

High IP3

# Frequency Mixer WIDE BAND

MCA-50MH+

Level 13 (LO Power+13 dBm) 1000 to 5000 MHz

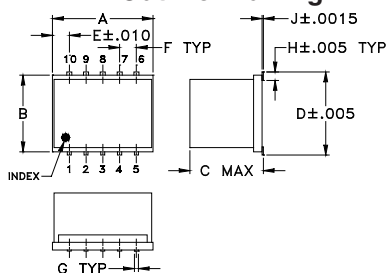
## Maximum Ratings

|                       |                |
|-----------------------|----------------|
| Operating Temperature | -55°C to 100°C |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 200 mW         |
| IF Current            | 40 mA          |

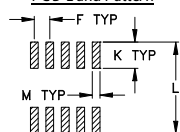
## Pin Connections

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

## Outline Drawing



### PCB Land Pattern



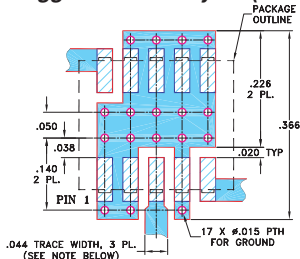
Suggested L layout,  
Tolerance to be within ±0.002

## Outline Dimensions (inch)

| 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.  
3. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
4. 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

- wide bandwidth, 1000 to 5000 MHz
- good L-R isolation, 25 dB typ.; L-I isolation, 30 dB typ.
- small size 0.25"x0.3"x0.2"
- aqueous washable
- triple balanced mixer
- protected by US Patent 6,917,796

## Applications

- PCN
- satellite
- line of sight links
- WiMax



Generic photo used for illustration purposes only

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            |

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

| FREQUENCY (MHz)                      |         | CONVERSION LOSS (dB) |          |      | LO-RF ISOLATION (dB) |      | LO-IF ISOLATION (dB) |      | IP3 at center band (dBm) |
|--------------------------------------|---------|----------------------|----------|------|----------------------|------|----------------------|------|--------------------------|
| LO/RF f <sub>L</sub> -f <sub>U</sub> | IF      | $\bar{X}$            | $\sigma$ | Max. | Typ.                 | Min. | Typ.                 | Min. |                          |
| 1000-5000                            | 10-1500 | 7.3                  | 0.2      | 9.9  |                      |      |                      |      |                          |
| 1000-1400                            | 10-400  | 6.2                  | 0.1      | 7.8  | 20                   | 11   | 32                   | 25   | 20                       |
| 1400-2000                            | 10-600  | 6.0                  | 0.1      | 7.7  | 34                   | 20   | 28                   | 20   | 21                       |
| 2000-2600                            | 10-600  | 7.8                  | 0.1      | 9.9  | 25                   | 18   | 28                   | 20   | 21                       |
| 2600-4500                            | 10-1500 | 6.6                  | 0.1      | 8.6  | 39                   | 22   | 30                   | 20   | 18                       |
| 4500-5000                            | 50-500  | 7.3                  | 0.2      | 8.9  | 35                   | 22   | 30                   | 20   | 21                       |

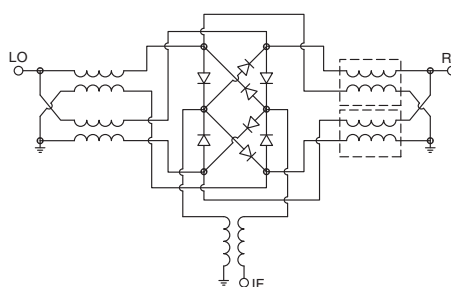
1 dB COMP. +9 dBm typ.

see individual band specs

## 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 +13dBm            | LO +13dBm          | LO +13dBm          | LO +13dBm         | LO +13dBm         |
| 1000.10         | 1030.10 | 6.43                 | 16.42              | 31.37              | 1.28              | 2.13              |
| 1100.10         | 1130.10 | 5.97                 | 18.64              | 31.89              | 1.17              | 2.23              |
| 1400.10         | 1430.10 | 5.91                 | 30.08              | 31.47              | 1.23              | 2.49              |
| 1500.10         | 1530.10 | 5.76                 | 34.43              | 31.25              | 1.26              | 2.39              |
| 1600.10         | 1630.10 | 5.78                 | 39.11              | 31.37              | 1.28              | 2.25              |
| 1800.10         | 1830.10 | 6.04                 | 39.49              | 29.65              | 1.42              | 2.06              |
| 2000.10         | 2030.10 | 6.32                 | 28.14              | 28.64              | 1.53              | 2.12              |
| 2300.10         | 2330.10 | 8.66                 | 23.59              | 25.91              | 1.90              | 1.97              |
| 2500.10         | 2530.10 | 7.82                 | 24.04              | 27.43              | 1.78              | 2.12              |
| 2700.10         | 2730.10 | 7.15                 | 28.71              | 30.07              | 1.63              | 2.12              |
| 3000.10         | 3030.10 | 6.26                 | 33.02              | 28.73              | 1.61              | 1.50              |
| 3300.10         | 3330.10 | 5.97                 | 41.64              | 28.07              | 1.75              | 1.33              |
| 3500.10         | 3530.10 | 6.06                 | 44.84              | 29.22              | 1.82              | 1.03              |
| 3600.10         | 3630.10 | 6.03                 | 56.06              | 28.90              | 1.80              | 1.05              |
| 3800.10         | 3830.10 | 5.91                 | 40.61              | 30.53              | 1.79              | 1.22              |
| 4000.10         | 4030.10 | 6.53                 | 35.57              | 34.07              | 1.78              | 1.11              |
| 4300.10         | 4330.10 | 7.10                 | 39.56              | 33.74              | 2.07              | 1.60              |
| 4500.10         | 4530.10 | 6.95                 | 40.10              | 31.97              | 2.08              | 2.10              |
| 4800.10         | 4830.10 | 7.36                 | 29.20              | 28.90              | 1.59              | 2.02              |
| 5000.10         | 5030.10 | 7.14                 | 32.79              | 30.33              | 1.57              | 1.61              |

## Electrical Schematic



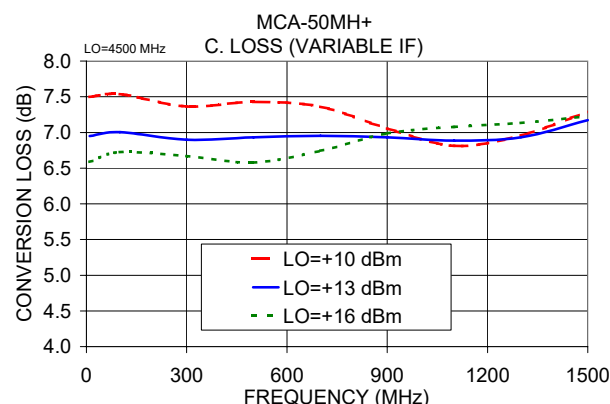
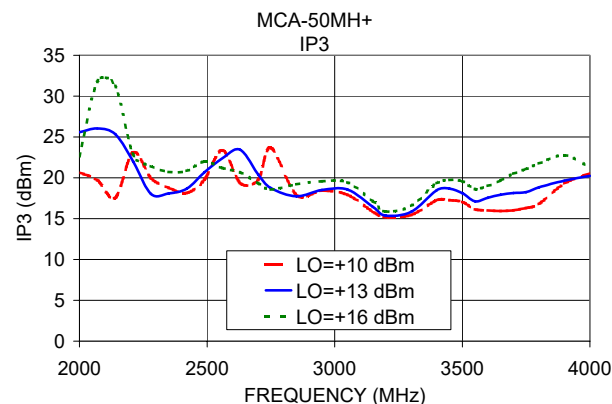
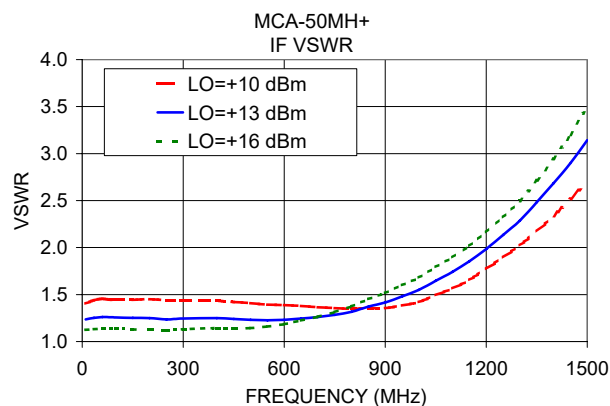
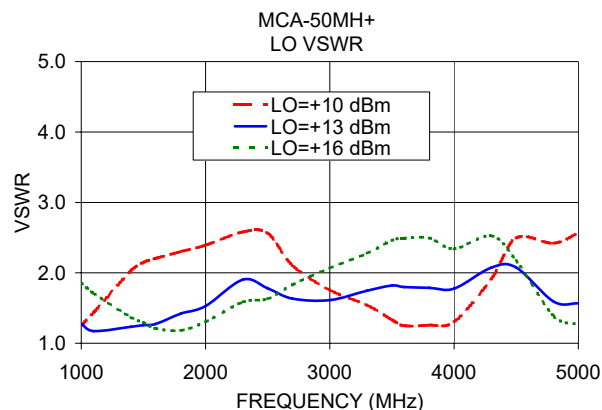
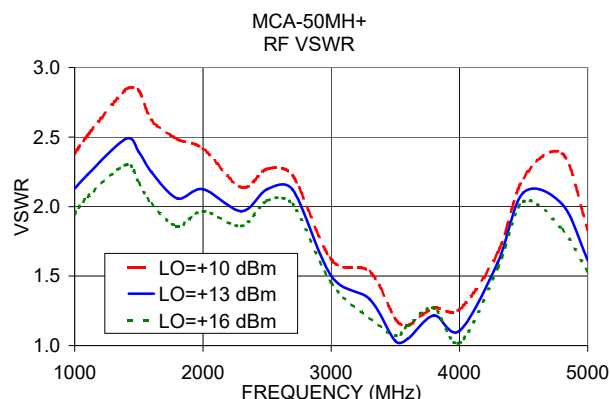
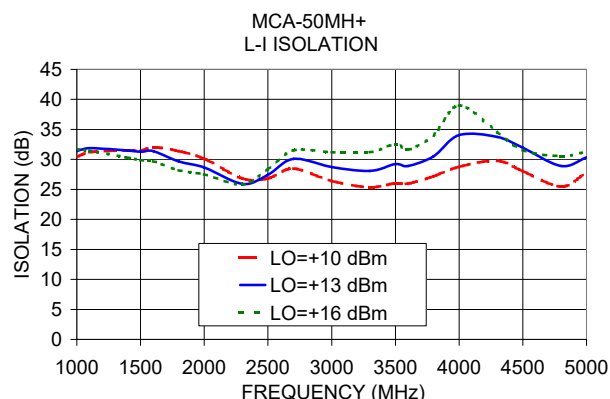
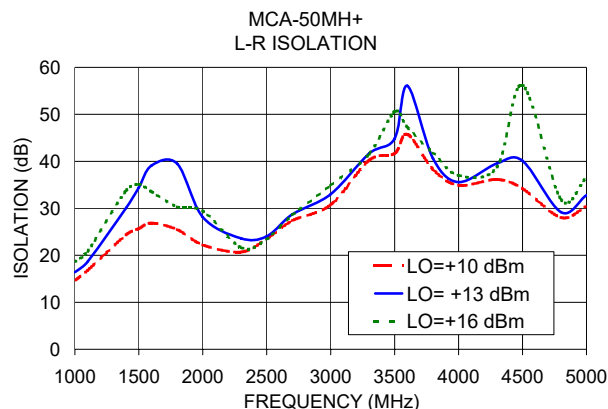
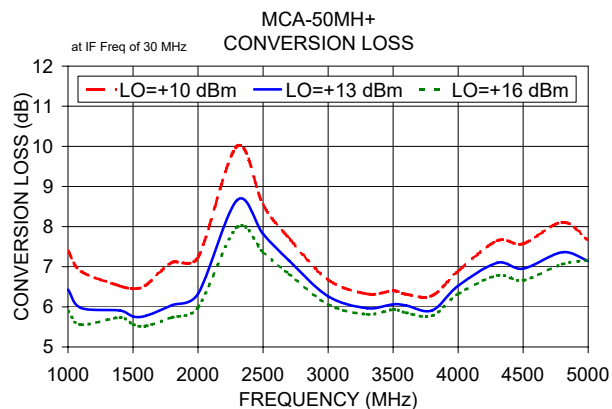
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REV. G  
M151107  
ED-9595B/2  
MCA-50MH+  
DJ/TD/CP/AM  
200604

# Performance Charts

# MCA-50MH+



## Notes

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# Frequency Mixer

# MCA-50MH+

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=30MHz<br>(dB) |       |       |
|---------------------|-------------|-------------------------------------------------------|-------|-------|
|                     |             | @LO (dBm)                                             |       |       |
|                     |             | +10                                                   | +13   | +16   |
| 800.1               | 830.1       | 7.54                                                  | 6.67  | 6.06  |
| 940.1               | 970.1       | 7.43                                                  | 6.48  | 5.84  |
| 1080.1              | 1110.1      | 8.03                                                  | 6.89  | 6.05  |
| 1220.1              | 1250.1      | 7.64                                                  | 6.61  | 6.08  |
| 1360.1              | 1390.1      | 7.24                                                  | 6.63  | 6.28  |
| 1500.1              | 1530.1      | 7.15                                                  | 6.42  | 6.16  |
| 1640.1              | 1670.1      | 7.34                                                  | 6.55  | 6.16  |
| 1780.1              | 1810.1      | 7.53                                                  | 6.51  | 6.09  |
| 1920.1              | 1950.1      | 7.75                                                  | 6.55  | 6.24  |
| 2060.1              | 2090.1      | 8.08                                                  | 6.98  | 6.61  |
| 2200.1              | 2230.1      | 10.18                                                 | 8.33  | 7.73  |
| 2480.1              | 2510.1      | 9.90                                                  | 8.86  | 8.15  |
| 2620.1              | 2650.1      | 8.13                                                  | 7.63  | 7.24  |
| 2760.1              | 2790.1      | 7.98                                                  | 7.49  | 7.12  |
| 2900.1              | 2930.1      | 7.67                                                  | 6.99  | 6.65  |
| 3040.1              | 3070.1      | 7.47                                                  | 6.81  | 6.55  |
| 3180.1              | 3210.1      | 7.05                                                  | 6.65  | 6.50  |
| 3320.1              | 3350.1      | 6.78                                                  | 6.37  | 6.21  |
| 3460.1              | 3490.1      | 6.73                                                  | 6.33  | 6.14  |
| 3600.1              | 3630.1      | 6.63                                                  | 6.36  | 6.25  |
| 3740.1              | 3770.1      | 6.55                                                  | 6.25  | 6.12  |
| 3880.1              | 3910.1      | 6.52                                                  | 6.31  | 6.23  |
| 4020.1              | 4050.1      | 6.88                                                  | 6.70  | 6.63  |
| 4160.1              | 4190.1      | 7.38                                                  | 7.20  | 7.06  |
| 4300.1              | 4330.1      | 7.92                                                  | 7.60  | 7.37  |
| 4460.1              | 4490.1      | 7.96                                                  | 7.41  | 7.13  |
| 4600.1              | 4630.1      | 8.81                                                  | 8.10  | 7.71  |
| 4760.1              | 4790.1      | 9.24                                                  | 8.31  | 7.82  |
| 4900.1              | 4930.1      | 9.53                                                  | 8.41  | 7.90  |
| 5060.1              | 5090.1      | 9.45                                                  | 8.31  | 7.91  |
| 5200.1              | 5230.1      | 9.73                                                  | 8.29  | 7.97  |
| 5360.1              | 5390.1      | 10.53                                                 | 8.74  | 8.30  |
| 5500.1              | 5530.1      | 11.61                                                 | 9.59  | 8.97  |
| 5660.1              | 5690.1      | 12.73                                                 | 10.40 | 9.48  |
| 5800.1              | 5830.1      | 11.92                                                 | 9.96  | 9.37  |
| 5960.1              | 5990.1      | 11.19                                                 | 9.99  | 9.83  |
| 6100.1              | 6130.1      | 11.30                                                 | 10.42 | 10.09 |
| 6260.1              | 6290.1      | 11.98                                                 | 11.01 | 11.10 |
| 6400.1              | 6430.1      | 13.35                                                 | 12.46 | 13.35 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       |
|---------------------|-------------|--------------------|-------|-------|
|                     |             | @LO (dBm)          |       |       |
|                     |             | +10                | +13   | +16   |
| 800.1               | 830.1       | 19.28              | 18.30 | 20.34 |
| 940.1               | 970.1       | 17.63              | 20.65 | 26.36 |
| 1080.1              | 1110.1      | 15.78              | 19.40 | 21.00 |
| 1220.1              | 1250.1      | 16.10              | 20.68 | 23.57 |
| 1360.1              | 1390.1      | 18.28              | 19.87 | 20.46 |
| 1500.1              | 1530.1      | 22.58              | 19.18 | 19.30 |
| 1640.1              | 1670.1      | 18.70              | 19.07 | 21.07 |
| 1780.1              | 1810.1      | 17.53              | 24.22 | 27.22 |
| 1920.1              | 1950.1      | 20.22              | 20.67 | 21.16 |
| 2060.1              | 2090.1      | 16.41              | 25.04 | 27.67 |
| 2200.1              | 2230.1      | 16.58              | 18.37 | 28.34 |
| 2480.1              | 2510.1      | 18.05              | 19.60 | 21.11 |
| 2620.1              | 2650.1      | 18.53              | 26.41 | 23.23 |
| 2760.1              | 2790.1      | 17.46              | 29.56 | 21.05 |
| 2900.1              | 2930.1      | 20.79              | 22.23 | 20.88 |
| 3040.1              | 3070.1      | 20.13              | 20.60 | 20.65 |
| 3180.1              | 3210.1      | 17.04              | 16.98 | 17.97 |
| 3320.1              | 3350.1      | 15.56              | 15.24 | 15.83 |
| 3460.1              | 3490.1      | 17.43              | 18.27 | 19.06 |
| 3600.1              | 3630.1      | 15.66              | 16.83 | 18.22 |
| 3740.1              | 3770.1      | 16.20              | 18.09 | 19.25 |
| 3880.1              | 3910.1      | 17.22              | 20.48 | 22.20 |
| 4020.1              | 4050.1      | 19.18              | 20.92 | 22.64 |
| 4160.1              | 4190.1      | 20.94              | 24.29 | 27.20 |
| 4300.1              | 4330.1      | 19.95              | 20.59 | 23.47 |
| 4460.1              | 4490.1      | 18.08              | 23.13 | 25.56 |
| 4600.1              | 4630.1      | 19.80              | 23.05 | 32.90 |
| 4760.1              | 4790.1      | 26.52              | 24.05 | 22.51 |
| 4900.1              | 4930.1      | 32.78              | 25.40 | 18.85 |
| 5060.1              | 5090.1      | 18.03              | 24.69 | 19.38 |
| 5200.1              | 5230.1      | 15.71              | 20.41 | 23.64 |
| 5360.1              | 5390.1      | 13.97              | 19.05 | 22.57 |
| 5500.1              | 5530.1      | 12.97              | 17.30 | 16.31 |
| 5660.1              | 5690.1      | 14.78              | 18.92 | 18.06 |
| 5800.1              | 5830.1      | 15.30              | 17.49 | 17.87 |
| 5960.1              | 5990.1      | 15.01              | 17.17 | 20.04 |
| 6100.1              | 6130.1      | 13.33              | 16.75 | 16.56 |
| 6260.1              | 6290.1      | 14.69              | 16.07 | 14.15 |
| 6400.1              | 6430.1      | 13.25              | 14.91 | 17.81 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+9dBm<br>(dB) |      |      |
|---------------------|-------------|-------------------------------------|------|------|
|                     |             | @LO (dBm)                           |      |      |
|                     |             | +10                                 | +13  | +16  |
| 800.1               | 830.1       | 0.69                                | 0.65 | 0.68 |
| 940.1               | 970.1       | 0.73                                | 0.71 | 0.75 |
| 1080.1              | 1110.1      | 0.25                                | 0.42 | 0.60 |
| 1220.1              | 1250.1      | 0.48                                | 0.50 | 0.49 |
| 1360.1              | 1390.1      | 0.59                                | 0.41 | 0.38 |
| 1500.1              | 1530.1      | 0.54                                | 0.38 | 0.33 |
| 1640.1              | 1670.1      | 0.36                                | 0.27 | 0.26 |
| 1780.1              | 1810.1      | 0.47                                | 0.33 | 0.25 |
| 1920.1              | 1950.1      | 0.56                                | 0.42 | 0.21 |
| 2060.1              | 2090.1      | 0.72                                | 0.40 | 0.27 |
| 2200.1              | 2230.1      | 0.04                                | 0.30 | 0.19 |
| 2480.1              | 2510.1      | 0.02                                | 0.04 | 0.16 |
| 2620.1              | 2650.1      | 0.73                                | 0.27 | 0.25 |
| 2760.1              | 2790.1      | 0.61                                | 0.34 | 0.22 |
| 2900.1              | 2930.1      | 0.56                                | 0.40 | 0.31 |
| 3040.1              | 3070.1      | 0.93                                | 0.56 | 0.42 |
| 3180.1              | 3210.1      | 0.95                                | 0.55 | 0.46 |
| 3320.1              | 3350.1      | 0.98                                | 0.60 | 0.51 |
| 3460.1              | 3490.1      | 0.91                                | 0.54 | 0.45 |
| 3600.1              | 3630.1      | 1.10                                | 0.58 | 0.43 |
| 3740.1              | 3770.1      | 1.07                                | 0.52 | 0.34 |
| 3880.1              | 3910.1      | 1.17                                | 0.58 | 0.32 |
| 4020.1              | 4050.1      | 1.12                                | 0.60 | 0.29 |
| 4160.1              | 4190.1      | 1.06                                | 0.57 | 0.35 |
| 4300.1              | 4330.1      | 1.09                                | 0.54 | 0.34 |
| 4460.1              | 4490.1      | 1.12                                | 0.61 | 0.38 |
| 4600.1              | 4630.1      | 0.68                                | 0.47 | 0.39 |
| 4760.1              | 4790.1      | 0.64                                | 0.53 | 0.56 |
| 4900.1              | 4930.1      | 0.52                                | 0.48 | 0.53 |
| 5060.1              | 5090.1      | 0.57                                | 0.59 | 0.53 |
| 5200.1              | 5230.1      | 0.36                                | 0.62 | 0.44 |
| 5360.1              | 5390.1      | 0.30                                | 0.67 | 0.52 |
| 5500.1              | 5530.1      | 0.25                                | 0.90 | 1.06 |
| 5660.1              | 5690.1      | 0.40                                | 1.29 | 1.55 |
| 5800.1              | 5830.1      | 1.01                                | 1.58 | 1.44 |
| 5960.1              | 5990.1      | 1.85                                | 1.68 | 1.11 |
| 6100.1              | 6130.1      | 2.08                                | 1.73 | 1.38 |
| 6260.1              | 6290.1      | 2.30                                | 1.93 | 0.88 |
| 6400.1              | 6430.1      | 1.21                                | 1.43 | 1.06 |

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=3000.1001MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=1000.1MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=5010.1001MHz<br>(dB) |
|----------------------|-------------|---------------------------------------------------------------------|----------------------|-------------|------------------------------------------------------------------|----------------------|-------------|---------------------------------------------------------------------|
|                      |             | @LO (dBm)                                                           |                      |             | @LO (dBm)                                                        |                      |             | @LO (dBm)                                                           |
|                      |             | +13                                                                 |                      |             | +13                                                              |                      |             | +13                                                                 |
| 2200.0               | 800.1       | 9.12                                                                | 10.0                 | 1010.1      | 6.99                                                             | 4210.0               | 800.1       | 10.69                                                               |
| 2089.7               | 910.4       | 9.19                                                                | 130.0                | 1130.1      | 6.42                                                             | 4110.0               | 900.1       | 10.52                                                               |
| 1979.4               | 1020.7      | 9.13                                                                | 250.0                | 1250.1      | 6.26                                                             | 4010.0               | 1000.1      | 10.35                                                               |
| 1869.1               | 1131.0      | 9.10                                                                | 370.0                | 1370.1      | 6.28                                                             | 3910.0               | 1100.1      | 10.13                                                               |
| 1758.8               | 1241.3      | 9.27                                                                | 490.0                | 1490.1      | 6.34                                                             | 3810.0               | 1200.1      | 9.80                                                                |
| 1648.6               | 1351.5      | 9.11                                                                | 610.0                | 1610.1      | 6.39                                                             | 3710.0               | 1300.1      | 9.68                                                                |
| 1538.3               | 1461.8      | 8.63                                                                | 730.0                | 1730.1      | 6.50                                                             | 3610.0               | 1400.1      | 10.13                                                               |
| 1428.0               | 1572.1      | 8.13                                                                | 850.0                | 1850.1      | 6.33                                                             | 3510.0               | 1500.1      | 10.22                                                               |
| 1317.7               | 1682.4      | 8.18                                                                | 970.0                | 1970.1      | 6.10                                                             | 3410.0               | 1600.1      | 10.56                                                               |
| 1207.4               | 1792.7      | 8.53                                                                | 1090.0               | 2090.1      | 6.31                                                             | 3310.0               | 1700.1      | 10.95                                                               |
| 1097.1               | 1903.0      | 8.65                                                                | 1210.0               | 2210.1      | 6.71                                                             | 3190.0               | 1820.1      | 11.14                                                               |
| 986.8                | 2013.3      | 8.42                                                                | 1330.0               | 2330.1      | 7.01                                                             | 3090.0               | 1920.1      | 10.99                                                               |
| 876.5                | 2123.6      | 8.17                                                                | 1450.0               | 2450.1      | 7.08                                                             | 2970.0               | 2040.1      | 11.02                                                               |
| 766.3                | 2233.8      | 8.00                                                                | 1570.0               | 2570.1      | 7.04                                                             | 2870.0               | 2140.1      | 10.86                                                               |
| 656.0                | 2344.1      | 7.89                                                                | 1690.0               | 2690.1      | 7.45                                                             | 2750.0               | 2260.1      | 10.45                                                               |
| 545.7                | 2454.4      | 7.37                                                                | 1810.0               | 2810.1      | 7.88                                                             | 2650.0               | 2360.1      | 10.28                                                               |
| 435.4                | 2564.7      | 7.17                                                                | 1930.0               | 2930.1      | 8.05                                                             | 2530.0               | 2480.1      | 10.00                                                               |
| 325.1                | 2675.0      | 7.48                                                                | 2050.0               | 3050.1      | 8.15                                                             | 2430.0               | 2580.1      | 10.16                                                               |
| 214.8                | 2785.3      | 7.55                                                                | 2170.0               | 3170.1      | 8.18                                                             | 2310.0               | 2700.1      | 10.14                                                               |
| 104.5                | 2895.6      | 6.98                                                                | 2310.0               | 3310.1      | 8.72                                                             | 2210.0               | 2800.1      | 9.57                                                                |
| 10.0                 | 3010.1      | 7.23                                                                | 2430.0               | 3430.1      | 9.10                                                             | 2090.0               | 2920.1      | 9.30                                                                |
| 179.5                | 3179.6      | 6.94                                                                | 2570.0               | 3570.1      | 9.16                                                             | 1990.0               | 3020.1      | 9.00                                                                |
| 349.0                | 3349.1      | 7.10                                                                | 2690.0               | 3690.1      | 9.25                                                             | 1870.0               | 3140.1      | 8.80                                                                |
| 518.5                | 3518.6      | 7.00                                                                | 2830.0               | 3830.1      | 9.29                                                             | 1770.0               | 3240.1      | 8.77                                                                |
| 688.0                | 3688.1      | 6.92                                                                | 2950.0               | 3950.1      | 8.79                                                             | 1650.0               | 3360.1      | 9.15                                                                |
| 857.5                | 3857.6      | 6.67                                                                | 3090.0               | 4090.1      | 8.80                                                             | 1550.0               | 3460.1      | 9.42                                                                |
| 1051.2               | 4051.3      | 6.68                                                                | 3210.0               | 4210.1      | 8.87                                                             | 1430.0               | 3580.1      | 9.34                                                                |
| 1220.7               | 4220.8      | 6.91                                                                | 3350.0               | 4350.1      | 9.44                                                             | 1330.0               | 3680.1      | 9.21                                                                |
| 1414.4               | 4414.5      | 7.36                                                                | 3470.0               | 4470.1      | 9.52                                                             | 1210.0               | 3800.1      | 9.02                                                                |
| 1583.9               | 4584.0      | 7.62                                                                | 3610.0               | 4610.1      | 8.95                                                             | 1110.0               | 3900.1      | 8.87                                                                |
| 1777.6               | 4777.7      | 7.78                                                                | 3730.0               | 4730.1      | 8.42                                                             | 990.0                | 4020.1      | 8.95                                                                |
| 1947.1               | 4947.2      | 8.75                                                                | 3870.0               | 4870.1      | 7.94                                                             | 890.0                | 4120.1      | 8.93                                                                |
| 2140.9               | 5141.0      | 9.42                                                                | 3990.0               | 4990.1      | 7.50                                                             | 770.0                | 4240.1      | 8.76                                                                |
| 2310.4               | 5310.5      | 9.76                                                                | 4130.0               | 5130.1      | 7.77                                                             | 670.0                | 4340.1      | 8.61                                                                |
| 2504.1               | 5504.2      | 10.44                                                               | 4250.0               | 5250.1      | 8.65                                                             | 550.0                | 4460.1      | 8.53                                                                |
| 2673.6               | 5673.7      | 10.95                                                               | 4390.0               | 5390.1      | 9.87                                                             | 450.0                | 4560.1      | 8.59                                                                |
| 2867.3               | 5867.4      | 11.13                                                               | 4510.0               | 5510.1      | 10.32                                                            | 330.0                | 4680.1      | 8.62                                                                |
| 3036.8               | 6036.9      | 11.51                                                               | 4650.0               | 5650.1      | 10.77                                                            | 230.0                | 4780.1      | 8.48                                                                |
| 3230.5               | 6230.6      | 11.63                                                               | 4770.0               | 5770.1      | 11.45                                                            | 110.0                | 4900.1      | 8.41                                                                |
| 3400.0               | 6400.1      | 13.40                                                               | 4910.0               | 5910.1      | 12.90                                                            | 10.0                 | 5000.1      | 8.49                                                                |

## 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   |
| 830.1       | 10.41                   | 12.44 | 14.48 | 30.07                   | 30.80 | 31.10 |
| 970.1       | 12.73                   | 14.61 | 16.64 | 28.80                   | 29.64 | 30.23 |
| 1110.1      | 15.45                   | 16.83 | 18.21 | 28.68                   | 29.74 | 30.21 |
| 1250.1      | 18.79                   | 20.57 | 22.24 | 29.06                   | 30.51 | 30.27 |
| 1390.1      | 22.53                   | 25.81 | 28.15 | 29.45                   | 30.83 | 30.12 |
| 1530.1      | 24.41                   | 31.01 | 37.79 | 28.76                   | 30.65 | 29.66 |
| 1670.1      | 25.72                   | 34.94 | 37.64 | 28.25                   | 29.89 | 28.86 |
| 1810.1      | 24.67                   | 36.39 | 31.57 | 28.62                   | 28.75 | 27.33 |
| 1950.1      | 23.86                   | 34.48 | 30.42 | 28.61                   | 27.74 | 26.59 |
| 2090.1      | 21.12                   | 28.81 | 29.17 | 28.20                   | 27.06 | 26.40 |
| 2230.1      | 21.75                   | 27.50 | 24.03 | 28.01                   | 26.41 | 25.82 |
| 2510.1      | 25.27                   | 25.67 | 24.59 | 28.43                   | 27.78 | 28.53 |
| 2650.1      | 27.42                   | 28.56 | 27.72 | 28.15                   | 28.50 | 29.58 |
| 2790.1      | 27.93                   | 31.57 | 30.93 | 27.76                   | 29.77 | 31.17 |
| 2930.1      | 28.45                   | 31.00 | 33.59 | 26.56                   | 28.60 | 30.15 |
| 3070.1      | 30.27                   | 32.66 | 36.89 | 25.25                   | 27.21 | 28.34 |
| 3210.1      | 29.69                   | 32.44 | 36.66 | 24.32                   | 26.73 | 27.05 |
| 3350.1      | 33.31                   | 36.65 | 40.83 | 23.39                   | 25.58 | 27.31 |
| 3490.1      | 45.57                   | 44.07 | 41.60 | 22.45                   | 24.81 | 27.25 |
| 3630.1      | 40.28                   | 39.10 | 36.74 | 22.54                   | 25.00 | 26.98 |
| 3770.1      | 41.15                   | 45.55 | 40.59 | 22.97                   | 25.32 | 26.82 |
| 3910.1      | 39.00                   | 41.70 | 41.28 | 23.57                   | 26.19 | 27.90 |
| 4050.1      | 35.58                   | 36.74 | 41.07 | 24.14                   | 27.01 | 28.17 |
| 4190.1      | 37.18                   | 39.96 | 54.05 | 22.89                   | 25.74 | 26.67 |
| 4330.1      | 37.61                   | 45.70 | 46.08 | 22.87                   | 24.99 | 25.87 |
| 4490.1      | 31.10                   | 33.43 | 37.62 | 22.59                   | 25.13 | 26.09 |
| 4630.1      | 30.21                   | 32.90 | 37.20 | 22.16                   | 24.47 | 24.89 |
| 4790.1      | 28.67                   | 30.99 | 35.31 | 21.12                   | 23.16 | 23.13 |
| 4930.1      | 27.23                   | 28.79 | 31.66 | 20.82                   | 23.21 | 23.47 |
| 5090.1      | 28.44                   | 30.92 | 35.00 | 22.35                   | 24.24 | 23.89 |
| 5230.1      | 28.73                   | 30.40 | 33.69 | 23.45                   | 25.03 | 23.29 |
| 5390.1      | 29.06                   | 27.71 | 28.51 | 23.29                   | 23.49 | 22.13 |
| 5530.1      | 30.75                   | 28.79 | 29.20 | 24.29                   | 23.52 | 22.36 |
| 5690.1      | 33.71                   | 32.01 | 32.16 | 24.90                   | 24.07 | 22.64 |
| 5830.1      | 36.65                   | 36.29 | 36.14 | 24.32                   | 23.59 | 22.36 |
| 5990.1      | 43.44                   | 47.04 | 37.80 | 23.45                   | 22.71 | 21.56 |
| 6130.1      | 36.52                   | 37.55 | 33.02 | 21.97                   | 21.20 | 20.50 |
| 6290.1      | 24.98                   | 25.85 | 25.86 | 19.71                   | 19.21 | 19.10 |
| 6430.1      | 21.46                   | 22.05 | 21.65 | 21.20                   | 20.73 | 20.45 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +10                     | +13   | +16   |
| 800.1               | 830.1       | 29.88                   | 27.96 | 27.56 |
| 940.1               | 970.1       | 28.11                   | 26.53 | 26.39 |
| 1080.1              | 1110.1      | 29.10                   | 28.05 | 26.34 |
| 1220.1              | 1250.1      | 28.83                   | 27.04 | 27.04 |
| 1360.1              | 1390.1      | 29.16                   | 28.53 | 29.02 |
| 1500.1              | 1530.1      | 28.35                   | 28.34 | 28.86 |
| 1640.1              | 1670.1      | 27.22                   | 27.49 | 26.87 |
| 1780.1              | 1810.1      | 25.26                   | 26.49 | 25.90 |
| 1920.1              | 1950.1      | 25.98                   | 25.82 | 25.80 |
| 2060.1              | 2090.1      | 29.05                   | 26.77 | 26.62 |
| 2200.1              | 2230.1      | 30.56                   | 28.73 | 27.98 |
| 2480.1              | 2510.1      | 41.03                   | 34.24 | 34.80 |
| 2620.1              | 2650.1      | 45.07                   | 38.39 | 38.46 |
| 2760.1              | 2790.1      | 42.49                   | 35.71 | 34.39 |
| 2900.1              | 2930.1      | 40.23                   | 39.36 | 36.71 |
| 3040.1              | 3070.1      | 51.73                   | 42.07 | 39.62 |
| 3180.1              | 3210.1      | 35.04                   | 34.40 | 32.70 |
| 3320.1              | 3350.1      | 29.45                   | 27.98 | 26.98 |
| 3460.1              | 3490.1      | 26.71                   | 25.95 | 25.31 |
| 3600.1              | 3630.1      | 25.47                   | 25.30 | 25.11 |
| 3740.1              | 3770.1      | 25.33                   | 26.30 | 26.68 |
| 3880.1              | 3910.1      | 27.19                   | 27.63 | 27.26 |
| 4020.1              | 4050.1      | 22.08                   | 21.57 | 21.01 |
| 4160.1              | 4190.1      | 19.53                   | 19.43 | 19.55 |
| 4300.1              | 4330.1      | 17.09                   | 16.83 | 16.92 |
| 4460.1              | 4490.1      | 17.48                   | 17.56 | 17.73 |
| 4600.1              | 4630.1      | 18.10                   | 18.35 | 18.44 |
| 4760.1              | 4790.1      | 18.88                   | 19.39 | 19.38 |
| 4900.1              | 4930.1      | 17.65                   | 17.90 | 17.99 |
| 5060.1              | 5090.1      | 17.94                   | 18.36 | 18.76 |
| 5200.1              | 5230.1      | 19.21                   | 20.03 | 20.45 |
| 5360.1              | 5390.1      | 20.40                   | 21.41 | 21.70 |
| 5500.1              | 5530.1      | 20.12                   | 20.20 | 21.23 |
| 5660.1              | 5690.1      | 18.90                   | 19.34 | 20.31 |
| 5800.1              | 5830.1      | 17.60                   | 18.35 | 19.31 |
| 5960.1              | 5990.1      | 16.05                   | 17.27 | 18.34 |
| 6100.1              | 6130.1      | 15.15                   | 16.19 | 17.20 |
| 6260.1              | 6290.1      | 14.30                   | 15.04 | 15.46 |
| 6400.1              | 6430.1      | 13.82                   | 14.47 | 15.09 |

# Frequency Mixer

# MCA-50MH+

## 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=5000MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|------|------|----------------------|--------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |      |      |                      | @LO (dBm)                      |      |      |
|                     |             | +10             | +13  | +16  |             | +10             | +13  | +16  |                      | +10                            | +13  | +16  |
| 800.1               | 830.1       | 2.28            | 2.04 | 1.84 | 830.1       | 1.28            | 1.33 | 1.82 | 10.0                 | 1.50                           | 1.13 | 1.03 |
| 940.1               | 970.1       | 2.50            | 2.20 | 1.95 | 970.1       | 1.41            | 1.11 | 1.58 | 70.0                 | 1.53                           | 1.15 | 1.02 |
| 1080.1              | 1110.1      | 3.11            | 2.73 | 2.42 | 1110.1      | 1.67            | 1.06 | 1.37 | 130.0                | 1.54                           | 1.17 | 1.06 |
| 1220.1              | 1250.1      | 3.35            | 2.93 | 2.69 | 1250.1      | 2.06            | 1.25 | 1.19 | 190.0                | 1.55                           | 1.19 | 1.08 |
| 1360.1              | 1390.1      | 3.30            | 2.95 | 2.77 | 1390.1      | 2.35            | 1.39 | 1.08 | 250.0                | 1.58                           | 1.22 | 1.11 |
| 1500.1              | 1530.1      | 3.30            | 2.78 | 2.52 | 1530.1      | 2.57            | 1.48 | 1.04 | 310.0                | 1.60                           | 1.25 | 1.15 |
| 1640.1              | 1670.1      | 3.24            | 2.74 | 2.38 | 1670.1      | 2.49            | 1.51 | 1.17 | 350.0                | 1.62                           | 1.26 | 1.16 |
| 1780.1              | 1810.1      | 2.94            | 2.36 | 2.01 | 1810.1      | 2.63            | 1.69 | 1.35 | 410.0                | 1.66                           | 1.30 | 1.20 |
| 1920.1              | 1950.1      | 2.72            | 2.23 | 2.01 | 1950.1      | 2.68            | 1.79 | 1.47 | 450.0                | 1.69                           | 1.32 | 1.22 |
| 2060.1              | 2090.1      | 2.68            | 2.23 | 2.06 | 2090.1      | 2.73            | 1.82 | 1.53 | 510.0                | 1.73                           | 1.38 | 1.28 |
| 2200.1              | 2230.1      | 2.60            | 2.31 | 2.13 | 2230.1      | 2.61            | 1.89 | 1.55 | 550.0                | 1.76                           | 1.39 | 1.28 |
| 2480.1              | 2510.1      | 2.54            | 2.41 | 2.33 | 2510.1      | 2.53            | 1.73 | 1.46 | 650.0                | 1.82                           | 1.46 | 1.36 |
| 2620.1              | 2650.1      | 2.58            | 2.43 | 2.30 | 2650.1      | 2.36            | 1.59 | 1.44 | 710.0                | 1.88                           | 1.54 | 1.45 |
| 2760.1              | 2790.1      | 2.45            | 2.35 | 2.25 | 2790.1      | 2.31            | 1.62 | 1.52 | 750.0                | 1.90                           | 1.56 | 1.48 |
| 2900.1              | 2930.1      | 2.32            | 2.18 | 2.07 | 2930.1      | 2.37            | 1.68 | 1.64 | 810.0                | 1.95                           | 1.64 | 1.56 |
| 3040.1              | 3070.1      | 1.97            | 1.80 | 1.74 | 3070.1      | 2.37            | 1.66 | 1.70 | 850.0                | 1.93                           | 1.63 | 1.56 |
| 3180.1              | 3210.1      | 1.72            | 1.52 | 1.43 | 3210.1      | 2.10            | 1.63 | 1.82 | 910.0                | 1.96                           | 1.69 | 1.62 |
| 3320.1              | 3350.1      | 1.76            | 1.54 | 1.40 | 3350.1      | 1.97            | 1.64 | 1.93 | 950.0                | 1.93                           | 1.68 | 1.62 |
| 3460.1              | 3490.1      | 1.42            | 1.27 | 1.20 | 3490.1      | 1.73            | 1.63 | 2.00 | 1010.0               | 1.93                           | 1.70 | 1.64 |
| 3600.1              | 3630.1      | 1.31            | 1.21 | 1.20 | 3630.1      | 1.61            | 1.66 | 2.13 | 1050.0               | 1.90                           | 1.69 | 1.64 |
| 3740.1              | 3770.1      | 1.14            | 1.13 | 1.22 | 3770.1      | 1.34            | 1.60 | 2.13 | 1110.0               | 1.89                           | 1.71 | 1.67 |
| 3880.1              | 3910.1      | 1.03            | 1.18 | 1.32 | 3910.1      | 1.17            | 1.64 | 2.25 | 1150.0               | 1.84                           | 1.69 | 1.68 |
| 4020.1              | 4050.1      | 1.09            | 1.25 | 1.38 | 4050.1      | 1.15            | 1.65 | 2.22 | 1210.0               | 1.80                           | 1.69 | 1.71 |
| 4160.1              | 4190.1      | 1.13            | 1.12 | 1.17 | 4190.1      | 1.23            | 1.67 | 2.24 | 1250.0               | 1.75                           | 1.68 | 1.73 |
| 4300.1              | 4330.1      | 1.38            | 1.37 | 1.37 | 4330.1      | 1.51            | 1.74 | 2.18 | 1310.0               | 1.69                           | 1.66 | 1.74 |
| 4460.1              | 4490.1      | 1.75            | 1.68 | 1.64 | 4490.1      | 1.92            | 1.90 | 2.22 | 1350.0               | 1.62                           | 1.64 | 1.76 |
| 4600.1              | 4630.1      | 2.27            | 2.16 | 2.09 | 4630.1      | 2.37            | 2.04 | 2.13 | 1410.0               | 1.54                           | 1.62 | 1.77 |
| 4760.1              | 4790.1      | 2.89            | 2.71 | 2.60 | 4790.1      | 2.97            | 2.21 | 2.03 | 1450.0               | 1.50                           | 1.66 | 1.84 |
| 4900.1              | 4930.1      | 3.32            | 3.01 | 2.86 | 4930.1      | 3.60            | 2.39 | 1.93 | 1510.0               | 1.49                           | 1.73 | 1.94 |
| 5060.1              | 5090.1      | 3.57            | 3.03 | 2.82 | 5090.1      | 4.72            | 2.76 | 1.92 | 1550.0               | 1.56                           | 1.88 | 2.13 |
| 5200.1              | 5230.1      | 4.03            | 3.16 | 2.80 | 5230.1      | 5.46            | 3.06 | 2.00 | 1610.0               | 1.63                           | 2.03 | 2.30 |
| 5360.1              | 5390.1      | 4.07            | 3.05 | 2.68 | 5390.1      | 6.11            | 3.42 | 2.26 | 1650.0               | 1.77                           | 2.24 | 2.53 |
| 5500.1              | 5530.1      | 4.62            | 3.72 | 3.31 | 5530.1      | 6.37            | 3.58 | 2.51 | 1710.0               | 1.89                           | 2.41 | 2.73 |
| 5660.1              | 5690.1      | 4.67            | 3.81 | 3.35 | 5690.1      | 6.30            | 3.73 | 2.84 | 1750.0               | 2.02                           | 2.61 | 2.95 |
| 5800.1              | 5830.1      | 4.04            | 3.25 | 2.93 | 5830.1      | 5.58            | 3.67 | 3.02 | 1810.0               | 2.15                           | 2.80 | 3.17 |
| 5960.1              | 5990.1      | 2.95            | 2.60 | 2.53 | 5990.1      | 4.52            | 3.42 | 2.94 | 1850.0               | 2.26                           | 2.96 | 3.36 |
| 6100.1              | 6130.1      | 2.41            | 2.28 | 2.26 | 6130.1      | 3.65            | 2.78 | 2.51 | 1910.0               | 2.39                           | 3.12 | 3.54 |
| 6260.1              | 6290.1      | 1.87            | 1.86 | 1.86 | 6290.1      | 2.11            | 1.80 | 1.81 | 1950.0               | 2.48                           | 3.24 | 3.66 |
| 6400.1              | 6430.1      | 1.86            | 2.00 | 2.19 | 6430.1      | 1.32            | 1.48 | 1.73 | 2010.0               | 2.52                           | 3.21 | 3.58 |

## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | ---    | ---    | 3   | 17  | 17  | 21  | 15  | 26  | 29  | --- | --- | --- |
| 1      | ---    | 25     | +0  | 40  | 22  | 47  | 38  | 43  | 40  | 48  | --- | --- |
| 2      | 76     | 54     | 54  | 46  | 51  | 56  | 53  | 62  | 56  | 58  | 57  | --- |
| 3      | >90    | >77    | 71  | >77 | 64  | 72  | 73  | >77 | >77 | >77 | 66  | >77 |
| 4      | >90    | >77    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 5      | >90    | >77    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 6      | >90    | >77    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 7      | >90    | >77    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 8      | ---    | ---    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 9      | ---    | ---    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 10     | ---    | ---    | --- | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

Test conditions:

RF IN: 3000 MHz; -6.00 dBm.  
LO IN: 3030 MHz; +13.00 dBm  
IF OUT: 30 MHz; -13.19 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | ---    | ---    | 13  | 27  | 28  | 30  | 28  | 36  | 41  | --- | --- | --- |
| 1      | ---    | 24     | +0  | 47  | 23  | 46  | 41  | 44  | 46  | 51  | --- | --- |
| 2      | 57     | 45     | 47  | 36  | 42  | 47  | 47  | 55  | 47  | 53  | 52  | --- |
| 3      | 84     | 59     | 50  | 63  | 42  | 54  | 53  | 61  | 61  | 64  | 55  | 67  |
| 4      | >90    | 71     | 62  | 72  | 63  | 58  | 58  | 65  | 58  | 68  | 72  | 69  |
| 5      | >90    | 80     | 77  | 74  | 75  | 73  | 62  | 70  | 71  | 79  | 75  | 72  |
| 6      | >90    | >87    | >87 | 83  | 78  | >87 | 77  | 77  | 75  | >87 | 75  | 79  |
| 7      | >90    | >87    | >87 | >87 | >87 | >87 | >87 | >87 | 78  | >87 | 82  | >87 |
| 8      | ---    | ---    | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 |
| 9      | ---    | ---    | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 |
| 10     | ---    | ---    | --- | 85  | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

## LO HARMONICS ORDER

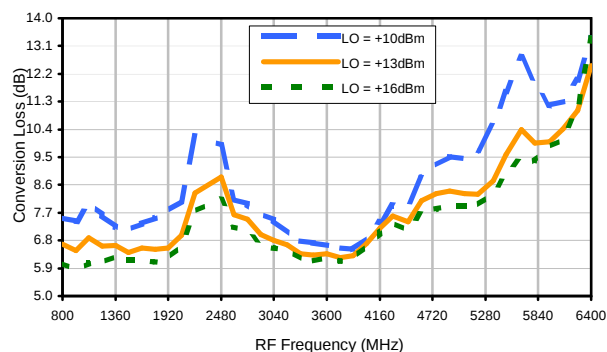
Test conditions:

RF IN: 3000 MHz; 4.00 dBm.  
LO IN: 3030 MHz; +13.00 dBm  
IF OUT: 30 MHz; -3.34 dBm

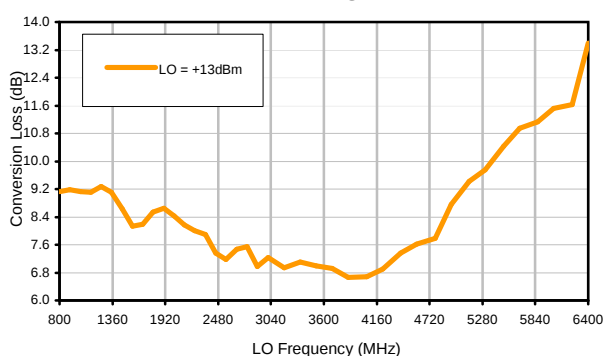
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

## Typical Performance Curves

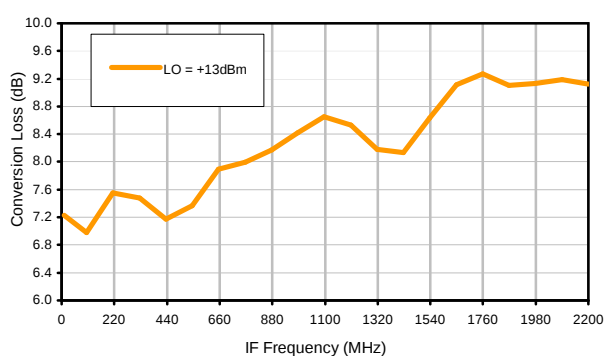
Conversion Loss @ IF=30MHz



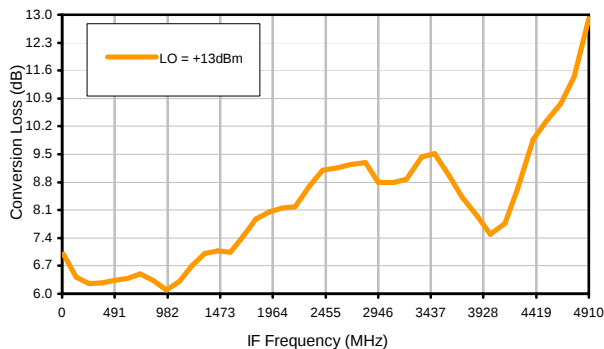
Conversion Loss vs. LO @ RF=3000.1001MHz



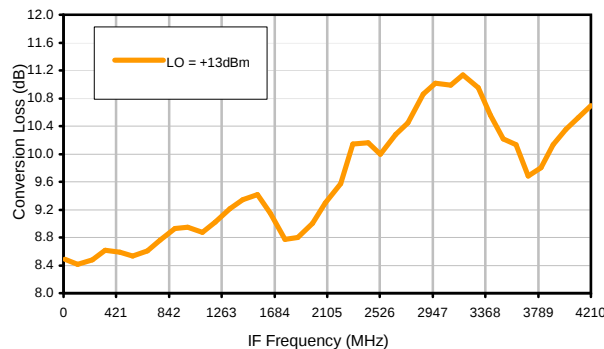
Conversion Loss vs. IF @ RF=3000.1001MHz



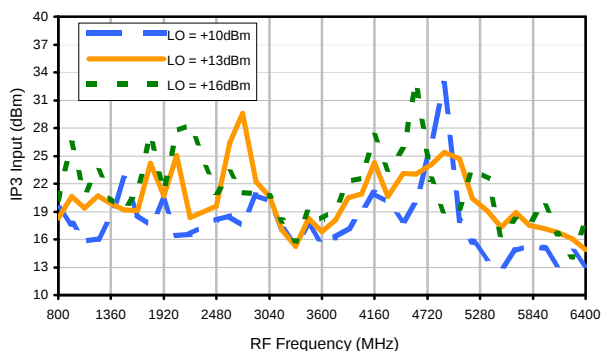
Conversion Loss vs. IF @ RF=1000.1MHz



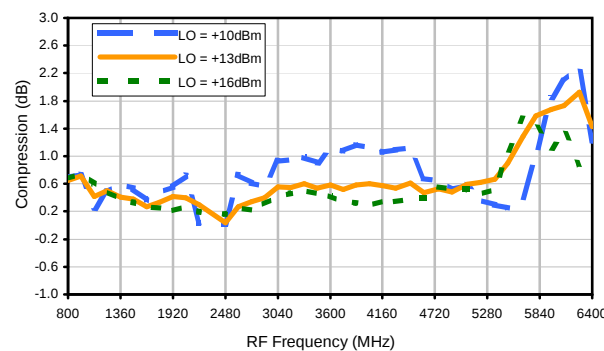
Conversion Loss vs. IF @ RF=5010.1001MHz



IP3 Input

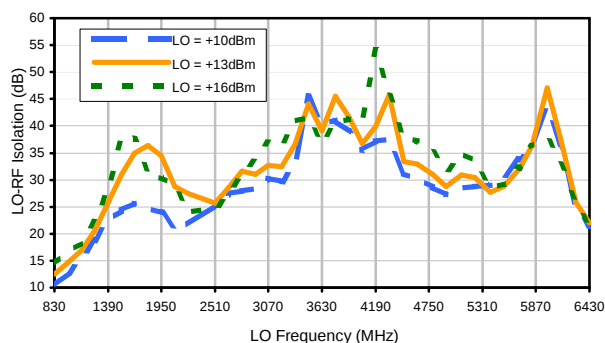


Compression @ RF IN=+9dBm

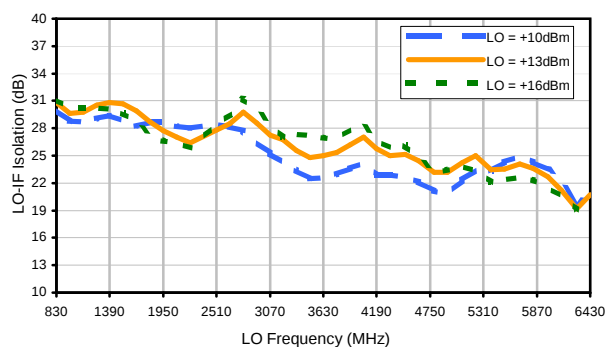


## Typical Performance Curves

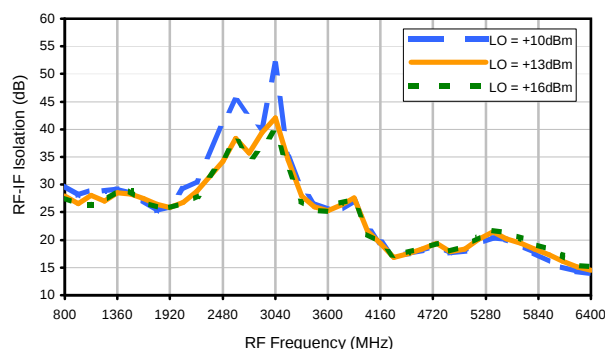
LO-RF Isolation



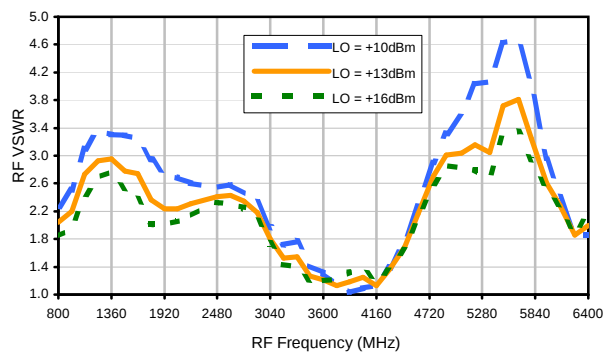
LO-IF Isolation



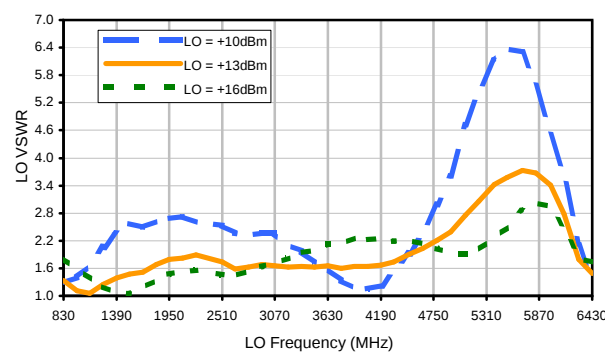
RF-IF Isolation



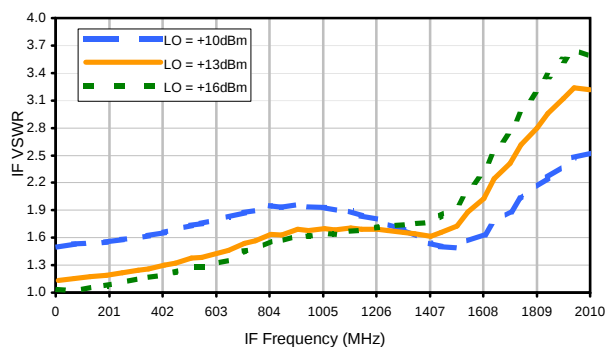
RF VSWR



LO VSWR



IF VSWR



## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | ---    | ---    | 3   | 17  | 17  | 21  | 15  | 26  | 29  | --- | --- | --- |
| 1      | ---    | 25     | +0  | 40  | 22  | 47  | 38  | 43  | 40  | 48  | --- | --- |
| 2      | 76     | 54     | 54  | 46  | 51  | 56  | 53  | 62  | 56  | 58  | 57  | --- |
| 3      | >90    | >77    | 71  | >77 | 64  | 72  | 73  | >77 | >77 | >77 | 66  | >77 |
| 4      | >90    | >77    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 5      | >90    | >77    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 6      | >90    | >77    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 7      | >90    | >77    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 8      | ---    | ---    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 9      | ---    | ---    | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| 10     | ---    | ---    | --- | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 | >77 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

Test conditions:

RF IN: 3000 MHz; -6.00 dBm.  
LO IN: 3030 MHz; +13.00 dBm  
IF OUT: 30 MHz; -13.19 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | ---    | ---    | 13  | 27  | 28  | 30  | 28  | 36  | 41  | --- | --- | --- |
| 1      | ---    | 24     | +0  | 47  | 23  | 46  | 41  | 44  | 46  | 51  | --- | --- |
| 2      | 57     | 45     | 47  | 36  | 42  | 47  | 47  | 55  | 47  | 53  | 52  | --- |
| 3      | 84     | 59     | 50  | 63  | 42  | 54  | 53  | 61  | 61  | 64  | 55  | 67  |
| 4      | >90    | 71     | 62  | 72  | 63  | 58  | 58  | 65  | 58  | 68  | 72  | 69  |
| 5      | >90    | 80     | 77  | 74  | 75  | 73  | 62  | 70  | 71  | 79  | 75  | 72  |
| 6      | >90    | >87    | >87 | 83  | 78  | >87 | 77  | 77  | 75  | >87 | 75  | 79  |
| 7      | >90    | >87    | >87 | >87 | >87 | >87 | >87 | >87 | 78  | >87 | 82  | >87 |
| 8      | ---    | ---    | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 |
| 9      | ---    | ---    | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 |
| 10     | ---    | ---    | --- | 85  | >87 | >87 | >87 | >87 | >87 | >87 | >87 | >87 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

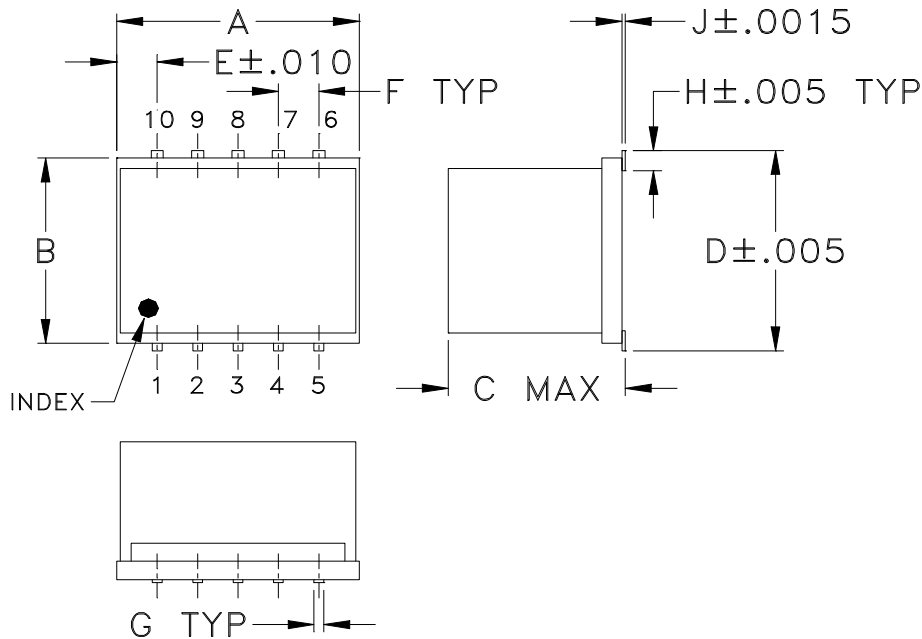
## LO HARMONICS ORDER

Test conditions:

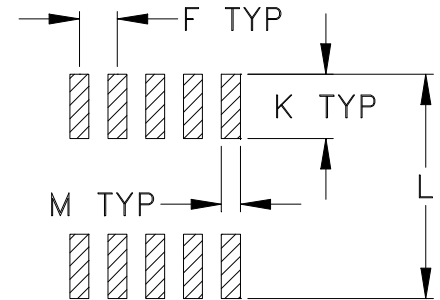
RF IN: 3000 MHz; 4.00 dBm.  
LO IN: 3030 MHz; +13.00 dBm  
IF OUT: 30 MHz; -3.34 dBm

- 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.  $\pm .005$

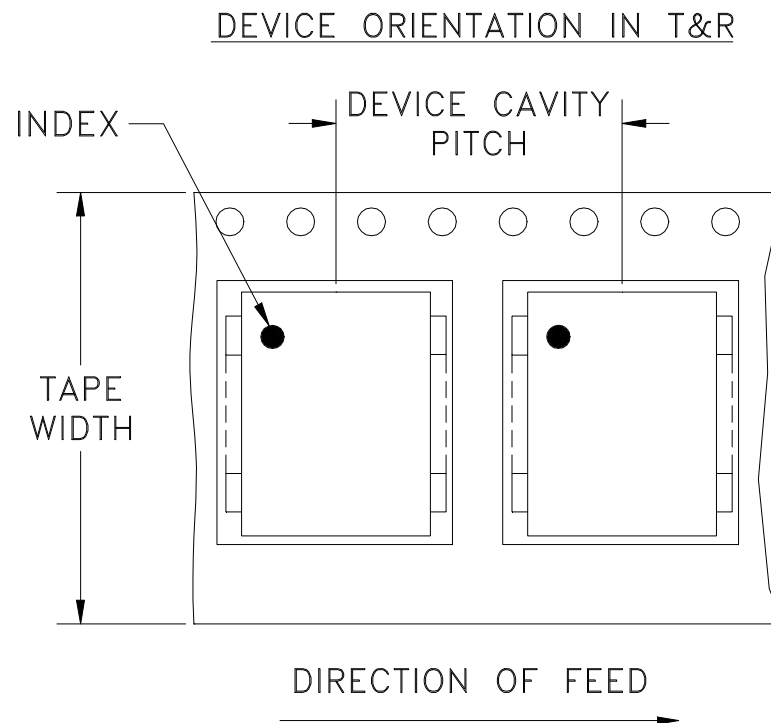
### Notes:

- 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)



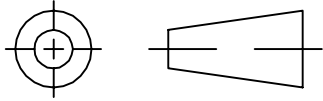
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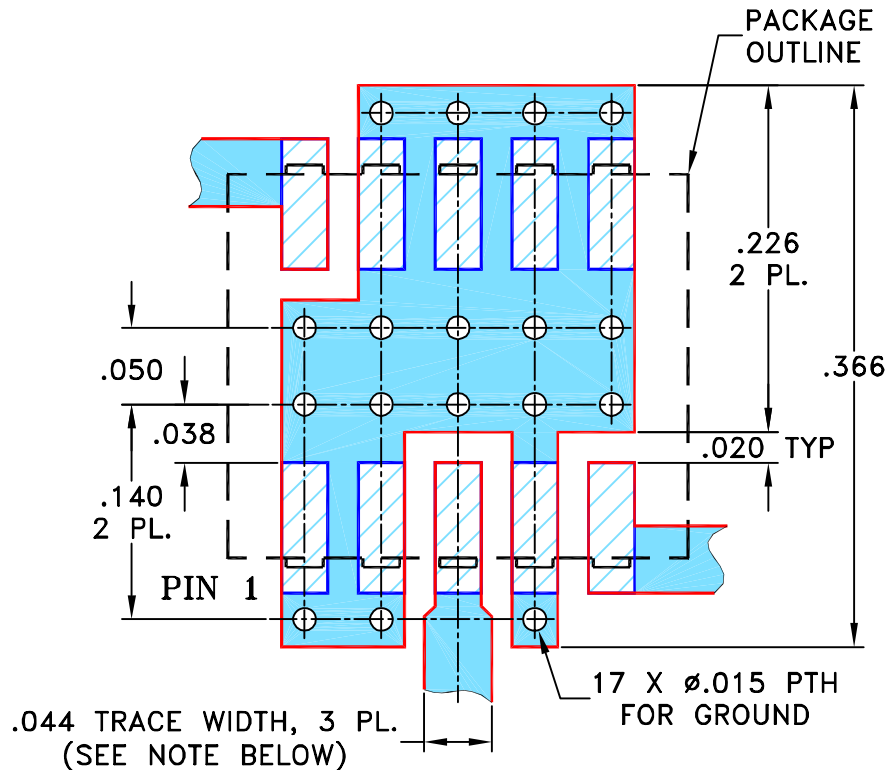
## THIRD ANGLE PROJECTION



## 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

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

DRAWN

AV

05/08/02

CHECKED

DB

05/16/02

APPROVED

WL

05/16/02

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



**Mini-Circuits®** 13 Neptune Avenue  
Brooklyn NY 11235

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

SIZE  
A

CODE IDENT  
15542

DRAWING NO:  
98-PL-045

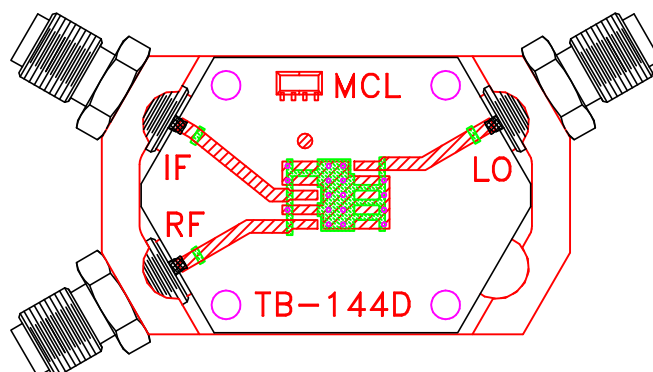
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D

FILE: 98PL045

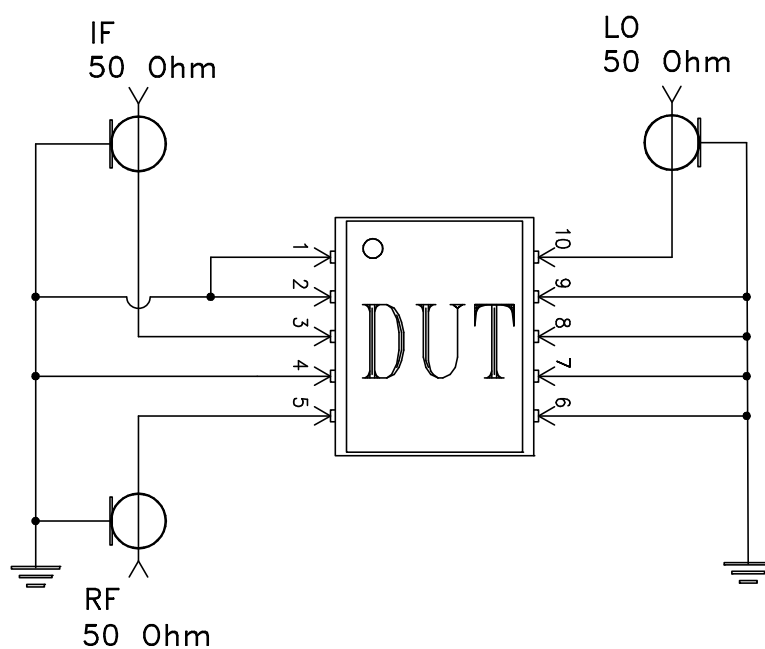
SCALE: 8:1

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                               |