

## Engineering Development Model

# Power Splitter/Combiner

# ADPQ-ED12602/1

## 2 Way-90°

### Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability. At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.



Please click "Back", and then click "Contact Us" for Applications support.

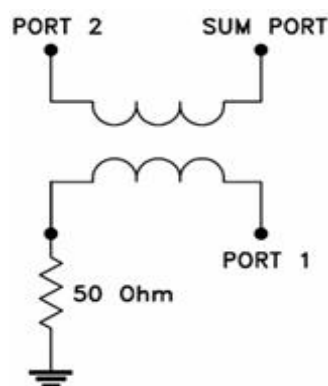
CASE STYLE : CD637

| ELECTRICAL SPECIFICATIONS 50Ω @ +25°C |               |      |        |            |
|---------------------------------------|---------------|------|--------|------------|
| Parameter                             |               | Min. | Typ.   | Max. Units |
| Frequency                             |               | 100  |        | 160 MHz    |
| Isolation                             | 100 - 160 MHz |      | 24     |            |
| Insertion Loss                        |               |      |        |            |
| Average of Coupled Outputs            | 100 - 160 MHz |      | 0.20   |            |
| above 3.0 dB                          |               |      |        |            |
| Phase Unbalance                       | 100 - 160 MHz |      | 88.930 |            |
|                                       |               |      |        | deg.       |
| Amplitude Unbalance                   | 100 - 160 MHz |      | 0.733  |            |
|                                       |               |      |        | dB         |
| VSWR                                  | SUM Port      |      | 1.10   |            |
|                                       | OUT Ports     |      | 1.10   |            |
|                                       |               |      |        | (:1)       |
|                                       |               |      |        | (:1)       |

| MAXIMUM RATINGS       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |

| PIN CONNECTIONS |      |
|-----------------|------|
| SUM PORT        | 1    |
| PORT 1          | 3    |
| PORT 2          | 6    |
| GND EXT         | 2, 5 |
| 50Ω TERMINATION | 4    |

### Functional Diagram



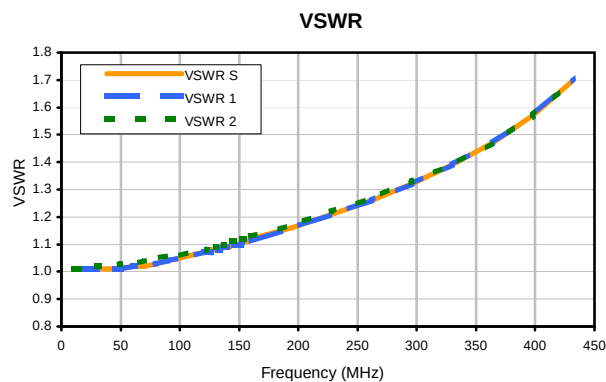
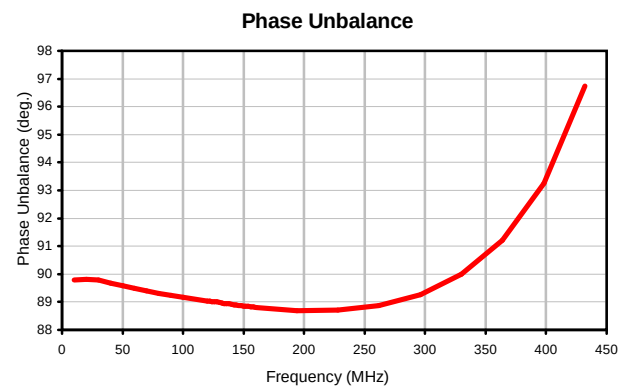
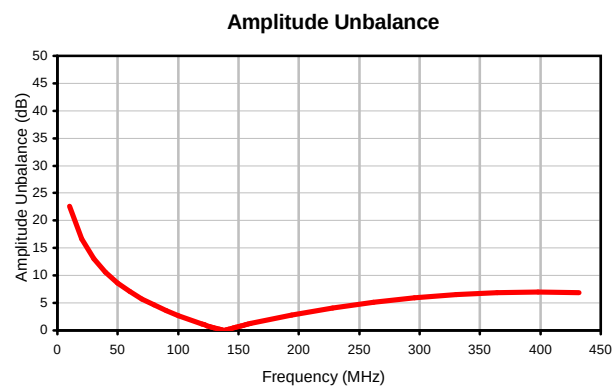
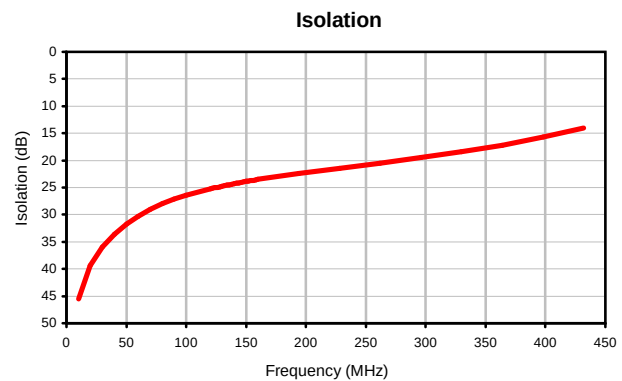
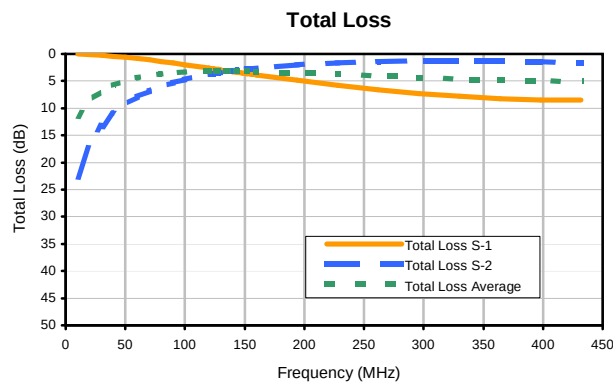
# 2 Way-90° Power Splitter/Combiner ADPQ-ED12602/1

## Typical Performance Data

| FREQ.<br>(MHz) | TOTAL LOSS <sup>1</sup><br>(dB) |       |       | AMP.<br>UNBAL.<br>(dB) | ISOLATION<br>(dB) | PHASE<br>UNBAL.<br>(deg.) | FREQ.<br>(MHz) | VSWR<br>(:1) |      |      |
|----------------|---------------------------------|-------|-------|------------------------|-------------------|---------------------------|----------------|--------------|------|------|
|                | S-1                             | S-2   | AVG.  |                        |                   |                           |                | S            | 1    | 2    |
| 10.0           | 0.05                            | 22.71 | 11.38 | 22.66                  | 45.51             | 89.79                     | 10.00          | 1.01         | 1.01 | 1.01 |
| 20.0           | 0.13                            | 16.77 | 8.45  | 16.64                  | 39.42             | 89.82                     | 20.00          | 1.01         | 1.01 | 1.01 |
| 30.0           | 0.26                            | 13.37 | 6.82  | 13.11                  | 35.96             | 89.78                     | 30.00          | 1.01         | 1.01 | 1.02 |
| 40.0           | 0.42                            | 11.03 | 5.73  | 10.61                  | 33.55             | 89.68                     | 40.00          | 1.01         | 1.01 | 1.02 |
| 50.0           | 0.63                            | 9.30  | 4.97  | 8.67                   | 31.73             | 89.59                     | 50.00          | 1.01         | 1.01 | 1.03 |
| 60.0           | 0.86                            | 7.95  | 4.41  | 7.09                   | 30.25             | 89.50                     | 60.00          | 1.02         | 1.02 | 1.03 |
| 70.0           | 1.12                            | 6.88  | 4.00  | 5.76                   | 29.02             | 89.41                     | 70.00          | 1.02         | 1.02 | 1.04 |
| 80.0           | 1.40                            | 6.01  | 3.71  | 4.61                   | 28.00             | 89.31                     | 80.00          | 1.03         | 1.03 | 1.05 |
| 90.0           | 1.69                            | 5.29  | 3.49  | 3.60                   | 27.13             | 89.24                     | 90.00          | 1.04         | 1.04 | 1.06 |
| 100.0          | 1.99                            | 4.69  | 3.34  | 2.70                   | 26.40             | 89.16                     | 100.00         | 1.05         | 1.05 | 1.06 |
| 120.0          | 2.62                            | 3.77  | 3.20  | 1.15                   | 25.26             | 89.04                     | 120.00         | 1.07         | 1.07 | 1.08 |
| 122.0          | 2.69                            | 3.70  | 3.20  | 1.01                   | 25.16             | 89.03                     | 122.00         | 1.07         | 1.07 | 1.08 |
| 124.0          | 2.75                            | 3.62  | 3.19  | 0.87                   | 25.05             | 89.02                     | 124.00         | 1.07         | 1.07 | 1.09 |
| 126.0          | 2.82                            | 3.55  | 3.19  | 0.73                   | 24.95             | 89.01                     | 126.00         | 1.08         | 1.07 | 1.09 |
| 128.0          | 2.88                            | 3.48  | 3.18  | 0.60                   | 24.86             | 89.00                     | 128.00         | 1.08         | 1.08 | 1.09 |
| 130.0          | 2.94                            | 3.41  | 3.18  | 0.47                   | 24.75             | 88.98                     | 130.00         | 1.08         | 1.08 | 1.09 |
| 132.0          | 3.01                            | 3.35  | 3.18  | 0.34                   | 24.66             | 88.96                     | 132.00         | 1.08         | 1.08 | 1.10 |
| 134.0          | 3.07                            | 3.28  | 3.18  | 0.21                   | 24.56             | 88.95                     | 134.00         | 1.09         | 1.08 | 1.10 |
| 136.0          | 3.13                            | 3.22  | 3.18  | 0.09                   | 24.47             | 88.94                     | 136.00         | 1.09         | 1.09 | 1.10 |
| 138.0          | 3.20                            | 3.16  | 3.18  | 0.03                   | 24.38             | 88.93                     | 138.00         | 1.09         | 1.09 | 1.10 |
| 140.0          | 3.26                            | 3.11  | 3.19  | 0.15                   | 24.29             | 88.91                     | 140.00         | 1.09         | 1.09 | 1.10 |
| 142.0          | 3.32                            | 3.05  | 3.19  | 0.27                   | 24.20             | 88.90                     | 142.00         | 1.09         | 1.09 | 1.11 |
| 144.0          | 3.38                            | 3.00  | 3.19  | 0.39                   | 24.12             | 88.89                     | 144.00         | 1.10         | 1.09 | 1.11 |
| 146.0          | 3.45                            | 2.94  | 3.20  | 0.50                   | 24.04             | 88.88                     | 146.00         | 1.10         | 1.10 | 1.11 |
| 148.0          | 3.51                            | 2.89  | 3.20  | 0.62                   | 23.95             | 88.87                     | 148.00         | 1.10         | 1.10 | 1.11 |
| 150.0          | 3.57                            | 2.84  | 3.21  | 0.73                   | 23.87             | 88.86                     | 150.00         | 1.10         | 1.10 | 1.12 |
| 152.0          | 3.63                            | 2.79  | 3.21  | 0.84                   | 23.79             | 88.85                     | 152.00         | 1.11         | 1.10 | 1.12 |
| 154.0          | 3.70                            | 2.75  | 3.23  | 0.95                   | 23.72             | 88.84                     | 154.00         | 1.11         | 1.11 | 1.12 |
| 156.0          | 3.76                            | 2.70  | 3.23  | 1.05                   | 23.65             | 88.82                     | 156.00         | 1.11         | 1.11 | 1.12 |
| 158.0          | 3.82                            | 2.66  | 3.24  | 1.16                   | 23.57             | 88.82                     | 158.00         | 1.11         | 1.11 | 1.12 |
| 160.0          | 3.88                            | 2.61  | 3.25  | 1.26                   | 23.50             | 88.80                     | 160.00         | 1.12         | 1.11 | 1.13 |
| 194.0          | 4.88                            | 2.05  | 3.47  | 2.83                   | 22.43             | 88.69                     | 194.00         | 1.16         | 1.16 | 1.17 |
| 228.0          | 5.78                            | 1.70  | 3.74  | 4.09                   | 21.47             | 88.71                     | 228.00         | 1.21         | 1.21 | 1.22 |
| 262.0          | 6.58                            | 1.47  | 4.03  | 5.11                   | 20.50             | 88.87                     | 262.00         | 1.26         | 1.26 | 1.27 |
| 296.0          | 7.26                            | 1.35  | 4.31  | 5.91                   | 19.49             | 89.27                     | 296.00         | 1.32         | 1.32 | 1.33 |
| 330.0          | 7.82                            | 1.30  | 4.56  | 6.51                   | 18.39             | 89.99                     | 330.00         | 1.39         | 1.39 | 1.39 |
| 364.0          | 8.23                            | 1.33  | 4.78  | 6.90                   | 17.16             | 91.22                     | 364.00         | 1.47         | 1.47 | 1.47 |
| 398.0          | 8.47                            | 1.44  | 4.96  | 7.03                   | 15.72             | 93.26                     | 398.00         | 1.57         | 1.57 | 1.57 |
| 432.0          | 8.50                            | 1.68  | 5.09  | 6.82                   | 14.04             | 96.73                     | 432.00         | 1.70         | 1.71 | 1.70 |

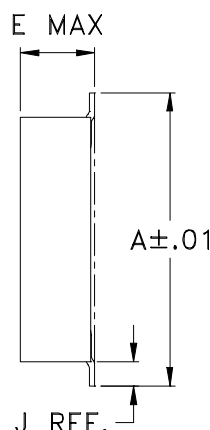
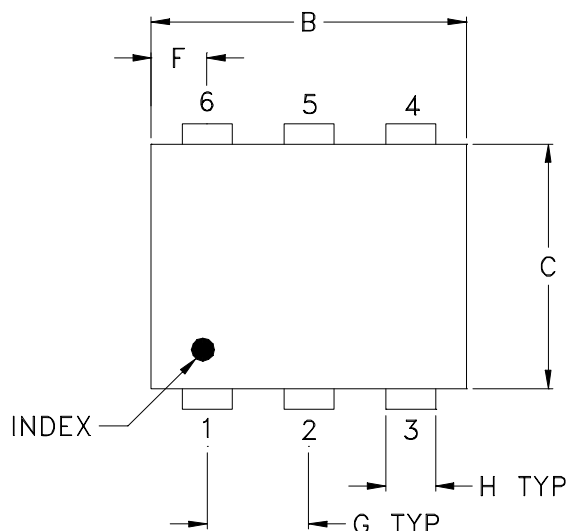
<sup>1</sup> Total Loss = Insertion Loss + 3dB Splitter Loss

## Typical Performance Curves

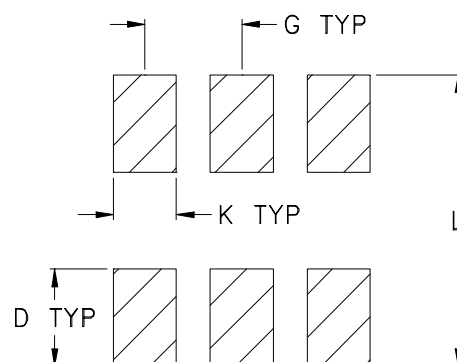


CD541  
CD542  
CD636  
CD637

## 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.



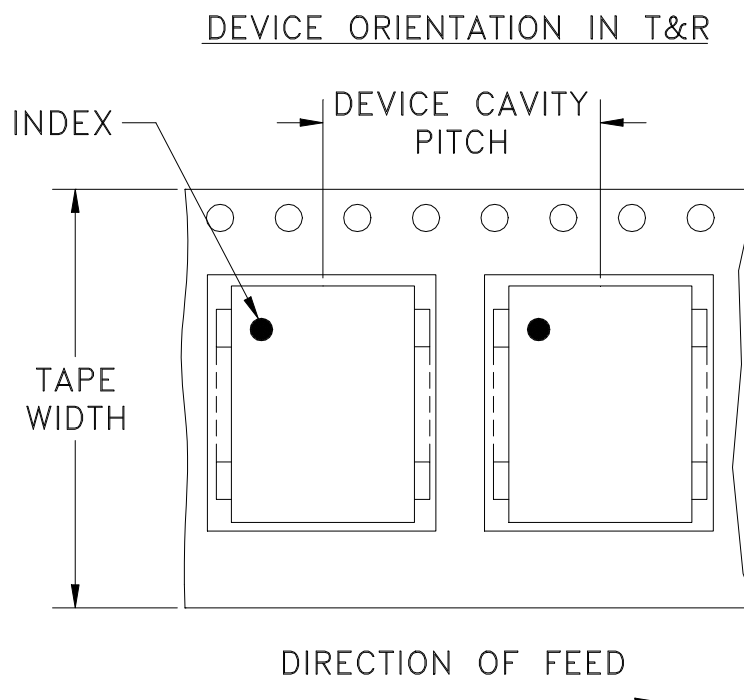
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# Tape & Reel Packaging TR-F46



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel |
|-------------------|----------------------------|----------------------|------------------|
| 16                | 12                         | 13                   | 900              |

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)



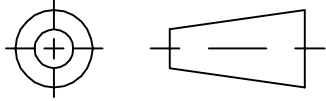
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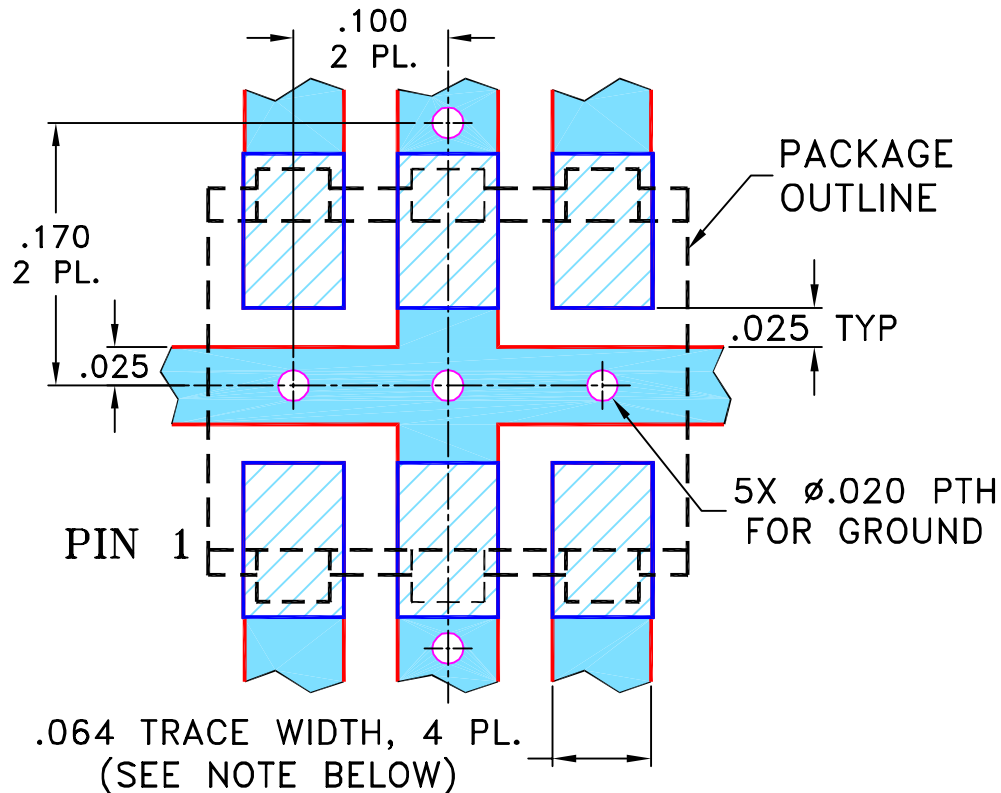
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION                                                                     | DATE     | DR  | AUTH |
|-----|---------|---------------------------------------------------------------------------------|----------|-----|------|
| OR  | M82476  | NEW RELEASE                                                                     | 11/26/02 | MMG | HY   |
| A   | M102713 | ADDED "ay", "lg", "ls" PIN CONNECTIONS, CD636/637 CASE STYLES & "...WITH SMOBC" | 01/17/06 | MMG | IL   |
|     |         |                                                                                 |          |     |      |

**SUGGESTED MOUNTING CONFIGURATION  
FOR BH292, CD636/CD637 CASE STYLES,  
"ay", "lg", "ls" PIN CONNECTIONS**



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B 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

MMG

10/30/02

CHECKED

AV

11/26/02

APPROVED

HY

11/26/02



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PL, ay/jg/lb, BH292, CD636/637,  
ADPQ/AMT/JPS, TB-211

SIZE  
A

CODE IDENT  
15542

DRAWING NO:  
98-PL-097

REV:  
A

FILE: 98PL097

SCALE: 8:1

SHEET: 1 OF 1

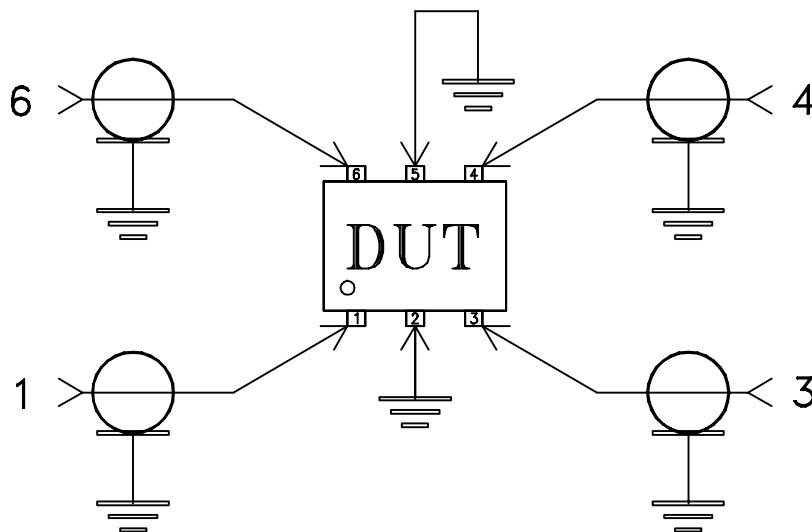
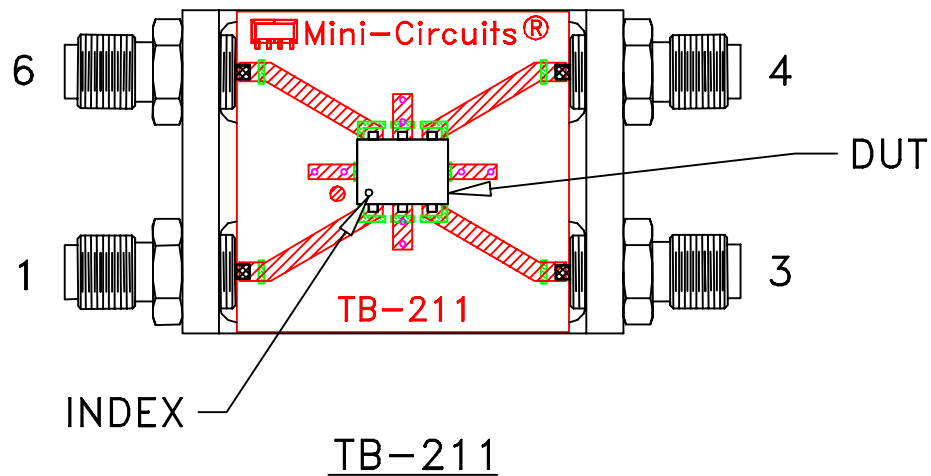
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ASHEETA1.DWG REV:A DATE:01/12/95

# Evaluation Board and Circuit

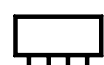
For Pin Connections refer to Data Sheet of the DUT



Schematic Diagram

## Notes:

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

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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                                                                              |