

# Frequency Mixer WIDE BAND

## SIM-193H+

Level 17 (LO Power +17 dBm) 7.3 to 19 GHz



CASE STYLE: HV1195  
PRICE: \$14.95 ea. QTY (10)

### Maximum Ratings

|                       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 120mW          |

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, 7.3 to 19 GHz
- low conversion loss, 6.2 dB typ.
- high L-R isolation, 33 dB typ.
- excellent IF BW, DC to 7.5 GHz
- 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**

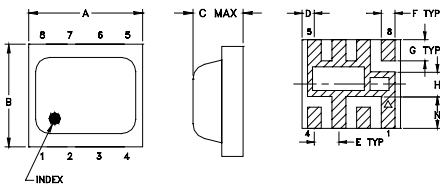
| Reel Size | Devices/Reel              |
|-----------|---------------------------|
| 7"        | 10, 20, 50, 100, 200, 500 |

### Electrical Specifications at 25°C

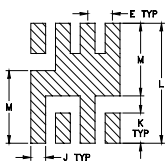
| Parameter                          | Condition (GHz) | Min. | Typ. | Max. | Unit |
|------------------------------------|-----------------|------|------|------|------|
| Frequency Range, LO/RF             |                 | 7.3  | —    | 19   | GHz  |
| Frequency Range, IF                |                 | DC   | —    | 7.5  | GHz  |
| Conversion Loss <sup>1</sup>       | 7.3-10          | —    | 8.6  | 10.5 | dB   |
|                                    | 10-15           | —    | 7.6  | 10.0 |      |
|                                    | 15-18           | —    | 9.7  | 11.8 |      |
|                                    | 18-19           | —    | 10.0 | 13.0 |      |
| LO to RF Isolation                 | 7.3-10          | 24   | 32   | —    | dB   |
|                                    | 10-15           | 20   | 28   | —    |      |
|                                    | 15-18           | 16   | 21   | —    |      |
|                                    | 18-19           | 20   | 26   | —    |      |
| LO to IF Isolation                 | 7.3-10          | 13   | 18   | —    | dB   |
|                                    | 10-15           | 13   | 18   | —    |      |
|                                    | 15-18           | 8    | 11   | —    |      |
|                                    | 18-19           | 12   | 17   | —    |      |
| IP3                                | 7.3-10          | —    | 17   | —    | dBm  |
|                                    | 10-15           | —    | 19   | —    |      |
|                                    | 15-18           | —    | 16   | —    |      |
|                                    | 18-19           | —    | 25   | —    |      |
| RF Input Power at 1 dB Compression | 7.3-19          | —    | +14  | —    | dBm  |

1. Conversion loss at 30 MHz IF.

### Outline Drawing



#### PCB Land Pattern

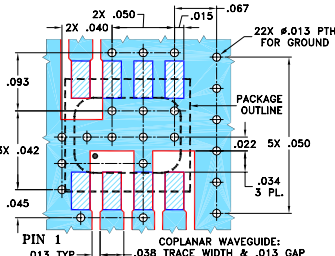


Suggested Layout,  
Tolerance to be within ±0.02

### Outline Dimensions (inch/mm)

| A    | B    | C    | D     | E     | F     | G     |
|------|------|------|-------|-------|-------|-------|
| .200 | .180 | .087 | .025  | .050  | .028  | .043  |
| 5.08 | 4.57 | 2.21 | 0.64  | 1.27  | 0.71  | 1.09  |
| H    | J    | K    | L     | M     | N     | wt    |
| .050 | .030 | .060 | 0.238 | 0.144 | 0.065 | grams |
| 1.27 | 0.76 | 1.52 | 6.05  | 3.66  | 1.65  | 0.08  |

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



#### NOTES:

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B 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

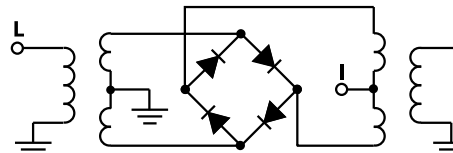
#### Notes

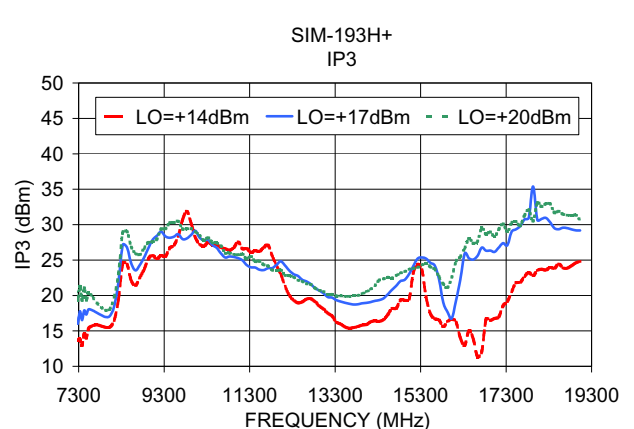
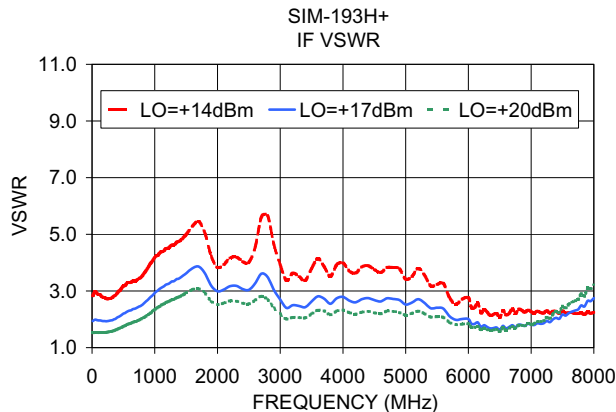
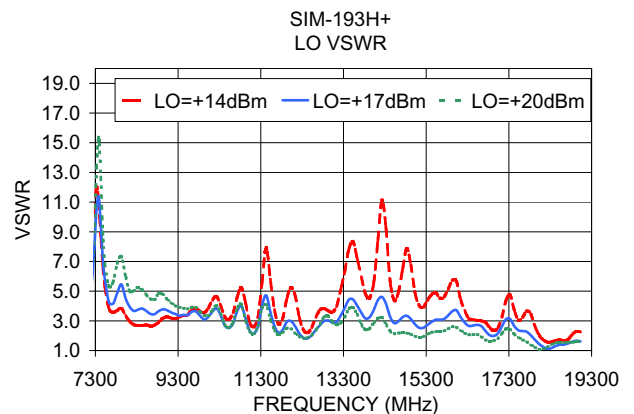
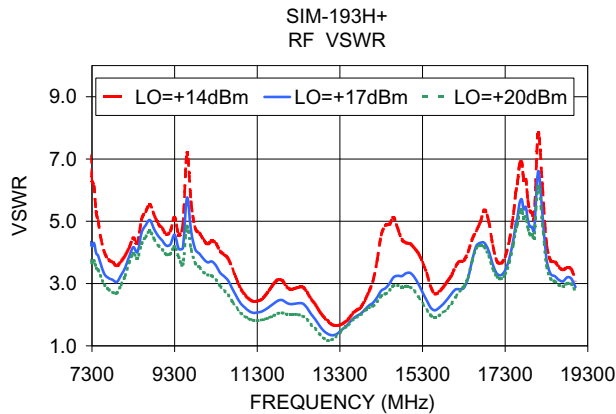
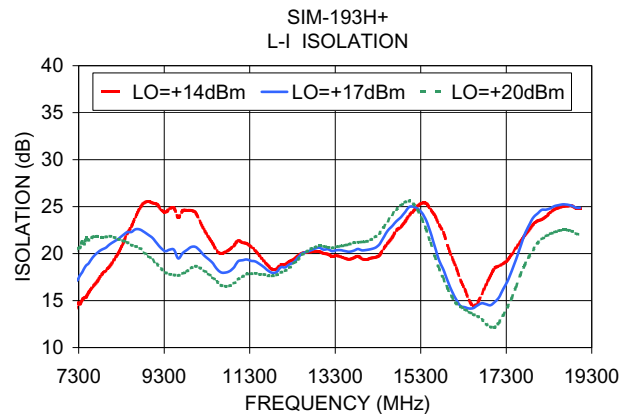
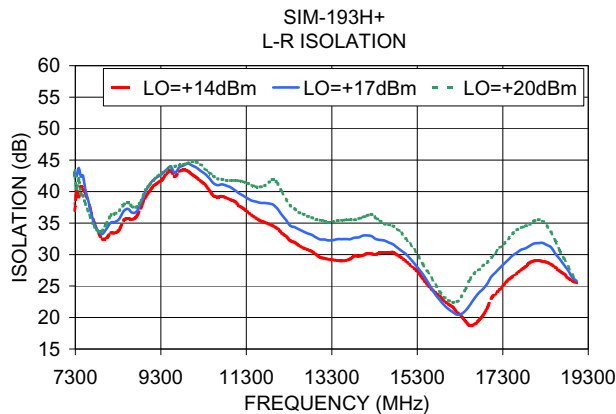
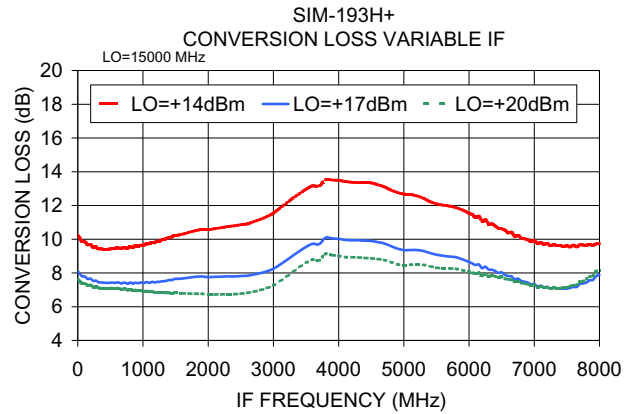
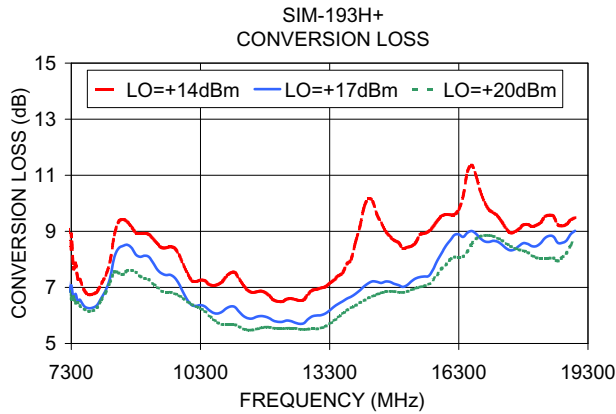
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### Typical Performance Data

| Frequency (MHz) |          | Conversion Loss (dB) | Isolation L-R (dB) | Isolation L-I (dB) | VSWR RF Port (:1) | VSWR LO Port (:1) |
|-----------------|----------|----------------------|--------------------|--------------------|-------------------|-------------------|
| RF              | LO       | LO +17dBm            | LO +17dBm          | LO +17dBm          | LO +17dBm         | LO +17dBm         |
| 7300.10         | 7330.00  | 7.07                 | 42.48              | 17.69              | 4.20              | 10.62             |
| 8500.10         | 8530.00  | 8.48                 | 37.26              | 22.30              | 4.64              | 3.67              |
| 9000.10         | 9030.00  | 8.13                 | 41.03              | 21.66              | 4.38              | 3.72              |
| 9500.10         | 9530.00  | 7.44                 | 43.94              | 20.41              | 4.15              | 3.39              |
| 10000.10        | 10030.00 | 6.54                 | 44.16              | 20.71              | 3.79              | 3.26              |
| 11000.10        | 11030.00 | 6.32                 | 40.24              | 19.18              | 2.23              | 2.34              |
| 11500.10        | 11530.00 | 5.89                 | 38.41              | 18.90              | 2.17              | 3.62              |
| 12000.10        | 12030.00 | 5.81                 | 37.27              | 18.55              | 2.39              | 2.98              |
| 12500.10        | 12530.00 | 5.74                 | 34.00              | 20.03              | 2.23              | 2.03              |
| 13000.10        | 13030.00 | 6.00                 | 32.41              | 20.42              | 1.39              | 2.90              |
| 14000.10        | 14030.00 | 6.89                 | 33.02              | 20.39              | 2.29              | 3.72              |
| 14500.10        | 14530.00 | 7.16                 | 32.23              | 22.45              | 3.00              | 2.84              |
| 15000.10        | 15030.00 | 7.02                 | 30.11              | 24.95              | 3.34              | 2.77              |
| 15500.10        | 15530.00 | 7.39                 | 25.82              | 22.24              | 2.22              | 3.08              |
| 16000.10        | 16030.00 | 8.48                 | 21.35              | 16.00              | 2.67              | 3.72              |
| 16500.10        | 16530.00 | 8.95                 | 21.99              | 14.20              | 3.74              | 2.73              |
| 17000.10        | 17030.00 | 8.62                 | 26.46              | 14.84              | 3.61              | 2.14              |
| 17500.10        | 17530.00 | 8.32                 | 29.85              | 19.38              | 4.43              | 2.36              |
| 18000.10        | 18030.00 | 8.47                 | 31.75              | 24.25              | 4.67              | 1.44              |
| 19000.10        | 19030.00 | 9.02                 | 25.80              | 24.87              | 2.89              | 1.62              |

### Electrical Schematic





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