

# Surface Mount Frequency Mixer

Level 7 (LO Power +7 dBm) 5 to 1000 MHz

SCM-2+



Generic photo used for illustration purposes only

CASE STYLE: YY109

## Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| Operating Temperature                                           | -40°C to 85°C  |
| Storage Temperature                                             | -55°C to 100°C |
| RF Power                                                        | 50mW           |
| IF Current                                                      | 40mA           |
| Permanent damage may occur if any of these limits are exceeded. |                |

## Pin Connections

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

## Features

- low conversion loss, 5.76 dB typ.
- high isolation, 40 dB typ.
- wideband, 5 to 1000 MHz

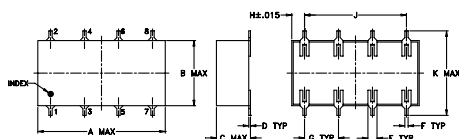
## Applications

- VHF/UHF
- cellular
- GSM/ISM

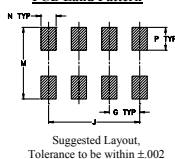
**+RoHS Compliant**

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

## Outline Drawing



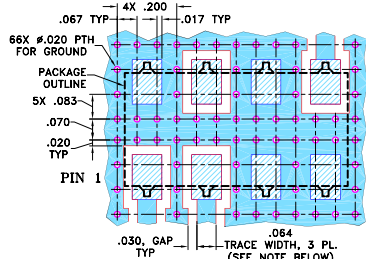
### PCB Land Pattern



## Outline Dimensions (inch/mm)

| A     | B     | C     | D     | E    | F    | G     |
|-------|-------|-------|-------|------|------|-------|
| .75   | .38   | .20   | .010  | .050 | .020 | .200  |
| 19.05 | 9.65  | 5.08  | 0.25  | 1.27 | 0.51 | 5.08  |
| H     | J     | K     | M     | N    | P    | wt    |
| .075  | .600  | .720  | .740  | .100 | .150 | grams |
| 1.91  | 15.24 | 18.29 | 18.80 | 2.54 | 3.81 | 1.6   |

## Demo Board MCL P/N: TB-172 Suggested PCB Layout (PL-132)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.

2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

■ DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

■ DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

### Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

## 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           |          | Total<br>Range<br>Max. | Typ. | L                       |      | M    |      | U    |      | L                       |      | M    |      | U    |    |                                   |
|                    |        | $\overline{X}$          | $\sigma$ |                        |      | Max.                    | Typ. | Min. | Typ. | Min. | Typ. | Min.                    | Typ. | Min. | Typ. | Min. |    |                                   |
|                    |        | $f_L$ - $f_U$           |          |                        |      |                         |      |      |      |      |      |                         |      |      |      |      |    |                                   |
| 5-1000             | DC-500 | 5.76                    | 0.03     | 8.3                    | 9.8  | 50                      | 40   | 40   | 25   | 35   | 20   | 55                      | 30   | 40   | 25   | 30   | 18 | 11                                |

1 dB COMP.: +1 dBm typ.

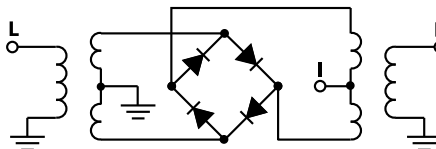
L = low range [ $f_L$  to  $10 f_L$ ]  
m= mid band [ $2f_L$  to  $f_U/2$ ]

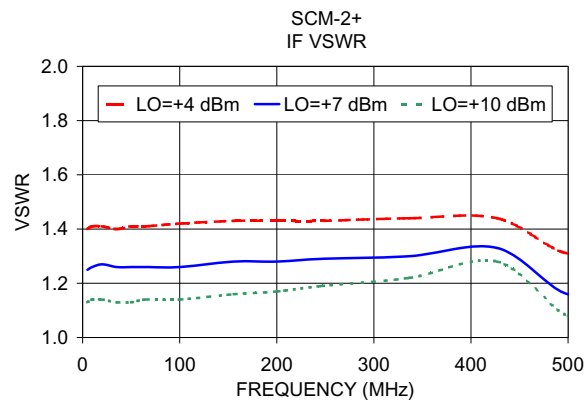
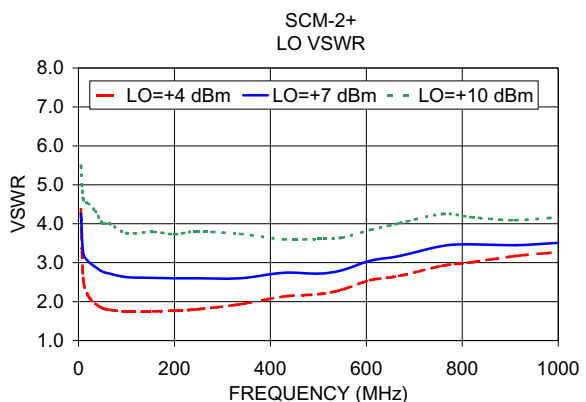
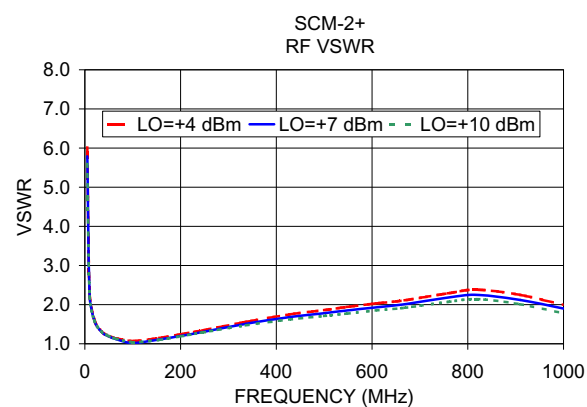
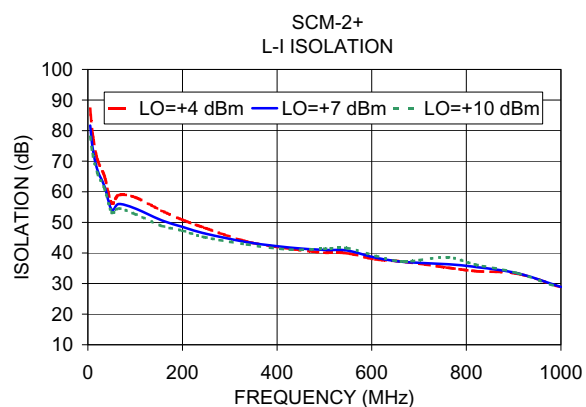
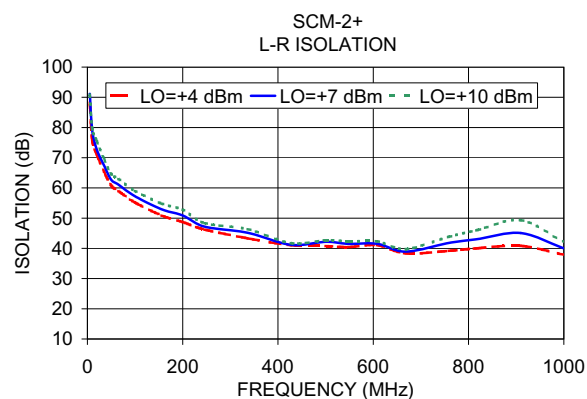
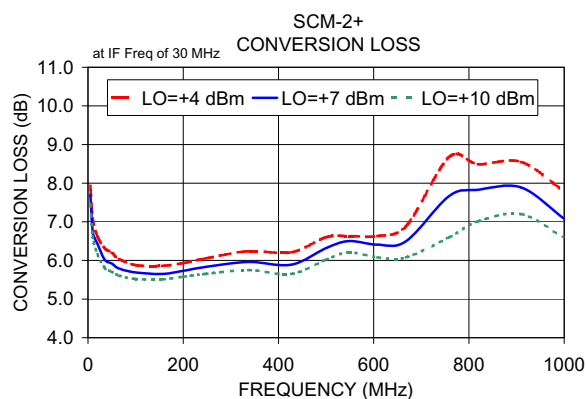
M = mid range [ $10 f_L$  to  $f_U/2$ ]  
U = upper range [ $f_U/2$  to  $f_U$ ]

## 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>+7dBm                | LO<br>+7dBm              | LO<br>+7dBm              | LO<br>+7dBm             | LO<br>+7dBm             |
| 5.00               | 35.00  | 7.70                       | 91.15                    | 81.65                    | 5.79                    | 4.26                    |
| 10.00              | 40.00  | 6.74                       | 79.06                    | 74.26                    | 2.25                    | 3.25                    |
| 20.00              | 50.00  | 6.43                       | 72.63                    | 67.23                    | 1.59                    | 3.04                    |
| 35.15              | 65.15  | 6.02                       | 67.42                    | 61.82                    | 1.30                    | 2.89                    |
| 50.00              | 80.00  | 5.92                       | 62.72                    | 54.16                    | 1.19                    | 2.77                    |
| 65.30              | 95.30  | 5.79                       | 61.08                    | 56.02                    | 1.12                    | 2.72                    |
| 100.00             | 70.00  | 5.69                       | 57.24                    | 54.55                    | 1.02                    | 2.63                    |
| 155.76             | 125.76 | 5.65                       | 52.92                    | 50.70                    | 1.11                    | 2.61                    |
| 200.00             | 170.00 | 5.73                       | 50.87                    | 48.52                    | 1.20                    | 2.60                    |
| 246.21             | 216.21 | 5.83                       | 47.20                    | 46.40                    | 1.30                    | 2.60                    |
| 336.67             | 306.67 | 5.96                       | 45.14                    | 43.55                    | 1.51                    | 2.60                    |
| 427.12             | 397.12 | 5.89                       | 41.17                    | 41.75                    | 1.68                    | 2.74                    |
| 500.00             | 470.00 | 6.32                       | 42.19                    | 40.98                    | 1.78                    | 2.72                    |
| 547.73             | 517.73 | 6.50                       | 41.49                    | 40.81                    | 1.85                    | 2.80                    |
| 608.03             | 578.03 | 6.41                       | 41.53                    | 38.45                    | 1.93                    | 3.05                    |
| 668.33             | 638.33 | 6.50                       | 38.93                    | 37.08                    | 2.01                    | 3.17                    |
| 758.79             | 728.79 | 7.67                       | 41.79                    | 36.35                    | 2.18                    | 3.43                    |
| 819.09             | 789.09 | 7.83                       | 43.08                    | 35.42                    | 2.25                    | 3.47                    |
| 909.55             | 879.55 | 7.89                       | 45.07                    | 33.32                    | 2.12                    | 3.45                    |
| 1000.00            | 970.00 | 7.08                       | 39.99                    | 28.91                    | 1.90                    | 3.51                    |

## Electrical Schematic





## Notes

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## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=30MHz<br>(dB) |       |       |
|---------------------|-------------|-------------------------------------------------------|-------|-------|
|                     |             | @LO (dBm)                                             |       |       |
|                     |             | +4                                                    | +7    | +10   |
| 5.0                 | 35.0        | 7.93                                                  | 7.70  | 7.46  |
| 10.0                | 40.0        | 7.07                                                  | 6.74  | 6.62  |
| 50.4                | 80.4        | 7.49                                                  | 7.03  | 6.79  |
| 90.7                | 120.7       | 7.34                                                  | 6.96  | 6.76  |
| 131.0               | 161.0       | 7.26                                                  | 6.90  | 6.76  |
| 171.3               | 201.3       | 7.24                                                  | 6.94  | 6.77  |
| 211.5               | 241.5       | 7.20                                                  | 6.91  | 6.76  |
| 251.8               | 281.8       | 7.23                                                  | 6.93  | 6.81  |
| 292.1               | 322.1       | 7.23                                                  | 6.94  | 6.79  |
| 332.4               | 362.4       | 7.24                                                  | 6.94  | 6.80  |
| 372.7               | 402.7       | 7.33                                                  | 7.06  | 6.83  |
| 413.0               | 443.0       | 7.34                                                  | 7.05  | 6.92  |
| 453.3               | 483.3       | 7.43                                                  | 7.05  | 6.82  |
| 493.6               | 523.6       | 7.41                                                  | 7.05  | 6.80  |
| 533.9               | 563.9       | 7.56                                                  | 7.23  | 6.96  |
| 574.2               | 604.2       | 7.59                                                  | 7.29  | 7.08  |
| 614.4               | 644.4       | 7.70                                                  | 7.33  | 7.10  |
| 654.7               | 684.7       | 7.72                                                  | 7.27  | 7.00  |
| 695.0               | 725.0       | 7.78                                                  | 7.20  | 6.97  |
| 735.3               | 765.3       | 8.14                                                  | 7.45  | 7.06  |
| 775.6               | 805.6       | 8.41                                                  | 7.65  | 7.12  |
| 815.9               | 845.9       | 8.64                                                  | 7.92  | 7.43  |
| 856.2               | 886.2       | 8.74                                                  | 8.00  | 7.46  |
| 896.5               | 926.5       | 8.76                                                  | 8.04  | 7.42  |
| 916.6               | 946.6       | 9.09                                                  | 8.39  | 7.73  |
| 956.9               | 986.9       | 9.25                                                  | 8.61  | 8.00  |
| 977.1               | 1007.1      | 9.26                                                  | 8.68  | 8.11  |
| 1017.3              | 1047.3      | 9.46                                                  | 8.86  | 8.37  |
| 1077.8              | 1107.8      | 9.20                                                  | 8.40  | 7.69  |
| 1097.9              | 1127.9      | 9.23                                                  | 8.32  | 7.58  |
| 1138.2              | 1168.2      | 8.85                                                  | 7.94  | 7.39  |
| 1158.4              | 1188.4      | 8.74                                                  | 7.85  | 7.41  |
| 1198.7              | 1228.7      | 8.69                                                  | 8.02  | 7.59  |
| 1218.8              | 1248.8      | 8.60                                                  | 8.00  | 7.65  |
| 1259.1              | 1289.1      | 9.02                                                  | 8.43  | 8.06  |
| 1279.2              | 1309.2      | 9.31                                                  | 8.72  | 8.35  |
| 1319.5              | 1349.5      | 9.75                                                  | 9.33  | 8.96  |
| 1339.7              | 1369.7      | 10.23                                                 | 9.75  | 9.46  |
| 1380.0              | 1410.0      | 10.65                                                 | 10.32 | 10.13 |
| 1400.1              | 1430.1      | 10.66                                                 | 10.35 | 10.17 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       |
|---------------------|-------------|--------------------|-------|-------|
|                     |             | @LO (dBm)          |       |       |
|                     |             | +4                 | +7    | +10   |
| 10.1                | 40.1        | 18.43              | 18.28 | 22.66 |
| 50.4                | 80.4        | 16.81              | 21.00 | 18.30 |
| 90.7                | 120.7       | 17.90              | 19.51 | 18.13 |
| 131.0               | 161.0       | 16.08              | 20.45 | 17.41 |
| 171.3               | 201.3       | 18.33              | 16.33 | 19.84 |
| 211.5               | 241.5       | 17.19              | 20.30 | 16.39 |
| 251.8               | 281.8       | 14.90              | 16.19 | 16.95 |
| 292.1               | 322.1       | 16.79              | 16.07 | 16.08 |
| 332.4               | 362.4       | 15.94              | 17.51 | 17.87 |
| 372.7               | 402.7       | 12.60              | 14.31 | 16.17 |
| 413.0               | 443.0       | 12.58              | 12.45 | 14.02 |
| 453.3               | 483.3       | 17.99              | 20.22 | 19.15 |
| 493.6               | 523.6       | 13.25              | 17.90 | 16.23 |
| 533.9               | 563.9       | 11.53              | 12.95 | 18.63 |
| 574.2               | 604.2       | 9.97               | 10.28 | 11.47 |
| 614.4               | 644.4       | 10.91              | 11.97 | 13.41 |
| 654.7               | 684.7       | 16.20              | 21.31 | 23.37 |
| 695.0               | 725.0       | 20.68              | 15.97 | 15.56 |
| 735.3               | 765.3       | 11.79              | 13.70 | 14.25 |
| 775.6               | 805.6       | 8.10               | 13.77 | 12.75 |
| 815.9               | 845.9       | 7.44               | 11.20 | 14.63 |
| 856.2               | 886.2       | 7.35               | 10.67 | 13.48 |
| 896.5               | 926.5       | 6.51               | 9.09  | 11.96 |
| 916.6               | 946.6       | 5.66               | 7.70  | 10.36 |
| 956.9               | 986.9       | 5.12               | 6.65  | 8.73  |
| 977.1               | 1007.1      | 5.18               | 6.29  | 7.84  |
| 1017.3              | 1047.3      | 4.38               | 5.04  | 6.03  |
| 1037.5              | 1067.5      | 4.13               | 4.78  | 5.98  |
| 1077.8              | 1107.8      | 3.69               | 5.25  | 7.64  |
| 1097.9              | 1127.9      | 3.95               | 5.78  | 8.54  |
| 1138.2              | 1168.2      | 6.06               | 9.33  | 11.48 |
| 1158.4              | 1188.4      | 7.29               | 10.32 | 12.50 |
| 1198.7              | 1228.7      | 8.32               | 10.73 | 12.21 |
| 1218.8              | 1248.8      | 9.36               | 12.02 | 13.72 |
| 1259.1              | 1289.1      | 8.98               | 10.97 | 12.83 |
| 1279.2              | 1309.2      | 9.03               | 11.12 | 13.13 |
| 1319.5              | 1349.5      | 8.81               | 11.20 | 13.49 |
| 1339.7              | 1369.7      | 7.77               | 10.84 | 12.57 |
| 1380.0              | 1410.0      | 7.62               | 10.81 | 12.87 |
| 1400.1              | 1430.1      | 8.45               | 11.43 | 14.08 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+1dBm<br>(dB) |      |      |
|---------------------|-------------|-------------------------------------|------|------|
|                     |             | @LO (dBm)                           |      |      |
|                     |             | +4                                  | +7   | +10  |
| 10.1                | 40.1        | 0.65                                | 0.45 | 0.32 |
| 50.4                | 80.4        | 0.61                                | 0.39 | 0.25 |
| 90.7                | 120.7       | 0.63                                | 0.36 | 0.22 |
| 131.0               | 161.0       | 0.60                                | 0.36 | 0.21 |
| 171.3               | 201.3       | 0.66                                | 0.36 | 0.21 |
| 211.5               | 241.5       | 0.54                                | 0.33 | 0.23 |
| 251.8               | 281.8       | 0.55                                | 0.34 | 0.22 |
| 292.1               | 322.1       | 0.58                                | 0.37 | 0.27 |
| 332.4               | 362.4       | 0.57                                | 0.39 | 0.26 |
| 372.7               | 402.7       | 0.58                                | 0.41 | 0.30 |
| 413.0               | 443.0       | 0.64                                | 0.44 | 0.31 |
| 453.3               | 483.3       | 0.71                                | 0.52 | 0.38 |
| 493.6               | 523.6       | 0.77                                | 0.61 | 0.48 |
| 533.9               | 563.9       | 0.86                                | 0.67 | 0.54 |
| 574.2               | 604.2       | 0.99                                | 0.75 | 0.59 |
| 614.4               | 644.4       | 1.08                                | 0.81 | 0.63 |
| 654.7               | 684.7       | 1.31                                | 1.00 | 0.82 |
| 695.0               | 725.0       | 1.53                                | 1.23 | 0.99 |
| 735.3               | 765.3       | 1.43                                | 1.29 | 1.10 |
| 775.6               | 805.6       | 1.37                                | 1.30 | 1.20 |
| 815.9               | 845.9       | 1.28                                | 1.20 | 1.09 |
| 856.2               | 886.2       | 1.28                                | 1.24 | 1.15 |
| 896.5               | 926.5       | 1.29                                | 1.25 | 1.19 |
| 916.6               | 946.6       | 1.22                                | 1.17 | 1.15 |
| 956.9               | 986.9       | 1.15                                | 1.05 | 1.04 |
| 977.1               | 1007.1      | 1.20                                | 1.06 | 1.02 |
| 1017.3              | 1047.3      | 1.19                                | 1.00 | 0.93 |
| 1037.5              | 1067.5      | 1.28                                | 1.14 | 1.07 |
| 1077.8              | 1107.8      | 1.36                                | 1.28 | 1.24 |
| 1097.9              | 1127.9      | 1.65                                | 1.53 | 1.45 |
| 1138.2              | 1168.2      | 1.92                                | 1.72 | 1.45 |
| 1158.4              | 1188.4      | 2.19                                | 1.83 | 1.51 |
| 1198.7              | 1228.7      | 2.43                                | 1.88 | 1.53 |
| 1218.8              | 1248.8      | 2.25                                | 1.78 | 1.48 |
| 1259.1              | 1289.1      | 2.30                                | 1.85 | 1.58 |
| 1279.2              | 1309.2      | 2.09                                | 1.73 | 1.51 |
| 1319.5              | 1349.5      | 1.77                                | 1.54 | 1.43 |
| 1339.7              | 1369.7      | 1.50                                | 1.26 | 1.18 |
| 1380.0              | 1410.0      | 1.31                                | 0.97 | 0.82 |
| 1400.1              | 1430.1      | 1.10                                | 0.79 | 0.64 |

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=500.1MHz<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)=1000.1MHz<br>(dB) |
|----------------------|-------------|-----------------------------------------------------------------|----------------------|-------------|----------------------------------------------------------------|----------------------|-------------|------------------------------------------------------------------|
|                      |             | @LO (dBm)                                                       |                      |             | @LO (dBm)                                                      |                      |             | @LO (dBm)                                                        |
|                      |             | +7                                                              |                      |             | +7                                                             |                      |             | +7                                                               |
| 490.0                | 10.1        | 6.84                                                            | 10.0                 | 20.1        | 6.95                                                           | 500.0                | 500.1       | 7.37                                                             |
| 477.7                | 22.4        | 6.78                                                            | 22.6                 | 32.7        | 6.75                                                           | 487.4                | 512.7       | 7.39                                                             |
| 465.4                | 34.7        | 6.73                                                            | 35.1                 | 45.2        | 6.74                                                           | 474.9                | 525.2       | 7.43                                                             |
| 453.1                | 47.0        | 6.73                                                            | 47.7                 | 57.8        | 6.76                                                           | 462.3                | 537.8       | 7.48                                                             |
| 440.8                | 59.3        | 6.78                                                            | 60.3                 | 70.4        | 6.74                                                           | 449.7                | 550.4       | 7.50                                                             |
| 428.5                | 71.6        | 6.73                                                            | 72.8                 | 82.9        | 6.76                                                           | 437.2                | 562.9       | 7.54                                                             |
| 416.2                | 83.9        | 6.67                                                            | 85.4                 | 95.5        | 6.76                                                           | 424.6                | 575.5       | 7.60                                                             |
| 403.8                | 96.3        | 6.65                                                            | 97.9                 | 108.0       | 6.77                                                           | 412.1                | 588.0       | 7.62                                                             |
| 391.5                | 108.6       | 6.62                                                            | 110.5                | 120.6       | 6.75                                                           | 399.5                | 600.6       | 7.55                                                             |
| 379.2                | 120.9       | 6.62                                                            | 123.1                | 133.2       | 6.73                                                           | 386.9                | 613.2       | 7.63                                                             |
| 366.9                | 133.2       | 6.61                                                            | 135.6                | 145.7       | 6.73                                                           | 374.4                | 625.7       | 7.65                                                             |
| 354.6                | 145.5       | 6.59                                                            | 148.2                | 158.3       | 6.77                                                           | 361.8                | 638.3       | 7.60                                                             |
| 342.3                | 157.8       | 6.63                                                            | 160.8                | 170.9       | 6.79                                                           | 349.2                | 650.9       | 7.52                                                             |
| 330.0                | 170.1       | 6.65                                                            | 173.3                | 183.4       | 6.78                                                           | 336.7                | 663.4       | 7.43                                                             |
| 317.7                | 182.4       | 6.64                                                            | 185.9                | 196.0       | 6.81                                                           | 324.1                | 676.0       | 7.29                                                             |
| 305.4                | 194.7       | 6.68                                                            | 198.5                | 208.6       | 6.77                                                           | 311.5                | 688.6       | 7.16                                                             |
| 293.1                | 207.0       | 6.65                                                            | 211.0                | 221.1       | 6.78                                                           | 299.0                | 701.1       | 7.06                                                             |
| 280.8                | 219.3       | 6.66                                                            | 223.6                | 233.7       | 6.78                                                           | 286.4                | 713.7       | 7.04                                                             |
| 268.5                | 231.6       | 6.70                                                            | 236.2                | 246.3       | 6.79                                                           | 273.8                | 726.3       | 7.08                                                             |
| 256.2                | 243.9       | 6.69                                                            | 248.7                | 258.8       | 6.85                                                           | 261.3                | 738.8       | 6.99                                                             |
| 243.8                | 256.3       | 6.74                                                            | 261.3                | 271.4       | 6.84                                                           | 248.7                | 751.4       | 7.12                                                             |
| 231.5                | 268.6       | 6.76                                                            | 273.8                | 283.9       | 6.84                                                           | 236.2                | 763.9       | 7.23                                                             |
| 219.2                | 280.9       | 6.72                                                            | 286.4                | 296.5       | 6.86                                                           | 223.6                | 776.5       | 7.25                                                             |
| 206.9                | 293.2       | 6.78                                                            | 299.0                | 309.1       | 6.87                                                           | 211.0                | 789.1       | 7.25                                                             |
| 194.6                | 305.5       | 6.78                                                            | 311.5                | 321.6       | 6.88                                                           | 198.5                | 801.6       | 7.37                                                             |
| 182.3                | 317.8       | 6.77                                                            | 324.1                | 334.2       | 6.92                                                           | 185.9                | 814.2       | 7.41                                                             |
| 170.0                | 330.1       | 6.80                                                            | 336.7                | 346.8       | 6.89                                                           | 173.3                | 826.8       | 7.40                                                             |
| 157.7                | 342.4       | 6.84                                                            | 349.2                | 359.3       | 6.89                                                           | 160.8                | 839.3       | 7.43                                                             |
| 145.4                | 354.7       | 6.84                                                            | 361.8                | 371.9       | 6.92                                                           | 148.2                | 851.9       | 7.65                                                             |
| 133.1                | 367.0       | 6.88                                                            | 374.4                | 384.5       | 6.98                                                           | 135.6                | 864.5       | 7.74                                                             |
| 120.8                | 379.3       | 6.90                                                            | 386.9                | 397.0       | 7.02                                                           | 123.1                | 877.0       | 7.61                                                             |
| 108.5                | 391.6       | 6.90                                                            | 399.5                | 409.6       | 7.00                                                           | 110.5                | 889.6       | 7.75                                                             |
| 96.2                 | 403.9       | 6.93                                                            | 412.1                | 422.2       | 6.96                                                           | 97.9                 | 902.2       | 7.85                                                             |
| 83.8                 | 416.3       | 6.93                                                            | 424.6                | 434.7       | 7.02                                                           | 85.4                 | 914.7       | 7.85                                                             |
| 71.5                 | 428.6       | 6.98                                                            | 437.2                | 447.3       | 7.03                                                           | 72.8                 | 927.3       | 7.84                                                             |
| 59.2                 | 440.9       | 7.01                                                            | 449.7                | 459.8       | 6.98                                                           | 60.3                 | 939.8       | 8.11                                                             |
| 46.9                 | 453.2       | 6.96                                                            | 462.3                | 472.4       | 7.01                                                           | 47.7                 | 952.4       | 8.20                                                             |
| 34.6                 | 465.5       | 6.97                                                            | 474.9                | 485.0       | 6.95                                                           | 35.1                 | 965.0       | 8.33                                                             |
| 22.3                 | 477.8       | 7.02                                                            | 487.4                | 497.5       | 6.98                                                           | 22.6                 | 977.5       | 8.35                                                             |
| 10.0                 | 490.1       | 7.11                                                            | 500.0                | 510.1       | 7.02                                                           | 10.0                 | 990.1       | 8.59                                                             |

## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +4                      | +7    | +10   | +4                      | +7    | +10   |
| 5.0         | 88.15                   | 91.15 | 90.85 | 87.15                   | 81.65 | 77.95 |
| 10.0        | 75.96                   | 79.06 | 79.76 | 78.96                   | 74.26 | 72.26 |
| 50.4        | 61.36                   | 62.53 | 63.15 | 81.09                   | 77.35 | 74.17 |
| 90.7        | 56.14                   | 57.19 | 58.08 | 74.46                   | 79.37 | 78.21 |
| 131.0       | 53.25                   | 54.41 | 55.17 | 66.20                   | 73.03 | 79.57 |
| 171.3       | 50.48                   | 51.83 | 52.82 | 60.83                   | 67.19 | 85.68 |
| 211.5       | 49.01                   | 50.38 | 51.28 | 58.19                   | 64.22 | 79.43 |
| 251.8       | 47.66                   | 48.94 | 49.82 | 56.61                   | 63.24 | 77.36 |
| 292.1       | 46.37                   | 47.74 | 48.67 | 54.44                   | 59.92 | 67.81 |
| 332.4       | 45.53                   | 46.87 | 47.97 | 53.89                   | 59.46 | 66.20 |
| 372.7       | 44.81                   | 46.12 | 47.27 | 53.32                   | 58.70 | 61.36 |
| 413.0       | 44.21                   | 45.81 | 47.12 | 51.40                   | 56.15 | 59.55 |
| 453.3       | 43.21                   | 44.72 | 46.00 | 51.45                   | 54.51 | 55.13 |
| 493.6       | 42.51                   | 44.14 | 45.49 | 50.85                   | 52.94 | 52.14 |
| 533.9       | 42.05                   | 43.77 | 45.21 | 49.83                   | 51.62 | 50.65 |
| 574.2       | 41.16                   | 42.97 | 44.55 | 48.01                   | 49.07 | 48.43 |
| 614.4       | 40.81                   | 42.58 | 44.16 | 46.03                   | 46.49 | 46.25 |
| 654.7       | 40.34                   | 42.03 | 43.67 | 44.44                   | 44.06 | 43.65 |
| 695.0       | 40.39                   | 42.37 | 44.11 | 42.76                   | 41.98 | 41.53 |
| 735.3       | 40.44                   | 42.27 | 43.87 | 42.47                   | 41.04 | 40.30 |
| 775.6       | 40.17                   | 42.15 | 43.77 | 43.08                   | 41.02 | 39.47 |
| 815.9       | 39.92                   | 42.08 | 43.80 | 42.84                   | 40.55 | 38.56 |
| 856.2       | 38.89                   | 41.25 | 43.22 | 41.44                   | 39.78 | 37.86 |
| 896.5       | 38.59                   | 40.88 | 42.94 | 39.30                   | 38.30 | 36.80 |
| 916.6       | 38.22                   | 40.44 | 42.44 | 38.61                   | 37.67 | 36.30 |
| 956.9       | 37.51                   | 39.67 | 41.98 | 36.54                   | 36.23 | 35.65 |
| 977.1       | 37.35                   | 39.51 | 41.72 | 35.71                   | 35.49 | 35.13 |
| 1017.3      | 37.18                   | 39.33 | 41.55 | 33.69                   | 33.71 | 33.78 |
| 1077.8      | 36.05                   | 38.26 | 40.88 | 31.63                   | 31.44 | 31.41 |
| 1097.9      | 35.91                   | 38.15 | 40.71 | 31.11                   | 30.98 | 30.94 |
| 1138.2      | 35.61                   | 38.50 | 41.82 | 30.34                   | 30.31 | 30.03 |
| 1158.4      | 36.55                   | 40.03 | 43.82 | 29.80                   | 29.70 | 29.27 |
| 1198.7      | 36.57                   | 40.42 | 45.07 | 28.67                   | 28.50 | 28.19 |
| 1218.8      | 36.78                   | 40.97 | 46.56 | 28.06                   | 28.04 | 27.72 |
| 1259.1      | 37.29                   | 41.84 | 48.79 | 26.95                   | 26.93 | 26.79 |
| 1279.2      | 36.48                   | 40.98 | 47.58 | 26.41                   | 26.46 | 26.37 |
| 1319.5      | 36.24                   | 40.88 | 47.34 | 25.28                   | 25.51 | 25.43 |
| 1339.7      | 37.04                   | 41.84 | 47.31 | 24.98                   | 25.13 | 25.13 |
| 1380.0      | 35.69                   | 39.99 | 43.62 | 24.01                   | 24.38 | 24.44 |
| 1400.1      | 35.81                   | 39.62 | 41.73 | 23.71                   | 24.12 | 24.19 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +4                      | +7    | +10   |
| 10.1                | 40.1        | 45.95                   | 55.28 | 66.28 |
| 50.4                | 80.4        | 36.89                   | 36.99 | 36.24 |
| 90.7                | 120.7       | 32.46                   | 32.14 | 32.06 |
| 131.0               | 161.0       | 29.87                   | 29.74 | 29.54 |
| 171.3               | 201.3       | 28.19                   | 28.23 | 28.17 |
| 211.5               | 241.5       | 27.20                   | 27.17 | 27.16 |
| 251.8               | 281.8       | 26.67                   | 26.75 | 26.76 |
| 292.1               | 322.1       | 26.66                   | 26.76 | 26.80 |
| 332.4               | 362.4       | 26.86                   | 27.15 | 27.32 |
| 372.7               | 402.7       | 26.91                   | 27.25 | 27.43 |
| 413.0               | 443.0       | 26.36                   | 26.48 | 26.60 |
| 453.3               | 483.3       | 25.94                   | 26.31 | 26.70 |
| 493.6               | 523.6       | 25.68                   | 26.29 | 27.14 |
| 533.9               | 563.9       | 24.91                   | 25.57 | 26.25 |
| 574.2               | 604.2       | 23.22                   | 23.44 | 23.65 |
| 614.4               | 644.4       | 20.68                   | 20.57 | 20.51 |
| 654.7               | 684.7       | 18.42                   | 18.10 | 17.86 |
| 695.0               | 725.0       | 16.94                   | 16.58 | 16.45 |
| 735.3               | 765.3       | 15.88                   | 15.53 | 15.22 |
| 775.6               | 805.6       | 15.17                   | 14.76 | 14.52 |
| 815.9               | 845.9       | 14.53                   | 14.20 | 13.93 |
| 856.2               | 886.2       | 13.95                   | 13.80 | 13.52 |
| 896.5               | 926.5       | 13.57                   | 13.51 | 13.35 |
| 916.6               | 946.6       | 13.45                   | 13.41 | 13.36 |
| 956.9               | 986.9       | 13.23                   | 13.29 | 13.36 |
| 977.1               | 1007.1      | 13.11                   | 13.18 | 13.29 |
| 1017.3              | 1047.3      | 12.92                   | 13.06 | 13.22 |
| 1037.5              | 1067.5      | 12.98                   | 13.13 | 13.37 |
| 1077.8              | 1107.8      | 13.02                   | 13.24 | 13.46 |
| 1097.9              | 1127.9      | 12.94                   | 13.25 | 13.36 |
| 1138.2              | 1168.2      | 13.05                   | 13.30 | 13.41 |
| 1158.4              | 1188.4      | 12.95                   | 13.19 | 13.31 |
| 1198.7              | 1228.7      | 12.74                   | 12.95 | 12.98 |
| 1218.8              | 1248.8      | 12.66                   | 12.77 | 12.80 |
| 1259.1              | 1289.1      | 12.19                   | 12.28 | 12.30 |
| 1279.2              | 1309.2      | 11.99                   | 12.05 | 12.04 |
| 1319.5              | 1349.5      | 11.51                   | 11.50 | 11.45 |
| 1339.7              | 1369.7      | 11.22                   | 11.19 | 11.10 |
| 1380.0              | 1410.0      | 10.93                   | 10.76 | 10.62 |
| 1400.1              | 1430.1      | 10.70                   | 10.52 | 10.34 |

## 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=1000.1MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|------|------|----------------------|----------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |      |      |                      | @LO (dBm)                        |      |      |
|                     |             | +4              | +7   | +10  |             | +4              | +7   | +10  |                      | +4                               | +7   | +10  |
| 5.0                 | 35.0        | 6.01            | 5.79 | 5.59 | 5.0         | 4.37            | 4.26 | 5.49 | 5.0                  | 1.40                             | 1.25 | 1.13 |
| 10.0                | 40.0        | 2.30            | 2.25 | 2.21 | 10.0        | 2.57            | 3.25 | 4.63 | 10.0                 | 1.41                             | 1.26 | 1.14 |
| 50.4                | 80.4        | 1.22            | 1.31 | 1.37 | 50.4        | 1.97            | 2.80 | 3.86 | 22.6                 | 2.85                             | 2.50 | 2.24 |
| 90.7                | 120.7       | 1.24            | 1.33 | 1.38 | 90.7        | 1.87            | 2.65 | 3.62 | 35.1                 | 2.61                             | 2.31 | 2.05 |
| 131.0               | 161.0       | 1.25            | 1.33 | 1.38 | 131.0       | 1.92            | 2.71 | 3.70 | 47.7                 | 2.38                             | 2.15 | 1.91 |
| 171.3               | 201.3       | 1.25            | 1.33 | 1.38 | 171.3       | 1.86            | 2.58 | 3.49 | 60.3                 | 2.33                             | 2.08 | 1.86 |
| 211.5               | 241.5       | 1.26            | 1.32 | 1.37 | 211.5       | 1.90            | 2.64 | 3.54 | 72.8                 | 2.37                             | 2.13 | 1.90 |
| 251.8               | 281.8       | 1.25            | 1.31 | 1.35 | 251.8       | 1.94            | 2.68 | 3.56 | 85.4                 | 2.46                             | 2.20 | 1.97 |
| 292.1               | 322.1       | 1.23            | 1.28 | 1.33 | 292.1       | 1.92            | 2.62 | 3.45 | 97.9                 | 2.57                             | 2.29 | 2.04 |
| 332.4               | 362.4       | 1.22            | 1.28 | 1.32 | 332.4       | 2.03            | 2.77 | 3.61 | 110.5                | 2.66                             | 2.37 | 2.11 |
| 372.7               | 402.7       | 1.20            | 1.25 | 1.29 | 372.7       | 2.11            | 2.84 | 3.67 | 123.1                | 2.71                             | 2.41 | 2.14 |
| 413.0               | 443.0       | 1.18            | 1.22 | 1.25 | 413.0       | 2.13            | 2.86 | 3.67 | 135.6                | 2.66                             | 2.37 | 2.11 |
| 453.3               | 483.3       | 1.19            | 1.23 | 1.27 | 453.3       | 2.21            | 2.91 | 3.70 | 148.2                | 2.54                             | 2.27 | 2.03 |
| 493.6               | 523.6       | 1.20            | 1.24 | 1.28 | 493.6       | 2.20            | 2.86 | 3.60 | 160.8                | 2.46                             | 2.20 | 1.96 |
| 533.9               | 563.9       | 1.20            | 1.23 | 1.26 | 533.9       | 2.32            | 2.98 | 3.71 | 173.3                | 2.48                             | 2.22 | 1.97 |
| 574.2               | 604.2       | 1.20            | 1.21 | 1.23 | 574.2       | 2.34            | 2.99 | 3.70 | 185.9                | 2.58                             | 2.30 | 2.05 |
| 614.4               | 644.4       | 1.19            | 1.20 | 1.21 | 614.4       | 2.44            | 3.07 | 3.76 | 198.5                | 2.67                             | 2.40 | 2.13 |
| 654.7               | 684.7       | 1.17            | 1.18 | 1.20 | 654.7       | 2.54            | 3.13 | 3.79 | 211.0                | 2.70                             | 2.42 | 2.15 |
| 695.0               | 725.0       | 1.18            | 1.18 | 1.19 | 695.0       | 2.61            | 3.20 | 3.88 | 223.6                | 2.63                             | 2.36 | 2.10 |
| 735.3               | 765.3       | 1.21            | 1.20 | 1.20 | 735.3       | 2.80            | 3.41 | 4.07 | 236.2                | 2.55                             | 2.29 | 2.03 |
| 775.6               | 805.6       | 1.26            | 1.24 | 1.23 | 775.6       | 2.81            | 3.40 | 4.01 | 248.7                | 2.51                             | 2.25 | 2.00 |
| 815.9               | 845.9       | 1.34            | 1.31 | 1.30 | 815.9       | 2.95            | 3.56 | 4.17 | 261.3                | 2.54                             | 2.28 | 2.03 |
| 856.2               | 886.2       | 1.42            | 1.38 | 1.37 | 856.2       | 3.01            | 3.61 | 4.23 | 273.8                | 2.58                             | 2.33 | 2.08 |
| 896.5               | 926.5       | 1.51            | 1.47 | 1.44 | 896.5       | 3.14            | 3.74 | 4.36 | 286.4                | 2.62                             | 2.36 | 2.11 |
| 916.6               | 946.6       | 1.57            | 1.53 | 1.49 | 916.6       | 3.27            | 3.89 | 4.52 | 299.0                | 2.63                             | 2.37 | 2.11 |
| 956.9               | 986.9       | 1.66            | 1.62 | 1.58 | 956.9       | 3.30            | 3.89 | 4.51 | 311.5                | 2.63                             | 2.36 | 2.10 |
| 977.1               | 1007.1      | 1.70            | 1.66 | 1.63 | 977.1       | 3.42            | 4.00 | 4.61 | 324.1                | 2.64                             | 2.37 | 2.11 |
| 1017.3              | 1047.3      | 1.78            | 1.74 | 1.70 | 1017.3      | 3.60            | 4.20 | 4.83 | 336.7                | 2.63                             | 2.36 | 2.11 |
| 1037.5              | 1067.5      | 1.79            | 1.75 | 1.72 | 1037.5      | 3.50            | 4.04 | 4.64 | 349.2                | 2.60                             | 2.35 | 2.09 |
| 1077.8              | 1107.8      | 1.85            | 1.81 | 1.76 | 1077.8      | 3.51            | 3.98 | 4.54 | 361.8                | 2.57                             | 2.32 | 2.07 |
| 1097.9              | 1127.9      | 1.89            | 1.84 | 1.80 | 1097.9      | 3.51            | 3.97 | 4.53 | 374.4                | 2.56                             | 2.31 | 2.06 |
| 1138.2              | 1168.2      | 1.98            | 1.94 | 1.92 | 1138.2      | 3.59            | 4.02 | 4.61 | 386.9                | 2.58                             | 2.32 | 2.07 |
| 1158.4              | 1188.4      | 2.03            | 2.00 | 1.98 | 1158.4      | 3.66            | 4.15 | 4.77 | 399.5                | 2.61                             | 2.35 | 2.10 |
| 1198.7              | 1228.7      | 2.18            | 2.15 | 2.13 | 1198.7      | 3.73            | 4.24 | 4.86 | 412.1                | 2.62                             | 2.36 | 2.11 |
| 1218.8              | 1248.8      | 2.27            | 2.23 | 2.20 | 1218.8      | 3.85            | 4.31 | 4.88 | 424.6                | 2.58                             | 2.32 | 2.07 |
| 1259.1              | 1289.1      | 2.42            | 2.40 | 2.36 | 1259.1      | 4.21            | 4.62 | 5.17 | 437.2                | 2.53                             | 2.28 | 2.03 |
| 1279.2              | 1309.2      | 2.51            | 2.49 | 2.45 | 1279.2      | 4.29            | 4.63 | 5.14 | 449.7                | 2.52                             | 2.26 | 2.02 |
| 1319.5              | 1349.5      | 2.67            | 2.67 | 2.62 | 1319.5      | 4.68            | 4.91 | 5.38 | 462.3                | 2.52                             | 2.27 | 2.04 |
| 1339.7              | 1369.7      | 2.74            | 2.78 | 2.76 | 1339.7      | 4.92            | 5.19 | 5.68 | 474.9                | 2.55                             | 2.30 | 2.06 |
| 1380.0              | 1410.0      | 2.84            | 2.93 | 2.95 | 1380.0      | 5.20            | 5.31 | 5.70 | 487.4                | 2.55                             | 2.30 | 2.06 |
| 1400.1              | 1430.1      | 2.89            | 2.97 | 3.01 | 1400.1      | 5.38            | 5.47 | 5.83 | 500.0                | 2.50                             | 2.25 | 2.02 |

## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 23  | 25  | 23  | 29  | 23  | 38  | 35  | 40  | 45  | 56  |
| 1  | -      | 19     | +0  | 30  | 12  | 31  | 24  | 38  | 46  | 36  | 42  | 44  |
| 2  | >100   | 74     | 59  | 62  | 63  | 67  | 61  | 71  | 65  | 79  | 70  | >79 |
| 3  | >100   | 63     | 65  | 64  | 60  | 65  | 58  | 66  | 69  | 78  | >79 | 73  |
| 4  | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 5  | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 6  | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 7  | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 8  | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 9  | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 10 | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -14.00 dBm.  
LO IN: 530.01 MHz; +7.00 dBm  
IF OUT: 29.91 MHz; -21.12 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 32  | 36  | 35  | 41  | 34  | 49  | 49  | 51  | 57  | 69  |
| 1  | -      | 21     | +0  | 27  | 12  | 35  | 25  | 44  | 46  | 42  | 46  | 50  |
| 2  | 97     | 57     | 51  | 56  | 54  | 62  | 53  | 60  | 59  | 66  | 64  | 72  |
| 3  | >100   | 48     | 45  | 53  | 62  | 50  | 45  | 54  | 54  | 57  | 70  | 51  |
| 4  | >100   | 73     | 68  | 67  | 71  | 69  | 76  | 68  | 74  | 85  | 79  | >89 |
| 5  | >100   | 68     | 75  | 61  | 54  | 62  | 54  | 62  | 53  | 63  | 65  | >89 |
| 6  | >100   | >89    | >89 | >89 | 83  | >89 | >89 | >89 | 85  | 87  | >89 | >89 |
| 7  | >100   | 83     | >89 | 86  | 77  | 79  | >89 | 83  | 81  | 79  | 74  | 79  |
| 8  | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| 9  | >100   | >89    | >89 | >89 | >89 | >89 | >89 | 87  | 88  | 85  | 86  | 86  |
| 10 | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -4.00 dBm.  
LO IN: 530.01 MHz; +7.00 dBm  
IF OUT: 29.91 MHz; -11.1 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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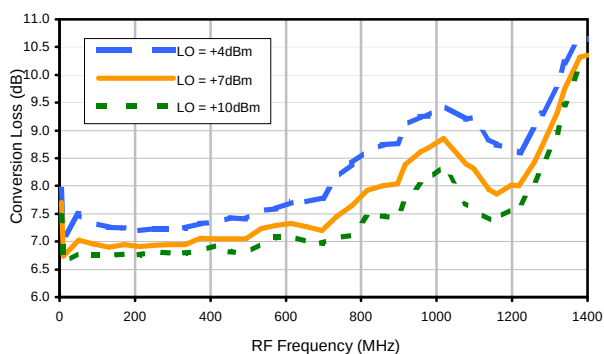
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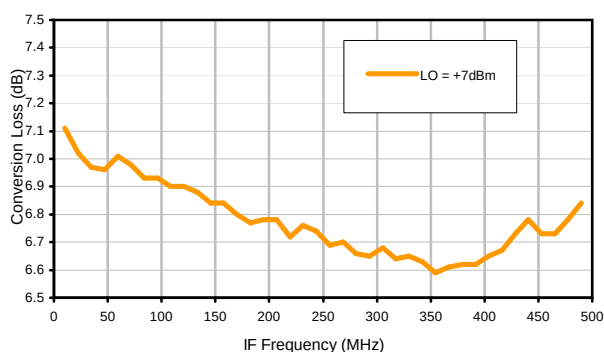


## Typical Performance Curves

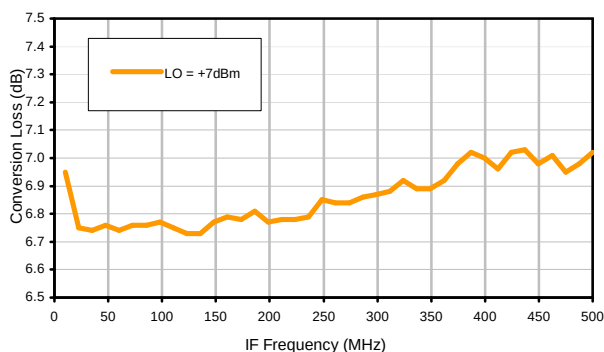
Conversion Loss @ IF=30MHz



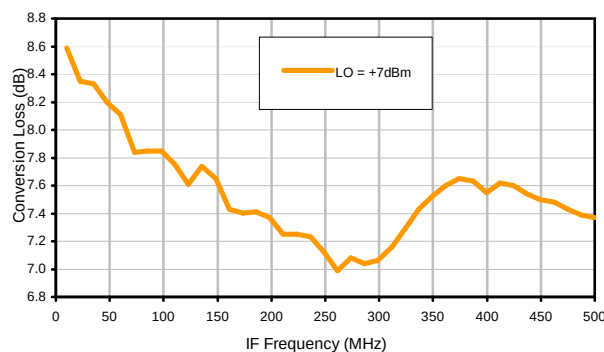
Conversion Loss vs. IF @ RF=500.1MHz



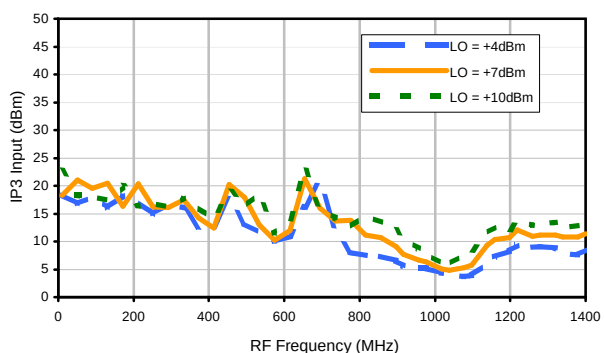
Conversion Loss vs. IF @ RF=10.1MHz



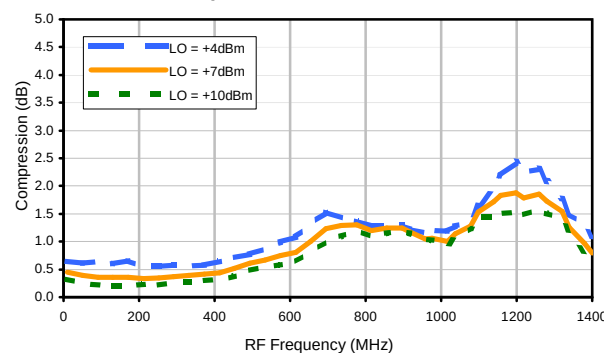
Conversion Loss vs. IF @ RF=1000.1MHz



IP3 Input



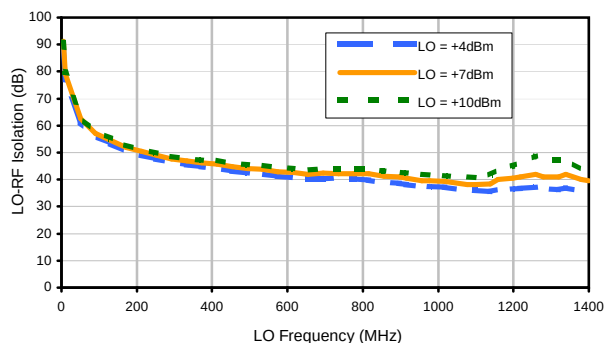
Compression @ RF IN=+1dBm



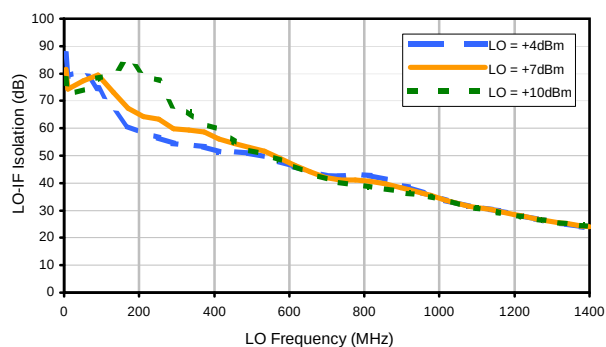


## Typical Performance Curves

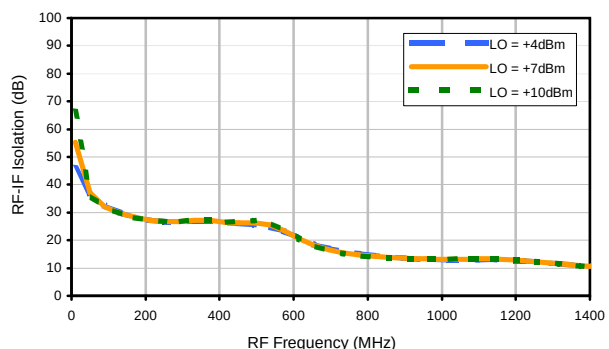
LO-RF Isolation



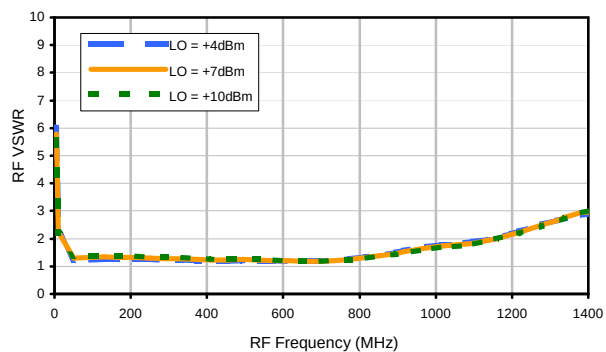
LO-IF Isolation



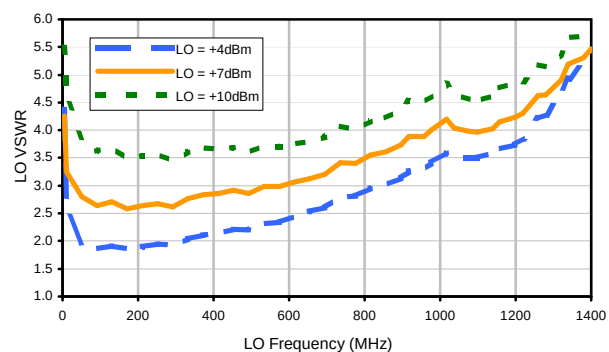
RF-IF Isolation



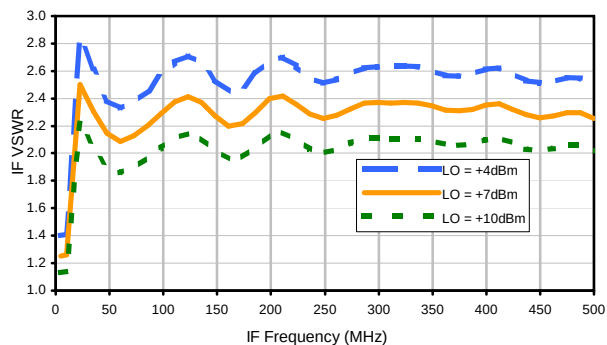
RF VSWR



LO VSWR



IF VSWR



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## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 23  | 25  | 23  | 29  | 23  | 38  | 35  | 40  | 45  | 56  |
| 1      | -      | 19     | +0  | 30  | 12  | 31  | 24  | 38  | 46  | 36  | 42  | 44  |
| 2      | >100   | 74     | 59  | 62  | 63  | 67  | 61  | 71  | 65  | 79  | 70  | >79 |
| 3      | >100   | 63     | 65  | 64  | 60  | 65  | 58  | 66  | 69  | 78  | >79 | 73  |
| 4      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 5      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 6      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 7      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 8      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 9      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 10     | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

### LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -14.00 dBm.  
LO IN: 530.01 MHz; +7.00 dBm  
IF OUT: 29.91 MHz; -21.12 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 32  | 36  | 35  | 41  | 34  | 49  | 49  | 51  | 57  | 69  |
| 1      | -      | 21     | +0  | 27  | 12  | 35  | 25  | 44  | 46  | 42  | 46  | 50  |
| 2      | 97     | 57     | 51  | 56  | 54  | 62  | 53  | 60  | 59  | 66  | 64  | 72  |
| 3      | >100   | 48     | 45  | 53  | 62  | 50  | 45  | 54  | 54  | 57  | 70  | 51  |
| 4      | >100   | 73     | 68  | 67  | 71  | 69  | 76  | 68  | 74  | 85  | 79  | >89 |
| 5      | >100   | 68     | 75  | 61  | 54  | 62  | 54  | 62  | 53  | 63  | 65  | >89 |
| 6      | >100   | >89    | >89 | >89 | 83  | >89 | >89 | >89 | 85  | 87  | >89 | >89 |
| 7      | >100   | 83     | >89 | 86  | 77  | 79  | >89 | 83  | 81  | 79  | 74  | 79  |
| 8      | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| 9      | >100   | >89    | >89 | >89 | >89 | >89 | >89 | 87  | 88  | 85  | 86  | 86  |
| 10     | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

### LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -4.00 dBm.  
LO IN: 530.01 MHz; +7.00 dBm  
IF OUT: 29.91 MHz; -11.1 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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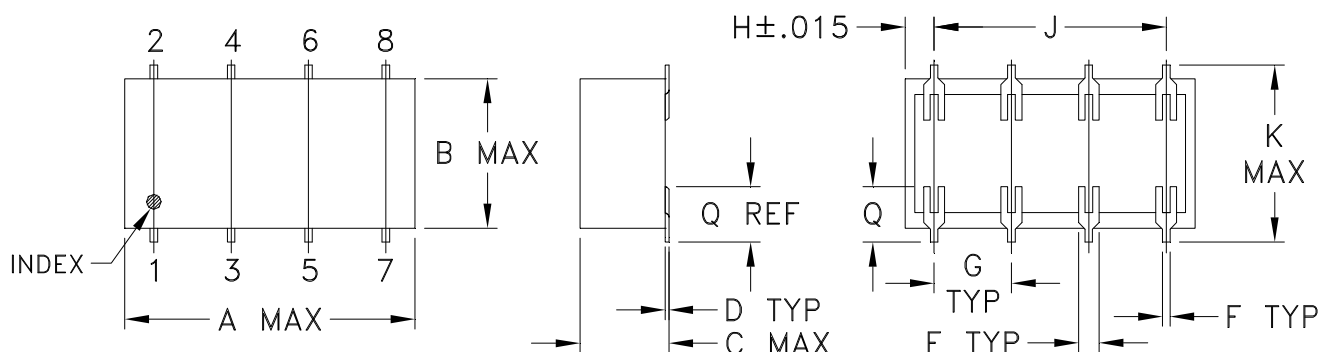


# Case Style

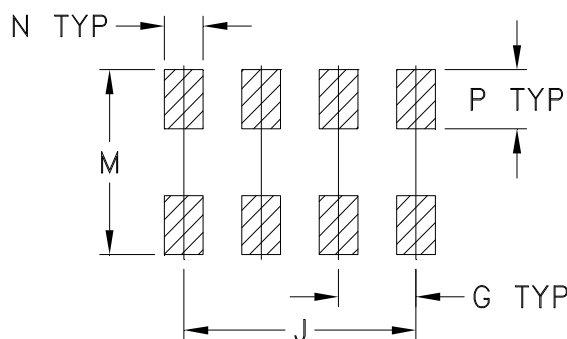
YY

## Outline Dimensions

YY101  
YY109  
YY161



## PCB Land Pattern



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

| CASE#  | A              | B             | C             | D              | E              | F              | G              | H              | J               | K               | L  | M               | N              | P              | Q              | WT.<br>GRAM<br>S |
|--------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|----|-----------------|----------------|----------------|----------------|------------------|
| YY101* |                |               | .20<br>(5.08) |                |                |                |                |                |                 | .450<br>(11.43) | -- | .470<br>(11.94) |                |                |                | 1.6              |
| YY109* | .75<br>(19.05) | .38<br>(9.65) | .20<br>(5.08) | .010<br>(0.25) | .050<br>(1.27) | .020<br>(0.51) | .200<br>(5.08) | .075<br>(1.91) | .600<br>(15.24) | .720<br>(18.29) | -- | .740<br>(18.80) | .100<br>(2.54) | .150<br>(3.81) | .148<br>(3.76) | 1.6              |
| YY161  |                |               | .28<br>(7.11) |                |                |                |                |                |                 | .450<br>(11.43) | -- | .470<br>(11.94) |                |                |                | 1.6              |

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

### Notes:

- Case material: Plastic.
- Termination finish:  
For RoHS Case Styles: Tin plate over Nickel plate.  
For RoHS-5 Case Styles: Tin-Lead plate.
- Special Tolerances: Termination thickness  $\pm .003$  inch.
- \* Denotes: For SCM mixers, long termination version (case YY109) is available upon request, consult factory. To order short termination version (case YY101) add -NL suffix.



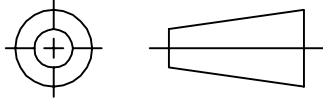
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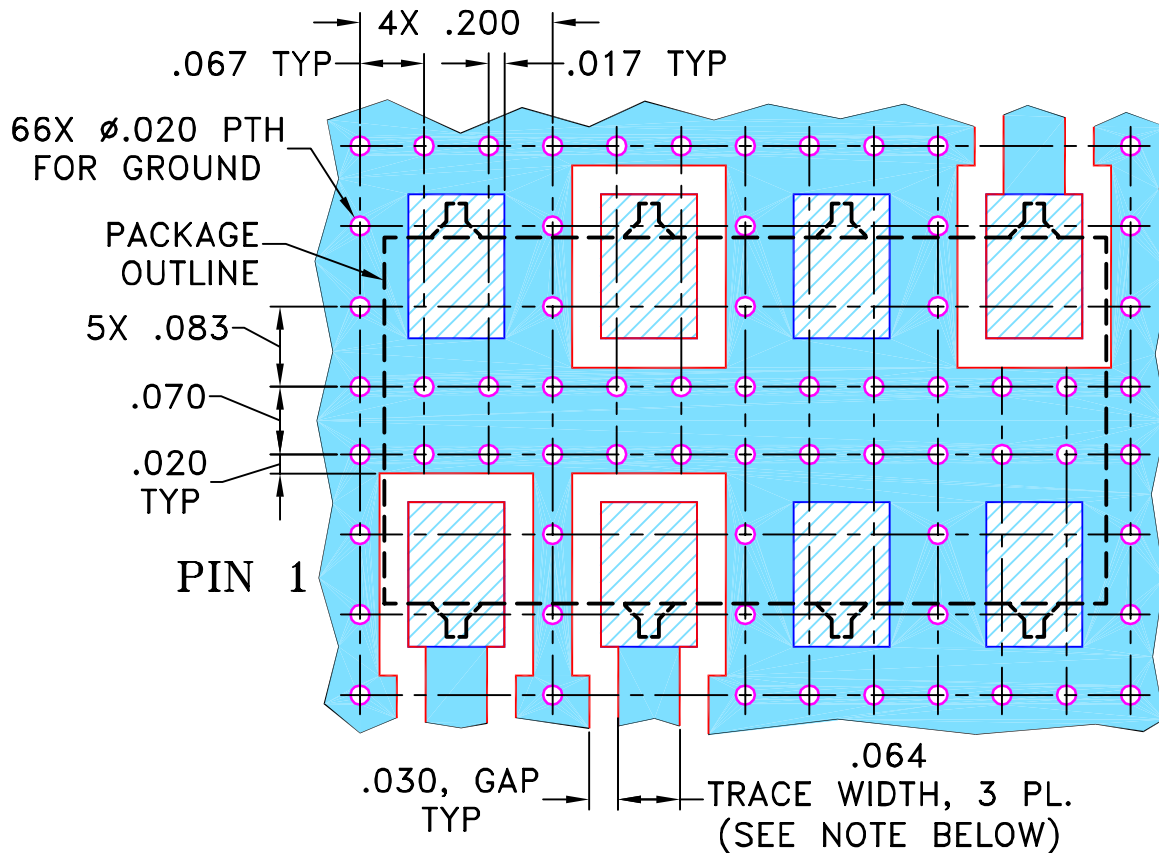
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION                        | DATE     | DR | AUTH |
|-----|---------|------------------------------------|----------|----|------|
| OR  | M88234  | NEW RELEASE                        | 08/06/03 | AV | WL   |
| A   | M91639  | REMOVED NOTE 2, UPDATED DIMENSIONS | 04/14/04 | AV | DJ   |
| B   | M102713 | ADDED "...WITH SMOBC"              | 01/16/08 | GF | IL   |

### SUGGESTED MOUNTING CONFIGURATION FOR YY101 CASE STYLE, "k" PIN CONNECTION



**NOTE:** 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

07/28/03

TOLERANCES ON:

CHECKED

IL

08/06/03

2 PL DECIMALS  $\pm$ 

APPROVED

WL

08/06/03

3 PL DECIMALS  $\pm$  .005ANGLES  $\pm$ FRACTIONS  $\pm$ 

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PL, k, YY101, SCM, TB-172

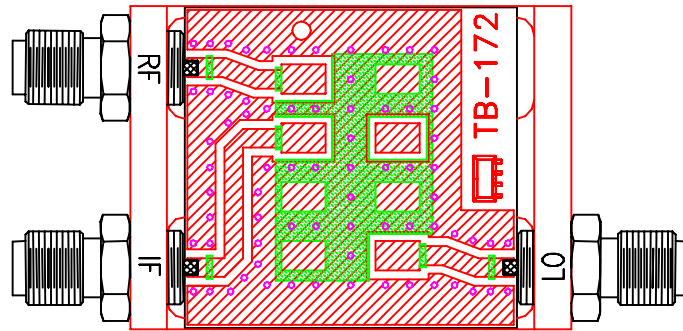
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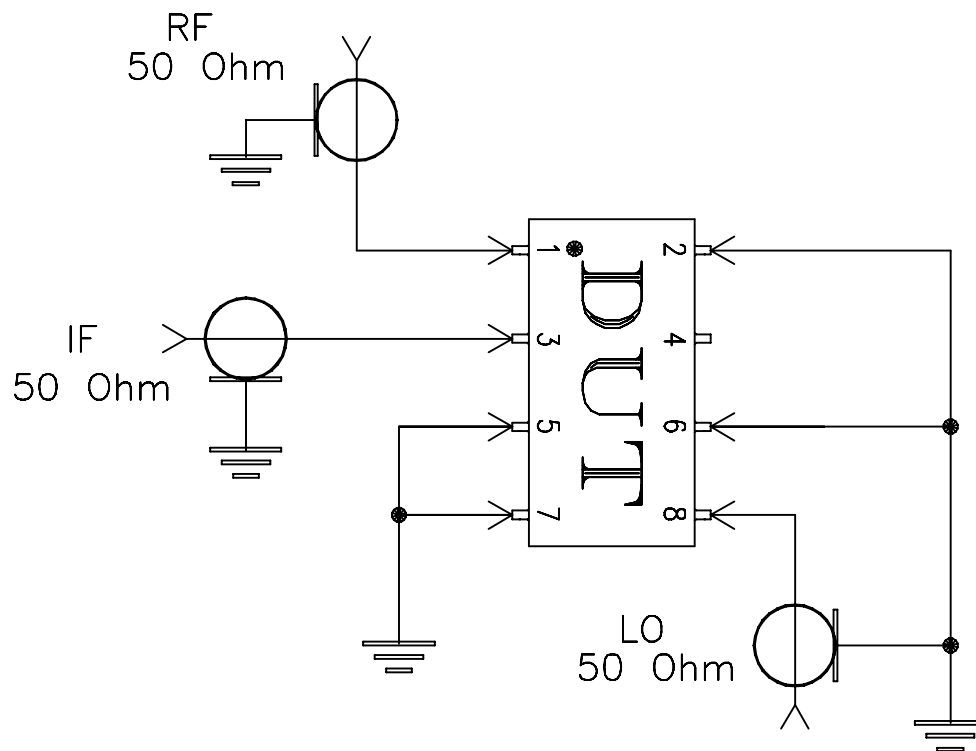
SCALE: 5:1

SHEET: 1 OF 1

# Evaluation Board and Circuit



TB-172



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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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>Ambient Environment                                                                                                                             | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                                                          |
| Humidity                       | 90 to 95% RH, 240 hours, 50°C                                                                                                                                   | MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                                                                       | MIL-STD-202, Method 107, Condition A-3, except +100°C                                                |
| Solder Reflow Heat             | Sn-Pb Eutetic Process: 225°C peak<br>Pb-Free Process 245° - 250°C peak                                                                                          | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1                                                        |
| Solderability                  | 10X Magnification                                                                                                                                               | J-STD-002, 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                                                                              |