

Mini-Circuits®

SURFACE MOUNT

## RF Transformer

ADT1-1+

50Ω

0.15 to 400 MHz

## FEATURES

- Good return loss, 22 dB in 1 dB bandwidth
- Excellent amplitude unbalance, 0.1 dB typ. and phase unbalance, 2 deg. typ. in 1dB bandwidth
- Aqueous washable
- Protected under US patent 6,133,525



Generic photo used for illustration purposes only

CASE STYLE: CD542

**+RoHS Compliant**

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

## APPLICATIONS

- Impedance matching
- Baluns

## ELECTRICAL SPECIFICATIONS AT 25°C

| Parameter           | Frequency (MHz) | Min. | Typ. | Max. | Units  |
|---------------------|-----------------|------|------|------|--------|
| Impedance Ratio     |                 | 1    |      |      |        |
| Frequency Range     |                 | 0.15 |      | 400  | MHz    |
| Insertion Loss*     | 0.15-400        | —    | 3    | —    | dB     |
|                     | 0.2-200         | —    | 2    | —    |        |
|                     | 0.3-100         | —    | 1    | —    |        |
| Amplitude Unbalance | 0.2-200         | —    | 0.5  | —    | dB     |
|                     | 0.3-100         | —    | 0.1  | —    |        |
| Phase Unbalance     | 0.2-200         | —    | 5    | —    | Degree |
|                     | 0.3-100         | —    | 2    | —    |        |

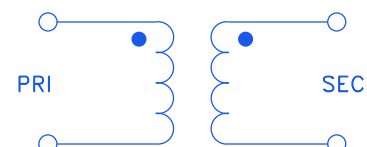
\* Insertion Loss is referenced to mid-band loss, 0.3 dB typ.

## 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           |

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

## CONFIGURATION C

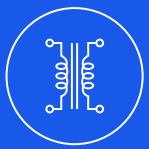


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REV. F  
ECO-014934  
ADT1-1+  
HY/CP/AM  
220829

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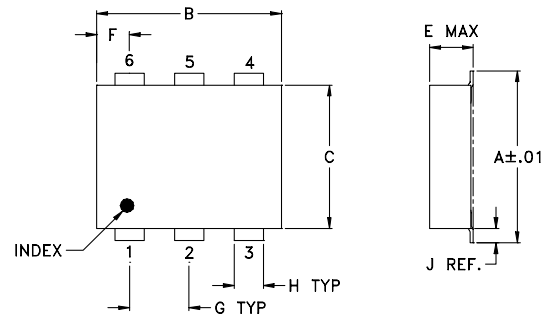
## PIN CONNECTIONS

|               |     |
|---------------|-----|
| PRIMARY DOT   | 3   |
| PRIMARY       | 1   |
| SECONDARY DOT | 4   |
| SECONDARY     | 6   |
| NOT USED      | 2,5 |

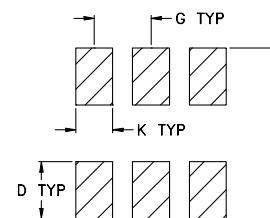
PRODUCT MARKING: N/A

DEMOBOARD MCL P/N: TB-430

## OUTLINE DRAWING



## PBC Land Pattern

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

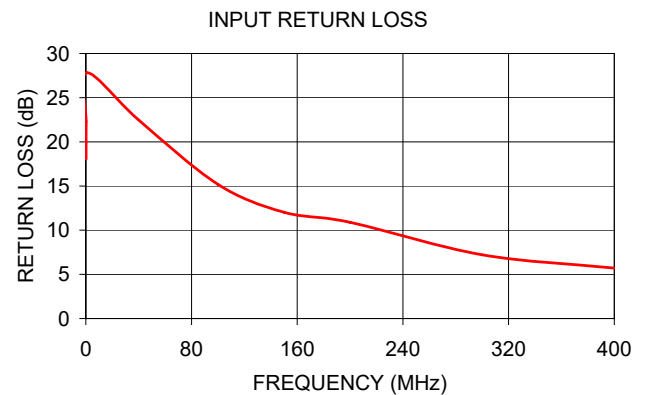
| A    | B    | C    | D    | E     | F    | G    |
|------|------|------|------|-------|------|------|
| .272 | .310 | .220 | .100 | .112  | .055 | .100 |
| 6.91 | 7.87 | 5.59 | 2.54 | 2.84  | 1.40 | 2.54 |
| H    | J    | K    | L    | wt    |      |      |
| .030 | .026 | .065 | .300 | grams |      |      |
| 0.76 | 0.66 | 1.65 | 7.62 | 0.20  |      |      |

TAPE &amp; REEL INFORMATION: F34



## TYPICAL PERFORMANCE DATA

| Frequency (MHz) | Insertion Loss (dB) | Return Loss (dB) | Amplitude Unbalance (dB) | Phase Unbalance (deg) |
|-----------------|---------------------|------------------|--------------------------|-----------------------|
| 0.15            | 0.58                | 18.04            | 0.01                     | 0.06                  |
| 0.20            | 0.51                | 19.90            | 0.01                     | 0.02                  |
| 0.30            | 0.44                | 22.30            | 0.02                     | 0.00                  |
| 1.00            | 0.30                | 27.82            | 0.00                     | 0.08                  |
| 40.00           | 0.31                | 22.47            | 0.04                     | 1.44                  |
| 100.00          | 0.52                | 15.19            | 0.22                     | 3.60                  |
| 150.00          | 0.64                | 12.04            | 0.53                     | 5.83                  |
| 200.00          | 1.08                | 10.90            | 0.99                     | 7.98                  |
| 300.00          | 1.58                | 7.21             | 2.21                     | 14.28                 |
| 400.00          | 1.82                | 5.71             | 4.06                     | 24.39                 |



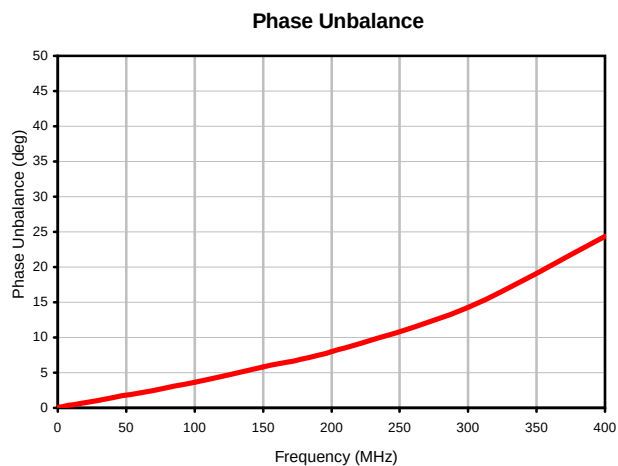
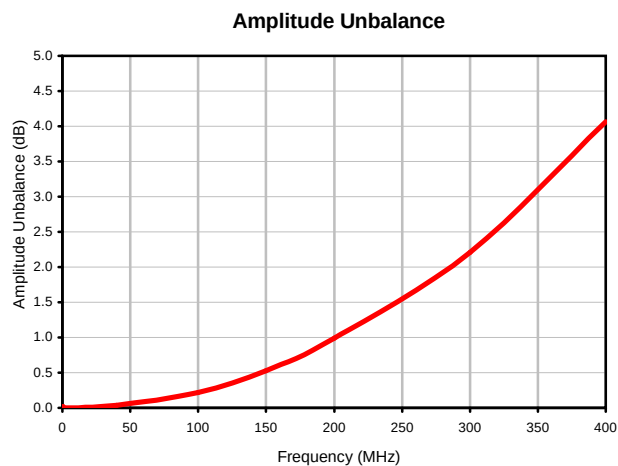
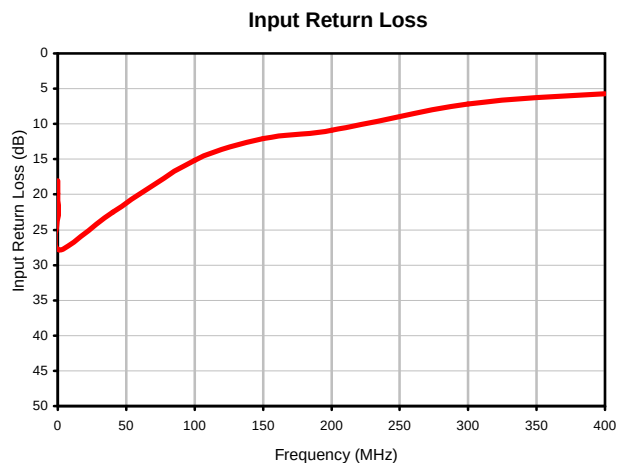
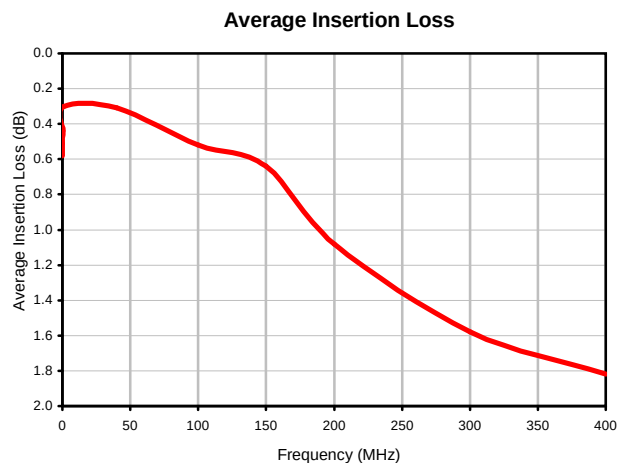
## NOTES

- 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/terms/viewterm.html](http://www.minicircuits.com/terms/viewterm.html)

## Typical Performance Data

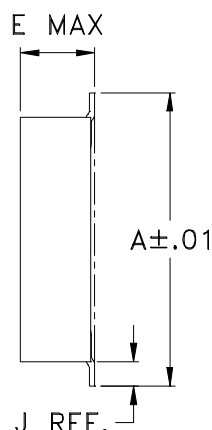
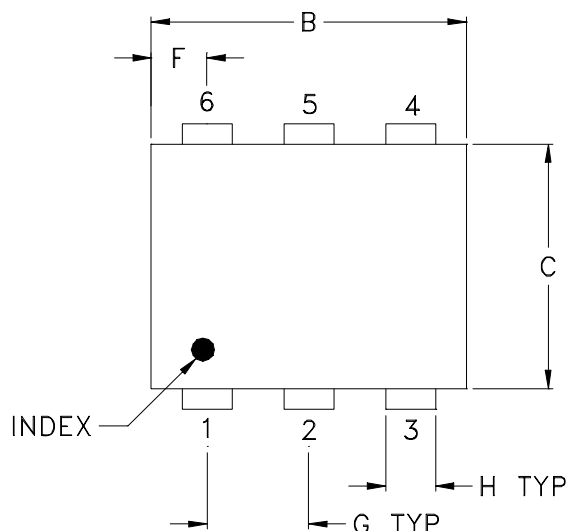
| FREQUENCY<br>(MHz) | AVERAGE<br>INSERTION<br>LOSS<br>(dB) | INPUT<br>RETURN<br>LOSS<br>(dB) | AMPLITUDE<br>UNBALANCE<br>(dB) | PHASE<br>UNBALANCE<br>(deg) |
|--------------------|--------------------------------------|---------------------------------|--------------------------------|-----------------------------|
| 0.15               | 0.58                                 | 18.04                           | 0.01                           | 0.06                        |
| 0.20               | 0.51                                 | 19.90                           | 0.01                           | 0.02                        |
| 0.30               | 0.44                                 | 22.30                           | 0.02                           | 0.00                        |
| 1.00               | 0.30                                 | 27.82                           | 0.00                           | 0.08                        |
| 40.00              | 0.31                                 | 22.47                           | 0.04                           | 1.44                        |
| 100.00             | 0.52                                 | 15.19                           | 0.22                           | 3.60                        |
| 150.00             | 0.64                                 | 12.04                           | 0.53                           | 5.83                        |
| 200.00             | 1.08                                 | 10.90                           | 0.99                           | 7.98                        |
| 300.00             | 1.58                                 | 7.21                            | 2.21                           | 14.28                       |
| 400.00             | 1.82                                 | 5.71                            | 4.06                           | 24.39                       |

## Typical Performance Curves

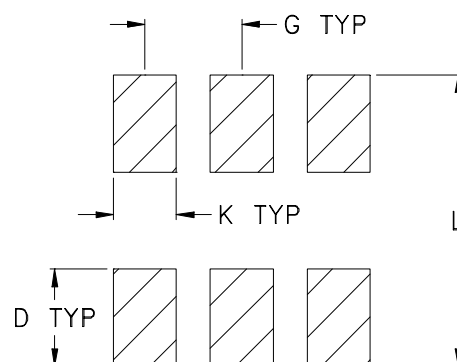


CD541  
CD542  
CD636  
CD637

## Outline Dimensions



## PCB Land Pattern



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

| CASE# | A              | B              | C              | D              | E              | F              | G              | H              | J              | K              | L              | WT,<br>GRAM |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------|
| CD541 |                |                |                |                | .082<br>(2.08) |                |                |                |                |                |                | .15         |
| CD542 | .272<br>(6.91) | .310<br>(7.87) | .220<br>(5.58) | .100<br>(2.54) | .112<br>(2.84) | .055<br>(1.40) | .100<br>(2.54) | .030<br>(0.76) | .026<br>(0.66) | .065<br>(1.65) | .300<br>(7.62) | .20         |
| CD636 |                |                |                |                | .162<br>(4.11) |                |                |                |                |                |                | .25         |
| CD637 |                |                |                |                | .206<br>(5.23) |                |                |                |                |                |                | .40         |

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.  
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



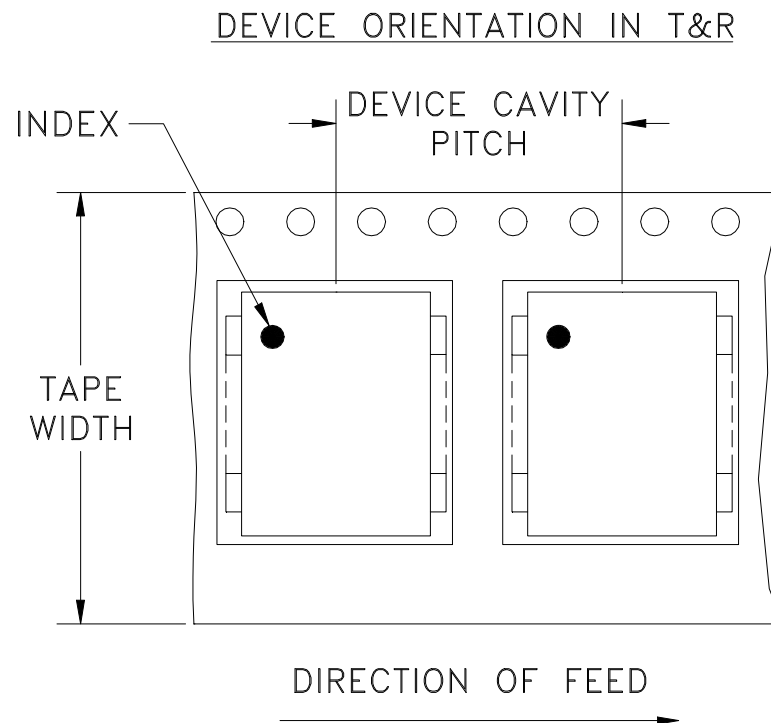
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Mini-Circuits ISO 9001 & ISO 14001 Certified

# Tape & Reel Packaging TR-F34



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel<br>see note                |      |
|-------------------|----------------------------|----------------------|---------------------------------------------|------|
| 16                | 12                         | 7                    | Small<br>quantity<br>standard<br>(see note) | 20   |
|                   |                            |                      |                                             | 50   |
|                   |                            |                      |                                             | 100  |
|                   |                            |                      |                                             | 200  |
|                   |                            | 13                   | Standard                                    | 500  |
|                   |                            |                      |                                             | 1000 |

Note: Availability of small reel quantity varies by model.  
Refer to pricing and availability on individual model dashboard.

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)



INTERNET <http://www.minicircuits.com>

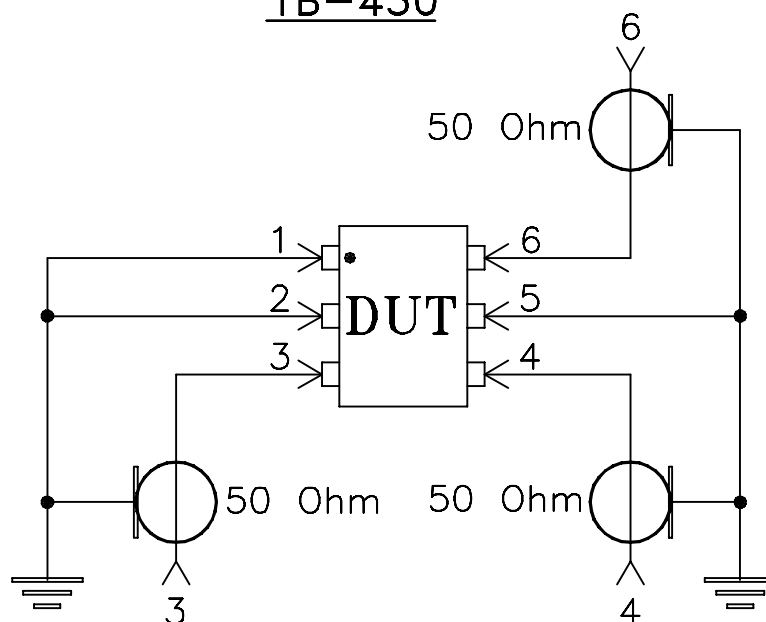
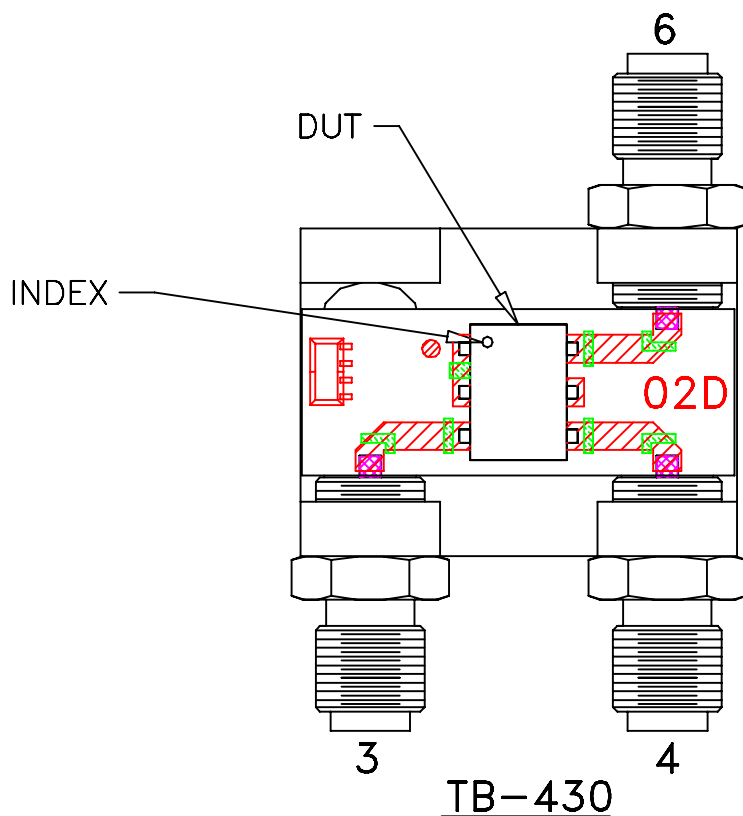
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# Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.
3. Must use ENA/PNA type agilent's network analyzers with impedance conversion option to convert ports to appropriate impedances.

 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<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                                                                              |