

Ceramic

# Frequency Mixer

WIDE BAND

MCA1T-85L+

Level 4 (LO Power+4 dBm) 2800 to 8500 MHz

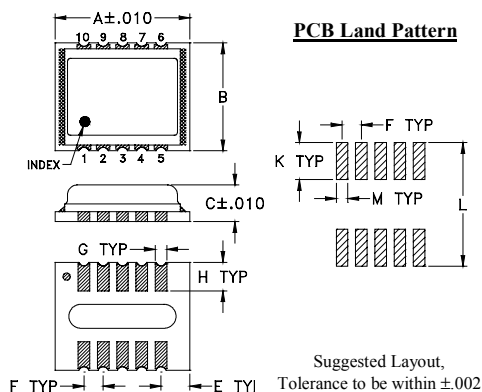
## Maximum Ratings

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

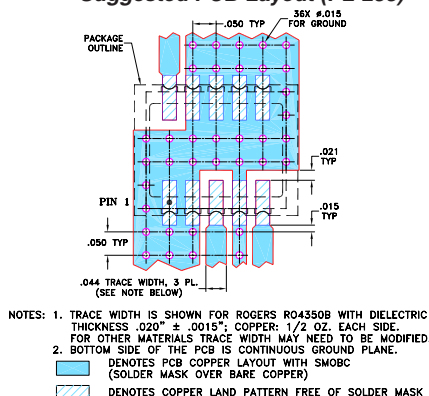
## Outline Drawing



## Outline Dimensions (inch)

| A    | B    | C    | E    | F     | G    |
|------|------|------|------|-------|------|
| .350 | .280 | .095 | .075 | .050  | .030 |
| 8.89 | 7.11 | 2.41 | 1.91 | 1.27  | 0.76 |
| H    | K    | L    | M    | wt    |      |
| .074 | .096 | .321 | .030 | grams |      |
| 1.88 | 2.44 | 8.15 | 0.76 | 0.21  |      |

## Demo Board MCL P/N: TB-493+ Suggested PCB Layout (PL-288)



### 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

- wide bandwidth, 2800 to 8500 MHz
- high L-R isolation, 35 dB typ.
- IF, DC to 1200 MHz
- LTCC double balanced mixer
- aqueous washable
- low cost
- low profile, 0.095"
- protected by US Patent 7,027,795 & 8,749,989

## Applications

- satellite up and down converters
- line of sight links
- defense radar
- defense communication

## Electrical Specifications (T<sub>AMB</sub>=-40°C to 85°C)

| FREQUENCY (MHz)                         |         | CONVERSION LOSS (dB) |          |      | LO-RF ISOLATION (dB) |      | LO-IF ISOLATION (dB) |      | IP3 at center band (dBm) |
|-----------------------------------------|---------|----------------------|----------|------|----------------------|------|----------------------|------|--------------------------|
| LO/RF<br>f <sub>L</sub> -f <sub>U</sub> | IF      | $\bar{X}$            | $\sigma$ | Max. | Typ.                 | Min. | Typ.                 | Min. | Typ.                     |
| 2800-8500                               | DC-1200 |                      |          |      |                      |      |                      |      |                          |
| 2800-5000                               | DC-1200 | 5.7                  | 0.2      | 8.4* | 35                   | 20   | 13                   | 7    | 11                       |
| 5000-7500                               | DC-1200 | 6.0                  | 0.3      | 8.4* | 35                   | 20   | 38                   | 20   | 7                        |
| 7500-8500                               | DC-1200 | 7.0                  | 0.3      | —    | 31                   | —    | 32                   | —    | 8                        |

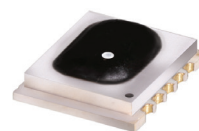
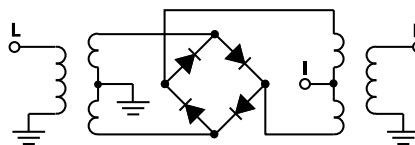
1 dB COMPR. 0 dBm typ.

\* Conversion loss at 30 MHz IF, increases with IF frequency.

## 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 +4dBm             | LO +4dBm           | LO +4dBm           | LO +4dBm          | LO +4dBm          |
| 2800.00         | 2770.10 | 6.57                 | 35.68              | 11.51              | 2.96              | 2.36              |
| 3028.00         | 2998.10 | 6.02                 | 35.94              | 13.02              | 2.53              | 2.01              |
| 3514.00         | 3484.10 | 5.36                 | 36.84              | 13.44              | 1.60              | 2.34              |
| 4000.00         | 3970.10 | 6.20                 | 27.71              | 11.19              | 2.09              | 2.43              |
| 4567.00         | 4537.10 | 6.88                 | 26.37              | 18.64              | 1.76              | 2.49              |
| 5030.00         | 5000.10 | 6.65                 | 30.49              | 25.08              | 2.34              | 2.87              |
| 5530.00         | 5500.10 | 6.49                 | 36.99              | 30.26              | 2.22              | 3.70              |
| 6108.00         | 6078.10 | 6.98                 | 50.37              | 37.40              | 3.10              | 3.61              |
| 6345.00         | 6315.10 | 6.64                 | 39.24              | 41.03              | 2.90              | 3.58              |
| 6582.00         | 6552.10 | 6.46                 | 40.54              | 44.77              | 2.57              | 3.38              |
| 6819.00         | 6789.10 | 6.25                 | 37.96              | 43.02              | 2.52              | 3.48              |
| 7056.00         | 7026.10 | 6.25                 | 37.74              | 39.02              | 2.45              | 3.19              |
| 7293.00         | 7263.10 | 6.30                 | 34.97              | 35.49              | 2.32              | 3.22              |
| 7530.00         | 7500.10 | 6.44                 | 32.69              | 35.99              | 2.26              | 3.00              |
| 7767.00         | 7737.10 | 6.58                 | 30.94              | 29.06              | 2.27              | 2.91              |
| 8004.00         | 7974.10 | 6.46                 | 28.52              | 22.33              | 2.02              | 2.80              |
| 8050.00         | 8020.10 | 6.38                 | 28.47              | 21.82              | 1.99              | 2.74              |
| 8150.00         | 8120.10 | 6.24                 | 27.46              | 21.67              | 1.87              | 2.46              |
| 8500.00         | 8470.10 | 6.07                 | 24.98              | 23.26              | 1.49              | 1.77              |
| 8550.00         | 8520.10 | 6.26                 | 24.71              | 23.44              | 1.46              | 2.13              |

## Electrical Schematic



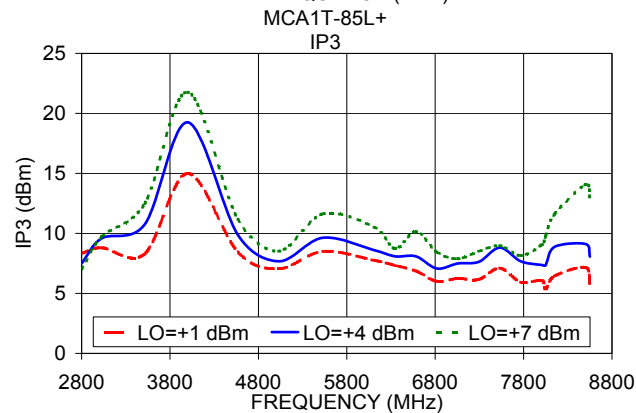
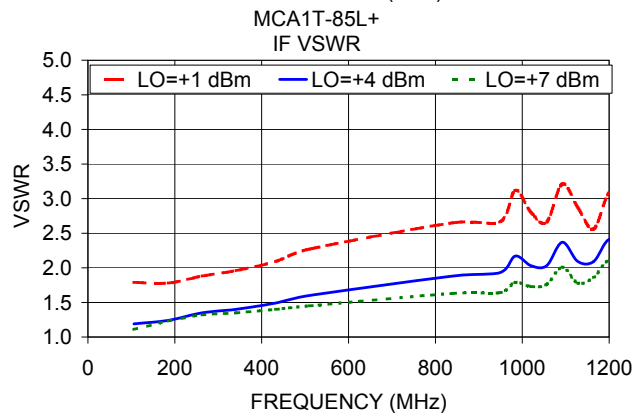
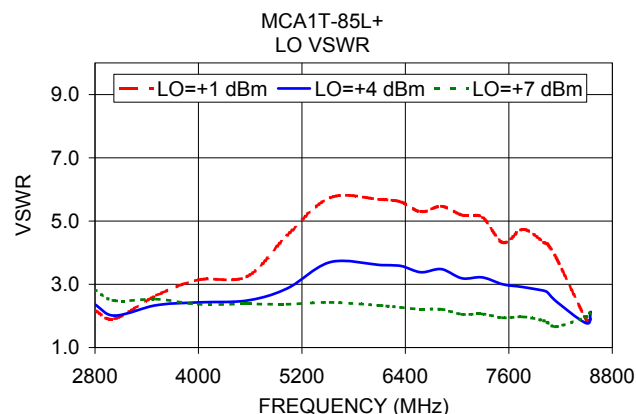
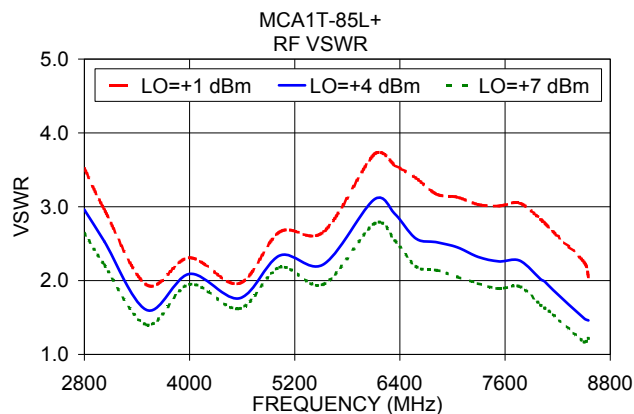
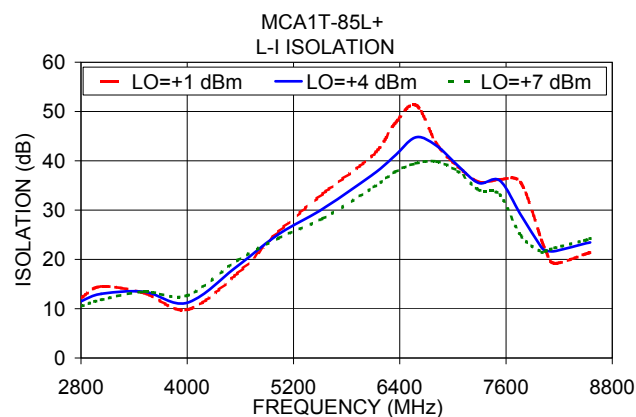
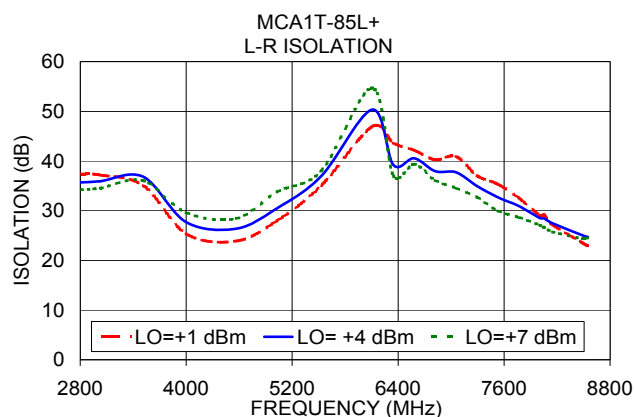
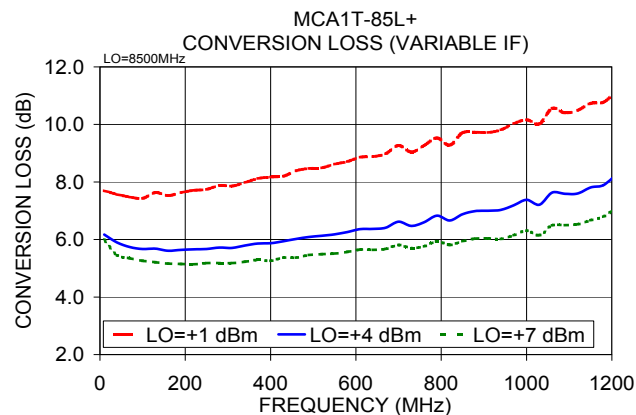
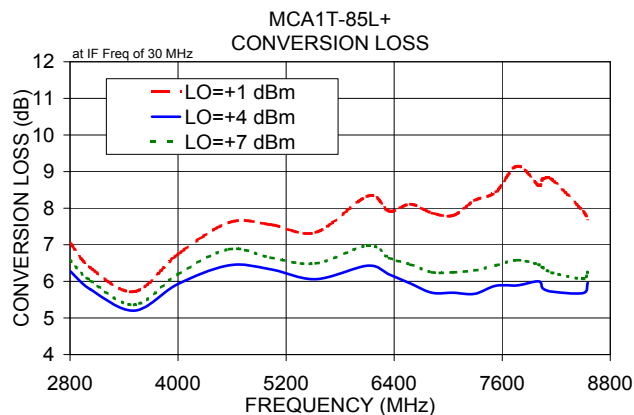
CASE STYLE: DZ885-2

### +RoHS Compliant

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

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REV. C  
M151777  
MCA1T-85L+  
DJ/RS/CP/AM  
160816



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# Frequency Mixer

MCA1T-85L+

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=29.9MHz<br>(dB) |      |      | RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP-3 INPUT<br>(dBm) |       |       | RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+0dBm<br>(dB) |      |      |
|---------------------|-------------|---------------------------------------------------------|------|------|---------------------|-------------|---------------------|-------|-------|---------------------|-------------|-------------------------------------|------|------|
|                     |             | @LO (dBm)                                               |      |      |                     |             | @LO (dBm)           |       |       |                     |             | @LO (dBm)                           |      |      |
|                     |             | +1                                                      | +4   | +7   |                     |             | +1                  | +4    | +7    |                     |             | +1                                  | +4   | +7   |
| 2560.0              | 2530.1      | 8.25                                                    | 7.37 | 6.93 | 2560.0              | 2530.1      | 9.49                | 8.58  | 8.02  | 2560.0              | 2530.1      | 1.18                                | 1.15 | 1.14 |
| 2650.0              | 2620.1      | 7.76                                                    | 7.02 | 6.69 | 2650.0              | 2620.1      | 8.54                | 7.67  | 7.27  | 2650.0              | 2620.1      | 1.32                                | 1.15 | 1.05 |
| 2710.0              | 2680.1      | 7.38                                                    | 6.61 | 6.36 | 2710.0              | 2680.1      | 8.61                | 7.82  | 7.45  | 2710.0              | 2680.1      | 1.33                                | 1.15 | 1.04 |
| 2800.0              | 2770.1      | 7.05                                                    | 6.57 | 6.28 | 2800.0              | 2770.1      | 8.29                | 7.56  | 7.06  | 2800.0              | 2770.1      | 1.33                                | 1.11 | 0.96 |
| 2866.0              | 2836.1      | 7.00                                                    | 6.59 | 6.34 | 2866.0              | 2836.1      | 8.76                | 8.39  | 8.23  | 2866.0              | 2836.1      | 1.27                                | 1.02 | 0.84 |
| 3109.0              | 3079.1      | 6.25                                                    | 5.87 | 5.63 | 3109.0              | 3079.1      | 8.83                | 10.26 | 11.03 | 3109.0              | 3079.1      | 1.26                                | 0.99 | 0.82 |
| 3271.0              | 3241.1      | 6.24                                                    | 5.77 | 5.48 | 3271.0              | 3241.1      | 8.05                | 8.66  | 8.86  | 3271.0              | 3241.1      | 1.31                                | 1.01 | 0.81 |
| 3514.0              | 3484.1      | 5.72                                                    | 5.36 | 5.20 | 3514.0              | 3484.1      | 8.29                | 10.85 | 12.59 | 3514.0              | 3484.1      | 1.22                                | 0.74 | 0.52 |
| 3757.0              | 3727.1      | 5.75                                                    | 5.30 | 5.11 | 3757.0              | 3727.1      | 9.36                | 10.79 | 11.28 | 3757.0              | 3727.1      | 1.13                                | 0.55 | 0.33 |
| 3919.0              | 3889.1      | 6.05                                                    | 5.63 | 5.38 | 3919.0              | 3889.1      | 9.41                | 13.54 | 16.16 | 3919.0              | 3889.1      | 1.12                                | 0.55 | 0.31 |
| 4162.0              | 4132.1      | 7.99                                                    | 7.07 | 6.55 | 4162.0              | 4132.1      | 16.49               | 17.90 | 19.49 | 4162.0              | 4132.1      | 1.04                                | 0.75 | 0.54 |
| 4324.0              | 4294.1      | 8.08                                                    | 7.21 | 6.72 | 4324.0              | 4294.1      | 8.56                | 10.82 | 12.75 | 4324.0              | 4294.1      | 0.77                                | 0.48 | 0.37 |
| 4567.0              | 4537.1      | 7.61                                                    | 6.88 | 6.44 | 4567.0              | 4537.1      | 8.67                | 10.06 | 11.31 | 4567.0              | 4537.1      | 0.86                                | 0.45 | 0.28 |
| 4729.0              | 4699.1      | 8.94                                                    | 7.93 | 7.25 | 4729.0              | 4699.1      | 16.49               | 15.48 | 15.36 | 4729.0              | 4699.1      | 0.43                                | 0.36 | 0.29 |
| 4972.0              | 4942.1      | 7.75                                                    | 6.89 | 6.48 | 4972.0              | 4942.1      | 6.91                | 7.49  | 8.29  | 4972.0              | 4942.1      | 0.76                                | 0.49 | 0.41 |
| 5080.0              | 5050.1      | 7.45                                                    | 6.53 | 6.09 | 5080.0              | 5050.1      | 6.97                | 7.61  | 8.76  | 5080.0              | 5050.1      | 0.85                                | 0.52 | 0.43 |
| 5230.0              | 5200.1      | 7.42                                                    | 6.43 | 5.91 | 5230.0              | 5200.1      | 6.96                | 7.68  | 8.81  | 5230.0              | 5200.1      | 0.82                                | 0.51 | 0.39 |
| 5380.0              | 5350.1      | 7.20                                                    | 6.28 | 5.82 | 5380.0              | 5350.1      | 6.79                | 8.18  | 9.72  | 5380.0              | 5350.1      | 0.75                                | 0.37 | 0.20 |
| 5480.0              | 5450.1      | 7.21                                                    | 6.40 | 5.93 | 5480.0              | 5450.1      | 7.47                | 8.68  | 10.55 | 5480.0              | 5450.1      | 0.74                                | 0.51 | 0.42 |
| 5871.0              | 5841.1      | 8.20                                                    | 7.05 | 6.53 | 5871.0              | 5841.1      | 12.60               | 16.39 | 21.29 | 5871.0              | 5841.1      | 0.60                                | 0.46 | 0.35 |
| 6345.0              | 6315.1      | 7.92                                                    | 6.64 | 6.19 | 6345.0              | 6315.1      | 7.30                | 8.11  | 8.76  | 6345.0              | 6315.1      | 0.70                                | 0.46 | 0.36 |
| 7056.0              | 7026.1      | 7.80                                                    | 6.25 | 5.69 | 7056.0              | 7026.1      | 6.21                | 7.48  | 7.93  | 7056.0              | 7026.1      | 0.70                                | 0.44 | 0.34 |
| 7530.0              | 7500.1      | 8.44                                                    | 6.44 | 5.88 | 7530.0              | 7500.1      | 7.16                | 8.96  | 9.12  | 7530.0              | 7500.1      | 0.65                                | 0.52 | 0.42 |
| 8050.0              | 8020.1      | 8.80                                                    | 6.38 | 5.81 | 8050.0              | 8020.1      | 5.44                | 7.37  | 10.01 | 8050.0              | 8020.1      | 0.73                                | 0.72 | 0.56 |
| 8200.0              | 8170.1      | 8.54                                                    | 6.22 | 5.70 | 8200.0              | 8170.1      | 9.21                | 9.72  | 12.30 | 8200.0              | 8170.1      | 0.69                                | 0.66 | 0.51 |
| 8300.0              | 8270.1      | 8.32                                                    | 6.17 | 5.57 | 8300.0              | 8270.1      | 18.28               | 10.96 | 13.06 | 8300.0              | 8270.1      | 0.78                                | 0.64 | 0.46 |
| 8500.0              | 8470.1      | 7.91                                                    | 6.07 | 5.68 | 8500.0              | 8470.1      | 7.17                | 8.99  | 13.69 | 8500.0              | 8470.1      | 1.12                                | 0.76 | 0.42 |
| 8550.0              | 8520.1      | 7.71                                                    | 6.26 | 5.96 | 8550.0              | 8520.1      | 5.56                | 8.01  | 12.64 | 8550.0              | 8520.1      | 1.18                                | 0.83 | 0.48 |
| 8700.0              | 8670.1      | 8.52                                                    | 6.74 | 6.12 | 8700.0              | 8670.1      | 6.65                | 10.68 | 14.25 | 8700.0              | 8670.1      | 0.97                                | 0.83 | 0.75 |
| 8800.0              | 8770.1      | 8.66                                                    | 6.79 | 5.94 | 8800.0              | 8770.1      | 7.82                | 14.18 | 11.01 | 8800.0              | 8770.1      | 0.88                                | 0.97 | 0.97 |
| 8950.0              | 8920.1      | 8.93                                                    | 6.98 | 6.04 | 8950.0              | 8920.1      | 11.99               | 12.89 | 9.93  | 8950.0              | 8920.1      | 0.80                                | 1.11 | 1.26 |
| 9100.0              | 9070.1      | 8.62                                                    | 7.18 | 6.33 | 9100.0              | 9070.1      | 9.39                | 10.66 | 8.15  | 9100.0              | 9070.1      | 1.51                                | 1.46 | 1.70 |
| 9235.0              | 9205.1      | 8.85                                                    | 7.99 | 7.73 | 9235.0              | 9205.1      | 4.79                | 4.87  | 4.65  | 9235.0              | 9205.1      | 2.89                                | 2.09 | 1.33 |
| 9370.0              | 9340.1      | 10.21                                                   | 9.76 | 9.32 | 9370.0              | 9340.1      | 0.53                | 3.30  | 8.62  | 9370.0              | 9340.1      | 0.94                                | 1.04 | 0.85 |
| 9460.0              | 9430.1      | 12.20                                                   | 9.18 | 7.89 | 9460.0              | 9430.1      | 4.24                | 6.29  | 8.77  | 9460.0              | 9430.1      | 0.96                                | 1.23 | 0.96 |
| 9595.0              | 9565.1      | 9.79                                                    | 7.75 | 7.06 | 9595.0              | 9565.1      | 4.37                | 7.63  | 10.23 | 9595.0              | 9565.1      | 0.68                                | 0.93 | 0.70 |
| 9685.0              | 9655.1      | 9.68                                                    | 7.34 | 6.73 | 9685.0              | 9655.1      | 6.83                | 10.86 | 12.16 | 9685.0              | 9655.1      | 0.24                                | 0.63 | 0.54 |
| 9820.0              | 9790.1      | 9.67                                                    | 7.22 | 6.54 | 9820.0              | 9790.1      | 9.37                | 11.79 | 11.94 | 9820.0              | 9790.1      | 0.03                                | 0.51 | 0.50 |
| 9910.0              | 9880.1      | 9.33                                                    | 7.11 | 6.59 | 9910.0              | 9880.1      | 9.61                | 11.06 | 11.93 | 9910.0              | 9880.1      | 0.30                                | 0.49 | 0.48 |
| 10000.0             | 9970.1      | 9.29                                                    | 7.05 | 6.57 | 10000.0             | 9970.1      | 11.33               | 12.41 | 14.14 | 10000.0             | 9970.1      | 0.40                                | 0.47 | 0.47 |

# Frequency Mixer

MCA1T-85L+

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=5650MHz<br>(dB) |
|----------------------|-------------|----------------------------------------------------------------|
|                      |             | @LO (dBm)                                                      |
|                      |             | +4                                                             |
| 2500.0               | 3150.0      | 9.02                                                           |
| 2450.0               | 3200.0      | 9.04                                                           |
| 2400.0               | 3250.0      | 8.97                                                           |
| 2256.0               | 3394.0      | 9.19                                                           |
| 2118.0               | 3532.0      | 9.77                                                           |
| 2003.0               | 3647.0      | 10.27                                                          |
| 1888.0               | 3762.0      | 11.35                                                          |
| 1773.0               | 3877.0      | 11.36                                                          |
| 1624.0               | 4026.0      | 11.70                                                          |
| 1514.0               | 4136.0      | 10.68                                                          |
| 1404.0               | 4246.0      | 9.41                                                           |
| 1294.0               | 4356.0      | 8.72                                                           |
| 1120.0               | 4530.0      | 8.39                                                           |
| 970.0                | 4680.0      | 7.50                                                           |
| 820.0                | 4830.0      | 6.95                                                           |
| 670.0                | 4980.0      | 6.40                                                           |
| 520.0                | 5130.0      | 6.12                                                           |
| 370.0                | 5280.0      | 6.43                                                           |
| 220.0                | 5430.0      | 6.54                                                           |
| 70.0                 | 5580.0      | 6.67                                                           |
| 10.0                 | 5660.0      | 7.10                                                           |
| 60.0                 | 5710.0      | 6.58                                                           |
| 110.0                | 5760.0      | 6.52                                                           |
| 348.0                | 5998.0      | 6.79                                                           |
| 594.0                | 6244.0      | 8.19                                                           |
| 799.0                | 6449.0      | 8.33                                                           |
| 1004.0               | 6654.0      | 8.69                                                           |
| 1250.0               | 6900.0      | 9.47                                                           |
| 1363.0               | 7013.0      | 10.82                                                          |
| 1418.0               | 7068.0      | 11.59                                                          |
| 1473.0               | 7123.0      | 11.90                                                          |
| 1528.0               | 7178.0      | 12.32                                                          |
| 1686.0               | 7336.0      | 12.75                                                          |
| 1796.0               | 7446.0      | 12.09                                                          |
| 1906.0               | 7556.0      | 11.68                                                          |
| 2016.0               | 7666.0      | 10.92                                                          |
| 2126.0               | 7776.0      | 10.59                                                          |
| 2236.0               | 7886.0      | 10.50                                                          |
| 2346.0               | 7996.0      | 10.42                                                          |
| 2456.0               | 8106.0      | 10.26                                                          |

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=2800MHz<br>(dB) |
|----------------------|-------------|----------------------------------------------------------------|
|                      |             | @LO (dBm)                                                      |
|                      |             | +4                                                             |
| 10.1                 | 2810.1      | 6.98                                                           |
| 40.1                 | 2840.1      | 6.34                                                           |
| 60.1                 | 2860.1      | 6.37                                                           |
| 90.1                 | 2890.1      | 6.44                                                           |
| 110.1                | 2910.1      | 6.40                                                           |
| 190.1                | 2990.1      | 6.41                                                           |
| 200.1                | 3000.1      | 6.30                                                           |
| 215.1                | 3015.1      | 6.34                                                           |
| 230.1                | 3030.1      | 6.26                                                           |
| 240.1                | 3040.1      | 6.26                                                           |
| 255.1                | 3055.1      | 6.37                                                           |
| 265.1                | 3065.1      | 6.33                                                           |
| 280.1                | 3080.1      | 6.31                                                           |
| 290.1                | 3090.1      | 6.24                                                           |
| 305.1                | 3105.1      | 6.31                                                           |
| 370.0                | 3170.0      | 6.43                                                           |
| 502.0                | 3302.0      | 6.52                                                           |
| 634.0                | 3434.0      | 6.54                                                           |
| 722.0                | 3522.0      | 6.48                                                           |
| 854.0                | 3654.0      | 6.37                                                           |
| 942.0                | 3742.0      | 6.44                                                           |
| 1074.0               | 3874.0      | 6.90                                                           |
| 1162.0               | 3962.0      | 7.24                                                           |
| 1300.0               | 4100.0      | 7.62                                                           |
| 1387.0               | 4187.0      | 7.92                                                           |
| 1445.0               | 4245.0      | 8.11                                                           |
| 1532.0               | 4332.0      | 9.37                                                           |
| 1590.0               | 4390.0      | 9.27                                                           |
| 1677.0               | 4477.0      | 10.36                                                          |
| 1735.0               | 4535.0      | 10.47                                                          |
| 1822.0               | 4622.0      | 10.04                                                          |
| 1880.0               | 4680.0      | 10.66                                                          |
| 1967.0               | 4767.0      | 9.75                                                           |
| 2054.0               | 4854.0      | 9.58                                                           |
| 2112.0               | 4912.0      | 9.04                                                           |
| 2199.0               | 4999.0      | 9.22                                                           |
| 2257.0               | 5057.0      | 9.29                                                           |
| 2344.0               | 5144.0      | 9.59                                                           |
| 2402.0               | 5202.0      | 9.77                                                           |
| 2460.0               | 5260.0      | 10.24                                                          |

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=8500MHz<br>(dB) |
|----------------------|-------------|----------------------------------------------------------------|
|                      |             | @LO (dBm)                                                      |
|                      |             | +4                                                             |
| 2100.0               | 6400.0      | 9.60                                                           |
| 2070.0               | 6430.0      | 9.54                                                           |
| 2050.0               | 6450.0      | 10.22                                                          |
| 2020.0               | 6480.0      | 9.72                                                           |
| 2000.0               | 6500.0      | 10.25                                                          |
| 1968.0               | 6532.0      | 10.10                                                          |
| 1954.0               | 6546.0      | 10.39                                                          |
| 1933.0               | 6567.0      | 10.85                                                          |
| 1912.0               | 6588.0      | 10.17                                                          |
| 1898.0               | 6602.0      | 10.87                                                          |
| 1877.0               | 6623.0      | 11.30                                                          |
| 1863.0               | 6637.0      | 10.67                                                          |
| 1842.0               | 6658.0      | 11.42                                                          |
| 1828.0               | 6672.0      | 11.53                                                          |
| 1807.0               | 6693.0      | 10.68                                                          |
| 1770.0               | 6730.0      | 11.14                                                          |
| 1692.0               | 6808.0      | 11.30                                                          |
| 1614.0               | 6886.0      | 11.03                                                          |
| 1562.0               | 6938.0      | 10.74                                                          |
| 1484.0               | 7016.0      | 10.40                                                          |
| 1432.0               | 7068.0      | 10.17                                                          |
| 1354.0               | 7146.0      | 9.48                                                           |
| 1302.0               | 7198.0      | 9.13                                                           |
| 1210.0               | 7290.0      | 8.88                                                           |
| 1120.0               | 7380.0      | 7.94                                                           |
| 1060.0               | 7440.0      | 7.82                                                           |
| 970.0                | 7530.0      | 7.11                                                           |
| 910.0                | 7590.0      | 7.00                                                           |
| 820.0                | 7680.0      | 6.61                                                           |
| 760.0                | 7740.0      | 6.76                                                           |
| 670.0                | 7830.0      | 6.52                                                           |
| 610.0                | 7890.0      | 6.38                                                           |
| 520.0                | 7980.0      | 6.24                                                           |
| 430.0                | 8070.0      | 6.18                                                           |
| 370.0                | 8130.0      | 6.18                                                           |
| 280.0                | 8220.0      | 6.04                                                           |
| 220.0                | 8280.0      | 6.01                                                           |
| 130.0                | 8370.0      | 5.99                                                           |
| 70.0                 | 8430.0      | 5.94                                                           |
| 10.0                 | 8490.0      | 6.54                                                           |

# Frequency Mixer

MCA1T-85L+

## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +1                      | +4    | +7    | +1                      | +4    | +7    |
| 2560.0      | 36.79                   | 37.78 | 40.85 | 7.89                    | 8.04  | 7.77  |
| 2650.0      | 36.40                   | 35.95 | 36.60 | 9.14                    | 9.11  | 8.63  |
| 2710.0      | 35.85                   | 34.89 | 34.80 | 10.45                   | 10.19 | 9.45  |
| 2800.0      | 37.40                   | 35.68 | 34.22 | 12.18                   | 11.51 | 10.49 |
| 2896.0      | 38.19                   | 37.45 | 36.14 | 13.21                   | 12.26 | 11.17 |
| 3139.0      | 44.59                   | 40.95 | 37.96 | 14.07                   | 12.94 | 11.99 |
| 3301.0      | 52.86                   | 45.89 | 40.22 | 14.27                   | 13.57 | 12.85 |
| 3544.0      | 35.07                   | 36.84 | 36.07 | 13.17                   | 13.44 | 13.45 |
| 3787.0      | 28.58                   | 29.03 | 29.81 | 11.75                   | 12.74 | 13.54 |
| 3949.0      | 27.81                   | 29.58 | 31.15 | 10.23                   | 11.59 | 12.95 |
| 4192.0      | 21.67                   | 24.56 | 27.11 | 10.52                   | 12.11 | 13.83 |
| 4354.0      | 21.22                   | 24.01 | 26.76 | 12.28                   | 14.10 | 15.91 |
| 4597.0      | 23.90                   | 26.37 | 28.43 | 17.14                   | 18.64 | 19.82 |
| 4759.0      | 25.87                   | 29.07 | 33.10 | 20.37                   | 21.34 | 21.89 |
| 5002.0      | 28.17                   | 31.21 | 34.99 | 24.99                   | 24.59 | 23.89 |
| 5080.0      | 28.10                   | 29.80 | 32.24 | 26.51                   | 25.58 | 24.48 |
| 5230.0      | 31.51                   | 33.44 | 34.73 | 29.23                   | 27.47 | 25.89 |
| 5380.0      | 34.54                   | 37.70 | 40.21 | 31.77                   | 29.01 | 27.03 |
| 5480.0      | 34.84                   | 37.36 | 38.76 | 33.09                   | 29.93 | 27.86 |
| 5871.0      | 39.46                   | 41.30 | 44.15 | 38.61                   | 34.67 | 31.97 |
| 6345.0      | 43.62                   | 39.24 | 37.01 | 47.55                   | 41.03 | 37.74 |
| 7056.0      | 40.92                   | 37.74 | 34.57 | 38.86                   | 39.02 | 37.88 |
| 7530.0      | 35.33                   | 32.69 | 29.96 | 36.21                   | 35.99 | 33.11 |
| 8050.0      | 29.20                   | 28.47 | 26.66 | 21.73                   | 21.82 | 21.72 |
| 8200.0      | 26.82                   | 27.33 | 25.45 | 19.03                   | 21.89 | 22.46 |
| 8300.0      | 25.13                   | 26.30 | 24.64 | 19.96                   | 22.69 | 23.12 |
| 8500.0      | 23.38                   | 24.98 | 24.34 | 21.11                   | 23.26 | 23.89 |
| 8550.0      | 22.93                   | 24.71 | 24.59 | 21.41                   | 23.44 | 24.26 |
| 8700.0      | 20.82                   | 21.72 | 21.90 | 21.86                   | 23.77 | 24.71 |
| 8800.0      | 19.15                   | 19.81 | 20.10 | 21.78                   | 23.62 | 24.77 |
| 8950.0      | 18.31                   | 18.57 | 18.87 | 22.06                   | 23.67 | 25.03 |
| 9130.0      | 16.47                   | 16.64 | 16.67 | 21.56                   | 23.16 | 24.55 |
| 9265.0      | 14.96                   | 15.70 | 16.19 | 20.41                   | 22.09 | 23.54 |
| 9400.0      | 14.83                   | 17.32 | 19.15 | 19.33                   | 21.21 | 23.01 |
| 9490.0      | 16.38                   | 19.51 | 21.20 | 20.80                   | 22.25 | 24.05 |
| 9625.0      | 21.67                   | 23.36 | 24.04 | 29.15                   | 27.90 | 28.00 |
| 9715.0      | 24.20                   | 24.63 | 24.19 | 35.55                   | 32.44 | 31.17 |
| 9850.0      | 26.84                   | 25.86 | 24.46 | 46.00                   | 39.09 | 36.74 |
| 9940.0      | 27.65                   | 26.06 | 24.28 | 41.69                   | 40.74 | 39.44 |
| 10030.0     | 27.20                   | 25.64 | 23.81 | 39.84                   | 42.15 | 42.16 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +1                      | +4    | +7    |
| 2560.0              | 2530.1      | 38.93                   | 37.22 | 40.29 |
| 2650.0              | 2620.1      | 39.88                   | 37.33 | 34.68 |
| 2710.0              | 2680.1      | 35.74                   | 33.25 | 31.66 |
| 2800.0              | 2770.1      | 31.98                   | 29.02 | 27.23 |
| 2866.0              | 2836.1      | 30.06                   | 27.09 | 25.60 |
| 3109.0              | 3079.1      | 25.84                   | 23.95 | 22.31 |
| 3271.0              | 3241.1      | 21.97                   | 20.88 | 19.87 |
| 3514.0              | 3484.1      | 17.40                   | 16.50 | 15.78 |
| 3757.0              | 3727.1      | 14.69                   | 13.91 | 13.31 |
| 3919.0              | 3889.1      | 12.77                   | 12.42 | 12.18 |
| 4162.0              | 4132.1      | 9.65                    | 9.88  | 9.86  |
| 4324.0              | 4294.1      | 8.57                    | 9.01  | 9.21  |
| 4567.0              | 4537.1      | 10.10                   | 10.58 | 10.87 |
| 4729.0              | 4699.1      | 10.97                   | 11.48 | 11.80 |
| 4972.0              | 4942.1      | 12.78                   | 13.15 | 13.38 |
| 5077.0              | 5047.1      | 13.62                   | 14.12 | 14.43 |
| 5218.0              | 5188.1      | 14.83                   | 15.35 | 15.87 |
| 5359.0              | 5329.1      | 16.51                   | 17.00 | 17.44 |
| 5453.0              | 5423.1      | 17.56                   | 18.05 | 18.41 |
| 5871.0              | 5841.1      | 21.58                   | 21.70 | 21.73 |
| 6345.0              | 6315.1      | 29.60                   | 29.43 | 29.19 |
| 7056.0              | 7026.1      | 26.26                   | 25.94 | 25.44 |
| 7530.0              | 7500.1      | 21.68                   | 23.02 | 24.47 |
| 8050.0              | 8020.1      | 20.62                   | 23.05 | 24.03 |
| 8200.0              | 8170.1      | 20.93                   | 22.32 | 23.13 |
| 8300.0              | 8270.1      | 20.62                   | 21.83 | 22.80 |
| 8500.0              | 8470.1      | 19.82                   | 21.52 | 22.80 |
| 8550.0              | 8520.1      | 19.90                   | 21.43 | 22.52 |
| 8700.0              | 8670.1      | 19.19                   | 20.31 | 21.40 |
| 8800.0              | 8770.1      | 19.04                   | 20.09 | 21.13 |
| 8950.0              | 8920.1      | 19.38                   | 20.25 | 21.16 |
| 9030.0              | 9000.1      | 20.29                   | 20.98 | 21.68 |
| 9175.5              | 9145.6      | 20.74                   | 21.42 | 21.85 |
| 9321.0              | 9291.1      | 23.09                   | 24.02 | 24.92 |
| 9418.0              | 9388.1      | 25.47                   | 26.05 | 26.49 |
| 9563.5              | 9533.6      | 30.02                   | 27.81 | 27.22 |
| 9660.5              | 9630.6      | 30.44                   | 28.47 | 27.11 |
| 9806.0              | 9776.1      | 29.15                   | 27.34 | 26.46 |
| 9903.0              | 9873.1      | 29.72                   | 27.58 | 26.52 |
| 10000.0             | 9970.1      | 29.34                   | 27.26 | 26.15 |



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# Frequency Mixer

MCA1T-85L+

## 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=8500MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|------|------|----------------------|--------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |      |      |                      | @LO (dBm)                      |      |      |
|                     |             | +1              | +4   | +7   |             | +1              | +4   | +7   |                      | +1                             | +4   | +7   |
| 2530.0              | 2560.0      | 4.34            | 3.72 | 3.32 | 2560.0      | 2.62            | 2.47 | 2.71 | 10.0                 | 1.88                           | 1.23 | 1.05 |
| 2620.0              | 2650.0      | 4.05            | 3.44 | 3.06 | 2620.0      | 2.57            | 2.51 | 2.81 | 46.0                 | 1.68                           | 1.13 | 1.11 |
| 2680.0              | 2710.0      | 3.71            | 3.19 | 2.88 | 2680.0      | 2.48            | 2.45 | 2.78 | 70.0                 | 1.76                           | 1.19 | 1.12 |
| 2800.0              | 2830.0      | 3.53            | 2.95 | 2.60 | 2800.0      | 2.17            | 2.36 | 2.82 | 106.0                | 1.79                           | 1.19 | 1.11 |
| 2866.0              | 2896.0      | 3.32            | 2.82 | 2.45 | 2830.0      | 2.11            | 2.35 | 2.86 | 130.0                | 1.79                           | 1.24 | 1.19 |
| 3109.0              | 3139.0      | 2.93            | 2.55 | 2.25 | 4120.2      | 1.82            | 1.97 | 2.47 | 198.0                | 1.81                           | 1.24 | 1.19 |
| 3271.0              | 3301.0      | 2.55            | 2.20 | 1.94 | 4280.5      | 2.03            | 2.08 | 2.50 | 224.0                | 1.85                           | 1.32 | 1.27 |
| 3514.0              | 3544.0      | 1.94            | 1.60 | 1.40 | 4440.8      | 2.25            | 2.20 | 2.53 | 263.0                | 1.88                           | 1.35 | 1.32 |
| 3757.0              | 3787.0      | 1.96            | 1.66 | 1.46 | 4681.3      | 2.65            | 2.34 | 2.53 | 302.0                | 1.95                           | 1.35 | 1.25 |
| 3919.0              | 3949.0      | 1.85            | 1.64 | 1.54 | 4841.7      | 2.81            | 2.37 | 2.48 | 328.0                | 1.96                           | 1.43 | 1.37 |
| 4162.0              | 4192.0      | 2.25            | 2.06 | 1.91 | 5002.0      | 2.97            | 2.36 | 2.38 | 367.0                | 1.97                           | 1.42 | 1.38 |
| 4324.0              | 4354.0      | 1.91            | 1.81 | 1.73 | 5080.0      | 3.14            | 2.43 | 2.37 | 393.0                | 2.04                           | 1.41 | 1.31 |
| 4567.0              | 4597.0      | 1.96            | 1.76 | 1.62 | 5180.0      | 3.25            | 2.51 | 2.40 | 432.0                | 2.09                           | 1.49 | 1.40 |
| 4729.0              | 4759.0      | 2.60            | 2.37 | 2.24 | 5330.0      | 3.21            | 2.51 | 2.42 | 458.0                | 2.10                           | 1.52 | 1.44 |
| 4972.0              | 5002.0      | 2.67            | 2.37 | 2.22 | 5430.0      | 3.25            | 2.49 | 2.38 | 497.0                | 2.25                           | 1.56 | 1.40 |
| 5050.0              | 5080.0      | 2.67            | 2.31 | 2.15 | 5530.0      | 3.28            | 2.44 | 2.31 | 516.0                | 2.23                           | 1.59 | 1.46 |
| 5200.0              | 5230.0      | 2.84            | 2.42 | 2.14 | 5871.0      | 3.91            | 2.55 | 2.18 | 624.0                | 2.42                           | 1.72 | 1.54 |
| 5350.0              | 5380.0      | 2.80            | 2.39 | 2.12 | 6345.0      | 4.55            | 2.87 | 2.37 | 732.0                | 2.61                           | 1.85 | 1.62 |
| 5450.0              | 5480.0      | 2.67            | 2.24 | 1.98 | 7056.0      | 6.04            | 3.70 | 2.74 | 804.0                | 2.62                           | 1.85 | 1.59 |
| 5837.0              | 5867.0      | 3.14            | 2.59 | 2.31 | 7530.0      | 6.30            | 3.80 | 2.61 | 912.0                | 2.78                           | 2.00 | 1.72 |
| 6311.0              | 6341.0      | 3.56            | 2.90 | 2.54 | 8004.0      | 5.75            | 3.57 | 2.40 | 984.0                | 3.12                           | 2.17 | 1.79 |
| 7022.0              | 7052.0      | 3.13            | 2.45 | 2.05 | 8100.0      | 5.87            | 3.66 | 2.43 | 1092.0               | 3.21                           | 2.37 | 2.01 |
| 7496.0              | 7526.0      | 3.01            | 2.26 | 1.89 | 8250.0      | 5.63            | 3.63 | 2.30 | 1200.0               | 3.08                           | 2.41 | 2.11 |
| 8000.0              | 8030.0      | 2.78            | 1.99 | 1.63 | 8350.0      | 5.61            | 3.58 | 2.27 | 1300.0               | 3.01                           | 2.42 | 2.15 |
| 8150.0              | 8180.0      | 2.72            | 1.89 | 1.56 | 8500.0      | 5.19            | 3.19 | 2.05 | 1480.0               | 2.16                           | 2.04 | 2.00 |
| 8250.0              | 8280.0      | 2.62            | 1.78 | 1.47 | 8550.0      | 5.12            | 3.22 | 2.06 | 1600.0               | 2.21                           | 1.91 | 1.80 |
| 8400.0              | 8430.0      | 2.21            | 1.49 | 1.18 | 8650.0      | 4.74            | 2.91 | 1.97 | 1780.0               | 2.02                           | 1.94 | 1.92 |
| 8500.0              | 8530.0      | 2.05            | 1.46 | 1.22 | 8800.0      | 3.75            | 2.39 | 1.68 | 1900.0               | 1.49                           | 1.60 | 1.73 |
| 8650.0              | 8680.0      | 2.33            | 1.85 | 1.62 | 8900.0      | 3.18            | 2.15 | 1.47 | 2080.0               | 1.40                           | 1.41 | 1.54 |
| 8750.0              | 8780.0      | 2.27            | 1.80 | 1.58 | 9000.0      | 2.68            | 1.90 | 1.42 | 2200.0               | 1.24                           | 1.51 | 1.74 |
| 8900.0              | 8930.0      | 2.27            | 1.84 | 1.55 | 9175.0      | 2.06            | 1.63 | 1.51 | 2380.0               | 1.26                           | 1.83 | 2.19 |
| 9000.0              | 9030.0      | 2.29            | 1.92 | 1.62 | 9265.0      | 1.87            | 1.77 | 1.97 | 2500.0               | 1.26                           | 1.85 | 2.23 |
| 9150.0              | 9180.0      | 2.28            | 2.07 | 1.82 | 9400.0      | 2.41            | 2.46 | 2.19 | 2592.0               | 1.31                           | 1.90 | 2.30 |
| 9300.0              | 9330.0      | 2.11            | 1.86 | 1.84 | 9490.0      | 2.92            | 2.69 | 2.25 | 2664.0               | 1.39                           | 1.90 | 2.28 |
| 9400.0              | 9430.0      | 2.02            | 1.79 | 1.89 | 9580.0      | 3.58            | 2.84 | 2.16 | 2712.0               | 1.42                           | 1.84 | 2.21 |
| 9550.0              | 9580.0      | 2.46            | 2.08 | 2.00 | 9670.0      | 3.76            | 3.13 | 2.15 | 2784.0               | 1.58                           | 1.86 | 2.17 |
| 9650.0              | 9680.0      | 2.74            | 2.23 | 2.11 | 9760.0      | 4.55            | 3.14 | 2.10 | 2832.0               | 1.78                           | 1.92 | 2.15 |
| 9800.0              | 9830.0      | 3.18            | 2.45 | 2.27 | 9895.0      | 4.91            | 3.21 | 2.08 | 2904.0               | 2.04                           | 2.11 | 2.28 |
| 9900.0              | 9930.0      | 3.25            | 2.51 | 2.31 | 9985.0      | 4.98            | 3.16 | 2.08 | 2952.0               | 2.22                           | 2.29 | 2.42 |
| 10000.0             | 10030.0     | 3.35            | 2.60 | 2.40 | 10030.0     | 5.42            | 3.31 | 2.11 | 3000.0               | 2.44                           | 2.48 | 2.59 |



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## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |       |       |       |       |       |       |       |       |       |       |
|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0      | --     | --     | 12.63 | 28.31 | 17.81 | 49.37 | --    | --    | --    | --    | --    | --    |
| 1      | --     | 15.07  | --    | 49.20 | 29.19 | 45.58 | 58.76 | --    | --    | --    | --    | --    |
| 2      | 116.84 | 56.39  | 57.79 | 46.15 | 57.72 | 51.52 | 49.54 | 64.93 | --    | --    | --    | --    |
| 3      | 116.22 | 66.18  | 59.00 | 75.67 | 50.19 | 67.89 | 67.47 | 68.18 | 74.23 | --    | --    | --    |
| 4      | 113.80 | 89.60  | 77.00 | 81.87 | 90.25 | 69.55 | 84.36 | 72.91 | 73.31 | 81.72 | --    | --    |
| 5      | 112.83 | --     | 86.84 | 88.92 | 88.28 | 92.76 | 76.57 | 91.18 | 87.01 | 87.54 | 89.98 | --    |
| 6      | 112.60 | --     | --    | 88.75 | 90.07 | 95.06 | 94.59 | 87.75 | 94.58 | 92.92 | 89.33 | 86.03 |
| 7      | 112.69 | --     | --    | --    | 88.39 | 89.90 | 92.65 | 94.68 | 93.07 | 96.38 | 92.22 | 90.56 |
| 8      | 114.01 | --     | --    | --    | --    | 87.31 | 91.48 | 93.66 | 95.55 | 92.96 | 96.19 | 95.42 |
| 9      | 112.93 | --     | --    | --    | --    | --    | 88.36 | 90.60 | 95.78 | 93.69 | 96.04 | 92.86 |
| 10     | 112.09 | --     | --    | --    | --    | --    | --    | 86.71 | 89.30 | 95.23 | 95.45 | 96.49 |
| RF CAL | 0      | 1      | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    |       |

## LO HARMONICS ORDER

Test conditions: RF IN: 5650 MHz; -10 dBm.  
 LO IN: 5680 MHz; +4 dBm  
 IF OUT: 30 MHz; -16.19 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |       |       |       |       |       |       |       |       |       |       |
|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0      | --     | --     | 21.76 | 38.45 | 31.64 | 57.81 | --    | --    | --    | --    | --    | --    |
| 1      | --     | 14.93  | --    | 49.10 | 29.87 | 59.75 | 65.06 | --    | --    | --    | --    | --    |
| 2      | 96.74  | 44.12  | 53.49 | 36.16 | 58.70 | 49.99 | 51.63 | 71.48 | --    | --    | --    | --    |
| 3      | 110.76 | 41.41  | 39.52 | 52.46 | 34.47 | 54.72 | 48.16 | 62.19 | 70.51 | --    | --    | --    |
| 4      | 110.06 | 66.30  | 60.53 | 60.84 | 63.09 | 41.71 | 68.86 | 57.28 | 63.89 | 81.51 | --    | --    |
| 5      | 107.32 | --     | 70.94 | 61.37 | 64.81 | 87.50 | 51.25 | 65.44 | 59.36 | 67.11 | 79.01 | --    |
| 6      | 107.95 | --     | --    | 77.86 | 67.47 | 67.65 | 70.73 | 49.84 | 77.69 | 65.19 | 71.70 | 88.14 |
| 7      | 107.28 | --     | --    | --    | 76.41 | 71.39 | 63.51 | 79.77 | 52.67 | 80.90 | 65.80 | 75.23 |
| 8      | 107.75 | --     | --    | --    | --    | 86.60 | 76.26 | 76.49 | 78.25 | 58.99 | 89.53 | 75.61 |
| 9      | 110.21 | --     | --    | --    | --    | --    | 86.74 | 80.65 | 70.10 | 84.22 | 59.58 | 99.66 |
| 10     | 109.22 | --     | --    | --    | --    | --    | --    | 89.56 | 82.14 | 81.78 | 84.24 | 76.22 |
| RF CAL | 0      | 1      | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    |       |

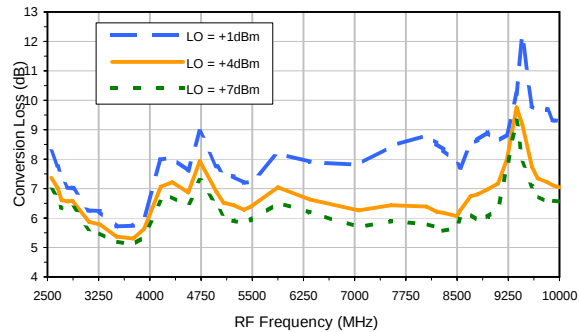
## LO HARMONICS ORDER

Test conditions: RF IN: 5650 MHz; 0 dBm.  
 LO IN: 5680 MHz; +4 dBm  
 IF OUT: 30 MHz; -6.71 dBm

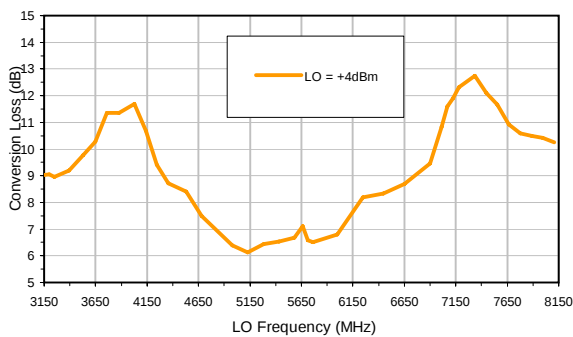
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT  
 2. + entry denotes harmonics are in (dBc) above IF OUTPUT  
 3. RF Cal represents the Harmonics level of the RF Input Signal to the mixer

## Typical Performance Curves

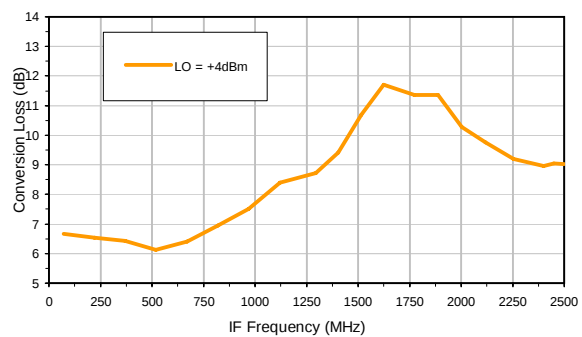
Conversion Loss @IF=29.9 MHz



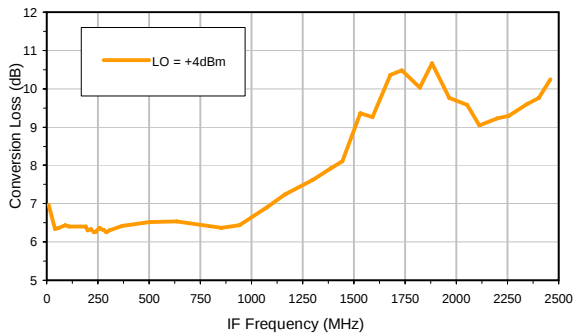
Conversion Loss vs. LO @ RF=5650 MHz



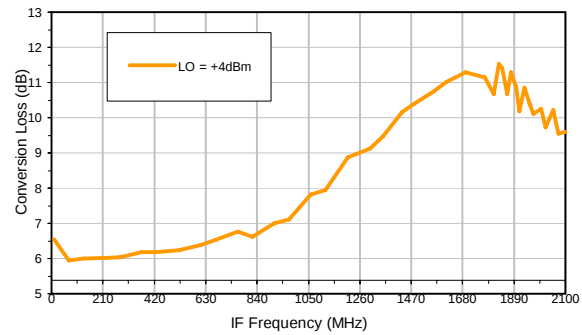
Conversion Loss vs. IF @ RF=5650 MHz



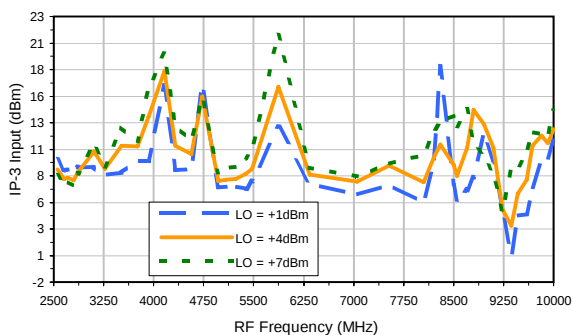
Conversion Loss vs. IF @ RF=2800 MHz



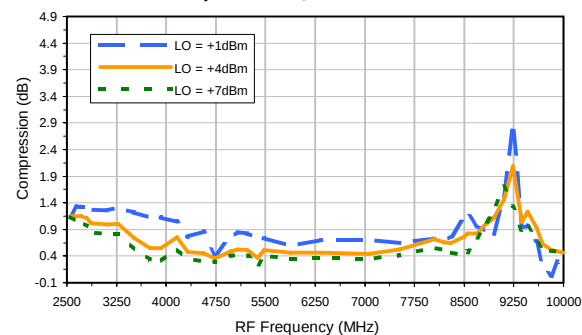
Conversion Loss vs. IF @ RF=8500 MHz



IP-3 Input

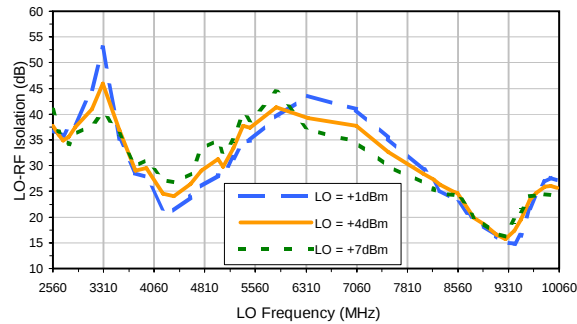


Compression @RF IN= 0 dBm

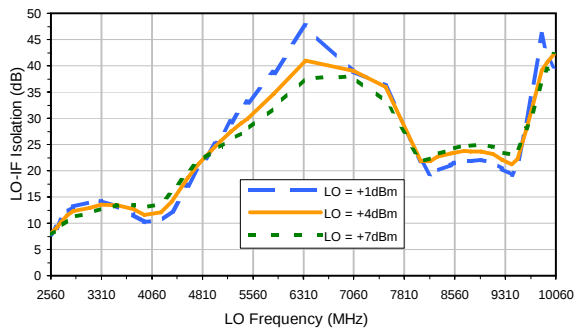


## Typical Performance Curves

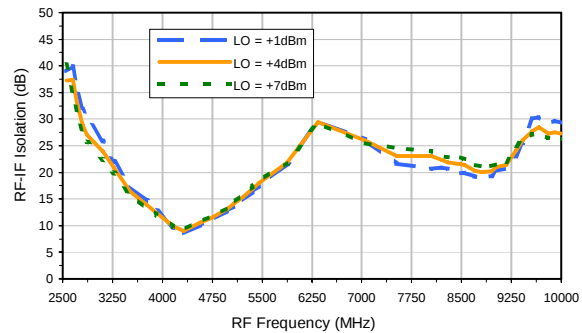
LO-RF Isolation



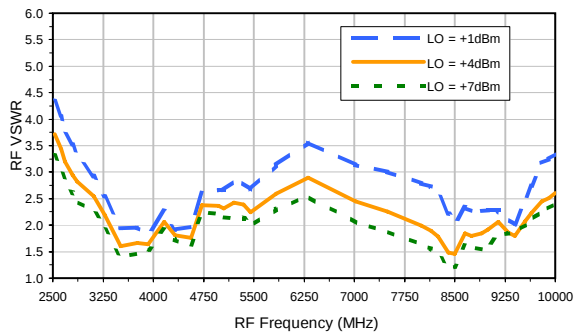
LO-IF Isolation



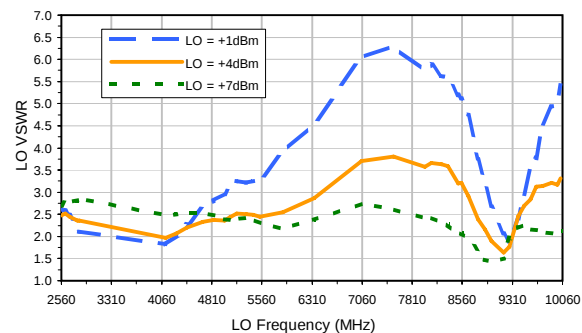
RF-IF Isolation



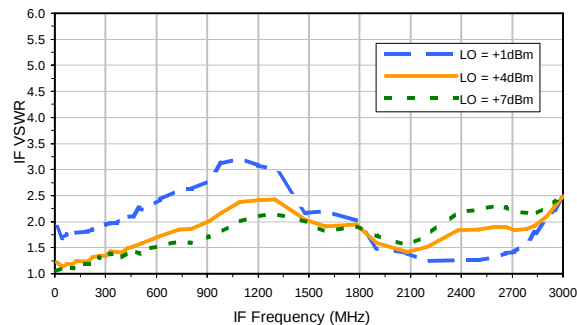
RF VSWR



LO VSWR



IF VSWR



## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |       |       |       |       |       |       |       |       |       |       |
|----|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0  | --     | --     | 12.63 | 28.31 | 17.81 | 49.37 | --    | --    | --    | --    | --    | --    |
| 1  | --     | 15.07  | --    | 49.20 | 29.19 | 45.58 | 58.76 | --    | --    | --    | --    | --    |
| 2  | 116.84 | 56.39  | 57.79 | 46.15 | 57.72 | 51.52 | 49.54 | 64.93 | --    | --    | --    | --    |
| 3  | 116.22 | 66.18  | 59.00 | 75.67 | 50.19 | 67.89 | 67.47 | 68.18 | 74.23 | --    | --    | --    |
| 4  | 113.80 | 89.60  | 77.00 | 81.87 | 90.25 | 69.55 | 84.36 | 72.91 | 73.31 | 81.72 | --    | --    |
| 5  | 112.83 | --     | 86.84 | 88.92 | 88.28 | 92.76 | 76.57 | 91.18 | 87.01 | 87.54 | 89.98 | --    |
| 6  | 112.60 | --     | --    | 88.75 | 90.07 | 95.06 | 94.59 | 87.75 | 94.58 | 92.92 | 89.33 | 86.03 |
| 7  | 112.69 | --     | --    | --    | 88.39 | 89.90 | 92.65 | 94.68 | 93.07 | 96.38 | 92.22 | 90.56 |
| 8  | 114.01 | --     | --    | --    | --    | 87.31 | 91.48 | 93.66 | 95.55 | 92.96 | 96.19 | 95.42 |
| 9  | 112.93 | --     | --    | --    | --    | --    | 88.36 | 90.60 | 95.78 | 93.69 | 96.04 | 92.86 |
| 10 | 112.09 | --     | --    | --    | --    | --    | --    | 86.71 | 89.30 | 95.23 | 95.45 | 96.49 |
|    | RF CAL | 0      | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    |

## LO HARMONICS ORDER

Test conditions: RF IN: 5650 MHz; -10 dBm.  
 LO IN: 5680 MHz; +4 dBm  
 IF OUT: 30 MHz; -16.19 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |       |       |       |       |       |       |       |       |       |       |
|----|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0  | --     | --     | 21.76 | 38.45 | 31.64 | 57.81 | --    | --    | --    | --    | --    | --    |
| 1  | --     | 14.93  | --    | 49.10 | 29.87 | 59.75 | 65.06 | --    | --    | --    | --    | --    |
| 2  | 96.74  | 44.12  | 53.49 | 36.16 | 58.70 | 49.99 | 51.63 | 71.48 | --    | --    | --    | --    |
| 3  | 110.76 | 41.41  | 39.52 | 52.46 | 34.47 | 54.72 | 48.16 | 62.19 | 70.51 | --    | --    | --    |
| 4  | 110.06 | 66.30  | 60.53 | 60.84 | 63.09 | 41.71 | 68.86 | 57.28 | 63.89 | 81.51 | --    | --    |
| 5  | 107.32 | --     | 70.94 | 61.37 | 64.81 | 87.50 | 51.25 | 65.44 | 59.36 | 67.11 | 79.01 | --    |
| 6  | 107.95 | --     | --    | 77.86 | 67.47 | 67.65 | 70.73 | 49.84 | 77.69 | 65.19 | 71.70 | 88.14 |
| 7  | 107.28 | --     | --    | --    | 76.41 | 71.39 | 63.51 | 79.77 | 52.67 | 80.90 | 65.80 | 75.23 |
| 8  | 107.75 | --     | --    | --    | --    | 86.60 | 76.26 | 76.49 | 78.25 | 58.99 | 89.53 | 75.61 |
| 9  | 110.21 | --     | --    | --    | --    | --    | 86.74 | 80.65 | 70.10 | 84.22 | 59.58 | 99.66 |
| 10 | 109.22 | --     | --    | --    | --    | --    | --    | 89.56 | 82.14 | 81.78 | 84.24 | 76.22 |
|    | RF CAL | 0      | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    |

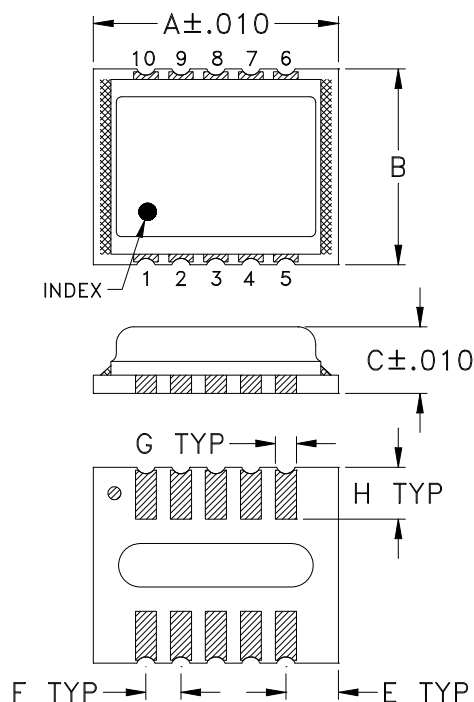
## LO HARMONICS ORDER

Test conditions: RF IN: 5650 MHz; 0 dBm.  
 LO IN: 5680 MHz; +4 dBm  
 IF OUT: 30 MHz; -6.71 dBm

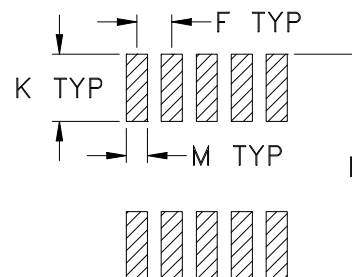
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT  
 2. + entry denotes harmonics are in (dBc) above IF OUTPUT  
 3. RF Cal represents the Harmonics level of the RF Input Signal to the mixer

**DZ885-2**

## 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 |
|---------|----------------|----------------|----------------|----------|----------------|----------------|----------------|----------------|----------|----------------|----------------|----------------|--------------|
| DZ885-2 | .350<br>(8.89) | .280<br>(7.11) | .095<br>(2.41) | --<br>-- | .075<br>(1.91) | .050<br>(1.27) | .030<br>(0.76) | .074<br>(1.88) | --<br>-- | .096<br>(2.44) | .321<br>(8.15) | .030<br>(0.76) | 0.21         |

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

### Notes:

- Case material: Plastic encapsulation on Ceramic base, mounted on PCB carrier board.
- Termination finish:  
For RoHS Case Styles: 3-5  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate.  
All models, (+) suffix.



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Mini-Circuits ISO 9001 & ISO 14001 Certified

# Tape & Reel Packaging TR-F34



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

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

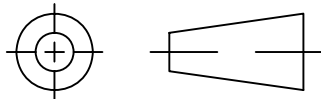
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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



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Mini-Circuits ISO 9001 & ISO 14001 Certified

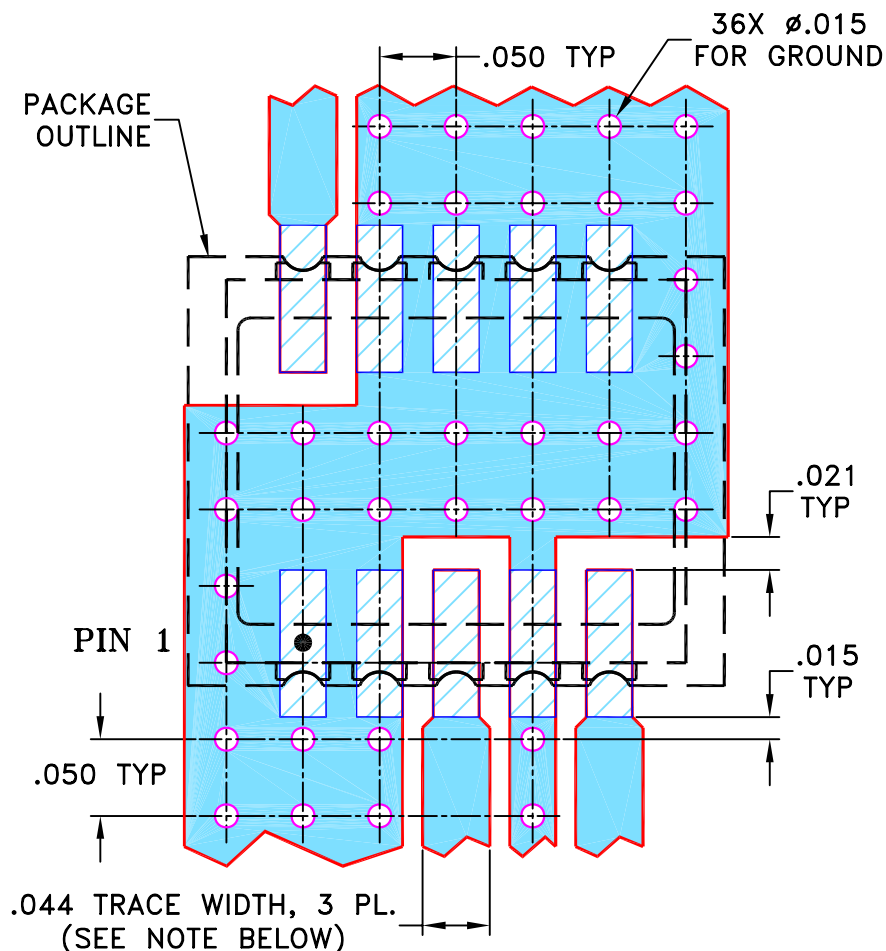
## THIRD ANGLE PROJECTION



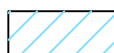
## REVISIONS

| REV | ECN No. | DESCRIPTION | DATE     | DR | AUTH |
|-----|---------|-------------|----------|----|------|
| OR  | M119455 | NEW RELEASE | 09/08/08 | AV | DJ   |
|     |         |             |          |    |      |
|     |         |             |          |    |      |

**SUGGESTED MOUNTING CONFIGURATION FOR  
DZ885-2/DZ1383-2 CASE STYLES  
"10MX01" PIN CODE**



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B 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

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

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

## INITIALS

## DATE

DRAWN

AV

09/05/08

CHECKED

MMG

09/08/08

APPROVED

DJ

09/08/08



Mini-Circuits®

13 Neptune Avenue  
Brooklyn NY 11235

PL, 10MX01, DZ885-2/DZ1383-2, TB-493

SIZE  
ACODE IDENT  
15542DRAWING NO:  
98-PL-288REV:  
OR

FILE: 98PL288

SCALE: 8:1

SHEET: 1 OF 1

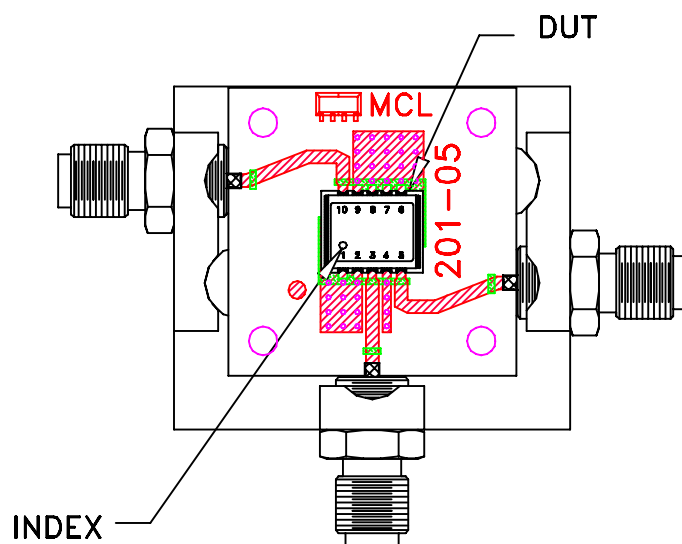
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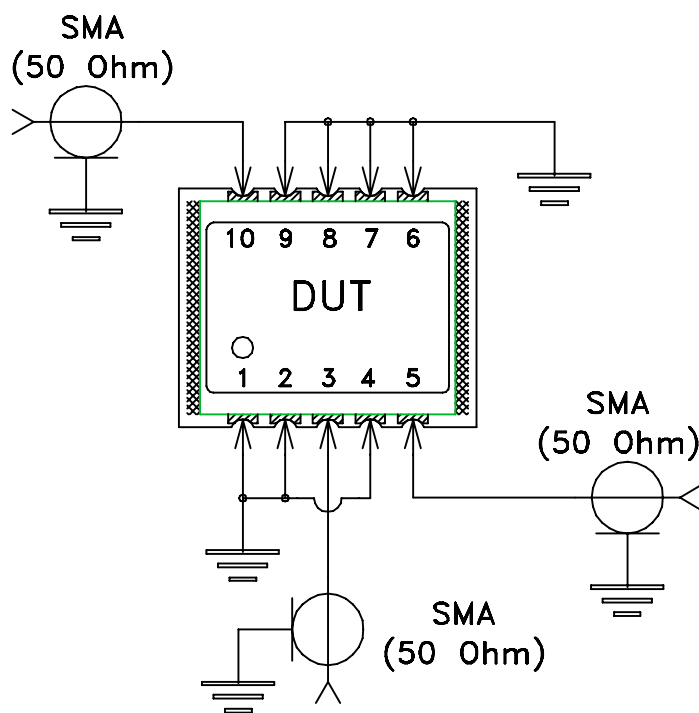
ASHEETA1.DWG REV:A DATE:01/12/95

# Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-493+



Schematic Diagram

## Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: 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          | -40° to 85° C<br>Case Temperature                                                                                                                               | Individual Model Data Sheet                           |
| Storage Temperature            | -40° to 85° 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                               |