

## Engineering Development Model

# Power Splitter/Combiner

# SBTCJ-ED11986/2

## 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.



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CASE STYLE : AT1029

| ELECTRICAL SPECIFICATIONS 50Ω @ +25°C |               |      |         |      |       |
|---------------------------------------|---------------|------|---------|------|-------|
| Parameter                             |               | Min. | Typ.    | Max. | Units |
| Frequency                             |               | 1    |         | 750  | MHz   |
| Isolation                             | 1 - 10 MHz    |      | 23      |      | dB    |
|                                       | 10 - 375 MHz  |      | 22      |      | dB    |
|                                       | 375 - 750 MHz |      | 25      |      | dB    |
| Insertion Loss Above 3.0 dB           | 1 - 10 MHz    |      | 0.60    |      | dB    |
|                                       | 10 - 375 MHz  |      | 0.60    |      | dB    |
|                                       | 375 - 750 MHz |      | 0.90    |      | dB    |
| Phase Unbalance                       | 1 - 10 MHz    |      | 180.047 |      | deg.  |
|                                       | 10 - 375 MHz  |      | 178.999 |      | deg.  |
|                                       | 375 - 750 MHz |      | 176.556 |      | deg.  |
| Amplitude Unbalance                   | 1 - 10 MHz    |      | 0.005   |      | dB    |
|                                       | 10 - 375 MHz  |      | 0.039   |      | dB    |
|                                       | 375 - 750 MHz |      | 0.344   |      | dB    |
| VSWR                                  | SUM Port      |      | 1.15    |      | (:1)  |
|                                       | OUT Ports     |      | 1.12    |      | (: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    |

### electrical schematic



# 2 Way-180° Power Splitter/Combiner SBTCJ-ED11986/2

## 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           | 4.86                            | 4.85 | 0.01                   | 16.78             | 180.16                    | 0.30           | 1.88         | 1.41 | 1.41 |
| 0.50           | 4.43                            | 4.43 | 0.01                   | 19.39             | 180.20                    | 0.50           | 1.59         | 1.30 | 1.30 |
| 0.75           | 4.20                            | 4.19 | 0.01                   | 21.22             | 180.06                    | 0.75           | 1.45         | 1.24 | 1.24 |
| 1.00           | 4.06                            | 4.05 | 0.01                   | 22.41             | 180.08                    | 1.00           | 1.37         | 1.21 | 1.21 |
| 2.00           | 3.79                            | 3.79 | 0.01                   | 24.47             | 180.04                    | 2.00           | 1.24         | 1.15 | 1.15 |
| 4.00           | 3.63                            | 3.63 | 0.00                   | 24.34             | 180.07                    | 4.00           | 1.16         | 1.10 | 1.10 |
| 6.00           | 3.58                            | 3.58 | 0.00                   | 23.62             | 180.05                    | 6.00           | 1.13         | 1.08 | 1.08 |
| 8.00           | 3.56                            | 3.56 | 0.00                   | 23.16             | 180.11                    | 8.00           | 1.12         | 1.07 | 1.07 |
| 10.00          | 3.57                            | 3.56 | 0.01                   | 22.89             | 179.93                    | 10.00          | 1.11         | 1.06 | 1.06 |
| 20.00          | 3.55                            | 3.55 | 0.00                   | 22.39             | 179.85                    | 20.00          | 1.10         | 1.05 | 1.05 |
| 30.00          | 3.55                            | 3.55 | 0.00                   | 22.33             | 179.79                    | 30.00          | 1.09         | 1.05 | 1.05 |
| 40.00          | 3.56                            | 3.56 | 0.00                   | 22.34             | 179.74                    | 40.00          | 1.09         | 1.05 | 1.05 |
| 50.00          | 3.57                            | 3.57 | 0.00                   | 22.37             | 179.63                    | 50.00          | 1.09         | 1.05 | 1.05 |
| 60.00          | 3.58                            | 3.58 | 0.00                   | 22.39             | 179.58                    | 60.00          | 1.09         | 1.05 | 1.05 |
| 70.00          | 3.59                            | 3.59 | 0.00                   | 22.42             | 179.55                    | 70.00          | 1.09         | 1.05 | 1.05 |
| 80.00          | 3.60                            | 3.60 | 0.00                   | 22.47             | 179.46                    | 80.00          | 1.09         | 1.05 | 1.05 |
| 90.00          | 3.60                            | 3.60 | 0.00                   | 22.50             | 179.40                    | 90.00          | 1.09         | 1.05 | 1.06 |
| 100.00         | 3.61                            | 3.61 | 0.01                   | 22.54             | 179.36                    | 100.00         | 1.09         | 1.05 | 1.06 |
| 125.00         | 3.62                            | 3.63 | 0.01                   | 22.63             | 179.18                    | 125.00         | 1.10         | 1.05 | 1.06 |
| 150.00         | 3.63                            | 3.66 | 0.02                   | 22.73             | 179.03                    | 150.00         | 1.10         | 1.05 | 1.07 |
| 175.00         | 3.64                            | 3.67 | 0.03                   | 22.85             | 178.91                    | 175.00         | 1.11         | 1.05 | 1.08 |
| 200.00         | 3.65                            | 3.69 | 0.04                   | 22.99             | 178.77                    | 200.00         | 1.11         | 1.06 | 1.08 |
| 225.00         | 3.66                            | 3.71 | 0.05                   | 23.14             | 178.59                    | 225.00         | 1.12         | 1.06 | 1.09 |
| 250.00         | 3.66                            | 3.73 | 0.07                   | 23.31             | 178.42                    | 250.00         | 1.12         | 1.06 | 1.10 |
| 275.00         | 3.66                            | 3.75 | 0.08                   | 23.49             | 178.27                    | 275.00         | 1.13         | 1.06 | 1.11 |
| 300.00         | 3.66                            | 3.76 | 0.10                   | 23.68             | 178.10                    | 300.00         | 1.14         | 1.07 | 1.12 |
| 325.00         | 3.67                            | 3.78 | 0.11                   | 23.89             | 177.88                    | 325.00         | 1.14         | 1.07 | 1.13 |
| 350.00         | 3.67                            | 3.80 | 0.13                   | 24.07             | 177.81                    | 350.00         | 1.15         | 1.08 | 1.14 |
| 375.00         | 3.67                            | 3.82 | 0.15                   | 24.31             | 177.72                    | 375.00         | 1.16         | 1.08 | 1.15 |
| 400.00         | 3.67                            | 3.84 | 0.17                   | 24.54             | 177.48                    | 400.00         | 1.17         | 1.09 | 1.16 |
| 450.00         | 3.67                            | 3.88 | 0.21                   | 25.03             | 177.27                    | 450.00         | 1.18         | 1.11 | 1.18 |
| 500.00         | 3.67                            | 3.95 | 0.27                   | 25.60             | 176.86                    | 500.00         | 1.20         | 1.13 | 1.21 |
| 550.00         | 3.67                            | 4.01 | 0.34                   | 26.19             | 176.66                    | 550.00         | 1.21         | 1.15 | 1.24 |
| 600.00         | 3.68                            | 4.08 | 0.40                   | 26.65             | 176.21                    | 600.00         | 1.23         | 1.18 | 1.27 |
| 650.00         | 3.69                            | 4.15 | 0.46                   | 27.08             | 175.86                    | 650.00         | 1.25         | 1.22 | 1.31 |
| 700.00         | 3.71                            | 4.22 | 0.52                   | 27.10             | 175.55                    | 700.00         | 1.27         | 1.25 | 1.36 |
| 750.00         | 3.73                            | 4.31 | 0.58                   | 26.83             | 175.39                    | 750.00         | 1.28         | 1.29 | 1.40 |
| 800.00         | 3.76                            | 4.40 | 0.65                   | 26.16             | 174.66                    | 800.00         | 1.30         | 1.33 | 1.45 |
| 900.00         | 3.83                            | 4.62 | 0.79                   | 24.23             | 174.30                    | 900.00         | 1.34         | 1.43 | 1.55 |
| 1000.00        | 3.94                            | 4.86 | 0.93                   | 22.09             | 174.42                    | 1000.00        | 1.38         | 1.53 | 1.68 |

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

REV. X2

SBTCJ-ED11986/2

100707

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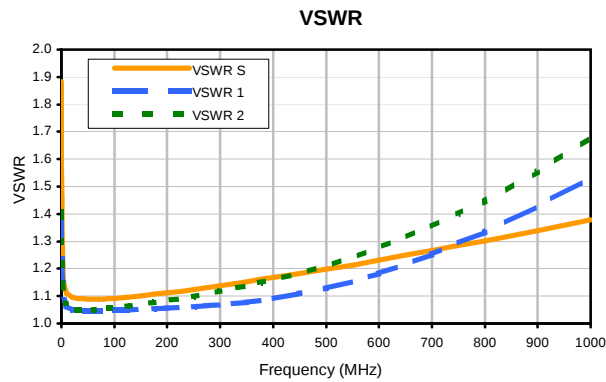
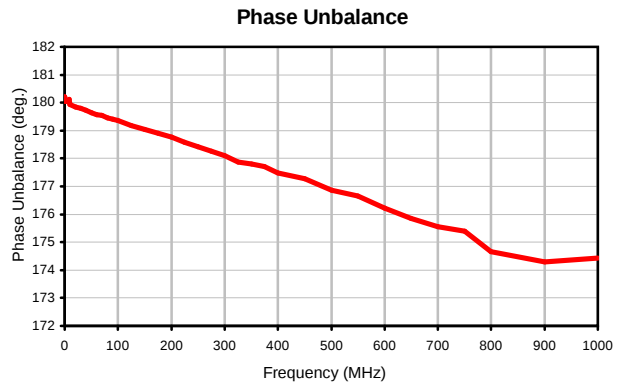
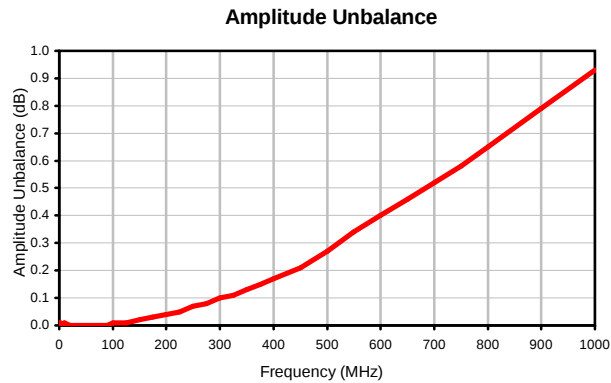
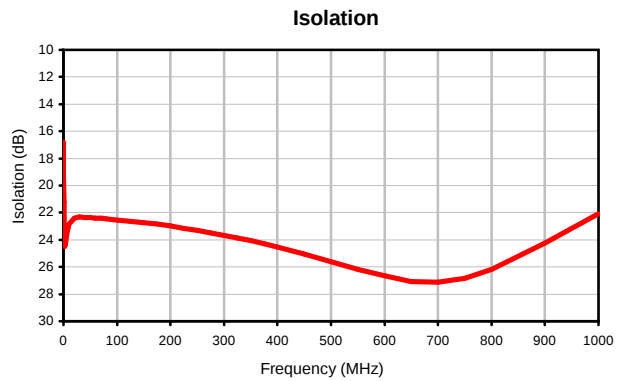
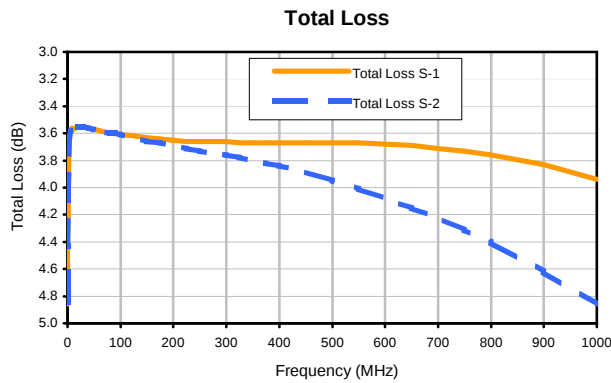


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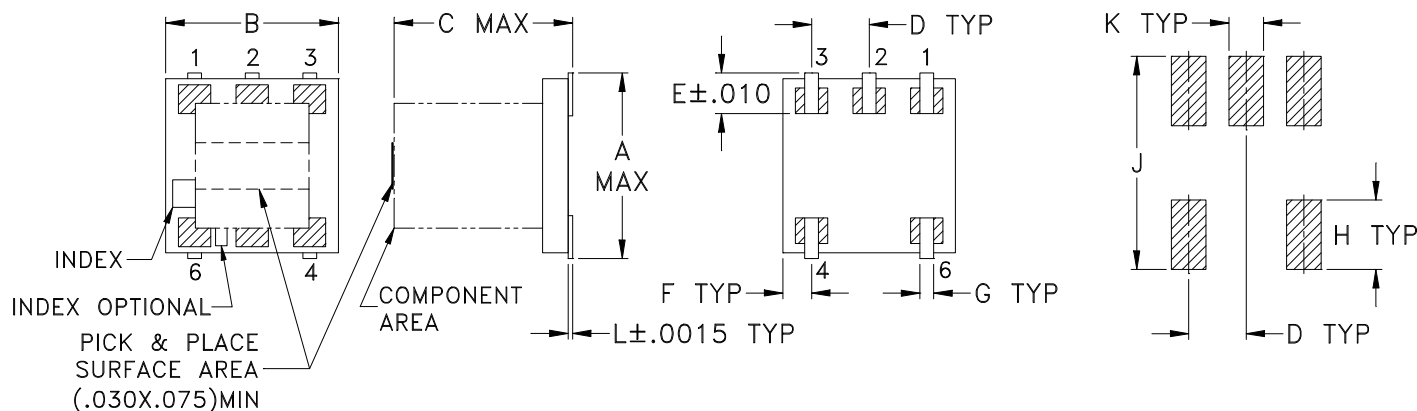
## Typical Performance Curves



## Outline Dimensions

AT1029

## 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 |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------|
| AT1029 | .166<br>(4.22) | .150<br>(3.81) | .155<br>(3.94) | .050<br>(1.27) | .037<br>(0.94) | .025<br>(0.64) | .012<br>(0.30) | .060<br>(1.52) | .184<br>(4.67) | .030<br>(0.76) | .004<br>(0.10) | .10       |

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

### Notes:

- Open style, ceramic base.
- Termination finish:  
For RoHS Case Styles: Tin plate.  
For RoHS-5 Case Styles: Tin-Lead plate.



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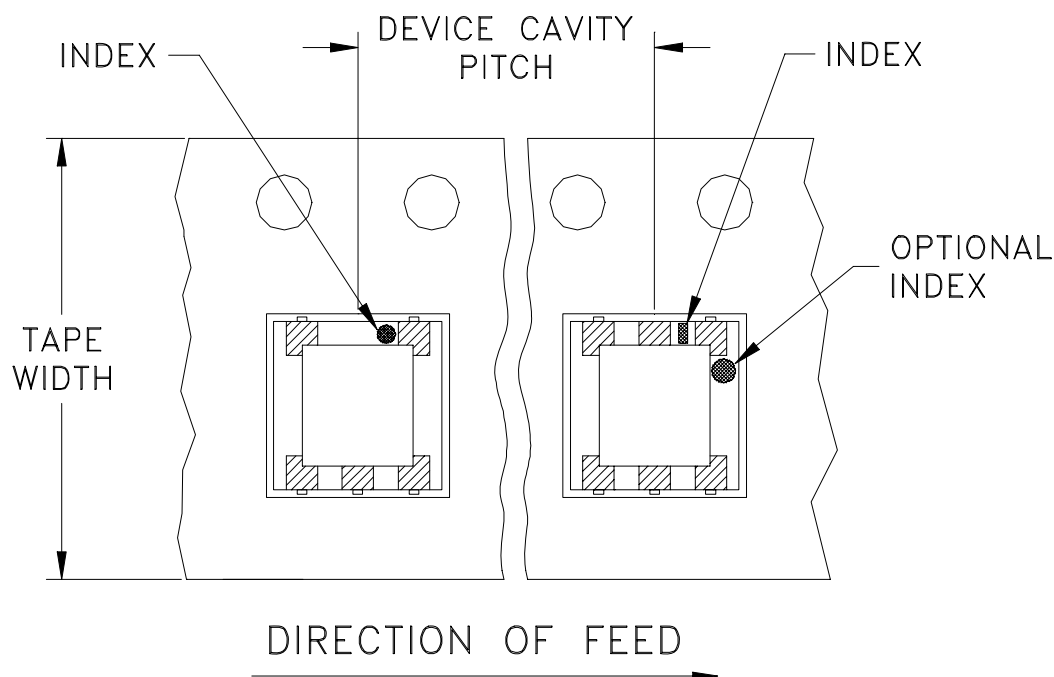


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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F76

## 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              |
|                   |                            |                      | 500              |
|                   |                            | 13                   | 1000             |
|                   |                            |                      | 2000             |

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

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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                                                                              |