

# Frequency Mixer

ADE-2+

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

## Maximum Ratings

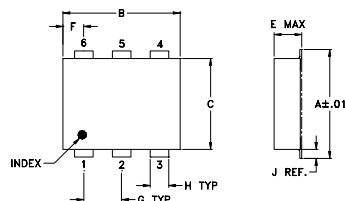
|                       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 50mW           |
| IF Current            | 40mA           |

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

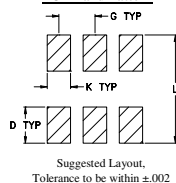
## Pin Connections

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

## Outline Drawing



### PCB Land Pattern



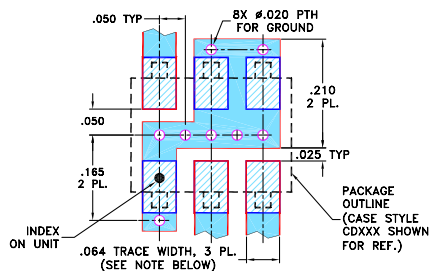
## Outline Dimensions (inch)

| A    | B    | C    | D    | E    | F    | G    |
|------|------|------|------|------|------|------|
| .272 | .310 | .220 | .100 | .112 | .055 | .100 |
| 6.91 | 7.87 | 5.59 | 2.54 | 2.84 | 1.40 | 2.54 |

| H    | J    | K    | L    | wt    |
|------|------|------|------|-------|
| .030 | .026 | .065 | .300 | grams |
| 0.76 | 0.66 | 1.65 | 7.62 | 0.20  |

## Demo Board MCL P/N: TB-03 Suggested PCB Layout (PL-052)



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.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## Notes

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.  
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.  
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## Features

- excellent L-R isolation, 47 dB typ.
- low profile package
- aqueous washable
- protected by U.S. Patent 6,133,525

## Applications

- cellular
- PCS



Generic photo used for illustration purposes only

CASE STYLE: CD542

## +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 (MHz) |                     | CONVERSION LOSS (dB) |          |                  |      | LO-RF ISOLATION (dB) |           |           | LO-IF ISOLATION (dB) |           |           | IP3 at center band (dBm) |
|-----------------|---------------------|----------------------|----------|------------------|------|----------------------|-----------|-----------|----------------------|-----------|-----------|--------------------------|
|                 |                     | Mid-Band m           |          | Total Range Max. |      | L                    | M         | U         | L                    | M         | U         |                          |
|                 | LO/RF $f_L$ - $f_U$ | $\bar{X}$            | $\sigma$ | Max.             | Max. | Typ. Min.            | Typ. Min. | Typ. Min. | Typ. Min.            | Typ. Min. | Typ. Min. | Typ.                     |
| 5-1000          | DC-1000             | 6.67                 | 0.26     | 8.0              | 9.5  | 60 40                | 47 25     | 32 22     | 62 35                | 45 25     | 32 20     | 20                       |

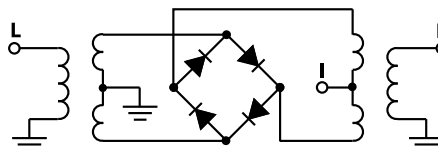
1 dB COMP.: +1 dBm typ.

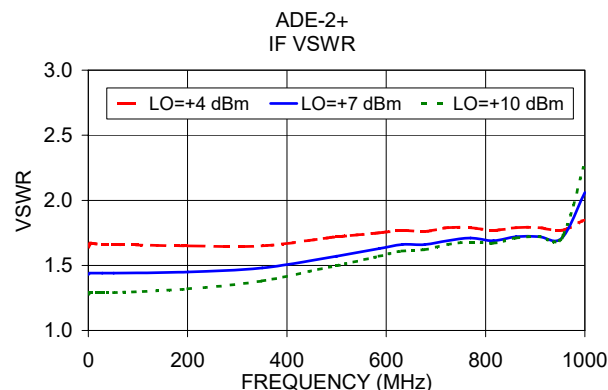
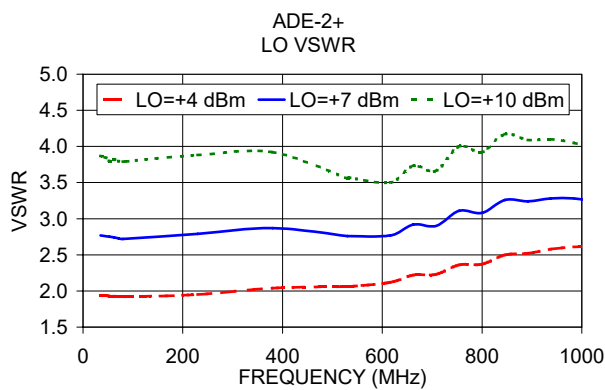
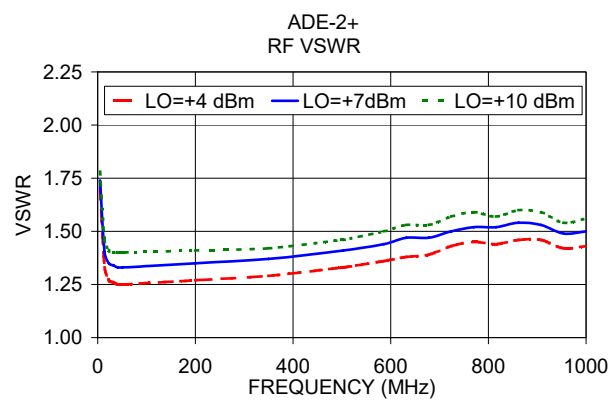
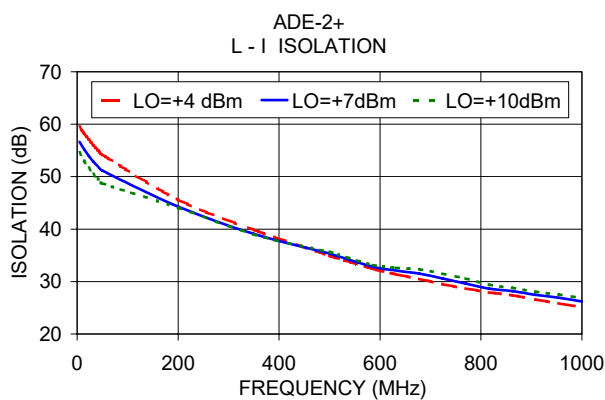
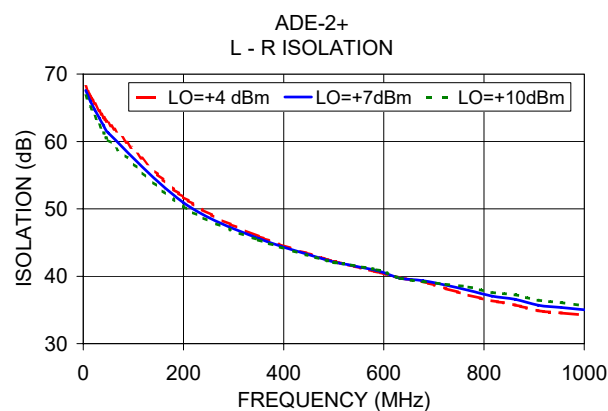
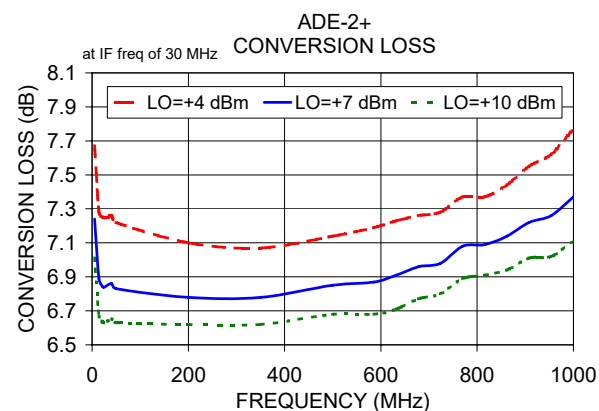
L = low range [ $f_L$  to  $10 f_L$ ]m = mid band [ $2f_L$  to  $f_U/2$ ]M = mid range [ $10 f_L$  to  $f_U/2$ ]U = upper range [ $f_U/2$  to  $f_U$ ]

## Typical Performance Data

| Frequency (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          |
| 5.0             | 35.0   | 7.24                 | 67.56              | 56.62              | 1.74              | 2.77              |
| 14.0            | 44.0   | 6.89                 | 66.00              | 55.21              | 1.40              | 2.76              |
| 23.0            | 53.0   | 6.84                 | 64.66              | 53.92              | 1.35              | 2.75              |
| 32.0            | 62.0   | 6.85                 | 63.45              | 52.89              | 1.34              | 2.74              |
| 41.0            | 71.0   | 6.86                 | 62.35              | 51.97              | 1.33              | 2.73              |
| 50.0            | 80.0   | 6.83                 | 61.27              | 51.17              | 1.33              | 2.72              |
| 200.0           | 230.0  | 6.78                 | 50.90              | 44.28              | 1.35              | 2.79              |
| 350.0           | 380.0  | 6.78                 | 45.63              | 39.09              | 1.37              | 2.87              |
| 500.0           | 530.0  | 6.85                 | 42.11              | 35.34              | 1.40              | 2.76              |
| 502.5           | 532.5  | 6.81                 | 42.09              | 35.27              | 1.41              | 2.76              |
| 586.0           | 616.0  | 6.87                 | 40.83              | 32.80              | 1.44              | 2.77              |
| 632.0           | 662.0  | 6.91                 | 39.73              | 32.12              | 1.47              | 2.92              |
| 678.0           | 708.0  | 6.96                 | 39.35              | 31.50              | 1.47              | 2.90              |
| 724.0           | 754.0  | 6.98                 | 38.67              | 30.57              | 1.50              | 3.11              |
| 770.0           | 800.0  | 7.08                 | 37.90              | 29.63              | 1.52              | 3.08              |
| 816.0           | 846.0  | 7.09                 | 37.06              | 28.64              | 1.52              | 3.26              |
| 862.0           | 892.0  | 7.14                 | 36.56              | 28.19              | 1.54              | 3.24              |
| 908.0           | 938.0  | 7.22                 | 35.71              | 27.46              | 1.53              | 3.28              |
| 954.0           | 984.0  | 7.26                 | 35.35              | 26.91              | 1.49              | 3.28              |
| 1000.0          | 1030.0 | 7.37                 | 35.01              | 26.18              | 1.50              | 3.23              |

## Electrical Schematic





## Notes

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# Frequency Mixer

ADE-2+

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=30MHz<br>(dB) |       |       | RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       | RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+1dBm<br>(dB) |      |      |
|---------------------|-------------|-------------------------------------------------------|-------|-------|---------------------|-------------|--------------------|-------|-------|---------------------|-------------|-------------------------------------|------|------|
|                     |             | @LO (dBm)                                             |       |       |                     |             | @LO (dBm)          |       |       |                     |             | @LO (dBm)                           |      |      |
|                     |             |                                                       |       |       |                     |             |                    |       |       |                     |             |                                     |      |      |
| +4                  | +7          | +10                                                   | +4    | +7    | +10                 | +4          | +7                 | +10   |       |                     |             |                                     |      |      |
| 10.1                | 40.1        | 6.92                                                  | 6.45  | 6.28  | 10.1                | 40.1        | 17.95              | 19.71 | 20.86 | 10.1                | 40.1        | 0.75                                | 0.44 | 0.36 |
| 50.1                | 80.1        | 7.02                                                  | 6.57  | 6.34  | 50.1                | 80.1        | 17.47              | 19.55 | 20.15 | 50.1                | 80.1        | 0.64                                | 0.41 | 0.28 |
| 90.1                | 120.1       | 7.05                                                  | 6.67  | 6.44  | 90.1                | 120.1       | 19.04              | 17.93 | 19.63 | 90.1                | 120.1       | 0.66                                | 0.42 | 0.25 |
| 130.1               | 160.1       | 7.04                                                  | 6.62  | 6.42  | 130.1               | 160.1       | 20.18              | 20.69 | 20.79 | 130.1               | 160.1       | 0.61                                | 0.40 | 0.25 |
| 170.1               | 200.1       | 7.07                                                  | 6.71  | 6.55  | 170.1               | 200.1       | 18.80              | 20.56 | 20.73 | 170.1               | 200.1       | 0.63                                | 0.41 | 0.26 |
| 210.1               | 240.1       | 6.99                                                  | 6.68  | 6.50  | 210.1               | 240.1       | 19.76              | 20.66 | 20.75 | 210.1               | 240.1       | 0.60                                | 0.37 | 0.23 |
| 250.1               | 280.1       | 7.09                                                  | 6.75  | 6.57  | 250.1               | 280.1       | 16.96              | 19.72 | 20.71 | 250.1               | 280.1       | 0.56                                | 0.34 | 0.22 |
| 290.1               | 320.1       | 7.00                                                  | 6.72  | 6.56  | 290.1               | 320.1       | 20.50              | 20.64 | 20.72 | 290.1               | 320.1       | 0.58                                | 0.35 | 0.23 |
| 330.1               | 360.1       | 7.02                                                  | 6.71  | 6.53  | 330.1               | 360.1       | 17.69              | 20.52 | 20.73 | 330.1               | 360.1       | 0.57                                | 0.35 | 0.24 |
| 370.1               | 400.1       | 7.01                                                  | 6.74  | 6.58  | 370.1               | 400.1       | 20.49              | 20.63 | 19.47 | 370.1               | 400.1       | 0.57                                | 0.38 | 0.25 |
| 410.1               | 440.1       | 6.99                                                  | 6.71  | 6.56  | 410.1               | 440.1       | 20.51              | 20.64 | 20.72 | 410.1               | 440.1       | 0.54                                | 0.34 | 0.25 |
| 450.1               | 480.1       | 7.05                                                  | 6.74  | 6.58  | 450.1               | 480.1       | 18.07              | 20.63 | 20.71 | 450.1               | 480.1       | 0.54                                | 0.37 | 0.26 |
| 490.1               | 520.1       | 7.07                                                  | 6.78  | 6.60  | 490.1               | 520.1       | 16.36              | 17.90 | 20.70 | 490.1               | 520.1       | 0.51                                | 0.34 | 0.25 |
| 530.1               | 560.1       | 7.15                                                  | 6.84  | 6.64  | 530.1               | 560.1       | 19.31              | 19.00 | 20.68 | 530.1               | 560.1       | 0.49                                | 0.31 | 0.22 |
| 570.1               | 600.1       | 7.15                                                  | 6.86  | 6.68  | 570.1               | 600.1       | 15.00              | 16.19 | 17.06 | 570.1               | 600.1       | 0.53                                | 0.35 | 0.25 |
| 610.1               | 640.1       | 7.14                                                  | 6.81  | 6.61  | 610.1               | 640.1       | 16.73              | 15.34 | 16.13 | 610.1               | 640.1       | 0.56                                | 0.39 | 0.28 |
| 650.1               | 680.1       | 7.22                                                  | 6.91  | 6.71  | 650.1               | 680.1       | 18.47              | 20.55 | 17.22 | 650.1               | 680.1       | 0.61                                | 0.42 | 0.28 |
| 690.1               | 720.1       | 7.28                                                  | 6.97  | 6.77  | 690.1               | 720.1       | 16.89              | 17.79 | 20.62 | 690.1               | 720.1       | 0.63                                | 0.42 | 0.30 |
| 730.1               | 760.1       | 7.38                                                  | 7.09  | 6.89  | 730.1               | 760.1       | 15.80              | 16.35 | 17.96 | 730.1               | 760.1       | 0.68                                | 0.44 | 0.31 |
| 770.1               | 800.1       | 7.38                                                  | 7.12  | 6.93  | 770.1               | 800.1       | 16.73              | 17.09 | 19.32 | 770.1               | 800.1       | 0.77                                | 0.51 | 0.36 |
| 810.1               | 840.1       | 7.43                                                  | 7.15  | 6.96  | 810.1               | 840.1       | 16.96              | 19.38 | 20.52 | 810.1               | 840.1       | 0.83                                | 0.56 | 0.40 |
| 850.1               | 880.1       | 7.44                                                  | 7.13  | 6.93  | 850.1               | 880.1       | 20.28              | 20.43 | 20.54 | 850.1               | 880.1       | 0.97                                | 0.67 | 0.51 |
| 890.1               | 920.1       | 7.50                                                  | 7.16  | 6.95  | 890.1               | 920.1       | 20.25              | 18.59 | 17.11 | 890.1               | 920.1       | 1.03                                | 0.74 | 0.57 |
| 930.1               | 960.1       | 7.60                                                  | 7.19  | 6.97  | 930.1               | 960.1       | 16.37              | 17.45 | 15.70 | 930.1               | 960.1       | 1.11                                | 0.82 | 0.62 |
| 970.1               | 1000.1      | 7.74                                                  | 7.27  | 7.03  | 970.1               | 1000.1      | 11.98              | 20.37 | 16.88 | 970.1               | 1000.1      | 1.12                                | 0.88 | 0.68 |
| 1010.1              | 1040.1      | 8.00                                                  | 7.44  | 7.13  | 1010.1              | 1040.1      | 9.64               | 20.28 | 17.65 | 1010.1              | 1040.1      | 1.12                                | 0.94 | 0.74 |
| 1050.1              | 1080.1      | 8.17                                                  | 7.55  | 7.17  | 1050.1              | 1080.1      | 8.43               | 15.66 | 16.89 | 1050.1              | 1080.1      | 1.14                                | 0.99 | 0.81 |
| 1090.1              | 1120.1      | 8.37                                                  | 7.73  | 7.27  | 1090.1              | 1120.1      | 7.45               | 11.78 | 18.08 | 1090.1              | 1120.1      | 1.14                                | 0.99 | 0.85 |
| 1130.1              | 1160.1      | 8.49                                                  | 7.86  | 7.37  | 1130.1              | 1160.1      | 7.70               | 10.95 | 17.98 | 1130.1              | 1160.1      | 1.13                                | 0.98 | 0.84 |
| 1170.1              | 1200.1      | 8.64                                                  | 8.01  | 7.48  | 1170.1              | 1200.1      | 8.29               | 11.07 | 17.11 | 1170.1              | 1200.1      | 1.13                                | 0.99 | 0.86 |
| 1210.1              | 1240.1      | 8.94                                                  | 8.31  | 7.76  | 1210.1              | 1240.1      | 8.47               | 10.77 | 14.82 | 1210.1              | 1240.1      | 1.03                                | 0.89 | 0.78 |
| 1250.1              | 1280.1      | 9.13                                                  | 8.52  | 7.98  | 1250.1              | 1280.1      | 8.19               | 9.88  | 12.39 | 1250.1              | 1280.1      | 1.00                                | 0.86 | 0.75 |
| 1290.1              | 1320.1      | 9.43                                                  | 8.82  | 8.29  | 1290.1              | 1320.1      | 7.18               | 8.30  | 9.69  | 1290.1              | 1320.1      | 0.95                                | 0.80 | 0.69 |
| 1340.1              | 1370.1      | 9.62                                                  | 9.01  | 8.47  | 1340.1              | 1370.1      | 6.20               | 6.87  | 7.79  | 1340.1              | 1370.1      | 0.96                                | 0.82 | 0.71 |
| 1380.1              | 1410.1      | 9.89                                                  | 9.22  | 8.64  | 1380.1              | 1410.1      | 5.65               | 6.40  | 7.53  | 1380.1              | 1410.1      | 0.98                                | 0.85 | 0.77 |
| 1430.1              | 1460.1      | 10.08                                                 | 9.34  | 8.75  | 1430.1              | 1460.1      | 6.02               | 7.35  | 9.09  | 1430.1              | 1460.1      | 1.00                                | 0.92 | 0.85 |
| 1470.1              | 1500.1      | 10.27                                                 | 9.51  | 8.97  | 1470.1              | 1500.1      | 6.81               | 8.64  | 10.30 | 1470.1              | 1500.1      | 1.08                                | 1.00 | 0.93 |
| 1520.1              | 1550.1      | 10.65                                                 | 10.00 | 9.55  | 1520.1              | 1550.1      | 8.17               | 9.85  | 10.83 | 1520.1              | 1550.1      | 0.97                                | 0.91 | 0.84 |
| 1560.1              | 1590.1      | 10.97                                                 | 10.45 | 10.06 | 1560.1              | 1590.1      | 8.82               | 10.39 | 11.15 | 1560.1              | 1590.1      | 0.87                                | 0.78 | 0.73 |
| 1610.1              | 1640.1      | 11.48                                                 | 11.14 | 10.88 | 1610.1              | 1640.1      | 9.83               | 11.21 | 11.83 | 1610.1              | 1640.1      | 0.58                                | 0.46 | 0.41 |

REV. X2

ADE-2+

101013

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



## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=500.1MHz<br>(dB) |
|----------------------|-------------|-----------------------------------------------------------------|
|                      |             | @LO (dBm)<br><br>+7                                             |
| 490.0                | 10.1        | 6.86                                                            |
| 479.8                | 20.3        | 6.79                                                            |
| 469.6                | 30.5        | 6.72                                                            |
| 459.4                | 40.7        | 6.72                                                            |
| 449.1                | 51.0        | 6.75                                                            |
| 438.9                | 61.2        | 6.74                                                            |
| 428.7                | 71.4        | 6.74                                                            |
| 418.5                | 81.6        | 6.74                                                            |
| 408.3                | 91.8        | 6.74                                                            |
| 398.1                | 102.0       | 6.68                                                            |
| 387.9                | 112.2       | 6.64                                                            |
| 377.7                | 122.4       | 6.62                                                            |
| 367.4                | 132.7       | 6.55                                                            |
| 357.2                | 142.9       | 6.60                                                            |
| 347.0                | 153.1       | 6.58                                                            |
| 336.8                | 163.3       | 6.59                                                            |
| 326.6                | 173.5       | 6.60                                                            |
| 316.4                | 183.7       | 6.58                                                            |
| 306.2                | 193.9       | 6.60                                                            |
| 296.0                | 204.1       | 6.58                                                            |
| 285.7                | 214.4       | 6.58                                                            |
| 275.5                | 224.6       | 6.56                                                            |
| 265.3                | 234.8       | 6.58                                                            |
| 255.1                | 245.0       | 6.60                                                            |
| 234.7                | 265.4       | 6.56                                                            |
| 224.5                | 275.6       | 6.50                                                            |
| 204.0                | 296.1       | 6.62                                                            |
| 193.8                | 306.3       | 6.63                                                            |
| 173.4                | 326.7       | 6.60                                                            |
| 163.2                | 336.9       | 6.59                                                            |
| 142.8                | 357.3       | 6.66                                                            |
| 132.6                | 367.5       | 6.65                                                            |
| 112.1                | 388.0       | 6.68                                                            |
| 101.9                | 398.2       | 6.64                                                            |
| 81.5                 | 418.6       | 6.61                                                            |
| 71.3                 | 428.8       | 6.64                                                            |
| 50.9                 | 449.2       | 6.70                                                            |
| 40.6                 | 459.5       | 6.67                                                            |
| 20.2                 | 479.9       | 6.68                                                            |
| 10.0                 | 490.1       | 6.67                                                            |

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=10MHz<br>(dB) |
|----------------------|-------------|--------------------------------------------------------------|
|                      |             | @LO (dBm)<br><br>+7                                          |
| 10.1                 | 20.1        | 6.33                                                         |
| 70.1                 | 80.1        | 6.35                                                         |
| 130.1                | 140.1       | 6.59                                                         |
| 190.1                | 200.1       | 6.70                                                         |
| 250.1                | 260.1       | 6.45                                                         |
| 310.1                | 320.1       | 6.45                                                         |
| 370.1                | 380.1       | 6.47                                                         |
| 430.1                | 440.1       | 6.62                                                         |
| 490.1                | 500.1       | 6.75                                                         |
| 550.1                | 560.1       | 6.75                                                         |
| 610.1                | 620.1       | 6.66                                                         |
| 670.1                | 680.1       | 7.06                                                         |
| 730.1                | 740.1       | 7.10                                                         |
| 790.1                | 800.1       | 6.91                                                         |
| 850.1                | 860.1       | 6.80                                                         |
| 910.1                | 920.1       | 6.67                                                         |
| 970.1                | 980.1       | 6.68                                                         |
| 1030.1               | 1040.1      | 6.57                                                         |
| 1090.1               | 1100.1      | 6.52                                                         |
| 1150.1               | 1160.1      | 6.74                                                         |
| 1210.1               | 1220.1      | 6.94                                                         |
| 1270.1               | 1280.1      | 6.80                                                         |
| 1330.1               | 1340.1      | 6.81                                                         |
| 1390.1               | 1400.1      | 6.51                                                         |
| 1450.1               | 1460.1      | 6.72                                                         |
| 1510.1               | 1520.1      | 6.88                                                         |
| 1570.1               | 1580.1      | 6.93                                                         |
| 1630.1               | 1640.1      | 6.89                                                         |
| 1690.1               | 1700.1      | 7.11                                                         |
| 1750.1               | 1760.1      | 7.38                                                         |
| 1810.1               | 1820.1      | 7.30                                                         |
| 1870.1               | 1880.1      | 7.57                                                         |
| 1930.1               | 1940.1      | 8.08                                                         |
| 1990.1               | 2000.1      | 8.22                                                         |
| 2050.1               | 2060.1      | 8.69                                                         |
| 2110.1               | 2120.1      | 9.02                                                         |
| 2170.1               | 2180.1      | 9.59                                                         |
| 2230.1               | 2240.1      | 10.05                                                        |
| 2270.1               | 2280.1      | 10.18                                                        |
| 2330.1               | 2340.1      | 10.73                                                        |

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=1000.1MHz<br>(dB) |
|----------------------|-------------|------------------------------------------------------------------|
|                      |             | @LO (dBm)<br><br>+7                                              |
| 990.0                | 10.1        | 7.48                                                             |
| 970.0                | 30.1        | 7.31                                                             |
| 950.0                | 50.1        | 7.31                                                             |
| 930.0                | 70.1        | 7.29                                                             |
| 910.0                | 90.1        | 7.30                                                             |
| 890.0                | 110.1       | 7.25                                                             |
| 870.0                | 130.1       | 7.12                                                             |
| 850.0                | 150.1       | 7.16                                                             |
| 830.0                | 170.1       | 7.14                                                             |
| 810.0                | 190.1       | 7.10                                                             |
| 790.0                | 210.1       | 7.12                                                             |
| 770.0                | 230.1       | 7.09                                                             |
| 750.0                | 250.1       | 7.06                                                             |
| 730.0                | 270.1       | 7.09                                                             |
| 710.0                | 290.1       | 7.10                                                             |
| 690.0                | 310.1       | 7.10                                                             |
| 670.0                | 330.1       | 7.08                                                             |
| 650.0                | 350.1       | 7.12                                                             |
| 630.0                | 370.1       | 7.14                                                             |
| 610.0                | 390.1       | 7.18                                                             |
| 570.0                | 430.1       | 7.11                                                             |
| 550.0                | 450.1       | 7.13                                                             |
| 510.0                | 490.1       | 7.23                                                             |
| 490.0                | 510.1       | 7.22                                                             |
| 450.0                | 550.1       | 7.23                                                             |
| 430.0                | 570.1       | 7.22                                                             |
| 390.0                | 610.1       | 7.23                                                             |
| 370.0                | 630.1       | 7.20                                                             |
| 330.0                | 670.1       | 7.23                                                             |
| 310.0                | 690.1       | 7.23                                                             |
| 270.0                | 730.1       | 7.29                                                             |
| 250.0                | 750.1       | 7.33                                                             |
| 210.0                | 790.1       | 7.33                                                             |
| 190.0                | 810.1       | 7.27                                                             |
| 150.0                | 850.1       | 7.26                                                             |
| 130.0                | 870.1       | 7.22                                                             |
| 90.0                 | 910.1       | 7.09                                                             |
| 70.0                 | 930.1       | 7.12                                                             |
| 30.0                 | 970.1       | 7.17                                                             |
| 10.0                 | 990.1       | 7.21                                                             |

## 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   |
| 40.1        | 59.73                   | 59.90 | 59.07 | 49.35                   | 46.48 | 44.56 |
| 80.1        | 54.92                   | 55.28 | 55.02 | 51.02                   | 48.27 | 46.54 |
| 120.1       | 51.73                   | 52.02 | 52.31 | 50.26                   | 47.61 | 45.96 |
| 160.1       | 49.38                   | 49.70 | 49.97 | 49.88                   | 47.25 | 45.62 |
| 200.1       | 47.57                   | 47.98 | 48.23 | 49.97                   | 47.38 | 45.53 |
| 240.1       | 46.14                   | 46.57 | 46.74 | 49.47                   | 46.69 | 44.65 |
| 280.1       | 44.84                   | 45.28 | 45.49 | 49.27                   | 46.51 | 44.44 |
| 320.1       | 43.87                   | 44.33 | 44.50 | 49.05                   | 46.26 | 44.00 |
| 360.1       | 42.87                   | 43.30 | 43.57 | 48.22                   | 45.72 | 43.40 |
| 400.1       | 41.97                   | 42.49 | 42.71 | 46.69                   | 44.82 | 42.91 |
| 440.1       | 41.19                   | 41.64 | 41.93 | 45.78                   | 44.43 | 42.46 |
| 480.1       | 40.43                   | 40.86 | 41.11 | 43.89                   | 43.76 | 42.48 |
| 520.1       | 39.93                   | 40.49 | 40.80 | 42.32                   | 42.09 | 41.36 |
| 560.1       | 39.27                   | 39.77 | 40.15 | 40.85                   | 40.80 | 40.20 |
| 600.1       | 38.79                   | 39.23 | 39.52 | 39.59                   | 40.20 | 39.78 |
| 640.1       | 38.44                   | 38.79 | 38.98 | 38.38                   | 39.37 | 39.60 |
| 680.1       | 37.99                   | 38.65 | 38.91 | 37.43                   | 38.35 | 38.92 |
| 720.1       | 37.37                   | 38.14 | 38.63 | 36.70                   | 37.51 | 38.13 |
| 760.1       | 36.72                   | 37.47 | 38.05 | 35.90                   | 36.52 | 36.93 |
| 800.1       | 36.31                   | 37.08 | 37.67 | 35.30                   | 35.76 | 35.71 |
| 840.1       | 35.86                   | 36.66 | 37.29 | 34.82                   | 35.95 | 36.06 |
| 880.1       | 35.40                   | 36.22 | 36.98 | 33.98                   | 35.42 | 36.00 |
| 920.1       | 35.25                   | 36.10 | 36.83 | 32.87                   | 34.43 | 35.21 |
| 960.1       | 35.38                   | 36.23 | 36.80 | 32.01                   | 33.61 | 34.53 |
| 1000.1      | 35.25                   | 36.15 | 36.66 | 31.32                   | 32.97 | 34.16 |
| 1040.1      | 34.76                   | 35.72 | 36.24 | 30.73                   | 32.35 | 33.66 |
| 1080.1      | 34.14                   | 35.08 | 35.63 | 30.27                   | 31.79 | 33.19 |
| 1120.1      | 33.64                   | 34.65 | 35.29 | 29.81                   | 31.40 | 33.10 |
| 1160.1      | 33.10                   | 34.09 | 34.84 | 29.19                   | 30.67 | 32.45 |
| 1200.1      | 32.47                   | 33.31 | 34.02 | 29.03                   | 30.15 | 31.63 |
| 1240.1      | 32.08                   | 32.72 | 33.32 | 29.00                   | 29.95 | 31.11 |
| 1280.1      | 31.74                   | 32.21 | 32.63 | 29.23                   | 30.27 | 31.14 |
| 1320.1      | 31.47                   | 31.83 | 32.16 | 29.78                   | 31.02 | 31.82 |
| 1370.1      | 31.27                   | 31.62 | 31.90 | 29.95                   | 31.77 | 33.09 |
| 1410.1      | 31.06                   | 31.40 | 31.71 | 30.06                   | 32.20 | 33.98 |
| 1460.1      | 30.85                   | 31.20 | 31.59 | 29.74                   | 32.08 | 34.38 |
| 1500.1      | 30.54                   | 30.88 | 31.28 | 29.31                   | 31.73 | 34.30 |
| 1550.1      | 30.23                   | 30.57 | 31.05 | 29.03                   | 31.54 | 34.36 |
| 1590.1      | 30.23                   | 30.57 | 31.01 | 28.64                   | 31.12 | 33.98 |
| 1640.1      | 30.48                   | 30.85 | 31.28 | 28.76                   | 31.26 | 34.10 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +4                      | +7    | +10   |
| 10.1                | 40.1        | 53.55                   | 53.12 | 51.30 |
| 50.1                | 80.1        | 42.84                   | 42.36 | 42.51 |
| 90.1                | 120.1       | 37.98                   | 38.21 | 38.51 |
| 130.1               | 160.1       | 35.37                   | 35.60 | 35.78 |
| 170.1               | 200.1       | 33.54                   | 33.82 | 33.92 |
| 210.1               | 240.1       | 32.31                   | 32.45 | 32.66 |
| 250.1               | 280.1       | 31.49                   | 31.71 | 31.92 |
| 290.1               | 320.1       | 30.76                   | 31.18 | 31.14 |
| 330.1               | 360.1       | 30.38                   | 30.65 | 30.82 |
| 370.1               | 400.1       | 30.22                   | 30.76 | 31.07 |
| 410.1               | 440.1       | 29.90                   | 30.50 | 30.98 |
| 450.1               | 480.1       | 29.23                   | 29.67 | 30.06 |
| 490.1               | 520.1       | 28.68                   | 29.06 | 29.40 |
| 530.1               | 560.1       | 28.35                   | 28.72 | 29.08 |
| 570.1               | 600.1       | 27.47                   | 28.08 | 28.54 |
| 610.1               | 640.1       | 26.37                   | 27.17 | 27.87 |
| 650.1               | 680.1       | 25.08                   | 25.67 | 26.27 |
| 690.1               | 720.1       | 23.54                   | 23.80 | 24.08 |
| 730.1               | 760.1       | 21.88                   | 21.89 | 21.90 |
| 770.1               | 800.1       | 20.85                   | 20.79 | 20.70 |
| 810.1               | 840.1       | 20.06                   | 20.02 | 19.95 |
| 850.1               | 880.1       | 19.42                   | 19.36 | 19.32 |
| 890.1               | 920.1       | 18.98                   | 18.93 | 18.90 |
| 930.1               | 960.1       | 18.82                   | 18.82 | 18.83 |
| 970.1               | 1000.1      | 18.59                   | 18.66 | 18.81 |
| 1010.1              | 1040.1      | 18.47                   | 18.65 | 18.93 |
| 1050.1              | 1080.1      | 18.47                   | 18.74 | 19.17 |
| 1090.1              | 1120.1      | 18.70                   | 18.93 | 19.42 |
| 1130.1              | 1160.1      | 18.89                   | 19.06 | 19.46 |
| 1170.1              | 1200.1      | 19.07                   | 19.13 | 19.20 |
| 1210.1              | 1240.1      | 19.33                   | 19.41 | 19.28 |
| 1250.1              | 1280.1      | 19.30                   | 19.50 | 19.42 |
| 1290.1              | 1320.1      | 18.92                   | 19.22 | 19.25 |
| 1340.1              | 1370.1      | 18.09                   | 18.36 | 18.39 |
| 1380.1              | 1410.1      | 17.24                   | 17.42 | 17.39 |
| 1430.1              | 1460.1      | 16.09                   | 16.07 | 15.90 |
| 1470.1              | 1500.1      | 15.12                   | 14.97 | 14.77 |
| 1520.1              | 1550.1      | 13.91                   | 13.65 | 13.42 |
| 1560.1              | 1590.1      | 13.00                   | 12.67 | 12.42 |
| 1610.1              | 1640.1      | 11.84                   | 11.46 | 11.16 |

## 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=1000MHz<br>(:1) |      |  |  |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|------|------|-------|----------------------|--------------------------------|------|--|--|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |      |      |       |                      | @LO (dBm)                      |      |  |  |
|                     |             | +4              | +7   | +10  |             | +4              | +7   | +10  | +4    |                      | +7                             | +10  |  |  |
| 10.1                | 40.1        | 1.37            | 1.71 | 1.45 | 40.1        | 3.03            | 7.90 | 8.81 | 10.1  | 1.80                 | 1.53                           | 1.38 |  |  |
| 50.1                | 80.1        | 1.17            | 1.26 | 1.31 | 80.1        | 1.99            | 3.03 | 4.72 | 40.1  | 1.80                 | 1.53                           | 1.38 |  |  |
| 90.1                | 120.1       | 1.17            | 1.27 | 1.32 | 120.1       | 1.96            | 2.91 | 4.27 | 60.1  | 1.82                 | 1.55                           | 1.40 |  |  |
| 130.1               | 160.1       | 1.21            | 1.30 | 1.37 | 160.1       | 1.88            | 2.73 | 3.89 | 90.1  | 1.76                 | 1.51                           | 1.37 |  |  |
| 170.1               | 200.1       | 1.18            | 1.26 | 1.32 | 200.1       | 1.85            | 2.65 | 3.71 | 110.1 | 1.83                 | 1.57                           | 1.42 |  |  |
| 210.1               | 240.1       | 1.23            | 1.31 | 1.37 | 240.1       | 1.90            | 2.75 | 3.86 | 140.1 | 1.80                 | 1.54                           | 1.40 |  |  |
| 250.1               | 280.1       | 1.22            | 1.30 | 1.37 | 280.1       | 1.85            | 2.61 | 3.60 | 160.1 | 1.84                 | 1.58                           | 1.44 |  |  |
| 290.1               | 320.1       | 1.24            | 1.32 | 1.38 | 320.1       | 1.89            | 2.68 | 3.68 | 190.1 | 1.78                 | 1.53                           | 1.40 |  |  |
| 330.1               | 360.1       | 1.26            | 1.35 | 1.40 | 360.1       | 1.89            | 2.64 | 3.58 | 210.1 | 1.86                 | 1.61                           | 1.48 |  |  |
| 370.1               | 400.1       | 1.27            | 1.35 | 1.41 | 400.1       | 1.91            | 2.65 | 3.56 | 240.1 | 1.82                 | 1.57                           | 1.44 |  |  |
| 410.1               | 440.1       | 1.31            | 1.39 | 1.45 | 440.1       | 1.96            | 2.70 | 3.61 | 260.1 | 1.87                 | 1.63                           | 1.50 |  |  |
| 450.1               | 480.1       | 1.30            | 1.39 | 1.45 | 480.1       | 1.96            | 2.67 | 3.54 | 290.1 | 1.82                 | 1.59                           | 1.47 |  |  |
| 490.1               | 520.1       | 1.32            | 1.39 | 1.45 | 520.1       | 2.02            | 2.75 | 3.64 | 310.1 | 1.89                 | 1.66                           | 1.55 |  |  |
| 530.1               | 560.1       | 1.33            | 1.40 | 1.46 | 560.1       | 2.03            | 2.73 | 3.57 | 340.1 | 1.88                 | 1.65                           | 1.54 |  |  |
| 570.1               | 600.1       | 1.36            | 1.44 | 1.49 | 600.1       | 2.07            | 2.77 | 3.61 | 360.1 | 1.90                 | 1.69                           | 1.59 |  |  |
| 610.1               | 640.1       | 1.39            | 1.48 | 1.55 | 640.1       | 2.10            | 2.78 | 3.58 | 390.1 | 1.85                 | 1.65                           | 1.55 |  |  |
| 650.1               | 680.1       | 1.41            | 1.50 | 1.58 | 680.1       | 2.13            | 2.80 | 3.58 | 410.1 | 1.90                 | 1.71                           | 1.63 |  |  |
| 690.1               | 720.1       | 1.44            | 1.52 | 1.59 | 720.1       | 2.18            | 2.86 | 3.65 | 440.1 | 1.92                 | 1.74                           | 1.65 |  |  |
| 730.1               | 760.1       | 1.46            | 1.54 | 1.60 | 760.1       | 2.20            | 2.86 | 3.64 | 460.1 | 1.91                 | 1.74                           | 1.66 |  |  |
| 770.1               | 800.1       | 1.47            | 1.54 | 1.60 | 800.1       | 2.25            | 2.91 | 3.69 | 490.1 | 1.88                 | 1.71                           | 1.64 |  |  |
| 810.1               | 840.1       | 1.49            | 1.56 | 1.62 | 840.1       | 2.28            | 2.90 | 3.65 | 510.1 | 1.92                 | 1.77                           | 1.72 |  |  |
| 850.1               | 880.1       | 1.49            | 1.56 | 1.62 | 880.1       | 2.31            | 2.92 | 3.64 | 540.1 | 1.94                 | 1.80                           | 1.75 |  |  |
| 890.1               | 920.1       | 1.50            | 1.58 | 1.64 | 920.1       | 2.38            | 2.98 | 3.69 | 560.1 | 1.92                 | 1.78                           | 1.74 |  |  |
| 930.1               | 960.1       | 1.49            | 1.57 | 1.63 | 960.1       | 2.46            | 3.05 | 3.75 | 590.1 | 1.90                 | 1.77                           | 1.74 |  |  |
| 970.1               | 1000.1      | 1.49            | 1.57 | 1.64 | 1000.1      | 2.52            | 3.10 | 3.79 | 610.1 | 1.93                 | 1.82                           | 1.80 |  |  |
| 1010.1              | 1040.1      | 1.52            | 1.60 | 1.66 | 1040.1      | 2.57            | 3.16 | 3.84 | 640.1 | 1.93                 | 1.83                           | 1.81 |  |  |
| 1050.1              | 1080.1      | 1.53            | 1.60 | 1.67 | 1080.1      | 2.61            | 3.21 | 3.87 | 660.1 | 1.94                 | 1.83                           | 1.82 |  |  |
| 1090.1              | 1120.1      | 1.60            | 1.66 | 1.73 | 1120.1      | 2.64            | 3.23 | 3.90 | 690.1 | 1.91                 | 1.81                           | 1.80 |  |  |
| 1130.1              | 1160.1      | 1.73            | 1.76 | 1.82 | 1160.1      | 2.68            | 3.27 | 3.94 | 710.1 | 1.91                 | 1.83                           | 1.84 |  |  |
| 1170.1              | 1200.1      | 1.84            | 1.86 | 1.90 | 1200.1      | 2.69            | 3.27 | 3.93 | 740.1 | 1.95                 | 1.86                           | 1.87 |  |  |
| 1210.1              | 1240.1      | 2.03            | 2.03 | 2.05 | 1240.1      | 2.73            | 3.30 | 3.98 | 760.1 | 1.93                 | 1.85                           | 1.86 |  |  |
| 1250.1              | 1280.1      | 2.20            | 2.19 | 2.19 | 1280.1      | 2.75            | 3.30 | 3.95 | 790.1 | 1.91                 | 1.82                           | 1.83 |  |  |
| 1290.1              | 1320.1      | 2.42            | 2.41 | 2.40 | 1320.1      | 2.73            | 3.26 | 3.90 | 810.1 | 1.88                 | 1.82                           | 1.85 |  |  |
| 1340.1              | 1370.1      | 2.74            | 2.72 | 2.70 | 1370.1      | 2.76            | 3.26 | 3.88 | 840.1 | 1.94                 | 1.87                           | 1.90 |  |  |
| 1380.1              | 1410.1      | 2.97            | 2.94 | 2.91 | 1410.1      | 2.73            | 3.20 | 3.81 | 860.1 | 1.90                 | 1.83                           | 1.86 |  |  |
| 1430.1              | 1460.1      | 3.34            | 3.29 | 3.24 | 1460.1      | 2.76            | 3.22 | 3.84 | 890.1 | 1.90                 | 1.81                           | 1.83 |  |  |
| 1470.1              | 1500.1      | 3.50            | 3.45 | 3.39 | 1500.1      | 2.75            | 3.18 | 3.79 | 910.1 | 1.84                 | 1.77                           | 1.81 |  |  |
| 1520.1              | 1550.1      | 3.76            | 3.70 | 3.64 | 1550.1      | 2.81            | 3.25 | 3.86 | 940.1 | 1.92                 | 1.85                           | 1.89 |  |  |
| 1560.1              | 1590.1      | 3.84            | 3.79 | 3.74 | 1590.1      | 2.87            | 3.27 | 3.86 | 960.1 | 1.88                 | 1.79                           | 1.82 |  |  |
| 1610.1              | 1640.1      | 3.98            | 3.95 | 3.92 | 1640.1      | 3.03            | 3.42 | 3.99 | 990.1 | 1.96                 | 1.87                           | 1.90 |  |  |

## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 14  | 27  | 15  | 28  | 24  | 28  | 44  | 34  | 33  | 53  |
| 1  | -      | 23     | +0  | 37  | 12  | 36  | 19  | 32  | 38  | 38  | 41  | 39  |
| 2  | >90    | >69    | 56  | 66  | 55  | >69 | 54  | 66  | 60  | >69 | >69 | 63  |
| 3  | >90    | >69    | 65  | >69 | 65  | >69 | 60  | >69 | 69  | >69 | >69 | >69 |
| 4  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 5  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 6  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 7  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 8  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 9  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 10 | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions: RF IN: 500 MHz; -14.00 dBm.  
LO IN: 530 MHz; +7.00 dBm  
IF OUT: 30 MHz; -20.74 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 24  | 37  | 26  | 38  | 37  | 40  | 54  | 49  | 47  | 68  |
| 1  | -      | 24     | +0  | 36  | 12  | 36  | 19  | 35  | 38  | 43  | 46  | 45  |
| 2  | 73     | 63     | 48  | 63  | 47  | >79 | 47  | 63  | 54  | 58  | 67  | 58  |
| 3  | >90    | 65     | 47  | 60  | 73  | 71  | 44  | 58  | 49  | 51  | 59  | 53  |
| 4  | >90    | 70     | >79 | 71  | 70  | 74  | 68  | 75  | 61  | 68  | 69  | >79 |
| 5  | >90    | 72     | 65  | 73  | 61  | 73  | 57  | 71  | 56  | 69  | 58  | >79 |
| 6  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 7  | >90    | >79    | >79 | >79 | 75  | >79 | 76  | >79 | 77  | >79 | 78  | >79 |
| 8  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 9  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 10 | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

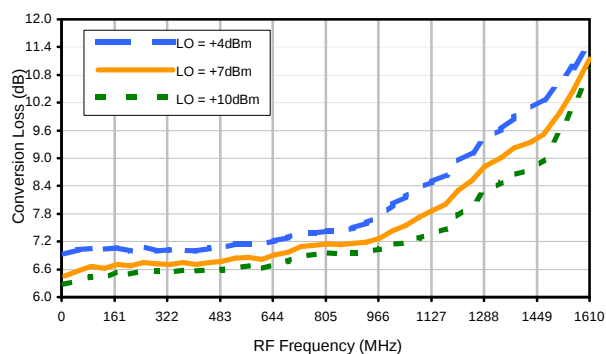
### LO HARMONICS ORDER

Test conditions: RF IN: 500 MHz; -4.00 dBm.  
LO IN: 530 MHz; +7.00 dBm  
IF OUT: 30 MHz; -10.77 dBm

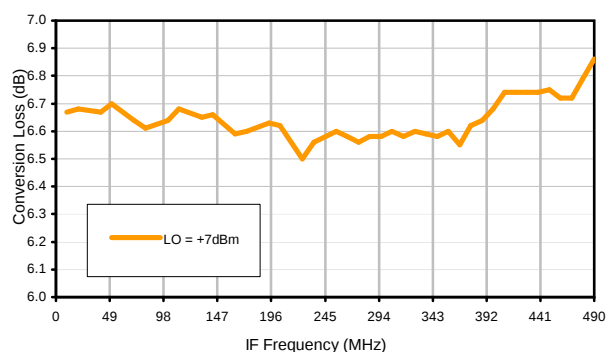
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

## Typical Performance Curves

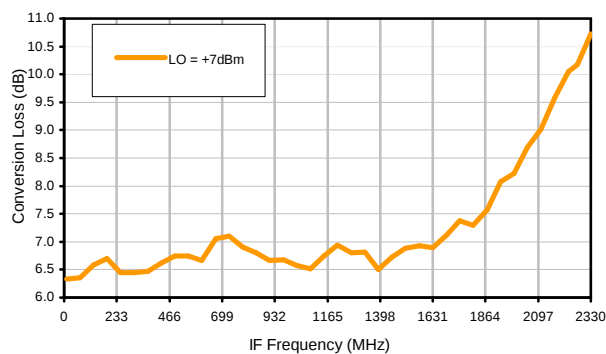
Conversion Loss @ IF=30MHz



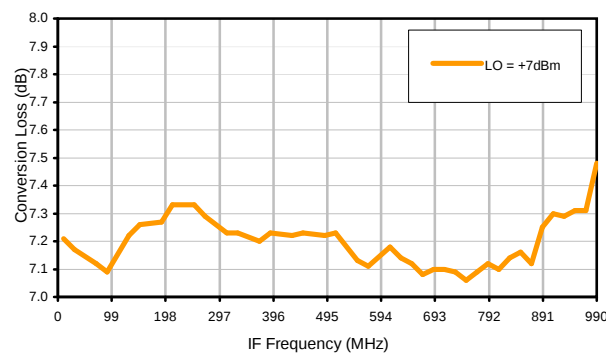
Conversion Loss vs. IF @ RF=500.1MHz



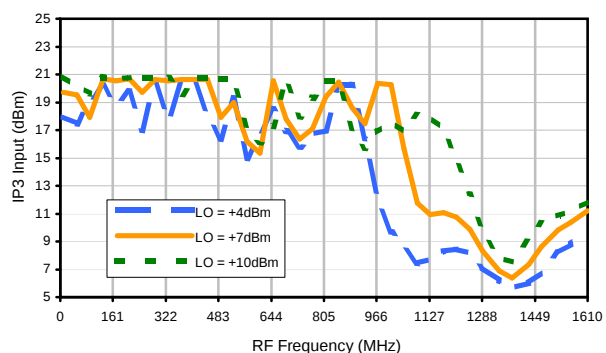
Conversion Loss vs. IF @ RF=10MHz



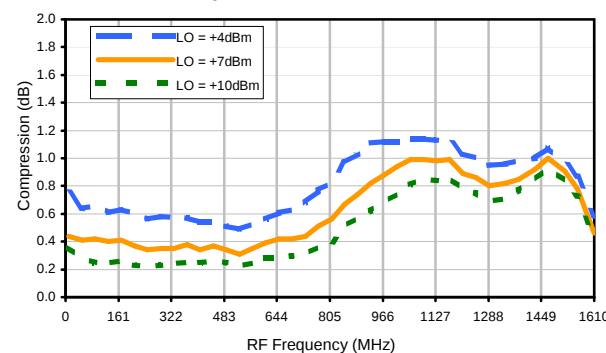
Conversion Loss vs. IF @ RF=1000.1MHz



IP3 Input

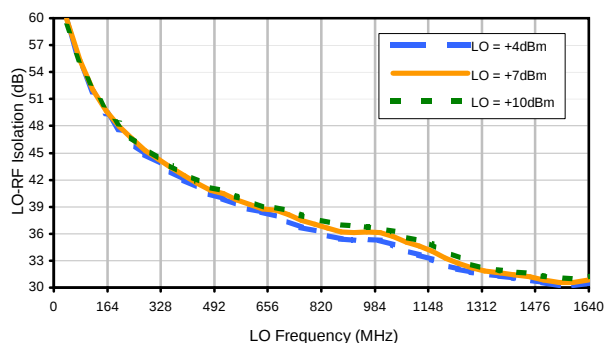


Compression @ RF IN=+1dBm

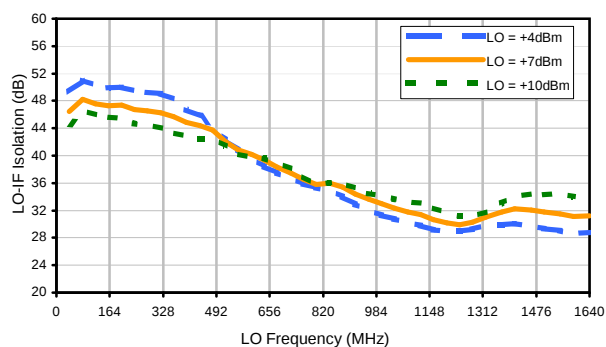


## Typical Performance Curves

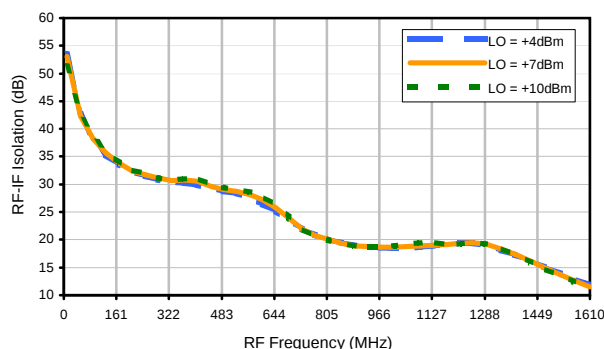
LO-RF Isolation



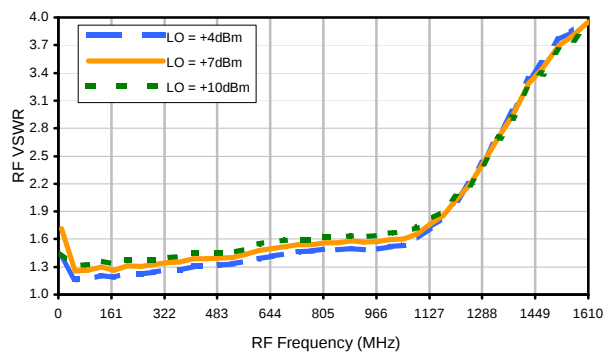
LO-IF Isolation



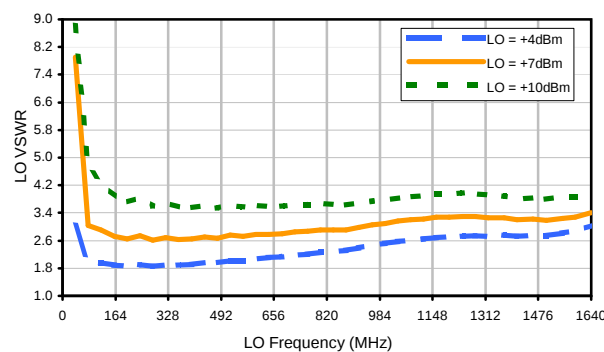
RF-IF Isolation



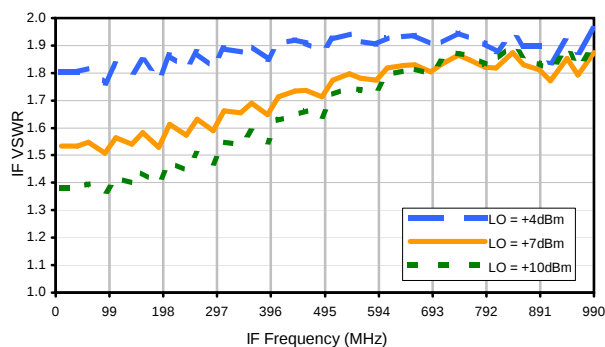
RF VSWR



LO VSWR



IF VSWR



REV. X2

ADE-2+

101013

Page 2 of 3



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## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 14  | 27  | 15  | 28  | 24  | 28  | 44  | 34  | 33  | 53  |
| 1  | -      | 23     | +0  | 37  | 12  | 36  | 19  | 32  | 38  | 38  | 41  | 39  |
| 2  | >90    | >69    | 56  | 66  | 55  | >69 | 54  | 66  | 60  | >69 | >69 | 63  |
| 3  | >90    | >69    | 65  | >69 | 65  | >69 | 60  | >69 | 69  | >69 | >69 | >69 |
| 4  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 5  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 6  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 7  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 8  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 9  | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 10 | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions: RF IN: 500 MHz; -14.00 dBm.  
LO IN: 530 MHz; +7.00 dBm  
IF OUT: 30 MHz; -20.74 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 24  | 37  | 26  | 38  | 37  | 40  | 54  | 49  | 47  | 68  |
| 1  | -      | 24     | +0  | 36  | 12  | 36  | 19  | 35  | 38  | 43  | 46  | 45  |
| 2  | 73     | 63     | 48  | 63  | 47  | >79 | 47  | 63  | 54  | 58  | 67  | 58  |
| 3  | >90    | 65     | 47  | 60  | 73  | 71  | 44  | 58  | 49  | 51  | 59  | 53  |
| 4  | >90    | 70     | >79 | 71  | 70  | 74  | 68  | 75  | 61  | 68  | 69  | >79 |
| 5  | >90    | 72     | 65  | 73  | 61  | 73  | 57  | 71  | 56  | 69  | 58  | >79 |
| 6  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 7  | >90    | >79    | >79 | >79 | 75  | >79 | 76  | >79 | 77  | >79 | 78  | >79 |
| 8  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 9  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 10 | >90    | >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 MHz; -4.00 dBm.  
LO IN: 530 MHz; +7.00 dBm  
IF OUT: 30 MHz; -10.77 dBm

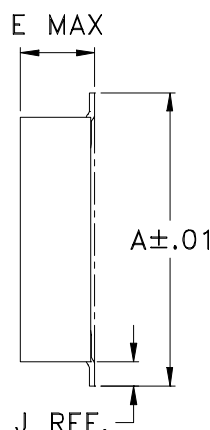
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

REV. X2  
ADE-2+  
101013  
Page 3 of 3



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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# 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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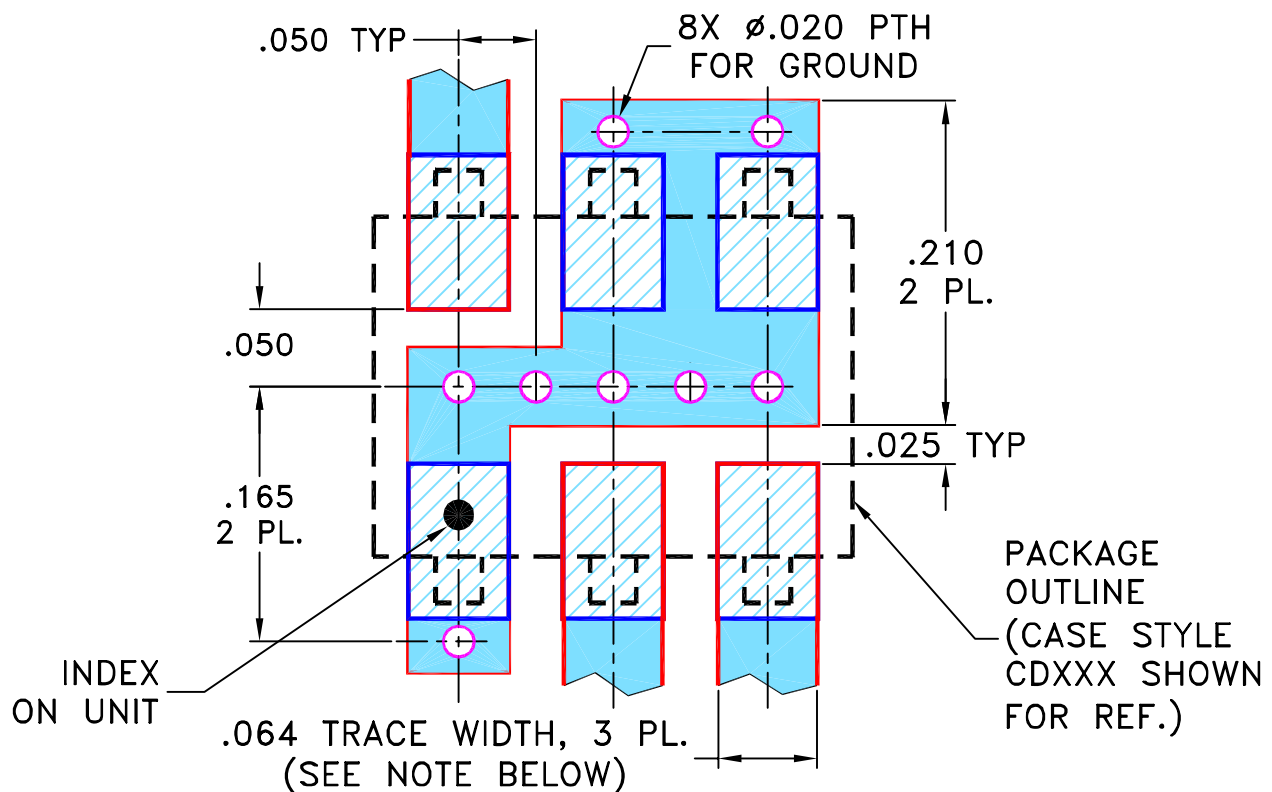
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION                                          | DATE     | DR  | AUTH |
|-----|---------|------------------------------------------------------|----------|-----|------|
| A   | M101143 | ADDED "gk" PIN CONNECTION, TT100 CASE STYLE & NOTE 2 | 10/10/05 | MMG | DJ   |
| B   | M102713 | ADDED "...WITH SMOBC"                                | 01/17/06 | MMG | IL   |
| C   | M108637 | REMOVED "PIN 1", ADDED INDEX ON UNIT                 | 12/01/06 | MYG | FL   |

**SUGGESTED MOUNTING CONFIGURATION**  
**FOR BH292, CD541/542/636/637, TT100/240 CASE**  
**STYLES, "gk", "ht", "hu", "nd", "w" 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

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

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

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, gk/ht/hu/nd/w, BH292,  
 CD541/542/636/637, TT100/240, TB-03

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-052

REV:

C

FILE:

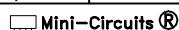
98PL052

SCALE:

8:1

SHEET:

1 OF 1



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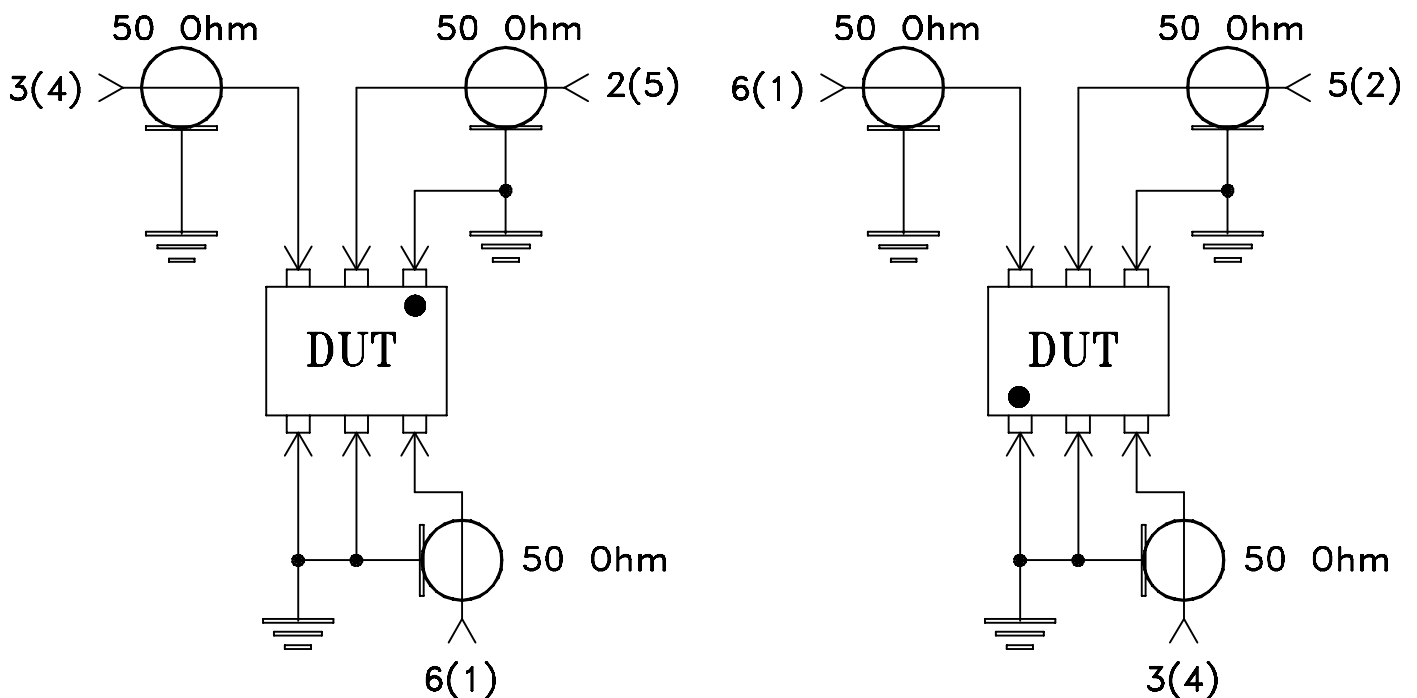
ASHEETA1.DWG REV:A DATE:01/12/95

# Evaluation Board and Circuit

For Pin Connections and DUT Orientation Refer to  
Data Sheet of the DUT



TB-03



Schematic Diagram

## Notes:

1. 50 Ohm 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                                                                              |