



SURFACE MOUNT

# RF Transformer

TC1.5-1+

Mini-Circuits

50Ω 0.5 to 2200 MHz

## FEATURES

- Wideband, 0.5-2200 MHz
- Excellent Return Loss
- Terminations, Tin Plated with Nickel Barrier for Solderability & Excellent Leach Resistance
- Autotransformer
- Plastic Base with Leads
- Aqueous Washable



Generic photo used for illustration purposes only

CASE STYLE: AT224-1A

## +RoHS Compliant

The +Suffix identifies RoHS Compliance.  
See our website for methodologies and qualifications

## APPLICATIONS

- Impedance Matching

## ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (Secondary/Primary)			1.5		
Frequency Range		0.5		2200	MHz
Insertion Loss <sup>1</sup>	0.5-2200		3		dB
	1-2000		2		
	2-1100		1		

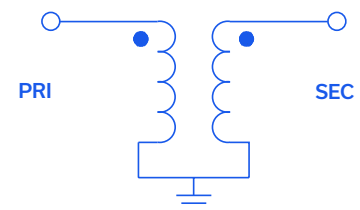
1. Insertion Loss is referenced to mid-band loss, 0.3 dB typ.

## ABSOLUTE MAXIMUM RATINGS

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

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

## CONFIG. D



REV. E  
ECO-025303  
TC1.5-1+  
MCL NY  
250423

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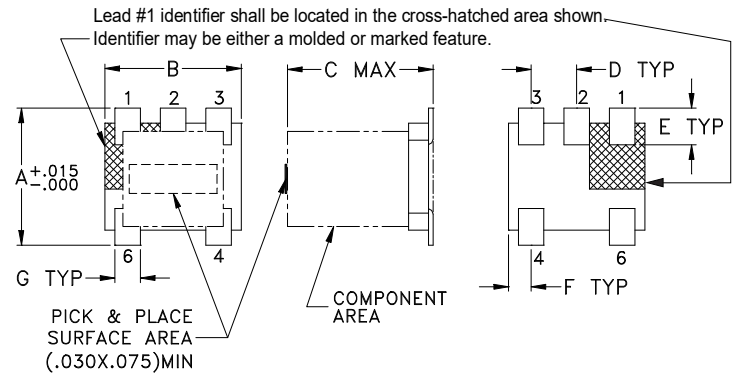


## PIN CONNECTIONS

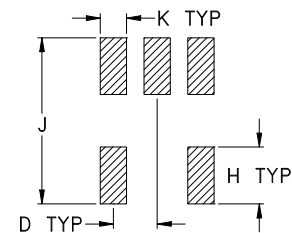
Function	Pin Number
PRIMARY DOT	6
PRIMARY	4
SECONDARY DOT	1
SECONDARY	4
NOT USED	2,5

PRODUCT MARKING: N/A

## OUTLINE DRAWING



## PCB Land Pattern

Suggested Layout,  
Tolerance to be within  $\pm .002$ OUTLINE DIMENSIONS (Inch  
mm)

A	B	C	D	E	F
.150	.150	.160	.050	.040	.025
3.81	3.81	4.06	1.27	1.02	0.64
G	H	J	K	wt	
.028	.065	.190	.030	grams	
0.71	1.65	4.83	0.76	0.15	

## TAPE &amp; REEL INFORMATION: F17



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## TYPICAL PERFORMANCE DATA

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)
0.10	0.79	9.30
10.00	0.34	32.27
55.00	0.26	34.33
100.00	0.28	31.27
500.00	0.38	21.15
800.00	0.47	17.71
1200.00	0.59	15.28
1500.00	0.71	16.70
1950.00	1.04	25.47
2250.00	1.43	11.82



### NOTES

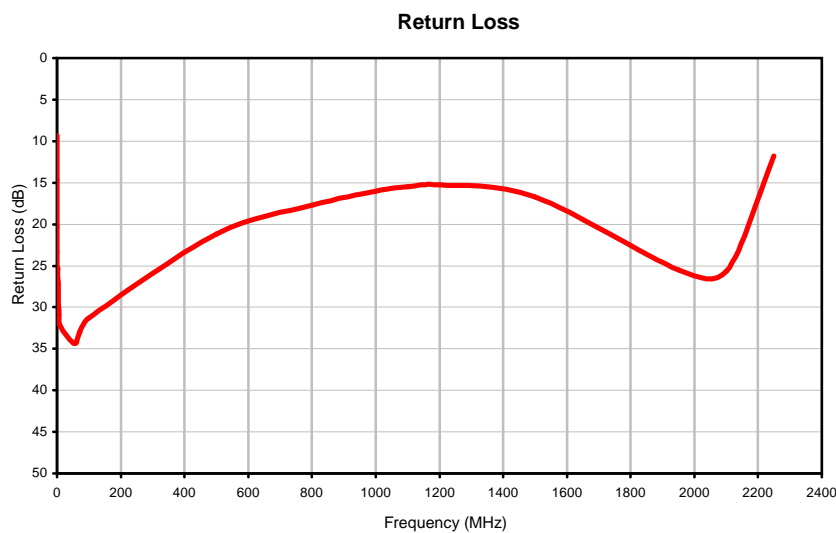
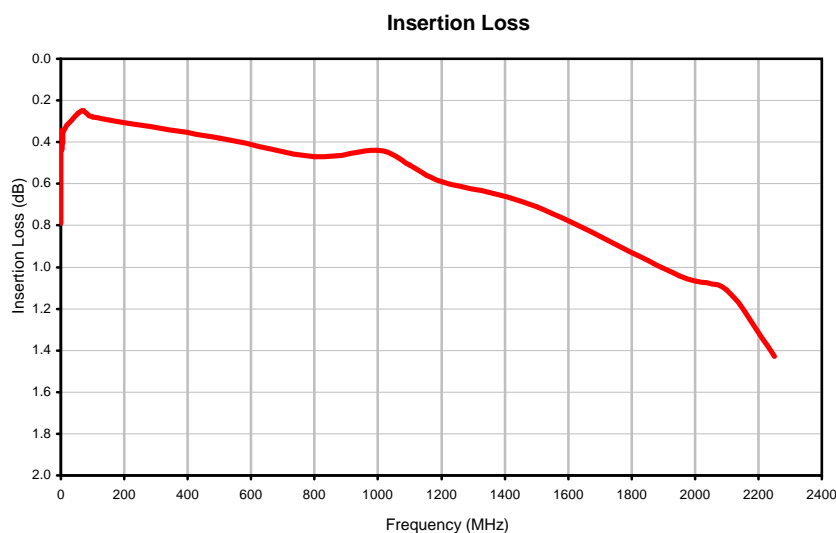
- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
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*Typical Performance Data*

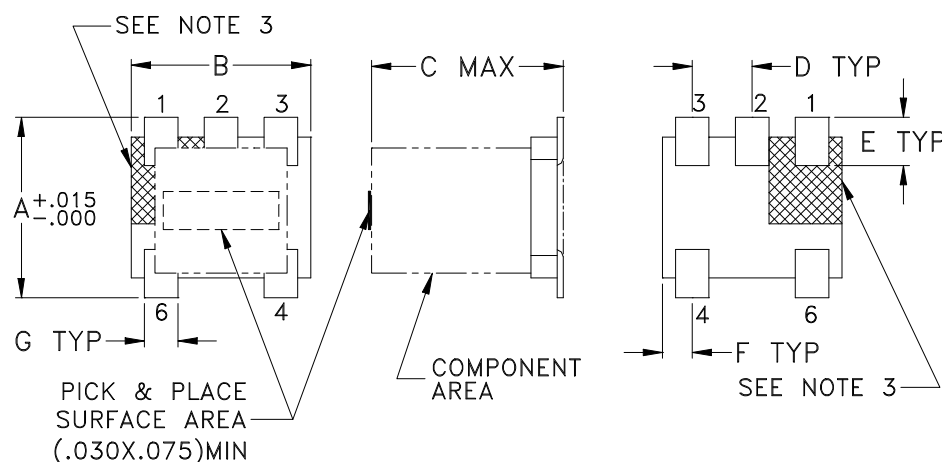
FREQUENCY (MHz)	INSERTION LOSS (dB)	RETURN LOSS (dB)
0.10	0.79	9.30
0.19	0.43	14.64
0.37	0.37	20.31
0.55	0.37	23.44
0.73	0.37	25.46
1.00	0.35	27.48
2.02	0.44	25.35
6.01	0.40	30.91
10.00	0.34	32.27
55.00	0.26	34.33
70.00	0.25	33.04
100.00	0.28	31.27
500.00	0.38	21.15
800.00	0.47	17.71
1000.00	0.44	16.04
1100.00	0.51	15.47
1200.00	0.59	15.28
1500.00	0.71	16.70
1950.00	1.04	25.47
2100.00	1.11	25.62
2250.00	1.43	11.82

## Typical Performance Curves

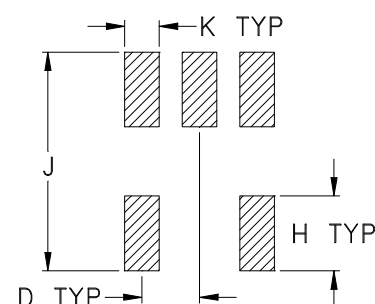


## Outline Dimensions

AT224-1A



## PCB Land Pattern



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

CASE #	A	B	C	D	E	F	G	H	J	K	WT. GRAMS
AT224-1A	.150 (3.81)	.150 (3.81)	.160 (4.06)	.050 (1.27)	.040 (1.02)	.025 (0.64)	.028 (0.71)	.065 (1.65)	.190 (4.83)	.030 (0.76)	.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.
- Lead #1 identifier shall be located in the cross-hatched area shown.  
Identifier may be either a molded or marked feature.



P.O. Box 350186, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site

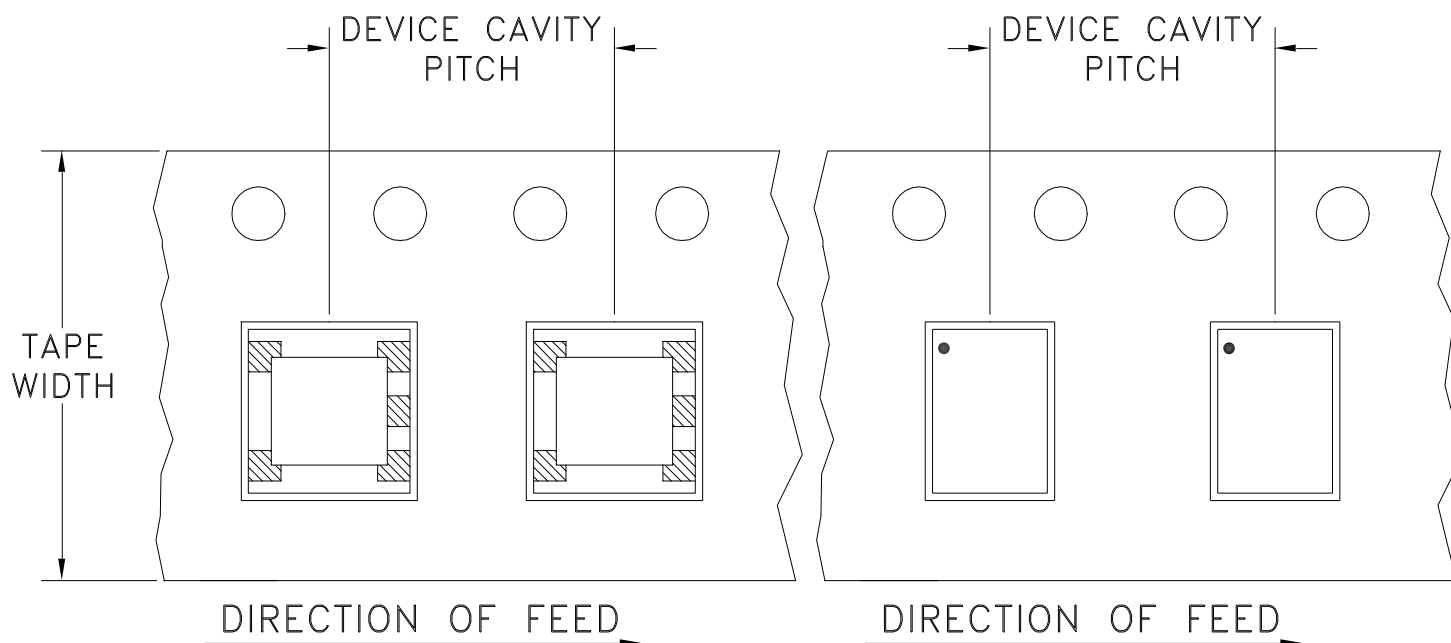


The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F17

## DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
12	8	7	Small quantity standards (see note)	20
				50
				100
				200
				500
		13	Standard	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)



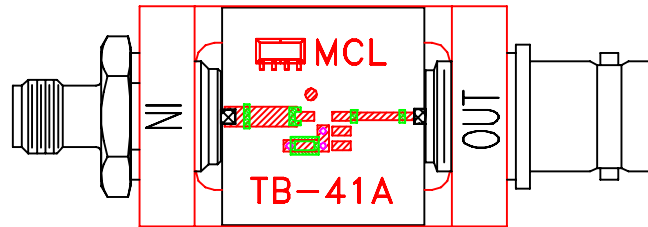
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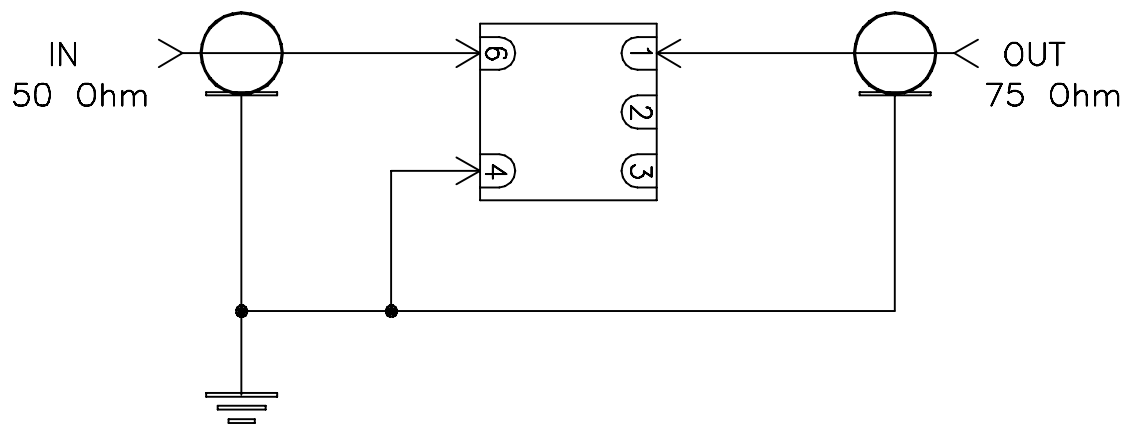
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RF/IF MICROWAVE COMPONENTS

# Evaluation Board and Circuit



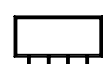
TB-41



Schematic Diagram

## Notes:

1. 75 Ohm BNC and 50 Ohm SMA 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	-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