

Level 13 (LO Power +13dBm) 2 to 500 MHz

## Maximum Ratings

Operating Temperature -40°C to 85°C

Storage Temperature -55°C to 100°C

RF Power 200mW

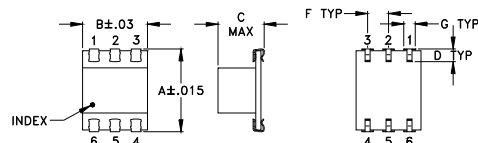
IF Current 40mA

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

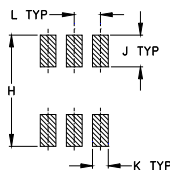
## Pin Connections

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

## Outline Drawing

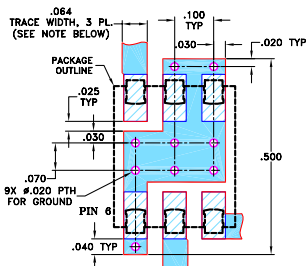


## PCB Land Pattern

Suggested Layout,  
Tolerance to be within ±0.002

## Outline Dimensions (inch/mm)

| A     | B    | C    | D    | E  | F     | G    |
|-------|------|------|------|----|-------|------|
| .390  | .31  | .225 | .060 | -- | .100  | .045 |
| 9.91  | 7.87 | 5.72 | 1.52 | -- | 2.54  | 1.14 |
| H     | J    | K    | L    | M  | wt    |      |
| .420  | .120 | .060 | .100 | -- | grams |      |
| 10.67 | 3.05 | 1.52 | 2.54 | -- | 0.50  |      |

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

NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B 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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## Features

- low conversion loss, 6.13 dB typ.
- excellent L-R isolation, 44 dB typ.
- aqueous washable
- J-leads for strain relief

## Applications

- VHF/UHF
- instrumentation



Generic photo used for illustration purposes only

CASE STYLE: QQQ569

## Electrical Specifications

| FREQUENCY<br>(MHz) |        | CONVERSION LOSS<br>(dB) |          |      |                        | LO-RF ISOLATION<br>(dB) |      |      |      |      |      | LO-IF ISOLATION<br>(dB) |      |      |      |      |      | IP3<br>at center<br>band<br>(dBm) |
|--------------------|--------|-------------------------|----------|------|------------------------|-------------------------|------|------|------|------|------|-------------------------|------|------|------|------|------|-----------------------------------|
| LO/RF              | IF     | Mid-Band<br>m           |          |      |                        | L                       |      | M    |      | U    |      | L                       |      | M    |      | U    |      |                                   |
|                    |        | $\bar{X}$               | $\sigma$ | Max. | Total<br>Range<br>Max. | Typ.                    | Min. | Typ. | Min. | Typ. | Min. | Typ.                    | Min. | Typ. | Min. | Typ. | Min. |                                   |
|                    |        |                         |          |      |                        |                         |      |      |      |      |      |                         |      |      |      |      |      |                                   |
| 2-500              | DC-500 | 6.13                    | .08      | 7.0  | 8.0                    | 58                      | 45   | 44   | 25   | 30   | 20   | 55                      | 40   | 36   | 25   | 28   | 17   | 23                                |

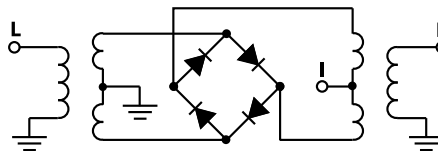
1 dB COMP.: +9 dBm typ.

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

## Typical Performance Data

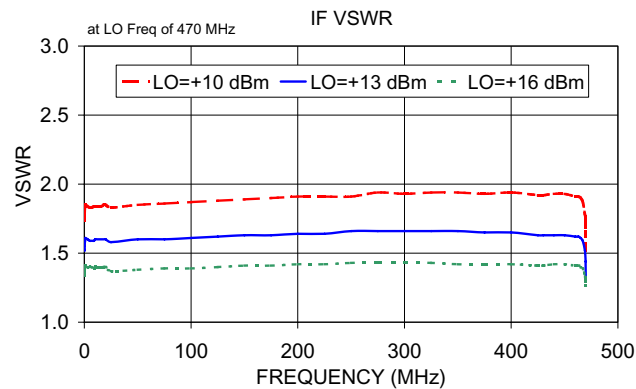
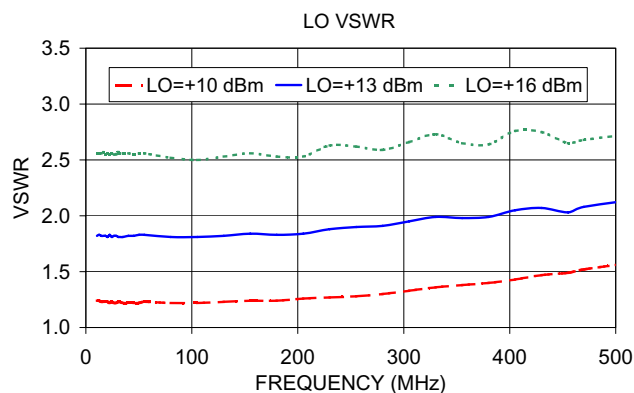
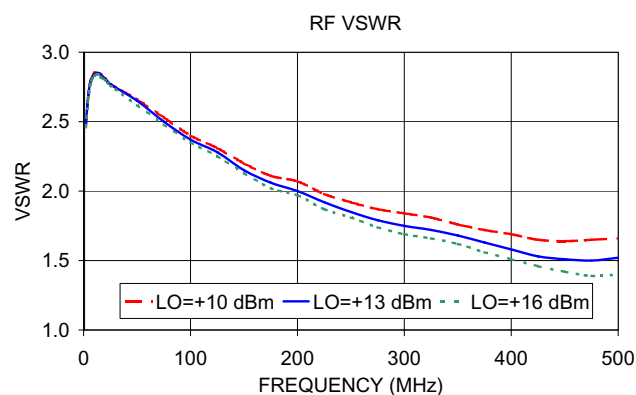
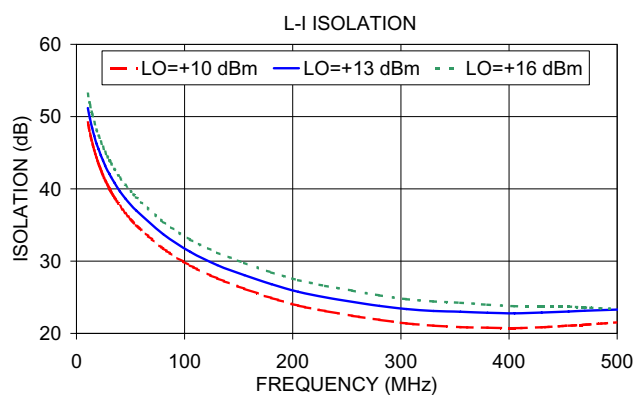
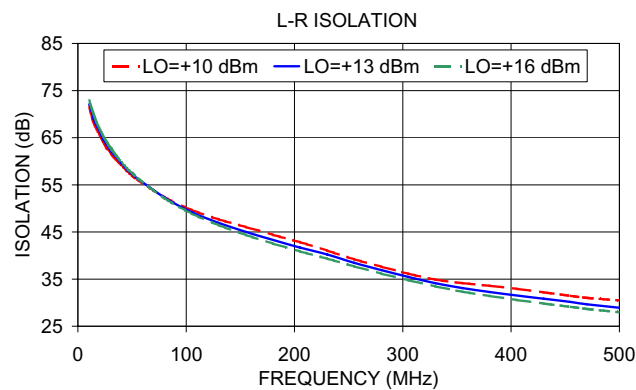
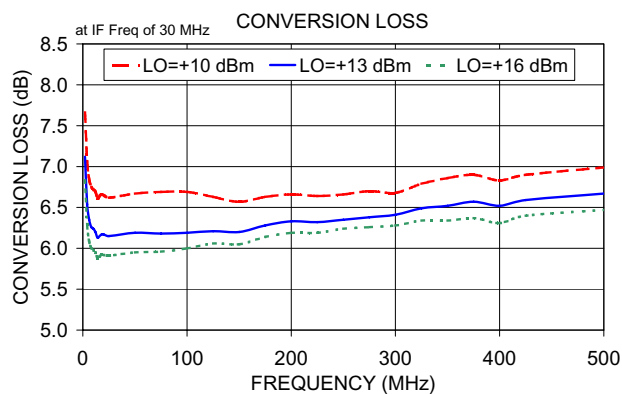
| Frequency<br>(MHz) |        | Conversion<br>Loss<br>(dB) | VSWR<br>RF Port<br>(:1) | Frequency<br>(MHz) | Isolation<br>L-R<br>(dB) | Isolation<br>L-I<br>(dB) | VSWR<br>LO Port<br>(:1) |
|--------------------|--------|----------------------------|-------------------------|--------------------|--------------------------|--------------------------|-------------------------|
| RF                 | LO     |                            |                         |                    |                          |                          |                         |
|                    |        | LO<br>+13dBm               | LO<br>+13dBm            |                    | LO<br>+13dBm             | LO<br>+13dBm             | LO<br>+13dBm            |
| 2.10               | 32.10  | 7.12                       | 2.48                    | 10.50              | 72.10                    | 51.18                    | 1.82                    |
| 4.10               | 34.10  | 6.54                       | 2.67                    | 14.50              | 69.04                    | 48.42                    | 1.82                    |
| 6.10               | 36.10  | 6.35                       | 2.78                    | 20.50              | 66.13                    | 45.46                    | 1.81                    |
| 10.10              | 40.10  | 6.24                       | 2.84                    | 24.50              | 64.29                    | 43.96                    | 1.81                    |
| 14.10              | 44.10  | 6.13                       | 2.85                    | 30.50              | 62.15                    | 42.08                    | 1.81                    |
| 18.10              | 48.10  | 6.17                       | 2.82                    | 35.00              | 61.00                    | 40.87                    | 1.81                    |
| 20.10              | 50.10  | 6.17                       | 2.81                    | 40.10              | 59.59                    | 39.68                    | 1.82                    |
| 25.10              | 55.10  | 6.15                       | 2.77                    | 50.10              | 57.26                    | 37.80                    | 1.83                    |
| 50.10              | 80.10  | 6.19                       | 2.65                    | 80.10              | 52.29                    | 33.74                    | 1.81                    |
| 100.10             | 130.10 | 6.19                       | 2.37                    | 105.10             | 49.20                    | 31.29                    | 1.81                    |
| 125.10             | 155.10 | 6.21                       | 2.28                    | 155.10             | 45.02                    | 28.06                    | 1.84                    |
| 150.10             | 180.10 | 6.20                       | 2.15                    | 205.10             | 41.68                    | 25.76                    | 1.84                    |
| 175.10             | 205.10 | 6.28                       | 2.06                    | 255.10             | 38.45                    | 24.37                    | 1.90                    |
| 200.10             | 230.10 | 6.33                       | 2.00                    | 305.10             | 35.47                    | 23.37                    | 1.95                    |
| 250.10             | 280.10 | 6.35                       | 1.85                    | 330.10             | 34.14                    | 23.10                    | 1.99                    |
| 300.10             | 330.10 | 6.41                       | 1.75                    | 355.10             | 33.10                    | 23.00                    | 1.98                    |
| 350.10             | 380.10 | 6.52                       | 1.68                    | 405.10             | 31.53                    | 22.77                    | 2.05                    |
| 400.10             | 430.10 | 6.52                       | 1.58                    | 430.10             | 30.84                    | 22.89                    | 2.07                    |
| 425.10             | 455.10 | 6.59                       | 1.53                    | 455.10             | 30.16                    | 23.02                    | 2.03                    |
| 500.00             | 470.00 | 6.67                       | 1.52                    | 470.00             | 29.64                    | 23.13                    | 2.08                    |

## Electrical Schematic



## Performance Charts

## LRMS-1MHJ



### Notes

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# Frequency Mixer

# LRMS-1MHJ+

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=30MHz<br>(dB) |       |       |
|---------------------|-------------|-------------------------------------------------------|-------|-------|
|                     |             | @LO (dBm)                                             |       |       |
|                     |             | +10                                                   | +13   | +16   |
| 2.0                 | 32.0        | 7.33                                                  | 6.87  | 6.69  |
| 5.0                 | 35.0        | 6.39                                                  | 5.99  | 5.81  |
| 10.0                | 40.0        | 6.66                                                  | 6.21  | 6.01  |
| 49.8                | 79.8        | 6.48                                                  | 6.08  | 5.84  |
| 89.5                | 119.5       | 6.47                                                  | 6.04  | 5.87  |
| 129.2               | 159.2       | 6.36                                                  | 6.04  | 5.91  |
| 168.9               | 198.9       | 6.37                                                  | 6.08  | 5.93  |
| 208.6               | 238.6       | 6.33                                                  | 6.07  | 5.96  |
| 248.3               | 278.3       | 6.42                                                  | 6.16  | 6.02  |
| 287.9               | 317.9       | 6.43                                                  | 6.18  | 6.03  |
| 327.6               | 357.6       | 6.49                                                  | 6.22  | 6.09  |
| 367.3               | 397.3       | 6.52                                                  | 6.26  | 6.10  |
| 407.0               | 437.0       | 6.53                                                  | 6.29  | 6.13  |
| 446.7               | 476.7       | 6.62                                                  | 6.34  | 6.18  |
| 486.4               | 516.4       | 6.70                                                  | 6.34  | 6.14  |
| 526.1               | 556.1       | 6.75                                                  | 6.41  | 6.18  |
| 565.8               | 595.8       | 6.78                                                  | 6.47  | 6.27  |
| 585.6               | 615.6       | 6.82                                                  | 6.52  | 6.35  |
| 625.3               | 655.3       | 6.95                                                  | 6.61  | 6.46  |
| 645.2               | 675.2       | 7.05                                                  | 6.67  | 6.49  |
| 684.9               | 714.9       | 7.24                                                  | 6.76  | 6.52  |
| 704.7               | 734.7       | 7.40                                                  | 6.81  | 6.56  |
| 744.4               | 774.4       | 7.83                                                  | 7.00  | 6.66  |
| 764.3               | 794.3       | 8.04                                                  | 7.14  | 6.68  |
| 803.9               | 833.9       | 8.37                                                  | 7.52  | 6.86  |
| 863.5               | 893.5       | 8.56                                                  | 7.73  | 7.22  |
| 883.3               | 913.3       | 8.52                                                  | 7.76  | 7.39  |
| 923.0               | 953.0       | 8.62                                                  | 8.05  | 7.74  |
| 942.9               | 972.9       | 8.63                                                  | 8.12  | 7.84  |
| 982.6               | 1012.6      | 8.72                                                  | 8.27  | 8.02  |
| 1002.4              | 1032.4      | 8.71                                                  | 8.31  | 8.08  |
| 1042.1              | 1072.1      | 8.73                                                  | 8.37  | 8.14  |
| 1061.9              | 1091.9      | 8.74                                                  | 8.38  | 8.14  |
| 1101.6              | 1131.6      | 8.75                                                  | 8.41  | 8.20  |
| 1121.5              | 1151.5      | 8.77                                                  | 8.44  | 8.26  |
| 1181.0              | 1211.0      | 9.01                                                  | 8.78  | 8.65  |
| 1220.7              | 1250.7      | 9.35                                                  | 9.09  | 8.99  |
| 1240.6              | 1270.6      | 9.62                                                  | 9.34  | 9.21  |
| 1280.3              | 1310.3      | 10.19                                                 | 9.87  | 9.77  |
| 1300.1              | 1330.1      | 10.48                                                 | 10.19 | 10.09 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       |
|---------------------|-------------|--------------------|-------|-------|
|                     |             | @LO (dBm)          |       |       |
|                     |             | +10                | +13   | +16   |
| 10.1                | 40.1        | 22.50              | 25.50 | 28.36 |
| 49.8                | 79.8        | 23.07              | 26.62 | 27.23 |
| 89.5                | 119.5       | 23.13              | 27.55 | 23.68 |
| 129.2               | 159.2       | 23.35              | 23.67 | 21.85 |
| 168.9               | 198.9       | 28.48              | 20.58 | 22.20 |
| 208.6               | 238.6       | 22.03              | 20.04 | 23.39 |
| 248.3               | 278.3       | 19.98              | 21.37 | 27.02 |
| 287.9               | 317.9       | 18.30              | 21.28 | 34.84 |
| 327.6               | 357.6       | 18.62              | 22.68 | 26.05 |
| 367.3               | 397.3       | 20.02              | 26.42 | 24.07 |
| 407.0               | 437.0       | 20.33              | 24.64 | 20.29 |
| 446.7               | 476.7       | 18.43              | 24.52 | 19.15 |
| 486.4               | 516.4       | 20.26              | 25.88 | 22.48 |
| 526.1               | 556.1       | 23.77              | 24.68 | 22.37 |
| 565.8               | 595.8       | 25.23              | 19.32 | 19.06 |
| 585.6               | 615.6       | 22.69              | 17.72 | 18.16 |
| 625.3               | 655.3       | 19.47              | 15.78 | 17.32 |
| 645.2               | 675.2       | 18.33              | 15.36 | 17.08 |
| 684.9               | 714.9       | 17.09              | 15.67 | 17.44 |
| 704.7               | 734.7       | 16.42              | 16.00 | 18.29 |
| 744.4               | 774.4       | 14.71              | 17.04 | 20.54 |
| 764.3               | 794.3       | 13.70              | 17.31 | 23.08 |
| 803.9               | 833.9       | 12.88              | 15.70 | 20.96 |
| 823.8               | 853.8       | 13.43              | 16.20 | 18.90 |
| 863.5               | 893.5       | 16.24              | 17.76 | 17.83 |
| 883.3               | 913.3       | 20.17              | 18.10 | 19.67 |
| 923.0               | 953.0       | 28.36              | 18.26 | 21.03 |
| 942.9               | 972.9       | 20.82              | 19.30 | 22.00 |
| 982.6               | 1012.6      | 21.59              | 19.76 | 21.83 |
| 1002.4              | 1032.4      | 19.55              | 20.12 | 21.79 |
| 1042.1              | 1072.1      | 18.16              | 20.30 | 20.64 |
| 1061.9              | 1091.9      | 17.75              | 19.90 | 20.83 |
| 1101.6              | 1131.6      | 16.50              | 18.21 | 20.60 |
| 1121.5              | 1151.5      | 15.58              | 17.64 | 21.09 |
| 1161.2              | 1191.2      | 13.67              | 17.47 | 23.55 |
| 1181.0              | 1211.0      | 13.81              | 18.38 | 25.04 |
| 1220.7              | 1250.7      | 15.04              | 19.95 | 25.14 |
| 1240.6              | 1270.6      | 15.45              | 19.25 | 24.13 |
| 1280.3              | 1310.3      | 17.23              | 18.10 | 21.41 |
| 1300.1              | 1330.1      | 17.30              | 18.89 | 21.95 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+9dBm<br>(dB) |      |      |
|---------------------|-------------|-------------------------------------|------|------|
|                     |             | @LO (dBm)                           |      |      |
|                     |             | +10                                 | +13  | +16  |
| 10.1                | 40.1        | 0.93                                | 0.60 | 0.37 |
| 49.8                | 79.8        | 0.90                                | 0.50 | 0.35 |
| 89.5                | 119.5       | 0.73                                | 0.49 | 0.28 |
| 129.2               | 159.2       | 0.84                                | 0.48 | 0.28 |
| 168.9               | 198.9       | 0.79                                | 0.43 | 0.27 |
| 208.6               | 238.6       | 0.82                                | 0.47 | 0.31 |
| 248.3               | 278.3       | 0.79                                | 0.46 | 0.32 |
| 287.9               | 317.9       | 0.78                                | 0.46 | 0.36 |
| 327.6               | 357.6       | 0.81                                | 0.49 | 0.38 |
| 367.3               | 397.3       | 0.80                                | 0.50 | 0.44 |
| 407.0               | 437.0       | 0.84                                | 0.51 | 0.46 |
| 446.7               | 476.7       | 0.89                                | 0.62 | 0.50 |
| 486.4               | 516.4       | 0.89                                | 0.70 | 0.59 |
| 526.1               | 556.1       | 1.01                                | 0.77 | 0.68 |
| 565.8               | 595.8       | 1.19                                | 0.83 | 0.75 |
| 585.6               | 615.6       | 1.24                                | 0.84 | 0.76 |
| 625.3               | 655.3       | 1.45                                | 0.98 | 0.87 |
| 645.2               | 675.2       | 1.52                                | 1.02 | 0.88 |
| 684.9               | 714.9       | 1.66                                | 1.20 | 1.03 |
| 704.7               | 734.7       | 1.74                                | 1.36 | 1.12 |
| 744.4               | 774.4       | 1.54                                | 1.43 | 1.23 |
| 764.3               | 794.3       | 1.46                                | 1.45 | 1.31 |
| 803.9               | 833.9       | 1.28                                | 1.32 | 1.40 |
| 823.8               | 853.8       | 1.29                                | 1.35 | 1.42 |
| 863.5               | 893.5       | 1.27                                | 1.30 | 1.28 |
| 883.3               | 913.3       | 1.34                                | 1.35 | 1.25 |
| 923.0               | 953.0       | 1.33                                | 1.15 | 1.10 |
| 942.9               | 972.9       | 1.35                                | 1.11 | 1.06 |
| 982.6               | 1012.6      | 1.36                                | 1.04 | 0.98 |
| 1002.4              | 1032.4      | 1.42                                | 1.05 | 1.00 |
| 1042.1              | 1072.1      | 1.43                                | 0.97 | 0.98 |
| 1061.9              | 1091.9      | 1.47                                | 1.03 | 1.01 |
| 1101.6              | 1131.6      | 1.58                                | 1.03 | 1.03 |
| 1121.5              | 1151.5      | 1.59                                | 1.03 | 1.02 |
| 1161.2              | 1191.2      | 1.71                                | 1.00 | 0.91 |
| 1181.0              | 1211.0      | 1.76                                | 0.97 | 0.84 |
| 1220.7              | 1250.7      | 1.81                                | 0.90 | 0.72 |
| 1240.6              | 1270.6      | 1.92                                | 0.93 | 0.72 |
| 1280.3              | 1310.3      | 2.19                                | 0.93 | 0.66 |
| 1300.1              | 1330.1      | 2.36                                | 0.99 | 0.71 |

# Frequency Mixer

# LRMS-1MHJ+

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=250.1MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=10.1MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=500.1MHz<br>(dB) |
|----------------------|-------------|-----------------------------------------------------------------|----------------------|-------------|----------------------------------------------------------------|----------------------|-------------|-----------------------------------------------------------------|
|                      |             | @LO (dBm)                                                       |                      |             | @LO (dBm)                                                      |                      |             | @LO (dBm)                                                       |
|                      |             | +13                                                             |                      |             | +13                                                            |                      |             | +13                                                             |
| 240.0                | 10.1        | 6.26                                                            | 10.0                 | 20.1        | 5.90                                                           | 490.0                | 10.1        | 6.46                                                            |
| 234.1                | 16.0        | 6.24                                                            | 22.3                 | 32.4        | 5.82                                                           | 477.7                | 22.4        | 6.43                                                            |
| 228.2                | 21.9        | 6.21                                                            | 34.6                 | 44.7        | 5.80                                                           | 465.4                | 34.7        | 6.39                                                            |
| 222.3                | 27.8        | 6.21                                                            | 46.9                 | 57.0        | 5.82                                                           | 453.1                | 47.0        | 6.38                                                            |
| 216.4                | 33.7        | 6.20                                                            | 59.2                 | 69.3        | 5.81                                                           | 440.8                | 59.3        | 6.39                                                            |
| 210.5                | 39.6        | 6.18                                                            | 71.5                 | 81.6        | 5.84                                                           | 428.5                | 71.6        | 6.31                                                            |
| 204.6                | 45.5        | 6.19                                                            | 83.8                 | 93.9        | 5.85                                                           | 416.2                | 83.9        | 6.27                                                            |
| 198.7                | 51.4        | 6.17                                                            | 96.2                 | 106.3       | 5.83                                                           | 403.8                | 96.3        | 6.20                                                            |
| 192.8                | 57.3        | 6.15                                                            | 108.5                | 118.6       | 5.83                                                           | 391.5                | 108.6       | 6.14                                                            |
| 186.9                | 63.2        | 6.13                                                            | 120.8                | 130.9       | 5.82                                                           | 379.2                | 120.9       | 6.13                                                            |
| 181.0                | 69.1        | 6.14                                                            | 133.1                | 143.2       | 5.81                                                           | 366.9                | 133.2       | 6.11                                                            |
| 175.1                | 75.0        | 6.18                                                            | 145.4                | 155.5       | 5.88                                                           | 354.6                | 145.5       | 6.07                                                            |
| 169.2                | 80.9        | 6.13                                                            | 157.7                | 167.8       | 5.90                                                           | 342.3                | 157.8       | 6.07                                                            |
| 163.3                | 86.8        | 6.13                                                            | 170.0                | 180.1       | 5.91                                                           | 330.0                | 170.1       | 6.06                                                            |
| 157.4                | 92.7        | 6.12                                                            | 182.3                | 192.4       | 5.92                                                           | 317.7                | 182.4       | 6.05                                                            |
| 151.5                | 98.6        | 6.07                                                            | 194.6                | 204.7       | 5.91                                                           | 305.4                | 194.7       | 6.03                                                            |
| 145.6                | 104.5       | 6.06                                                            | 206.9                | 217.0       | 5.92                                                           | 293.1                | 207.0       | 6.01                                                            |
| 139.7                | 110.4       | 6.05                                                            | 219.2                | 229.3       | 5.94                                                           | 280.8                | 219.3       | 6.01                                                            |
| 133.8                | 116.3       | 6.02                                                            | 231.5                | 241.6       | 5.95                                                           | 268.5                | 231.6       | 6.04                                                            |
| 127.9                | 122.2       | 5.98                                                            | 243.8                | 253.9       | 5.99                                                           | 256.2                | 243.9       | 6.05                                                            |
| 122.1                | 128.0       | 5.96                                                            | 256.2                | 266.3       | 6.04                                                           | 243.8                | 256.3       | 6.06                                                            |
| 116.2                | 133.9       | 6.00                                                            | 268.5                | 278.6       | 6.04                                                           | 231.5                | 268.6       | 6.07                                                            |
| 110.3                | 139.8       | 6.02                                                            | 280.8                | 290.9       | 6.05                                                           | 219.2                | 280.9       | 6.05                                                            |
| 104.4                | 145.7       | 6.02                                                            | 293.1                | 303.2       | 6.06                                                           | 206.9                | 293.2       | 6.08                                                            |
| 98.5                 | 151.6       | 6.03                                                            | 305.4                | 315.5       | 6.08                                                           | 194.6                | 305.5       | 6.08                                                            |
| 92.6                 | 157.5       | 6.02                                                            | 317.7                | 327.8       | 6.13                                                           | 182.3                | 317.8       | 6.09                                                            |
| 86.7                 | 163.4       | 6.02                                                            | 330.0                | 340.1       | 6.14                                                           | 170.0                | 330.1       | 6.12                                                            |
| 80.8                 | 169.3       | 6.03                                                            | 342.3                | 352.4       | 6.14                                                           | 157.7                | 342.4       | 6.14                                                            |
| 74.9                 | 175.2       | 6.04                                                            | 354.6                | 364.7       | 6.17                                                           | 145.4                | 354.7       | 6.17                                                            |
| 69.0                 | 181.1       | 6.03                                                            | 366.9                | 377.0       | 6.22                                                           | 133.1                | 367.0       | 6.20                                                            |
| 63.1                 | 187.0       | 6.02                                                            | 379.2                | 389.3       | 6.25                                                           | 120.8                | 379.3       | 6.19                                                            |
| 57.2                 | 192.9       | 6.01                                                            | 391.5                | 401.6       | 6.26                                                           | 108.5                | 391.6       | 6.20                                                            |
| 51.3                 | 198.8       | 6.02                                                            | 403.8                | 413.9       | 6.23                                                           | 96.2                 | 403.9       | 6.23                                                            |
| 45.4                 | 204.7       | 6.04                                                            | 416.2                | 426.3       | 6.25                                                           | 83.8                 | 416.3       | 6.23                                                            |
| 39.5                 | 210.6       | 6.05                                                            | 428.5                | 438.6       | 6.28                                                           | 71.5                 | 428.6       | 6.26                                                            |
| 33.6                 | 216.5       | 6.05                                                            | 440.8                | 450.9       | 6.30                                                           | 59.2                 | 440.9       | 6.28                                                            |
| 27.7                 | 222.4       | 6.05                                                            | 453.1                | 463.2       | 6.28                                                           | 46.9                 | 453.2       | 6.27                                                            |
| 21.8                 | 228.3       | 6.10                                                            | 465.4                | 475.5       | 6.23                                                           | 34.6                 | 465.5       | 6.31                                                            |
| 15.9                 | 234.2       | 6.10                                                            | 477.7                | 487.8       | 6.21                                                           | 22.3                 | 477.8       | 6.33                                                            |
| 10.0                 | 240.1       | 6.20                                                            | 490.0                | 500.1       | 6.23                                                           | 10.0                 | 490.1       | 6.43                                                            |

# Frequency Mixer

# LRMS-1MHJ+

## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +10                     | +13   | +16   | +10                     | +13   | +16   |
| 2.0         | 76.01                   | 74.51 | 74.01 | 68.31                   | 65.71 | 64.46 |
| 5.0         | 69.66                   | 68.76 | 68.46 | 63.66                   | 61.00 | 59.73 |
| 10.0        | 64.01                   | 63.07 | 62.89 | 58.52                   | 55.80 | 54.50 |
| 49.8        | 52.79                   | 51.28 | 50.15 | 45.48                   | 43.68 | 42.37 |
| 89.5        | 48.36                   | 47.07 | 46.51 | 40.95                   | 38.97 | 38.00 |
| 129.2       | 46.36                   | 45.67 | 43.99 | 38.63                   | 36.92 | 35.88 |
| 168.9       | 46.21                   | 44.61 | 42.57 | 37.07                   | 35.85 | 34.53 |
| 208.6       | 45.25                   | 42.74 | 40.74 | 36.63                   | 34.90 | 33.59 |
| 248.3       | 44.55                   | 41.76 | 39.90 | 36.51                   | 34.26 | 32.78 |
| 287.9       | 42.35                   | 39.97 | 38.07 | 35.78                   | 33.63 | 31.96 |
| 327.6       | 41.01                   | 38.41 | 36.65 | 34.60                   | 32.50 | 30.88 |
| 367.3       | 39.53                   | 37.35 | 35.66 | 33.10                   | 31.10 | 29.70 |
| 407.0       | 37.26                   | 35.72 | 34.34 | 31.93                   | 30.35 | 28.87 |
| 446.7       | 34.49                   | 33.72 | 32.72 | 29.43                   | 28.71 | 27.83 |
| 486.4       | 32.70                   | 31.76 | 30.79 | 27.93                   | 27.02 | 26.32 |
| 526.1       | 31.29                   | 30.07 | 29.28 | 27.51                   | 25.76 | 24.68 |
| 565.8       | 30.65                   | 29.31 | 28.21 | 26.91                   | 25.62 | 24.09 |
| 585.6       | 30.31                   | 28.90 | 27.75 | 26.35                   | 25.36 | 23.93 |
| 625.3       | 29.69                   | 27.85 | 26.66 | 24.50                   | 23.97 | 23.04 |
| 645.2       | 29.48                   | 27.62 | 26.48 | 23.69                   | 23.35 | 22.49 |
| 684.9       | 28.55                   | 26.84 | 25.63 | 22.01                   | 22.00 | 21.21 |
| 704.7       | 28.09                   | 26.37 | 25.05 | 21.12                   | 21.14 | 20.51 |
| 744.4       | 27.16                   | 25.61 | 24.34 | 19.69                   | 19.64 | 19.13 |
| 764.3       | 26.63                   | 25.12 | 23.81 | 19.29                   | 19.14 | 18.65 |
| 803.9       | 25.61                   | 24.26 | 22.91 | 18.68                   | 18.09 | 17.50 |
| 863.5       | 24.72                   | 23.53 | 22.64 | 18.18                   | 17.43 | 16.47 |
| 883.3       | 24.48                   | 23.25 | 22.34 | 18.05                   | 17.33 | 16.23 |
| 923.0       | 24.13                   | 22.98 | 22.41 | 17.23                   | 16.66 | 15.46 |
| 942.9       | 23.92                   | 22.90 | 22.40 | 16.97                   | 16.46 | 15.18 |
| 982.6       | 23.61                   | 22.88 | 22.59 | 16.06                   | 15.82 | 14.54 |
| 1002.4      | 23.42                   | 23.04 | 23.00 | 15.59                   | 15.49 | 14.32 |
| 1042.1      | 23.11                   | 23.00 | 23.17 | 14.57                   | 14.60 | 13.43 |
| 1061.9      | 23.10                   | 23.06 | 23.27 | 14.20                   | 14.24 | 13.22 |
| 1101.6      | 23.04                   | 23.04 | 23.34 | 13.07                   | 13.15 | 12.18 |
| 1121.5      | 23.06                   | 23.19 | 23.61 | 12.55                   | 12.73 | 11.89 |
| 1181.0      | 23.51                   | 23.70 | 24.10 | 11.14                   | 11.54 | 10.94 |
| 1220.7      | 23.83                   | 23.95 | 23.97 | 10.33                   | 10.77 | 10.27 |
| 1240.6      | 24.36                   | 24.27 | 23.92 | 10.06                   | 10.45 | 10.03 |
| 1280.3      | 24.81                   | 24.16 | 23.12 | 9.63                    | 9.89  | 9.44  |
| 1300.1      | 25.03                   | 24.06 | 22.82 | 9.52                    | 9.71  | 9.33  |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +10                     | +13   | +16   |
| 10.1                | 40.1        | 45.50                   | 44.46 | 44.01 |
| 49.8                | 79.8        | 31.98                   | 31.67 | 31.46 |
| 89.5                | 119.5       | 27.21                   | 27.04 | 27.07 |
| 129.2               | 159.2       | 24.60                   | 24.58 | 24.59 |
| 168.9               | 198.9       | 23.01                   | 23.03 | 23.04 |
| 208.6               | 238.6       | 21.88                   | 21.94 | 22.02 |
| 248.3               | 278.3       | 21.26                   | 21.32 | 21.37 |
| 287.9               | 317.9       | 20.95                   | 21.06 | 21.12 |
| 327.6               | 357.6       | 20.75                   | 20.99 | 21.15 |
| 367.3               | 397.3       | 20.77                   | 21.02 | 21.22 |
| 407.0               | 437.0       | 21.02                   | 21.24 | 21.30 |
| 446.7               | 476.7       | 21.19                   | 21.33 | 21.58 |
| 486.4               | 516.4       | 21.23                   | 21.50 | 21.94 |
| 526.1               | 556.1       | 20.59                   | 20.52 | 20.98 |
| 565.8               | 595.8       | 19.27                   | 19.05 | 19.29 |
| 585.6               | 615.6       | 18.23                   | 18.08 | 18.34 |
| 625.3               | 655.3       | 16.28                   | 16.33 | 16.52 |
| 645.2               | 675.2       | 15.33                   | 15.45 | 15.60 |
| 684.9               | 714.9       | 13.83                   | 14.08 | 14.30 |
| 704.7               | 734.7       | 13.14                   | 13.38 | 13.61 |
| 744.4               | 774.4       | 11.97                   | 12.17 | 12.44 |
| 764.3               | 794.3       | 11.57                   | 11.73 | 12.04 |
| 803.9               | 833.9       | 10.87                   | 11.00 | 11.39 |
| 823.8               | 853.8       | 10.59                   | 10.76 | 11.32 |
| 863.5               | 893.5       | 10.08                   | 10.35 | 11.08 |
| 883.3               | 913.3       | 9.86                    | 10.20 | 10.85 |
| 923.0               | 953.0       | 9.47                    | 9.83  | 10.41 |
| 942.9               | 972.9       | 9.27                    | 9.69  | 10.29 |
| 982.6               | 1012.6      | 9.01                    | 9.52  | 10.07 |
| 1002.4              | 1032.4      | 8.97                    | 9.53  | 10.08 |
| 1042.1              | 1072.1      | 9.01                    | 9.63  | 10.18 |
| 1061.9              | 1091.9      | 9.03                    | 9.67  | 10.20 |
| 1101.6              | 1131.6      | 9.13                    | 9.75  | 10.37 |
| 1121.5              | 1151.5      | 9.12                    | 9.76  | 10.43 |
| 1161.2              | 1191.2      | 9.01                    | 9.78  | 10.40 |
| 1181.0              | 1211.0      | 8.97                    | 9.76  | 10.26 |
| 1220.7              | 1250.7      | 8.70                    | 9.34  | 9.53  |
| 1240.6              | 1270.6      | 8.38                    | 8.88  | 8.99  |
| 1280.3              | 1310.3      | 7.64                    | 7.89  | 7.91  |
| 1300.1              | 1330.1      | 7.30                    | 7.43  | 7.42  |

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# Frequency Mixer

# LRMS-1MHJ+

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF VSWR<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|
|                     |             | @LO (dBm)       |      |      |
|                     |             | +10             | +13  | +16  |
| 5.0                 | 35.0        | 1.38            | 2.10 | 3.07 |
| 10.0                | 40.0        | 1.33            | 2.01 | 2.91 |
| 49.8                | 79.8        | 1.11            | 1.02 | 1.07 |
| 89.5                | 119.5       | 1.09            | 1.02 | 1.09 |
| 129.2               | 159.2       | 1.06            | 1.04 | 1.10 |
| 168.9               | 198.9       | 1.05            | 1.05 | 1.11 |
| 208.6               | 238.6       | 1.04            | 1.06 | 1.13 |
| 248.3               | 278.3       | 1.04            | 1.06 | 1.12 |
| 287.9               | 317.9       | 1.03            | 1.07 | 1.14 |
| 327.6               | 357.6       | 1.03            | 1.09 | 1.16 |
| 367.3               | 397.3       | 1.03            | 1.11 | 1.18 |
| 407.0               | 437.0       | 1.04            | 1.12 | 1.20 |
| 446.7               | 476.7       | 1.04            | 1.15 | 1.23 |
| 486.4               | 516.4       | 1.04            | 1.15 | 1.25 |
| 526.1               | 556.1       | 1.06            | 1.16 | 1.26 |
| 565.8               | 595.8       | 1.10            | 1.19 | 1.28 |
| 585.6               | 615.6       | 1.11            | 1.21 | 1.30 |
| 625.3               | 655.3       | 1.13            | 1.23 | 1.31 |
| 645.2               | 675.2       | 1.14            | 1.24 | 1.31 |
| 684.9               | 714.9       | 1.12            | 1.24 | 1.30 |
| 704.7               | 734.7       | 1.12            | 1.23 | 1.30 |
| 744.4               | 774.4       | 1.11            | 1.21 | 1.28 |
| 764.3               | 794.3       | 1.13            | 1.21 | 1.29 |
| 803.9               | 833.9       | 1.19            | 1.22 | 1.31 |
| 823.8               | 853.8       | 1.22            | 1.25 | 1.33 |
| 863.5               | 893.5       | 1.29            | 1.33 | 1.39 |
| 883.3               | 913.3       | 1.33            | 1.38 | 1.43 |
| 923.0               | 953.0       | 1.41            | 1.46 | 1.50 |
| 942.9               | 972.9       | 1.46            | 1.51 | 1.55 |
| 982.6               | 1012.6      | 1.54            | 1.59 | 1.64 |
| 1002.4              | 1032.4      | 1.57            | 1.62 | 1.66 |
| 1042.1              | 1072.1      | 1.64            | 1.70 | 1.74 |
| 1061.9              | 1091.9      | 1.67            | 1.73 | 1.78 |
| 1101.6              | 1131.6      | 1.77            | 1.83 | 1.89 |
| 1121.5              | 1151.5      | 1.81            | 1.88 | 1.96 |
| 1161.2              | 1191.2      | 1.91            | 2.01 | 2.10 |
| 1181.0              | 1211.0      | 1.98            | 2.09 | 2.18 |
| 1220.7              | 1250.7      | 2.10            | 2.22 | 2.30 |
| 1240.6              | 1270.6      | 2.14            | 2.26 | 2.33 |
| 1280.3              | 1310.3      | 2.18            | 2.29 | 2.36 |
| 1300.1              | 1330.1      | 2.17            | 2.27 | 2.35 |

| LO<br>(MHz) | LO VSWR<br>(:1) |      |      |
|-------------|-----------------|------|------|
|             | @LO (dBm)       |      |      |
|             | +10             | +13  | +16  |
| 5.0         | 1.16            | 1.13 | 1.15 |
| 10.0        | 1.12            | 1.06 | 1.09 |
| 49.8        | 1.30            | 1.96 | 2.79 |
| 89.5        | 1.28            | 1.88 | 2.65 |
| 129.2       | 1.29            | 1.92 | 2.71 |
| 168.9       | 1.28            | 1.89 | 2.65 |
| 208.6       | 1.29            | 1.92 | 2.68 |
| 248.3       | 1.32            | 1.96 | 2.72 |
| 287.9       | 1.33            | 1.95 | 2.69 |
| 327.6       | 1.37            | 2.01 | 2.76 |
| 367.3       | 1.40            | 2.02 | 2.74 |
| 407.0       | 1.44            | 2.07 | 2.79 |
| 446.7       | 1.48            | 2.11 | 2.82 |
| 486.4       | 1.53            | 2.13 | 2.83 |
| 526.1       | 1.58            | 2.20 | 2.89 |
| 565.8       | 1.61            | 2.22 | 2.90 |
| 585.6       | 1.64            | 2.25 | 2.93 |
| 625.3       | 1.69            | 2.30 | 2.96 |
| 645.2       | 1.71            | 2.31 | 2.96 |
| 684.9       | 1.77            | 2.34 | 2.97 |
| 704.7       | 1.81            | 2.38 | 3.00 |
| 744.4       | 1.87            | 2.42 | 3.02 |
| 764.3       | 1.89            | 2.45 | 3.03 |
| 803.9       | 1.95            | 2.51 | 3.09 |
| 823.8       | 1.97            | 2.53 | 3.10 |
| 863.5       | 2.00            | 2.55 | 3.10 |
| 883.3       | 2.02            | 2.57 | 3.12 |
| 923.0       | 2.06            | 2.61 | 3.15 |
| 942.9       | 2.08            | 2.61 | 3.14 |
| 982.6       | 2.12            | 2.63 | 3.13 |
| 1002.4      | 2.15            | 2.66 | 3.15 |
| 1042.1      | 2.18            | 2.66 | 3.12 |
| 1061.9      | 2.19            | 2.65 | 3.10 |
| 1101.6      | 2.21            | 2.65 | 3.05 |
| 1121.5      | 2.23            | 2.65 | 3.05 |
| 1161.2      | 2.23            | 2.62 | 2.98 |
| 1181.0      | 2.24            | 2.61 | 2.96 |
| 1220.7      | 2.25            | 2.60 | 2.94 |
| 1240.6      | 2.25            | 2.59 | 2.91 |
| 1280.3      | 2.25            | 2.54 | 2.82 |
| 1300.1      | 2.28            | 2.53 | 2.82 |

| IF<br>(OUT)<br>(MHz) | IF VSWR<br>@LO=500.5MHz<br>(:1) |      |      |
|----------------------|---------------------------------|------|------|
|                      | @LO (dBm)                       |      |      |
|                      | +10                             | +13  | +16  |
| 5.0                  | 1.41                            | 1.24 | 1.14 |
| 10.0                 | 1.42                            | 1.25 | 1.14 |
| 22.3                 | 1.77                            | 1.51 | 1.29 |
| 34.5                 | 1.75                            | 1.50 | 1.30 |
| 46.8                 | 1.87                            | 1.61 | 1.38 |
| 59.0                 | 1.80                            | 1.54 | 1.32 |
| 71.3                 | 1.81                            | 1.54 | 1.33 |
| 83.5                 | 1.79                            | 1.52 | 1.32 |
| 95.8                 | 1.86                            | 1.59 | 1.37 |
| 108.0                | 1.80                            | 1.53 | 1.33 |
| 120.3                | 1.87                            | 1.60 | 1.39 |
| 132.5                | 1.89                            | 1.61 | 1.39 |
| 144.8                | 1.86                            | 1.58 | 1.37 |
| 157.0                | 1.83                            | 1.56 | 1.35 |
| 169.3                | 1.82                            | 1.55 | 1.34 |
| 181.5                | 1.83                            | 1.56 | 1.36 |
| 193.8                | 1.88                            | 1.60 | 1.39 |
| 206.0                | 1.89                            | 1.61 | 1.40 |
| 218.3                | 1.92                            | 1.63 | 1.42 |
| 230.5                | 1.92                            | 1.62 | 1.41 |
| 242.8                | 1.89                            | 1.60 | 1.39 |
| 255.0                | 1.89                            | 1.60 | 1.39 |
| 267.3                | 1.88                            | 1.59 | 1.38 |
| 279.5                | 1.89                            | 1.60 | 1.39 |
| 291.8                | 1.92                            | 1.62 | 1.41 |
| 304.0                | 1.89                            | 1.60 | 1.40 |
| 316.3                | 1.93                            | 1.63 | 1.42 |
| 328.5                | 1.92                            | 1.62 | 1.41 |
| 340.8                | 1.93                            | 1.63 | 1.42 |
| 353.0                | 1.95                            | 1.64 | 1.43 |
| 365.3                | 1.91                            | 1.62 | 1.41 |
| 377.5                | 1.92                            | 1.62 | 1.42 |
| 389.8                | 1.93                            | 1.63 | 1.42 |
| 402.0                | 1.97                            | 1.66 | 1.45 |
| 414.3                | 2.01                            | 1.69 | 1.48 |
| 426.5                | 1.99                            | 1.68 | 1.46 |
| 438.8                | 1.97                            | 1.66 | 1.45 |
| 451.0                | 1.96                            | 1.65 | 1.44 |
| 463.3                | 1.94                            | 1.64 | 1.43 |
| 487.8                | 1.99                            | 1.69 | 1.49 |
| 500.0                | 1.88                            | 1.63 | 1.49 |

## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |    |    |    |    |    |    |    |    |    |    |
|--------|--------|--------|----|----|----|----|----|----|----|----|----|----|
| 0      | -      | -      | 17 | 25 | 22 | 31 | 25 | 45 | 35 | 57 | 41 | 62 |
| 1      | -      | 15     | +0 | 27 | 12 | 32 | 20 | 35 | 33 | 55 | 41 | 53 |
| 2      | 79     | 48     | 36 | 50 | 36 | 46 | 36 | 44 | 38 | 55 | 47 | 58 |
| 3      | >100   | 44     | 45 | 49 | 53 | 53 | 46 | 48 | 46 | 52 | 51 | 56 |
| 4      | >100   | 64     | 56 | 57 | 54 | 54 | 54 | 50 | 49 | 54 | 50 | 62 |
| 5      | >100   | 57     | 55 | 57 | 57 | 60 | 52 | 57 | 49 | 60 | 50 | 68 |
| 6      | >100   | 70     | 62 | 75 | 62 | 68 | 65 | 64 | 66 | 60 | 59 | 63 |
| 7      | >100   | 83     | 77 | 73 | 74 | 68 | 72 | 68 | 65 | 67 | 63 | 76 |
| 8      | >100   | 73     | 76 | 66 | 65 | 66 | 64 | 80 | 74 | 81 | 85 | 71 |
| 9      | >100   | 85     | 82 | 89 | 78 | 81 | 74 | 72 | 91 | 72 | 78 | 74 |
| 10     | >100   | 89     | 81 | 85 | 82 | 75 | 81 | 71 | 79 | 77 | 83 | 84 |
| RF CAL | 0      | 1      | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |    |

### LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; 4.00 dBm.  
LO IN: 280.01 MHz; +13.00 dBm  
IF OUT: 29.91 MHz; -2.24 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 9   | 16  | 9   | 17  | 11  | 29  | 21  | 36  | 28  | 51  |
| 1      | -      | 15     | +0  | 26  | 13  | 30  | 20  | 34  | 34  | 46  | 34  | 47  |
| 2      | 99     | 65     | 40  | 49  | 41  | 47  | 39  | 52  | 42  | 57  | 53  | 60  |
| 3      | >100   | 72     | 57  | 70  | 56  | 63  | 53  | 71  | 56  | 70  | 54  | 68  |
| 4      | >100   | 75     | 65  | 72  | 69  | 67  | 71  | 67  | 65  | 72  | 87  | 77  |
| 5      | >100   | 88     | 86  | 87  | 78  | 83  | 74  | >88 | 72  | 86  | 74  | 81  |
| 6      | >100   | >88    | >88 | >88 | >88 | 87  | >88 | 85  | 83  | 85  | 84  | 85  |
| 7      | >100   | >88    | >88 | >88 | >88 | >88 | >88 | >88 | 84  | >88 | >88 | >88 |
| 8      | >100   | >88    | >88 | >88 | >88 | >88 | >88 | >88 | 85  | >88 | >88 | >88 |
| 9      | >100   | >88    | >88 | >88 | >88 | >88 | >88 | >88 | >88 | 66  | >88 | >88 |
| 10     | >100   | >88    | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 | 78  | >88 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

### LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; -6.00 dBm.  
LO IN: 280.01 MHz; +13.00 dBm  
IF OUT: 29.91 MHz; -12.18 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.

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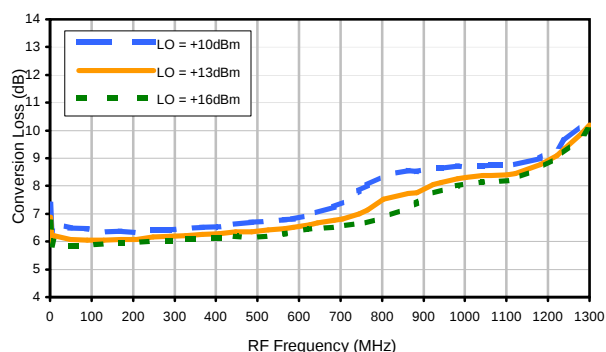


# Frequency Mixer

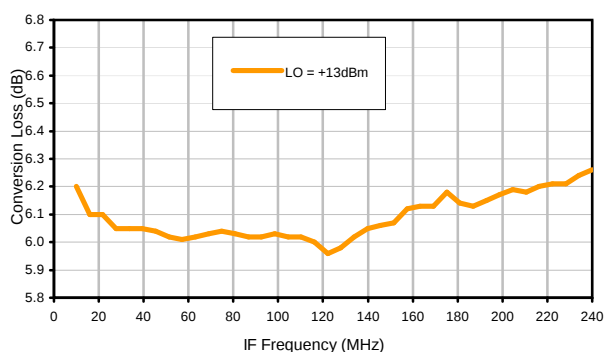
# LRMS-1MHJ+

## Typical Performance Curves

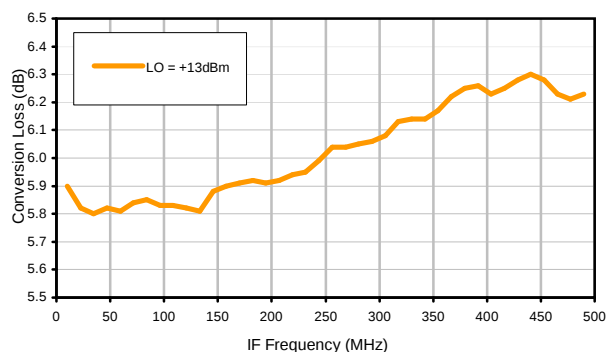
Conversion Loss @ IF=30MHz



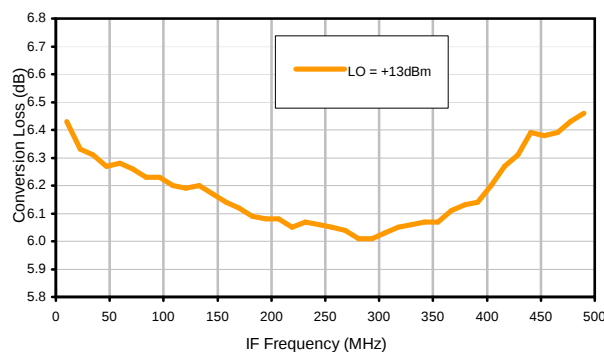
Conversion Loss vs. IF @ RF=250.1MHz



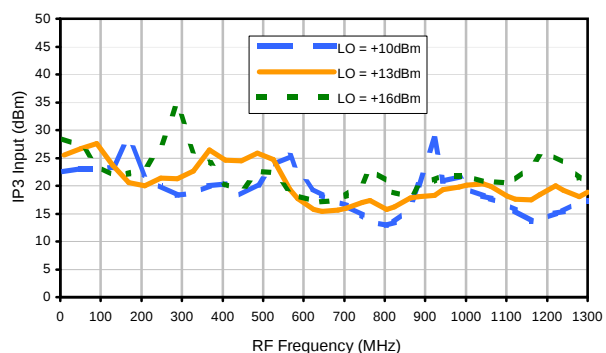
Conversion Loss vs. IF @ RF=10.1MHz



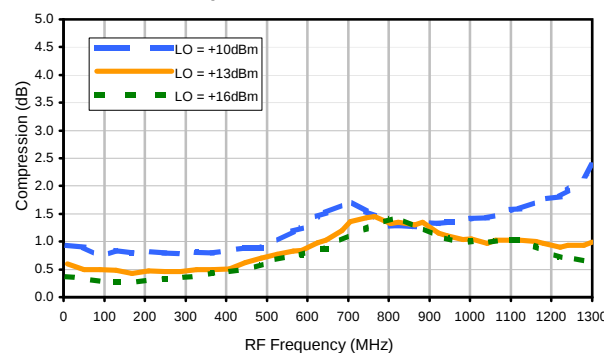
Conversion Loss vs. IF @ RF=500.1MHz



IP3 Input



Compression @ RF IN=+9dBm

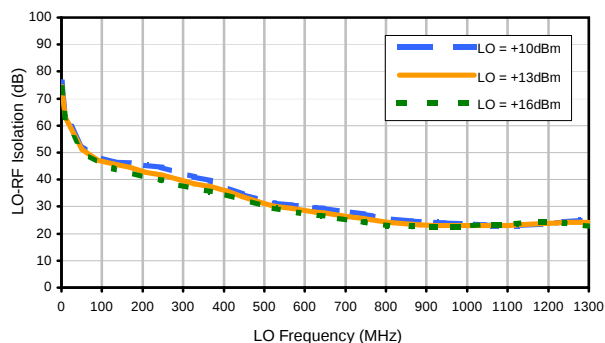


# Frequency Mixer

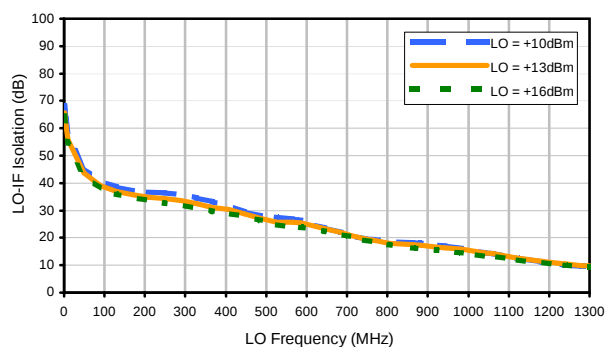
# LRMS-1MHJ+

## Typical Performance Curves

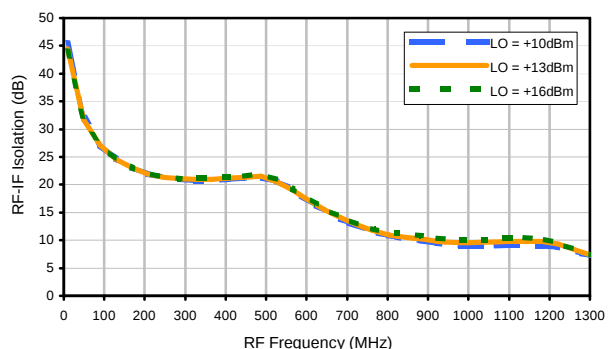
LO-RF Isolation



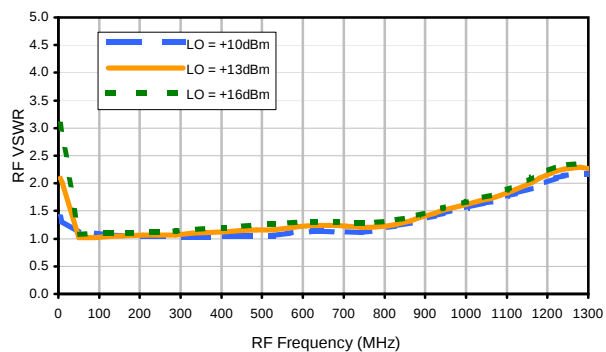
LO-IF Isolation



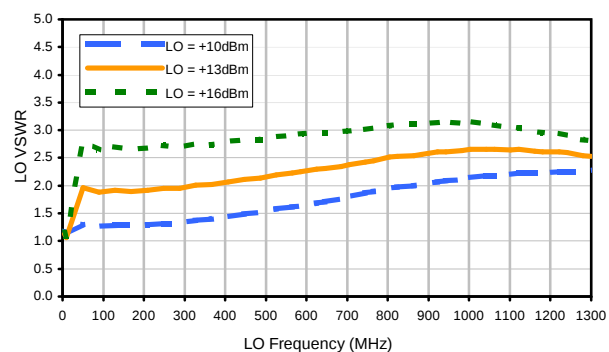
RF-IF Isolation



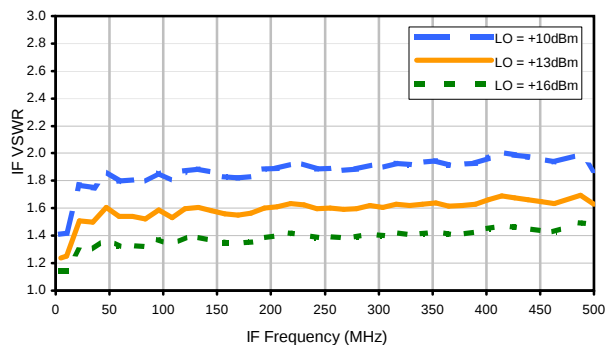
RF VSWR



LO VSWR



IF VSWR



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## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |    |    |    |    |    |    |    |    |    |    |
|--------|--------|--------|----|----|----|----|----|----|----|----|----|----|
| 0      | -      | -      | 17 | 25 | 22 | 31 | 25 | 45 | 35 | 57 | 41 | 62 |
| 1      | -      | 15     | +0 | 27 | 12 | 32 | 20 | 35 | 33 | 55 | 41 | 53 |
| 2      | 79     | 48     | 36 | 50 | 36 | 46 | 36 | 44 | 38 | 55 | 47 | 58 |
| 3      | >100   | 44     | 45 | 49 | 53 | 53 | 46 | 48 | 46 | 52 | 51 | 56 |
| 4      | >100   | 64     | 56 | 57 | 54 | 54 | 54 | 50 | 49 | 54 | 50 | 62 |
| 5      | >100   | 57     | 55 | 57 | 57 | 60 | 52 | 57 | 49 | 60 | 50 | 68 |
| 6      | >100   | 70     | 62 | 75 | 62 | 68 | 65 | 64 | 66 | 60 | 59 | 63 |
| 7      | >100   | 83     | 77 | 73 | 74 | 68 | 72 | 68 | 65 | 67 | 63 | 76 |
| 8      | >100   | 73     | 76 | 66 | 65 | 66 | 64 | 80 | 74 | 81 | 85 | 71 |
| 9      | >100   | 85     | 82 | 89 | 78 | 81 | 74 | 72 | 91 | 72 | 78 | 74 |
| 10     | >100   | 89     | 81 | 85 | 82 | 75 | 81 | 71 | 79 | 77 | 83 | 84 |
| RF CAL | 0      | 1      | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |    |

### LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; 4.00 dBm.  
LO IN: 280.01 MHz; +13.00 dBm  
IF OUT: 29.91 MHz; -2.24 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 9   | 16  | 9   | 17  | 11  | 29  | 21  | 36  | 28  | 51  |
| 1      | -      | 15     | +0  | 26  | 13  | 30  | 20  | 34  | 34  | 46  | 34  | 47  |
| 2      | 99     | 65     | 40  | 49  | 41  | 47  | 39  | 52  | 42  | 57  | 53  | 60  |
| 3      | >100   | 72     | 57  | 70  | 56  | 63  | 53  | 71  | 56  | 70  | 54  | 68  |
| 4      | >100   | 75     | 65  | 72  | 69  | 67  | 71  | 67  | 65  | 72  | 87  | 77  |
| 5      | >100   | 88     | 86  | 87  | 78  | 83  | 74  | >88 | 72  | 86  | 74  | 81  |
| 6      | >100   | >88    | >88 | >88 | >88 | 87  | >88 | 85  | 83  | 85  | 84  | 85  |
| 7      | >100   | >88    | >88 | >88 | >88 | >88 | >88 | >88 | 84  | >88 | >88 | >88 |
| 8      | >100   | >88    | >88 | >88 | >88 | >88 | >88 | >88 | 85  | >88 | >88 | >88 |
| 9      | >100   | >88    | >88 | >88 | >88 | >88 | >88 | >88 | >88 | 66  | >88 | >88 |
| 10     | >100   | >88    | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 | 78  | >88 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

### LO HARMONICS ORDER

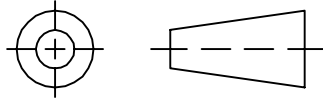
Test conditions: RF IN: 250.1 MHz; -6.00 dBm.  
LO IN: 280.01 MHz; +13.00 dBm  
IF OUT: 29.91 MHz; -12.18 dBm

- 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.

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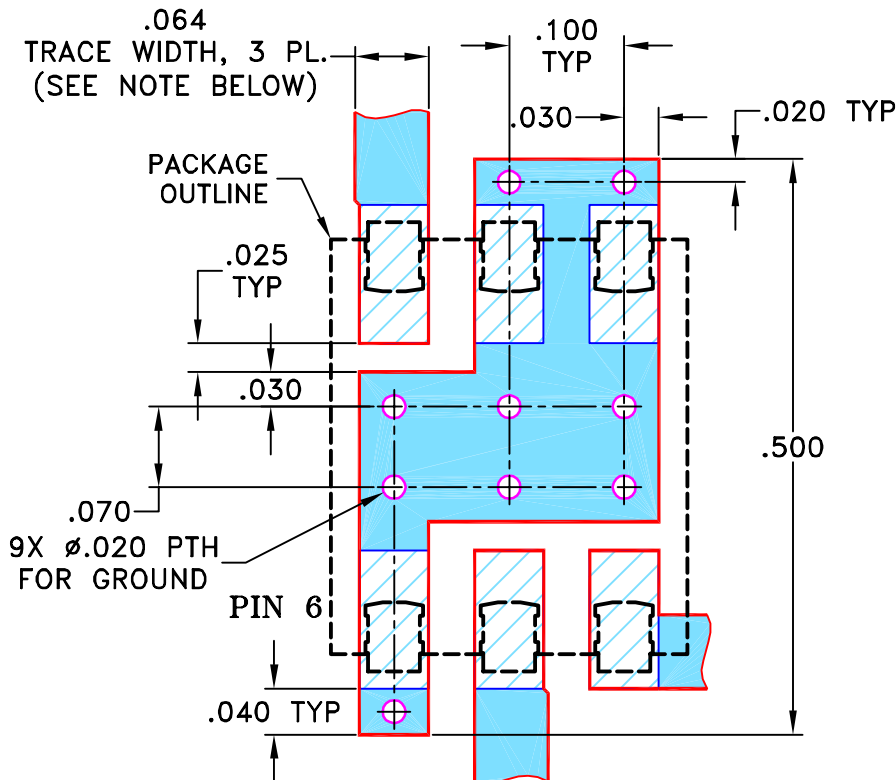
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION   | DATE     | DR | AUTH |
|-----|---------|---------------|----------|----|------|
| OR  | M82272  | NEW RELEASE   | 08/02/02 | AV | DJ   |
| A   | M102713 | UPDATED NOTES | 01/14/06 | GF | IL   |
|     |         |               |          |    |      |
|     |         |               |          |    |      |

### SUGGESTED MOUNTING CONFIGURATION FOR QQQ569 CASE STYLE, "w" PIN CONNECTION



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030"  $\pm$  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

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

DRAWN

AV

07/19/02

TOLERANCES ON:

CHECKED

WL

08/02/02

2 PL DECIMALS  $\pm$

APPROVED

DJ

08/02/02

3 PL DECIMALS  $\pm$  .005

ANGLES  $\pm$

FRACTIONS  $\pm$

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



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13 Neptune Avenue  
Brooklyn NY 11235

PL, w, QQQ569, LRMS-J, TB-44

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-083

REV:

A

FILE:

98PL083

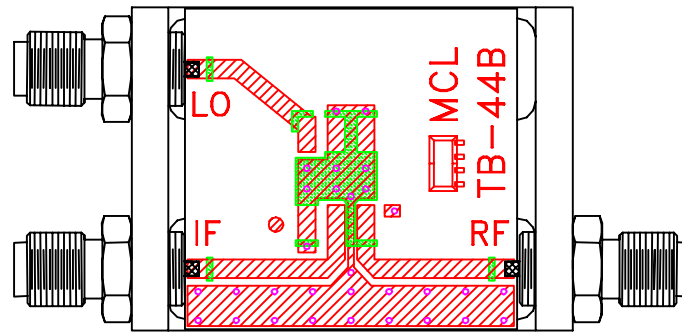
SCALE:

6:1

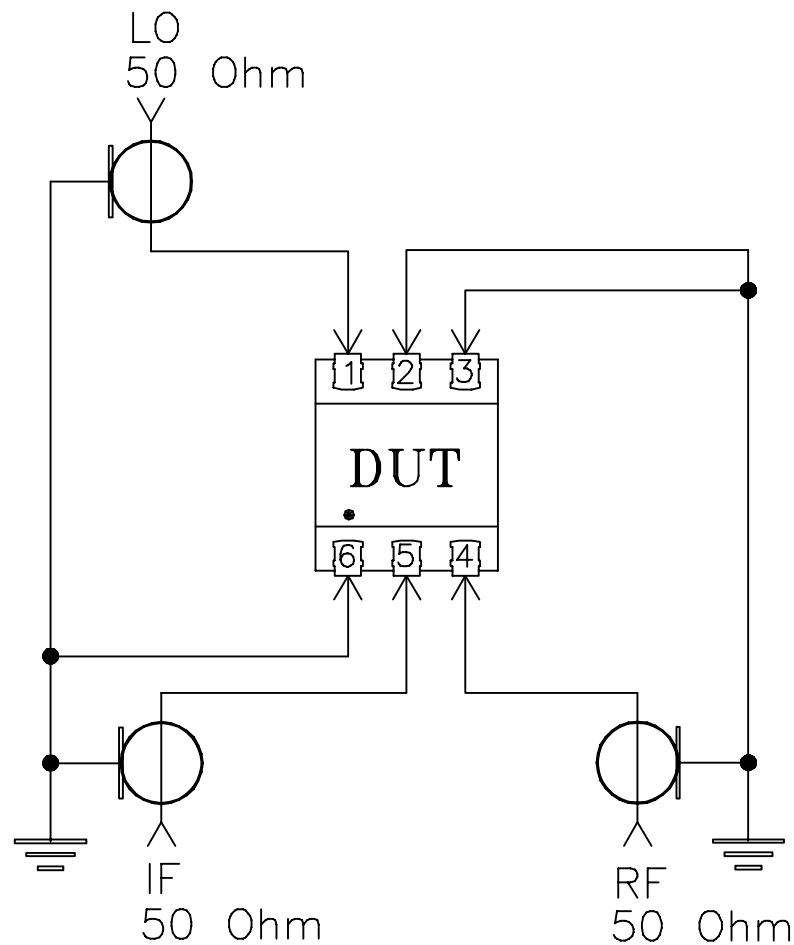
SHEET:

1 OF 1

# Evaluation Board and Circuit



TB-44+



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.030 inch.

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