

## Engineering Development Model

# RF Transformer

# TCN1-ED12817/34B3

Impedance Ratio : 1

### Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability. At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.



Please click "Back", and then click "Contact Us" for Applications support.

CASE STYLE: FV1206-1

| ELECTRICAL SPECIFICATIONS 75Ω @ +25°C |      |             |      |       |
|---------------------------------------|------|-------------|------|-------|
| Parameter                             | Min. | Typ.        | Max. | Units |
| Frequency                             | 1120 |             | 1650 | MHz   |
| Insertion Loss * 1 dB Bandwidth       |      | 1120 - 1650 |      | MHz   |

**Note:** \* Insertion Loss is referenced to mid-band loss, 0.86dB typ.

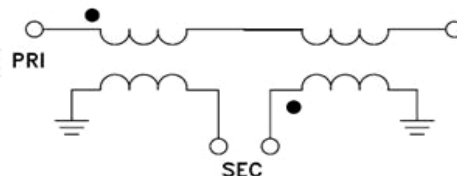
| MAXIMUM RATINGS       |                |
|-----------------------|----------------|
| Operating Temperature | -55°C to 100°C |
| Storage Temperature   | -55°C to 100°C |
| Input RF Power **     | 5 W            |

\*\* Derate linearly to 2.5W at 100°C

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

Pads 1,3,4,6 are DC-connected internally.

### Configuration : J



# RF Transformer

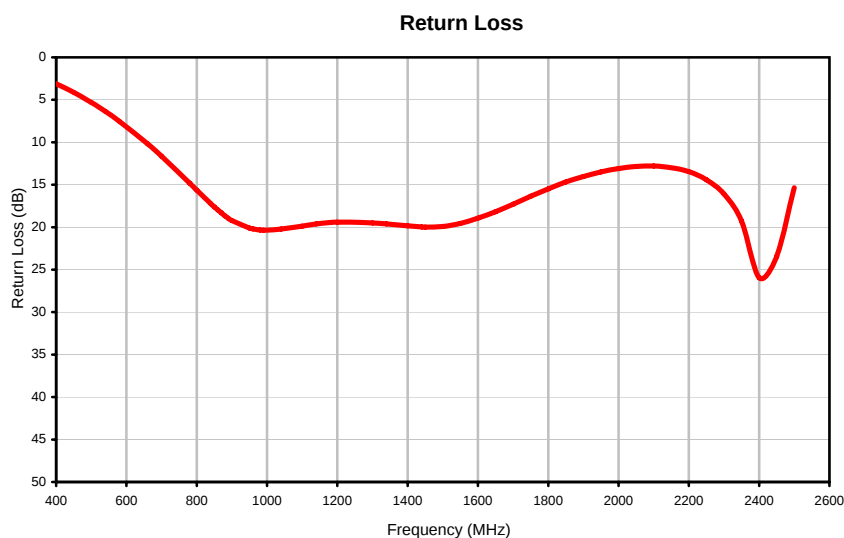
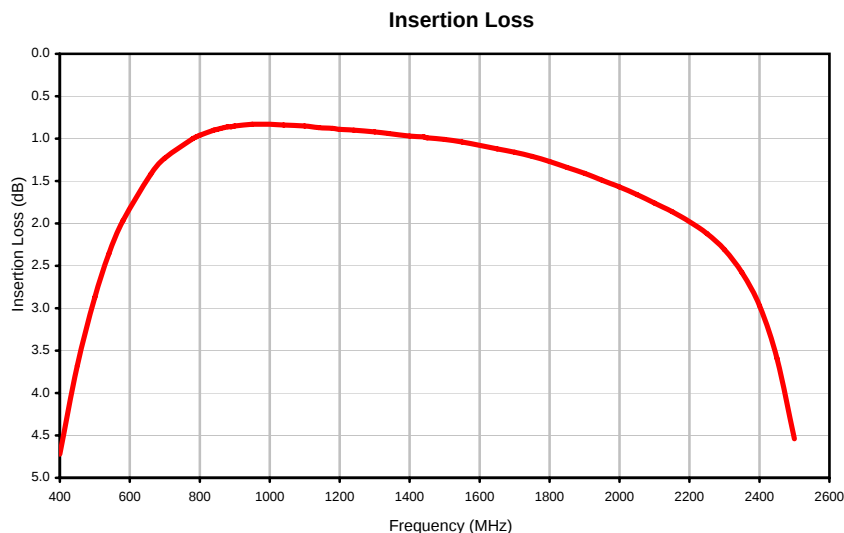
# TCN1-ED12817/34B3

## Typical Performance Data

| FREQUENCY<br>(MHz) | INSERTION<br>LOSS<br>(dB) | RETURN<br>LOSS<br>(dB) |
|--------------------|---------------------------|------------------------|
| 400                | 4.72                      | 3.11                   |
| 450                | 3.68                      | 4.13                   |
| 500                | 2.87                      | 5.31                   |
| 540                | 2.36                      | 6.37                   |
| 580                | 1.97                      | 7.53                   |
| 660                | 1.42                      | 10.17                  |
| 700                | 1.23                      | 11.65                  |
| 780                | 1.00                      | 14.83                  |
| 790                | 0.98                      | 15.23                  |
| 800                | 0.96                      | 15.63                  |
| 840                | 0.90                      | 17.23                  |
| 850                | 0.89                      | 17.61                  |
| 860                | 0.88                      | 17.97                  |
| 870                | 0.87                      | 18.32                  |
| 880                | 0.86                      | 18.65                  |
| 890                | 0.86                      | 18.95                  |
| 900                | 0.85                      | 19.22                  |
| 950                | 0.83                      | 20.11                  |
| 960                | 0.83                      | 20.20                  |
| 970                | 0.83                      | 20.27                  |
| 980                | 0.83                      | 20.32                  |
| 990                | 0.83                      | 20.34                  |
| 1000               | 0.83                      | 20.35                  |
| 1040               | 0.84                      | 20.22                  |
| 1100               | 0.85                      | 19.88                  |
| 1140               | 0.87                      | 19.61                  |
| 1180               | 0.88                      | 19.44                  |
| 1200               | 0.89                      | 19.40                  |
| 1240               | 0.90                      | 19.40                  |
| 1300               | 0.92                      | 19.50                  |
| 1340               | 0.94                      | 19.62                  |
| 1400               | 0.97                      | 19.83                  |
| 1440               | 0.98                      | 19.97                  |
| 1450               | 0.99                      | 19.98                  |
| 1500               | 1.01                      | 19.92                  |
| 1550               | 1.04                      | 19.55                  |
| 1600               | 1.08                      | 18.94                  |
| 1650               | 1.12                      | 18.18                  |
| 1700               | 1.16                      | 17.29                  |
| 1750               | 1.21                      | 16.36                  |
| 1800               | 1.27                      | 15.49                  |
| 1850               | 1.34                      | 14.68                  |
| 1900               | 1.41                      | 14.04                  |
| 1950               | 1.49                      | 13.49                  |
| 2000               | 1.57                      | 13.09                  |
| 2050               | 1.66                      | 12.84                  |
| 2100               | 1.76                      | 12.8                   |
| 2150               | 1.86                      | 12.99                  |
| 2200               | 1.98                      | 13.46                  |
| 2250               | 2.12                      | 14.42                  |
| 2300               | 2.31                      | 16.09                  |
| 2350               | 2.58                      | 19.29                  |
| 2400               | 2.97                      | 25.95                  |
| 2450               | 3.59                      | 23.46                  |
| 2500               | 4.54                      | 15.35                  |



## Typical Performance Curves



### 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  | M  | N  | P  | WT. GRAM |
|----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----|----|----|----------|
| FV1206-1 | .126<br>(3.20) | .063<br>(1.60) | .035<br>(0.89) | .024<br>(0.61) | .022<br>(0.56) | .011<br>(0.28) | .039<br>(0.99) | .024<br>(0.61) | .042<br>(1.07) | .123<br>(3.12) | -- | -- | -- | -- | .020     |

Dimensions are in inches (mm). Tolerances: 2 PL.  $\pm .01$ ; 3 PL.  $\pm .005$

#### Notes:

- Open style, ceramic base.
- Termination finish: **as shown below or indicated on Data Sheet.**  
 For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.  
 For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



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](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS

## DEVICE ORIENTATION IN T&R

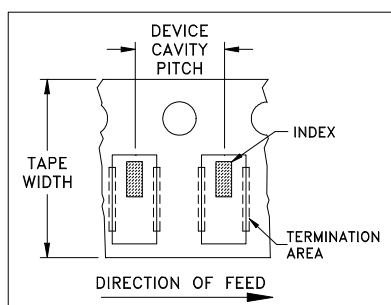


ILLUSTRATION 1



ILLUSTRATION 2



ILLUSTRATION 3

### Applicable Case Styles

FV1206-1  
FV1206-3

### Applicable Case Styles

FV1206-4  
FV1206-5  
FV1206-6  
FV1206-7  
FV1206-9

### Applicable Case Styles

FV1206-11  
FV1206-12  
GE0805C-18  
NL1008C-6  
NL1008C-7  
NL1008C-9  
NL1008C-10  
NL1008C-12

| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel                    |      |
|----------------|-------------------------|-------------------|-------------------------------------|------|
| 8              | 4                       | 7                 | Small quantity standards (see note) | 20   |
|                |                         |                   |                                     | 50   |
|                |                         |                   |                                     | 100  |
|                |                         |                   |                                     | 200  |
|                |                         |                   |                                     | 500  |
|                |                         |                   |                                     | 1000 |
|                |                         |                   | Standard                            | 3000 |

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.

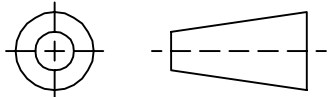
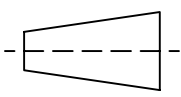
Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



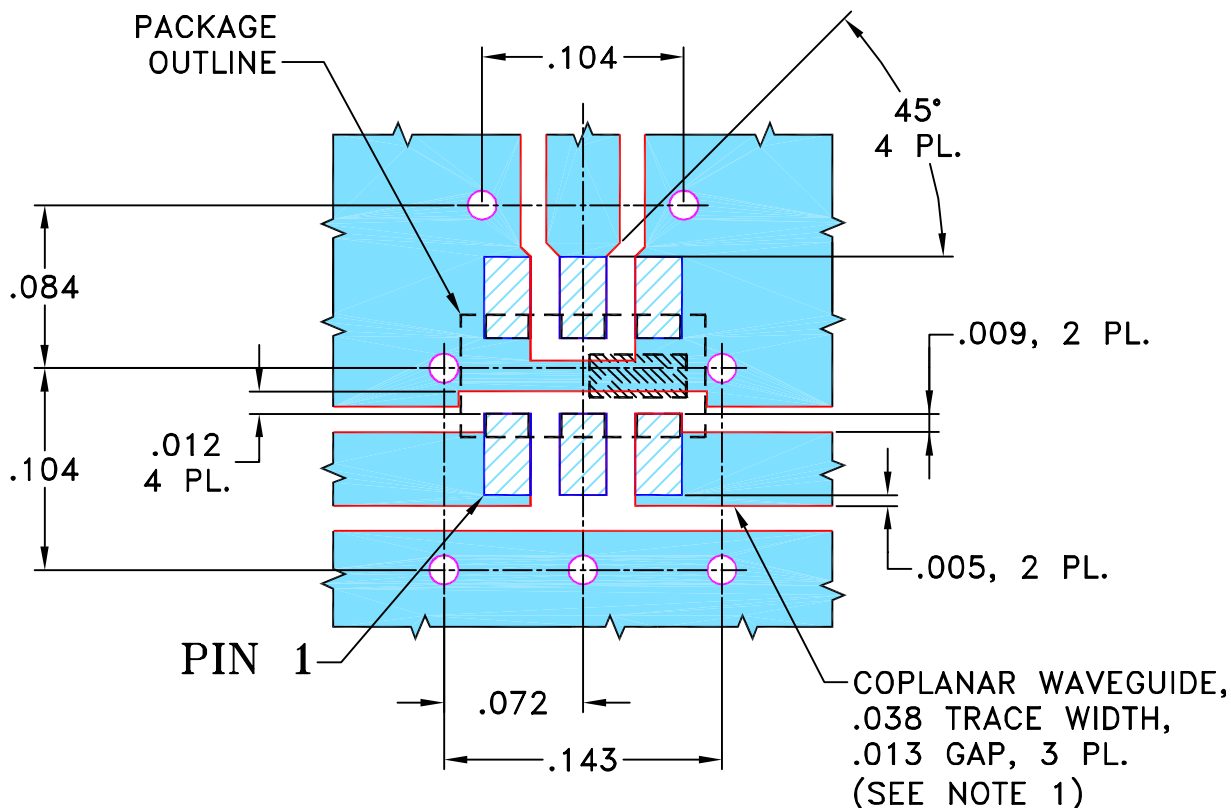
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| THIRD ANGLE PROJECTION                                                           |                                                                                  | REVISIONS |         |             |          |    |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------|---------|-------------|----------|----|
|  |  | REV       | ECN No. | DESCRIPTION | DATE     | DR |
|                                                                                  |                                                                                  | OR        | M109527 | NEW RELEASE | 01/31/07 | PW |
|                                                                                  |                                                                                  |           |         |             |          |    |
|                                                                                  |                                                                                  |           |         |             |          |    |

**SUGGESTED MOUNTING CONFIGURATION  
FOR FV1206-1 CASE STYLE, "sa" PIN CONNECTION.**

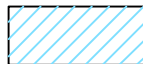


**NOTES:**

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .020"  $\pm$  .0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



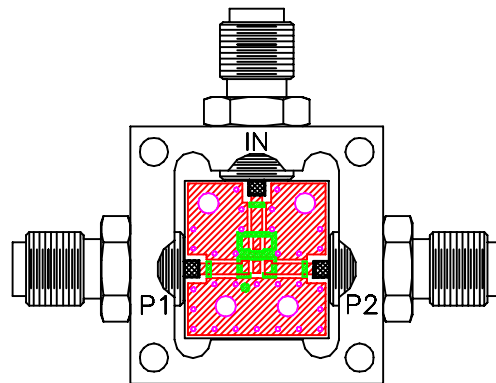
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).



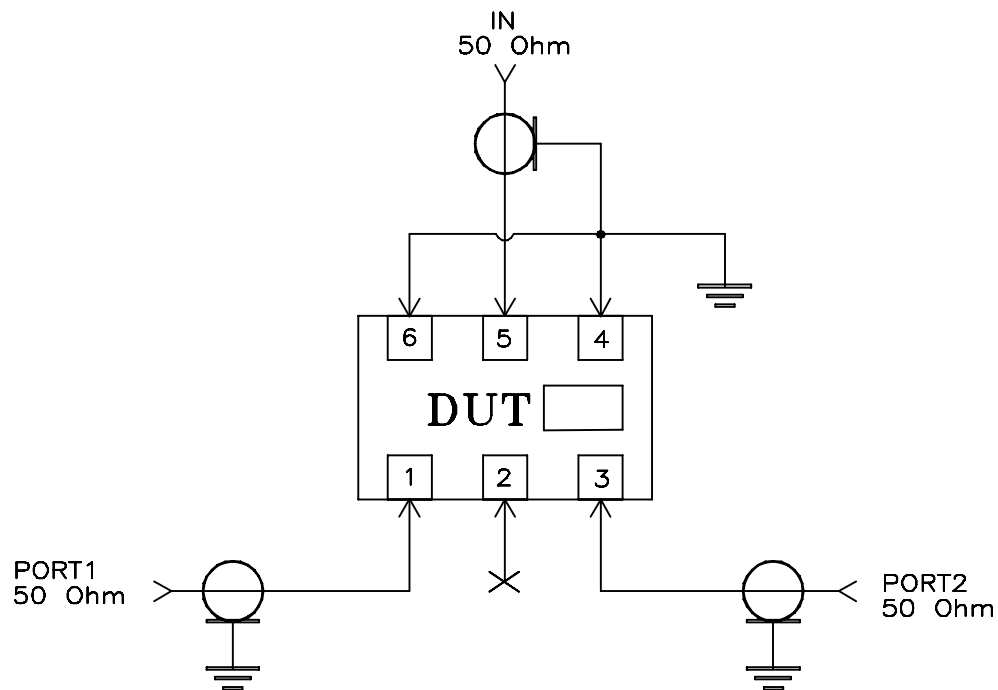
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |                    |    |               |  |                                                                                                   |  |                  |  |                       |  |         |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------|----|---------------|--|---------------------------------------------------------------------------------------------------|--|------------------|--|-----------------------|--|---------|--|
| UNLESS OTHERWISE SPECIFIED                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  | INITIALS           |    | DATE          |  | <div><div></div><div>Mini-Circuits®</div><div>13 Neptune Avenue<br/>Brooklyn NY 11235</div></div> |  |                  |  |                       |  |         |  |
| DIMENSIONS ARE IN INCHES                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | DRAWN              | PW | 01/29/07      |  | <div>PL, sa, FV1206-1, TCN, TB-417+</div>                                                         |  |                  |  |                       |  |         |  |
| TOLERANCES ON:                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | CHECKED            | IL | 01/31/07      |  |                                                                                                   |  |                  |  |                       |  |         |  |
| 2 PL DECIMALS ±                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | APPROVED           | DJ | 01/31/07      |  |                                                                                                   |  |                  |  |                       |  |         |  |
| 3 PL DECIMALS ± .005                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |                    |    |               |  |                                                                                                   |  |                  |  |                       |  |         |  |
| ANGLES ± 1°                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                    |    |               |  |                                                                                                   |  |                  |  |                       |  |         |  |
| FRACTIONS ±                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                    |    |               |  |                                                                                                   |  |                  |  |                       |  |         |  |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | ASHEETA1.DWG REV:A |    | DATE:01/12/95 |  | SIZE A                                                                                            |  | CODE IDENT 15542 |  | DRAWING NO: 98-PL-265 |  | REV: OR |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |                    |    |               |  | FILE: 98PL265                                                                                     |  | SCALE: 10:1      |  | SHEET: 1 OF 1         |  |         |  |

# Evaluation Board and Circuit



TB-417+



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.010 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      | -55° to 100°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 |
| 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, Para 4.2.5, Test S, 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                                                                 |