



Mini-Circuits

SURFACE MOUNT

## RF Transformer

TC1-1-13M-75+

75Ω 4.5 to 3000 MHz

TC1-1-13M-75X+  
Upgraded Version\*

## FEATURES

- Wideband, 4.5 to 3000 MHz
- Balanced transmission line
- Good return loss
- Excellent amplitude unbalance, 0.7 dB typ. and phase unbalance, 2 deg typ. in 1 dB bandwidth
- Plastic base with leads
- Aqueous washable



Generic photo used for illustration purposes only

CASE STYLE: AT224-1A

## +RoHS Compliant

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

## APPLICATIONS

- Balanced to unbalanced transformation
- Push-pull amplifiers
- PCS/DCS
- MMDS

## ELECTRICAL SPECIFICATIONS AT +25°C

| Parameter           | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|---------------------|-----------------|------|------|------|------|
| Impedance Ratio     |                 |      | 1    |      |      |
| Frequency Range     |                 | 4.5  |      | 3000 | MHz  |
| Insertion Loss*     | 2000-3000       |      | 3    |      | dB   |
|                     | 1000-2000       |      | 2    |      |      |
|                     | 4.5-1000        |      | 1    |      |      |
| Phase Unbalance     | 4.5-1000        |      | 2    |      | Deg. |
|                     | 1000-2000       |      | 3    |      |      |
| Amplitude Unbalance | 4.5-1000        |      | 0.7  |      | dB   |
|                     | 1000-2000       |      | 0.5  |      |      |

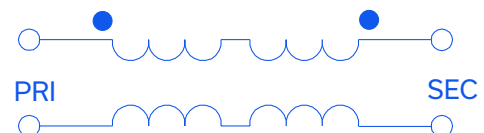
\*Insertion Loss is referenced to mid-band loss, 0.5 dB typ.

## 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.

## CONFIG. G

REV. C  
ECO-021646  
TC1-1-13M-75+  
MCL NY  
240424



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**TC1-1-13M-75+**

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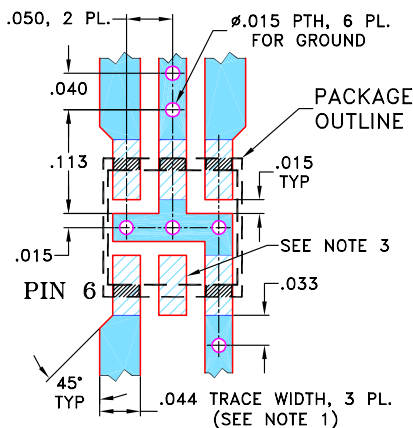
75Ω 4.5 to 3000 MHz

## PIN CONNECTIONS

| Function      | Pin Number |
|---------------|------------|
| PRIMARY DOT   | 6          |
| PRIMARY       | 4          |
| SECONDARY DOT | 1          |
| SECONDARY     | 3          |
| NOT USED      | 2          |

PRODUCT MARKING: N/A

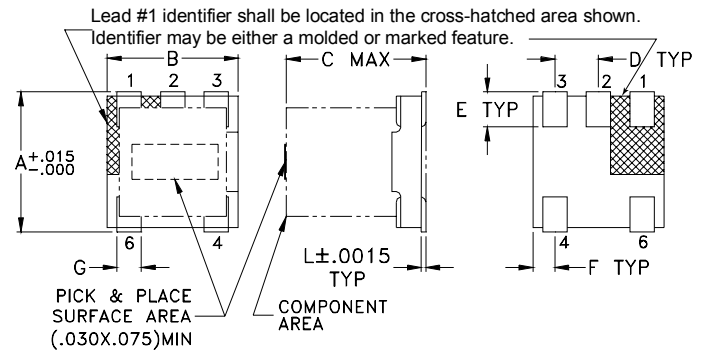
DEMO BOARD MCL P/N: TB-145  
SUGGESTED PCB LAYOUT: (PL-244)



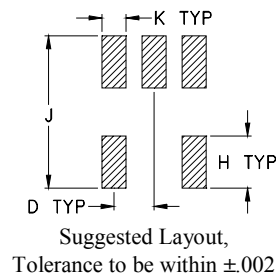
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS  $.020" \pm .0015"$ ; COPPER: 1/2 OZ. ON EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
3. THIS PAD IS NOT REQUIRED FOR AT224 CASE STYLE.

 DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## OUTLINE DRAWING



## PCB Land Pattern



## OUTLINE DIMENSIONS (Inch mm)

| A    | B    | C    | D    | E    | F    | G    | H    | J    | K    | L    |
|------|------|------|------|------|------|------|------|------|------|------|
| .150 | .150 | .160 | .050 | .040 | .025 | .028 | .065 | .190 | .030 | .007 |
| 3.81 | 3.81 | 4.06 | 1.27 | 1.02 | 0.64 | 0.71 | 1.65 | 4.83 | 0.76 | 0.18 |

Weight: 0.15 grams

## TAPE & REEL INFORMATION: F17

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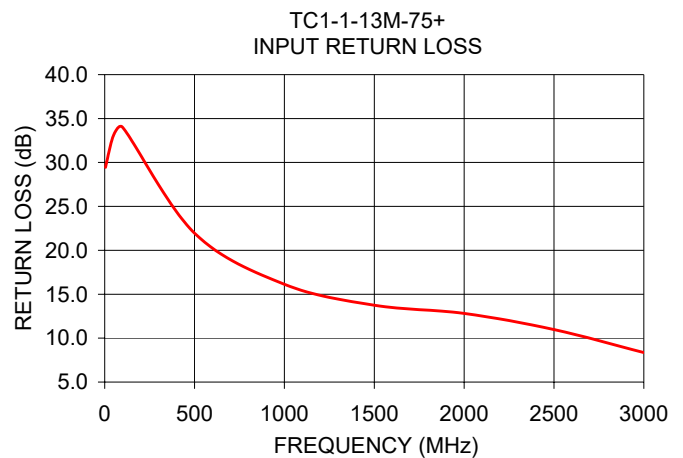
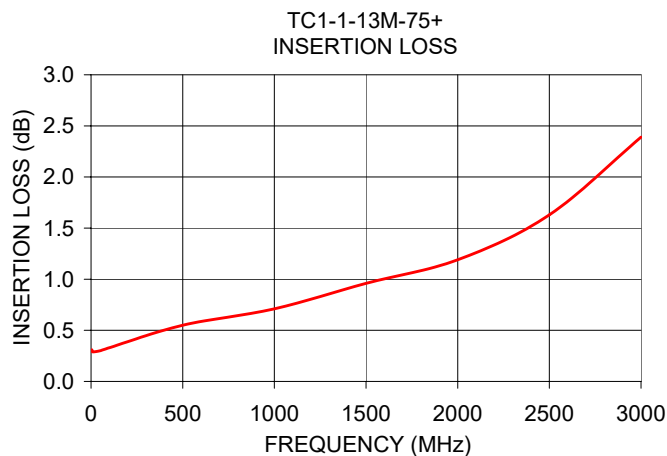
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## TYPICAL PERFORMANCE DATA

| FREQUENCY (MHz) | INSERTION LOSS (dB) | INPUT R. LOSS (dB) | AMPLITUDE UNBALANCE (dB) | PHASE UNBALANCE (Deg.) |
|-----------------|---------------------|--------------------|--------------------------|------------------------|
| 4.50            | 0.31                | 29.45              | 1.10                     | 5.08                   |
| 10.00           | 0.29                | 29.98              | 0.90                     | 2.60                   |
| 50.00           | 0.30                | 33.14              | 0.88                     | 0.06                   |
| 100.00          | 0.33                | 34.00              | 0.91                     | 0.32                   |
| 500.00          | 0.55                | 21.95              | 0.65                     | 0.81                   |
| 1000.00         | 0.71                | 16.13              | 0.61                     | 2.12                   |
| 1500.00         | 0.96                | 13.75              | 0.21                     | 1.23                   |
| 2000.00         | 1.19                | 12.82              | 0.30                     | 0.38                   |
| 2500.00         | 1.63                | 10.98              | 0.47                     | 4.03                   |
| 3000.00         | 2.39                | 8.36               | 0.49                     | 8.50                   |



### NOTES

- 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.
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