

### THE BIG DEAL

- Miniature size 0603 (0.063" [1.6mm] x 0.031" [0.8mm] x 0.024" [0.6mm])
- Low cost
- Aqueous washable



Generic photo used for illustration purposes only

CASE STYLE: JC0603C

### APPLICATIONS

- ISM Band
- WLAN
- 

#### +RoHS Compliant

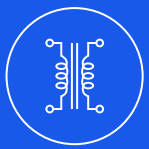
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

### PRODUCT OVERVIEW

Mini-Circuits' TCW4-582+ is a tiny ceramic RF balun transformer with an impedance ratio of 1:4, covering a variety of wireless communications applications from 5000 to 5800 MHz. This model provides low insertion loss, low phase unbalance (relative to 180°), low amplitude unbalance, and RF input power handling up to 0.5W. It provides DC isolation from input to output allowing it to be used for DC biasing of external circuits at the output. Fabricated using LTCC technology, the unit comes housed in a tiny, rugged ceramic package (0.06 x 0.03 x 0.02") suitable for harsh operating environments.

### KEY FEATURES

| Feature                          | Advantages                                                                                                                                                               |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DC Isolated from input to output | Can be used to DC bias external circuits at the output.                                                                                                                  |
| Tiny size, 0603                  | Accommodates tight space requirements for dense PCB layouts.                                                                                                             |
| LTCC construction                | LTCC process enables tiny size and low cost, suitable for high-volume production. Rugged ceramic package provides excellent reliability in harsh operating environments. |



## ELECTRICAL SPECIFICATIONS AT 25°C

| Parameter                            | Frequency (GHz) | Min. | Typ. | Max. | Units  |
|--------------------------------------|-----------------|------|------|------|--------|
| Impedance Ratio (Secondary/ Primary) |                 |      | 4    |      |        |
| Frequency Range                      |                 | 5000 |      | 5800 | MHz    |
| Insertion Loss Loss <sup>1</sup>     | 5000 - 5800     | —    | —    | 1.7  | dB     |
| Amplitude Unbalance                  | 5000 - 5800     | —    | 1    | 1    | dB     |
| Phase Unbalance <sup>2</sup>         | 5000 - 5800     | —    | 10   | 13   | Degree |
| Unbalance Return Loss                | 5000 - 5800     | —    | 9.5  | —    | dB     |

1. Tested on Evaluation Board TB-TCW4-582+

2. Relative to 180°

## MAXIMUM RATINGS

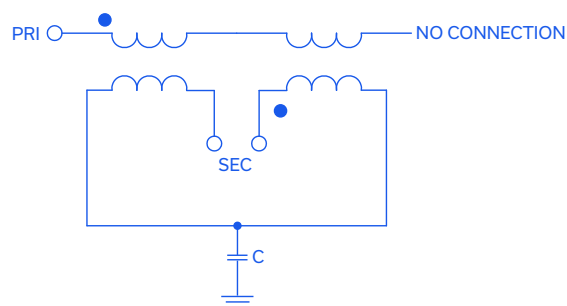
| Parameter                        | Ratings        |
|----------------------------------|----------------|
| Operating Temperature            | -55°C to 125°C |
| Storage Temperature <sup>3</sup> | -55°C to 125°C |
| RF Power <sup>4</sup>            | 0.5W           |

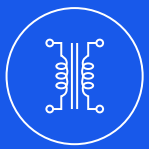
3. Refer to product storage temperature after installation. Suggestion for T&amp;R unused product storage condition: +5~+35°C, Humidity 45~75%RH, 12 Month max.

4. Derate linearly to 0.1W at 125°C.

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

## CONFIGURATION H





Mini-Circuits

CERAMIC BALUN

# RF Transformer

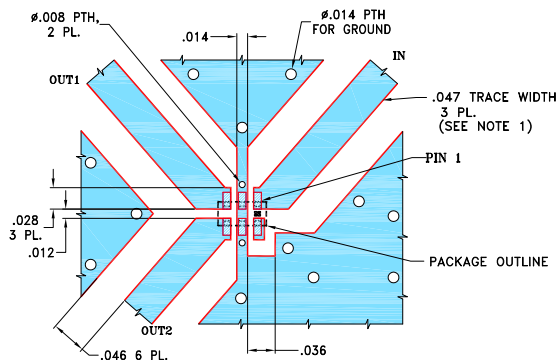
TCW4-582+

## PAD CONNECTIONS

|                               |   |
|-------------------------------|---|
| PRIMARY DOT (Unbalanced Port) | 1 |
| GND or DC feed                | 2 |
| SECONDARY DOT (Balanced)      | 3 |
| SECONDARY (Balanced)          | 4 |
| NO CONNECTION                 | 6 |
| GND                           | 5 |

PRODUCT MARKING: N/A

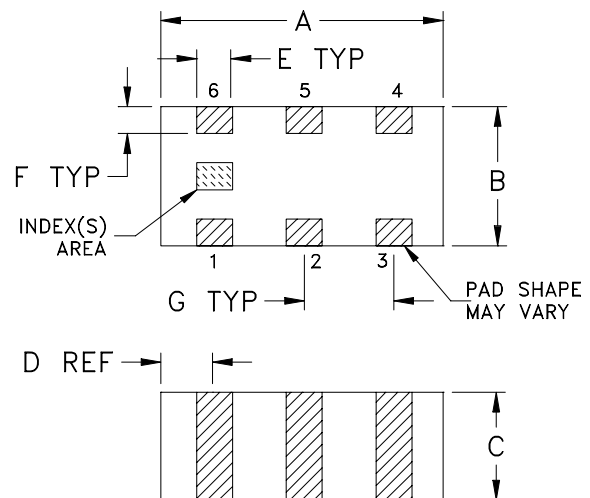
## DEMO BOARD MCL P/N: TB-TCW4-582+ SUGGESTED PCB LAYOUT (PL-561)



### NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS R04233.  
WITH DIELECTRIC THICKNESS .020±.0015. COPPER: 1/2 OZ. EACH SIDE.  
FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
  - 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

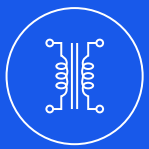


## OUTLINE DIMENSIONS (Inches/mm)

| A    | B    | C    | D    | E    | F    | G    | wt    |
|------|------|------|------|------|------|------|-------|
| .063 | .031 | .024 | .012 | .008 | .006 | .020 | grams |
| 1.60 | 0.79 | 0.61 | 0.30 | 0.20 | 0.15 | 0.51 | 0.005 |

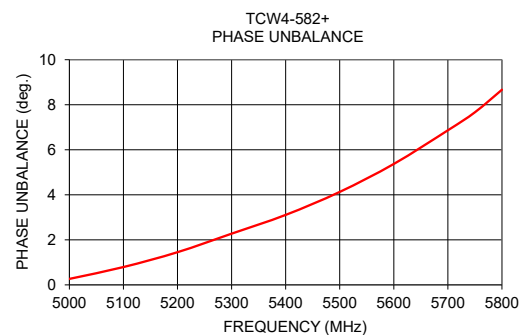
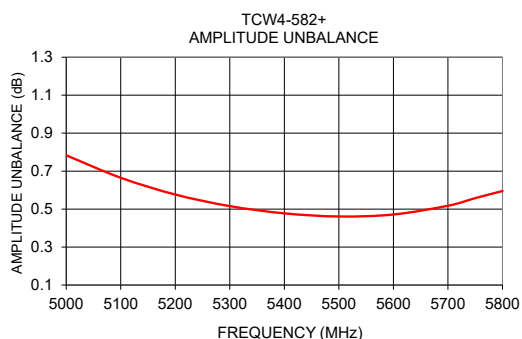
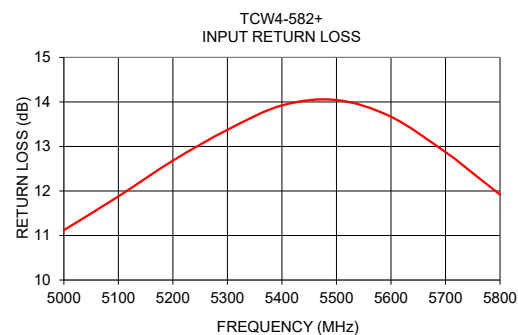
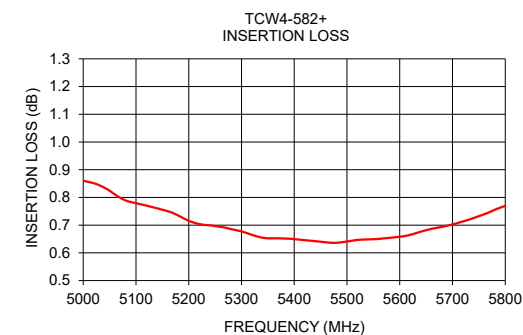
## TAPE & REEL INFORMATION: F114



TYPICAL PERFORMANCE DATA<sup>5</sup>

| Frequency (MHz) | Insertion Loss (dB) | Input Return Loss (dB) | Amplitude Unbalance (dB) | Phase Unbalance (deg) |
|-----------------|---------------------|------------------------|--------------------------|-----------------------|
| 5000            | 0.86                | 11.12                  | 0.78                     | 0.27                  |
| 5100            | 0.78                | 11.88                  | 0.67                     | 0.79                  |
| 5200            | 0.72                | 12.68                  | 0.58                     | 1.45                  |
| 5300            | 0.68                | 13.37                  | 0.52                     | 2.27                  |
| 5400            | 0.65                | 13.92                  | 0.48                     | 3.11                  |
| 5500            | 0.64                | 14.04                  | 0.46                     | 4.13                  |
| 5600            | 0.66                | 13.67                  | 0.47                     | 5.37                  |
| 5700            | 0.70                | 12.87                  | 0.52                     | 6.87                  |
| 5750            | 0.73                | 12.40                  | 0.56                     | 7.66                  |
| 5800            | 0.77                | 11.92                  | 0.60                     | 8.67                  |

5. Measured with Agilent N5242A network analyzer using impedance conversion and port extension.



- 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.
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