

# Frequency Mixer

Level 13 (LO Power +13 dBm) 5 to 2500 MHz

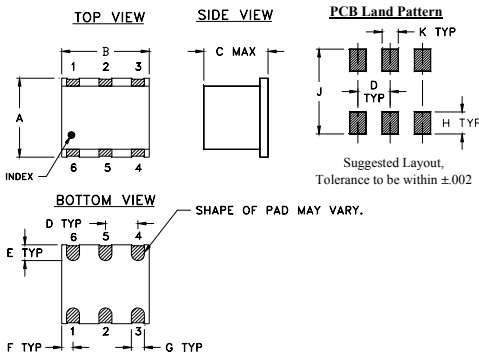
## Maximum Ratings

|                                                                |                |
|----------------------------------------------------------------|----------------|
| Operating Temperature                                          | -40°C to 85°C  |
| Storage Temperature                                            | -55°C to 100°C |
| RF Power                                                       | 200mW          |
| IF Current                                                     | 40mA           |
| Permanent damage may occur if any of these limits are exceeded |                |

## Pin Connections

|        |       |
|--------|-------|
| LO     | 1     |
| RF     | 4     |
| IF     | 5     |
| GROUND | 2,3,6 |

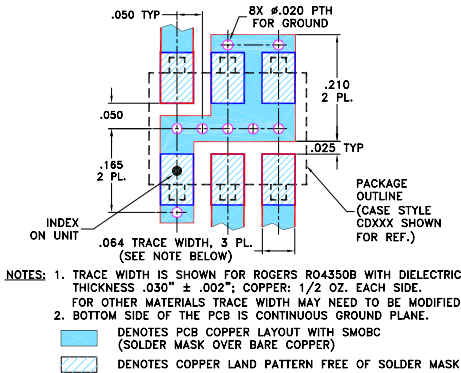
## Outline Drawing



## Outline Dimensions ( $\frac{\text{inch}}{\text{mm}}$ )

|      |      |      |      |      |       |
|------|------|------|------|------|-------|
| A    | B    | C    | D    | E    | F     |
| .250 | .31  | .20  | .100 | .050 | .055  |
| 6.35 | 7.87 | 5.08 | 2.54 | 1.27 | 1.40  |
| G    | H    | J    | K    |      | wt    |
| .040 | .070 | .270 | .050 |      | grams |
| 1.02 | 1.78 | 6.86 | 1.27 |      | 0.50  |

**Demo Board MCL P/N: TB-03**  
**Suggested PCB Layout (PL-052)**



## 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.  
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## Features

- excellent L-R isolation, 32 dB typ.
- conversion loss, 7.0 dB typ.
- small size, 0.25"x0.31"x0.2"

## Applications

- cellular
- satellite distribution
- GPS

## Electrical Specifications

| FREQUENCY<br>(MHz) |        | CONVERSION LOSS<br>(dB) |          |                |      | LO-RF ISOLATION<br>(dB) |      |      |      |      |      | LO-IF ISOLATION<br>(dB) |      |      |      |      |      | IP3<br>at center<br>band<br>(dBm) |
|--------------------|--------|-------------------------|----------|----------------|------|-------------------------|------|------|------|------|------|-------------------------|------|------|------|------|------|-----------------------------------|
| LO/Rf              | IF     |                         |          | Total<br>Range |      | L                       |      | M    |      | U    |      | L                       |      | M    |      | U    |      |                                   |
| $f_L$ - $f_U$      |        | $\bar{X}$               | $\sigma$ | Max.           | Max. | Typ.                    | Min. | Typ. | Min. | Typ. | Min. | Typ.                    | Min. | Typ. | Min. | Typ. | Min. | Typ.                              |
| 5-2500             | 5-1500 | 7.0                     | .20      | 8.5            | 9.8  | 54                      | 28   | 32   | 23   | 32   | 20   | 34                      | 23   | 32   | 25   | 28   | 17   | 17                                |

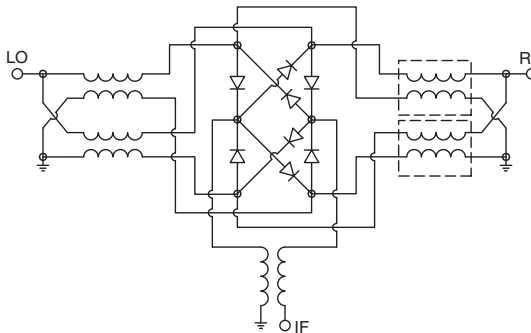
1 dB COMP.: +9 dBm typ.

L = low range [ $f_L$  to 10  $f_L$ ]  
M = mid range [10  $f_L$  to  $f_U/2$ ]  
U = upper range [ $f_U/2$  to  $f_U$ ]

## Typical Performance Data

| Frequency (MHz) |         | Conversion Loss (dB) | Isolation L-R (dB) | Isolation L-I (dB) | VSWR RF Port (:1) | VSWR LO Port (:1) |
|-----------------|---------|----------------------|--------------------|--------------------|-------------------|-------------------|
| RF              | LO      | LO +13 dBm           | LO +13 dBm         | LO +13 dBm         | LO +13 dBm        | LO +13 dBm        |
| 5.00            | 35.00   | 6.60                 | 43.66              | 31.16              | 1.43              | 2.14              |
| 10.10           | 40.10   | 6.47                 | 48.02              | 33.66              | 1.42              | 2.07              |
| 20.18           | 50.18   | 6.42                 | 53.20              | 34.80              | 1.42              | 2.09              |
| 33.51           | 63.51   | 6.47                 | 56.82              | 34.60              | 1.42              | 2.09              |
| 49.03           | 79.03   | 6.46                 | 59.20              | 34.63              | 1.42              | 2.08              |
| 81.42           | 111.42  | 6.50                 | 57.10              | 34.59              | 1.42              | 2.06              |
| 135.23          | 165.23  | 6.58                 | 52.43              | 34.78              | 1.45              | 2.08              |
| 224.60          | 194.60  | 6.60                 | 46.08              | 35.72              | 1.52              | 2.08              |
| 373.01          | 343.01  | 6.77                 | 40.43              | 37.11              | 1.71              | 1.95              |
| 480.71          | 450.71  | 6.88                 | 38.16              | 36.46              | 1.86              | 1.92              |
| 545.72          | 515.72  | 6.82                 | 37.54              | 35.91              | 1.95              | 1.80              |
| 798.38          | 768.38  | 6.92                 | 36.87              | 32.89              | 2.23              | 1.71              |
| 906.34          | 876.34  | 6.92                 | 37.27              | 31.38              | 2.32              | 1.62              |
| 1168.03         | 1138.03 | 7.19                 | 36.90              | 30.53              | 2.35              | 1.61              |
| 1250.00         | 1220.00 | 7.10                 | 38.52              | 31.35              | 2.37              | 1.62              |
| 1505.28         | 1475.28 | 6.78                 | 39.76              | 30.96              | 2.27              | 1.65              |
| 1800.00         | 1770.00 | 6.85                 | 31.84              | 27.67              | 2.24              | 1.57              |
| 2000.00         | 1970.00 | 7.07                 | 28.62              | 28.09              | 2.19              | 1.62              |
| 2200.00         | 2170.00 | 7.09                 | 25.62              | 28.13              | 2.18              | 1.77              |
| 2500.00         | 2470.00 | 7.52                 | 22.96              | 26.44              | 1.95              | 1.99              |

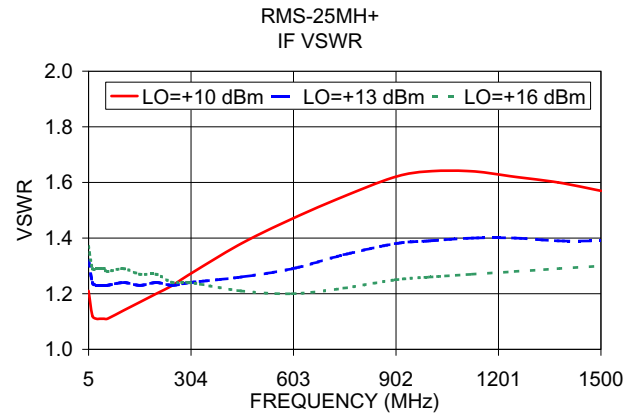
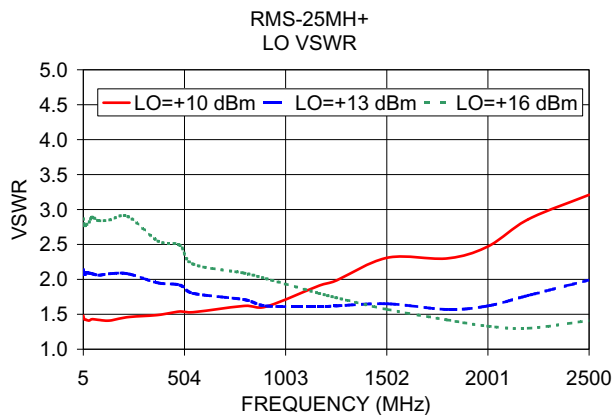
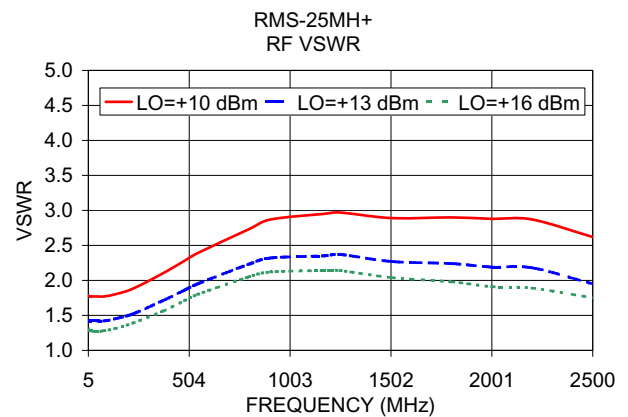
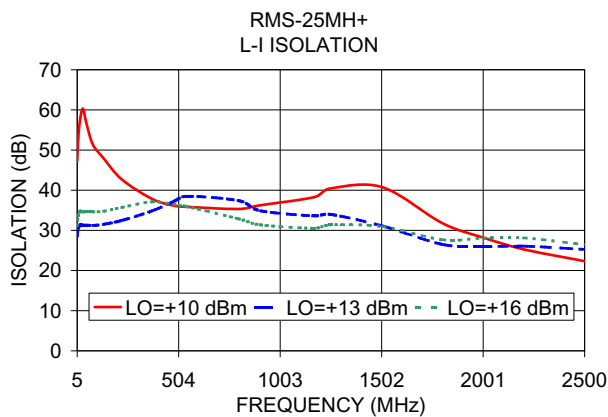
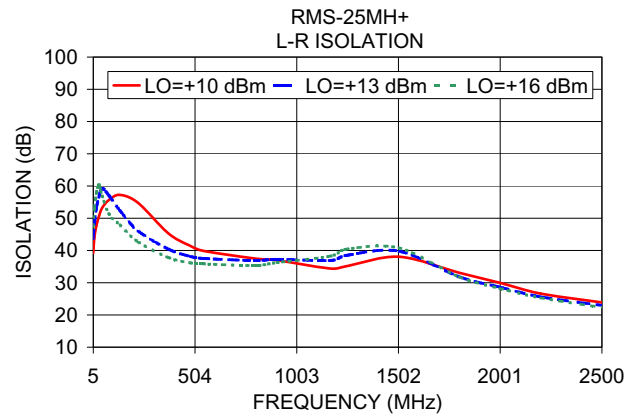
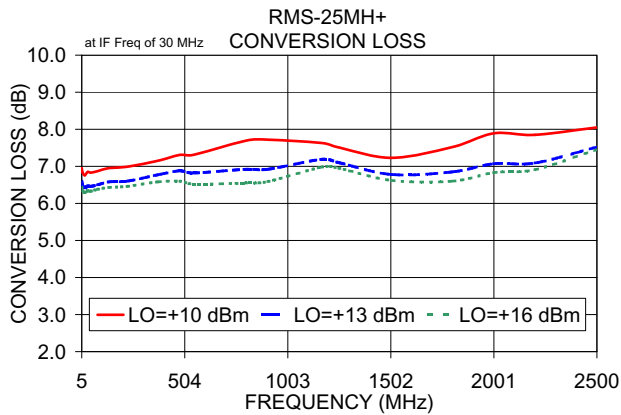
## Electrical Schematic



CASE STYLE: TT240

**+RoHS Compliant**

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



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