

High IP3

# Frequency Mixer

Level 13 (LO Power+13 dBm) 3500 to 3600 MHz

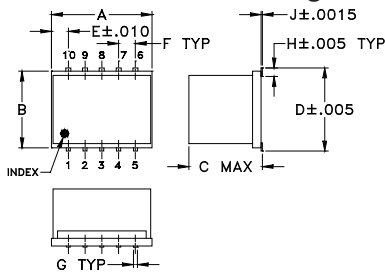
## Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| Operating Temperature                                           | -55°C to 100°C |
| Storage Temperature                                             | -55°C to 100°C |
| LO & RF Power                                                   | 16 dBm         |
| Permanent damage may occur if any of these limits are exceeded. |                |

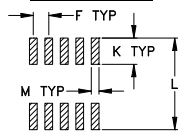
## Pin Connections

|        |               |
|--------|---------------|
| LO     | 10            |
| RF     | 5             |
| IF     | 3             |
| GROUND | 1,2,4,6,7,8,9 |

## Outline Drawing



### PCB Land Pattern



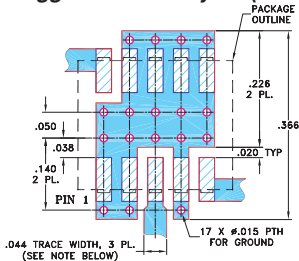
Suggested L layout,  
Tolerance to be within ±.002

## Outline Dimensions (inch/mm)

| A    | B    | C    | D    | E    | F    | G     |
|------|------|------|------|------|------|-------|
| .30  | .250 | .190 | .266 | .050 | .050 | .012  |
| 7.62 | 6.35 | 4.83 | 6.76 | 1.27 | 1.27 | 0.30  |
| H    | J    | K    | L    | M    |      | wt    |
| .029 | .004 | .085 | .296 | .030 |      | grams |
| 0.74 | 0.10 | 2.16 | 7.52 | 0.76 |      | 0.5   |

## Demo Board MCL P/N: TB-144

### Suggested PCB Layout (PL-045)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .0015"; 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-Circuits' applicable established test performance criteria and measurement instructions.  
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## Features

- excellent IP3, 30 dBm typ.
- excellent L-R isolation, 42 dB typ.
- excellent 1dB compression, RF>LO power
- industry standard foot print
- LTCC design for excellent temperature stability, performance repeatability and small size
- aqueous washable
- double balanced mixer
- low price
- protected by US Patent 6,959,180

## Applications

- line of sight links
- satellite communications
- WiMAX

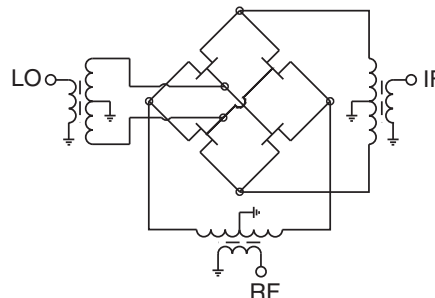
## Electrical Specifications (T<sub>AMB</sub>=-55°C to 100°C)

| FREQUENCY (MHz) |           |         | IP3 (dBm) | RF in at 1 dB compr. (dBm) | CONVERSION LOSS (dB) |      | LO-RF ISOLATION (dB) |      | LO-IF ISOLATION (dB) |      |
|-----------------|-----------|---------|-----------|----------------------------|----------------------|------|----------------------|------|----------------------|------|
| RF              | LO        | IF      | Typ.      | Min.                       | Typ.                 | Max. | Typ.                 | Min. | Typ.                 | Min. |
| 3500-3600       | 3070-3170 | 380-480 | 30        | 13                         | 8.3                  | 9.3  | 42                   | 20   | 27                   | 15   |

## Typical Performance Data

| Frequency (MHz) |         | Conversion Loss (dB) | Isolation L-R (dB) | Isolation L-I (dB) | VSWR RF Port (:1) | VSWR LO Port (:1) | IP3 (dBm) |
|-----------------|---------|----------------------|--------------------|--------------------|-------------------|-------------------|-----------|
| RF              | LO      | LO +13dBm            | LO +13dBm          | LO +13dBm          | LO +13dBm         | LO +13dBm         | LO +13dBm |
| 3500.00         | 3070.00 | 7.66                 | 43.70              | 24.07              | 2.20              | 3.50              | 32.03     |
| 3510.00         | 3080.00 | 7.81                 | 42.84              | 24.46              | 2.36              | 3.62              | 32.45     |
| 3520.00         | 3090.00 | 8.16                 | 42.47              | 24.94              | 2.52              | 3.66              | 34.10     |
| 3530.00         | 3100.00 | 8.12                 | 43.22              | 25.47              | 2.67              | 3.54              | 32.67     |
| 3540.00         | 3110.00 | 8.00                 | 44.47              | 25.83              | 2.80              | 3.47              | 32.06     |
| 3550.00         | 3120.00 | 8.05                 | 45.26              | 26.13              | 2.93              | 3.41              | 33.59     |
| 3560.00         | 3130.00 | 7.92                 | 45.60              | 26.42              | 3.09              | 3.40              | 33.95     |
| 3570.00         | 3140.00 | 7.46                 | 50.36              | 26.68              | 3.28              | 3.44              | 32.32     |
| 3580.00         | 3150.00 | 7.20                 | 57.12              | 27.11              | 3.50              | 3.54              | 32.46     |
| 3590.00         | 3160.00 | 7.38                 | 56.79              | 27.68              | 3.77              | 3.59              | 32.93     |
| 3600.00         | 3170.00 | 7.64                 | 54.68              | 28.36              | 4.05              | 3.61              | 32.34     |

## Electrical Schematic



CASE STYLE: DZ883

### +RoHS Compliant

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



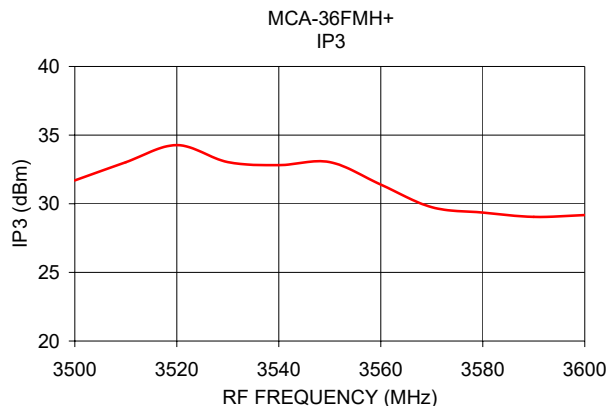
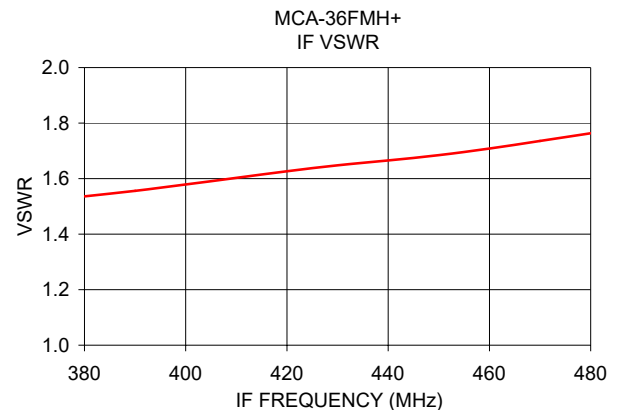
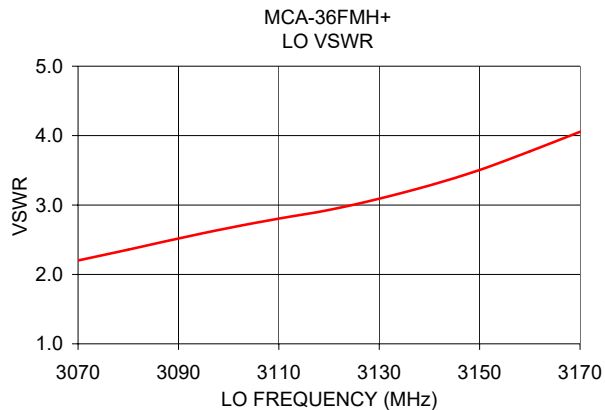
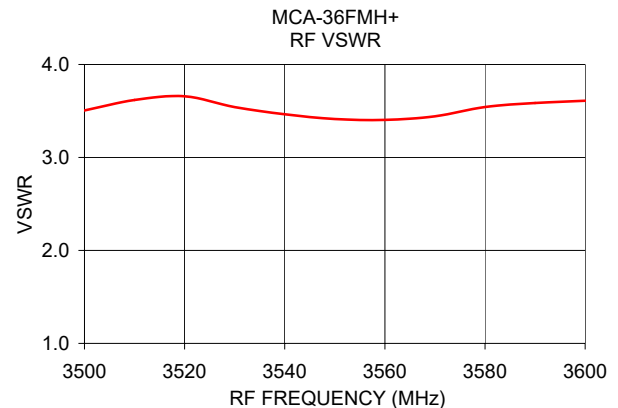
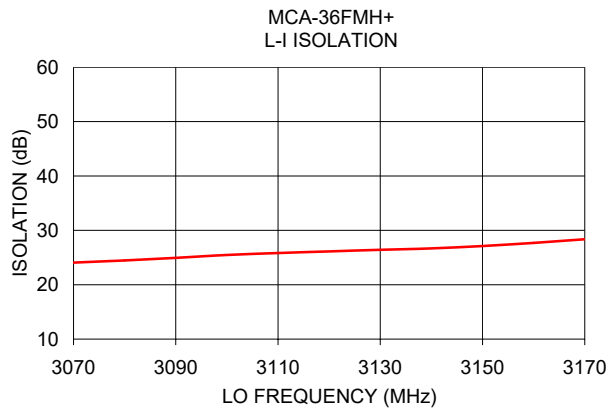
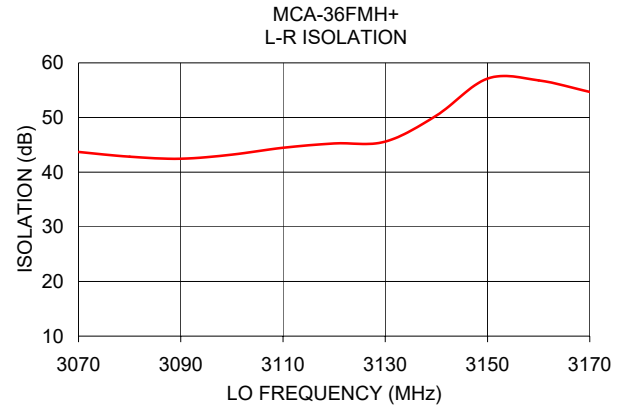
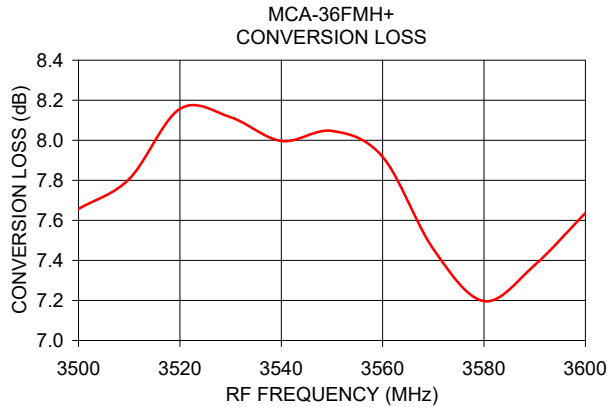
Available Tape and Reel at no extra cost

| Reel Size | Devices/Reel         |
|-----------|----------------------|
| 7"        | 10, 20, 50, 100, 200 |
| 13"       | 500, 1000            |



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REV. K  
ECO-001562  
ED-9488C2/2  
MCA-36FMH+  
DJ/CP/AM  
200127



### Notes

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# Frequency Mixer

# MCA-36FMH+

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=430MHz<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=+13dBm<br>(dB) |      |       |
|---------------------|-------------|--------------------------------------------------------|-------|-------|---------------------|-------------|--------------------|-------|-------|---------------------|-------------|--------------------------------------|------|-------|
|                     |             | @LO (dBm)                                              |       |       |                     |             | @LO (dBm)          |       |       |                     |             | @LO (dBm)                            |      |       |
|                     |             |                                                        |       |       |                     |             |                    |       |       |                     |             |                                      |      |       |
| +10                 | +13         | +16                                                    | +10   | +13   | +16                 | +10         | +13                | +16   |       |                     |             |                                      |      |       |
| 2860.0              | 2430.0      | 12.67                                                  | 10.82 | 11.00 | 2860.0              | 2430.0      | 14.74              | 17.07 | 11.60 | 2860.0              | 2430.0      | 1.50                                 | 1.35 | -0.24 |
| 2890.0              | 2460.0      | 11.59                                                  | 10.14 | 11.80 | 2890.0              | 2460.0      | 14.70              | 16.83 | 14.90 | 2890.0              | 2460.0      | 1.67                                 | 1.33 | -1.63 |
| 2920.0              | 2490.0      | 11.58                                                  | 10.12 | 9.81  | 2920.0              | 2490.0      | 14.31              | 16.80 | 17.43 | 2920.0              | 2490.0      | 1.53                                 | 1.26 | 0.28  |
| 2950.0              | 2520.0      | 11.35                                                  | 9.92  | 8.99  | 2950.0              | 2520.0      | 14.47              | 17.23 | 20.18 | 2950.0              | 2520.0      | 1.34                                 | 1.10 | 0.88  |
| 2980.0              | 2550.0      | 10.57                                                  | 9.39  | 8.67  | 2980.0              | 2550.0      | 15.35              | 17.88 | 20.51 | 2980.0              | 2550.0      | 1.25                                 | 1.01 | 0.76  |
| 3015.0              | 2585.0      | 10.40                                                  | 9.27  | 8.61  | 3015.0              | 2585.0      | 15.33              | 17.47 | 20.23 | 3015.0              | 2585.0      | 1.25                                 | 0.98 | 0.73  |
| 3045.0              | 2615.0      | 10.29                                                  | 9.19  | 8.60  | 3045.0              | 2615.0      | 15.69              | 18.31 | 20.93 | 3045.0              | 2615.0      | 1.13                                 | 0.90 | 0.71  |
| 3080.0              | 2650.0      | 9.69                                                   | 8.81  | 8.34  | 3080.0              | 2650.0      | 16.75              | 19.27 | 22.11 | 3080.0              | 2650.0      | 1.01                                 | 0.82 | 0.63  |
| 3110.0              | 2680.0      | 9.63                                                   | 8.80  | 8.34  | 3110.0              | 2680.0      | 17.18              | 19.68 | 22.80 | 3110.0              | 2680.0      | 0.94                                 | 0.75 | 0.62  |
| 3145.0              | 2715.0      | 9.50                                                   | 8.75  | 8.35  | 3145.0              | 2715.0      | 18.06              | 20.78 | 24.34 | 3145.0              | 2715.0      | 0.75                                 | 0.65 | 0.56  |
| 3175.0              | 2745.0      | 9.09                                                   | 8.54  | 8.24  | 3175.0              | 2745.0      | 19.00              | 22.71 | 26.13 | 3175.0              | 2745.0      | 0.68                                 | 0.58 | 0.43  |
| 3210.0              | 2780.0      | 9.02                                                   | 8.54  | 8.31  | 3210.0              | 2780.0      | 19.87              | 24.16 | 26.92 | 3210.0              | 2780.0      | 0.59                                 | 0.47 | 0.32  |
| 3240.0              | 2810.0      | 8.84                                                   | 8.48  | 8.32  | 3240.0              | 2810.0      | 21.27              | 25.61 | 27.68 | 3240.0              | 2810.0      | 0.55                                 | 0.39 | 0.22  |
| 3275.0              | 2845.0      | 8.50                                                   | 8.28  | 8.23  | 3275.0              | 2845.0      | 22.84              | 27.87 | 29.51 | 3275.0              | 2845.0      | 0.49                                 | 0.28 | 0.15  |
| 3305.0              | 2875.0      | 8.47                                                   | 8.31  | 8.28  | 3305.0              | 2875.0      | 23.86              | 29.28 | 29.88 | 3305.0              | 2875.0      | 0.43                                 | 0.21 | 0.12  |
| 3340.0              | 2910.0      | 8.43                                                   | 8.31  | 8.30  | 3340.0              | 2910.0      | 25.41              | 29.89 | 30.71 | 3340.0              | 2910.0      | 0.30                                 | 0.16 | 0.09  |
| 3370.0              | 2940.0      | 8.40                                                   | 8.34  | 8.36  | 3370.0              | 2940.0      | 26.05              | 32.38 | 32.32 | 3370.0              | 2940.0      | 0.25                                 | 0.12 | 0.07  |
| 3405.0              | 2975.0      | 8.58                                                   | 8.55  | 8.60  | 3405.0              | 2975.0      | 27.78              | 33.32 | 33.02 | 3405.0              | 2975.0      | 0.18                                 | 0.07 | 0.05  |
| 3435.0              | 3005.0      | 8.58                                                   | 8.56  | 8.61  | 3435.0              | 3005.0      | 27.72              | 33.54 | 34.06 | 3435.0              | 3005.0      | 0.17                                 | 0.06 | 0.04  |
| 3470.0              | 3040.0      | 8.55                                                   | 8.55  | 8.61  | 3470.0              | 3040.0      | 27.46              | 36.21 | 33.17 | 3470.0              | 3040.0      | 0.23                                 | 0.07 | 0.04  |
| 3500.0              | 3070.0      | 8.67                                                   | 8.68  | 8.75  | 3500.0              | 3070.0      | 27.39              | 34.92 | 33.22 | 3500.0              | 3070.0      | 0.26                                 | 0.07 | 0.04  |
| 3535.0              | 3105.0      | 8.61                                                   | 8.60  | 8.66  | 3535.0              | 3105.0      | 24.49              | 31.00 | 35.22 | 3535.0              | 3105.0      | 0.45                                 | 0.13 | 0.04  |
| 3565.0              | 3135.0      | 8.57                                                   | 8.54  | 8.60  | 3565.0              | 3135.0      | 23.21              | 28.13 | 35.77 | 3565.0              | 3135.0      | 0.57                                 | 0.18 | 0.06  |
| 3600.0              | 3170.0      | 8.74                                                   | 8.68  | 8.72  | 3600.0              | 3170.0      | 23.00              | 28.50 | 33.28 | 3600.0              | 3170.0      | 0.57                                 | 0.19 | 0.07  |
| 3630.0              | 3200.0      | 8.81                                                   | 8.71  | 8.72  | 3630.0              | 3200.0      | 21.80              | 26.57 | 34.65 | 3630.0              | 3200.0      | 0.66                                 | 0.26 | 0.09  |
| 3665.0              | 3235.0      | 8.88                                                   | 8.72  | 8.71  | 3665.0              | 3235.0      | 20.88              | 25.06 | 33.01 | 3665.0              | 3235.0      | 0.70                                 | 0.32 | 0.12  |
| 3695.0              | 3265.0      | 9.10                                                   | 8.92  | 8.89  | 3695.0              | 3265.0      | 21.13              | 25.09 | 31.84 | 3695.0              | 3265.0      | 0.64                                 | 0.30 | 0.12  |
| 3730.0              | 3300.0      | 9.26                                                   | 9.02  | 8.93  | 3730.0              | 3300.0      | 20.41              | 23.40 | 28.35 | 3730.0              | 3300.0      | 0.68                                 | 0.38 | 0.15  |
| 3760.0              | 3330.0      | 9.33                                                   | 9.07  | 8.96  | 3760.0              | 3330.0      | 20.39              | 22.98 | 27.15 | 3760.0              | 3330.0      | 0.63                                 | 0.38 | 0.15  |
| 3795.0              | 3365.0      | 9.62                                                   | 9.35  | 9.22  | 3795.0              | 3365.0      | 20.75              | 23.27 | 26.76 | 3795.0              | 3365.0      | 0.51                                 | 0.29 | 0.12  |
| 3825.0              | 3395.0      | 9.76                                                   | 9.43  | 9.26  | 3825.0              | 3395.0      | 20.47              | 22.58 | 25.33 | 3825.0              | 3395.0      | 0.52                                 | 0.31 | 0.12  |
| 3860.0              | 3430.0      | 9.86                                                   | 9.51  | 9.33  | 3860.0              | 3430.0      | 20.83              | 22.81 | 25.16 | 3860.0              | 3430.0      | 0.44                                 | 0.22 | 0.06  |
| 3890.0              | 3460.0      | 10.07                                                  | 9.77  | 9.61  | 3890.0              | 3460.0      | 21.90              | 23.70 | 26.03 | 3890.0              | 3460.0      | 0.36                                 | 0.15 | 0.02  |
| 3925.0              | 3495.0      | 10.26                                                  | 9.90  | 9.74  | 3925.0              | 3495.0      | 25.08              | 25.40 | 26.76 | 3925.0              | 3495.0      | 0.48                                 | 0.25 | 0.07  |
| 3955.0              | 3525.0      | 10.46                                                  | 10.11 | 10.00 | 3955.0              | 3525.0      | 24.82              | 24.43 | 26.80 | 3955.0              | 3525.0      | 0.47                                 | 0.28 | 0.13  |
| 3990.0              | 3560.0      | 10.84                                                  | 10.47 | 10.34 | 3990.0              | 3560.0      | 21.48              | 24.00 | 29.05 | 3990.0              | 3560.0      | 0.46                                 | 0.34 | 0.15  |
| 4020.0              | 3590.0      | 10.96                                                  | 10.48 | 10.29 | 4020.0              | 3590.0      | 20.37              | 23.09 | 28.56 | 4020.0              | 3590.0      | 0.52                                 | 0.43 | 0.22  |
| 4055.0              | 3625.0      | 11.10                                                  | 10.56 | 10.32 | 4055.0              | 3625.0      | 19.82              | 23.06 | 29.29 | 4055.0              | 3625.0      | 0.50                                 | 0.44 | 0.23  |
| 4085.0              | 3655.0      | 11.24                                                  | 10.70 | 10.45 | 4085.0              | 3655.0      | 19.83              | 23.69 | 30.57 | 4085.0              | 3655.0      | 0.46                                 | 0.39 | 0.20  |
| 4120.0              | 3690.0      | 11.47                                                  | 10.79 | 10.44 | 4120.0              | 3690.0      | 18.90              | 22.11 | 28.17 | 4120.0              | 3690.0      | 0.44                                 | 0.42 | 0.25  |

# Frequency Mixer

# MCA-36FMH+

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=3500MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=3489.89MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=3610.1MHz<br>(dB) |
|----------------------|-------------|----------------------------------------------------------------|----------------------|-------------|-------------------------------------------------------------------|----------------------|-------------|------------------------------------------------------------------|
|                      |             | @LO (dBm)                                                      |                      |             | @LO (dBm)                                                         |                      |             | @LO (dBm)                                                        |
|                      |             | +13                                                            |                      |             | +13                                                               |                      |             | +13                                                              |
| 840.0                | 2660.0      | 10.59                                                          | 110.1                | 3600.0      | 10.78                                                             | 890.1                | 2720.0      | 10.48                                                            |
| 793.9                | 2706.1      | 10.22                                                          | 120.1                | 3610.0      | 10.42                                                             | 870.1                | 2740.0      | 10.21                                                            |
| 747.8                | 2752.2      | 9.67                                                           | 130.1                | 3620.0      | 10.12                                                             | 850.1                | 2760.0      | 10.04                                                            |
| 701.7                | 2798.3      | 9.44                                                           | 140.1                | 3630.0      | 9.82                                                              | 830.1                | 2780.0      | 9.93                                                             |
| 655.6                | 2844.4      | 9.18                                                           | 150.1                | 3640.0      | 9.63                                                              | 810.1                | 2800.0      | 9.81                                                             |
| 609.4                | 2890.6      | 9.05                                                           | 160.1                | 3650.0      | 9.49                                                              | 790.1                | 2820.0      | 9.68                                                             |
| 563.3                | 2936.7      | 8.91                                                           | 170.1                | 3660.0      | 9.36                                                              | 770.1                | 2840.0      | 9.54                                                             |
| 517.2                | 2982.8      | 8.85                                                           | 180.1                | 3670.0      | 9.26                                                              | 750.1                | 2860.0      | 9.50                                                             |
| 471.1                | 3028.9      | 8.77                                                           | 190.1                | 3680.0      | 9.19                                                              | 730.1                | 2880.0      | 9.39                                                             |
| 425.0                | 3075.0      | 8.71                                                           | 200.1                | 3690.0      | 9.17                                                              | 710.1                | 2900.0      | 9.34                                                             |
| 378.9                | 3121.1      | 8.56                                                           | 210.1                | 3700.0      | 9.12                                                              | 690.1                | 2920.0      | 9.29                                                             |
| 332.8                | 3167.2      | 8.44                                                           | 220.1                | 3710.0      | 9.09                                                              | 670.1                | 2940.0      | 9.24                                                             |
| 286.7                | 3213.3      | 8.43                                                           | 230.1                | 3720.0      | 9.02                                                              | 650.1                | 2960.0      | 9.22                                                             |
| 240.6                | 3259.4      | 8.44                                                           | 240.1                | 3730.0      | 8.99                                                              | 630.1                | 2980.0      | 9.13                                                             |
| 194.4                | 3305.6      | 8.72                                                           | 260.1                | 3750.0      | 8.96                                                              | 610.1                | 3000.0      | 9.14                                                             |
| 148.3                | 3351.7      | 9.28                                                           | 270.1                | 3760.0      | 8.97                                                              | 590.1                | 3020.0      | 9.06                                                             |
| 102.2                | 3397.8      | 10.71                                                          | 290.1                | 3780.0      | 9.04                                                              | 570.1                | 3040.0      | 9.07                                                             |
| 56.1                 | 3443.9      | 13.95                                                          | 300.1                | 3790.0      | 9.08                                                              | 550.1                | 3060.0      | 9.05                                                             |
| 10.0                 | 3490.0      | 28.57                                                          | 320.1                | 3810.0      | 9.08                                                              | 530.1                | 3080.0      | 8.99                                                             |
| 27.0                 | 3527.0      | 19.72                                                          | 330.1                | 3820.0      | 9.10                                                              | 510.1                | 3100.0      | 8.99                                                             |
| 61.1                 | 3561.1      | 13.66                                                          | 350.1                | 3840.0      | 9.13                                                              | 490.1                | 3120.0      | 8.92                                                             |
| 95.1                 | 3595.1      | 11.39                                                          | 360.1                | 3850.0      | 9.17                                                              | 470.1                | 3140.0      | 8.87                                                             |
| 129.2                | 3629.2      | 10.15                                                          | 380.1                | 3870.0      | 9.26                                                              | 450.1                | 3160.0      | 8.80                                                             |
| 163.2                | 3663.2      | 9.51                                                           | 390.1                | 3880.0      | 9.32                                                              | 430.1                | 3180.0      | 8.69                                                             |
| 197.3                | 3697.3      | 9.25                                                           | 410.1                | 3900.0      | 9.41                                                              | 410.1                | 3200.0      | 8.73                                                             |
| 231.4                | 3731.4      | 9.04                                                           | 420.1                | 3910.0      | 9.38                                                              | 390.1                | 3220.0      | 8.67                                                             |
| 265.4                | 3765.4      | 9.02                                                           | 440.1                | 3930.0      | 9.41                                                              | 370.1                | 3240.0      | 8.68                                                             |
| 299.5                | 3799.5      | 9.13                                                           | 450.1                | 3940.0      | 9.49                                                              | 350.1                | 3260.0      | 8.62                                                             |
| 333.5                | 3833.5      | 9.16                                                           | 470.1                | 3960.0      | 9.60                                                              | 330.1                | 3280.0      | 8.65                                                             |
| 367.6                | 3867.6      | 9.28                                                           | 480.1                | 3970.0      | 9.67                                                              | 310.1                | 3300.0      | 8.62                                                             |
| 401.6                | 3901.6      | 9.43                                                           | 500.1                | 3990.0      | 9.78                                                              | 290.1                | 3320.0      | 8.67                                                             |
| 435.7                | 3935.7      | 9.47                                                           | 510.1                | 4000.0      | 9.78                                                              | 270.1                | 3340.0      | 8.69                                                             |
| 469.7                | 3969.7      | 9.68                                                           | 530.1                | 4020.0      | 9.78                                                              | 250.1                | 3360.0      | 8.74                                                             |
| 486.8                | 3986.8      | 9.79                                                           | 540.1                | 4030.0      | 9.81                                                              | 230.1                | 3380.0      | 8.85                                                             |
| 520.8                | 4020.8      | 9.80                                                           | 560.1                | 4050.0      | 9.95                                                              | 210.1                | 3400.0      | 8.96                                                             |
| 537.8                | 4037.8      | 9.86                                                           | 570.1                | 4060.0      | 9.99                                                              | 190.1                | 3420.0      | 9.14                                                             |
| 571.9                | 4071.9      | 10.08                                                          | 590.1                | 4080.0      | 10.07                                                             | 170.1                | 3440.0      | 9.27                                                             |
| 588.9                | 4088.9      | 10.12                                                          | 600.1                | 4090.0      | 10.10                                                             | 150.1                | 3460.0      | 9.60                                                             |
| 623.0                | 4123.0      | 10.17                                                          | 620.1                | 4110.0      | 10.12                                                             | 130.1                | 3480.0      | 10.01                                                            |
| 640.0                | 4140.0      | 10.32                                                          | 630.1                | 4120.0      | 10.17                                                             | 110.1                | 3500.0      | 10.75                                                            |

REV. X3

MCA-36FMH+

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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant  
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## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +10                     | +13   | +16   | +10                     | +13   | +16   |
| 2430.0      | 34.22                   | 35.38 | 36.27 | 45.29                   | 48.63 | 43.18 |
| 2460.0      | 34.88                   | 36.04 | 36.85 | 47.63                   | 47.59 | 41.51 |
| 2490.0      | 34.89                   | 36.07 | 37.04 | 47.95                   | 47.29 | 44.16 |
| 2520.0      | 35.33                   | 36.40 | 37.15 | 45.59                   | 43.16 | 40.72 |
| 2550.0      | 35.45                   | 36.31 | 36.82 | 41.65                   | 39.47 | 37.77 |
| 2585.0      | 35.17                   | 35.93 | 36.40 | 38.75                   | 37.07 | 35.88 |
| 2615.0      | 35.05                   | 35.77 | 36.48 | 36.47                   | 34.99 | 34.38 |
| 2650.0      | 34.92                   | 35.69 | 36.40 | 34.13                   | 33.20 | 32.90 |
| 2680.0      | 34.85                   | 35.62 | 36.43 | 32.98                   | 32.36 | 32.25 |
| 2715.0      | 34.94                   | 36.05 | 37.20 | 31.78                   | 31.57 | 31.86 |
| 2745.0      | 35.29                   | 36.50 | 37.83 | 31.44                   | 31.60 | 32.30 |
| 2780.0      | 35.58                   | 37.07 | 38.70 | 31.66                   | 32.45 | 33.64 |
| 2810.0      | 36.04                   | 37.68 | 39.22 | 32.22                   | 33.45 | 34.80 |
| 2845.0      | 36.47                   | 38.15 | 39.87 | 33.10                   | 34.79 | 36.52 |
| 2875.0      | 37.04                   | 38.89 | 41.01 | 33.70                   | 35.32 | 36.99 |
| 2910.0      | 39.45                   | 41.92 | 44.89 | 34.01                   | 35.29 | 36.28 |
| 2940.0      | 41.17                   | 43.96 | 47.77 | 33.97                   | 34.88 | 35.48 |
| 2975.0      | 44.04                   | 47.71 | 53.43 | 34.02                   | 34.61 | 34.83 |
| 3005.0      | 46.44                   | 50.20 | 54.30 | 33.50                   | 33.73 | 33.93 |
| 3040.0      | 48.25                   | 51.95 | 54.20 | 33.23                   | 33.32 | 33.41 |
| 3070.0      | 48.72                   | 50.96 | 51.01 | 34.17                   | 34.15 | 34.17 |
| 3105.0      | 46.72                   | 47.46 | 47.18 | 35.86                   | 35.76 | 35.71 |
| 3135.0      | 46.72                   | 48.49 | 48.41 | 37.23                   | 37.26 | 36.91 |
| 3170.0      | 47.84                   | 50.83 | 55.40 | 37.37                   | 37.25 | 37.14 |
| 3200.0      | 45.70                   | 46.56 | 47.54 | 37.13                   | 37.05 | 36.66 |
| 3235.0      | 43.57                   | 43.38 | 43.27 | 36.99                   | 36.80 | 36.31 |
| 3265.0      | 42.75                   | 42.28 | 41.80 | 37.02                   | 36.68 | 36.12 |
| 3300.0      | 42.67                   | 42.40 | 41.71 | 37.43                   | 37.00 | 36.21 |
| 3330.0      | 42.87                   | 42.64 | 42.11 | 38.06                   | 37.72 | 36.93 |
| 3365.0      | 43.19                   | 43.34 | 42.89 | 38.99                   | 38.54 | 37.49 |
| 3395.0      | 43.38                   | 43.74 | 43.49 | 40.40                   | 39.85 | 38.74 |
| 3430.0      | 43.68                   | 44.23 | 44.13 | 42.98                   | 42.53 | 41.44 |
| 3460.0      | 44.08                   | 44.85 | 45.21 | 47.70                   | 47.42 | 46.43 |
| 3495.0      | 42.82                   | 43.40 | 43.91 | 47.22                   | 44.54 | 42.09 |
| 3525.0      | 40.29                   | 40.48 | 40.75 | 40.34                   | 38.27 | 36.61 |
| 3560.0      | 39.17                   | 39.50 | 39.97 | 36.57                   | 35.37 | 34.33 |
| 3590.0      | 38.94                   | 39.39 | 39.97 | 36.10                   | 35.18 | 34.24 |
| 3625.0      | 38.79                   | 39.19 | 39.67 | 35.83                   | 34.96 | 33.99 |
| 3655.0      | 39.07                   | 39.50 | 39.88 | 35.44                   | 34.54 | 33.58 |
| 3690.0      | 39.39                   | 39.67 | 39.92 | 35.81                   | 34.78 | 33.79 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +10                     | +13   | +16   |
| 2860.0              | 2430.0      | 32.09                   | 27.81 | 27.52 |
| 2890.0              | 2460.0      | 31.38                   | 28.11 | 32.85 |
| 2920.0              | 2490.0      | 32.82                   | 29.74 | 29.19 |
| 2950.0              | 2520.0      | 33.86                   | 31.07 | 30.56 |
| 2980.0              | 2550.0      | 35.03                   | 32.76 | 32.94 |
| 3015.0              | 2585.0      | 37.48                   | 34.66 | 34.05 |
| 3045.0              | 2615.0      | 37.58                   | 34.19 | 32.48 |
| 3080.0              | 2650.0      | 33.09                   | 30.34 | 28.48 |
| 3110.0              | 2680.0      | 30.95                   | 28.51 | 26.80 |
| 3145.0              | 2715.0      | 29.25                   | 27.25 | 25.89 |
| 3175.0              | 2745.0      | 28.03                   | 26.47 | 25.41 |
| 3210.0              | 2780.0      | 27.58                   | 26.31 | 25.48 |
| 3240.0              | 2810.0      | 26.97                   | 26.05 | 25.34 |
| 3275.0              | 2845.0      | 25.91                   | 25.22 | 24.69 |
| 3305.0              | 2875.0      | 25.14                   | 24.64 | 24.19 |
| 3340.0              | 2910.0      | 24.08                   | 23.74 | 23.57 |
| 3370.0              | 2940.0      | 24.33                   | 24.12 | 23.89 |
| 3405.0              | 2975.0      | 24.33                   | 24.39 | 24.45 |
| 3435.0              | 3005.0      | 23.78                   | 23.91 | 24.14 |
| 3470.0              | 3040.0      | 23.17                   | 23.24 | 23.34 |
| 3500.0              | 3070.0      | 22.63                   | 22.63 | 22.68 |
| 3535.0              | 3105.0      | 22.26                   | 22.20 | 22.18 |
| 3565.0              | 3135.0      | 22.06                   | 21.98 | 21.97 |
| 3600.0              | 3170.0      | 21.97                   | 21.93 | 21.94 |
| 3630.0              | 3200.0      | 22.04                   | 22.07 | 22.06 |
| 3665.0              | 3235.0      | 22.25                   | 22.26 | 22.25 |
| 3695.0              | 3265.0      | 22.46                   | 22.55 | 22.60 |
| 3730.0              | 3300.0      | 22.75                   | 22.88 | 23.01 |
| 3760.0              | 3330.0      | 23.06                   | 23.24 | 23.45 |
| 3795.0              | 3365.0      | 23.32                   | 23.56 | 23.80 |
| 3825.0              | 3395.0      | 23.43                   | 23.72 | 24.02 |
| 3860.0              | 3430.0      | 23.59                   | 23.85 | 24.19 |
| 3890.0              | 3460.0      | 23.84                   | 24.12 | 24.46 |
| 3925.0              | 3495.0      | 24.00                   | 24.40 | 24.76 |
| 3955.0              | 3525.0      | 24.37                   | 24.60 | 24.91 |
| 3990.0              | 3560.0      | 24.84                   | 24.93 | 25.06 |
| 4020.0              | 3590.0      | 25.40                   | 25.31 | 25.34 |
| 4055.0              | 3625.0      | 26.05                   | 25.76 | 25.64 |
| 4085.0              | 3655.0      | 26.64                   | 26.14 | 25.84 |
| 4120.0              | 3690.0      | 27.58                   | 26.78 | 26.10 |

# Frequency Mixer

# MCA-36FMH+

## 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=3170MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|-------|-------|----------------------|--------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |       |       |                      | @LO (dBm)                      |      |      |
|                     |             | +10             | +13  | +16  |             | +10             | +13   | +16   |                      | +10                            | +13  | +16  |
| 2860.0              | 2430.0      | 2.88            | 2.53 | 2.17 | 2430.0      | 28.03           | 27.59 | 23.18 | 10.0                 | 9.58                           | 9.28 | 8.95 |
| 2890.0              | 2460.0      | 2.75            | 2.40 | 1.91 | 2460.0      | 28.03           | 26.33 | 23.18 | 70.0                 | 4.27                           | 3.98 | 3.79 |
| 2920.0              | 2490.0      | 2.71            | 2.36 | 1.98 | 2490.0      | 25.19           | 24.14 | 21.73 | 130.0                | 2.31                           | 2.25 | 2.25 |
| 2950.0              | 2520.0      | 2.60            | 2.25 | 1.92 | 2520.0      | 23.18           | 21.73 | 19.76 | 190.0                | 1.60                           | 1.63 | 1.70 |
| 2980.0              | 2550.0      | 2.50            | 2.14 | 1.82 | 2550.0      | 22.87           | 22.00 | 20.95 | 270.0                | 1.17                           | 1.29 | 1.42 |
| 3015.0              | 2585.0      | 2.40            | 2.04 | 1.73 | 2585.0      | 20.70           | 19.32 | 18.11 | 330.0                | 1.11                           | 1.24 | 1.37 |
| 3045.0              | 2615.0      | 2.31            | 1.96 | 1.69 | 2615.0      | 18.70           | 17.39 | 16.11 | 410.0                | 1.30                           | 1.34 | 1.41 |
| 3080.0              | 2650.0      | 2.21            | 1.90 | 1.68 | 2650.0      | 17.22           | 16.56 | 15.81 | 470.0                | 1.47                           | 1.47 | 1.51 |
| 3110.0              | 2680.0      | 2.14            | 1.86 | 1.66 | 2680.0      | 15.00           | 14.15 | 13.29 | 550.0                | 1.65                           | 1.61 | 1.61 |
| 3145.0              | 2715.0      | 2.06            | 1.82 | 1.68 | 2715.0      | 12.80           | 11.93 | 11.17 | 610.0                | 1.77                           | 1.70 | 1.68 |
| 3175.0              | 2745.0      | 2.00            | 1.82 | 1.72 | 2745.0      | 11.03           | 10.43 | 9.96  | 690.0                | 1.91                           | 1.83 | 1.78 |
| 3210.0              | 2780.0      | 1.90            | 1.76 | 1.70 | 2780.0      | 8.81            | 8.31  | 7.83  | 750.0                | 2.00                           | 1.90 | 1.85 |
| 3240.0              | 2810.0      | 1.81            | 1.73 | 1.71 | 2810.0      | 7.31            | 6.89  | 6.51  | 830.0                | 2.08                           | 1.96 | 1.89 |
| 3275.0              | 2845.0      | 1.80            | 1.75 | 1.77 | 2845.0      | 5.72            | 5.41  | 5.14  | 890.0                | 2.10                           | 1.97 | 1.89 |
| 3305.0              | 2875.0      | 1.75            | 1.72 | 1.74 | 2875.0      | 4.54            | 4.28  | 4.05  | 970.0                | 2.11                           | 1.97 | 1.87 |
| 3340.0              | 2910.0      | 1.77            | 1.78 | 1.83 | 2910.0      | 3.49            | 3.31  | 3.17  | 1030.0               | 2.11                           | 1.96 | 1.85 |
| 3370.0              | 2940.0      | 1.85            | 1.88 | 1.95 | 2940.0      | 2.82            | 2.70  | 2.61  | 1110.0               | 2.01                           | 1.85 | 1.74 |
| 3405.0              | 2975.0      | 1.81            | 1.85 | 1.92 | 2975.0      | 2.39            | 2.34  | 2.31  | 1170.0               | 1.95                           | 1.78 | 1.66 |
| 3435.0              | 3005.0      | 1.82            | 1.88 | 1.95 | 3005.0      | 2.31            | 2.32  | 2.35  | 1250.0               | 1.90                           | 1.72 | 1.59 |
| 3470.0              | 3040.0      | 1.91            | 1.96 | 2.03 | 3040.0      | 2.47            | 2.54  | 2.62  | 1310.0               | 1.77                           | 1.59 | 1.47 |
| 3500.0              | 3070.0      | 1.91            | 1.96 | 2.02 | 3070.0      | 2.86            | 2.99  | 3.12  | 1390.0               | 1.70                           | 1.52 | 1.39 |
| 3535.0              | 3105.0      | 1.96            | 2.01 | 2.08 | 3105.0      | 3.40            | 3.56  | 3.70  | 1450.0               | 1.66                           | 1.47 | 1.34 |
| 3565.0              | 3135.0      | 2.04            | 2.08 | 2.14 | 3135.0      | 3.95            | 4.12  | 4.28  | 1530.0               | 1.56                           | 1.38 | 1.25 |
| 3600.0              | 3170.0      | 2.08            | 2.10 | 2.15 | 3170.0      | 4.79            | 5.02  | 5.23  | 1590.0               | 1.47                           | 1.30 | 1.17 |
| 3630.0              | 3200.0      | 2.17            | 2.18 | 2.23 | 3200.0      | 5.33            | 5.52  | 5.66  | 1670.0               | 1.38                           | 1.22 | 1.10 |
| 3665.0              | 3235.0      | 2.28            | 2.27 | 2.31 | 3235.0      | 6.03            | 6.26  | 6.37  | 1730.0               | 1.29                           | 1.14 | 1.03 |
| 3695.0              | 3265.0      | 2.33            | 2.32 | 2.36 | 3265.0      | 6.89            | 7.14  | 7.34  | 1810.0               | 1.20                           | 1.06 | 1.05 |
| 3730.0              | 3300.0      | 2.48            | 2.46 | 2.48 | 3300.0      | 7.31            | 7.50  | 7.50  | 1870.0               | 1.17                           | 1.08 | 1.12 |
| 3760.0              | 3330.0      | 2.57            | 2.54 | 2.56 | 3330.0      | 7.80            | 7.97  | 7.97  | 1950.0               | 1.17                           | 1.19 | 1.27 |
| 3795.0              | 3365.0      | 2.64            | 2.60 | 2.62 | 3365.0      | 8.72            | 8.90  | 9.08  | 2010.0               | 1.21                           | 1.28 | 1.37 |
| 3825.0              | 3395.0      | 2.80            | 2.75 | 2.76 | 3395.0      | 8.81            | 8.86  | 8.72  | 2090.0               | 1.33                           | 1.40 | 1.50 |
| 3860.0              | 3430.0      | 2.91            | 2.86 | 2.85 | 3430.0      | 8.99            | 8.99  | 8.90  | 2150.0               | 1.45                           | 1.50 | 1.58 |
| 3890.0              | 3460.0      | 2.95            | 2.90 | 2.89 | 3460.0      | 9.33            | 9.33  | 9.28  | 2230.0               | 1.60                           | 1.63 | 1.69 |
| 3925.0              | 3495.0      | 3.14            | 3.05 | 3.01 | 3495.0      | 8.90            | 8.68  | 8.35  | 2290.0               | 1.72                           | 1.71 | 1.73 |
| 3955.0              | 3525.0      | 3.18            | 3.07 | 3.03 | 3525.0      | 8.90            | 8.81  | 8.64  | 2370.0               | 1.96                           | 1.91 | 1.90 |
| 3990.0              | 3560.0      | 3.19            | 3.09 | 3.06 | 3560.0      | 10.25           | 10.37 | 10.43 | 2430.0               | 2.10                           | 2.04 | 2.01 |
| 4020.0              | 3590.0      | 3.37            | 3.24 | 3.19 | 3590.0      | 10.82           | 10.69 | 10.31 | 2510.0               | 2.37                           | 2.28 | 2.22 |
| 4055.0              | 3625.0      | 3.52            | 3.35 | 3.29 | 3625.0      | 11.46           | 11.38 | 11.09 | 2570.0               | 2.65                           | 2.54 | 2.47 |
| 4085.0              | 3655.0      | 3.56            | 3.40 | 3.33 | 3655.0      | 12.35           | 12.35 | 12.26 | 2650.0               | 2.84                           | 2.75 | 2.67 |
| 4120.0              | 3690.0      | 3.80            | 3.60 | 3.48 | 3690.0      | 12.26           | 11.93 | 11.31 | 2710.0               | 2.92                           | 2.84 | 2.78 |

## Harmonics Tables

### RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 15  | 24  | 19  | 23  | 57  | 34  | 36  | --- | --- | --- |
| 1  | -      | 13     | +0  | 33  | 22  | 28  | 38  | 52  | 48  | 56  | --- | --- |
| 2  | 69     | 55     | 66  | 60  | 50  | 60  | 62  | 65  | 74  | 63  | 72  | --- |
| 3  | >90    | 77     | 62  | 71  | 56  | 67  | 61  | 71  | 66  | >80 | >80 | >80 |
| 4  | >90    | >80    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 5  | >90    | >80    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 6  | >90    | >80    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 7  | ---    | ---    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 8  | ---    | ---    | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 9  | ---    | ---    | --- | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 10 | ---    | ---    | --- | --- | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

Test conditions:

RF IN: 3550 MHz; -2.00 dBm.

LO IN: 3120 MHz; +13.00 dBm

IF OUT: 430 MHz; -10.23 dBm

### RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 24  | 32  | 29  | 34  | 60  | 51  | 48  | --- | --- | --- |
| 1  | -      | 13     | +0  | 34  | 23  | 29  | 40  | 55  | 51  | 55  | --- | --- |
| 2  | 49     | 45     | 56  | 53  | 40  | 50  | 53  | 55  | 68  | 55  | 67  | --- |
| 3  | 73     | 55     | 42  | 55  | 36  | 49  | 42  | 55  | 48  | 74  | 80  | 83  |
| 4  | >90    | 80     | 83  | 68  | 66  | 63  | 68  | 58  | 67  | 73  | 72  | 71  |
| 5  | >90    | >90    | >90 | 84  | 72  | 73  | 60  | 68  | 64  | 74  | 69  | 72  |
| 6  | >90    | 84     | >90 | 82  | >90 | >90 | >90 | 77  | 82  | 79  | 81  | 80  |
| 7  | ---    | ---    | >90 | >90 | >90 | >90 | 85  | >90 | 76  | 80  | 77  | >90 |
| 8  | ---    | ---    | --- | >90 | >90 | >90 | >90 | >90 | >90 | 89  | 85  | 87  |
| 9  | ---    | ---    | --- | --- | >90 | >90 | >90 | >90 | >90 | >90 | 82  | 88  |
| 10 | ---    | ---    | --- | --- | --- | >90 | >90 | >90 | >90 | >90 | >90 | >90 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions:

RF IN: 3550 MHz; 8.00 dBm.

LO IN: 3120 MHz; +13.00 dBm

IF OUT: 430 MHz; -0.36 dBm

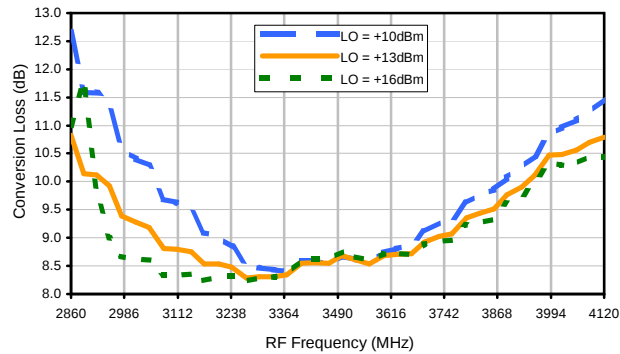
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.

2. + entry denotes harmonics are in (dBc) above IF OUTPUT.

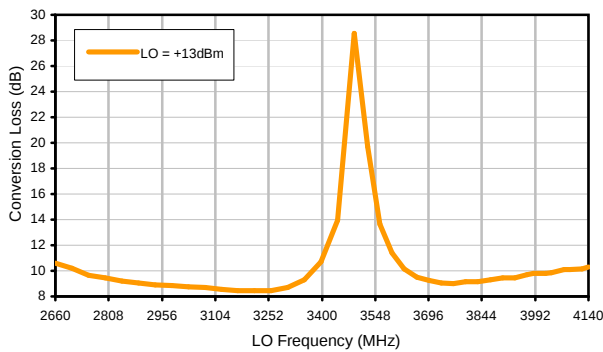
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

## Typical Performance Curves

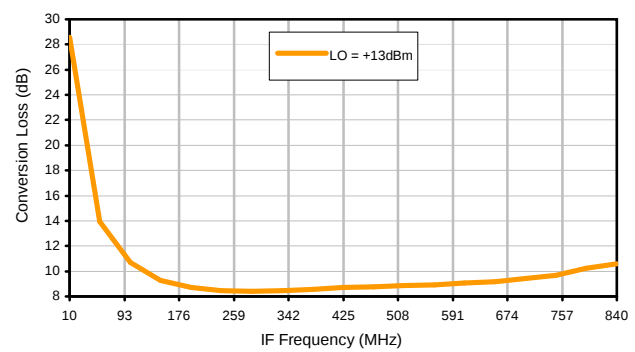
Conversion Loss @ IF=430MHz



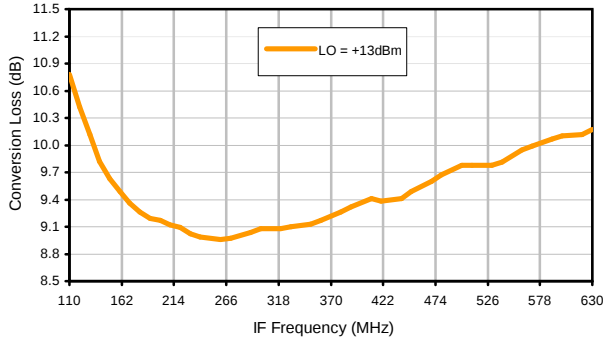
Conversion Loss vs. LO @ RF=3500MHz



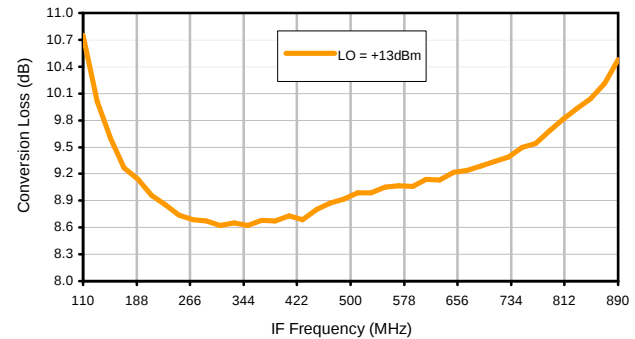
Conversion Loss vs. IF @ RF=3500MHz



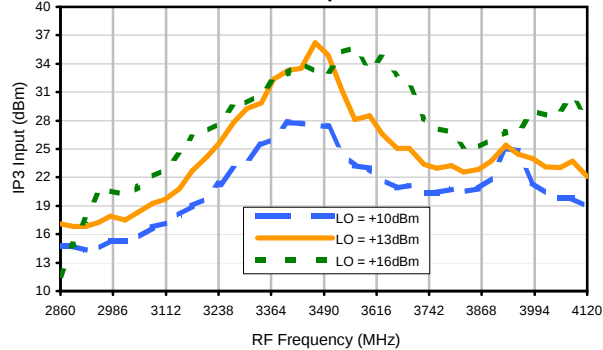
Conversion Loss vs. IF @ RF=3489.89MHz



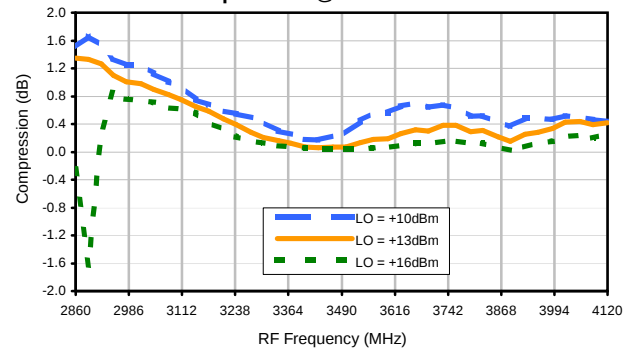
Conversion Loss vs. IF @ RF=3610.1001MHz



IP3 Input

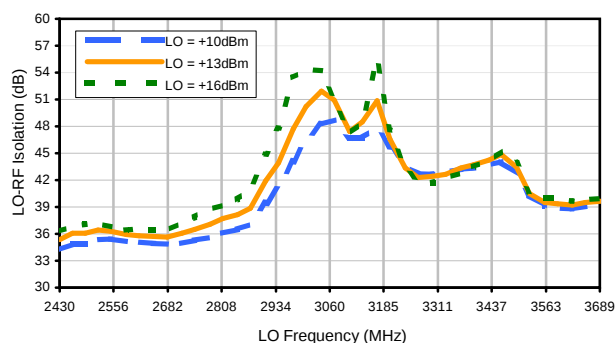


Compression @ RF IN=+13dBm

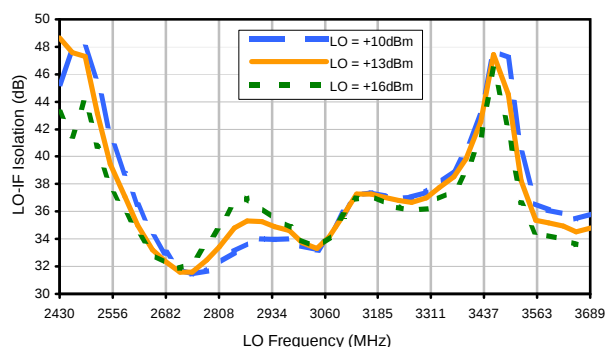


## Typical Performance Curves

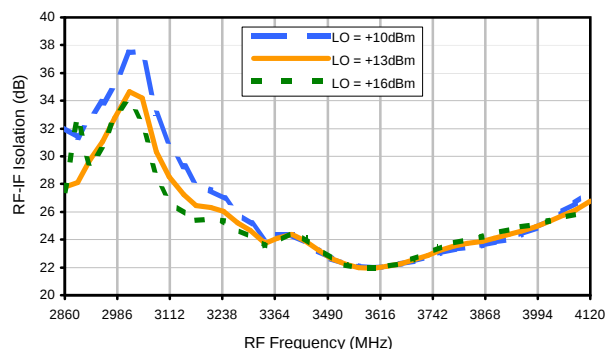
LO-RF Isolation



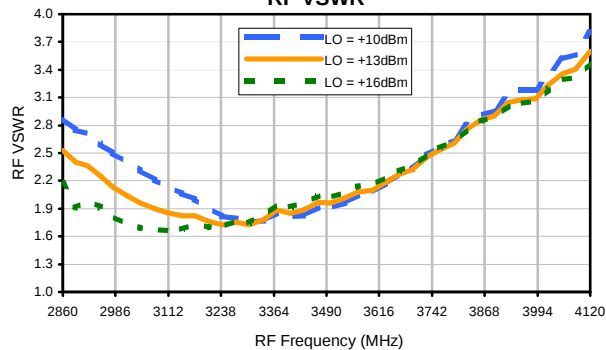
LO-IF Isolation



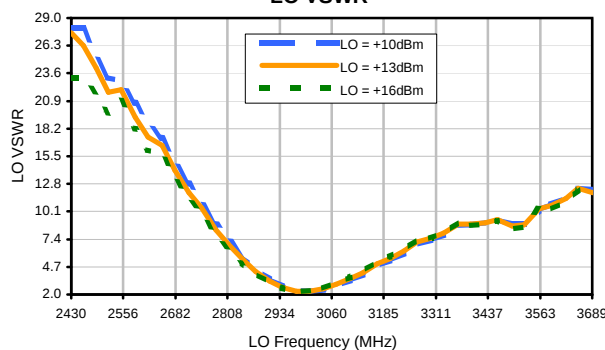
RF-IF Isolation



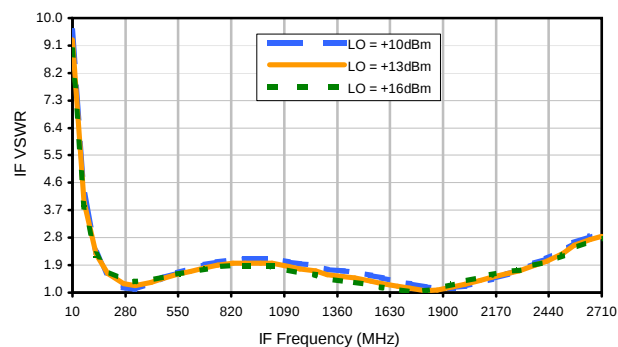
RF VSWR



LO VSWR



IF VSWR



## Harmonics Tables

### RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 15  | 24  | 19  | 23  | 57  | 34  | 36  | --- | --- | --- |
| 1  | -      | 13     | +0  | 33  | 22  | 28  | 38  | 52  | 48  | 56  | --- | --- |
| 2  | 69     | 55     | 66  | 60  | 50  | 60  | 62  | 65  | 74  | 63  | 72  | --- |
| 3  | >90    | 77     | 62  | 71  | 56  | 67  | 61  | 71  | 66  | >80 | >80 | >80 |
| 4  | >90    | >80    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 5  | >90    | >80    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 6  | >90    | >80    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 7  | ---    | ---    | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 8  | ---    | ---    | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 9  | ---    | ---    | --- | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
| 10 | ---    | ---    | --- | --- | --- | >80 | >80 | >80 | >80 | >80 | >80 | >80 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

Test conditions:

RF IN: 3550 MHz; -2.00 dBm.

LO IN: 3120 MHz; +13.00 dBm

IF OUT: 430 MHz; -10.23 dBm

### RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 24  | 32  | 29  | 34  | 60  | 51  | 48  | --- | --- | --- |
| 1  | -      | 13     | +0  | 34  | 23  | 29  | 40  | 55  | 51  | 55  | --- | --- |
| 2  | 49     | 45     | 56  | 53  | 40  | 50  | 53  | 55  | 68  | 55  | 67  | --- |
| 3  | 73     | 55     | 42  | 55  | 36  | 49  | 42  | 55  | 48  | 74  | 80  | 83  |
| 4  | >90    | 80     | 83  | 68  | 66  | 63  | 68  | 58  | 67  | 73  | 72  | 71  |
| 5  | >90    | >90    | >90 | 84  | 72  | 73  | 60  | 68  | 64  | 74  | 69  | 72  |
| 6  | >90    | 84     | >90 | 82  | >90 | >90 | >90 | 77  | 82  | 79  | 81  | 80  |
| 7  | ---    | ---    | >90 | >90 | >90 | >90 | 85  | >90 | 76  | 80  | 77  | >90 |
| 8  | ---    | ---    | --- | >90 | >90 | >90 | >90 | >90 | >90 | 89  | 85  | 87  |
| 9  | ---    | ---    | --- | --- | >90 | >90 | >90 | >90 | >90 | >90 | 82  | 88  |
| 10 | ---    | ---    | --- | --- | --- | >90 | >90 | >90 | >90 | >90 | >90 | >90 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions:

RF IN: 3550 MHz; 8.00 dBm.

LO IN: 3120 MHz; +13.00 dBm

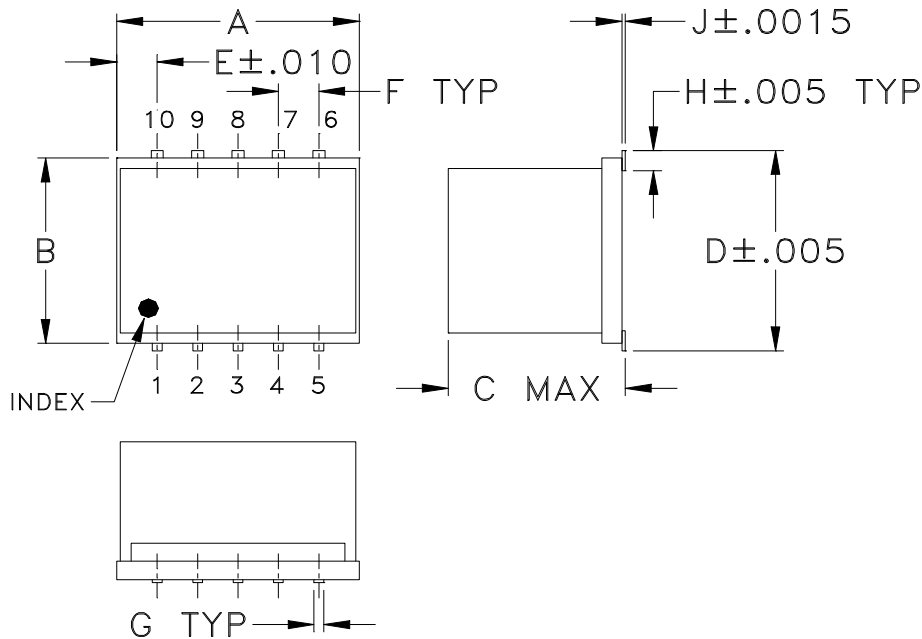
IF OUT: 430 MHz; -0.36 dBm

Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.

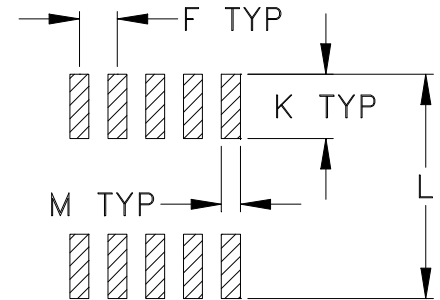
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.

3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

### 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              | M              | WT.<br>GRAMS |
|-------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------|
| DZ883 | .30<br>(7.62) | .250<br>(6.35) | .190<br>(4.83) | .266<br>(6.76) | .050<br>(1.27) | .050<br>(1.27) | .012<br>(0.30) | .029<br>(0.74) | .004<br>(0.10) | .085<br>(2.16) | .296<br>(7.52) | .030<br>(0.76) | 0.5          |

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

### Notes:

- Case material: Ceramic.
- Termination finish:
  - For RoHS Case Styles: Tin 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)



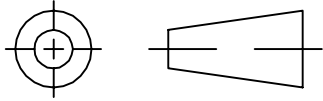
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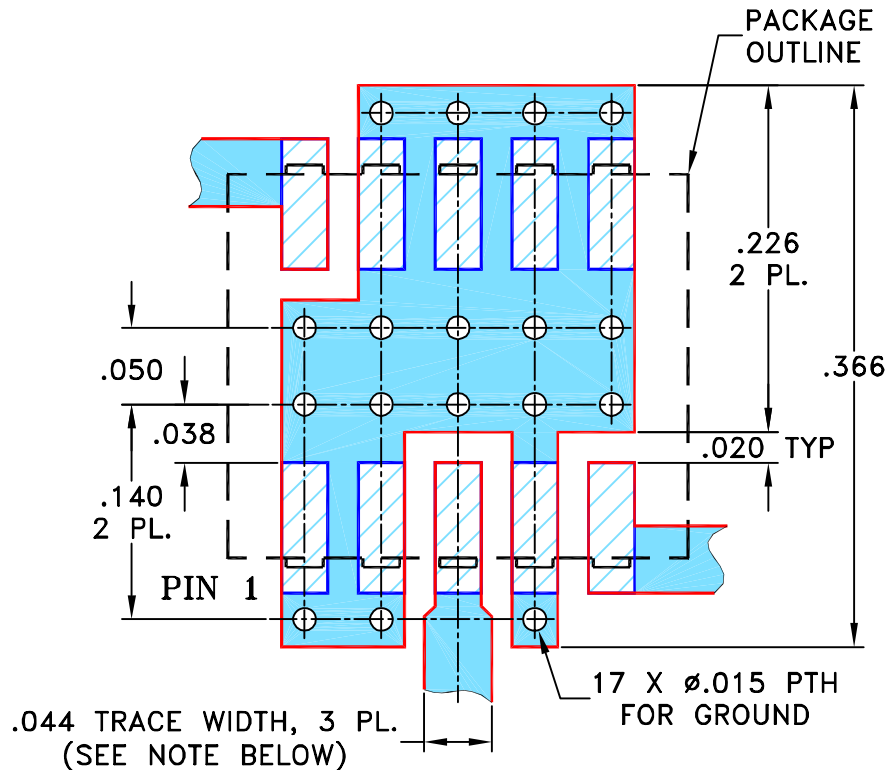
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION                     | DATE     | DR  | AUTH |
|-----|---------|---------------------------------|----------|-----|------|
| A   | M81781  | UPDATED PCB LAYOUT              | 06/07/02 | GF  | DJ   |
| B   | M82377  | UPDATED DRAWING                 | 07/31/02 | AV  | WL   |
| C   | M102713 | ADDED NOTE 2 & "...WITH SMOBC"  | 01/17/06 | MMG | IL   |
| D   | M135488 | ADDED DZ1650, CHANGED PIN CONN. | 02/02/12 | GF  | DJ   |

## SUGGESTED MOUNTING CONFIGURATION FOR DZ883, DZ885 & DZ1650 CASE STYLES, "10MX01" PIN CONNECTION



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020"  $\pm$  .0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



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



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

DRAWN

AV

05/08/02

TOLERANCES ON:

CHECKED

DB

05/16/02

2 PL DECIMALS  $\pm$ 

APPROVED

WL

05/16/02

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

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



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Brooklyn NY 11235

PL, 10MX01, DZ883/885/1650, TB-144

SIZE  
A

CODE IDENT  
15542

DRAWING NO:  
98-PL-045

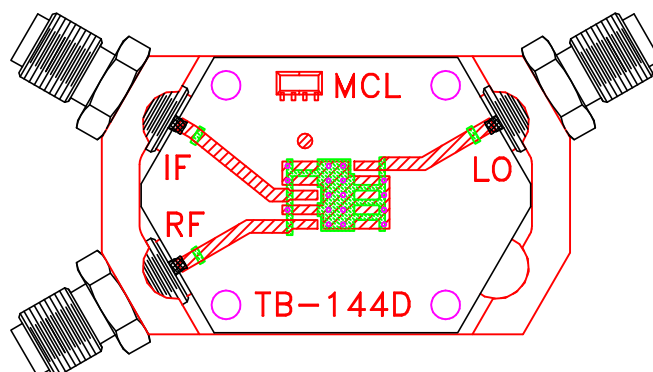
REV:  
D

FILE: 98PL045

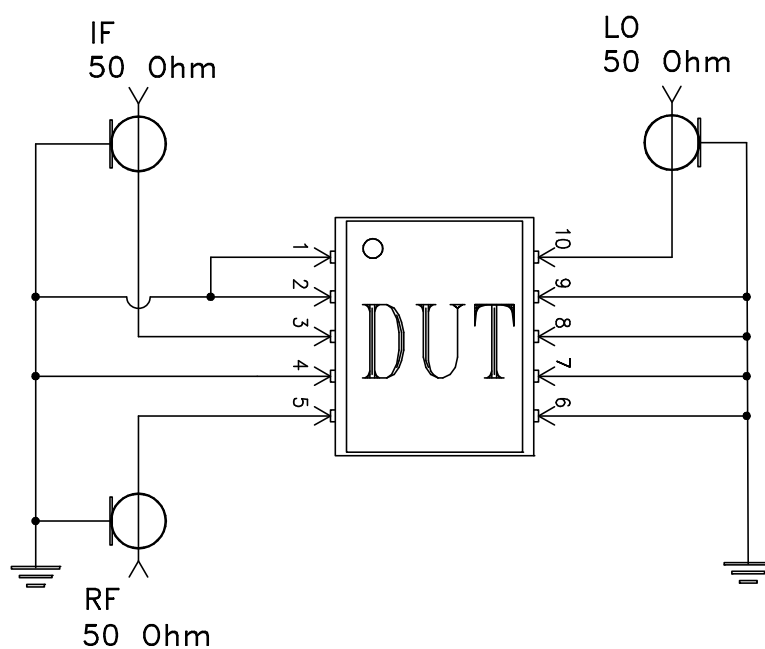
SCALE: 8:1

SHEET: 1 OF 1

# Evaluation Board and Circuit



TB-144



Schematic Diagram

## Notes:

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

 **Mini-Circuits®**



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

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