*Surface Mount*

# RF Transformer

## TC9-1G2+

50Ω 2 to 200 MHz

*Generic photo used for illustration purposes only*

CASE STYLE: AT224-3

***+RoHS Compliant***

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

### Maximum Ratings

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

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

### Pin Connections

| | |
|---|---|
| PRIMARY DOT | 6 |
| PRIMARY | 4 |
| SECONDARY DOT | 1 |
| SECONDARY | 3 |
| SECONDARY CT | 2 |

### Features

- suitable for tin/lead and RoHS solder systems
- good return loss
- excellent amplitude unbalance, 0.1 dB typ. and phase unbalance, 1 deg. typ. in 1 dB band width
- aqueous washable

### Applications

- impedance matching

*Available Tape and Reel at no extra cost*

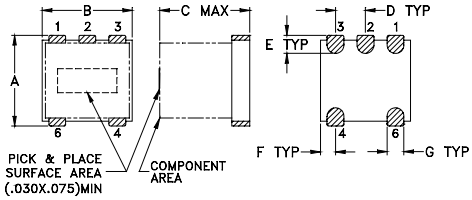
| Reel Size | Devices/Reel |
|---|---|
| 7" | 20, 50, 100, 200, 500 |
| 13" | 1000, 2000 |

### Transformer Electrical Specifications

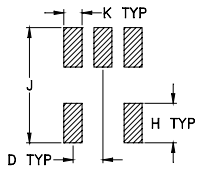
| Ω RATIO (Secondary/Primary) | FREQUENCY (MHz) | INSERTION LOSS* | | |
|---|---|---|---|---|
| | | 3 dB MHz | 2 dB MHz | 1 dB MHz |
| 9 | 2-200 | 2-200 | 3-100 | 5-40 |

* Insertion Loss is referenced to mid-band loss, 0.7 dB typ.

### Outline Drawing AT224-3




PCB Land Pattern



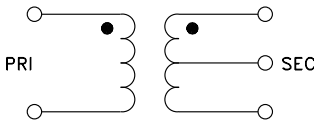

Suggested Layout, Tolerance to be within ±.002

### Outline Dimensions (inch / mm)

| A | B | C | D | E | F |
|---|---|---|---|---|---|
| .150 | .150 | .150 | .050 | .030 | .025 |
| 3.81 | 3.81 | 3.81 | 1.27 | 0.76 | 0.64 |

| G | H | J | K | wt |
|---|---|---|---|---|
| .028 | .065 | .190 | .030 | grams |
| 0.71 | 1.65 | 4.83 | 0.76 | 0.10 |

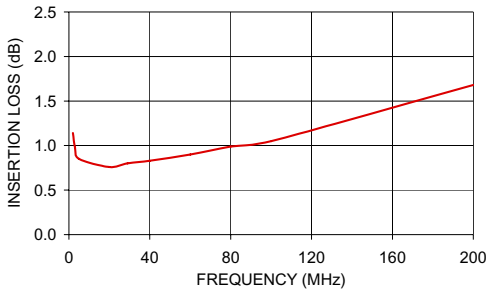
### Config. A



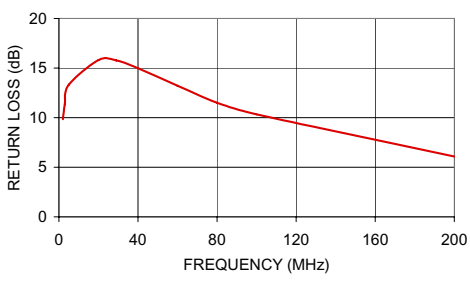

### Typical Performance Data

| FREQUENCY (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 | 11.5 |
| 100.00 | 1.05 | 10.34 |
| 200.00 | 1.68 | 6.08 |

TC9-1G2+
INSERTION LOSS




TC9-1G2+
INPUT RETURN LOSS




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

# RF Transformer TC9-1G2+

*Typical Performance Data*

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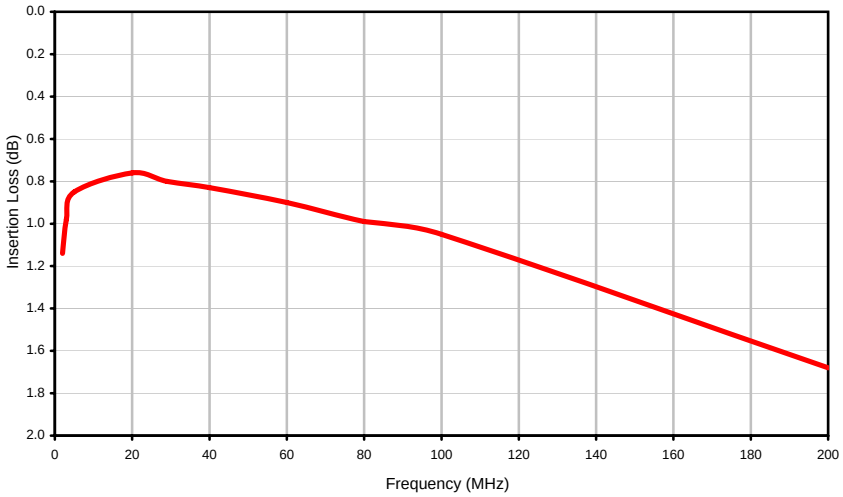
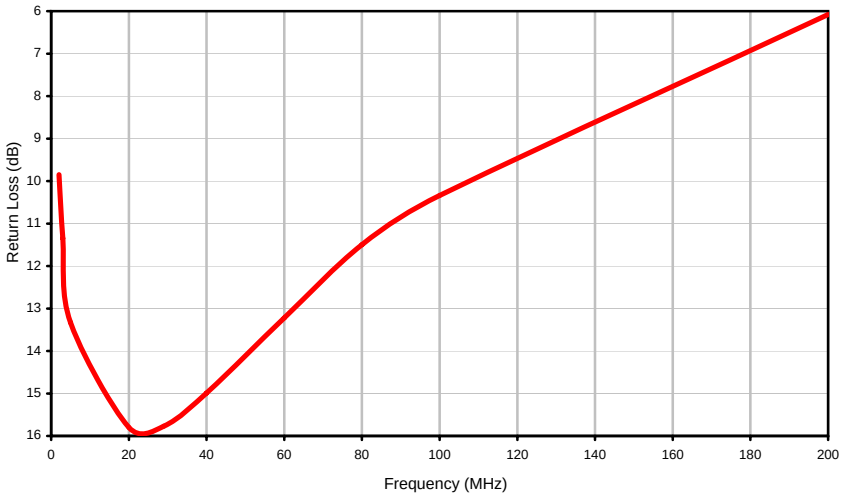
| 29.00 | 0.80 | 15.77 |
| 40.00 | 0.83 | 14.99 |
| 60.00 | 0.90 | 13.22 |
| 80.00 | 0.99 | 11.50 |
| 100.00 | 1.05 | 10.34 |
| 200.00 | 1.68 | 6.08 |

*Typical Performance Curves*

**Insertion Loss**



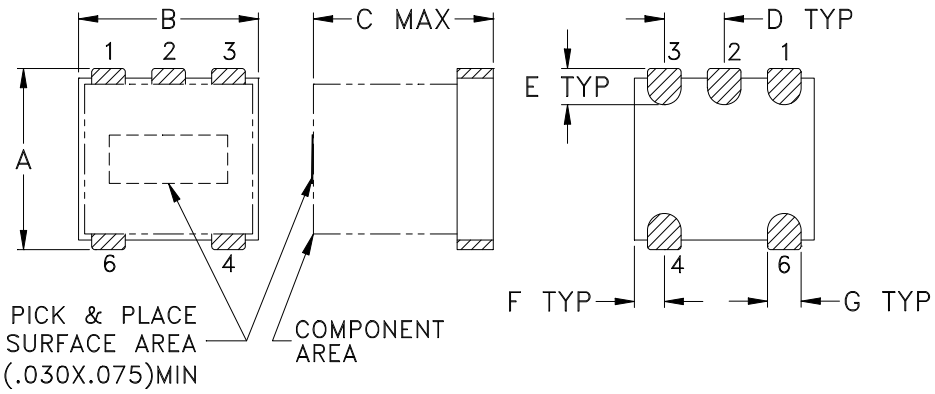

**Return Loss**



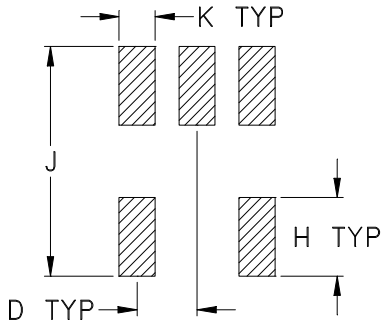
# Case Style AT

## Outline Dimensions

**AT224-3**




**PCB Land Pattern**




Suggested Layout,
Tolerance to be within ±.002

| CASE # | A | B | C | D | E | F | G | H | J | K | L | WT. GRAMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AT224-3 | .150 (3.81) | .150 (3.81) | .150 (3.81) | .050 (1.27) | .030 (0.76) | .025 (0.64) | .028 (0.71) | .065 (1.65) | .190 (4.83) | .030 (0.76) | -- -- | .10 |

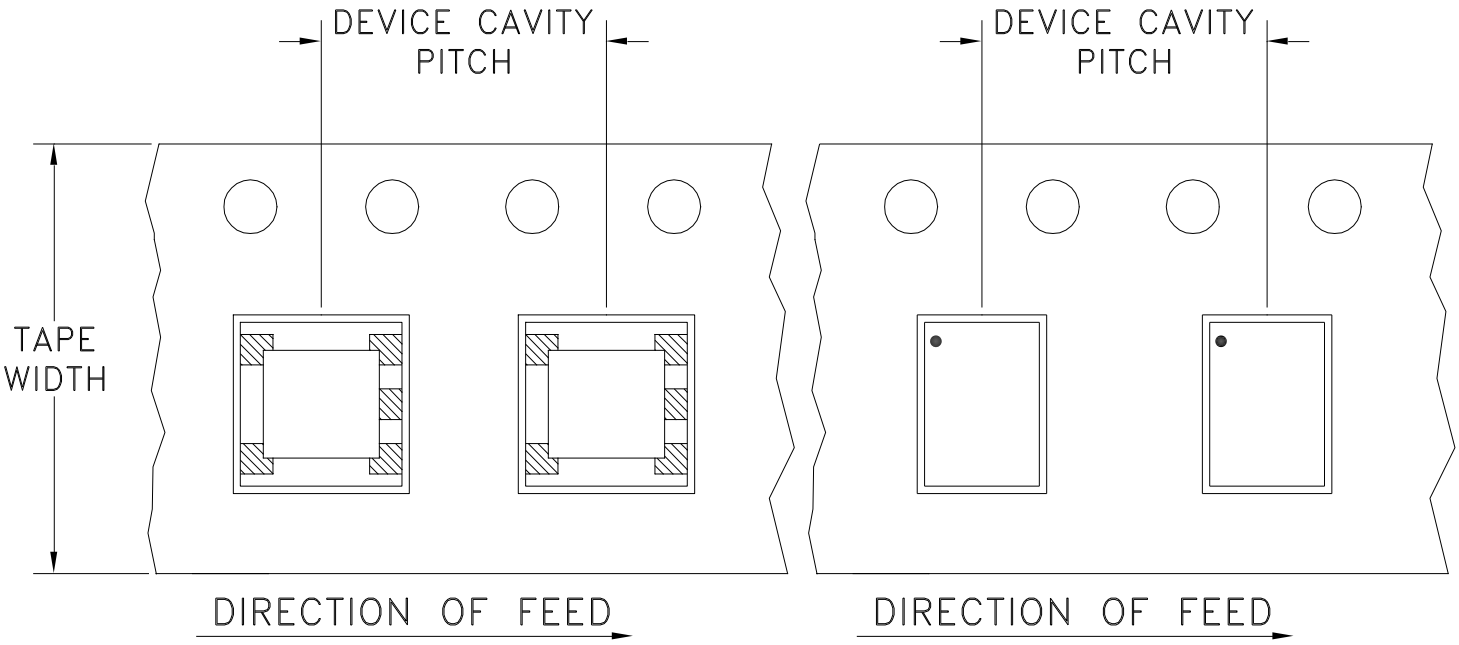
**Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3 Pl. ± .005**

**Notes:**

1. Open style, ceramic base.
2. Termination finish: 3.15-5.12 µ inch (.08-.130 microns) Gold over 78–236 µ inch (1.98-6.0 microns) Nickel plate.

# 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 |

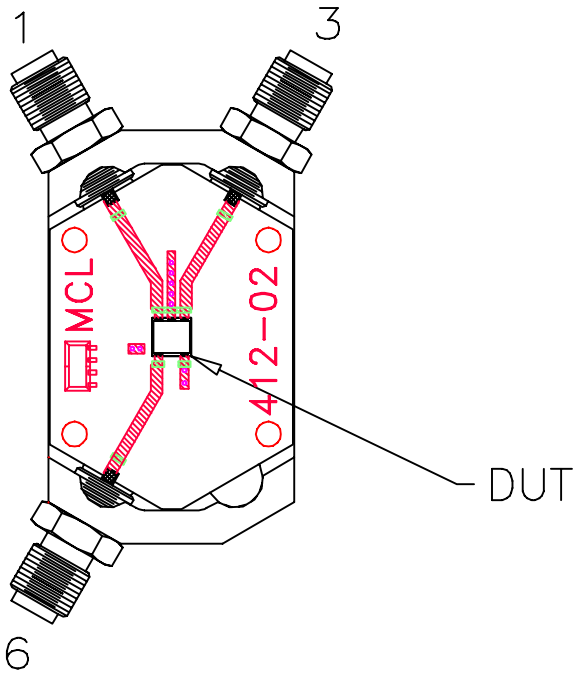
Note: Please Consult individual model data sheet to determine device per reel availability.

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.

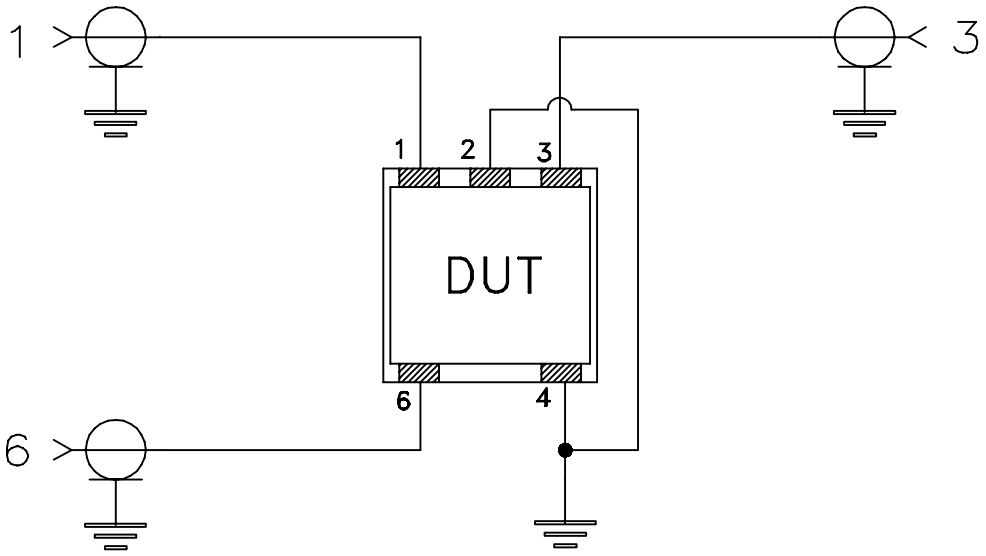
Go to: www.minicircuits.com/pages/pdfs/tape.pdf

# 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, Dielectric Constant=3.5, Thickness=.020"

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