

# Frequency Mixer WIDE BAND

SIM-73L+

Level 4 (LO Power +4 dBm) 2400 to 7000 MHz

## Maximum Ratings

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

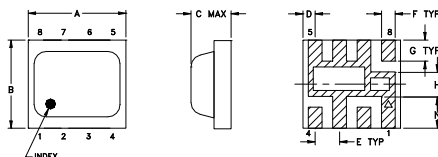
For extended temperature range, consult factory.

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

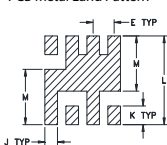
## Pin Connections

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

## Outline Drawing



PCB Metal Land Pattern



Suggested Layout, Tolerance to be within ±0.002

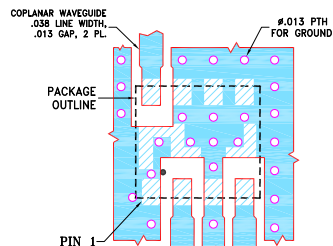
## Outline Dimensions (inch)

| 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-382 Suggested PCB Layout (PL-239)



- NOTES:
- 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.
  - 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.

## Features

- wide bandwidth, 2400 to 7000 MHz
- low conversion loss, 6.2 dB typ.
- excellent IF BW, DC to 3000 MHz
- LTCC double balanced mixer
- tiny size, low profile, 0.08"
- useable as up and down converter
- aqueous washable
- protected by US patent 7,027,795

## Applications

- satellite up and down converters
- defense radar and communications
- line of sight links
- WIFI
- blue tooth
- VSAT
- ISM

## 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<br>$f_L - f_U$ | Typ. $\sigma$ Max.       | Typ. Min.               | Typ. Min.               | Typ.                              |
| 2400-7000            |                          |                         |                         |                                   |
| 2400-3200            | 6.3                      | 35                      | 20                      | 10                                |
| 3200-4200            | 6.1                      | 32                      | 26                      | 12                                |
| 4200-7000            | 6.0                      | 23                      | 18                      | 9                                 |

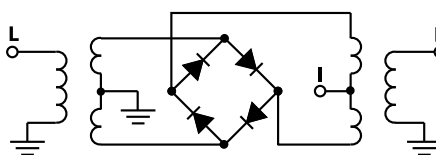
1 dB Compression: +1 dBm typ.

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

## Typical Performance Data

| Frequency<br>(MHz) |         | Conversion<br>Loss<br>(dB) | Isolation<br>L-R<br>(dB) | Isolation<br>L-I<br>(dB) | VSWR<br>RF Port<br>(:1) | VSWR<br>LO Port<br>(:1) |
|--------------------|---------|----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|
| RF                 | LO      | LO<br>+4dBm                | LO<br>+4dBm              | LO<br>+4dBm              | LO<br>+4dBm             | LO<br>+4dBm             |
| 2400.00            | 2431.00 | 6.89                       | 35.71                    | 17.07                    | 2.65                    | 2.95                    |
| 2500.00            | 2531.00 | 6.57                       | 37.21                    | 17.53                    | 2.82                    | 2.44                    |
| 2700.00            | 2731.00 | 6.19                       | 39.47                    | 19.32                    | 2.87                    | 1.96                    |
| 2900.00            | 2931.00 | 6.05                       | 34.89                    | 22.18                    | 2.83                    | 1.72                    |
| 3100.00            | 3131.00 | 5.90                       | 32.79                    | 24.37                    | 2.73                    | 1.74                    |
| 3300.00            | 3331.00 | 6.11                       | 32.25                    | 27.18                    | 2.76                    | 1.88                    |
| 3500.00            | 3531.00 | 6.29                       | 31.58                    | 28.20                    | 2.70                    | 2.03                    |
| 3700.00            | 3731.00 | 6.19                       | 31.36                    | 29.17                    | 2.41                    | 2.29                    |
| 4000.00            | 4031.00 | 6.26                       | 33.62                    | 35.84                    | 2.70                    | 2.11                    |
| 4400.00            | 4431.00 | 6.28                       | 30.28                    | 21.82                    | 3.38                    | 1.87                    |
| 4800.00            | 4831.00 | 7.37                       | 30.30                    | 16.05                    | 4.73                    | 2.03                    |
| 5200.00            | 5231.00 | 6.64                       | 28.00                    | 17.21                    | 3.43                    | 2.77                    |
| 5600.00            | 5631.00 | 6.18                       | 25.85                    | 20.00                    | 2.75                    | 2.66                    |
| 5900.00            | 5931.00 | 5.89                       | 25.08                    | 22.79                    | 2.20                    | 2.60                    |
| 6100.00            | 6131.00 | 5.78                       | 24.38                    | 26.07                    | 2.05                    | 3.49                    |
| 6300.00            | 6331.00 | 5.73                       | 23.41                    | 29.97                    | 1.68                    | 2.46                    |
| 6500.00            | 6531.00 | 5.84                       | 23.16                    | 29.13                    | 1.61                    | 1.72                    |
| 6700.00            | 6731.00 | 5.88                       | 23.17                    | 26.55                    | 1.61                    | 1.54                    |
| 6900.00            | 6931.00 | 5.73                       | 22.21                    | 26.06                    | 1.36                    | 1.25                    |
| 7000.00            | 7031.00 | 5.78                       | 21.68                    | 24.72                    | 1.44                    | 1.20                    |

## Electrical Schematic



Generic photo used for illustration purposes only

CASE STYLE: HV1195

## +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 |

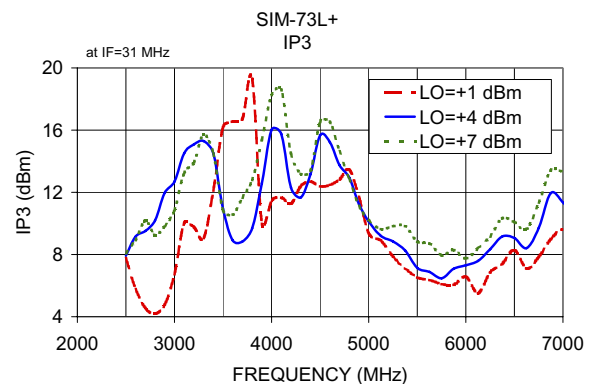
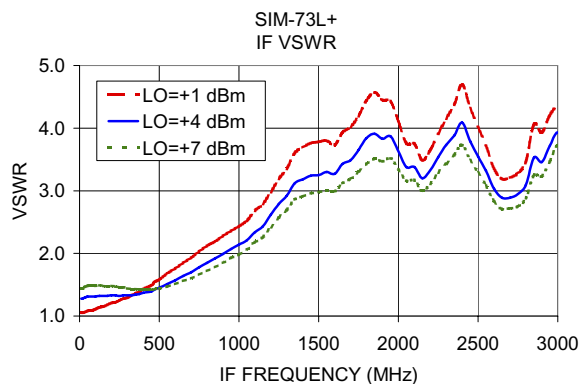
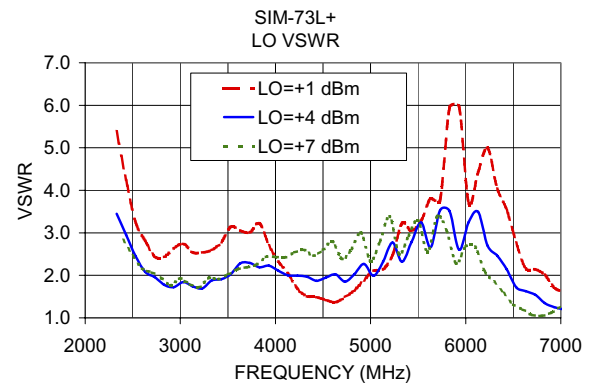
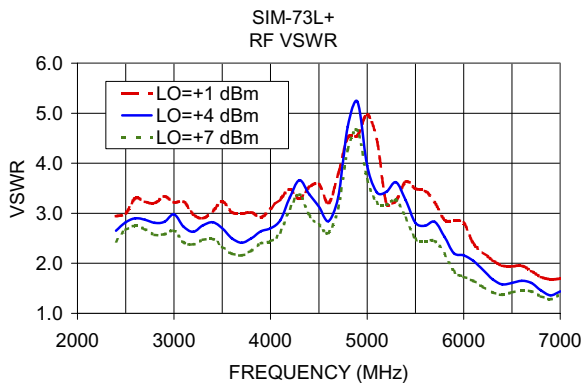
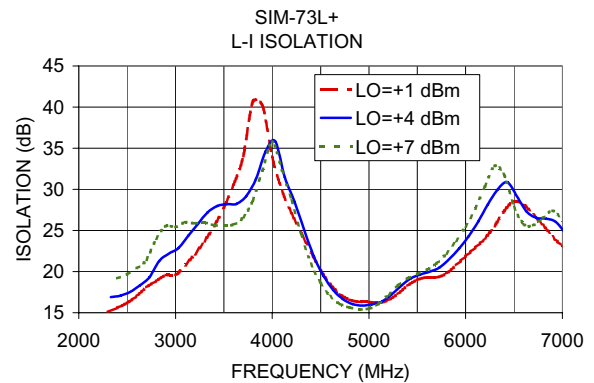
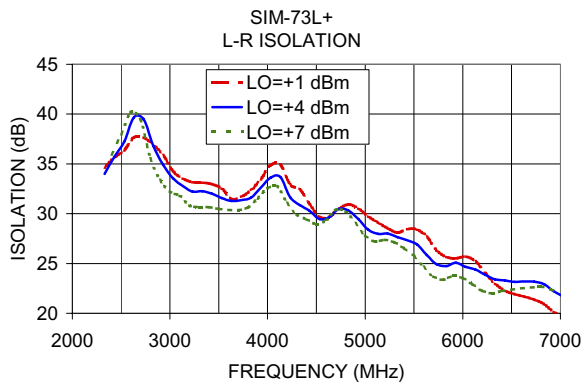
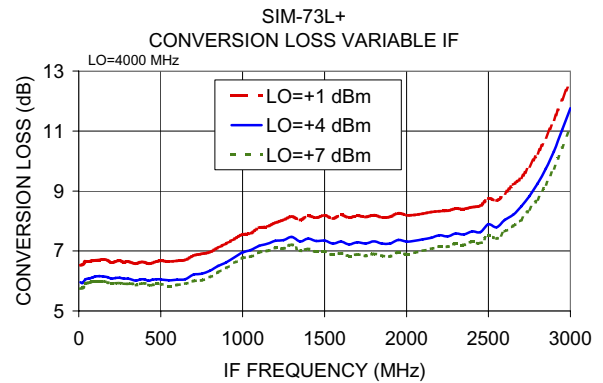
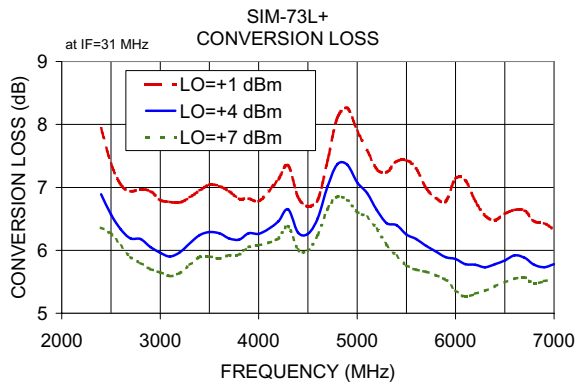
## Notes

- 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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REV. B  
ECO-000060  
SIM-73L+  
ED-12399/2  
DJ/RS/CP  
200821



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# Frequency Mixer

# SIM-73L+

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=30MHz<br>(dB) |       |       |
|---------------------|-------------|-------------------------------------------------------|-------|-------|
|                     |             | @LO (dBm)                                             |       |       |
|                     |             | +1                                                    | +4    | +7    |
| 1500.0              | 1530.0      | 26.23                                                 | 18.42 | 11.31 |
| 1680.0              | 1710.0      | 19.61                                                 | 13.80 | 8.95  |
| 1860.0              | 1890.0      | 15.55                                                 | 10.96 | 8.04  |
| 2040.0              | 2070.0      | 12.56                                                 | 9.14  | 7.43  |
| 2220.0              | 2250.0      | 8.92                                                  | 7.41  | 6.56  |
| 2400.0              | 2430.0      | 7.53                                                  | 6.81  | 6.38  |
| 2580.0              | 2610.0      | 7.14                                                  | 6.64  | 6.45  |
| 2760.0              | 2790.0      | 7.20                                                  | 6.60  | 6.32  |
| 2940.0              | 2970.0      | 7.12                                                  | 6.53  | 6.26  |
| 3120.0              | 3150.0      | 7.07                                                  | 6.41  | 6.10  |
| 3300.0              | 3330.0      | 7.00                                                  | 6.39  | 6.06  |
| 3480.0              | 3510.0      | 7.04                                                  | 6.42  | 6.06  |
| 3660.0              | 3690.0      | 6.87                                                  | 6.27  | 6.00  |
| 3840.0              | 3870.0      | 6.75                                                  | 6.33  | 6.12  |
| 4020.0              | 4050.0      | 6.70                                                  | 6.29  | 6.09  |
| 4200.0              | 4230.0      | 6.95                                                  | 6.43  | 6.14  |
| 4380.0              | 4410.0      | 6.72                                                  | 6.26  | 6.00  |
| 4560.0              | 4590.0      | 6.48                                                  | 6.02  | 5.78  |
| 4740.0              | 4770.0      | 6.85                                                  | 6.32  | 6.03  |
| 4920.0              | 4950.0      | 7.46                                                  | 6.70  | 6.24  |
| 5100.0              | 5130.0      | 7.22                                                  | 6.50  | 6.11  |
| 5280.0              | 5310.0      | 7.00                                                  | 6.14  | 5.78  |
| 5460.0              | 5490.0      | 7.11                                                  | 6.08  | 5.60  |
| 5640.0              | 5670.0      | 7.03                                                  | 6.05  | 5.56  |
| 5820.0              | 5850.0      | 6.97                                                  | 5.95  | 5.55  |
| 6000.0              | 6030.0      | 7.03                                                  | 5.91  | 5.43  |
| 6180.0              | 6210.0      | 6.73                                                  | 5.86  | 5.47  |
| 6360.0              | 6390.0      | 6.69                                                  | 5.91  | 5.57  |
| 6520.0              | 6550.0      | 6.80                                                  | 6.03  | 5.66  |
| 6700.0              | 6730.0      | 6.58                                                  | 5.98  | 5.67  |
| 6860.0              | 6890.0      | 6.44                                                  | 5.84  | 5.60  |
| 7040.0              | 7070.0      | 6.40                                                  | 5.81  | 5.62  |
| 7200.0              | 7230.0      | 6.25                                                  | 5.67  | 5.43  |
| 7380.0              | 7410.0      | 6.38                                                  | 5.71  | 5.45  |
| 7540.0              | 7570.0      | 7.39                                                  | 6.48  | 5.98  |
| 7720.0              | 7750.0      | 7.72                                                  | 6.62  | 6.04  |
| 7880.0              | 7910.0      | 8.29                                                  | 6.74  | 6.17  |
| 8060.0              | 8090.0      | 8.76                                                  | 7.42  | 6.61  |
| 8220.0              | 8250.0      | 9.53                                                  | 8.61  | 8.13  |
| 8400.0              | 8430.0      | 14.26                                                 | 12.01 | 11.29 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       |
|---------------------|-------------|--------------------|-------|-------|
|                     |             | @LO (dBm)          |       |       |
|                     |             | +1                 | +4    | +7    |
| 1500.0              | 1530.0      | -10.71             | -6.59 | 1.16  |
| 1680.0              | 1710.0      | -8.42              | -4.38 | 0.25  |
| 1860.0              | 1890.0      | -5.23              | -1.85 | 3.17  |
| 2040.0              | 2070.0      | -2.16              | 3.33  | 9.31  |
| 2220.0              | 2250.0      | 4.98               | 7.83  | 11.00 |
| 2400.0              | 2430.0      | 9.71               | 9.67  | 10.60 |
| 2580.0              | 2610.0      | 16.16              | 10.40 | 9.85  |
| 2760.0              | 2790.0      | 13.41              | 10.85 | 11.32 |
| 2940.0              | 2970.0      | 10.38              | 14.70 | 11.78 |
| 3120.0              | 3150.0      | 15.51              | 15.77 | 14.94 |
| 3300.0              | 3330.0      | 19.91              | 16.13 | 14.82 |
| 3480.0              | 3510.0      | 13.33              | 10.51 | 10.73 |
| 3660.0              | 3690.0      | 8.85               | 10.13 | 12.53 |
| 3840.0              | 3870.0      | 10.02              | 13.96 | 17.16 |
| 4020.0              | 4050.0      | 12.74              | 17.17 | 20.91 |
| 4200.0              | 4230.0      | 11.31              | 11.55 | 12.81 |
| 4380.0              | 4410.0      | 11.14              | 14.56 | 13.46 |
| 4560.0              | 4590.0      | 12.45              | 14.19 | 14.53 |
| 4740.0              | 4770.0      | 11.78              | 12.87 | 13.46 |
| 4920.0              | 4950.0      | 12.24              | 11.33 | 10.60 |
| 5100.0              | 5130.0      | 8.16               | 9.01  | 9.45  |
| 5280.0              | 5310.0      | 6.68               | 8.16  | 9.42  |
| 5460.0              | 5490.0      | 5.87               | 6.97  | 8.93  |
| 5640.0              | 5670.0      | 5.57               | 6.88  | 8.20  |
| 5820.0              | 5850.0      | 7.82               | 7.48  | 8.22  |
| 6000.0              | 6030.0      | 6.83               | 8.35  | 8.63  |
| 6180.0              | 6210.0      | 7.61               | 9.40  | 9.71  |
| 6360.0              | 6390.0      | 9.89               | 11.69 | 11.63 |
| 6520.0              | 6550.0      | 8.86               | 10.30 | 10.97 |
| 6700.0              | 6730.0      | 8.17               | 9.74  | 11.13 |
| 6860.0              | 6890.0      | 9.19               | 12.73 | 14.41 |
| 7040.0              | 7070.0      | 9.81               | 11.08 | 12.21 |
| 7200.0              | 7230.0      | 10.14              | 10.32 | 11.61 |
| 7380.0              | 7410.0      | 10.69              | 12.51 | 11.79 |
| 7540.0              | 7570.0      | 20.31              | 15.26 | 12.53 |
| 7720.0              | 7750.0      | 6.91               | 8.96  | 9.44  |
| 7880.0              | 7910.0      | 4.84               | 7.52  | 8.43  |
| 8060.0              | 8090.0      | 3.37               | 4.62  | 5.69  |
| 8220.0              | 8250.0      | 0.16               | 2.09  | 6.79  |
| 8400.0              | 8430.0      | -1.09              | 4.61  | 11.10 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+1dBm<br>(dB) |       |      |
|---------------------|-------------|-------------------------------------|-------|------|
|                     |             | @LO (dBm)                           |       |      |
|                     |             | +1                                  | +4    | +7   |
| 1500.0              | 1530.0      | -7.98                               | -3.12 | 1.06 |
| 1680.0              | 1710.0      | -2.76                               | 0.12  | 2.04 |
| 1860.0              | 1890.0      | -0.03                               | 1.46  | 1.81 |
| 2040.0              | 2070.0      | 0.02                                | 1.34  | 1.57 |
| 2220.0              | 2250.0      | 1.71                                | 1.79  | 1.58 |
| 2400.0              | 2430.0      | 1.93                                | 1.57  | 1.25 |
| 2580.0              | 2610.0      | 1.49                                | 1.09  | 0.87 |
| 2760.0              | 2790.0      | 1.06                                | 0.74  | 0.65 |
| 2940.0              | 2970.0      | 1.04                                | 0.74  | 0.56 |
| 3120.0              | 3150.0      | 0.92                                | 0.61  | 0.47 |
| 3300.0              | 3330.0      | 0.84                                | 0.58  | 0.45 |
| 3480.0              | 3510.0      | 0.87                                | 0.63  | 0.45 |
| 3660.0              | 3690.0      | 1.06                                | 0.57  | 0.27 |
| 3840.0              | 3870.0      | 1.09                                | 0.46  | 0.23 |
| 4020.0              | 4050.0      | 1.08                                | 0.48  | 0.27 |
| 4200.0              | 4230.0      | 1.06                                | 0.65  | 0.40 |
| 4380.0              | 4410.0      | 0.93                                | 0.63  | 0.47 |
| 4560.0              | 4590.0      | 0.99                                | 0.61  | 0.41 |
| 4740.0              | 4770.0      | 1.15                                | 0.73  | 0.50 |
| 4920.0              | 4950.0      | 1.28                                | 0.97  | 0.78 |
| 5100.0              | 5130.0      | 1.41                                | 1.16  | 0.94 |
| 5280.0              | 5310.0      | 1.39                                | 1.21  | 1.06 |
| 5460.0              | 5490.0      | 1.61                                | 1.22  | 1.03 |
| 5640.0              | 5670.0      | 1.73                                | 1.16  | 0.94 |
| 5820.0              | 5850.0      | 1.82                                | 1.16  | 0.91 |
| 6000.0              | 6030.0      | 1.33                                | 0.85  | 0.69 |
| 6180.0              | 6210.0      | 1.34                                | 0.81  | 0.63 |
| 6360.0              | 6390.0      | 1.25                                | 0.75  | 0.58 |
| 6520.0              | 6550.0      | 1.23                                | 0.77  | 0.64 |
| 6700.0              | 6730.0      | 1.12                                | 0.71  | 0.63 |
| 6860.0              | 6890.0      | 1.16                                | 0.71  | 0.56 |
| 7040.0              | 7070.0      | 1.28                                | 0.71  | 0.54 |
| 7200.0              | 7230.0      | 1.23                                | 0.71  | 0.49 |
| 7380.0              | 7410.0      | 1.53                                | 0.82  | 0.52 |
| 7540.0              | 7570.0      | 1.42                                | 1.07  | 0.94 |
| 7720.0              | 7750.0      | 1.85                                | 1.46  | 1.50 |
| 7880.0              | 7910.0      | 2.18                                | 1.69  | 1.64 |
| 8060.0              | 8090.0      | 2.50                                | 1.81  | 1.72 |
| 8220.0              | 8250.0      | 3.59                                | 2.28  | 1.46 |
| 8400.0              | 8430.0      | 1.13                                | 1.27  | 0.52 |

REV. X3

SIM-73L+

101028

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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant  
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The Design Engineers Search Engine finds the model you need, instantly • For detailed performance specs & shopping online see



## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=4700MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=2390MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=7010MHz<br>(dB) |
|----------------------|-------------|----------------------------------------------------------------|----------------------|-------------|----------------------------------------------------------------|----------------------|-------------|----------------------------------------------------------------|
|                      |             | @LO (dBm)                                                      |                      |             | @LO (dBm)                                                      |                      |             | @LO (dBm)                                                      |
|                      |             | +4                                                             |                      |             | +4                                                             |                      |             | +4                                                             |
| 2900.0               | 1800.0      | 17.64                                                          | 10.0                 | 2400.0      | 7.13                                                           | 3710.0               | 3300.0      | 10.53                                                          |
| 2754.6               | 1945.4      | 11.73                                                          | 110.0                | 2500.0      | 6.81                                                           | 3610.0               | 3400.0      | 9.60                                                           |
| 2609.2               | 2090.8      | 9.16                                                           | 210.0                | 2600.0      | 6.60                                                           | 3510.0               | 3500.0      | 8.99                                                           |
| 2463.8               | 2236.2      | 7.36                                                           | 310.0                | 2700.0      | 6.38                                                           | 3410.0               | 3600.0      | 8.52                                                           |
| 2318.4               | 2381.6      | 6.72                                                           | 410.0                | 2800.0      | 6.28                                                           | 3310.0               | 3700.0      | 8.15                                                           |
| 2173.0               | 2527.0      | 6.64                                                           | 510.0                | 2900.0      | 6.15                                                           | 3210.0               | 3800.0      | 7.95                                                           |
| 2027.5               | 2672.5      | 7.06                                                           | 610.0                | 3000.0      | 6.02                                                           | 3110.0               | 3900.0      | 7.83                                                           |
| 1882.1               | 2817.9      | 7.70                                                           | 710.0                | 3100.0      | 5.96                                                           | 3010.0               | 4000.0      | 7.63                                                           |
| 1736.7               | 2963.3      | 8.00                                                           | 810.0                | 3200.0      | 6.05                                                           | 2910.0               | 4100.0      | 7.62                                                           |
| 1591.3               | 3108.7      | 8.60                                                           | 910.0                | 3300.0      | 6.38                                                           | 2810.0               | 4200.0      | 7.73                                                           |
| 1445.9               | 3254.1      | 9.10                                                           | 1010.0               | 3400.0      | 6.81                                                           | 2710.0               | 4300.0      | 7.96                                                           |
| 1300.5               | 3399.5      | 8.70                                                           | 1110.0               | 3500.0      | 7.19                                                           | 2610.0               | 4400.0      | 8.11                                                           |
| 1155.1               | 3544.9      | 8.38                                                           | 1210.0               | 3600.0      | 7.21                                                           | 2510.0               | 4500.0      | 8.38                                                           |
| 1009.7               | 3690.3      | 7.68                                                           | 1310.0               | 3700.0      | 7.21                                                           | 2410.0               | 4600.0      | 8.32                                                           |
| 864.3                | 3835.7      | 7.33                                                           | 1410.0               | 3800.0      | 7.49                                                           | 2310.0               | 4700.0      | 8.12                                                           |
| 718.9                | 3981.1      | 6.75                                                           | 1510.0               | 3900.0      | 7.66                                                           | 2210.0               | 4800.0      | 7.86                                                           |
| 573.5                | 4126.5      | 6.02                                                           | 1610.0               | 4000.0      | 7.56                                                           | 2110.0               | 4900.0      | 7.82                                                           |
| 428.1                | 4271.9      | 5.64                                                           | 1710.0               | 4100.0      | 7.43                                                           | 2010.0               | 5000.0      | 7.88                                                           |
| 282.6                | 4417.4      | 5.69                                                           | 1810.0               | 4200.0      | 7.54                                                           | 1910.0               | 5100.0      | 7.80                                                           |
| 137.2                | 4562.8      | 6.03                                                           | 1910.0               | 4300.0      | 7.61                                                           | 1810.0               | 5200.0      | 7.77                                                           |
| 10.0                 | 4710.0      | 6.48                                                           | 2010.0               | 4400.0      | 7.72                                                           | 1730.0               | 5280.0      | 7.78                                                           |
| 184.5                | 4884.5      | 6.61                                                           | 2110.0               | 4500.0      | 7.88                                                           | 1630.0               | 5380.0      | 7.91                                                           |
| 359.0                | 5059.0      | 7.21                                                           | 2210.0               | 4600.0      | 7.92                                                           | 1550.0               | 5460.0      | 7.90                                                           |
| 533.5                | 5233.5      | 7.46                                                           | 2310.0               | 4700.0      | 8.04                                                           | 1450.0               | 5560.0      | 7.74                                                           |
| 708.0                | 5408.0      | 7.92                                                           | 2410.0               | 4800.0      | 8.20                                                           | 1370.0               | 5640.0      | 7.55                                                           |
| 904.3                | 5604.3      | 8.17                                                           | 2510.0               | 4900.0      | 8.45                                                           | 1270.0               | 5740.0      | 7.35                                                           |
| 1078.8               | 5778.8      | 8.47                                                           | 2610.0               | 5000.0      | 8.62                                                           | 1190.0               | 5820.0      | 7.18                                                           |
| 1275.1               | 5975.1      | 8.73                                                           | 2710.0               | 5100.0      | 8.61                                                           | 1090.0               | 5920.0      | 7.14                                                           |
| 1449.6               | 6149.6      | 9.10                                                           | 2810.0               | 5200.0      | 8.54                                                           | 1010.0               | 6000.0      | 7.03                                                           |
| 1645.9               | 6345.9      | 9.39                                                           | 2910.0               | 5300.0      | 8.51                                                           | 910.0                | 6100.0      | 6.93                                                           |
| 1820.4               | 6520.4      | 9.52                                                           | 2990.0               | 5380.0      | 8.61                                                           | 830.0                | 6180.0      | 6.88                                                           |
| 2016.7               | 6716.8      | 9.48                                                           | 3090.0               | 5480.0      | 8.47                                                           | 730.0                | 6280.0      | 6.61                                                           |
| 2191.3               | 6891.3      | 8.91                                                           | 3170.0               | 5560.0      | 8.63                                                           | 650.0                | 6360.0      | 6.47                                                           |
| 2387.6               | 7087.6      | 8.47                                                           | 3270.0               | 5660.0      | 8.78                                                           | 550.0                | 6460.0      | 6.26                                                           |
| 2562.1               | 7262.1      | 8.35                                                           | 3350.0               | 5740.0      | 8.63                                                           | 470.0                | 6540.0      | 6.15                                                           |
| 2758.4               | 7458.4      | 8.22                                                           | 3450.0               | 5840.0      | 8.55                                                           | 370.0                | 6640.0      | 6.01                                                           |
| 2932.9               | 7632.9      | 8.05                                                           | 3530.0               | 5920.0      | 8.63                                                           | 290.0                | 6720.0      | 5.86                                                           |
| 3129.2               | 7829.2      | 8.13                                                           | 3630.0               | 6020.0      | 9.07                                                           | 190.0                | 6820.0      | 5.77                                                           |
| 3303.7               | 8003.7      | 9.35                                                           | 3710.0               | 6100.0      | 9.51                                                           | 110.0                | 6900.0      | 5.77                                                           |
| 3500.0               | 8200.0      | 12.78                                                          | 3810.0               | 6200.0      | 10.30                                                          | 10.0                 | 7000.0      | 6.00                                                           |

# Frequency Mixer

**SIM-73L+**

## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +1                      | +4    | +7    | +1                      | +4    | +7    |
| 1530.0      | 48.70                   | 51.08 | 44.37 | 21.99                   | 22.04 | 22.26 |
| 1710.0      | 45.59                   | 47.46 | 42.82 | 19.91                   | 20.03 | 20.42 |
| 1890.0      | 41.42                   | 38.37 | 33.88 | 17.91                   | 18.13 | 19.20 |
| 2070.0      | 36.45                   | 33.45 | 32.28 | 16.24                   | 17.28 | 19.20 |
| 2250.0      | 35.30                   | 34.96 | 35.08 | 15.78                   | 17.74 | 20.01 |
| 2430.0      | 36.16                   | 37.19 | 37.46 | 16.42                   | 18.86 | 21.33 |
| 2610.0      | 35.85                   | 36.89 | 36.01 | 17.60                   | 20.25 | 22.52 |
| 2790.0      | 34.05                   | 32.88 | 31.70 | 19.36                   | 22.00 | 23.35 |
| 2970.0      | 32.83                   | 31.54 | 29.86 | 20.59                   | 22.88 | 23.90 |
| 3150.0      | 32.74                   | 30.73 | 28.85 | 22.56                   | 24.42 | 24.03 |
| 3330.0      | 32.67                   | 30.63 | 29.10 | 26.08                   | 26.60 | 25.18 |
| 3510.0      | 32.19                   | 30.71 | 29.07 | 30.23                   | 27.68 | 24.95 |
| 3690.0      | 32.11                   | 30.65 | 29.05 | 32.63                   | 28.48 | 25.90 |
| 3870.0      | 32.55                   | 31.08 | 29.71 | 33.24                   | 30.64 | 28.79 |
| 4050.0      | 32.37                   | 31.09 | 29.96 | 30.78                   | 31.61 | 32.16 |
| 4230.0      | 29.56                   | 29.07 | 28.54 | 27.65                   | 28.53 | 29.14 |
| 4410.0      | 28.31                   | 28.13 | 27.57 | 23.92                   | 22.97 | 22.11 |
| 4590.0      | 27.25                   | 26.73 | 26.47 | 19.19                   | 17.98 | 17.38 |
| 4750.0      | 27.35                   | 27.05 | 26.58 | 16.30                   | 15.61 | 14.93 |
| 4930.0      | 26.81                   | 26.30 | 26.09 | 14.82                   | 14.36 | 14.13 |
| 5090.0      | 26.05                   | 25.52 | 25.20 | 14.61                   | 14.52 | 14.45 |
| 5270.0      | 25.02                   | 24.55 | 24.28 | 14.86                   | 15.03 | 15.19 |
| 5430.0      | 24.56                   | 23.92 | 23.23 | 15.42                   | 15.93 | 16.13 |
| 5610.0      | 24.49                   | 23.41 | 22.45 | 16.43                   | 17.05 | 17.50 |
| 5770.0      | 24.19                   | 23.16 | 21.74 | 17.30                   | 18.28 | 18.97 |
| 5950.0      | 23.40                   | 22.25 | 21.19 | 18.66                   | 19.82 | 21.01 |
| 6110.0      | 22.69                   | 21.45 | 20.24 | 20.36                   | 21.83 | 23.42 |
| 6290.0      | 21.82                   | 20.73 | 19.57 | 22.51                   | 24.30 | 26.56 |
| 6450.0      | 21.03                   | 20.25 | 19.25 | 24.62                   | 25.44 | 26.43 |
| 6630.0      | 20.05                   | 19.71 | 18.82 | 27.64                   | 26.63 | 25.64 |
| 6790.0      | 19.35                   | 19.42 | 18.91 | 28.30                   | 26.63 | 25.56 |
| 6970.0      | 18.47                   | 18.84 | 18.87 | 26.69                   | 26.76 | 26.92 |
| 7130.0      | 17.38                   | 17.99 | 18.07 | 25.17                   | 26.11 | 26.68 |
| 7310.0      | 17.07                   | 17.79 | 17.98 | 23.01                   | 23.38 | 23.14 |
| 7470.0      | 17.14                   | 18.02 | 18.75 | 20.29                   | 20.24 | 20.11 |
| 7650.0      | 17.09                   | 17.90 | 18.70 | 18.30                   | 18.24 | 18.45 |
| 7810.0      | 16.89                   | 17.68 | 18.45 | 17.53                   | 16.67 | 16.81 |
| 7990.0      | 17.72                   | 18.27 | 19.07 | 14.62                   | 12.65 | 12.57 |
| 8150.0      | 19.34                   | 19.99 | 20.80 | 11.53                   | 9.99  | 9.62  |
| 8330.0      | 22.00                   | 22.09 | 21.81 | 8.80                    | 8.24  | 8.05  |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +1                      | +4    | +7    |
| 1500.0              | 1530.0      | 21.29                   | 22.33 | 27.77 |
| 1680.0              | 1710.0      | 20.28                   | 20.86 | 19.61 |
| 1860.0              | 1890.0      | 19.77                   | 16.73 | 12.11 |
| 2040.0              | 2070.0      | 17.47                   | 12.99 | 11.01 |
| 2220.0              | 2250.0      | 15.88                   | 13.06 | 11.77 |
| 2400.0              | 2430.0      | 17.02                   | 15.22 | 14.23 |
| 2580.0              | 2610.0      | 19.14                   | 18.14 | 17.65 |
| 2760.0              | 2790.0      | 20.71                   | 19.67 | 19.20 |
| 2940.0              | 2970.0      | 21.17                   | 20.86 | 20.57 |
| 3120.0              | 3150.0      | 21.68                   | 21.63 | 21.47 |
| 3300.0              | 3330.0      | 21.43                   | 21.23 | 20.98 |
| 3480.0              | 3510.0      | 20.78                   | 20.49 | 19.97 |
| 3660.0              | 3690.0      | 20.77                   | 20.46 | 20.03 |
| 3840.0              | 3870.0      | 20.92                   | 20.68 | 20.49 |
| 4020.0              | 4050.0      | 21.26                   | 20.93 | 20.69 |
| 4200.0              | 4230.0      | 23.59                   | 23.27 | 22.93 |
| 4380.0              | 4410.0      | 27.92                   | 27.37 | 26.72 |
| 4560.0              | 4590.0      | 31.13                   | 30.20 | 29.49 |
| 4720.0              | 4750.0      | 38.33                   | 37.59 | 37.15 |
| 4900.0              | 4930.0      | 32.16                   | 31.77 | 31.28 |
| 5060.0              | 5090.0      | 28.71                   | 28.47 | 28.30 |
| 5240.0              | 5270.0      | 25.87                   | 25.45 | 25.27 |
| 5400.0              | 5430.0      | 24.36                   | 23.97 | 23.64 |
| 5580.0              | 5610.0      | 23.61                   | 23.01 | 22.65 |
| 5740.0              | 5770.0      | 23.48                   | 22.60 | 22.21 |
| 5920.0              | 5950.0      | 24.60                   | 23.09 | 22.00 |
| 6080.0              | 6110.0      | 24.39                   | 23.39 | 22.45 |
| 6260.0              | 6290.0      | 24.13                   | 22.54 | 21.49 |
| 6420.0              | 6450.0      | 26.55                   | 24.13 | 22.27 |
| 6600.0              | 6630.0      | 29.11                   | 27.35 | 25.82 |
| 6760.0              | 6790.0      | 31.15                   | 28.51 | 26.85 |
| 6940.0              | 6970.0      | 34.32                   | 31.36 | 29.94 |
| 7100.0              | 7130.0      | 43.17                   | 41.03 | 38.33 |
| 7280.0              | 7310.0      | 35.07                   | 36.98 | 40.47 |
| 7440.0              | 7470.0      | 58.34                   | 35.77 | 31.28 |
| 7620.0              | 7650.0      | 25.68                   | 25.84 | 26.68 |
| 7780.0              | 7810.0      | 26.04                   | 28.06 | 30.61 |
| 7960.0              | 7990.0      | 23.60                   | 26.63 | 31.26 |
| 8120.0              | 8150.0      | 21.90                   | 22.76 | 28.41 |
| 8300.0              | 8330.0      | 21.58                   | 25.42 | 30.17 |

# Frequency Mixer

**SIM-73L+**

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF VSWR<br>(:1) |      |      | LO<br>(MHz) | LO VSWR<br>(:1) |       |       |        | IF<br>(OUT)<br>(MHz) | IF VSWR<br>@LO=7000MHz<br>(:1) |      |  |  |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|-------|-------|--------|----------------------|--------------------------------|------|--|--|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |       |       |        |                      | @LO (dBm)                      |      |  |  |
|                     |             | +1              | +4   | +7   |             | +1              | +4    | +7    | +1     |                      | +4                             | +7   |  |  |
| 1500.0              | 1530.0      | 9.79            | 6.78 | 3.76 | 1530.0      | 30.49           | 29.96 | 26.74 | 10.0   | 1.14                 | 1.10                           | 1.25 |  |  |
| 1680.0              | 1710.0      | 5.91            | 3.94 | 2.51 | 1710.0      | 25.56           | 24.83 | 20.70 | 89.8   | 1.18                 | 1.14                           | 1.26 |  |  |
| 1860.0              | 1890.0      | 4.41            | 2.87 | 1.88 | 1890.0      | 20.70           | 17.75 | 11.53 | 169.5  | 1.27                 | 1.19                           | 1.28 |  |  |
| 2040.0              | 2070.0      | 3.99            | 2.59 | 2.01 | 2070.0      | 13.60           | 8.51  | 6.11  | 269.3  | 1.38                 | 1.27                           | 1.32 |  |  |
| 2220.0              | 2250.0      | 3.35            | 2.69 | 2.34 | 2250.0      | 6.42            | 4.44  | 4.07  | 349.0  | 1.48                 | 1.35                           | 1.36 |  |  |
| 2400.0              | 2430.0      | 3.31            | 3.02 | 2.84 | 2430.0      | 3.54            | 2.78  | 2.86  | 448.7  | 1.64                 | 1.47                           | 1.44 |  |  |
| 2580.0              | 2610.0      | 3.29            | 3.07 | 3.00 | 2610.0      | 2.53            | 2.03  | 2.23  | 528.5  | 1.80                 | 1.59                           | 1.53 |  |  |
| 2760.0              | 2790.0      | 3.48            | 3.13 | 2.97 | 2790.0      | 2.34            | 1.78  | 1.94  | 628.2  | 1.98                 | 1.74                           | 1.65 |  |  |
| 2940.0              | 2970.0      | 3.71            | 3.30 | 3.04 | 2970.0      | 2.45            | 1.84  | 1.93  | 708.0  | 2.15                 | 1.86                           | 1.75 |  |  |
| 3120.0              | 3150.0      | 3.87            | 3.39 | 3.07 | 3150.0      | 2.47            | 1.90  | 2.02  | 807.7  | 2.41                 | 2.07                           | 1.92 |  |  |
| 3300.0              | 3330.0      | 3.94            | 3.45 | 3.11 | 3330.0      | 2.40            | 1.99  | 2.19  | 887.5  | 2.58                 | 2.20                           | 2.03 |  |  |
| 3480.0              | 3510.0      | 3.37            | 2.87 | 2.49 | 3510.0      | 2.39            | 2.17  | 2.40  | 987.2  | 2.90                 | 2.45                           | 2.24 |  |  |
| 3660.0              | 3690.0      | 2.95            | 2.52 | 2.27 | 3690.0      | 2.32            | 2.11  | 2.37  | 1067.0 | 3.15                 | 2.64                           | 2.39 |  |  |
| 3840.0              | 3870.0      | 2.96            | 2.65 | 2.44 | 3870.0      | 1.95            | 1.94  | 2.36  | 1166.7 | 3.46                 | 2.88                           | 2.60 |  |  |
| 4020.0              | 4050.0      | 2.97            | 2.66 | 2.46 | 4050.0      | 1.61            | 1.88  | 2.45  | 1246.5 | 3.66                 | 3.05                           | 2.74 |  |  |
| 4200.0              | 4230.0      | 3.43            | 3.07 | 2.82 | 4230.0      | 1.37            | 1.84  | 2.52  | 1346.2 | 3.92                 | 3.27                           | 2.92 |  |  |
| 4380.0              | 4410.0      | 3.31            | 2.92 | 2.64 | 4410.0      | 1.32            | 1.91  | 2.63  | 1425.9 | 4.04                 | 3.38                           | 3.04 |  |  |
| 4560.0              | 4590.0      | 2.77            | 2.44 | 2.21 | 4590.0      | 1.44            | 1.98  | 2.66  | 1525.7 | 4.20                 | 3.52                           | 3.17 |  |  |
| 4720.0              | 4750.0      | 3.13            | 2.80 | 2.57 | 4750.0      | 1.64            | 2.02  | 2.61  | 1605.4 | 4.37                 | 3.67                           | 3.31 |  |  |
| 4900.0              | 4930.0      | 3.49            | 3.13 | 2.86 | 4930.0      | 2.01            | 2.21  | 2.67  | 1705.1 | 4.46                 | 3.77                           | 3.41 |  |  |
| 5060.0              | 5090.0      | 3.52            | 3.13 | 2.87 | 5090.0      | 2.36            | 2.37  | 2.74  | 1784.9 | 4.55                 | 3.84                           | 3.48 |  |  |
| 5240.0              | 5270.0      | 3.25            | 2.83 | 2.58 | 5270.0      | 2.92            | 2.59  | 2.73  | 1884.6 | 4.59                 | 3.86                           | 3.50 |  |  |
| 5400.0              | 5430.0      | 3.05            | 2.60 | 2.35 | 5430.0      | 3.46            | 2.86  | 2.83  | 1964.4 | 4.66                 | 3.92                           | 3.53 |  |  |
| 5580.0              | 5610.0      | 2.86            | 2.42 | 2.17 | 5610.0      | 4.02            | 3.05  | 2.79  | 2064.1 | 4.63                 | 3.90                           | 3.50 |  |  |
| 5740.0              | 5770.0      | 2.82            | 2.35 | 2.08 | 5770.0      | 4.52            | 3.13  | 2.65  | 2143.9 | 4.64                 | 3.90                           | 3.51 |  |  |
| 5920.0              | 5950.0      | 3.00            | 2.42 | 2.09 | 5950.0      | 4.56            | 2.95  | 2.34  | 2243.6 | 4.64                 | 3.91                           | 3.51 |  |  |
| 6080.0              | 6110.0      | 2.61            | 2.19 | 1.89 | 6110.0      | 4.16            | 2.65  | 2.05  | 2323.4 | 4.55                 | 3.82                           | 3.43 |  |  |
| 6260.0              | 6290.0      | 2.63            | 2.25 | 1.97 | 6290.0      | 3.52            | 2.19  | 1.64  | 2423.1 | 4.47                 | 3.76                           | 3.38 |  |  |
| 6420.0              | 6450.0      | 2.48            | 2.13 | 1.87 | 6450.0      | 3.04            | 1.85  | 1.32  | 2502.9 | 4.39                 | 3.68                           | 3.31 |  |  |
| 6600.0              | 6630.0      | 2.63            | 2.30 | 2.05 | 6630.0      | 2.30            | 1.45  | 1.03  | 2602.6 | 4.19                 | 3.52                           | 3.18 |  |  |
| 6760.0              | 6790.0      | 2.34            | 2.05 | 1.87 | 6790.0      | 1.90            | 1.24  | 1.20  | 2682.3 | 4.02                 | 3.38                           | 3.08 |  |  |
| 6940.0              | 6970.0      | 2.17            | 1.86 | 1.71 | 6970.0      | 1.58            | 1.03  | 1.39  | 2782.1 | 3.83                 | 3.26                           | 3.00 |  |  |
| 7100.0              | 7130.0      | 2.29            | 2.02 | 1.90 | 7130.0      | 1.42            | 1.26  | 1.62  | 2861.8 | 3.62                 | 3.12                           | 2.90 |  |  |
| 7280.0              | 7310.0      | 2.06            | 1.77 | 1.59 | 7310.0      | 1.67            | 1.64  | 1.93  | 2961.5 | 3.38                 | 3.00                           | 2.85 |  |  |
| 7440.0              | 7470.0      | 2.11            | 1.75 | 1.51 | 7470.0      | 2.06            | 2.01  | 2.28  | 3041.3 | 3.42                 | 3.08                           | 2.97 |  |  |
| 7620.0              | 7650.0      | 2.47            | 2.13 | 1.87 | 7650.0      | 2.60            | 2.38  | 2.55  | 3141.0 | 3.20                 | 3.00                           | 2.95 |  |  |
| 7780.0              | 7810.0      | 2.97            | 2.54 | 2.26 | 7810.0      | 3.33            | 2.78  | 2.78  | 3220.8 | 3.12                 | 3.00                           | 2.99 |  |  |
| 7960.0              | 7990.0      | 2.74            | 2.32 | 2.09 | 7990.0      | 3.68            | 3.02  | 2.80  | 3320.5 | 3.07                 | 3.07                           | 3.14 |  |  |
| 8120.0              | 8150.0      | 2.93            | 2.46 | 2.01 | 8150.0      | 3.51            | 2.92  | 2.73  | 3400.3 | 3.14                 | 3.25                           | 3.42 |  |  |
| 8300.0              | 8330.0      | 3.03            | 2.42 | 2.36 | 8330.0      | 2.87            | 2.50  | 2.53  | 3500.0 | 4.43                 | 5.49                           | 2.76 |  |  |

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## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | +9  | 6   | 17  | 42  | 21  | --- | --- | --- | --- | --- |
| 1  | -      | 31     | +0  | 45  | 13  | 39  | 55  | 46  | --- | --- | --- | --- |
| 2  | 89     | 56     | 61  | 61  | 56  | 54  | 62  | >70 | 58  | --- | --- | --- |
| 3  | >90    | >70    | 61  | >70 | 64  | >70 | 62  | >70 | >70 | >70 | --- | --- |
| 4  | >90    | >70    | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | --- |
| 5  | >90    | >70    | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 |
| 6  | ---    | ---    | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 |
| 7  | ---    | ---    | --- | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 |
| 8  | ---    | ---    | --- | --- | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 |
| 9  | ---    | ---    | --- | --- | --- | >70 | >70 | >70 | >70 | >70 | >70 | >70 |
| 10 | ---    | ---    | --- | --- | --- | --- | >70 | >70 | >70 | >70 | >70 | >70 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

Test conditions: RF IN: 4700 MHz; -14.00 dBm.  
LO IN: 4730 MHz; +4.00 dBm  
IF OUT: 30 MHz; -20.36 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 1   | 16  | 27  | 52  | 34  | --- | --- | --- | --- | --- |
| 1  | -      | 30     | +0  | 47  | 13  | 42  | 54  | 51  | --- | --- | --- | --- |
| 2  | 72     | 44     | 51  | 47  | 47  | 44  | 56  | 72  | 50  | --- | --- | --- |
| 3  | 75     | 49     | 40  | 64  | 42  | 63  | 42  | 59  | >80 | 64  | --- | --- |
| 4  | >90    | >80    | >80 | 65  | 77  | 64  | 68  | 60  | 73  | >80 | 72  | --- |
| 5  | >90    | >80    | >80 | >80 | 67  | >80 | 71  | >80 | 65  | >80 | >80 | >80 |
| 6  | ---    | ---    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 7  | ---    | ---    | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 8  | ---    | ---    | --- | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 9  | ---    | ---    | --- | --- | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 10 | ---    | ---    | --- | --- | --- | --- | >80 | >80 | >80 | >80 | >80 | >80 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

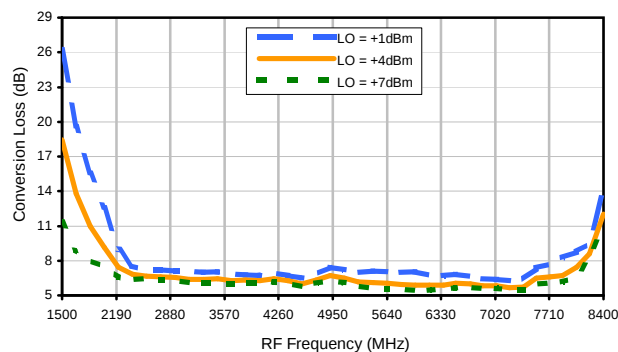
### LO HARMONICS ORDER

Test conditions: RF IN: 4700 MHz; -4.00 dBm.  
LO IN: 4730 MHz; +4.00 dBm  
IF OUT: 30 MHz; -10.36 dBm

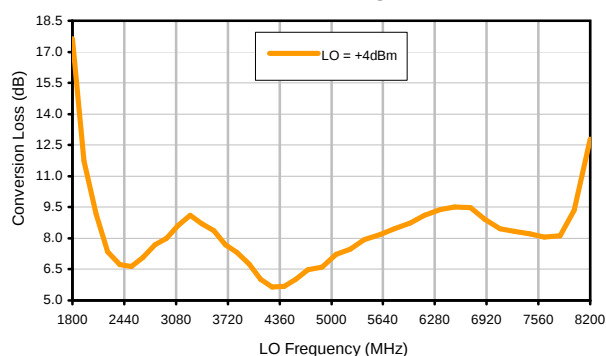
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

## Typical Performance Curves

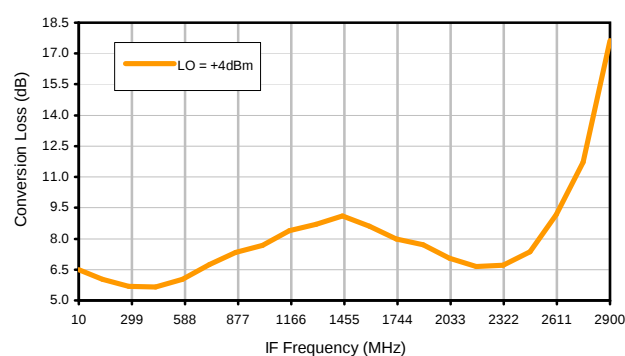
Conversion Loss @ IF=30MHz



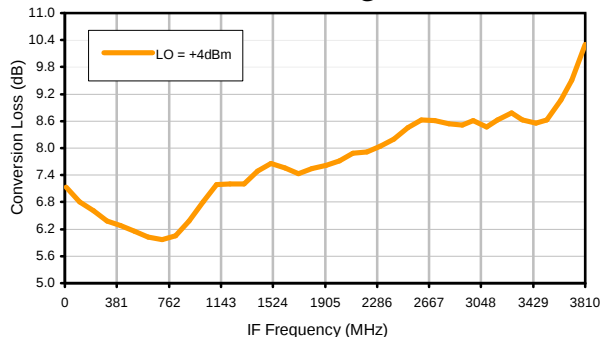
Conversion Loss vs. LO @ RF=4700MHz



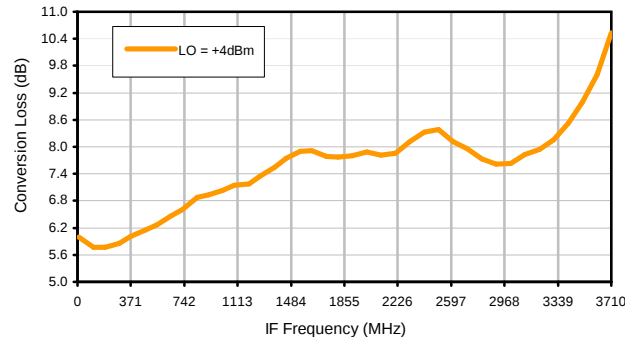
Conversion Loss vs. IF @ RF=4700MHz



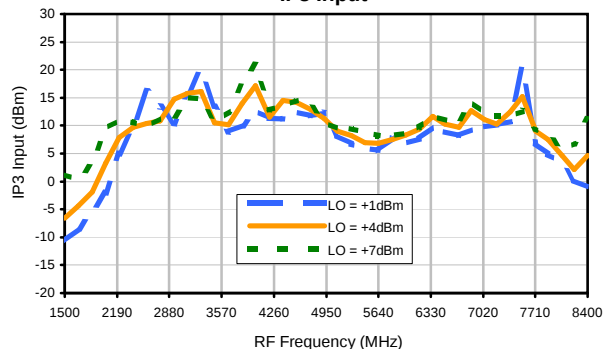
Conversion Loss vs. IF @ RF=2390MHz



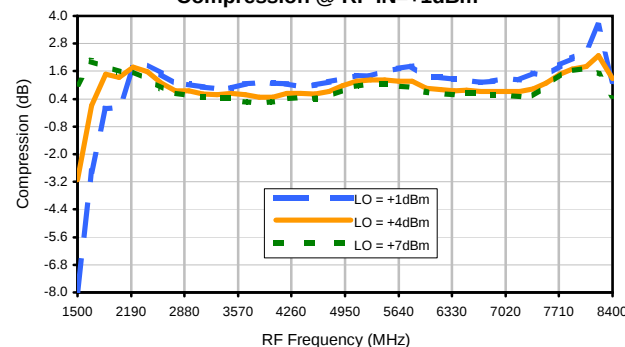
Conversion Loss vs. IF @ RF=7010MHz



IP3 Input

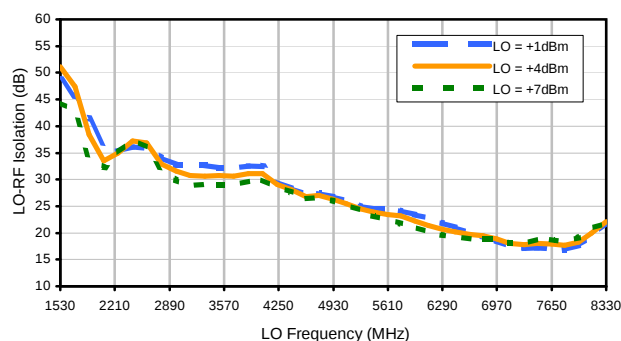


Compression @ RF IN=+1dBm

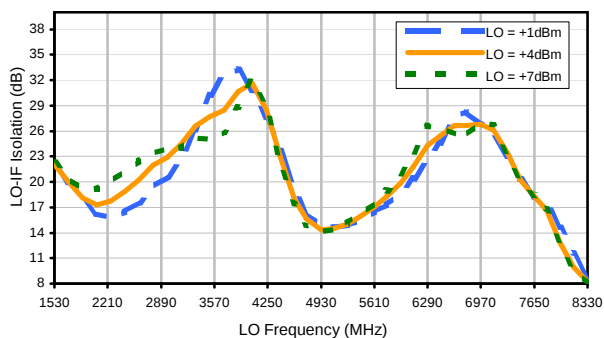


## Typical Performance Curves

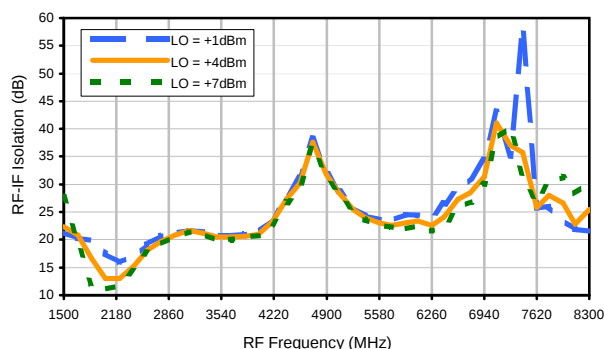
LO-RF Isolation



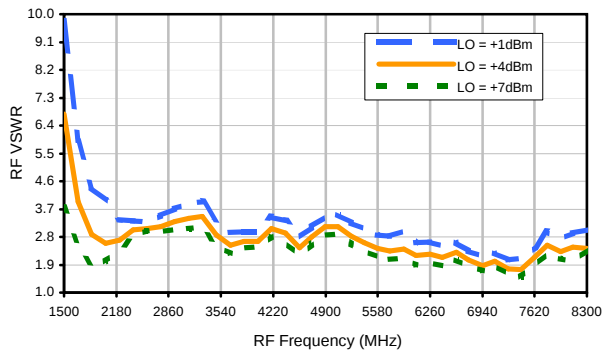
LO-IF Isolation



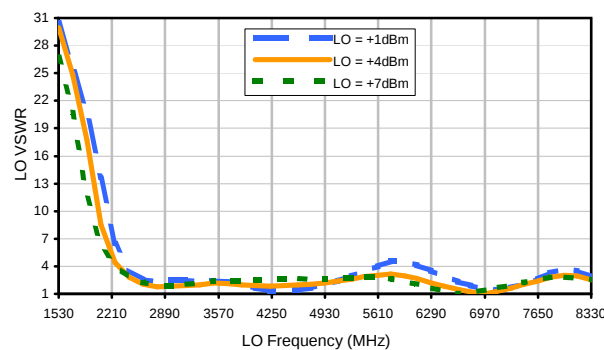
RF-IF Isolation



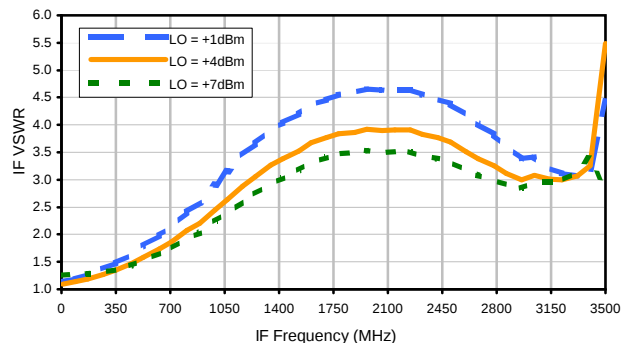
RF VSWR



LO VSWR



IF VSWR



REV. X3

SIM-73L+

101028

Page 2 of 3



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant  
P.O. Box 350166, Brooklyn, New York 11235-0006 (718) 934-4500 Fax (718) 332-4661



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## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
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| 5  | >90    | >70    | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 |
| 6  | ---    | ---    | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 |
| 7  | ---    | ---    | --- | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 |
| 8  | ---    | ---    | --- | --- | >70 | >70 | >70 | >70 | >70 | >70 | >70 | >70 |
| 9  | ---    | ---    | --- | --- | --- | >70 | >70 | >70 | >70 | >70 | >70 | >70 |
| 10 | ---    | ---    | --- | --- | --- | --- | >70 | >70 | >70 | >70 | >70 | >70 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

Test conditions: RF IN: 4700 MHz; -14.00 dBm.  
LO IN: 4730 MHz; +4.00 dBm  
IF OUT: 30 MHz; -20.36 dBm

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| 5  | >90    | >80    | >80 | >80 | 67  | >80 | 71  | >80 | 65  | >80 | >80 | >80 |
| 6  | ---    | ---    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 7  | ---    | ---    | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 8  | ---    | ---    | --- | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 9  | ---    | ---    | --- | --- | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 10 | ---    | ---    | --- | --- | --- | --- | >80 | >80 | >80 | >80 | >80 | >80 |
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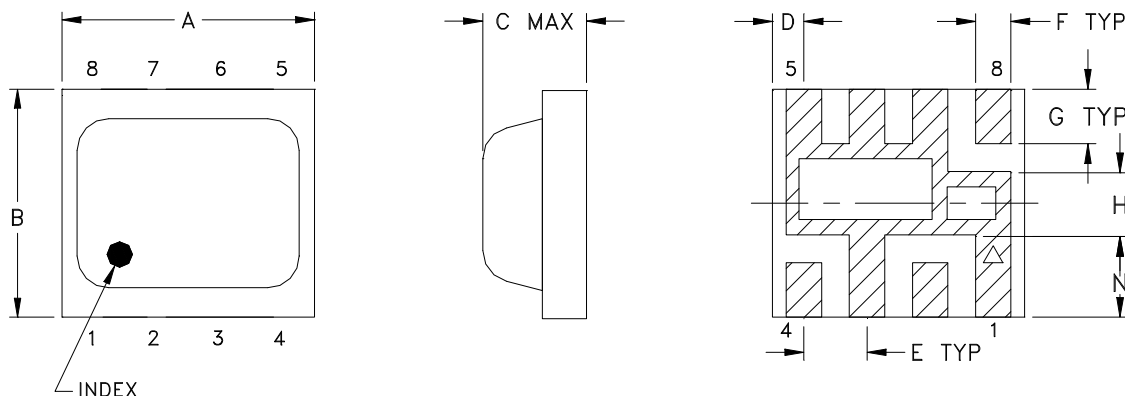
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Test conditions: RF IN: 4700 MHz; -4.00 dBm.  
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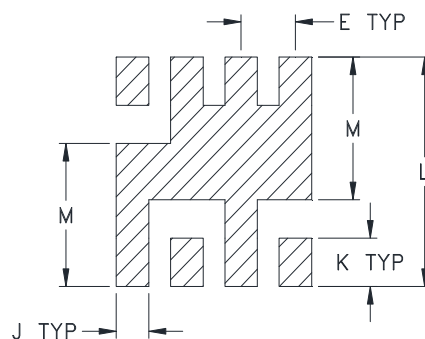
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

## Outline Dimensions

HV1195



## PCB Metal Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm.002$

| CASE#  | A               | B               | C               | D               | E               | F               | G               | H               | J               | K               | L               | M               | N               |
|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| HV1195 | 0.200<br>(5.08) | 0.180<br>(4.57) | 0.087<br>(2.21) | 0.025<br>(0.64) | 0.050<br>(1.27) | 0.028<br>(0.71) | 0.043<br>(1.09) | 0.050<br>(1.27) | 0.030<br>(0.76) | 0.043<br>(1.09) | 0.204<br>(5.18) | 0.127<br>(3.23) | 0.065<br>(1.65) |

| CASE#  | WT, GRAM |
|--------|----------|
| HV1195 | .08      |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .01$ ; 3 Pl.  $\pm .005$

### Notes:

1. Case material: Plastic encapsulation on Ceramic base.
2. Termination finish: Palladium Silver.



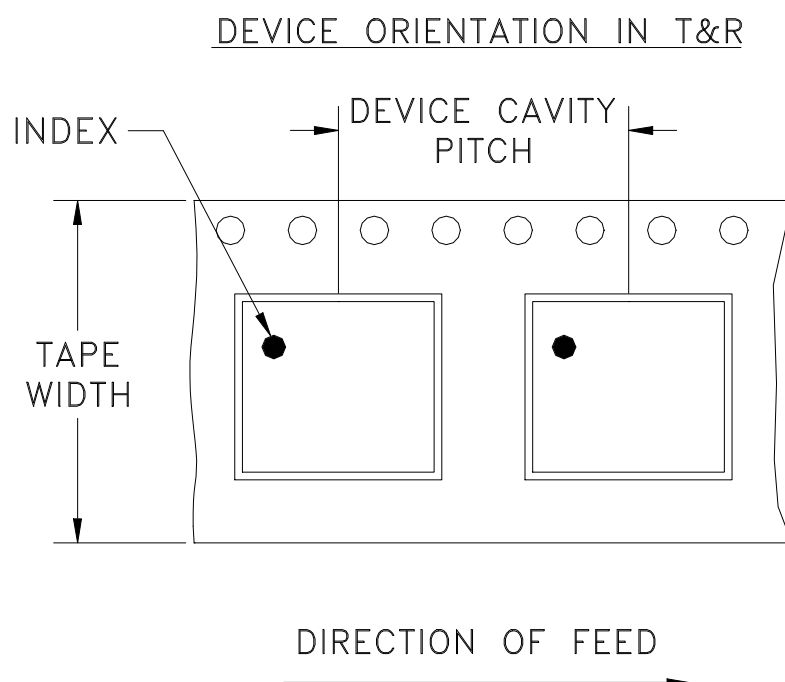
P.O. Box 350186, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F82



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel |
|-------------------|----------------------------|----------------------|------------------|
| 12                | 8                          | 7                    | 500              |

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



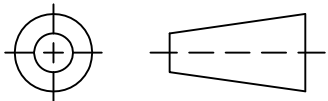
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*Mini-Circuits ISO 9001 & ISO 14001 Certified*

## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION                         | DATE     | DR  | AUTH |
|-----|---------|-------------------------------------|----------|-----|------|
| OR  | M104559 | NEW RELEASE                         | 04/11/06 | MMG | DJ   |
| A   | M109513 | MODIFIED SMOBC AREA, REMOVED NOTE 3 | 01/31/07 | PW  | DJ   |
| B   | M176274 | MODIFIED CASE STYLE                 | 09/23/19 | ITG | RB   |

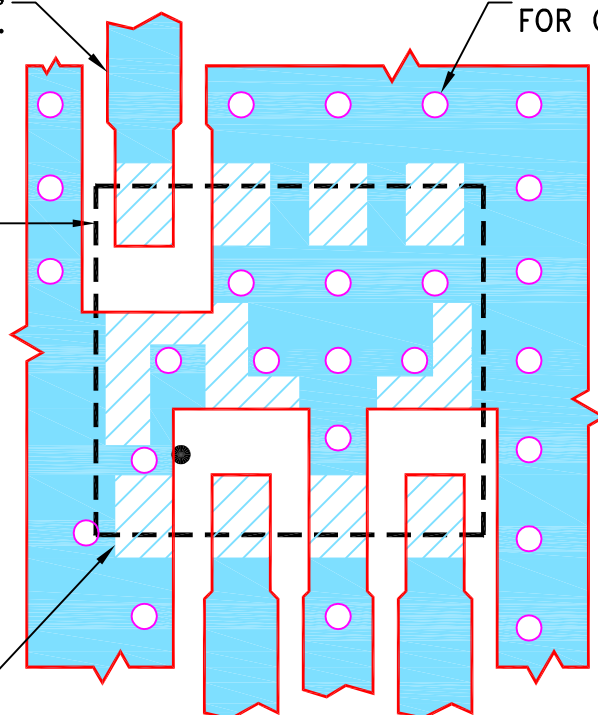
### SUGGESTED MOUNTING CONFIGURATION FOR HV1195 CASE STYLE, "rh" PIN CONNECTION

COPLANAR WAVEGUIDE  
.038 LINE WIDTH,  
.013 GAP, 2 PL.

Ø.013 PTH  
FOR GROUND

PACKAGE  
OUTLINE

PIN 1

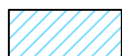


## NOTES:

1. TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS R04350B 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.

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS ±

3 PL DECIMALS ± .005

ANGLES ±

FRACTIONS ±

DRAWN

MMG

04/10/06

CHECKED

IL

04/11/06

APPROVED

DJ

04/11/06



Mini-Circuits®

13 Neptune Avenue  
Brooklyn NY 11235

PL, rh, HV1195, SIM, TB-382

SIZE

CODE IDENT

DRAWING NO:

REV:

A

15542

98-PL-239

B

FILE:

98PL239

SCALE:

10:1

SHEET:

1 OF 1

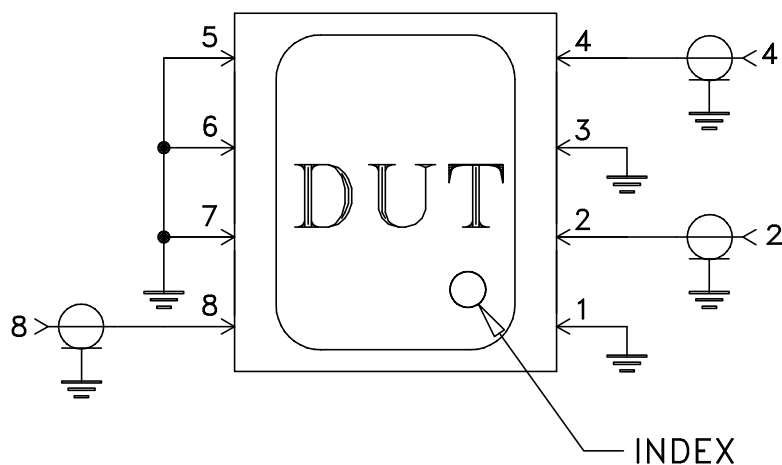
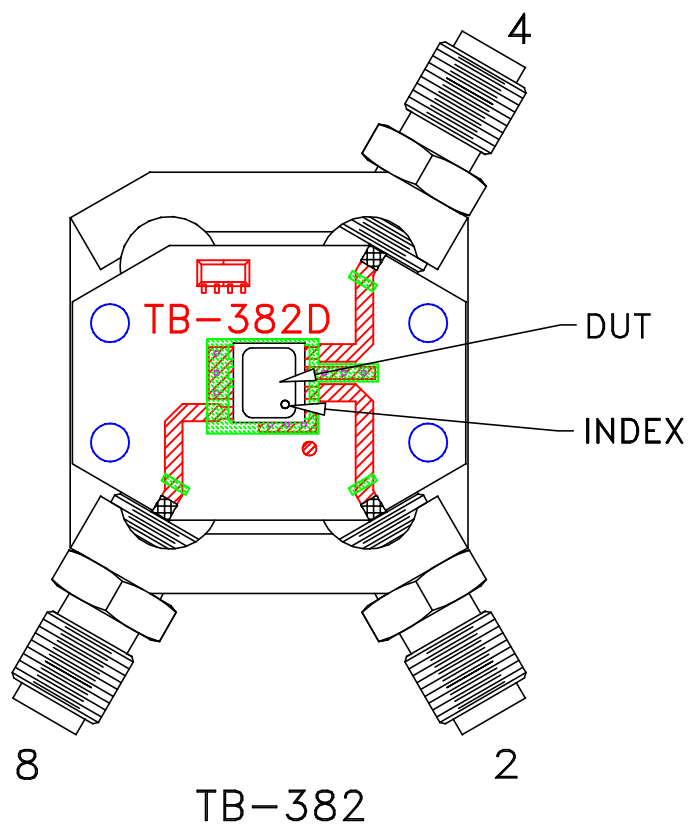
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ASHEETA1.DWG REV:A DATE:01/12/95

# Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.020 inch.

 **Mini-Circuits®**



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification                  | Test/Inspection Condition                                                                                                                                       | Reference/Spec                                        |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| Operating Temperature          | -40° to 85° C<br>Case Temperature                                                                                                                               | Individual Model Data Sheet                           |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                           |
| Autoclave                      | 15 psig, 100% RH, 121°C, 96 hours                                                                                                                               | JESD22-A102-C, Condition C                            |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                                                                       | MIL-STD-202, Method 107, Condition A-3, except +100°C |
| Solder Reflow Heat             | Sn-Pb Eutectic Process: 225°C peak<br>Pb-Free Process: 250°C peak                                                                                               | J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1         |
| Solderability                  | 10X Magnification                                                                                                                                               | J-STD-002, Para 4.2.5, Test S, 95% Coverage           |
| Vibration (High Frequency)     | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)                                                                             | MIL-STD-202, Method 204, Condition D                  |
| Mechanical Shock               | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes                                                                                               | MIL-STD-202, Method 213, Condition A                  |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                               |