           | 4.12                            | 3.89 | 0.22                   | 4.18                      | 16.96                    | 1.37         | 1.50 | 1.40 |
| 2400           | 4.15                            | 4.02 | 0.13                   | 5.58                      | 15.60                    | 1.44         | 1.49 | 1.37 |
| 2500           | 4.20                            | 4.14 | 0.06                   | 6.53                      | 14.45                    | 1.51         | 1.47 | 1.34 |
| 2600           | 4.26                            | 4.30 | 0.04                   | 7.68                      | 13.42                    | 1.60         | 1.45 | 1.31 |

<sup>1</sup>Total Loss = Insertion Loss + 3dB Splitter Loss

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100624  
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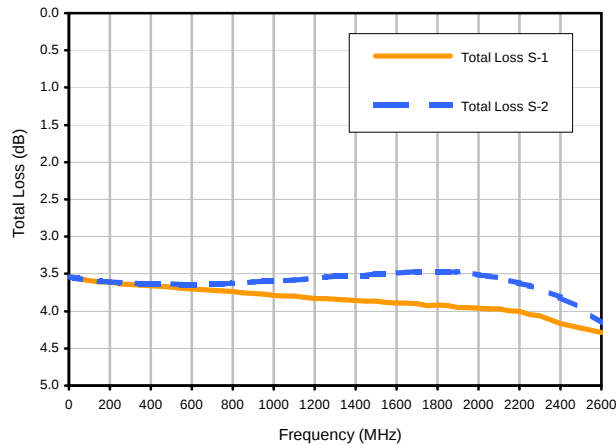


# 2 Way-0° Power Splitter/Combiner

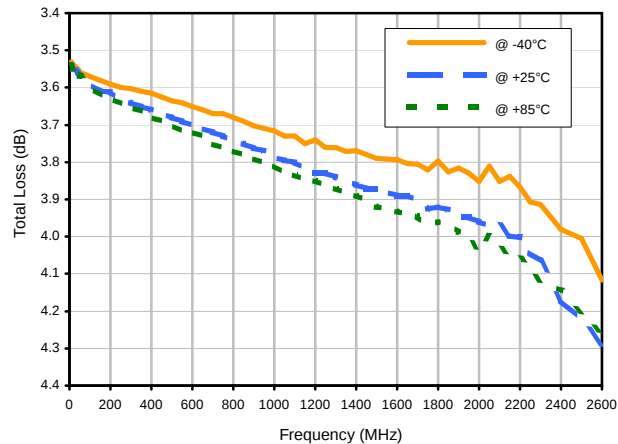
LRPS-2-11J

## Typical Performance Curves

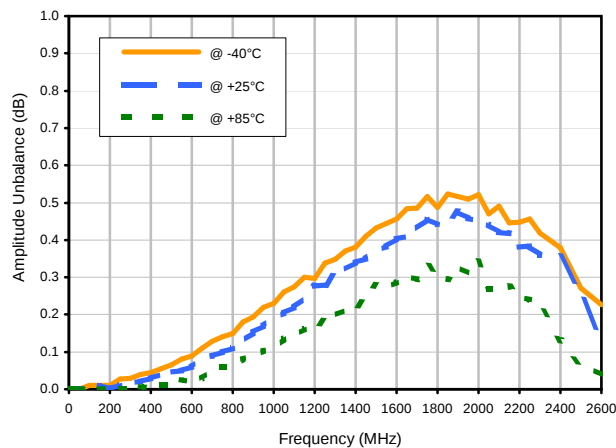
Total Loss



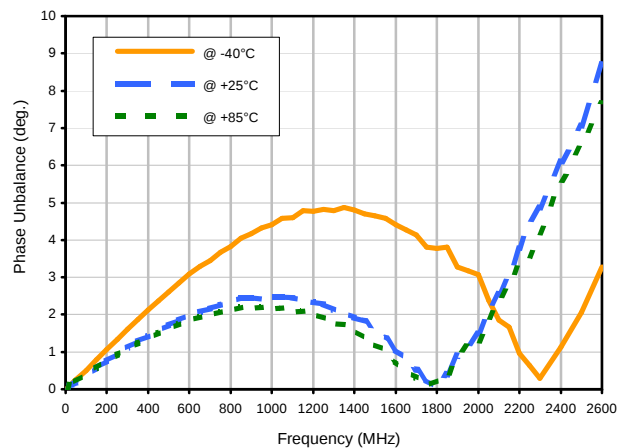
Total Loss S-1 vs. TEMPERATURE



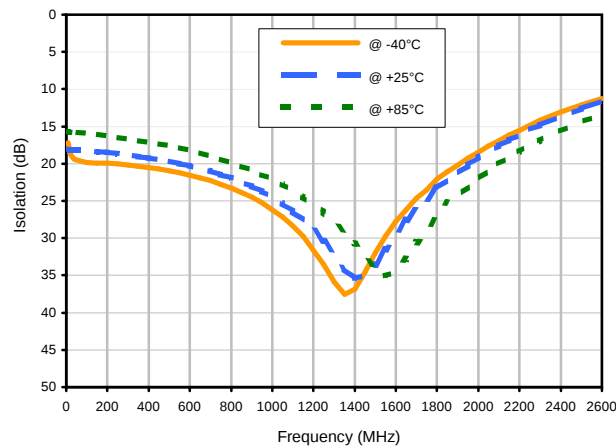
Amplitude Unbalance vs. TEMPERATURE



Phase Unbalance vs. TEMPERATURE



Isolation 1-2 vs. TEMPERATURE



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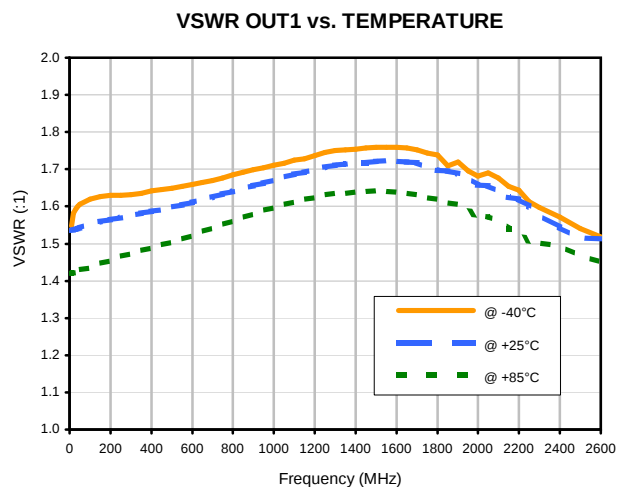
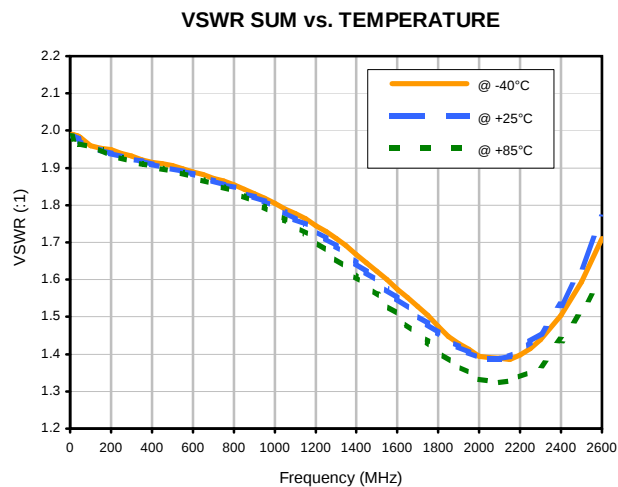
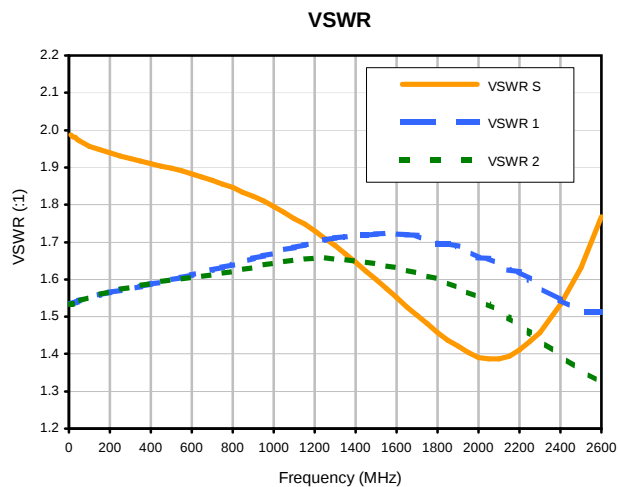


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100624  
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# 2 Way-0° Power Splitter/Combiner

LRPS-2-11J

## Typical Performance Curves



Patent Pending

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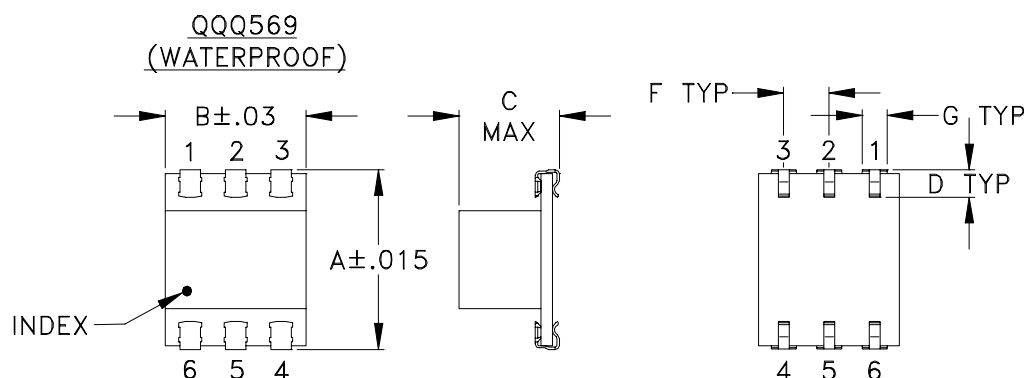


# Case Style

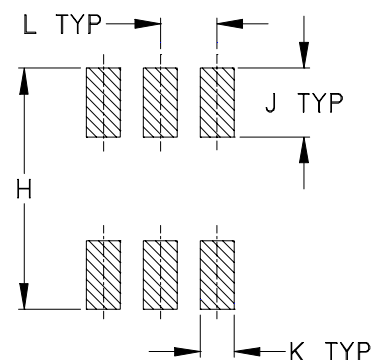
# QQQ

QQQ569 (waterproof)

## 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              | M | WT,<br>GRAM |
|--------|----------------|---------------|----------------|----------------|---|----------------|----------------|-----------------|----------------|----------------|----------------|---|-------------|
| QQQ569 | .390<br>(9.90) | .31<br>(7.87) | .225<br>(5.72) | .060<br>(1.52) | - | .100<br>(2.54) | .045<br>(1.14) | .420<br>(10.67) | .120<br>(3.05) | .060<br>(1.52) | .100<br>(2.54) | - | .50         |

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

### Notes:

- Case material: Ceramic.
- Termination finish:
  - For RoHS Case Styles: Tin plate over Nickel plate.
  - For RoHS-5 Case Styles: Tin-Lead plate.



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# Tape & Reel Packaging TR-F5



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel |
|-------------------|----------------------------|----------------------|------------------|
| 32                | 16                         | 13                   | 500              |

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)



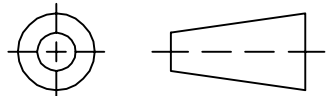
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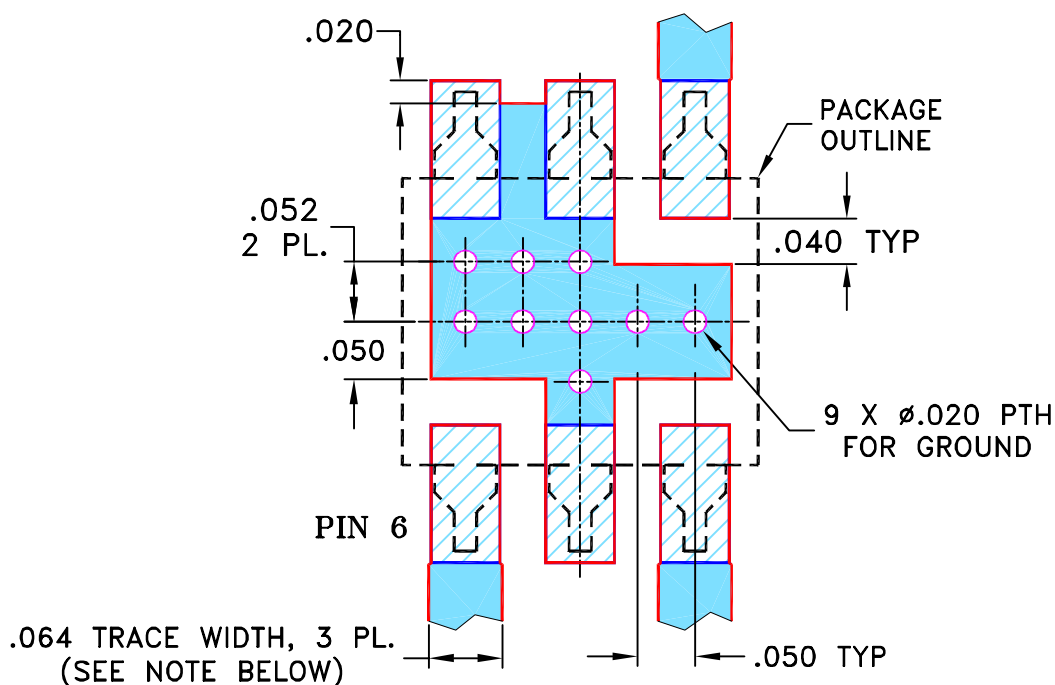
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION                          | DATE     | DR  | AUTH |
|-----|---------|--------------------------------------|----------|-----|------|
| OR  | M82272  | NEW RELEASE                          | 08/05/02 | GF  | DJ   |
| A   | M102713 | ADDED NOTE 2 & "...WITH SMOBC",      | 01/18/06 | MMG | LC   |
|     |         | QQQ130/828 WAS QQQ569/828 CASE STYLE |          |     |      |

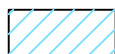
### SUGGESTED MOUNTING CONFIGURATION FOR QQQ130/828 CASE STYLE, "gn" PIN CONNECTION



- 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

GF

07/17/02

CHECKED

HY

08/01/02

APPROVED

DJ

08/05/02



# Mini-Circuits®

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Brooklyn NY 11235

PL, gn, QQQ130/828, LRPS/SCL, TB-100

SIZE  
A

CODE IDENT  
15542

DRAWING NO:

98-PL-057

REV:

A

FILE:

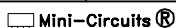
98PL057

SCALE:

6:1

SHEET:

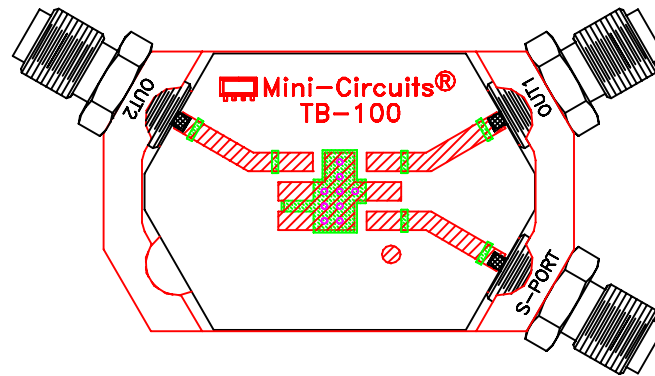
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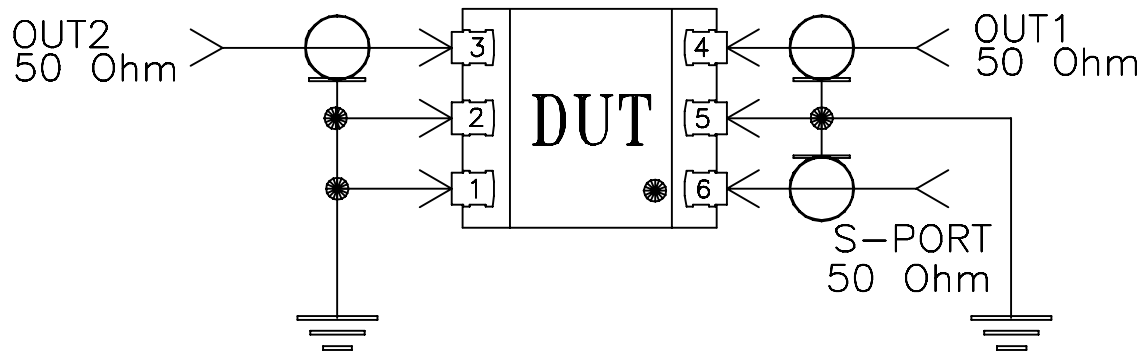
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ASHEETA1.DWG REV:A DATE:01/12/95

# Evaluation Board and Circuit



TB-100



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                                                                              |