

Surface Mount

# Power Splitter/Combiner

## SBTC-2-15-75+

2 Way-0° 75Ω 500 to 1500 MHz

### Features

- low insertion loss, 0.8 dB typ.
- high isolation, 28 dB typ.
- very good phase unbalance, 1.0 deg. typ.
- temperature stable LTCC base
- small size
- low cost
- aqueous washable
- protected by US patent 6,963,255

### Applications

- internet over satellite modems
- VSAT

### Electrical Specifications

| Parameter                   | Frequency (MHz) | Min. | Typ. | Max. | Unit   |
|-----------------------------|-----------------|------|------|------|--------|
| Frequency Range             |                 | 500  |      | 1500 | MHz    |
| Insertion Loss Above 3.0 dB | 500 - 1500      | —    | 0.8  | 1.5  | dB     |
|                             | 750 - 1500      | —    | 0.8  | 1.5  |        |
| Isolation                   | 500 - 1500      | 18   | 28   | —    | dB     |
|                             | 750 - 1500      | 20   | 28   | —    |        |
| Phase Unbalance             | 500 - 1500      | —    | —    | 5    | Degree |
|                             | 750 - 1500      | —    | —    | 4    |        |
| Amplitude Unbalance         | 500 - 1500      | —    | —    | 0.9  | dB     |
|                             | 750 - 1500      | —    | —    | 0.7  |        |

For Model with Leads see SBTC-2-15-75L+



Generic photo used for illustration purposes only

CASE STYLE: AT790

**+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"        | 20, 50, 100, 200 |
| 13"       | 500, 1000, 2000  |

### Maximum Ratings

| Parameter                   | Ratings        |
|-----------------------------|----------------|
| Operating Temperature       | -40°C to 85°C  |
| Storage Temperature         | -55°C to 100°C |
| Power Input (as a splitter) | 0.5W max.      |
| Internal Dissipation        | 0.125W max.    |

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

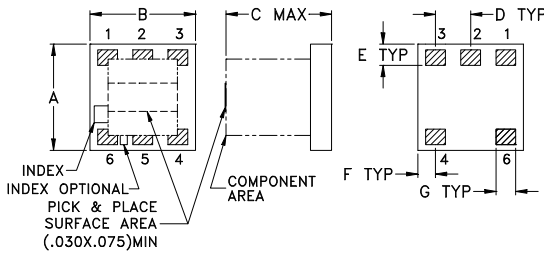
### Pin Connections

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

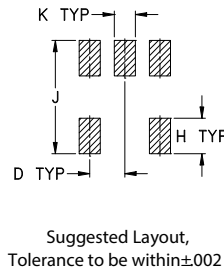
### Electrical Schematic



## Outline Drawing



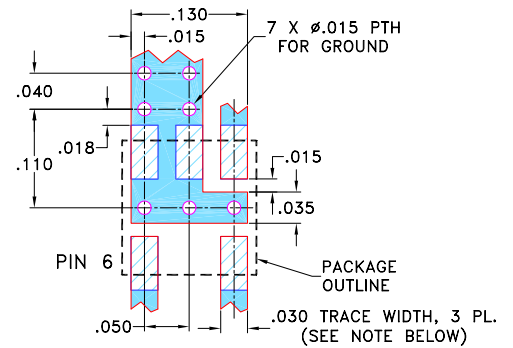
## PCB Land Pattern



## Outline Dimensions (inch mm)

| A    | B    | C    | D    | E    | F    | G    | H    | J    | K    | wt<br>grams |
|------|------|------|------|------|------|------|------|------|------|-------------|
| .150 | .150 | .150 | .050 | .030 | .025 | .028 | .050 | .160 | .030 | 0.10        |
| 3.81 | 3.81 | 3.81 | 1.27 | 0.76 | 0.64 | 0.71 | 1.27 | 4.06 | 0.76 |             |

## Demo Board MCL P/N: TB-277 Suggested PCB Layout (PL-153)



NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS  $0.030 \pm 0.002$ "; 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.

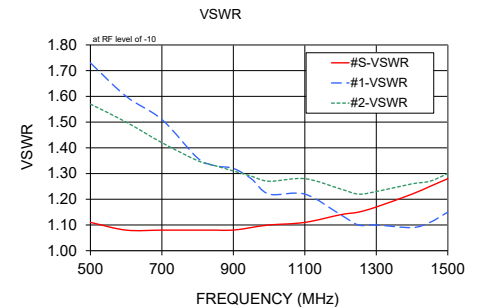
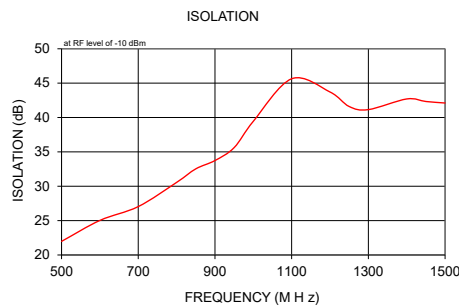
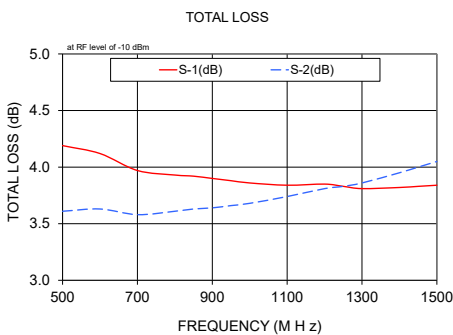
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## 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  |                          |                |                        |        |        |        |
| 500.00          | 4.19                         | 3.61 | 0.58                     | 21.98          | 1.92                   | 1.11   | 1.73   | 1.57   |
| 600.00          | 4.12                         | 3.63 | 0.49                     | 25.03          | 1.30                   | 1.08   | 1.60   | 1.50   |
| 700.00          | 3.97                         | 3.58 | 0.39                     | 27.04          | 0.91                   | 1.08   | 1.51   | 1.42   |
| 800.00          | 3.93                         | 3.61 | 0.32                     | 30.56          | 0.59                   | 1.08   | 1.36   | 1.35   |
| 850.00          | 3.92                         | 3.63 | 0.29                     | 32.53          | 0.44                   | 1.08   | 1.33   | 1.33   |
| 900.00          | 3.90                         | 3.64 | 0.25                     | 33.74          | 0.29                   | 1.08   | 1.32   | 1.31   |
| 950.00          | 3.88                         | 3.66 | 0.22                     | 35.62          | 0.20                   | 1.09   | 1.28   | 1.29   |
| 1000.00         | 3.86                         | 3.68 | 0.18                     | 39.45          | 0.15                   | 1.10   | 1.22   | 1.27   |
| 1100.00         | 3.84                         | 3.74 | 0.10                     | 45.64          | 0.17                   | 1.11   | 1.22   | 1.28   |
| 1200.00         | 3.85                         | 3.81 | 0.04                     | 43.71          | 0.19                   | 1.14   | 1.14   | 1.24   |
| 1250.00         | 3.83                         | 3.83 | 0.03                     | 41.60          | 0.21                   | 1.15   | 1.10   | 1.22   |
| 1300.00         | 3.81                         | 3.86 | 0.05                     | 41.15          | 0.19                   | 1.17   | 1.10   | 1.23   |
| 1400.00         | 3.82                         | 3.95 | 0.13                     | 42.70          | 0.21                   | 1.22   | 1.09   | 1.26   |
| 1450.00         | 3.83                         | 4.00 | 0.17                     | 42.33          | 0.24                   | 1.25   | 1.11   | 1.27   |
| 1500.00         | 3.84                         | 4.05 | 0.21                     | 42.11          | 0.30                   | 1.28   | 1.15   | 1.30   |

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

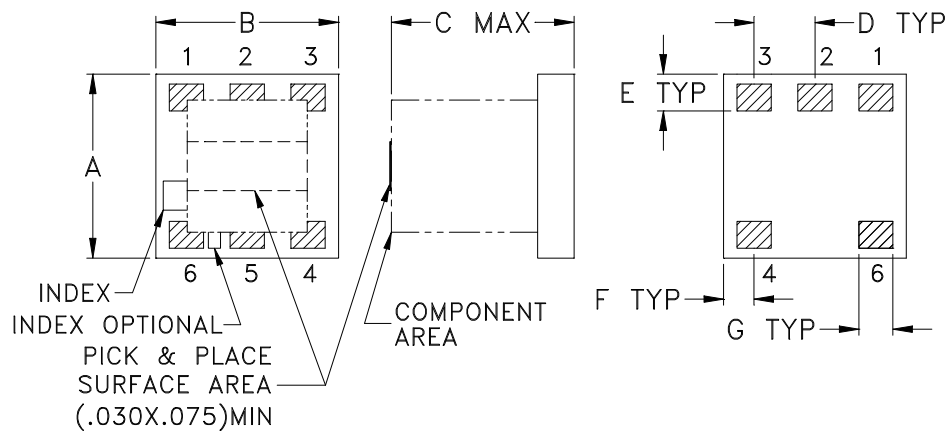


## Additional Notes

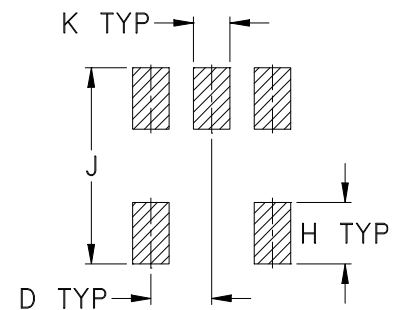
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## Outline Dimensions

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.



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

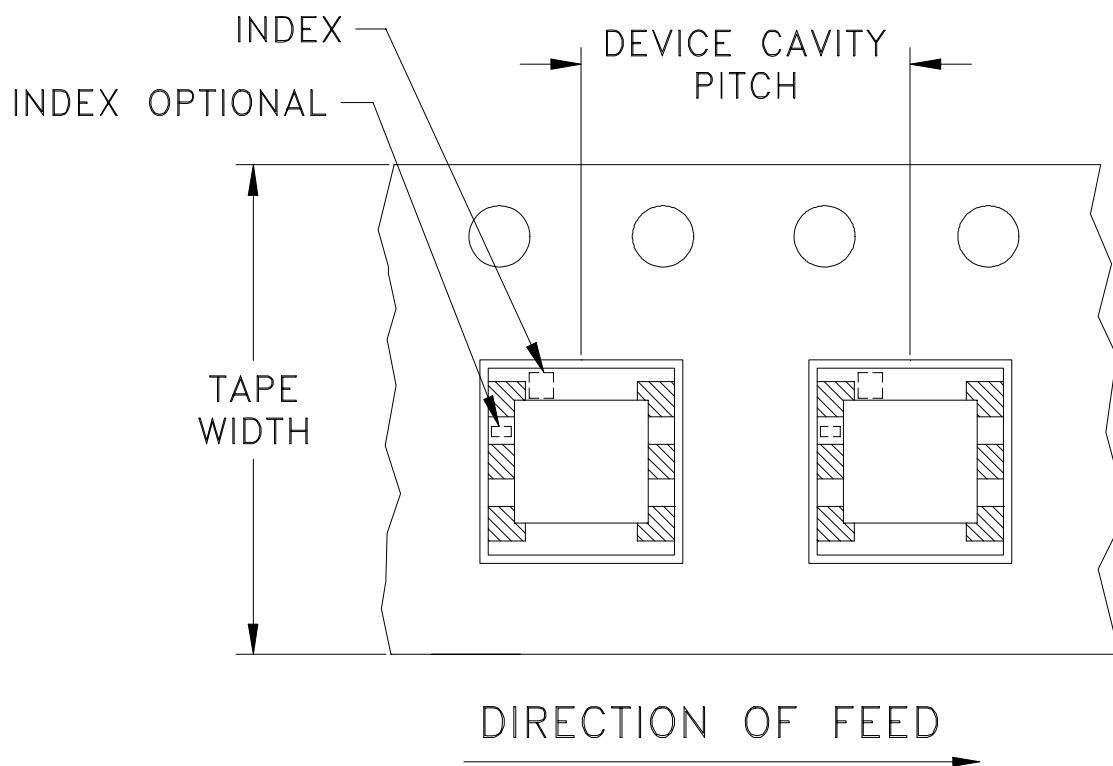


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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F15

## DEVICE ORIENTATION IN T&R



| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel |
|----------------|-------------------------|-------------------|------------------|
| 12             | 8                       | 7                 | 20               |
|                |                         |                   | 50               |
|                |                         |                   | 100              |
|                |                         | 13                | 200              |
|                |                         |                   | 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)



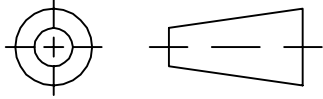
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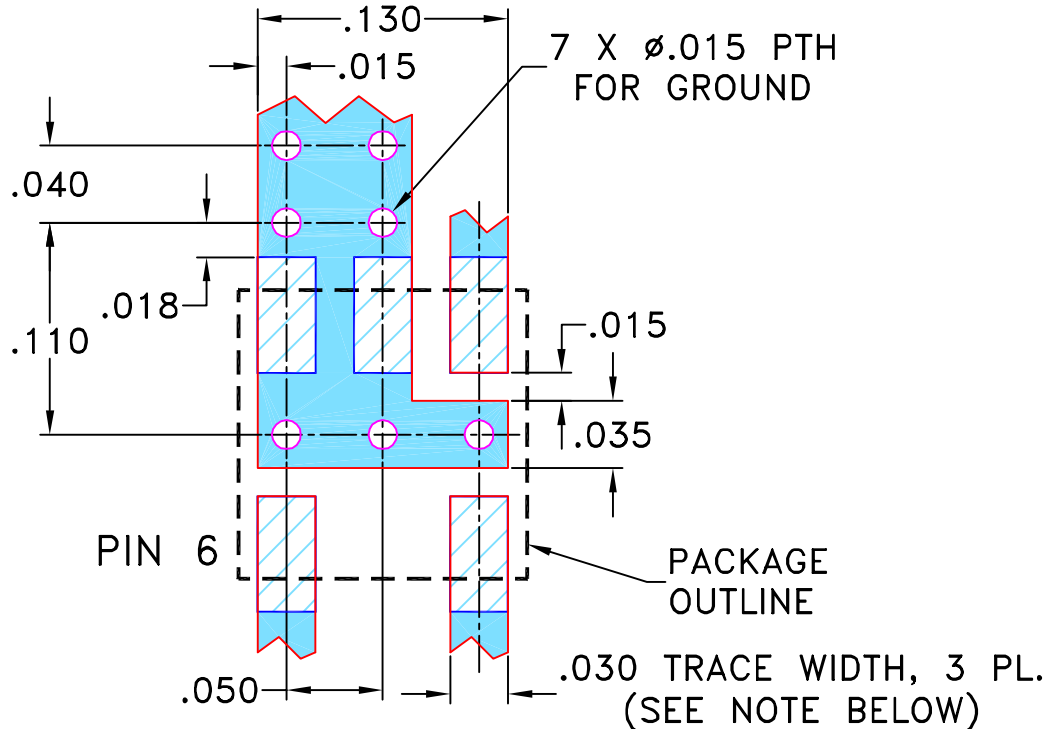
THIRD ANGLE PROJECTION



REVISIONS

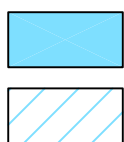
| REV | ECN No. | DESCRIPTION           | DATE     | DR | AUTH |
|-----|---------|-----------------------|----------|----|------|
| OR  | M90457  | NEW RELEASE           | 01/16/04 | AV | WP   |
| A   | M102713 | ADDED "...WITH SMOBC" | 01/12/06 | GF | IL   |
|     |         |                       |          |    |      |

SUGGESTED MOUNTING CONFIGURATION FOR AT1029 CASE STYLE, "nc" PIN CONNECTION



NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; 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.

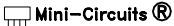


DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

| UNLESS OTHERWISE SPECIFIED | INITIALS | DATE     |
|----------------------------|----------|----------|
| DRAWN                      | AV       | 01/07/04 |
| CHECKED                    | IL       | 01/16/04 |
| APPROVED                   | WP       | 01/16/04 |

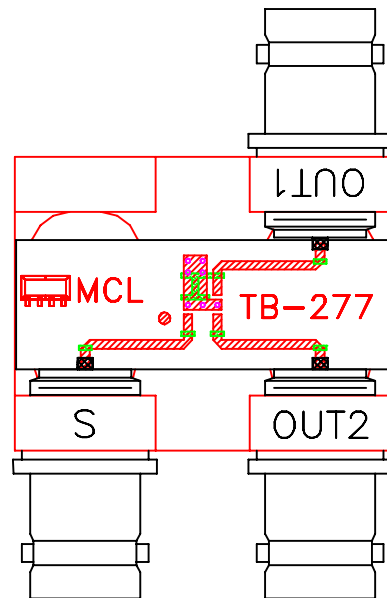
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PL, nc, 75, AT1029, SBTC, TB-277

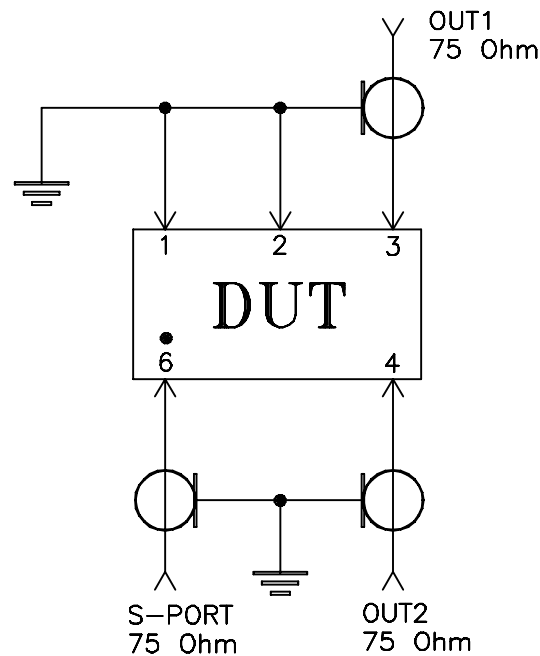
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| SIZE  | CODE IDENT | DRAWING NO: | REV:   |
|-------|------------|-------------|--------|
| A     | 15542      | 98-PL-153   | A      |
| FILE: | 98PL153    | SCALE:      | 10:1   |
|       |            | SHEET:      | 1 OF 1 |

# Evaluation Board and Circuit



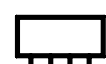
TB-277



Schematic Diagram

## Notes:

1. 75 Ohm BNC 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  |