



# THE DATASHEET OF SIM-24MH+



# Frequency Mixer WIDE BAND

## SIM-24MH+

Level 13 (LO Power +13 dBm) 7300 to 20000 MHz



Generic photo used for illustration purposes only

CASE STYLE: HV1195

### Maximum Ratings

|                       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 50mW           |

For extended temperature range, consult factory.  
Permanent damage may occur if any of these limits are exceeded.

### Pin Connections

|        |           |
|--------|-----------|
| LO     | 8         |
| RF     | 4         |
| IF     | 2         |
| GROUND | 1,3,5,6,7 |

### Features

- wide bandwidth, 7300 to 20000 MHz
- low conversion loss, 5.7 dB typ.
- high L-R isolation, 36 dB typ.
- excellent IF BW, DC to 7500 MHz
- LTCC double balanced mixer
- tiny size, low profile, 0.08"
- useable as up and down converter
- aqueous washable
- protected under U.S Patent 7,027,795

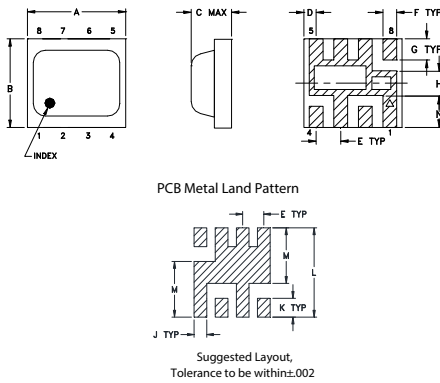
### Applications

- fixed satellite
- mobile
- radio location

**+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: 7" Devices/Reel: 10, 20, 50, 100, 200, 500

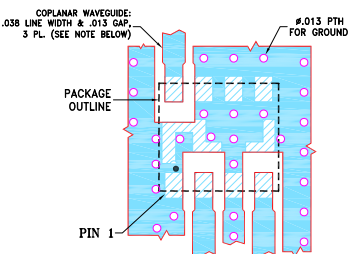
### Outline Drawing



### Outline Dimensions (inch/mm)

| A    | B    | C      | D    | E    | F     | G     |
|------|------|--------|------|------|-------|-------|
| .200 | .180 | .087   | .025 | .050 | .028  | .043  |
| 5.08 | 4.57 | 2.2098 | 0.64 | 1.27 | 0.71  | 1.09  |
| H    | J    | K      | L    | M    | N     | wt    |
| .050 | .030 | .043   | .204 | .127 | 0.065 | grams |
| 1.27 | 0.76 | 1.09   | 5.18 | 3.23 | 1.65  | 0.08  |

### Demo Board MCL P/N: TB-458+ Suggested PCB Layout (PL-284)



- NOTES:**
1. TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020±.0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP 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.

### 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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### Electrical Specifications

| FREQUENCY (MHz)   | CONVERSION LOSS* (dB) |     |                    | LO-RF ISOLATION (dB) |           | LO-IF ISOLATION (dB) |    | IP3 at center band (dBm) |    |
|-------------------|-----------------------|-----|--------------------|----------------------|-----------|----------------------|----|--------------------------|----|
|                   | LO/RF $f_L-f_U$       | IF  | Typ. $\sigma$ Max. | Typ. Min.            | Typ. Min. | Typ.                 |    |                          |    |
| <b>7300-20000</b> | <b>DC-7500</b>        |     |                    |                      |           |                      |    |                          |    |
| 7300-10000        |                       | 7.0 | 0.2                | 8.5                  | 43        | 31                   | 19 | 13                       | 20 |
| 10000-14500       |                       | 5.7 | 0.1                | 7.5                  | 36        | 29                   | 18 | 13                       | 16 |
| 14500-18000       |                       | 7.6 | 0.3                | 9.3                  | 26        | 19                   | 15 | 10                       | 18 |
| 18000-20000       |                       | 8.5 | 0.3                | 10.9                 | 28        | 22                   | 25 | 16                       | 25 |

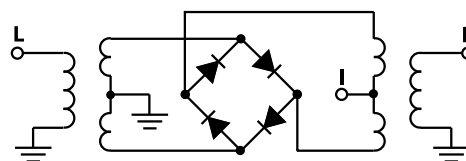
1 dB COMPR. +9 dBm typ.

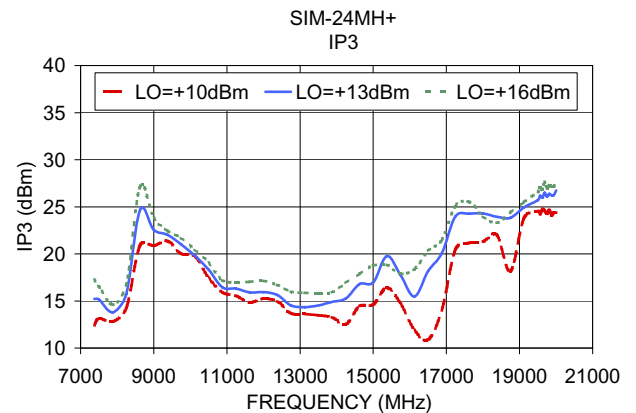
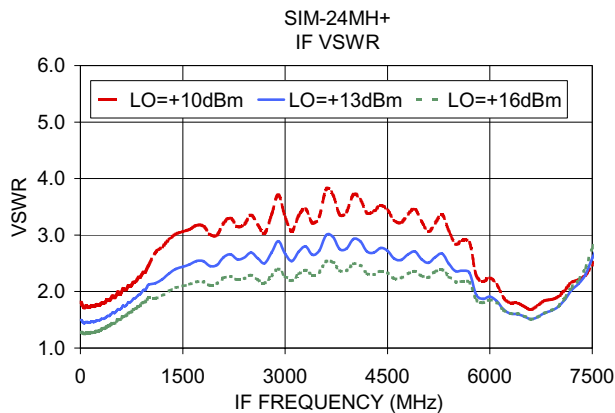
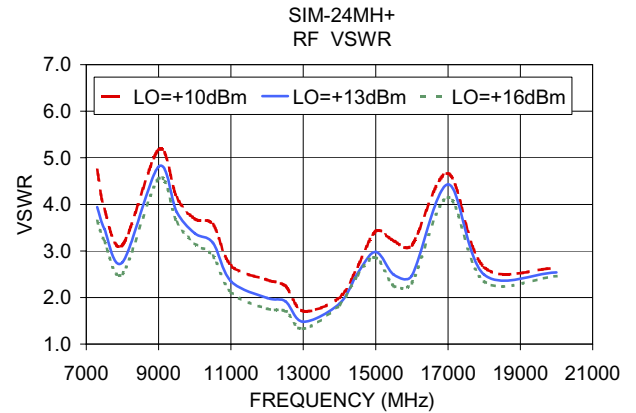
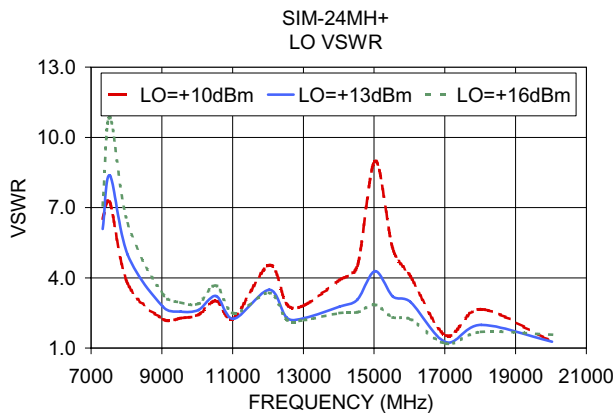
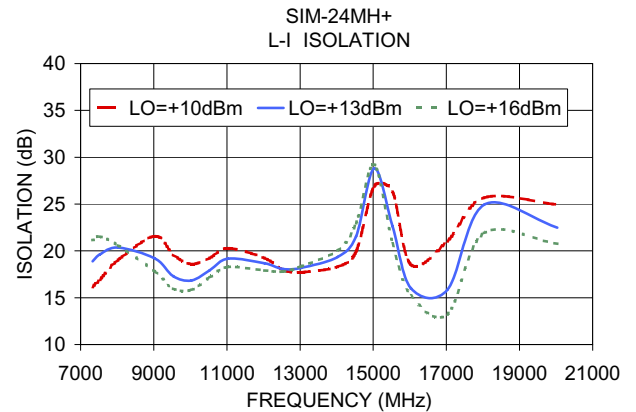
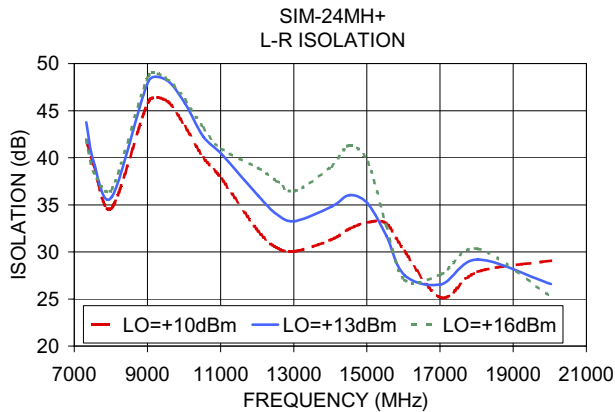
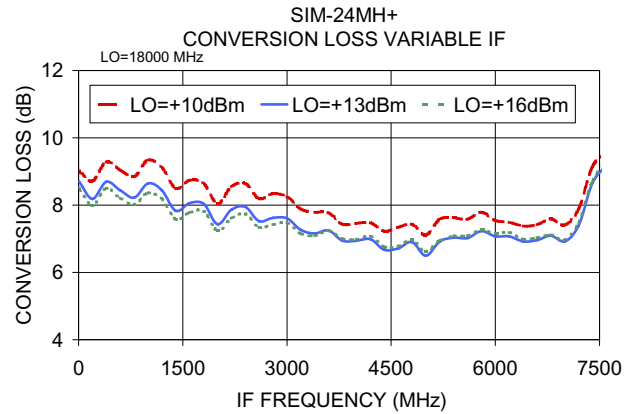
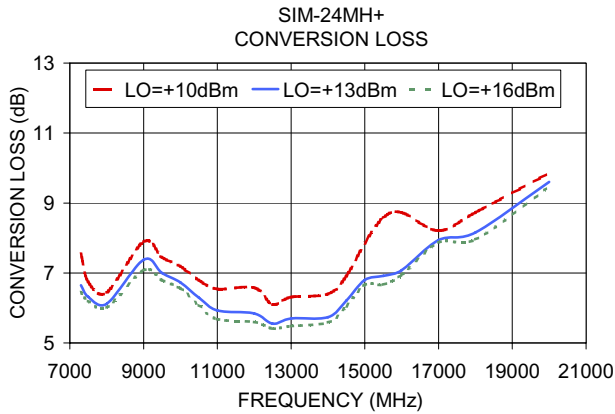
\* Conversion loss at 30 MHz IF.  $\sigma$  is a measure of repeatability from unit to unit.

### Typical Performance Data

| Frequency (MHz) | Conversion Loss (dB) |        | Isolation L-R (dB) |        | Isolation L-I (dB) |        | VSWR RF Port (:1) |        | VSWR LO Port (:1) |        |
|-----------------|----------------------|--------|--------------------|--------|--------------------|--------|-------------------|--------|-------------------|--------|
|                 | LO                   | RF     | LO                 | RF     | LO                 | RF     | LO                | RF     | LO                | RF     |
|                 | +13dBm               | +13dBm | +13dBm             | +13dBm | +13dBm             | +13dBm | +13dBm            | +13dBm | +13dBm            | +13dBm |
| 7300.00         | 7330.10              | 6.65   | 43.77              | 18.89  | 3.94               | 6.09   |                   |        |                   |        |
| 7500.00         | 7530.10              | 6.32   | 39.57              | 19.63  | 3.47               | 8.37   |                   |        |                   |        |
| 8000.00         | 8030.10              | 6.12   | 35.84              | 20.35  | 2.76               | 4.99   |                   |        |                   |        |
| 9000.00         | 9030.10              | 7.38   | 48.14              | 19.20  | 4.81               | 2.76   |                   |        |                   |        |
| 9500.00         | 9530.10              | 7.00   | 48.23              | 17.30  | 3.84               | 2.56   |                   |        |                   |        |
| 10000.00        | 10030.10             | 6.73   | 45.78              | 16.83  | 3.38               | 2.62   |                   |        |                   |        |
| 10500.00        | 10530.10             | 6.29   | 42.22              | 17.92  | 3.17               | 3.22   |                   |        |                   |        |
| 11000.00        | 11030.10             | 5.93   | 40.36              | 19.17  | 2.35               | 2.25   |                   |        |                   |        |
| 12000.00        | 12030.10             | 5.84   | 35.97              | 18.67  | 1.99               | 3.49   |                   |        |                   |        |
| 12500.00        | 12530.10             | 5.55   | 34.02              | 18.08  | 1.92               | 2.31   |                   |        |                   |        |
| 13000.00        | 13030.10             | 5.70   | 33.28              | 18.18  | 1.48               | 2.28   |                   |        |                   |        |
| 14000.00        | 14030.10             | 5.74   | 34.81              | 19.35  | 1.87               | 2.77   |                   |        |                   |        |
| 14500.00        | 14530.10             | 6.21   | 36.04              | 21.54  | 2.52               | 3.07   |                   |        |                   |        |
| 15000.00        | 15030.10             | 6.80   | 35.11              | 28.80  | 2.98               | 4.28   |                   |        |                   |        |
| 15500.00        | 15530.10             | 6.92   | 31.74              | 22.63  | 2.49               | 3.20   |                   |        |                   |        |
| 16000.00        | 16030.10             | 7.08   | 27.52              | 16.03  | 2.47               | 2.97   |                   |        |                   |        |
| 17000.00        | 17030.10             | 7.94   | 26.56              | 15.86  | 4.43               | 1.25   |                   |        |                   |        |
| 18000.00        | 18030.10             | 8.16   | 29.19              | 24.93  | 2.49               | 1.99   |                   |        |                   |        |
| 19000.00        | 19030.10             | 7.75   | 31.50              | 28.10  | 3.12               | 2.04   |                   |        |                   |        |
| 20000.00        | 20030.10             | 9.60   | 26.59              | 22.49  | 2.54               | 1.27   |                   |        |                   |        |

### Electrical Schematic





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