

 $50\Omega$  2 to 200 MHz

TC9-1X+



Generic photo used for illustration purposes only

CASE STYLE: AT1521

+ROHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications



#### **Features**

- good return loss
- excellent amplitude unbalance, 0.1dB typ. and phase unbalance, 1 deg typ. in 1dB band width
- plastic base with leads
- aqueous washable

### **Applications**

• impedance matching

### Electrical Specifications at 25°C

| Parameter                             | Condition | Min. | Тур. | Max. | Unit |
|---------------------------------------|-----------|------|------|------|------|
| Impedance Ratio (secondary / primary) |           |      | 9    |      | Ohm  |
| Frequency Range                       |           | 2    |      | 200  | MHz  |
|                                       | 2-200     |      | 3.0  |      |      |
| Insertion Loss*                       | 3-100     |      | 2.0  |      | dB   |
|                                       | 5-40      |      | 1.0  |      |      |

 $<sup>^{\</sup>star}$  Insertion Loss is referenced to mid-band loss,  $\,$  0.7 dB typ.

### **Maximum Ratings**

| Parameter             | Ratings        |
|-----------------------|----------------|
| Operating Temperature | -20°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 0.25W          |
| DC Current            | 30mA           |

 $\label{permanent} \mbox{Permanent damage may occur if any of these limits are exceeded.}$ 

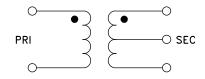
#### **Pin Connections**

| Function      | Pin Number |
|---------------|------------|
| PRIMARY DOT   | 6          |
| PRIMARY       | 4          |
| SECONDARY DOT | 3          |
| SECONDARY     | 1          |
| SECONDARY CT  | 2          |

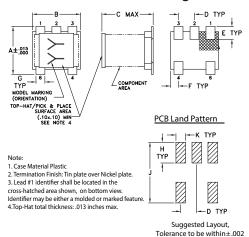
### **Product Marking**



### Config. A



### **Outline Drawing**

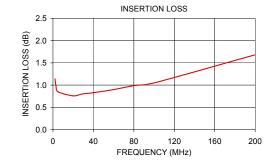


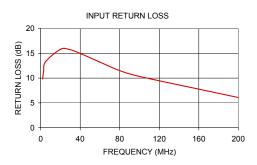
### Outline Dimensions (inch )

| F     | Е    | D    | С    | В    | Α    |
|-------|------|------|------|------|------|
| .025  | .040 | .050 | .160 | .150 | .150 |
| 0.64  | 1.02 | 1.27 | 4.06 | 3.81 | 3.81 |
| wt    |      | K    | J    | Н    | G    |
| grams |      | .030 | .190 | .065 | .028 |
| n 15  |      | 0.76 | 4 83 | 1 65 | 0.71 |

### **Typical Performance Data**

| FI | REQUENCY<br>(MHz) | INSERTION<br>LOSS<br>(dB) | INPUT<br>R. LOSS<br>(dB) |  |
|----|-------------------|---------------------------|--------------------------|--|
|    | 2.00              | 1.14                      | 9.85                     |  |
|    | 3.00              | 0.98                      | 11.35                    |  |
|    | 5.00              | 0.85                      | 13.33                    |  |
|    | 20.00             | 0.76                      | 15.80                    |  |
|    | 29.00             | 0.80                      | 15.77                    |  |
|    | 40.00             | 0.83                      | 14.99                    |  |
|    | 60.00             | 0.90                      | 13.22                    |  |
|    | 80.00             | 0.99                      | 11.50                    |  |
|    | 100.00            | 1.05                      | 10.34                    |  |
|    | 200.00            | 1.68                      | 6.08                     |  |





#### **Additional Notes**

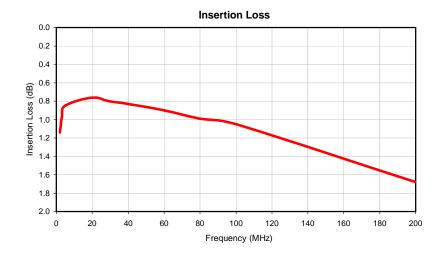
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

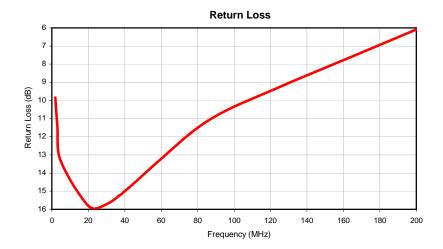
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

# Typical Performance Data

| FREQUENCY<br>(MHz) | INSERTION LOSS<br>(dB) | RETURN LOSS<br>(dB) |
|--------------------|------------------------|---------------------|
| 2.0                | 1.14                   | 9.85                |
| 3.0                | 0.98                   | 11.35               |
| 5.0                | 0.85                   | 13.33               |
| 20.0               | 0.76                   | 15.80               |
| 29.0               | 0.80                   | 15.77               |
| 40.0               | 0.83                   | 14.99               |
| 60.0               | 0.90                   | 13.22               |
| 80.0               | 0.99                   | 11.50               |
| 100.0              | 1.05                   | 10.34               |
| 200.0              | 1.68                   | 6.08                |

## Typical Performance Data

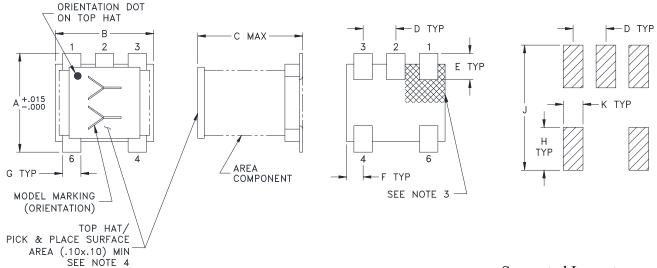




### **Outline Dimensions**

AT1521

### **PCB Land Pattern**



Suggested Layout, Tolerance to be within ±.002

| CASE # | A              | В              | С              | D              | Е              | F             | G             | Н              | J              | K             | WT.<br>GRAMS |
|--------|----------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|---------------|--------------|
| AT1521 | .150<br>(3.81) | .150<br>(3.81) | .160<br>(4.06) | .050<br>(1.27) | .040<br>(1.02) | .025<br>(.64) | .028<br>(.71) | .065<br>(1.65) | .190<br>(4.83) | .030<br>(.76) | .15          |

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.

- Orientation Dot on Top Hat & Marking on the Substrate both refers to Pin #1 of the Unit.
- 4. Top-Hat total thickness: .013 inches MAX.

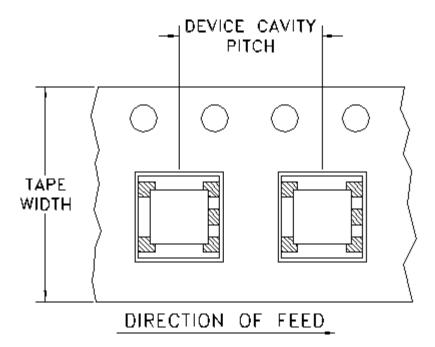




P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

# Tape & Reel Packaging TR-F17

### DEVICE ORIENTATION IN T&R



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices    | s per Reel |
|-------------------|----------------------------|----------------------|------------|------------|
|                   |                            |                      | Small      | 20         |
|                   |                            |                      | quantity   | 50         |
|                   |                            | 7                    | standards  | 100        |
| 12                | 8                          |                      | (see note) | 200        |
|                   |                            |                      |            | 500        |
|                   |                            | 12                   | Ctondond   | 1000       |
|                   |                            | 13                   | Standard   | 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



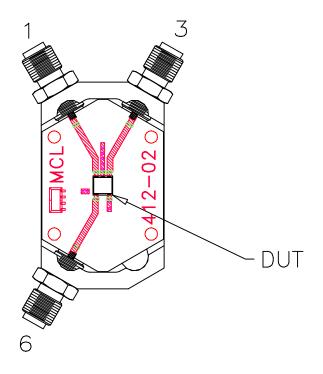


P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

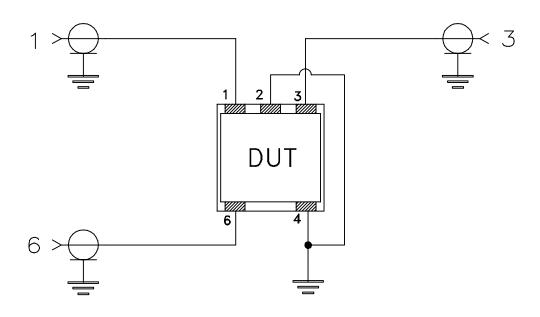
RF/IF MICROWAVE COMPONENTS

# **Evaluation Board and Circuit**

For Pin Connections refer to Data Sheet of the DUT



TB-145



Schematic Diagram

### Notes:

- 1. 50 Ohm SMA Female connectors.
- 2. PCB Material: Rogers RO4350B or its equivalent, III Mini-Circuits® Dielectric Constant=3.5, Thickness=.020"



### **Environmental Specifications**

ENV02

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          | -20° 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; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215  |
|                                |  |  |

ENV02 Rev: A

02/25/11

M130240 File: ENV02.pdf

This document and its contents are the property of Mini-Circuits.