



Mini-Circuits

SURFACE MOUNT



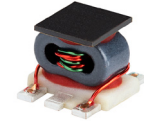
# RF Transformer

## TCM1-382WX+

50Ω 0.5 to 3800 MHz

### THE BIG DEAL

- Wideband, 0.2 to 3800 MHz
- Flat response,  $\pm 0.6$  dB insertion loss over full band
- Aqueous washable
- Protected by US Patent 9,071,229B1



Generic photo used for illustration purposes only

CASE STYLE: DB1627

### +RoHS Compliant

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

### APPLICATIONS

- Differential modulator/demodulators and active mixers
- Wideband push-pull amplifiers

### PRODUCT OVERVIEW

Mini-Circuits' TCM1-382WX+ is a surface-mount, transmission line, core and wire transformer covering a very wide frequency range, specified from 0.5 to 3800 MHz and usable from 0.2 to 3800 MHz. The transformer provides a 1:1 impedance ratio with low insertion loss, excellent flatness, as well as low phase and amplitude unbalance. Featuring core and wire construction on a 6-lead plastic base with tin over nickel termination finish. The unit measures 0.16" x 0.15" x 0.16" accommodating dense circuit board layouts. It also incorporates the Mini-Circuits' Top Hat® feature for faster, more accurate pick-and-place assembly and easy visual inspection.

### KEY FEATURES

| Feature                               | Advantages                                                                                                    |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Wideband 0.5 to 3800 MHz              | Very wide frequency range covers bandwidth requirements for many applications                                 |
| Low loss 1.94 dB, 0.2 to 3800 MHz     | Provide excellent signal transmission from input to output with consistent performance                        |
| Small footprint 0.16" x 0.15" x 0.16" | Accommodates tight space requirements for dense PCB layout                                                    |
| Top Hat® feature                      | Improves speed and accuracy of pick & place assembly and provides clear device marking for visual inspection. |





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### ELECTRICAL SPECIFICATIONS AT 25°C

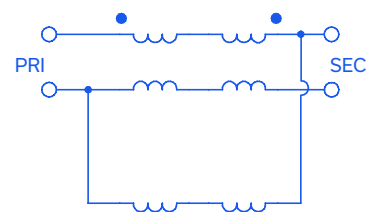
| Parameter           | Frequency (MHz) | Min. | Typ. | Max. | Units  |
|---------------------|-----------------|------|------|------|--------|
| Impedance Ratio     |                 | 1    |      |      |        |
| Frequency Range     |                 | 0.5  |      | 3800 | MHz    |
| Insertion Loss      | 10-2000         |      | 1.1  | 2.0  | dB     |
|                     | 0.5-3800        |      | 1.9  | 3.0  |        |
| Amplitude Unbalance | 0.5-2000        |      | 0.5  |      | dB     |
|                     | 2000-3800       |      | 1.2  |      |        |
| Phase Unbalance     | 0.5-3000        |      | 4    |      | Degree |
|                     | 3000-3800       |      | 6    |      |        |
| Return Loss         | 0.5-3800        |      | 12   |      | dB     |

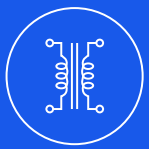
1. Measured on Mini-Circuits Characterization test board TB-TCM1-382WX+ with testboard loss deducted.

### MAXIMUM RATINGS

| Parameter             | Ratings        |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 0.2W           |
| DC Current            | 30mA           |

### CONFIGURATION K





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# RF Transformer

TCM1-382WX+

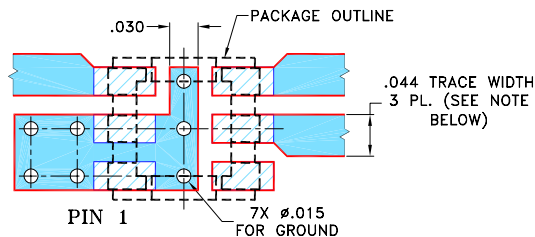
50Ω 0.5 to 3800 MHz

## PIN CONNECTIONS

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

PRODUCT MARKING: YM

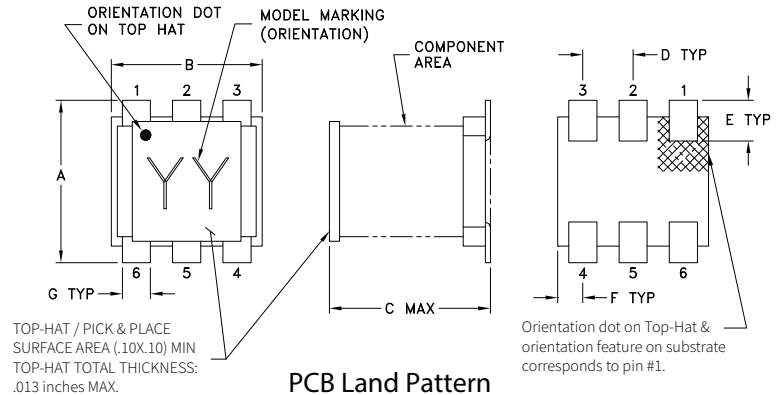
## DEMOBOARD MCL P/N: TB-TCM1-382WX+ SUGGESTED PCB LAYOUT (PL-395)



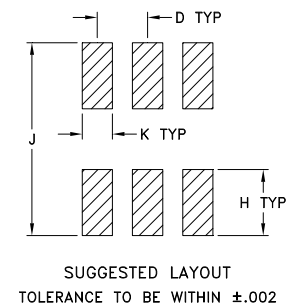
- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .020" ± .0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.  
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

## OUTLINE DRAWING



## PCB Land Pattern



## OUTLINE DIMENSIONS (Inches mm)

| A    | B    | C    | D    | E     | F    |
|------|------|------|------|-------|------|
| .160 | .150 | .160 | .050 | .040  | .025 |
| 4.06 | 3.81 | 4.06 | 1.27 | 1.02  | 0.64 |
| G    | H    | J    | K    | wt    |      |
| .028 | .065 | .190 | .030 | grams |      |
| 0.71 | 1.65 | 4.83 | 0.76 | 0.15  |      |





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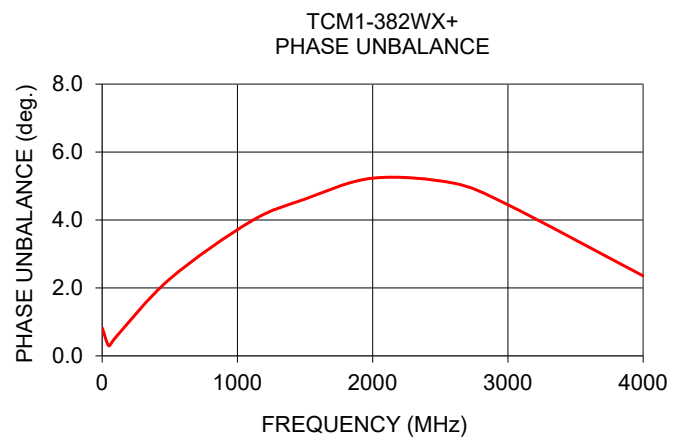
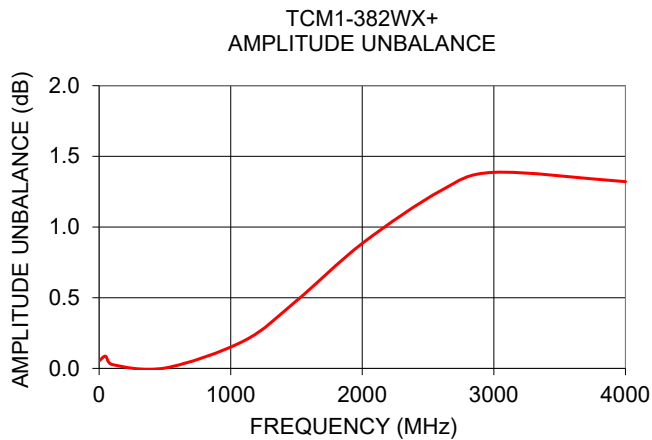
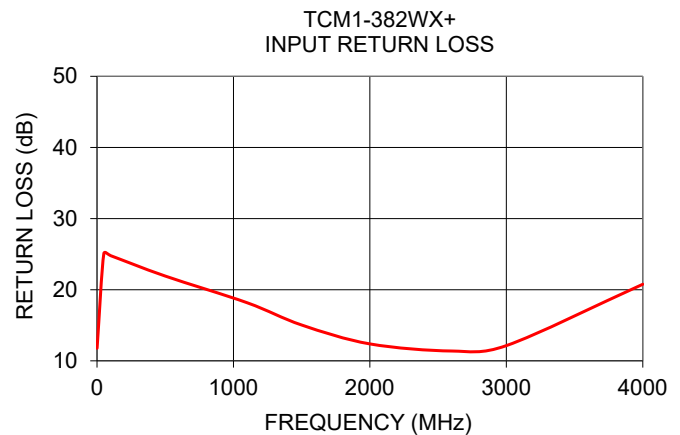
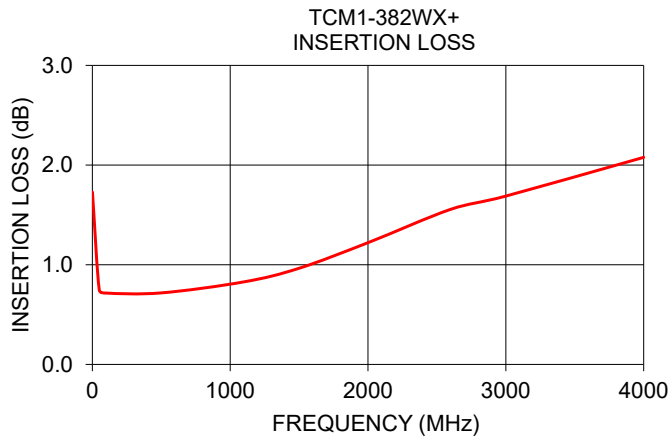
# RF Transformer

## TCM1-382WX+

50Ω 0.5 to 3800 MHz

### TYPICAL PERFORMANCE DATA

| Frequency (MHz) | Insertion Loss (dB) | Return Loss (dB) | Amplitude Unbalance (dB) | Phase Unbalance (deg) |
|-----------------|---------------------|------------------|--------------------------|-----------------------|
| 0.50            | 1.73                | 11.77            | 0.05                     | 0.82                  |
| 50              | 0.75                | 25.07            | 0.09                     | 0.29                  |
| 100             | 0.72                | 24.78            | 0.03                     | 0.55                  |
| 500             | 0.72                | 21.92            | 0.00                     | 2.26                  |
| 1100            | 0.83                | 18.17            | 0.19                     | 3.96                  |
| 1500            | 0.96                | 15.04            | 0.48                     | 4.62                  |
| 2000            | 1.22                | 12.38            | 0.88                     | 5.23                  |
| 2600            | 1.56                | 11.38            | 1.26                     | 5.08                  |
| 3000            | 1.69                | 12.14            | 1.39                     | 4.45                  |
| 3800            | 1.94                | 19.64            | 1.36                     | 0.55                  |



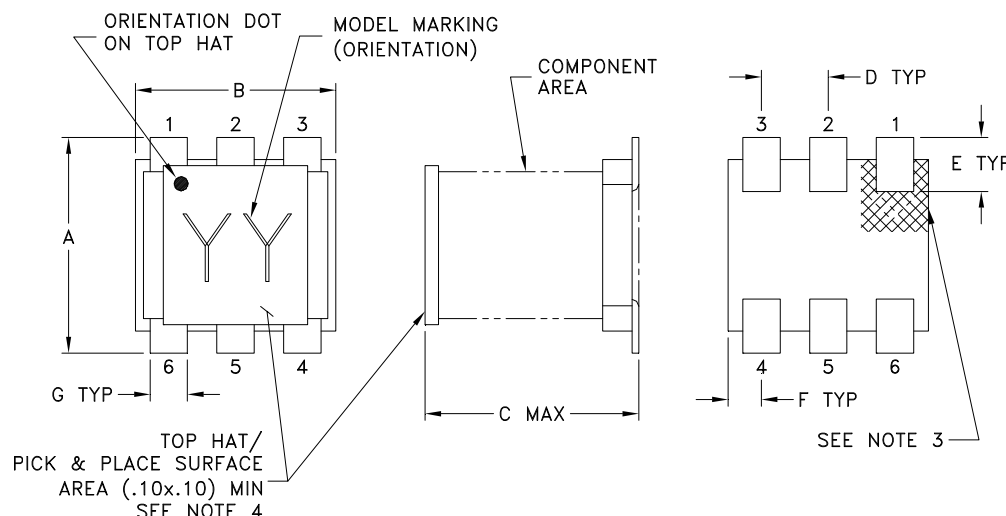
#### NOTES

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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)

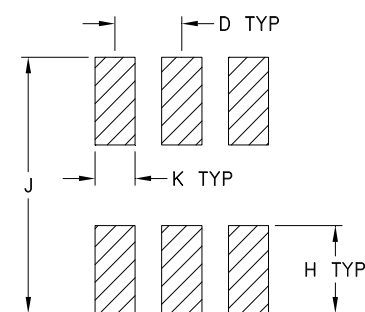


## Outline Dimensions

DB1627



## PCB Land Pattern



| CASE # | A              | B              | C              | D              | E              | F              | G              | H              | J              | K              | WT. GRAM |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|
| DB1627 | .160<br>(4.06) | .150<br>(3.81) | .160<br>(4.06) | .050<br>(1.27) | .040<br>(1.02) | .025<br>(0.64) | .028<br>(0.71) | .065<br>(1.65) | .190<br>(4.83) | .030<br>(0.76) | .15      |

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

### 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.
- Orientation dot on top hat & orientation feature on substrate correspondence to pin #1.
- Top-Hat total thickness: .013 inches MAX.



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



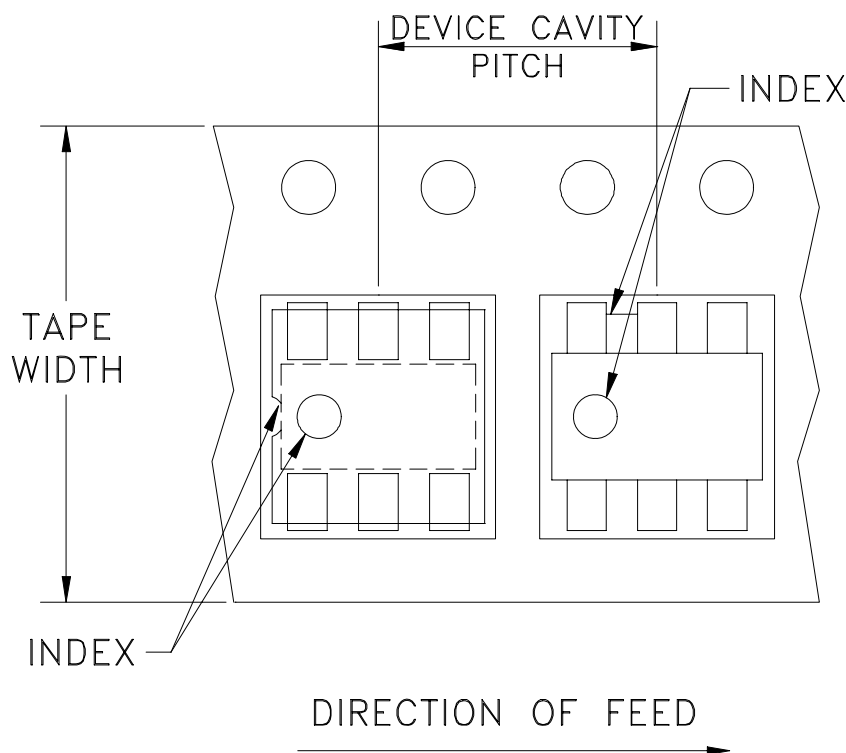
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS



# Tape & Reel Packaging TR-F47

## DEVICE ORIENTATION IN T&R



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel<br>see note |
|-------------------|----------------------------|----------------------|------------------------------|
| 12                | 8                          | 13                   | 1000, 2000                   |
|                   |                            | 7                    | 20, 50, 100, 200, 500        |

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)



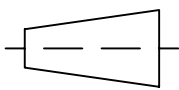
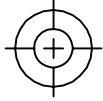
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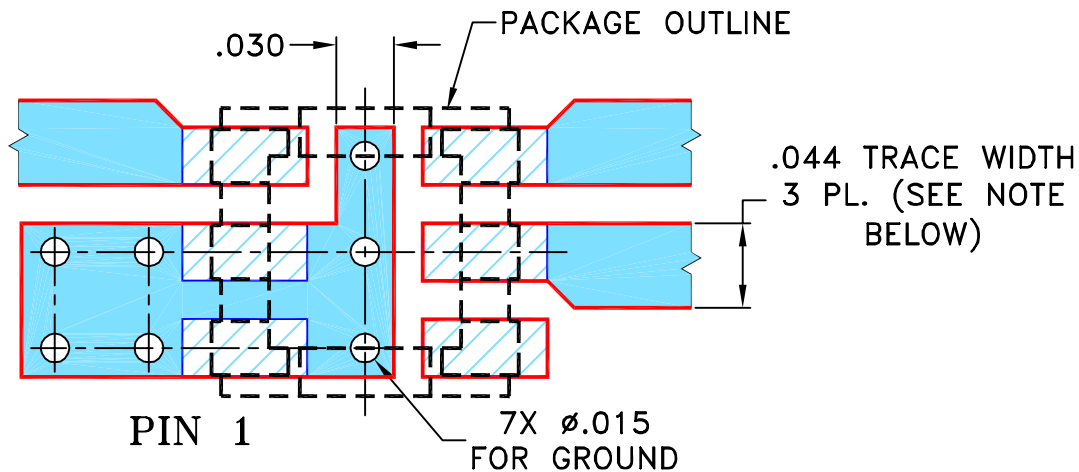
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION | DATE     | DR | AUTH |
|-----|---------|-------------|----------|----|------|
| OR  | M141791 | NEW RELEASE | 06/14/13 | AV | DJ   |
|     |         |             |          |    |      |
|     |         |             |          |    |      |
|     |         |             |          |    |      |

SUGGESTED MOUNTING CONFIGURATION  
FOR DB1627 CASE STYLE, "06TK03" PIN CODE



- NOTES:** 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020"  $\pm$  .0015"; 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

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS  $\pm$ 3 PL DECIMALS  $\pm$  .005ANGLES  $\pm$ FRACTIONS  $\pm$ 

DRAWN

AV

06/03/13

CHECKED

IL

06/14/13

APPROVED

DJ

06/14/13



**Mini-Circuits®** 13 Neptune Avenue  
Brooklyn NY 11235

PL, 06TK03, DB1627, TB-717+

SIZE  
A

CODE IDENT  
15542

DRAWING NO:  
98-PL-395

REV:  
OR

FILE: 98PL395

SCALE: 10:1

SHEET: 1 OF 1

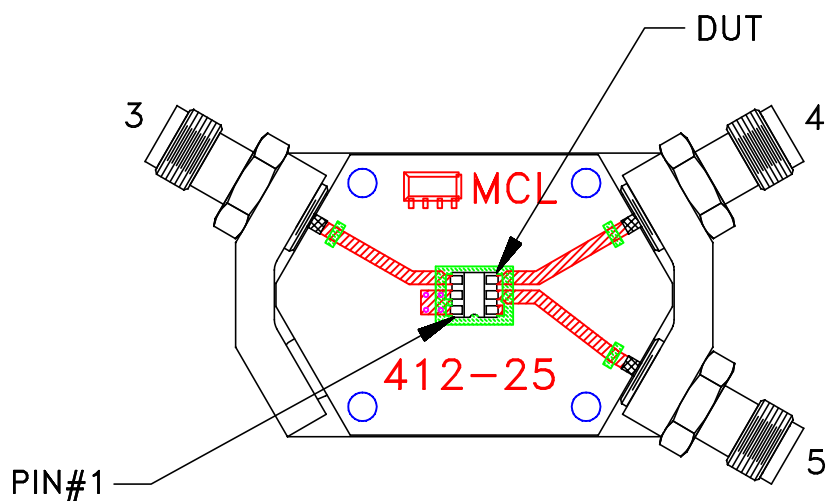
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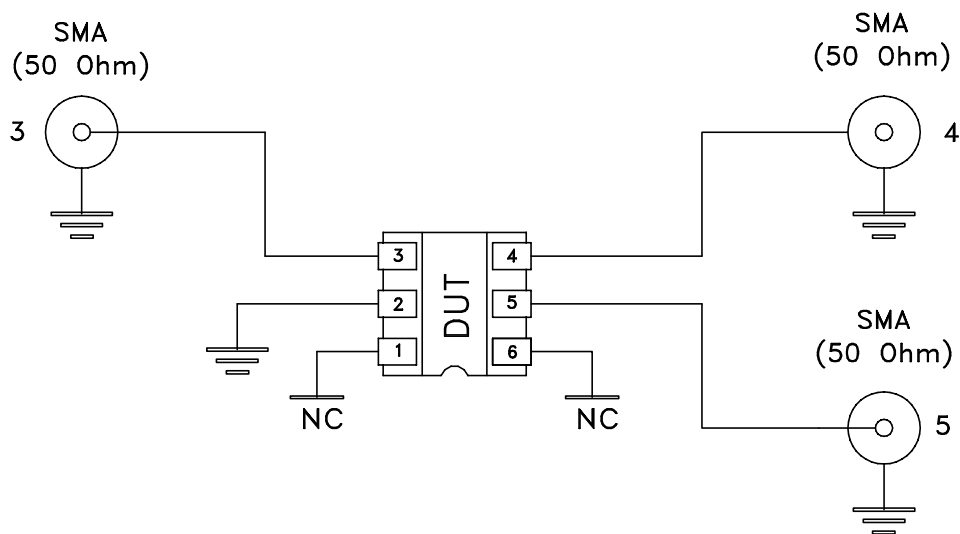
ASHEETA1.DWG REV:A DATE:01/12/95

# Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-TCM1-382WX+



Schematic Diagram

## Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.020 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          | -40° 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                                                                              |