

# Surface Mount Frequency Mixer

Level 7 (LO Power +7dBm) 0.5 to 500 MHz

## LRMS-1+ LRMS-1



CASE STYLE: QQQ130

### Maximum Ratings

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

### Features

- low conversion loss, 5.94 dB typ.

### Applications

- HF/VHF/UHF
- instrumentation
- cellular

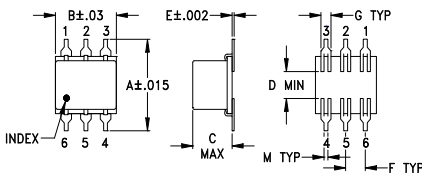
### +RoHS Compliant

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

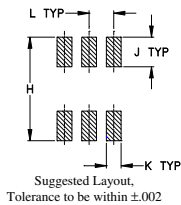
Available Tape and Reel at no extra cost

| Reel Size | Devices/Reel         |
|-----------|----------------------|
| 7"        | 10, 20, 50, 100, 200 |
| 13"       | 500                  |

### Outline Drawing



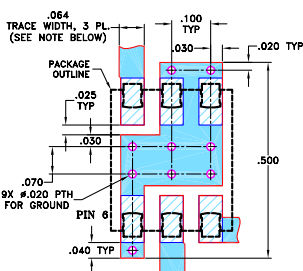
### PCB Land Pattern



### Outline Dimensions (inch/mm)

| A     | B    | C    | D    | E    | F    | G     |  |
|-------|------|------|------|------|------|-------|--|
| .400  | .31  | .200 | .10  | .010 | .100 | .050  |  |
| 10.16 | 7.87 | 5.08 | 2.54 | 0.25 | 2.54 | 1.27  |  |
| H     | J    | K    | L    | M    |      | wt    |  |
| .420  | .120 | .060 | .100 | .020 |      | grams |  |
| 10.67 | 3.05 | 1.52 | 2.54 | 0.51 |      | 0.55  |  |

### Demo Board MCL P/N: TB-44+ Suggested PCB Layout (PL-083)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; 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

### 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) |    |    |    |    |    |    |
|-----------------|----------------------|----------------------|----|----|----------------------|----|----|--------------------------|----|----|----|----|----|----|
|                 |                      | L                    | M  | U  | L                    | M  | U  |                          |    |    |    |    |    |    |
| 0.5-500         | DC-500               | 55                   | 50 | 33 | 25                   | 27 | 20 | 55                       | 45 | 30 | 23 | 24 | 19 | 15 |

1 dB COMP.: +1 dBm typ.

L = low range [ $f_l$  to  $10 f_l$ ]  
m = mid band [ $2 f_l$  to  $f_l/2$ ]

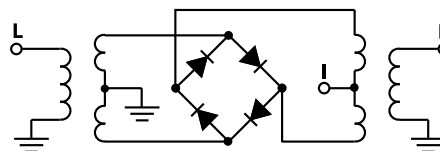
M = mid range [ $10 f_l$  to  $f_l/2$ ]

U = upper range [ $f_l/2$  to  $f_l$ ]

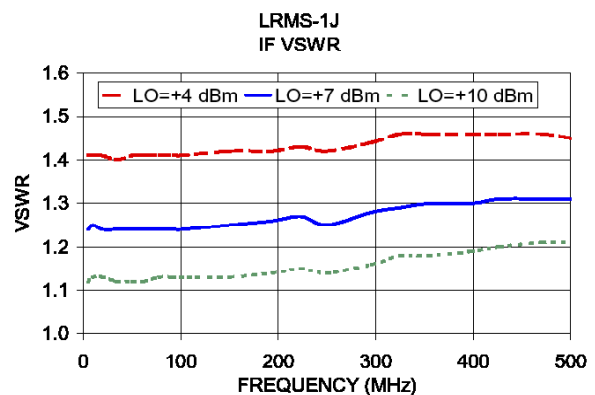
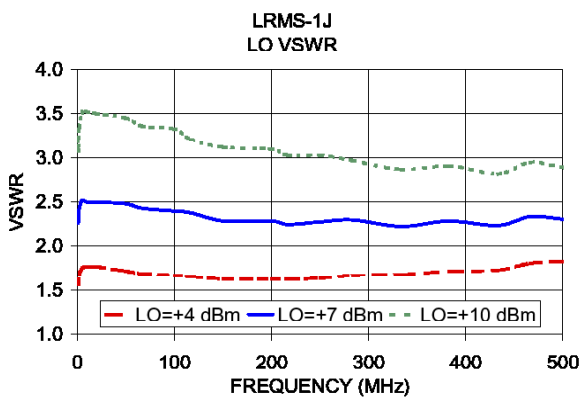
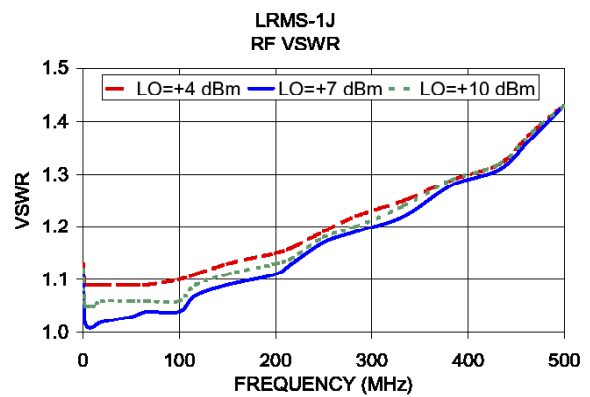
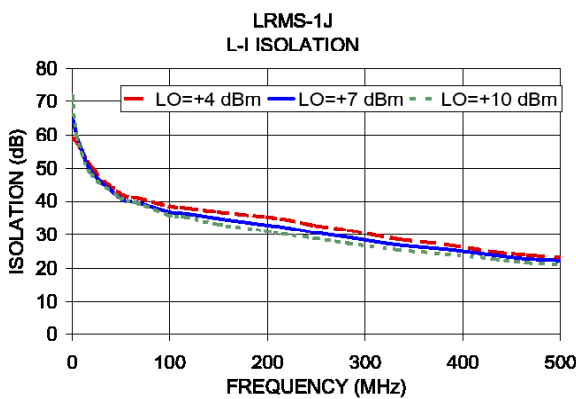
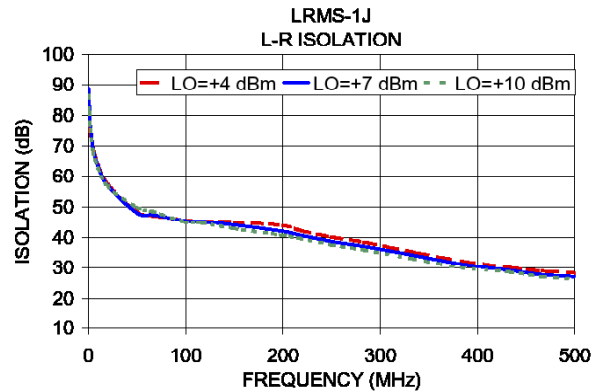
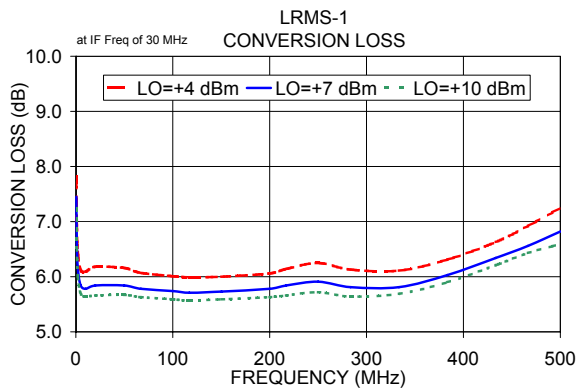
### Typical Performance Data

| Frequency (MHz) |        | Conversion Loss (dB) | Isolation L-R (dB) | Isolation L-I (dB) | VSWR RF Port (:1) | VSWR LO Port (:1) |
|-----------------|--------|----------------------|--------------------|--------------------|-------------------|-------------------|
| RF              | LO     | LO +7dBm             | LO +7dBm           | LO +7dBm           | LO +7dBm          | LO +7dBm          |
| 0.50            | 30.50  | 7.45                 | 89.00              | 64.40              | 1.11              | 2.27              |
| 1.00            | 31.00  | 6.68                 | 82.65              | 64.35              | 1.05              | 2.27              |
| 2.00            | 32.00  | 6.15                 | 76.59              | 63.49              | 1.02              | 2.43              |
| 5.00            | 35.00  | 5.84                 | 68.78              | 59.68              | 1.01              | 2.52              |
| 10.00           | 40.00  | 5.78                 | 63.45              | 55.38              | 1.01              | 2.50              |
| 20.00           | 50.00  | 5.84                 | 56.92              | 48.99              | 1.02              | 2.50              |
| 50.00           | 80.00  | 5.84                 | 48.06              | 40.83              | 1.03              | 2.48              |
| 67.10           | 97.10  | 5.78                 | 47.33              | 39.62              | 1.04              | 2.43              |
| 100.00          | 170.00 | 5.74                 | 45.42              | 36.85              | 1.04              | 2.40              |
| 117.05          | 87.05  | 5.71                 | 45.23              | 36.32              | 1.07              | 2.38              |
| 150.35          | 120.35 | 5.73                 | 44.09              | 34.84              | 1.09              | 2.29              |
| 200.00          | 170.00 | 5.78                 | 41.97              | 32.90              | 1.11              | 2.29              |
| 216.95          | 186.95 | 5.84                 | 40.74              | 32.23              | 1.13              | 2.25              |
| 250.00          | 220.00 | 5.91                 | 38.62              | 30.58              | 1.17              | 2.28              |
| 283.55          | 253.55 | 5.81                 | 36.99              | 29.19              | 1.19              | 2.30              |
| 333.50          | 303.50 | 5.81                 | 34.17              | 26.96              | 1.22              | 2.23              |
| 383.45          | 353.45 | 6.03                 | 31.17              | 25.64              | 1.28              | 2.29              |
| 433.40          | 403.40 | 6.34                 | 29.18              | 23.85              | 1.31              | 2.24              |
| 466.70          | 436.70 | 6.56                 | 27.71              | 22.78              | 1.37              | 2.34              |
| 500.00          | 470.00 | 6.82                 | 27.09              | 22.32              | 1.43              | 2.31              |

### Electrical Schematic



## Performance Charts



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