

## Engineering Development Model

# Power Splitter/Combiner

# SBTCJ-ED8081B/1

## 2 Way-180°

### 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.

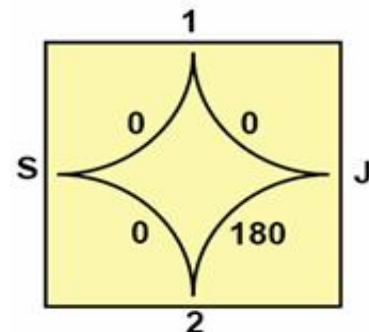
CASE STYLE : AT790

| ELECTRICAL SPECIFICATIONS 50Ω @ +25°C |               |      |         |            |
|---------------------------------------|---------------|------|---------|------------|
| Parameter                             |               | Min. | Typ.    | Max. Units |
| Frequency                             |               | 1    |         | 800 MHz    |
| Isolation                             | 1 - 10 MHz    |      | 23      | dB         |
|                                       | 10 - 400 MHz  |      | 23      | dB         |
|                                       | 400 - 800 MHz |      | 29      | dB         |
| Insertion Loss Above 3.0 dB           | 1 - 10 MHz    |      | 0.70    | dB         |
|                                       | 10 - 400 MHz  |      | 0.70    | dB         |
|                                       | 400 - 800 MHz |      | 1.00    | dB         |
| Phase Unbalance                       | 1 - 10 MHz    |      | 179.995 | deg.       |
|                                       | 10 - 400 MHz  |      | 178.863 | deg.       |
|                                       | 400 - 800 MHz |      | 176.055 | deg.       |
| Amplitude Unbalance                   | 1 - 10 MHz    |      | 0.003   | dB         |
|                                       | 10 - 400 MHz  |      | 0.057   | dB         |
|                                       | 400 - 800 MHz |      | 0.516   | dB         |
| VSWR                                  | SUM Port      |      | 1.20    | (:1)       |
|                                       | OUT Ports     |      | 1.20    | (:1)       |

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

| PIN CONNECTIONS |      |
|-----------------|------|
| SUM PORT        | 6    |
| PORT 1          | 1    |
| PORT 2          | 3    |
| GND EXT         | 2, 4 |
| NOT USED        | 5    |

### Functional Diagram



# 2 Way-180° Power Splitter/CombinerSBTCJ-ED8081B/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  |                        |                   |                           |                | S            | 1    | 2    |
| 0.30           | 4.51                            | 4.50 | 0.00                   | 17.78             | 180.00                    | 0.30           | 1.75         | 1.36 | 1.36 |
| 0.75           | 4.04                            | 4.04 | 0.00                   | 22.06             | 180.03                    | 0.75           | 1.38         | 1.21 | 1.21 |
| 1.00           | 3.94                            | 3.94 | 0.00                   | 22.99             | 180.03                    | 1.00           | 1.32         | 1.18 | 1.18 |
| 3.00           | 3.63                            | 3.63 | 0.00                   | 24.20             | 180.04                    | 3.00           | 1.17         | 1.11 | 1.11 |
| 5.00           | 3.56                            | 3.55 | 0.00                   | 23.26             | 180.04                    | 5.00           | 1.13         | 1.09 | 1.09 |
| 10.00          | 3.54                            | 3.53 | 0.01                   | 22.20             | 179.87                    | 10.00          | 1.10         | 1.07 | 1.06 |
| 20.00          | 3.54                            | 3.53 | 0.00                   | 21.83             | 179.80                    | 20.00          | 1.09         | 1.06 | 1.05 |
| 30.00          | 3.55                            | 3.55 | 0.00                   | 21.87             | 179.73                    | 30.00          | 1.09         | 1.05 | 1.05 |
| 40.00          | 3.57                            | 3.57 | 0.00                   | 21.97             | 179.67                    | 40.00          | 1.09         | 1.05 | 1.05 |
| 50.00          | 3.58                            | 3.59 | 0.00                   | 22.05             | 179.60                    | 50.00          | 1.09         | 1.05 | 1.05 |
| 60.00          | 3.60                            | 3.60 | 0.00                   | 22.12             | 179.53                    | 60.00          | 1.09         | 1.06 | 1.05 |
| 70.00          | 3.61                            | 3.61 | 0.00                   | 22.19             | 179.46                    | 70.00          | 1.09         | 1.06 | 1.05 |
| 80.00          | 3.62                            | 3.62 | 0.01                   | 22.27             | 179.40                    | 80.00          | 1.09         | 1.06 | 1.05 |
| 90.00          | 3.63                            | 3.63 | 0.01                   | 22.33             | 179.32                    | 90.00          | 1.09         | 1.06 | 1.05 |
| 100.00         | 3.63                            | 3.64 | 0.01                   | 22.37             | 179.25                    | 100.00         | 1.10         | 1.07 | 1.06 |
| 150.00         | 3.66                            | 3.69 | 0.03                   | 22.65             | 178.90                    | 150.00         | 1.11         | 1.08 | 1.07 |
| 200.00         | 3.68                            | 3.73 | 0.05                   | 23.04             | 178.58                    | 200.00         | 1.13         | 1.10 | 1.09 |
| 250.00         | 3.69                            | 3.77 | 0.09                   | 23.49             | 178.27                    | 250.00         | 1.15         | 1.12 | 1.10 |
| 300.00         | 3.69                            | 3.81 | 0.12                   | 24.13             | 177.92                    | 300.00         | 1.18         | 1.15 | 1.12 |
| 325.00         | 3.70                            | 3.84 | 0.14                   | 24.49             | 177.77                    | 325.00         | 1.19         | 1.16 | 1.14 |
| 350.00         | 3.70                            | 3.86 | 0.16                   | 24.88             | 177.64                    | 350.00         | 1.20         | 1.17 | 1.15 |
| 375.00         | 3.70                            | 3.88 | 0.18                   | 25.30             | 177.48                    | 375.00         | 1.21         | 1.19 | 1.16 |
| 400.00         | 3.70                            | 3.91 | 0.21                   | 25.79             | 177.35                    | 400.00         | 1.22         | 1.20 | 1.17 |
| 450.00         | 3.71                            | 3.97 | 0.26                   | 26.96             | 177.09                    | 450.00         | 1.25         | 1.23 | 1.20 |
| 500.00         | 3.71                            | 4.05 | 0.34                   | 28.57             | 176.85                    | 500.00         | 1.28         | 1.27 | 1.22 |
| 550.00         | 3.71                            | 4.13 | 0.41                   | 30.38             | 176.49                    | 550.00         | 1.30         | 1.30 | 1.26 |
| 600.00         | 3.73                            | 4.20 | 0.48                   | 32.11             | 176.14                    | 600.00         | 1.33         | 1.35 | 1.29 |
| 650.00         | 3.74                            | 4.29 | 0.55                   | 32.99             | 175.84                    | 650.00         | 1.36         | 1.39 | 1.33 |
| 700.00         | 3.77                            | 4.38 | 0.62                   | 32.15             | 175.59                    | 700.00         | 1.39         | 1.44 | 1.37 |
| 725.00         | 3.78                            | 4.43 | 0.65                   | 31.18             | 175.48                    | 725.00         | 1.41         | 1.47 | 1.39 |
| 750.00         | 3.80                            | 4.48 | 0.68                   | 30.07             | 175.36                    | 750.00         | 1.42         | 1.50 | 1.41 |
| 775.00         | 3.82                            | 4.54 | 0.72                   | 28.89             | 175.26                    | 775.00         | 1.44         | 1.53 | 1.43 |
| 800.00         | 3.83                            | 4.59 | 0.76                   | 27.74             | 175.16                    | 800.00         | 1.46         | 1.56 | 1.45 |
| 825.00         | 3.85                            | 4.65 | 0.79                   | 26.70             | 175.09                    | 825.00         | 1.47         | 1.59 | 1.48 |
| 850.00         | 3.87                            | 4.70 | 0.83                   | 25.70             | 175.02                    | 850.00         | 1.49         | 1.62 | 1.50 |
| 875.00         | 3.90                            | 4.76 | 0.87                   | 24.78             | 174.94                    | 875.00         | 1.51         | 1.65 | 1.53 |
| 900.00         | 3.93                            | 4.83 | 0.90                   | 23.91             | 174.89                    | 900.00         | 1.52         | 1.69 | 1.55 |
| 925.00         | 3.96                            | 4.89 | 0.93                   | 23.11             | 174.84                    | 925.00         | 1.54         | 1.72 | 1.58 |
| 950.00         | 3.99                            | 4.96 | 0.97                   | 22.36             | 174.81                    | 950.00         | 1.55         | 1.76 | 1.61 |
| 975.00         | 4.03                            | 5.03 | 1.00                   | 21.66             | 174.80                    | 975.00         | 1.57         | 1.79 | 1.64 |
| 1000.00        | 4.06                            | 5.10 | 1.04                   | 21.01             | 174.82                    | 1000.00        | 1.59         | 1.83 | 1.67 |

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

REV. X2  
SBTCJ-ED8081B/1  
100714  
Page 1 of 1

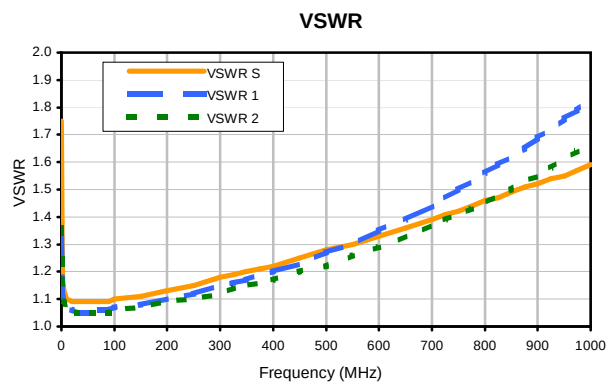
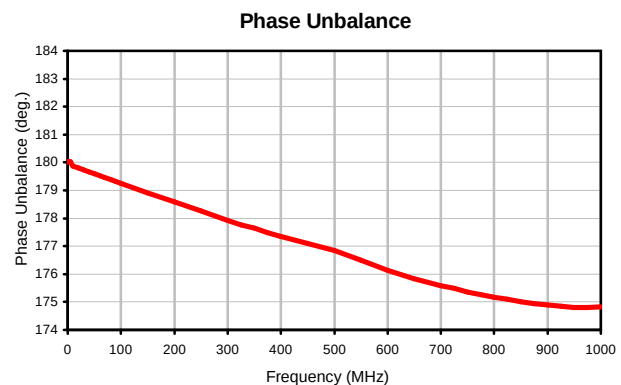
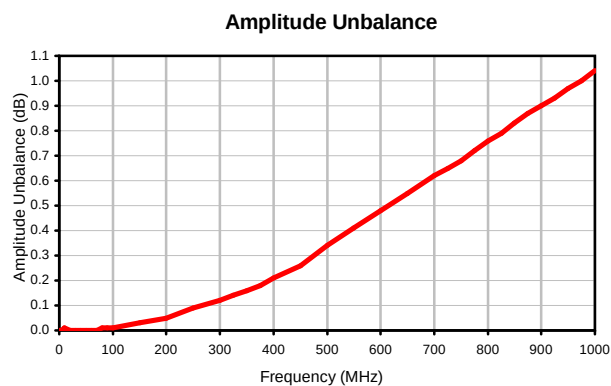
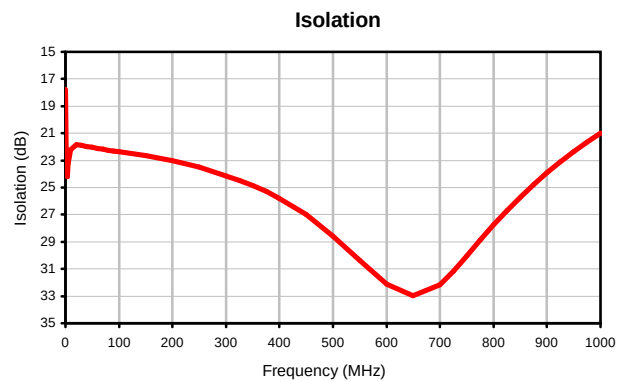
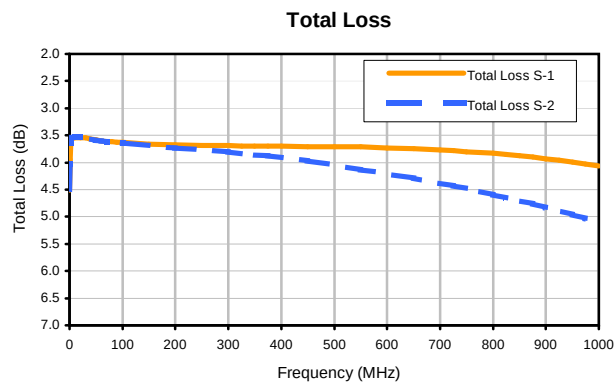


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# 2 Way-180° Power Splitter/Combiner SBTCJ-ED8081B/1

## Typical Performance Curves



REV. X2  
SBTCJ-ED8081B/1  
100714  
Page 1 of 1



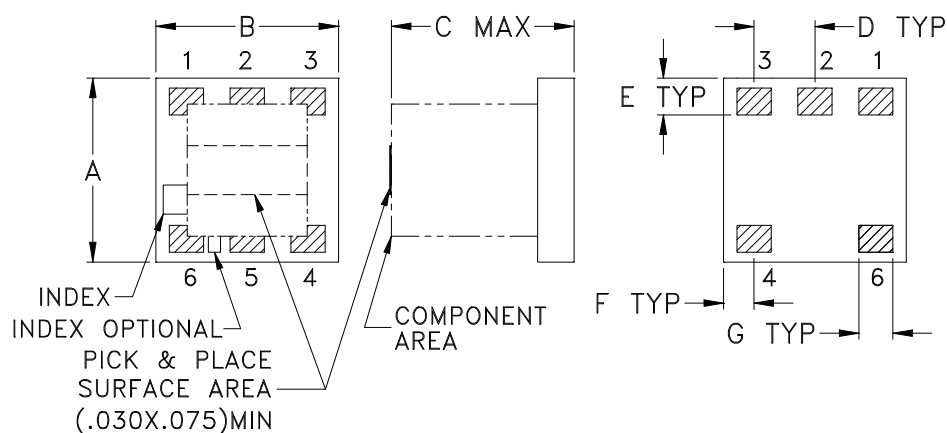
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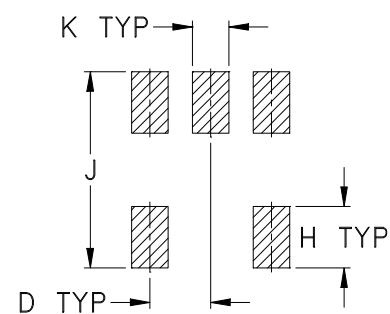
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## Outline Dimensions

AT790



## PCB Land Pattern



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

| CASE # | A              | B              | C              | D              | E              | F              | G              | H              | J              | K              | L        | WT. GRAMS |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|-----------|
| AT790  | .150<br>(3.81) | .150<br>(3.81) | .150<br>(3.81) | .050<br>(1.27) | .030<br>(0.76) | .025<br>(0.64) | .028<br>(0.71) | .050<br>(1.27) | .160<br>(4.06) | .030<br>(0.76) | --<br>-- | .10       |

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

### Notes:

1. Open style, Ceramic base.
2. Termination finish: Silver palladium or gold over nickel based on stock availability.



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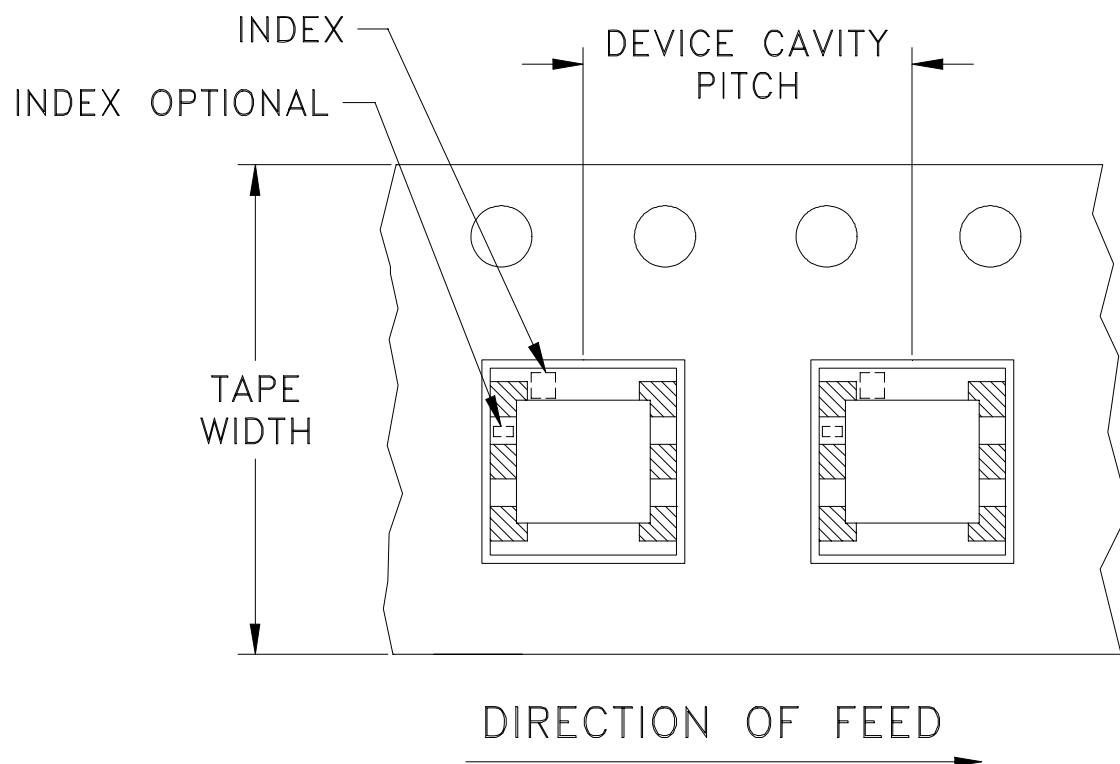


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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F15

## DEVICE ORIENTATION IN T&R



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel |
|-------------------|----------------------------|----------------------|------------------|
| 12                | 8                          | 7                    | 20               |
|                   |                            |                      | 50               |
|                   |                            |                      | 100              |
|                   |                            |                      | 200              |
|                   |                            | 13                   | 500              |
|                   |                            |                      | 1000             |
|                   |                            |                      | 2000             |

**Note:** Please consult individual model data sheet to determine device per reel availability.

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)

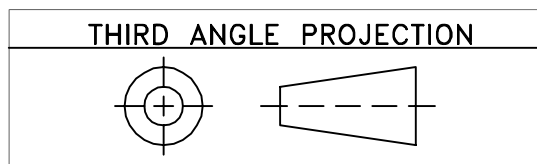


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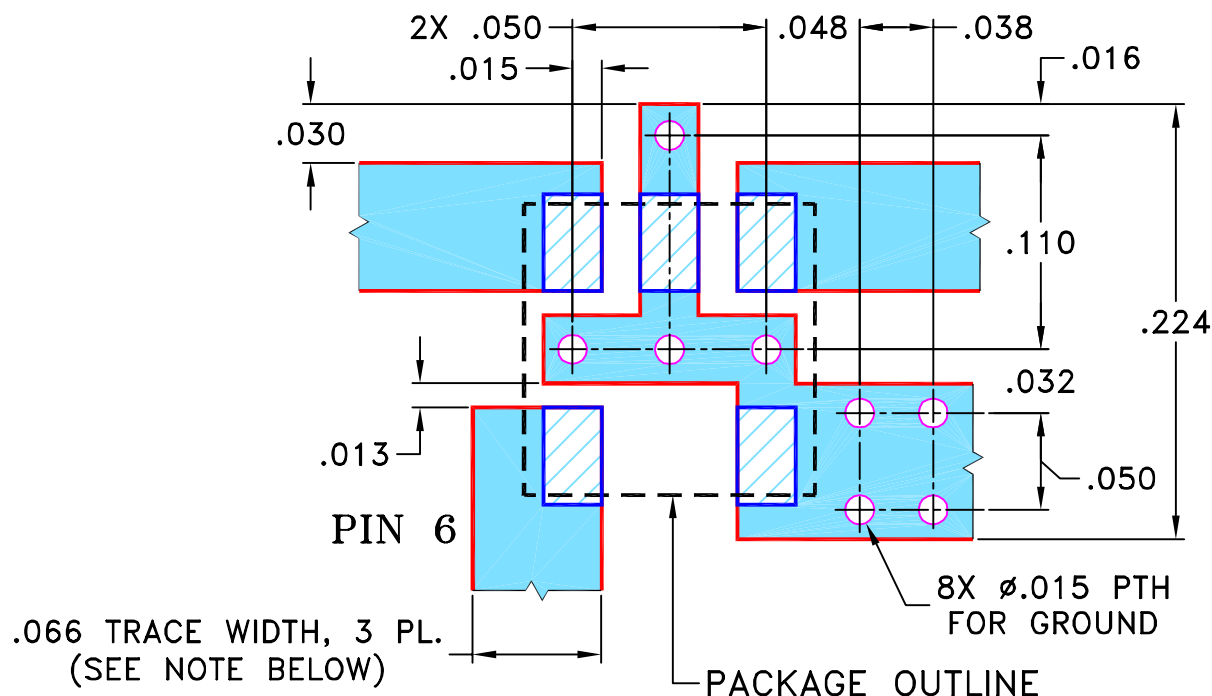
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| REVISIONS |         |                       |          |     |      |
|-----------|---------|-----------------------|----------|-----|------|
| REV       | ECN No. | DESCRIPTION           | DATE     | DR  | AUTH |
| OR        | M82767  | NEW RELEASE           | 12/26/02 | MMG | HY   |
| A         | M102713 | ADDED "...WITH SMOBC" | 10/27/06 | MMG | HY   |
|           |         |                       |          |     |      |
|           |         |                       |          |     |      |

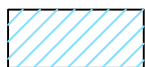
SUGGESTED MOUNTING CONFIGURATION FOR  
AT790 CASE STYLE, "nk" PIN CONNECTION



- 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<br>TOLERANCES ON:<br>2 PL DECIMALS $\pm$<br>3 PL DECIMALS $\pm$ .005<br>ANGLES $\pm$<br>FRACTIONS $\pm$ | DRAWN    | MMG | 12/26/02 |
|                                                                                                                                  | CHECKED  | AV  | 12/26/02 |
|                                                                                                                                  | APPROVED | HY  | 12/26/02 |
|                                                                                                                                  |          |     |          |



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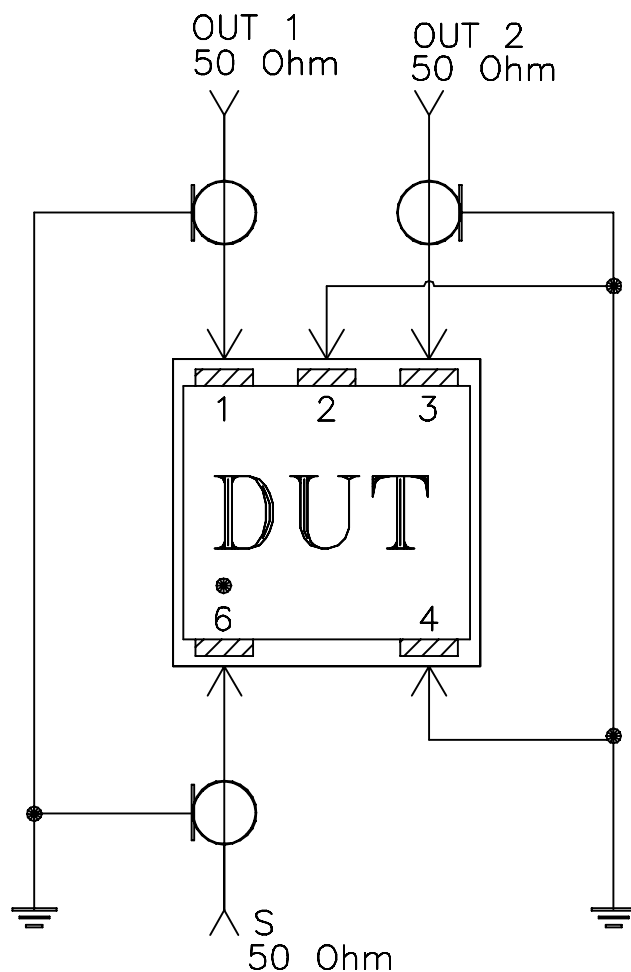
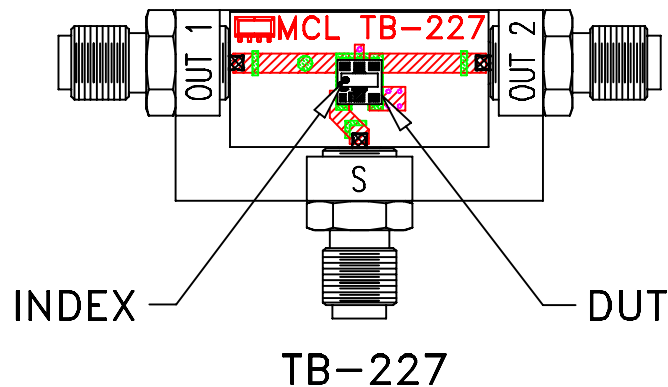
PL, nk, AT790, SBT CJ-1W, TB-227

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| SIZE   | CODE IDENT | DRAWING NO: | REV: |
|--------|------------|-------------|------|
| A      | 15542      | 98-PL-117   | A    |
| FILE:  | 98PL117    | SCALE:      | 10:1 |
| SHEET: |            | 1 OF 1      |      |

# Evaluation Board and Circuit



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                                                                              |