

# Frequency Mixer

ADE-12+

Level 7 (LO Power +7 dBm) 50 to 1000 MHz

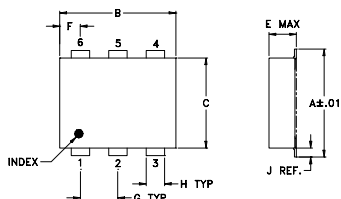
## Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| 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. |                |

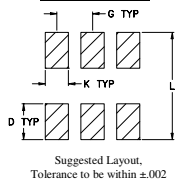
## Pin Connections

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

## Outline Drawing



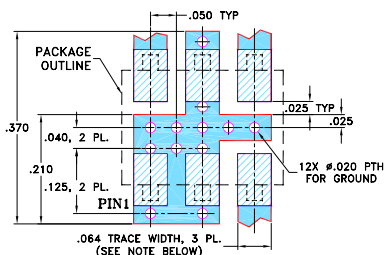
### PCB Land Pattern



## Outline Dimensions (inch)

| A    | B    | C    | D    | E    | F     | G    |
|------|------|------|------|------|-------|------|
| .272 | .310 | .220 | .100 | .082 | .055  | .100 |
| 6.91 | 7.87 | 5.59 | 2.54 | 2.08 | 1.40  | 2.54 |
| H    | J    | K    | L    |      | wt    |      |
| .030 | .026 | .065 | .300 |      | grams |      |
| 0.76 | 0.66 | 1.65 | 7.62 |      | 0.15  |      |

## Demo Board MCL P/N: TB-02 Suggested PCB Layout (PL-051)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .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.  
3. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
4. DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## Features

- low conversion loss, 7.0 dB typ.
- excellent IP3, 17 dBm typ.
- low profile package
- aqueous washable
- protected by U.S. Patent 6,133,525

## Applications

- cellular
- VHF/UHF



Generic photo used for illustration purposes only  
CASE STYLE: CD541

### +RoHS Compliant

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



Available Tape and Reel  
at no extra cost

| Reel Size | Devices/Reel     |
|-----------|------------------|
| 7"        | 20, 50, 100, 200 |
| 13"       | 500, 1000        |

## Electrical Specifications

| FREQUENCY<br>(MHz)     |         | CONVERSION LOSS<br>(dB) |          |      |                        | LO-RF ISOLATION<br>(dB) |      |      |      | LO-IF ISOLATION<br>(dB) |      |      |      | IP3<br>at center<br>band<br>(dBm) |
|------------------------|---------|-------------------------|----------|------|------------------------|-------------------------|------|------|------|-------------------------|------|------|------|-----------------------------------|
| LO/RF<br>$f_L$ - $f_U$ | IF      | Mid-Band<br>$m$         |          |      | Total<br>Range<br>Max. | L                       |      | U    |      | L                       |      | U    |      |                                   |
|                        |         | $\overline{X}$          | $\sigma$ | Max. |                        | Typ.                    | Min. | Typ. | Min. | Typ.                    | Min. | Typ. | Min. |                                   |
| 50-1000                | DC-1000 | 7.0                     | 0.15     | 8.0  | 9.0                    | 40                      | 25   | 33   | 22   | 44                      | 26   | 37   | 20   | 17                                |

1 dB COMP.: +1 dBm typ.

L = low range [ $f_L$  to 10  $f_L$ ]

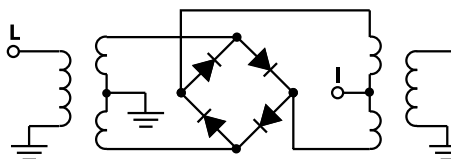
U = upper range [ $f_U/2$  to  $f_U$ ]

m = mid band [ $2f_L$  to  $f_U/2$ ]

## Typical Performance Data

| Frequency (MHz) |         | Conversion Loss (dB) | Isolation L-R (dB) | Isolation L-I (dB) | VSWR RF Port (:1) | VSWR LO Port (:1) |
|-----------------|---------|----------------------|--------------------|--------------------|-------------------|-------------------|
| RF              | LO      |                      |                    |                    |                   |                   |
|                 |         | LO +7dBm             | LO +7dBm           | LO +7dBm           | LO +7dBm          | LO +7dBm          |
| 50.00           | 80.00   | 7.27                 | 51.50              | 46.30              | 2.68              | 1.39              |
| 70.00           | 100.00  | 7.27                 | 49.70              | 44.50              | 2.65              | 1.41              |
| 80.00           | 110.00  | 7.18                 | 48.90              | 43.90              | 2.68              | 1.42              |
| 100.00          | 130.00  | 7.18                 | 47.70              | 42.50              | 2.68              | 1.41              |
| 117.86          | 147.86  | 7.19                 | 46.30              | 41.80              | 2.76              | 1.43              |
| 185.71          | 215.71  | 7.23                 | 43.40              | 39.00              | 2.68              | 1.41              |
| 253.57          | 283.57  | 7.08                 | 41.00              | 37.40              | 2.55              | 1.42              |
| 321.43          | 351.43  | 7.04                 | 39.30              | 35.50              | 2.61              | 1.40              |
| 389.29          | 419.29  | 6.94                 | 37.90              | 35.20              | 2.68              | 1.39              |
| 457.14          | 487.14  | 6.85                 | 37.00              | 34.20              | 2.61              | 1.35              |
| 500.00          | 530.00  | 6.90                 | 36.70              | 33.60              | 2.61              | 1.30              |
| 525.00          | 555.00  | 6.93                 | 36.50              | 33.20              | 2.55              | 1.27              |
| 592.86          | 622.86  | 6.96                 | 35.60              | 33.90              | 2.65              | 1.27              |
| 660.71          | 690.71  | 6.84                 | 35.80              | 34.80              | 2.80              | 1.25              |
| 728.57          | 758.57  | 6.85                 | 35.30              | 34.80              | 2.84              | 1.21              |
| 796.43          | 826.43  | 6.87                 | 34.70              | 37.00              | 2.80              | 1.21              |
| 800.00          | 830.00  | 6.92                 | 34.70              | 37.00              | 2.84              | 1.22              |
| 864.29          | 894.29  | 6.87                 | 34.70              | 36.10              | 3.06              | 1.17              |
| 932.14          | 962.14  | 6.85                 | 34.70              | 28.40              | 3.26              | 1.23              |
| 1000.00         | 1030.00 | 6.91                 | 35.60              | 25.60              | 3.44              | 1.26              |

## Electrical Schematic



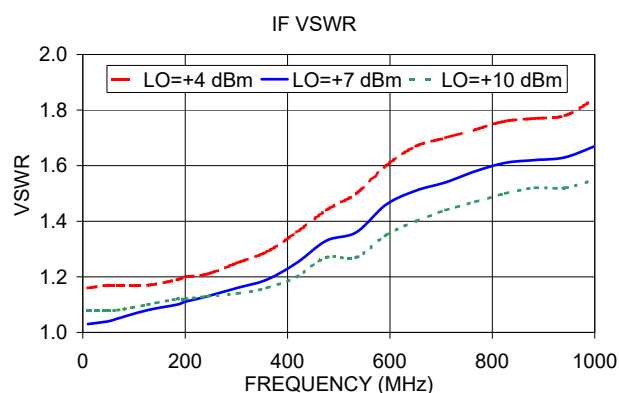
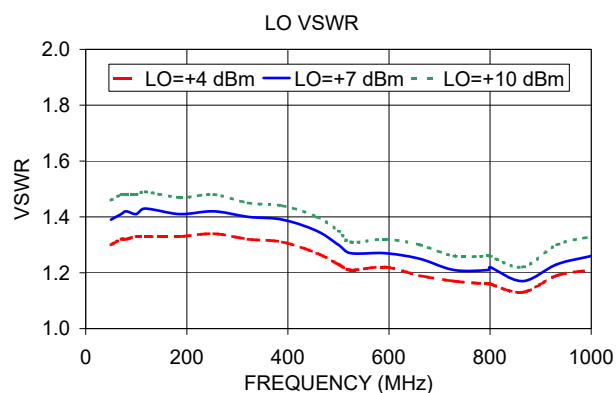
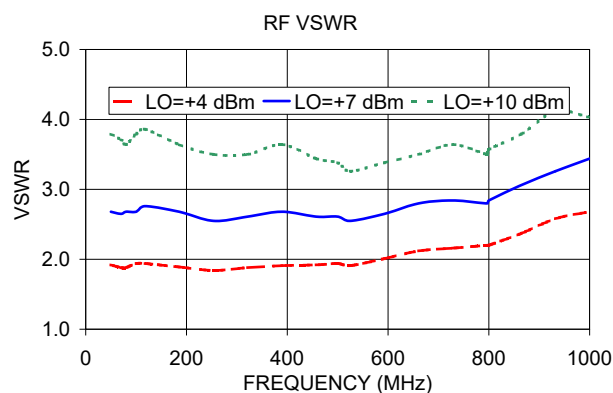
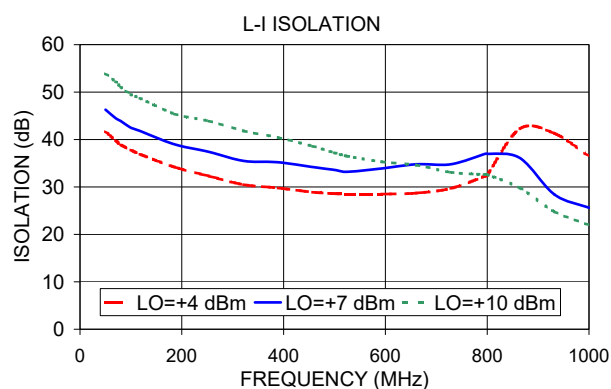
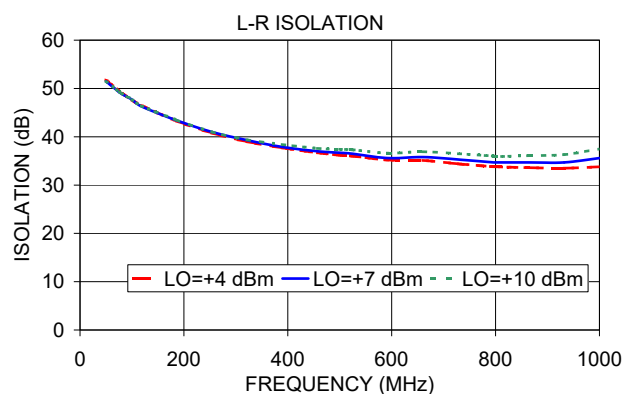
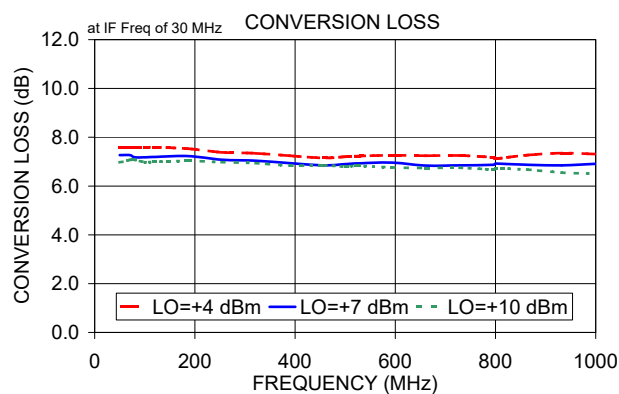
### Notes

- 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.  
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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  |
| 50.1                | 80.1        | 7.86                                                  | 7.27  | 6.99 |
| 90.4                | 120.4       | 7.85                                                  | 7.28  | 6.99 |
| 130.6               | 160.6       | 7.77                                                  | 7.22  | 6.96 |
| 170.9               | 200.9       | 7.72                                                  | 7.19  | 6.96 |
| 211.1               | 241.1       | 7.62                                                  | 7.13  | 6.91 |
| 251.4               | 281.4       | 7.58                                                  | 7.12  | 6.92 |
| 291.7               | 321.7       | 7.53                                                  | 7.09  | 6.88 |
| 331.9               | 361.9       | 7.49                                                  | 7.09  | 6.89 |
| 372.2               | 402.2       | 7.49                                                  | 7.09  | 6.88 |
| 412.4               | 442.4       | 7.41                                                  | 7.02  | 6.82 |
| 452.7               | 482.7       | 7.46                                                  | 7.08  | 6.87 |
| 493.0               | 523.0       | 7.47                                                  | 7.06  | 6.85 |
| 533.2               | 563.2       | 7.45                                                  | 7.06  | 6.82 |
| 573.5               | 603.5       | 7.49                                                  | 7.10  | 6.87 |
| 613.7               | 643.7       | 7.48                                                  | 7.11  | 6.89 |
| 654.0               | 684.0       | 7.48                                                  | 7.10  | 6.89 |
| 694.3               | 724.3       | 7.49                                                  | 7.09  | 6.87 |
| 734.5               | 764.5       | 7.51                                                  | 7.09  | 6.87 |
| 774.8               | 804.8       | 7.54                                                  | 7.13  | 6.90 |
| 815.0               | 845.0       | 7.58                                                  | 7.16  | 6.93 |
| 855.3               | 885.3       | 7.69                                                  | 7.24  | 6.97 |
| 895.6               | 925.6       | 7.75                                                  | 7.28  | 6.99 |
| 935.8               | 965.8       | 7.92                                                  | 7.43  | 7.11 |
| 976.1               | 1006.1      | 8.10                                                  | 7.56  | 7.22 |
| 1016.3              | 1046.3      | 8.23                                                  | 7.70  | 7.31 |
| 1056.6              | 1086.6      | 8.40                                                  | 7.82  | 7.42 |
| 1096.9              | 1126.9      | 8.54                                                  | 7.95  | 7.51 |
| 1137.1              | 1167.1      | 8.64                                                  | 8.02  | 7.57 |
| 1177.4              | 1207.4      | 8.77                                                  | 8.09  | 7.63 |
| 1217.6              | 1247.6      | 8.82                                                  | 8.14  | 7.67 |
| 1257.9              | 1287.9      | 8.94                                                  | 8.25  | 7.77 |
| 1298.2              | 1328.2      | 9.04                                                  | 8.32  | 7.86 |
| 1338.4              | 1368.4      | 9.27                                                  | 8.53  | 8.05 |
| 1378.7              | 1408.7      | 9.48                                                  | 8.73  | 8.24 |
| 1418.9              | 1448.9      | 9.71                                                  | 8.96  | 8.47 |
| 1459.2              | 1489.2      | 9.92                                                  | 9.17  | 8.67 |
| 1499.5              | 1529.5      | 10.13                                                 | 9.42  | 8.95 |
| 1539.7              | 1569.7      | 10.29                                                 | 9.66  | 9.21 |
| 1580.0              | 1610.0      | 10.64                                                 | 10.08 | 9.66 |
| 1600.1              | 1630.1      | 10.74                                                 | 10.23 | 9.83 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       |
|---------------------|-------------|--------------------|-------|-------|
|                     |             | @LO (dBm)          |       |       |
|                     |             | +4                 | +7    | +10   |
| 50.1                | 80.1        | 14.69              | 18.03 | 19.39 |
| 90.4                | 120.4       | 14.75              | 16.97 | 19.34 |
| 130.6               | 160.6       | 15.16              | 22.60 | 20.94 |
| 170.9               | 200.9       | 15.87              | 18.57 | 20.05 |
| 211.1               | 241.1       | 16.97              | 17.76 | 22.51 |
| 251.4               | 281.4       | 19.28              | 19.53 | 21.62 |
| 291.7               | 321.7       | 16.67              | 21.16 | 20.82 |
| 331.9               | 361.9       | 18.47              | 19.43 | 24.90 |
| 372.2               | 402.2       | 17.61              | 19.85 | 20.43 |
| 412.4               | 442.4       | 19.15              | 17.48 | 22.49 |
| 452.7               | 482.7       | 17.77              | 19.74 | 22.64 |
| 493.0               | 523.0       | 17.63              | 23.53 | 27.35 |
| 533.2               | 563.2       | 16.46              | 19.39 | 21.02 |
| 573.5               | 603.5       | 17.22              | 18.06 | 21.97 |
| 613.7               | 643.7       | 17.03              | 18.56 | 17.02 |
| 654.0               | 684.0       | 17.98              | 19.30 | 17.69 |
| 694.3               | 724.3       | 18.55              | 22.73 | 17.96 |
| 734.5               | 764.5       | 18.03              | 22.33 | 20.61 |
| 774.8               | 804.8       | 16.86              | 23.50 | 27.97 |
| 815.0               | 845.0       | 13.18              | 19.60 | 18.12 |
| 855.3               | 885.3       | 11.45              | 17.11 | 22.48 |
| 895.6               | 925.6       | 9.71               | 16.20 | 20.41 |
| 935.8               | 965.8       | 8.25               | 12.49 | 18.66 |
| 976.1               | 1006.1      | 6.93               | 10.38 | 15.85 |
| 1016.3              | 1046.3      | 6.64               | 9.00  | 12.72 |
| 1056.6              | 1086.6      | 6.69               | 8.55  | 12.19 |
| 1096.9              | 1126.9      | 7.15               | 9.60  | 12.87 |
| 1137.1              | 1167.1      | 8.16               | 10.78 | 15.64 |
| 1177.4              | 1207.4      | 8.91               | 12.15 | 16.11 |
| 1217.6              | 1247.6      | 10.80              | 12.66 | 14.68 |
| 1257.9              | 1287.9      | 9.83               | 13.28 | 14.01 |
| 1298.2              | 1328.2      | 10.29              | 12.01 | 13.90 |
| 1338.4              | 1368.4      | 9.73               | 12.51 | 14.01 |
| 1378.7              | 1408.7      | 9.62               | 11.88 | 12.94 |
| 1418.9              | 1448.9      | 9.22               | 11.68 | 12.90 |
| 1459.2              | 1489.2      | 9.06               | 10.82 | 12.06 |
| 1499.5              | 1529.5      | 9.38               | 10.15 | 12.05 |
| 1539.7              | 1569.7      | 9.59               | 11.26 | 12.01 |
| 1580.0              | 1610.0      | 9.47               | 10.43 | 12.12 |
| 1600.1              | 1630.1      | 9.63               | 10.92 | 11.80 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+1dBm<br>(dB) |      |      |
|---------------------|-------------|-------------------------------------|------|------|
|                     |             | @LO (dBm)                           |      |      |
|                     |             | +4                                  | +7   | +10  |
| 50.1                | 80.1        | 0.54                                | 0.34 | 0.24 |
| 90.4                | 120.4       | 0.50                                | 0.32 | 0.23 |
| 130.6               | 160.6       | 0.52                                | 0.34 | 0.24 |
| 170.9               | 200.9       | 0.52                                | 0.33 | 0.21 |
| 211.1               | 241.1       | 0.51                                | 0.32 | 0.22 |
| 251.4               | 281.4       | 0.52                                | 0.31 | 0.23 |
| 291.7               | 321.7       | 0.53                                | 0.32 | 0.21 |
| 331.9               | 361.9       | 0.53                                | 0.32 | 0.20 |
| 372.2               | 402.2       | 0.52                                | 0.30 | 0.20 |
| 412.4               | 442.4       | 0.53                                | 0.33 | 0.22 |
| 452.7               | 482.7       | 0.51                                | 0.31 | 0.23 |
| 493.0               | 523.0       | 0.51                                | 0.32 | 0.24 |
| 533.2               | 563.2       | 0.47                                | 0.31 | 0.23 |
| 573.5               | 603.5       | 0.51                                | 0.32 | 0.23 |
| 613.7               | 643.7       | 0.52                                | 0.32 | 0.23 |
| 654.0               | 684.0       | 0.67                                | 0.42 | 0.30 |
| 694.3               | 724.3       | 0.68                                | 0.43 | 0.32 |
| 734.5               | 764.5       | 0.78                                | 0.48 | 0.35 |
| 774.8               | 804.8       | 0.79                                | 0.55 | 0.38 |
| 815.0               | 845.0       | 0.91                                | 0.65 | 0.47 |
| 855.3               | 885.3       | 0.92                                | 0.65 | 0.50 |
| 895.6               | 925.6       | 0.94                                | 0.70 | 0.53 |
| 935.8               | 965.8       | 0.99                                | 0.75 | 0.60 |
| 976.1               | 1006.1      | 1.03                                | 0.80 | 0.66 |
| 1016.3              | 1046.3      | 1.00                                | 0.82 | 0.66 |
| 1056.6              | 1086.6      | 0.98                                | 0.80 | 0.70 |
| 1096.9              | 1126.9      | 0.92                                | 0.80 | 0.71 |
| 1137.1              | 1167.1      | 0.94                                | 0.84 | 0.73 |
| 1177.4              | 1207.4      | 0.93                                | 0.82 | 0.73 |
| 1217.6              | 1247.6      | 0.92                                | 0.80 | 0.74 |
| 1257.9              | 1287.9      | 0.98                                | 0.87 | 0.76 |
| 1298.2              | 1328.2      | 0.98                                | 0.88 | 0.77 |
| 1338.4              | 1368.4      | 0.97                                | 0.87 | 0.74 |
| 1378.7              | 1408.7      | 0.89                                | 0.78 | 0.68 |
| 1418.9              | 1448.9      | 0.83                                | 0.77 | 0.69 |
| 1459.2              | 1489.2      | 0.78                                | 0.73 | 0.66 |
| 1499.5              | 1529.5      | 0.76                                | 0.70 | 0.67 |
| 1539.7              | 1569.7      | 0.69                                | 0.63 | 0.60 |
| 1580.0              | 1610.0      | 0.58                                | 0.58 | 0.55 |
| 1600.1              | 1630.1      | 0.55                                | 0.50 | 0.48 |

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=500.6MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=50.1MHz<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                                                               |
| 400.5                | 100.1       | 7.02                                                            | 10.0                 | 60.1        | 7.27                                                           | 950.0                | 50.1        | 7.73                                                             |
| 390.5                | 110.1       | 7.02                                                            | 30.0                 | 80.1        | 7.29                                                           | 930.0                | 70.1        | 7.74                                                             |
| 380.5                | 120.1       | 6.99                                                            | 50.0                 | 100.1       | 7.26                                                           | 910.0                | 90.1        | 7.69                                                             |
| 370.5                | 130.1       | 6.93                                                            | 70.0                 | 120.1       | 7.32                                                           | 890.0                | 110.1       | 7.62                                                             |
| 360.5                | 140.1       | 6.91                                                            | 90.0                 | 140.1       | 7.32                                                           | 870.0                | 130.1       | 7.55                                                             |
| 350.5                | 150.1       | 6.92                                                            | 110.0                | 160.1       | 7.33                                                           | 850.0                | 150.1       | 7.55                                                             |
| 340.5                | 160.1       | 6.90                                                            | 130.0                | 180.1       | 7.33                                                           | 830.0                | 170.1       | 7.52                                                             |
| 330.5                | 170.1       | 6.89                                                            | 150.0                | 200.1       | 7.36                                                           | 810.0                | 190.1       | 7.47                                                             |
| 320.5                | 180.1       | 6.88                                                            | 170.0                | 220.1       | 7.35                                                           | 790.0                | 210.1       | 7.45                                                             |
| 310.5                | 190.1       | 6.88                                                            | 190.0                | 240.1       | 7.38                                                           | 770.0                | 230.1       | 7.41                                                             |
| 300.5                | 200.1       | 6.88                                                            | 210.0                | 260.1       | 7.39                                                           | 750.0                | 250.1       | 7.37                                                             |
| 290.5                | 210.1       | 6.87                                                            | 230.0                | 280.1       | 7.40                                                           | 730.0                | 270.1       | 7.44                                                             |
| 280.5                | 220.1       | 6.86                                                            | 250.0                | 300.1       | 7.43                                                           | 710.0                | 290.1       | 7.44                                                             |
| 270.5                | 230.1       | 6.85                                                            | 270.0                | 320.1       | 7.41                                                           | 690.0                | 310.1       | 7.38                                                             |
| 260.5                | 240.1       | 6.84                                                            | 290.0                | 340.1       | 7.46                                                           | 670.0                | 330.1       | 7.35                                                             |
| 250.5                | 250.1       | 6.44                                                            | 310.0                | 360.1       | 7.46                                                           | 650.0                | 350.1       | 7.37                                                             |
| 240.5                | 260.1       | 6.82                                                            | 330.0                | 380.1       | 7.47                                                           | 630.0                | 370.1       | 7.36                                                             |
| 230.5                | 270.1       | 6.81                                                            | 350.0                | 400.1       | 7.49                                                           | 610.0                | 390.1       | 7.37                                                             |
| 220.5                | 280.1       | 6.82                                                            | 370.0                | 420.1       | 7.52                                                           | 590.0                | 410.1       | 7.34                                                             |
| 210.5                | 290.1       | 6.90                                                            | 390.0                | 440.1       | 7.55                                                           | 570.0                | 430.1       | 7.35                                                             |
| 200.5                | 300.1       | 6.90                                                            | 410.0                | 460.1       | 7.52                                                           | 550.0                | 450.1       | 7.35                                                             |
| 190.5                | 310.1       | 6.91                                                            | 430.0                | 480.1       | 7.67                                                           | 530.0                | 470.1       | 7.34                                                             |
| 180.5                | 320.1       | 6.90                                                            | 450.0                | 500.1       | 7.58                                                           | 510.0                | 490.1       | 7.32                                                             |
| 170.5                | 330.1       | 6.91                                                            | 470.0                | 520.1       | 7.56                                                           | 490.0                | 510.1       | 7.35                                                             |
| 160.5                | 340.1       | 6.90                                                            | 510.0                | 560.1       | 7.59                                                           | 450.0                | 550.1       | 7.36                                                             |
| 150.5                | 350.1       | 6.91                                                            | 530.0                | 580.1       | 7.66                                                           | 430.0                | 570.1       | 7.43                                                             |
| 140.5                | 360.1       | 6.93                                                            | 570.0                | 620.1       | 7.72                                                           | 390.0                | 610.1       | 7.33                                                             |
| 130.5                | 370.1       | 6.95                                                            | 590.0                | 640.1       | 7.71                                                           | 370.0                | 630.1       | 7.34                                                             |
| 120.5                | 380.1       | 6.99                                                            | 630.0                | 680.1       | 7.75                                                           | 330.0                | 670.1       | 7.38                                                             |
| 110.5                | 390.1       | 7.00                                                            | 650.0                | 700.1       | 7.74                                                           | 310.0                | 690.1       | 7.37                                                             |
| 100.5                | 400.1       | 6.96                                                            | 690.0                | 740.1       | 7.70                                                           | 270.0                | 730.1       | 7.36                                                             |
| 90.5                 | 410.1       | 6.97                                                            | 710.0                | 760.1       | 7.78                                                           | 250.0                | 750.1       | 7.36                                                             |
| 80.5                 | 420.1       | 6.95                                                            | 750.0                | 800.1       | 7.71                                                           | 210.0                | 790.1       | 7.37                                                             |
| 70.5                 | 430.1       | 7.01                                                            | 770.0                | 820.1       | 7.68                                                           | 190.0                | 810.1       | 7.38                                                             |
| 60.5                 | 440.1       | 7.00                                                            | 810.0                | 860.1       | 7.66                                                           | 150.0                | 850.1       | 7.44                                                             |
| 50.5                 | 450.1       | 7.00                                                            | 830.0                | 880.1       | 7.65                                                           | 130.0                | 870.1       | 7.43                                                             |
| 40.5                 | 460.1       | 7.02                                                            | 870.0                | 920.1       | 7.57                                                           | 90.0                 | 910.1       | 7.47                                                             |
| 30.5                 | 470.1       | 7.04                                                            | 890.0                | 940.1       | 7.62                                                           | 70.0                 | 930.1       | 7.45                                                             |
| 20.5                 | 480.1       | 7.09                                                            | 930.0                | 980.1       | 7.60                                                           | 30.0                 | 970.1       | 7.55                                                             |
| 10.5                 | 490.1       | 7.05                                                            | 950.0                | 1000.1      | 7.63                                                           | 10.0                 | 990.1       | 7.68                                                             |

## 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   |
| 50.1        | 56.42                   | 55.89 | 56.18 | 59.50                   | 57.49 | 56.61 |
| 90.4        | 50.80                   | 51.03 | 50.98 | 57.18                   | 55.04 | 53.32 |
| 130.6       | 47.64                   | 47.78 | 48.27 | 54.39                   | 52.63 | 51.71 |
| 170.9       | 45.32                   | 45.77 | 45.73 | 52.43                   | 51.00 | 50.16 |
| 211.1       | 43.60                   | 43.84 | 44.25 | 51.23                   | 50.30 | 49.28 |
| 251.4       | 42.25                   | 42.58 | 42.72 | 49.98                   | 49.04 | 48.37 |
| 291.7       | 41.04                   | 41.45 | 41.53 | 49.00                   | 48.34 | 47.08 |
| 331.9       | 40.09                   | 40.30 | 40.80 | 47.33                   | 46.76 | 46.29 |
| 372.2       | 39.27                   | 39.66 | 39.59 | 45.81                   | 45.38 | 44.69 |
| 412.4       | 38.56                   | 38.75 | 39.09 | 44.38                   | 44.44 | 44.16 |
| 452.7       | 37.97                   | 38.34 | 38.34 | 42.44                   | 42.75 | 42.99 |
| 493.0       | 37.39                   | 37.69 | 37.98 | 40.99                   | 41.52 | 41.77 |
| 533.2       | 36.83                   | 37.12 | 37.36 | 39.58                   | 40.05 | 40.53 |
| 573.5       | 36.33                   | 36.85 | 36.77 | 38.44                   | 39.27 | 39.52 |
| 613.7       | 36.04                   | 36.15 | 36.61 | 37.21                   | 38.06 | 39.26 |
| 654.0       | 35.75                   | 36.16 | 36.01 | 36.40                   | 36.97 | 37.85 |
| 694.3       | 35.63                   | 35.77 | 36.12 | 35.88                   | 36.39 | 37.00 |
| 734.5       | 35.51                   | 35.81 | 35.70 | 35.22                   | 35.53 | 35.95 |
| 774.8       | 35.57                   | 35.69 | 35.80 | 34.85                   | 35.42 | 35.46 |
| 815.0       | 35.70                   | 35.64 | 35.67 | 34.07                   | 35.28 | 35.76 |
| 855.3       | 35.80                   | 35.95 | 35.60 | 33.05                   | 34.89 | 35.80 |
| 895.6       | 35.96                   | 35.83 | 35.98 | 32.16                   | 34.00 | 35.60 |
| 935.8       | 36.15                   | 36.27 | 35.84 | 31.33                   | 33.11 | 34.71 |
| 976.1       | 36.16                   | 36.25 | 36.25 | 30.65                   | 32.39 | 34.16 |
| 1016.3      | 36.25                   | 36.37 | 36.15 | 30.16                   | 31.72 | 33.60 |
| 1056.6      | 36.12                   | 36.41 | 36.27 | 29.60                   | 31.16 | 32.76 |
| 1096.9      | 36.24                   | 36.33 | 36.67 | 28.94                   | 30.37 | 32.14 |
| 1137.1      | 36.25                   | 36.60 | 36.52 | 28.28                   | 29.50 | 30.72 |
| 1177.4      | 36.54                   | 36.78 | 37.20 | 27.88                   | 28.78 | 29.90 |
| 1217.6      | 36.97                   | 37.43 | 37.36 | 27.56                   | 28.10 | 28.92 |
| 1257.9      | 37.47                   | 37.79 | 38.18 | 28.02                   | 28.65 | 29.32 |
| 1298.2      | 37.88                   | 38.46 | 38.54 | 28.69                   | 29.34 | 30.09 |
| 1338.4      | 38.32                   | 39.31 | 39.65 | 28.81                   | 29.63 | 30.26 |
| 1378.7      | 38.42                   | 39.59 | 40.51 | 28.55                   | 29.27 | 30.23 |
| 1418.9      | 38.15                   | 39.77 | 40.66 | 27.80                   | 28.45 | 29.01 |
| 1459.2      | 37.25                   | 38.69 | 40.12 | 27.13                   | 27.68 | 28.36 |
| 1499.5      | 35.99                   | 37.35 | 38.46 | 26.55                   | 26.85 | 27.40 |
| 1539.7      | 34.80                   | 35.98 | 37.40 | 26.17                   | 26.49 | 26.99 |
| 1580.0      | 34.02                   | 35.19 | 36.27 | 25.73                   | 25.80 | 26.29 |
| 1600.1      | 33.58                   | 34.83 | 35.73 | 25.72                   | 25.83 | 26.09 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +4                      | +7    | +10   |
| 50.1                | 80.1        | 42.26                   | 41.38 | 43.45 |
| 90.4                | 120.4       | 37.48                   | 38.26 | 37.93 |
| 130.6               | 160.6       | 34.44                   | 35.14 | 35.84 |
| 170.9               | 200.9       | 32.16                   | 32.85 | 33.60 |
| 211.1               | 241.1       | 30.68                   | 31.39 | 31.98 |
| 251.4               | 281.4       | 29.30                   | 30.12 | 30.67 |
| 291.7               | 321.7       | 28.21                   | 29.11 | 29.68 |
| 331.9               | 361.9       | 27.55                   | 28.33 | 28.84 |
| 372.2               | 402.2       | 26.78                   | 27.66 | 28.38 |
| 412.4               | 442.4       | 26.30                   | 27.29 | 28.01 |
| 452.7               | 482.7       | 25.85                   | 26.88 | 27.71 |
| 493.0               | 523.0       | 25.61                   | 26.73 | 27.53 |
| 533.2               | 563.2       | 25.57                   | 26.61 | 27.48 |
| 573.5               | 603.5       | 25.71                   | 26.77 | 27.59 |
| 613.7               | 643.7       | 26.10                   | 27.27 | 28.33 |
| 654.0               | 684.0       | 26.51                   | 27.83 | 29.13 |
| 694.3               | 724.3       | 26.72                   | 28.37 | 29.73 |
| 734.5               | 764.5       | 26.80                   | 28.57 | 29.94 |
| 774.8               | 804.8       | 26.23                   | 27.58 | 28.35 |
| 815.0               | 845.0       | 25.66                   | 26.55 | 26.85 |
| 855.3               | 885.3       | 24.92                   | 25.44 | 25.58 |
| 895.6               | 925.6       | 24.18                   | 24.43 | 24.39 |
| 935.8               | 965.8       | 23.55                   | 23.62 | 23.52 |
| 976.1               | 1006.1      | 23.20                   | 23.11 | 22.95 |
| 1016.3              | 1046.3      | 22.75                   | 22.57 | 22.28 |
| 1056.6              | 1086.6      | 22.65                   | 22.37 | 22.04 |
| 1096.9              | 1126.9      | 22.64                   | 22.25 | 21.78 |
| 1137.1              | 1167.1      | 22.49                   | 21.97 | 21.37 |
| 1177.4              | 1207.4      | 22.46                   | 21.75 | 21.00 |
| 1217.6              | 1247.6      | 22.29                   | 21.54 | 20.74 |
| 1257.9              | 1287.9      | 21.77                   | 21.06 | 20.35 |
| 1298.2              | 1328.2      | 20.91                   | 20.24 | 19.63 |
| 1338.4              | 1368.4      | 19.77                   | 19.14 | 18.64 |
| 1378.7              | 1408.7      | 18.63                   | 18.01 | 17.51 |
| 1418.9              | 1448.9      | 17.52                   | 16.92 | 16.47 |
| 1459.2              | 1489.2      | 16.40                   | 15.78 | 15.35 |
| 1499.5              | 1529.5      | 15.40                   | 14.77 | 14.35 |
| 1539.7              | 1569.7      | 14.38                   | 13.72 | 13.31 |
| 1580.0              | 1610.0      | 13.49                   | 12.81 | 12.39 |
| 1600.1              | 1630.1      | 13.16                   | 12.44 | 12.03 |

## 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  |
| 50.1                | 80.1        | 1.29            | 1.38 | 1.46 | 50.1        | 1.75            | 2.51 | 3.50 | 10.0                 | 2.30                             | 1.90 | 1.55 |
| 90.4                | 120.4       | 1.20            | 1.29 | 1.36 | 90.4        | 1.74            | 2.48 | 3.41 | 30.2                 | 2.16                             | 1.88 | 1.63 |
| 130.6               | 160.6       | 1.24            | 1.34 | 1.41 | 130.6       | 1.73            | 2.47 | 3.40 | 50.4                 | 2.05                             | 1.73 | 1.51 |
| 170.9               | 200.9       | 1.21            | 1.31 | 1.37 | 170.9       | 1.72            | 2.44 | 3.38 | 70.6                 | 2.05                             | 1.73 | 1.53 |
| 211.1               | 241.1       | 1.28            | 1.38 | 1.45 | 211.1       | 1.72            | 2.42 | 3.28 | 90.8                 | 2.10                             | 1.77 | 1.56 |
| 251.4               | 281.4       | 1.28            | 1.38 | 1.44 | 251.4       | 1.75            | 2.47 | 3.38 | 111.0                | 2.11                             | 1.78 | 1.57 |
| 291.7               | 321.7       | 1.29            | 1.39 | 1.45 | 291.7       | 1.74            | 2.44 | 3.31 | 131.2                | 2.10                             | 1.78 | 1.57 |
| 331.9               | 361.9       | 1.32            | 1.40 | 1.47 | 331.9       | 1.76            | 2.49 | 3.38 | 151.4                | 2.07                             | 1.75 | 1.55 |
| 372.2               | 402.2       | 1.33            | 1.42 | 1.48 | 372.2       | 1.81            | 2.55 | 3.48 | 171.6                | 2.07                             | 1.76 | 1.56 |
| 412.4               | 442.4       | 1.35            | 1.43 | 1.50 | 412.4       | 1.82            | 2.55 | 3.42 | 191.8                | 2.08                             | 1.78 | 1.58 |
| 452.7               | 482.7       | 1.35            | 1.43 | 1.50 | 452.7       | 1.85            | 2.59 | 3.51 | 212.0                | 2.08                             | 1.77 | 1.57 |
| 493.0               | 523.0       | 1.37            | 1.46 | 1.51 | 493.0       | 1.85            | 2.53 | 3.38 | 232.2                | 2.06                             | 1.77 | 1.57 |
| 533.2               | 563.2       | 1.40            | 1.48 | 1.54 | 533.2       | 1.87            | 2.58 | 3.44 | 252.4                | 2.05                             | 1.75 | 1.57 |
| 573.5               | 603.5       | 1.43            | 1.51 | 1.57 | 573.5       | 1.90            | 2.58 | 3.41 | 272.7                | 2.04                             | 1.75 | 1.57 |
| 613.7               | 643.7       | 1.47            | 1.55 | 1.61 | 613.7       | 1.95            | 2.65 | 3.50 | 292.9                | 2.04                             | 1.77 | 1.59 |
| 654.0               | 684.0       | 1.54            | 1.62 | 1.69 | 654.0       | 2.01            | 2.70 | 3.56 | 313.1                | 2.04                             | 1.76 | 1.59 |
| 694.3               | 724.3       | 1.56            | 1.64 | 1.70 | 694.3       | 2.03            | 2.71 | 3.52 | 333.3                | 2.01                             | 1.74 | 1.57 |
| 734.5               | 764.5       | 1.64            | 1.72 | 1.78 | 734.5       | 2.08            | 2.78 | 3.61 | 353.5                | 1.99                             | 1.72 | 1.57 |
| 774.8               | 804.8       | 1.63            | 1.71 | 1.76 | 774.8       | 2.10            | 2.75 | 3.52 | 373.7                | 1.99                             | 1.73 | 1.58 |
| 815.0               | 845.0       | 1.67            | 1.74 | 1.80 | 815.0       | 2.13            | 2.77 | 3.54 | 393.9                | 2.00                             | 1.74 | 1.60 |
| 855.3               | 885.3       | 1.67            | 1.73 | 1.79 | 855.3       | 2.19            | 2.82 | 3.56 | 434.3                | 1.97                             | 1.73 | 1.60 |
| 895.6               | 925.6       | 1.69            | 1.75 | 1.80 | 895.6       | 2.22            | 2.84 | 3.56 | 454.5                | 1.96                             | 1.73 | 1.60 |
| 935.8               | 965.8       | 1.70            | 1.74 | 1.79 | 935.8       | 2.30            | 2.94 | 3.69 | 494.9                | 1.97                             | 1.75 | 1.63 |
| 976.1               | 1006.1      | 1.74            | 1.77 | 1.81 | 976.1       | 2.34            | 2.96 | 3.66 | 515.1                | 1.97                             | 1.75 | 1.64 |
| 1016.3              | 1046.3      | 1.84            | 1.85 | 1.89 | 1016.3      | 2.39            | 3.02 | 3.76 | 555.5                | 1.96                             | 1.75 | 1.66 |
| 1056.6              | 1086.6      | 1.92            | 1.93 | 1.95 | 1056.6      | 2.40            | 3.00 | 3.71 | 575.7                | 1.98                             | 1.78 | 1.69 |
| 1096.9              | 1126.9      | 2.13            | 2.12 | 2.13 | 1096.9      | 2.38            | 2.97 | 3.67 | 616.1                | 1.96                             | 1.76 | 1.69 |
| 1137.1              | 1167.1      | 2.31            | 2.29 | 2.29 | 1137.1      | 2.38            | 2.94 | 3.60 | 636.3                | 1.97                             | 1.78 | 1.70 |
| 1177.4              | 1207.4      | 2.55            | 2.52 | 2.50 | 1177.4      | 2.39            | 2.92 | 3.56 | 676.7                | 1.98                             | 1.80 | 1.73 |
| 1217.6              | 1247.6      | 2.77            | 2.71 | 2.68 | 1217.6      | 2.39            | 2.89 | 3.55 | 696.9                | 2.00                             | 1.81 | 1.74 |
| 1257.9              | 1287.9      | 2.98            | 2.91 | 2.86 | 1257.9      | 2.44            | 2.92 | 3.54 | 737.3                | 1.99                             | 1.80 | 1.74 |
| 1298.2              | 1328.2      | 3.13            | 3.03 | 2.98 | 1298.2      | 2.44            | 2.92 | 3.54 | 757.6                | 2.00                             | 1.81 | 1.75 |
| 1338.4              | 1368.4      | 3.42            | 3.31 | 3.24 | 1338.4      | 2.51            | 2.96 | 3.57 | 798.0                | 2.00                             | 1.81 | 1.75 |
| 1378.7              | 1408.7      | 3.47            | 3.34 | 3.27 | 1378.7      | 2.54            | 2.97 | 3.58 | 818.2                | 2.00                             | 1.81 | 1.76 |
| 1418.9              | 1448.9      | 3.78            | 3.65 | 3.54 | 1418.9      | 2.58            | 2.98 | 3.55 | 858.6                | 2.01                             | 1.83 | 1.77 |
| 1459.2              | 1489.2      | 3.91            | 3.78 | 3.67 | 1459.2      | 2.63            | 2.99 | 3.54 | 878.8                | 2.02                             | 1.82 | 1.76 |
| 1499.5              | 1529.5      | 4.26            | 4.10 | 3.97 | 1499.5      | 2.65            | 2.97 | 3.50 | 919.2                | 2.01                             | 1.82 | 1.76 |
| 1539.7              | 1569.7      | 4.34            | 4.19 | 4.05 | 1539.7      | 2.72            | 3.01 | 3.51 | 939.4                | 2.02                             | 1.83 | 1.76 |
| 1580.0              | 1610.0      | 4.54            | 4.39 | 4.25 | 1580.0      | 2.79            | 3.06 | 3.54 | 979.8                | 2.05                             | 1.85 | 1.79 |
| 1600.1              | 1630.1      | 4.55            | 4.40 | 4.27 | 1600.1      | 2.82            | 3.07 | 3.54 | 1000.0               | 1.85                             | 1.89 | 2.10 |

REV. X2

ADE-12+

100817

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## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 17  | 16  | 16  | 35  | 15  | 30  | 21  | 38  | 37  | 51  |
| 1      | -      | 19     | 0   | 39  | 12  | 50  | 20  | 37  | 40  | 44  | 47  | 42  |
| 2      | 109    | 68     | 58  | 71  | 58  | 68  | 57  | 67  | 56  | 69  | 57  | 67  |
| 3      | 113    | 68     | 71  | 69  | 67  | 77  | 63  | 74  | 69  | 91  | 72  | 85  |
| 4      | 120    | 100    | 97  | 106 | 90  | 78  | 95  | 97  | 95  | 97  | 96  | 102 |
| 5      | 119    | 98     | 105 | 104 | 96  | 91  | 86  | 92  | 98  | 100 | 99  | 107 |
| 6      | 128    | 105    | 109 | 115 | 103 | 94  | 96  | 91  | 96  | 103 | 105 | 111 |
| 7      | 112    | 117    | 104 | 101 | 100 | 95  | 97  | 91  | 91  | 96  | 101 | 113 |
| 8      | 116    | 99     | 101 | 108 | 103 | 110 | 105 | 100 | 90  | 88  | 99  | 114 |
| 9      | 111    | 107    | 100 | 106 | 110 | 101 | 122 | 99  | 93  | 94  | 89  | 108 |
| 10     | 120    | 104    | 101 | 108 | 111 | 103 | 107 | 111 | 109 | 103 | 97  | 94  |
| 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; -20.92 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 26  | 26  | 27  | 45  | 27  | 42  | 34  | 53  | 53  | 77  |
| 1      | -      | 20     | 0   | 38  | 12  | 49  | 21  | 40  | 40  | 49  | 52  | 48  |
| 2      | 94     | 62     | 49  | 78  | 49  | 63  | 50  | 65  | 49  | 59  | 50  | 62  |
| 3      | 110    | 48     | 51  | 50  | 67  | 62  | 47  | 59  | 56  | 61  | 59  | 63  |
| 4      | 109    | 78     | 76  | 72  | 72  | 71  | 75  | 70  | 65  | 72  | 68  | 81  |
| 5      | 142    | 80     | 70  | 89  | 61  | 79  | 58  | 79  | 57  | 70  | 59  | 76  |
| 6      | 112    | 104    | 92  | 89  | 86  | 91  | 84  | 87  | 81  | 89  | 81  | 87  |
| 7      | 113    | 91     | 88  | 89  | 79  | 95  | 81  | 89  | 82  | 87  | 98  | 89  |
| 8      | 112    | 107    | 97  | 106 | 100 | 103 | 117 | 104 | 98  | 101 | 100 | 104 |
| 9      | 109    | 107    | 115 | 104 | 102 | 109 | 96  | 111 | 97  | 103 | 89  | 102 |
| 10     | 113    | 116    | 110 | 127 | 119 | 115 | 108 | 110 | 112 | 105 | 102 | 105 |
| 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; -10.85 dBm

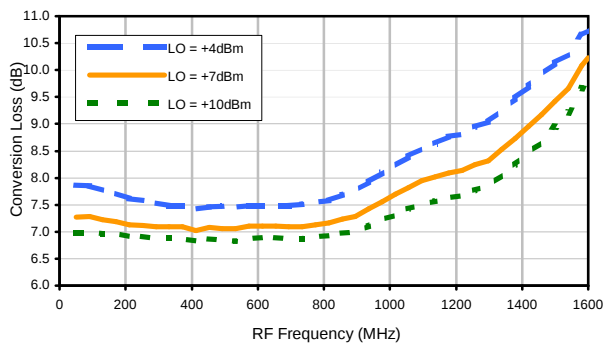
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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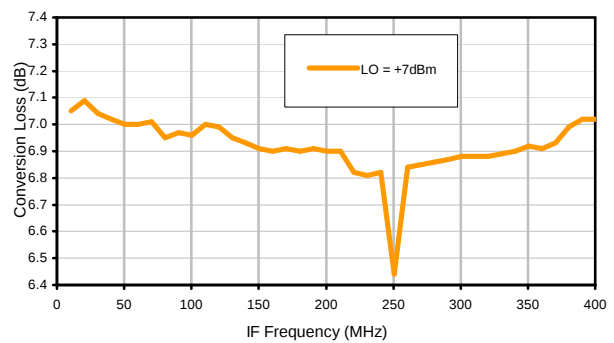


## Typical Performance Curves

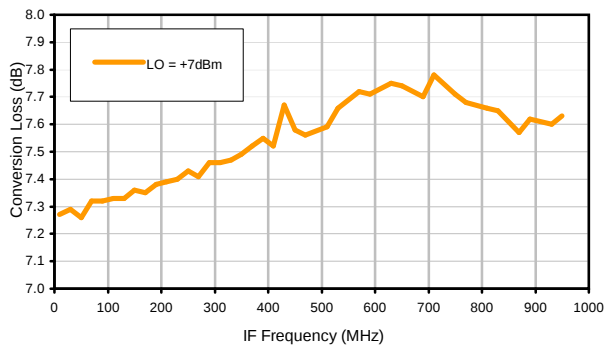
Conversion Loss @ IF=30MHz



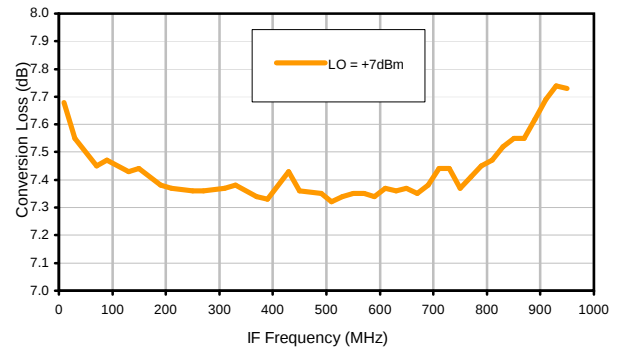
Conversion Loss vs. IF @ RF=500.6MHz



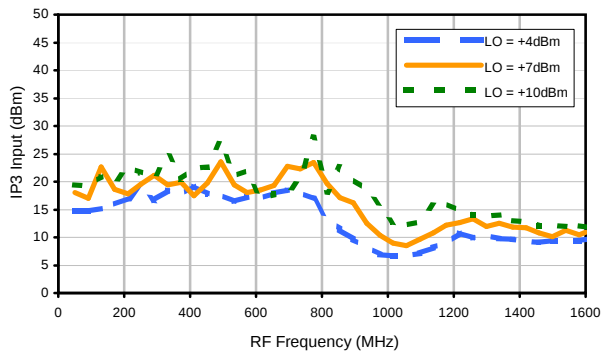
Conversion Loss vs. IF @ RF=50.1MHz



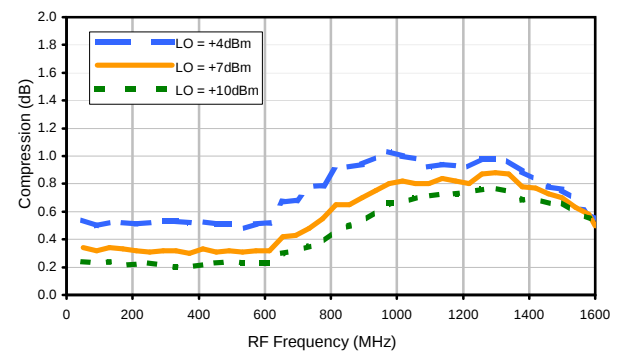
Conversion Loss vs. IF @ RF=1000.1MHz



IP3 Input

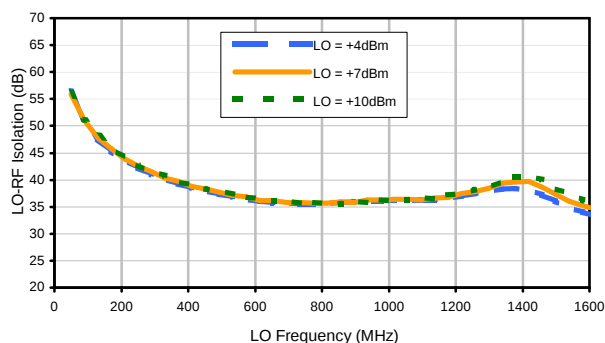


Compression @ RF IN=+1dBm

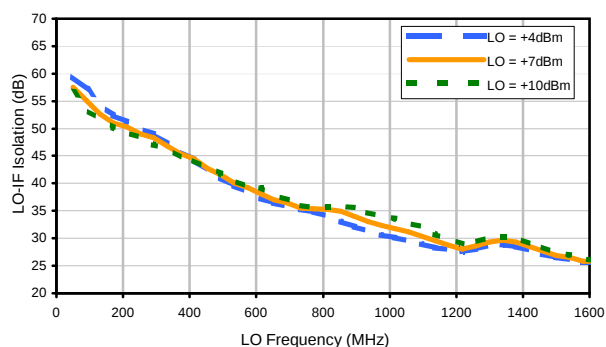


## Typical Performance Curves

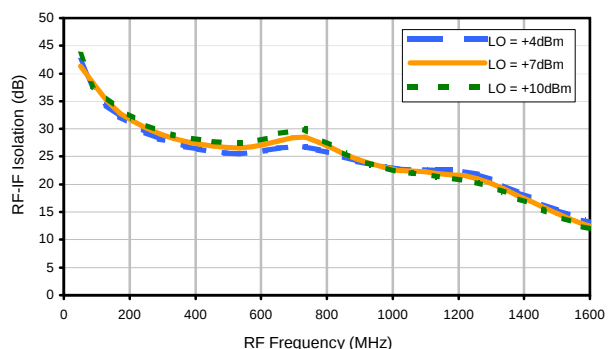
LO-RF Isolation



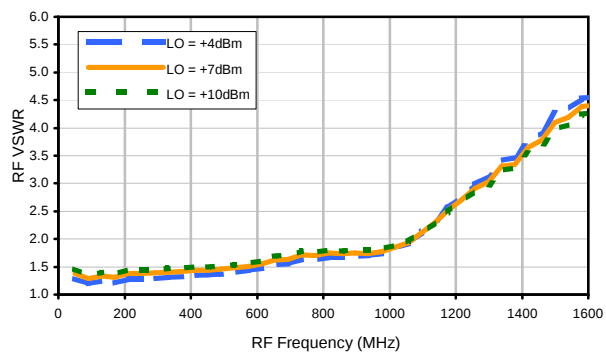
LO-IF Isolation



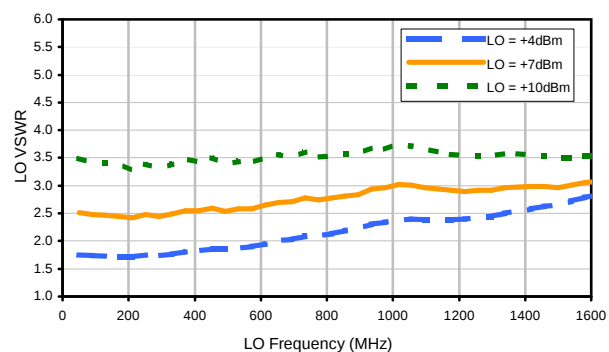
RF-IF Isolation



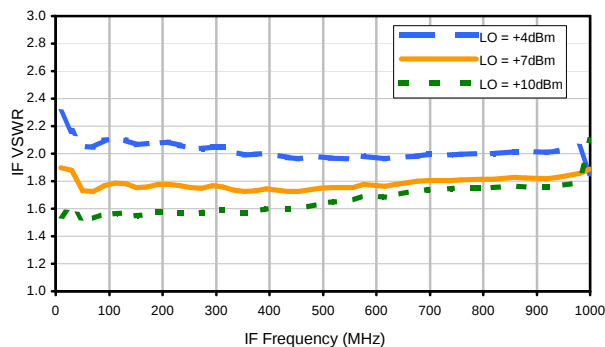
RF VSWR



LO VSWR



IF VSWR



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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant

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## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 17  | 16  | 16  | 35  | 15  | 30  | 21  | 38  | 37  | 51  |
| 1      | -      | 19     | 0   | 39  | 12  | 50  | 20  | 37  | 40  | 44  | 47  | 42  |
| 2      | 109    | 68     | 58  | 71  | 58  | 68  | 57  | 67  | 56  | 69  | 57  | 67  |
| 3      | 113    | 68     | 71  | 69  | 67  | 77  | 63  | 74  | 69  | 91  | 72  | 85  |
| 4      | 120    | 100    | 97  | 106 | 90  | 78  | 95  | 97  | 95  | 97  | 96  | 102 |
| 5      | 119    | 98     | 105 | 104 | 96  | 91  | 86  | 92  | 98  | 100 | 99  | 107 |
| 6      | 128    | 105    | 109 | 115 | 103 | 94  | 96  | 91  | 96  | 103 | 105 | 111 |
| 7      | 112    | 117    | 104 | 101 | 100 | 95  | 97  | 91  | 91  | 96  | 101 | 113 |
| 8      | 116    | 99     | 101 | 108 | 103 | 110 | 105 | 100 | 90  | 88  | 99  | 114 |
| 9      | 111    | 107    | 100 | 106 | 110 | 101 | 122 | 99  | 93  | 94  | 89  | 108 |
| 10     | 120    | 104    | 101 | 108 | 111 | 103 | 107 | 111 | 109 | 103 | 97  | 94  |
| 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; -20.92 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 26  | 26  | 27  | 45  | 27  | 42  | 34  | 53  | 53  | 77  |
| 1      | -      | 20     | 0   | 38  | 12  | 49  | 21  | 40  | 40  | 49  | 52  | 48  |
| 2      | 94     | 62     | 49  | 78  | 49  | 63  | 50  | 65  | 49  | 59  | 50  | 62  |
| 3      | 110    | 48     | 51  | 50  | 67  | 62  | 47  | 59  | 56  | 61  | 59  | 63  |
| 4      | 109    | 78     | 76  | 72  | 72  | 71  | 75  | 70  | 65  | 72  | 68  | 81  |
| 5      | 142    | 80     | 70  | 89  | 61  | 79  | 58  | 79  | 57  | 70  | 59  | 76  |
| 6      | 112    | 104    | 92  | 89  | 86  | 91  | 84  | 87  | 81  | 89  | 81  | 87  |
| 7      | 113    | 91     | 88  | 89  | 79  | 95  | 81  | 89  | 82  | 87  | 98  | 89  |
| 8      | 112    | 107    | 97  | 106 | 100 | 103 | 117 | 104 | 98  | 101 | 100 | 104 |
| 9      | 109    | 107    | 115 | 104 | 102 | 109 | 96  | 111 | 97  | 103 | 89  | 102 |
| 10     | 113    | 116    | 110 | 127 | 119 | 115 | 108 | 110 | 112 | 105 | 102 | 105 |
| 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; -10.85 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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CD541  
CD542  
CD636  
CD637

## Outline Dimensions



## PCB Land Pattern



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

| CASE# | A              | B              | C              | D              | E              | F              | G              | H              | J              | K              | L              | WT, GRAM |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|
| CD541 |                |                |                |                | .082<br>(2.08) |                |                |                |                |                |                | .15      |
| CD542 | .272<br>(6.91) | .310<br>(7.87) | .220<br>(5.58) | .100<br>(2.54) | .112<br>(2.84) | .055<br>(1.40) | .100<br>(2.54) | .030<br>(0.76) | .026<br>(0.66) | .065<br>(1.65) | .300<br>(7.62) | .20      |
| CD636 |                |                |                |                | .162<br>(4.11) |                |                |                |                |                |                | .25      |
| CD637 |                |                |                |                | .206<br>(5.23) |                |                |                |                |                |                | .40      |

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. All models, (+) suffix.  
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



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Mini-Circuits ISO 9001 & ISO 14001 Certified

# Tape & Reel Packaging TR-F34



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel<br>see note                |      |
|-------------------|----------------------------|----------------------|---------------------------------------------|------|
| 16                | 12                         | 7                    | Small<br>quantity<br>standard<br>(see note) | 20   |
|                   |                            |                      |                                             | 50   |
|                   |                            |                      |                                             | 100  |
|                   |                            |                      |                                             | 200  |
|                   |                            | 13                   | Standard                                    | 500  |
|                   |                            |                      |                                             | 1000 |

Note: Availability of small reel quantity varies by model.  
Refer to pricing and availability on individual model dashboard.

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

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



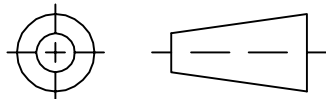
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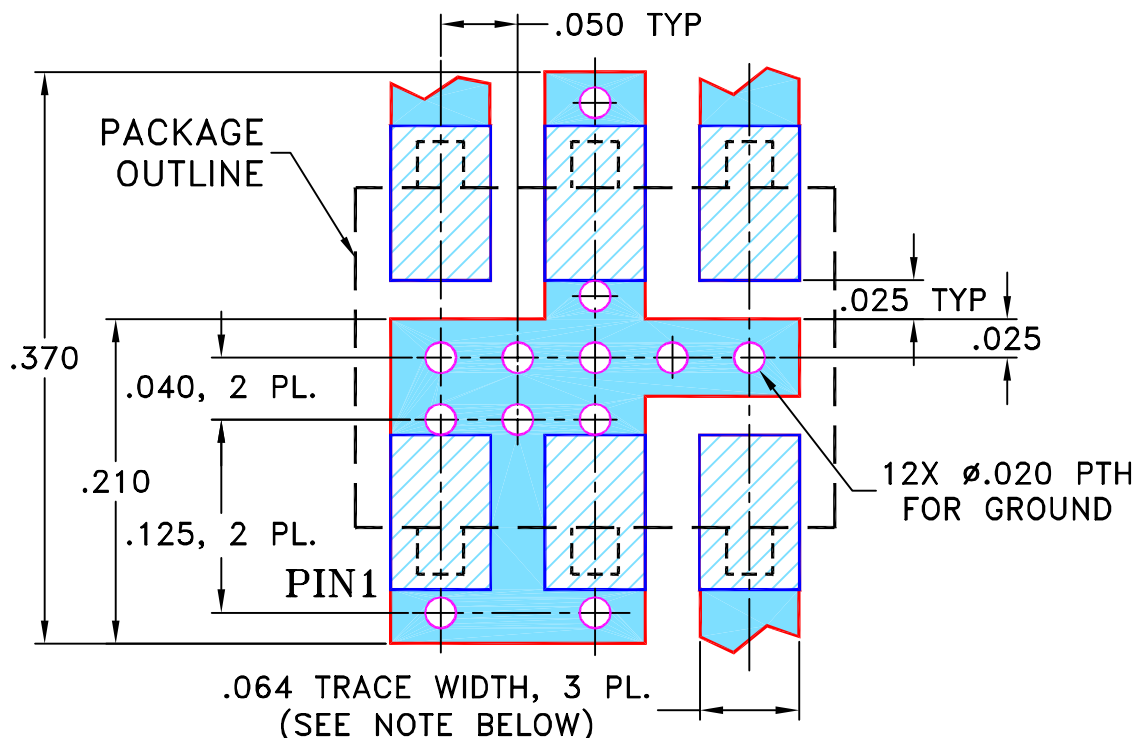
## THIRD ANGLE PROJECTION



## REVISIONS

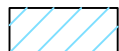
| REV | ECN No. | DESCRIPTION                    | DATE     | DR  | AUTH |
|-----|---------|--------------------------------|----------|-----|------|
| OR  | M82272  | NEW RELEASE                    | 08/05/02 | MMG | DJ   |
| A   | M102713 | ADDED NOTE 2 & "...WITH SMOBC" | 01/17/06 | MMG | IL   |
|     |         |                                |          |     |      |
|     |         |                                |          |     |      |

SUGGESTED MOUNTING CONFIGURATION  
FOR CD541/542/636/637 CASE STYLES,  
"jv", "ju", "jw" PIN CONNECTIONS



- NOTES:** 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030"  $\pm$  .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

DIMENSIONS ARE IN INCHES

TOLERANCES ON:  
 2 PL DECIMALS  $\pm$   
 3 PL DECIMALS  $\pm$  .005  
 ANGLES  $\pm$   
 FRACTIONS  $\pm$

INITIALS

DATE

DRAWN

MMG

07/17/02

CHECKED

WL

08/02/02

APPROVED

DJ

08/05/02



Mini-Circuits®

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Brooklyn NY 11235

PL, jv/ju/jw, CD541/542/636/637, ADE, TB-02

SIZE  
ACODE IDENT  
15542DRAWING NO:  
98-PL-051REV:  
A

FILE: 98PL051

SCALE: 8:1

SHEET: 1 OF 1

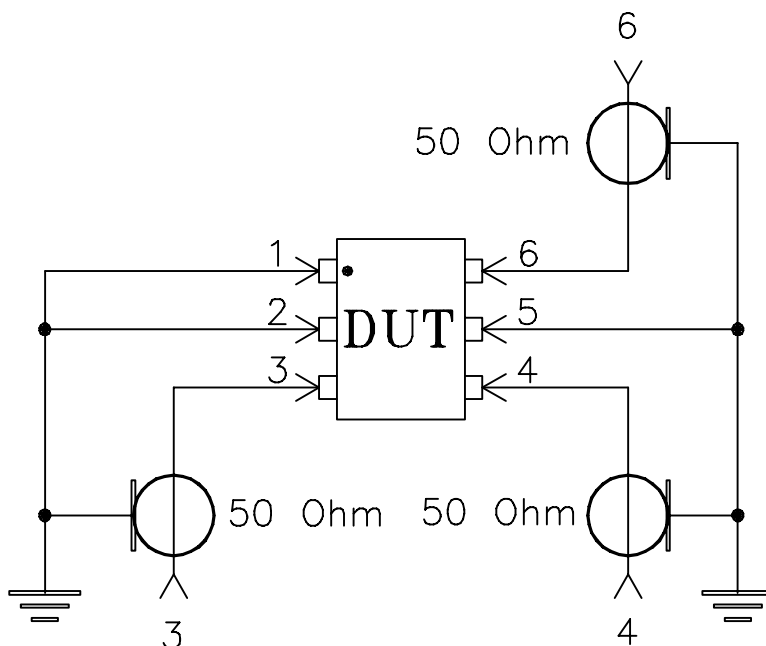
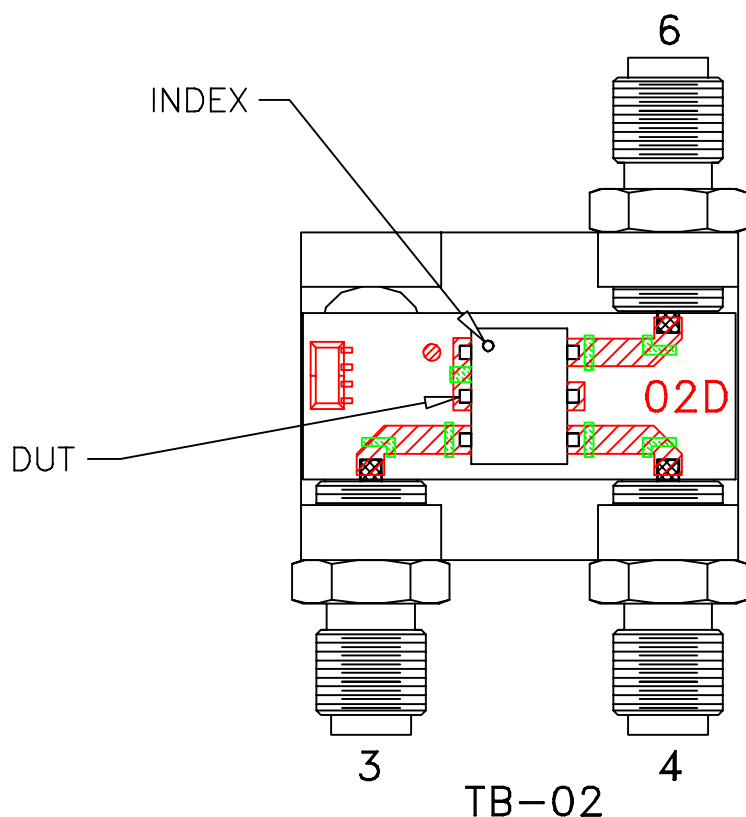
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ASHEETA1.DWG REV:A DATE:01/12/95

# Evaluation Board and Circuit

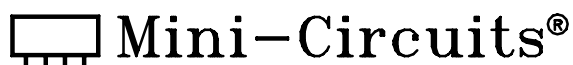
For Pin Connections refer to Data Sheet of the DUT



Schematic Diagram

## Notes:

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





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                                                                              |