

 $50\Omega$  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

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

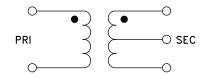
#### **Pin Connections**

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

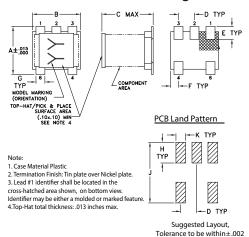
### **Product Marking**



### Config. A



### **Outline Drawing**

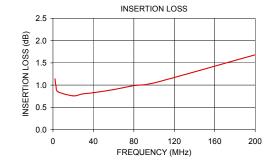


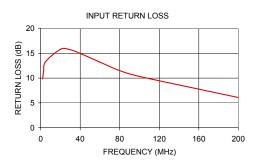
### Outline Dimensions (inch )

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 (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (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**

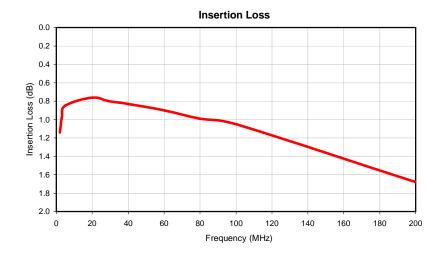
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

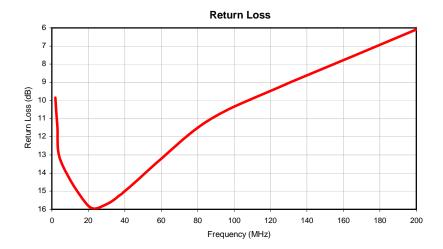
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty 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 (MHz)	INSERTION LOSS (dB)	RETURN LOSS (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

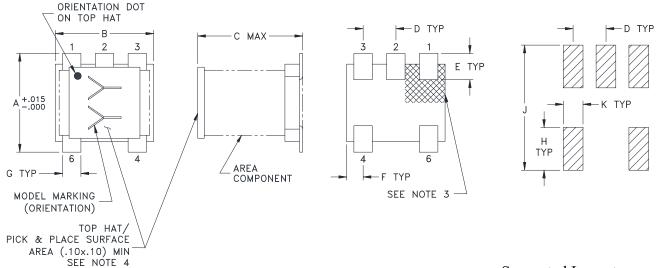




### **Outline Dimensions**

AT1521

### **PCB Land Pattern**



Suggested Layout, Tolerance to be within ±.002

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

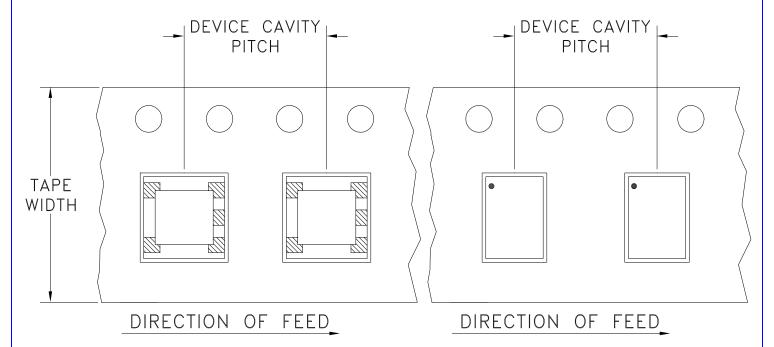




P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

# Tape & Reel Packaging TR-F17

### DEVICE ORIENTATION IN T&R



Tape Width,	<b>Device Cavity</b>	Reel Size,	Devices	s per Reel	
mm	Pitch, mm	inches			
			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





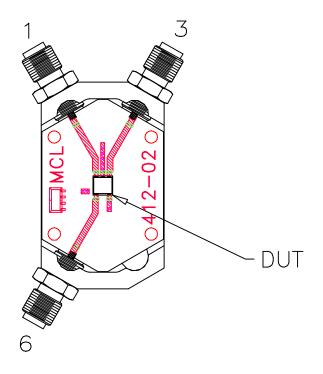
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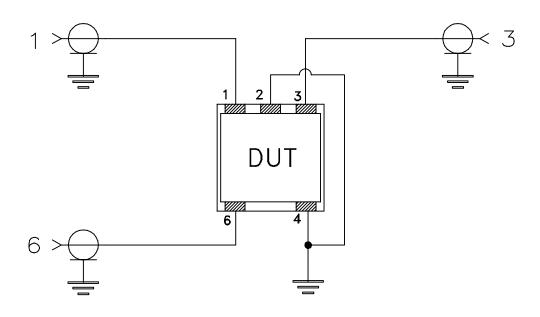
RFJIF MICROWAVE COMPONENTS

# **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 Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C 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 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

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