

Balanced <sup>top hat</sup>  
  
**RF Transformer**

**TRS2-1T-75+**

75Ω      5 to 1200 MHz

**The Big Deal**

- Low insertion loss, 1.0 dB typ.
- Good return loss, 20 dB typ.
- Low amplitude unbalance, 0.3 dB
- Power handling up to 0.25W



CASE STYLE: TT1618

**Product Overview**

The TRS2-1T-75+ is a 75Ω surface mount balanced-to-balanced transformer with a 2:1 secondary/primary impedance ratio covering the 5 to 1200 MHz band, meeting bandwidth requirements for DOCSIS® 3.1 compliant systems and equipment, among other applications. This model handles RF input power up to 0.25W and provides low insertion loss, good return loss and low amplitude unbalance. Measuring only 0.28 x 0.25 x 0.12”, the unit features core and wire, all-welded construction with gold over nickel plate wraparound terminations suitable for tin/lead and RoHS solder systems. The unit also includes Mini-Circuits’ Top Hat™ feature for faster more accurate pick-and-place assembly.

**Key Features**

| Feature                         | Advantages   |
|---------------------------------|--|
| Wideband, 5 to 1200 MHz         | TRS2-1T-75+ supports a variety of applications including CATV and DOCSIS 3.1 systems and equipment.            |
| Low insertion loss, 1.0 dB      | Enables excellent signal power transmission from input to output.  |
| Good return loss, 20 dB typ.    | Excellent matching for 75Ω systems with minimal signal reflection.   |
| Low amplitude unbalance, 0.3 dB | Low unbalance can improve a system’s electromagnetic compatibility by rejecting unwanted common-mode noise.    |
| Small footprint, 0.28 x 0.25”   | Accommodates tight space requirements for dense PCB layouts.   |
| Top Hat® feature                | Improves speed and accuracy of pick and place assembly and provides clear device marking for visual inspection |

top hat®  
Balanced  
**RF Transformer**

75Ω 5 to 1200 MHz

**TRS2-1T-75+**

**Features**

- suitable for tin/lead and RoHS solder systems
- wideband, 5 to 1200 MHz
- balanced transmission line
- good return loss, 20 dB typ. at 1 dB band
- excellent amplitude unbalance, 0.3 dB typ.
- aqueous washable

**Applications**

- balanced to unbalanced transformation
- push-pull amplifiers
- PCS/DCS
- cable TV
- cellular



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**+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 |
| 13"       | 500, 1000        |

**Electrical Specifications at 25°C**

| Parameter                           | Frequency (MHz) | Min. | Typ. | Max. | Unit   |
|-------------------------------------|-----------------|------|------|------|--------|
| Impedance Ratio (secondary/primary) |                 |      | 2    |      |        |
| Frequency Range                     |                 | 5    |      | 1200 | MHz    |
| Insertion Loss*                     | 5 - 600         | —    | 0.6  | 1.0  | dB     |
|                                     | 600 - 1000      | —    | 1.0  | 1.8  |        |
|                                     | 1000 - 1200     | —    | 1.3  | 2.2  |        |
| Amplitude Unbalance                 | 5 - 600         | —    | 0.3  | 1.0  | dB     |
|                                     | 600 - 1000      | —    | 0.6  | 1.7  |        |
|                                     | 1000 - 1200     | —    | 0.8  | 1.9  |        |
| Phase Unbalance                     | 5 - 50          | —    | 0.8  | 3    | Degree |
|                                     | 50 - 1200       | —    | 5    | 9    |        |
| Primary Return Loss (Input)         | 5 - 50          | 17   | 22   | —    | dB     |
|                                     | 50 - 1000       | 13   | 22   | —    |        |
|                                     | 1000 - 1200     | 9    | 17   | —    |        |

\* Insertion Loss is referenced to mid-band loss, 0.6 dB typ.

**Maximum Ratings**

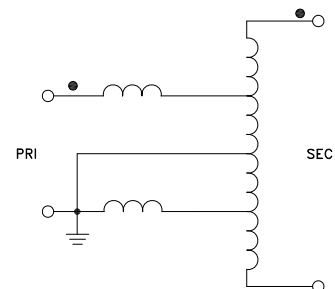
| Parameter             | Ratings        |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 0.25W          |
| DC Current            | 30mA           |

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

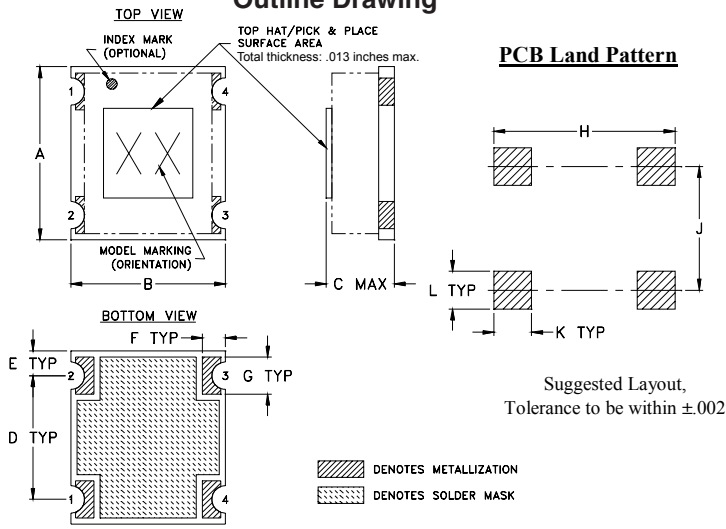
**Pin Connections**

| Function         | Pin Number |
|------------------|------------|
| PRIMARY DOT      | 1          |
| PRIMARY (GROUND) | 4          |
| SECONDARY DOT    | 3          |
| SECONDARY        | 2          |

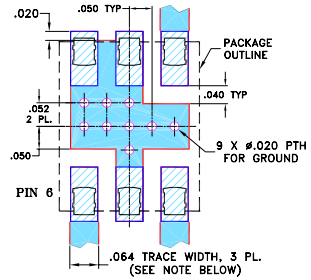
**Config. P1**



## Outline Drawing



## Demo Board MCL P/N: TB-619+ Suggested PCB Layout (PL-237)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS  $.030 \pm .002$ ; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH 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

## Outline Dimensions (inch/mm)

| A    | B    | C    | D    | E    | F     |
|------|------|------|------|------|-------|
| .280 | .250 | .12  | .200 | .040 | .037  |
| 7.11 | 6.35 | 3.05 | 5.08 | 1.02 | 0.94  |
| G    | H    | J    | K    | L    | wt.   |
| .060 | .293 | .200 | .061 | .061 | grams |
| 1.52 | 7.44 | 5.08 | 1.55 | 1.55 | 2.8   |

## Typical Performance Data

| FREQUENCY (MHz) | INSERTION LOSS (dB) | INPUT R. LOSS (dB) | AMPLITUDE UNBALANCE (dB) | PHASE UNBALANCE (Deg.) |
|-----------------|---------------------|--------------------|--------------------------|------------------------|
| 5.00            | 0.76                | 20.46              | 0.16                     | 0.07                   |
| 100.00          | 0.72                | 23.43              | 0.13                     | 1.58                   |
| 200.00          | 0.77                | 24.55              | 0.11                     | 2.85                   |
| 400.00          | 0.87                | 27.39              | 0.15                     | 4.61                   |
| 500.00          | 0.94                | 29.37              | 0.20                     | 5.13                   |
| 600.00          | 1.02                | 30.97              | 0.27                     | 5.43                   |
| 700.00          | 1.11                | 29.50              | 0.37                     | 5.60                   |
| 800.00          | 1.21                | 26.22              | 0.45                     | 5.67                   |
| 1000.00         | 1.45                | 20.59              | 0.62                     | 5.26                   |
| 1200.00         | 1.75                | 16.81              | 0.70                     | 4.30                   |

