

# Ceramic Balun RF Transformer

50Ω 720 to 1600 MHz

## TCN4-162+



Generic photo used for illustration purposes only  
CASE STYLE: FV1206-1

### Maximum Ratings

Operating Temperature -40°C to 85°C

Storage Temperature -55°C to 100°C

Input RF Power\*\*\* 3W

\*\*\*Derate linearly to 2.5W at 100°C  
Permanent damage may occur if any of these limits are exceeded.

### Pad Connections

PRIMARY DOT (Unbalanced Port) 5

PRIMARY (GND) 4,6

SECONDARY DOT (Balanced) 3

SECONDARY (Balanced) 1

NO CONNECTION 2

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

### Features

- wideband, 720 to 1600 MHz
- low phase unbalance, 2 deg. typ. and amplitude unbalance, 0.3 dB typ.
- miniature size, 0.12"x.06"x.037"
- LTCC construction
- low cost
- aqueous washable

### Applications

- GSM
- WCDMA
- GPS
- ISM

### Electrical Specifications (T<sub>AMB</sub>=25°C)

| Ω RATIO<br>(Secondary/Primary) | FREQUENCY<br>(MHz) | INSERTION*<br>LOSS<br>(dB) | PHASE<br>UNBALANCE†<br>(Deg.)<br>Typ. | AMPLITUDE<br>UNBALANCE<br>(dB)<br>Typ. |
|--------------------------------|--------------------|----------------------------|---------------------------------------|--|
| 4                              | 720-1600           | 1.0                        | 2.0                                   | 0.4                                    |

\* Insertion Loss is referenced to mid-band loss, 0.7 dB. Reference Demo Board TB-417+

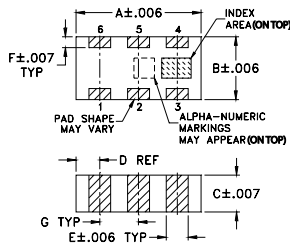
† Relative to 180°

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

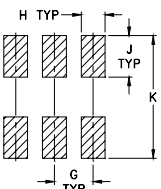
**Available Tape and Reel**  
at no extra cost

| Reel Size | Devices/Reel                      |
|-----------|-----------------------------------|
| 7"        | 20, 50, 100, 200, 500, 1000, 3000 |

### Outline Drawing



### PCB Land Pattern

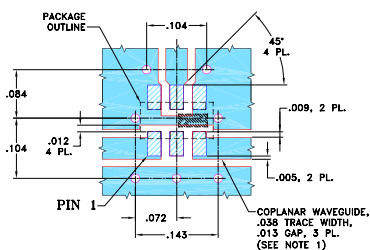


Suggested Layout,  
Tolerance to be within ±0.02

### Outline Dimensions (inch/mm)

| A    | B    | C    | D    | E     | F    |
|------|------|------|------|-------|------|
| .126 | .063 | .035 | .024 | .022  | .011 |
| 3.20 | 1.60 | 0.89 | 0.61 | 0.56  | 0.28 |
| G    | H    | J    | K    | wt    |      |
| .039 | .024 | .042 | .123 | grams |      |
| 0.99 | 0.61 | 1.07 | 3.12 | .020  |      |

### Demo Board MCL P/N: TB-417+ Suggested PCB Layout (PL-265)



### NOTES:

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .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

### 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](http://www.minicircuits.com/MCLStore/terms.jsp)



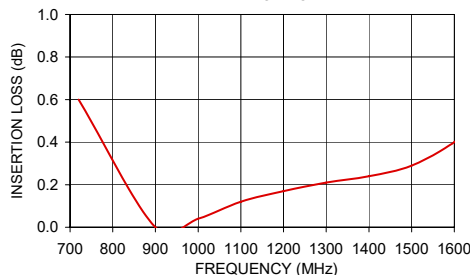
[www.minicircuits.com](http://www.minicircuits.com) P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

### Typical Performance Data at 25°C\*\*

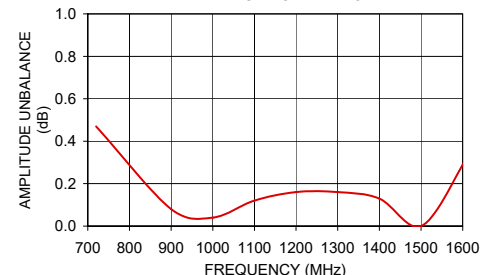
| FREQUENCY<br>(MHz) | INSERTION<br>LOSS<br>(dB) | INPUT<br>R. LOSS<br>(dB) | AMPLITUDE<br>UNBALANCE<br>(dB) | PHASE<br>UNBALANCE<br>(Deg.) |
|--------------------|---------------------------|--------------------------|--------------------------------|------------------------------|
| 720.00             | 0.60                      | 10.28                    | 0.47                           | 1.21                         |
| 900.00             | 0.00                      | 25.18                    | 0.08                           | 2.81                         |
| 1000.00            | 0.04                      | 19.64                    | 0.04                           | 3.39                         |
| 1100.00            | 0.12                      | 16.88                    | 0.12                           | 3.44                         |
| 1200.00            | 0.17                      | 16.38                    | 0.16                           | 3.09                         |
| 1300.00            | 0.21                      | 17.28                    | 0.16                           | 2.31                         |
| 1400.00            | 0.24                      | 19.25                    | 0.13                           | 1.33                         |
| 1500.00            | 0.29                      | 21.00                    | 0.00                           | 0.19                         |
| 1600.00            | 0.40                      | 19.65                    | 0.29                           | 1.10                         |

\*\* Measured with Agilent E5071B network analyzer using impedance conversion and port extension.

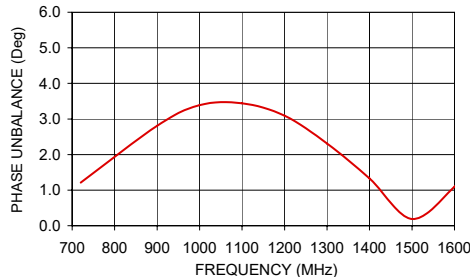
TCN4-162+  
INSERTION LOSS



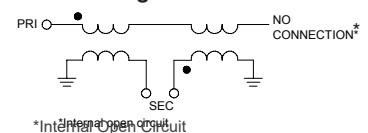
TCN4-162+  
AMPLITUDE UNBALANCE



TCN4-162+  
PHASE UNBALANCE



### configuration J



\* Internal Open Circuit

REV. C  
M151107  
TCN4-162+  
ED-12817/34B2  
RS/CP/AM  
170410