

Ceramic

# NON-CATALOG

## Frequency Mixer WIDE BAND

MCA1T-60+

Level 7 (LO Power+7 dBm) 1600 to 6000 MHz

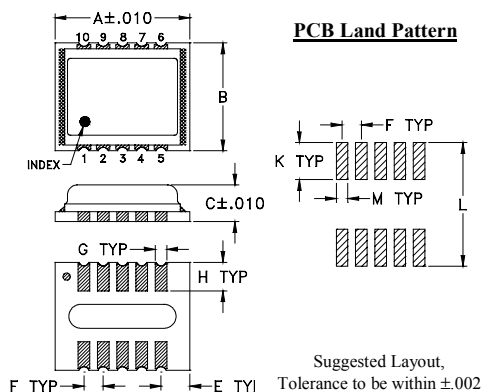
### Maximum Ratings

|                                                                 |               |
|-----------------------------------------------------------------|---------------|
| 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 |

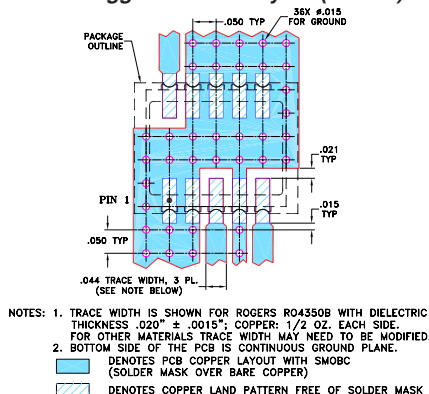
### Outline Drawing



### Outline Dimensions (inch/mm)

| 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-Circuit's applicable established test performance criteria and measurement instructions.
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### Features

- wide bandwidth, 1600 to 6000 MHz
- useable to 8000 MHz
- IF, DC to 2000 MHz
- LTCC double balanced mixer
- aqueous washable
- low cost
- low profile, 0.095"
- protected by US Patent 7,027,795 & 8,749,989

### Applications

- PCN
- defense & weather radar
- WCDMA
- defense communications

### 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.                     |
| 1600-4400                               | DC-2000 | 6.3                  | 0.2      | 8.3* | 32                   | 20   | 17                   | —    | 9                        |
| 4400-6000                               | DC-2000 | 6.2                  | 0.3      | 8.5* | 23                   | 17   | 18                   | —    | 8                        |

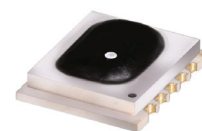
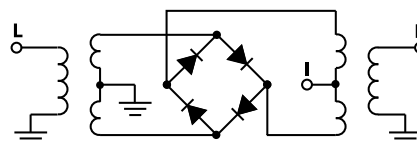
1 dB COMPR. +1 dBm typ.

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

### Typical Performance Data

| Frequency (MHz) |         | Conversion Loss (dB) | Isolation L-R (dB) | Isolation L-I (dB) | VSWR RF Port (:1) | VSWR LO Port (:1) |
|-----------------|---------|----------------------|--------------------|--------------------|-------------------|-------------------|
| RF              | LO      | LO +7dBm             | LO +7dBm           | LO +7dBm           | LO +7dBm          | LO +7dBm          |
| 1600.00         | 1630.00 | 5.85                 | 33.44              | 18.92              | 3.21              | 2.77              |
| 1800.00         | 1830.00 | 5.57                 | 43.23              | 20.13              | 2.72              | 3.06              |
| 2000.00         | 2030.00 | 5.67                 | 35.50              | 19.59              | 1.52              | 3.18              |
| 2300.00         | 2330.00 | 5.57                 | 30.85              | 17.13              | 2.55              | 2.32              |
| 2500.00         | 2530.00 | 5.67                 | 31.53              | 16.64              | 3.70              | 1.12              |
| 3000.00         | 3030.00 | 6.65                 | 33.86              | 17.37              | 6.40              | 4.50              |
| 3300.00         | 3330.00 | 6.51                 | 33.27              | 17.79              | 2.35              | 4.42              |
| 3500.00         | 3530.00 | 6.26                 | 32.26              | 16.02              | 2.17              | 2.74              |
| 3800.00         | 3830.00 | 5.85                 | 33.61              | 14.80              | 2.21              | 4.29              |
| 4000.00         | 4030.00 | 6.13                 | 34.90              | 16.01              | 2.03              | 3.49              |
| 4300.00         | 4330.00 | 6.05                 | 33.36              | 17.95              | 1.97              | 3.60              |
| 4500.00         | 4530.00 | 5.95                 | 29.83              | 18.64              | 2.31              | 2.60              |
| 4700.00         | 4730.00 | 6.02                 | 28.69              | 19.14              | 1.78              | 2.51              |
| 4900.00         | 4930.00 | 6.11                 | 25.78              | 19.89              | 1.91              | 2.02              |
| 5000.00         | 5030.00 | 5.99                 | 24.51              | 20.40              | 1.50              | 1.54              |
| 5200.00         | 5230.00 | 5.88                 | 23.40              | 21.37              | 1.53              | 1.71              |
| 5300.00         | 5330.00 | 6.06                 | 22.68              | 21.68              | 2.25              | 2.45              |
| 5500.00         | 5530.00 | 6.00                 | 22.63              | 19.20              | 3.70              | 3.96              |
| 5700.00         | 5730.00 | 6.14                 | 23.13              | 15.10              | 5.34              | 6.43              |
| 6000.00         | 6030.00 | 6.61                 | 24.37              | 13.33              | 1.73              | 2.81              |

### Electrical Schematic



CASE STYLE: DZ885-2

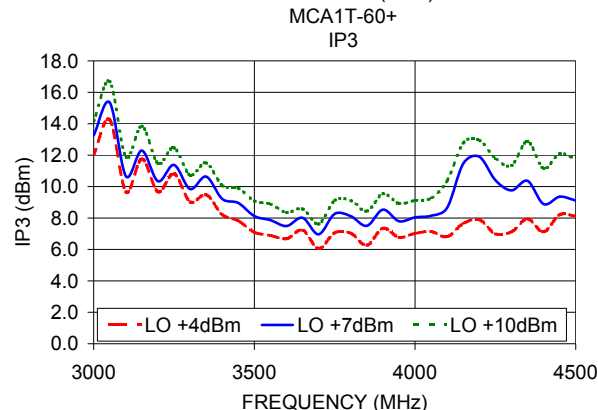
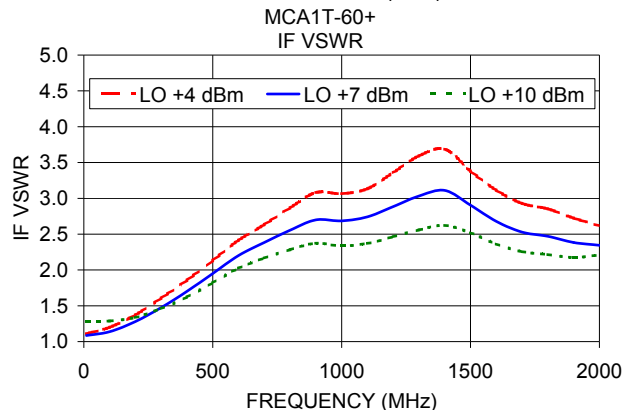
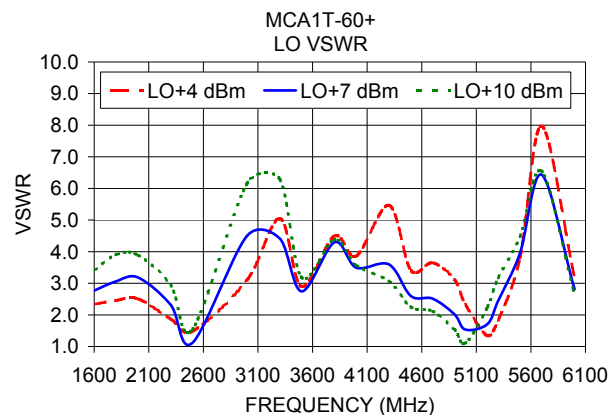
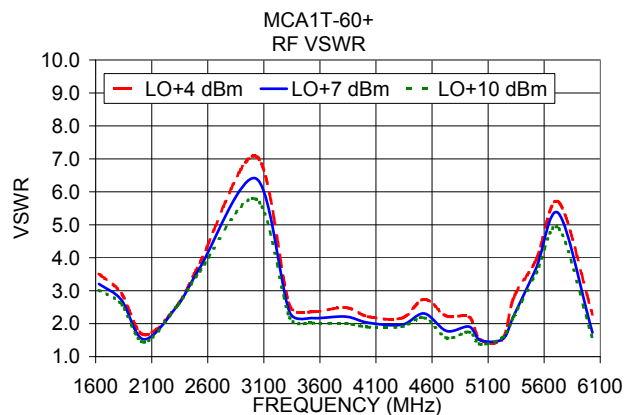
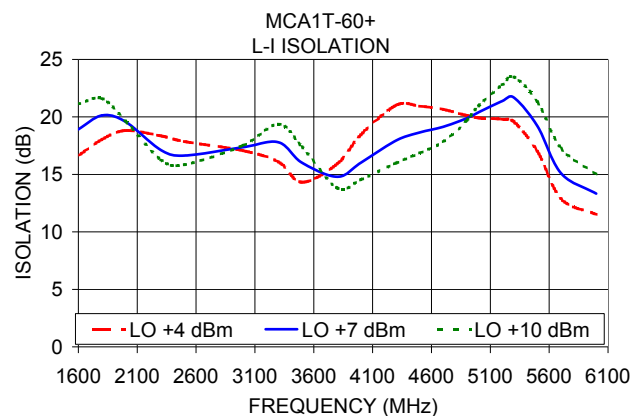
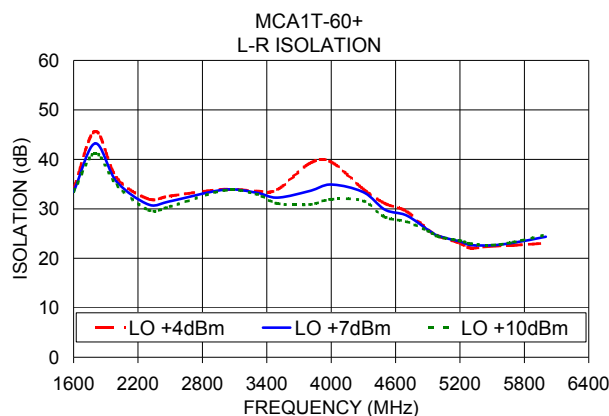
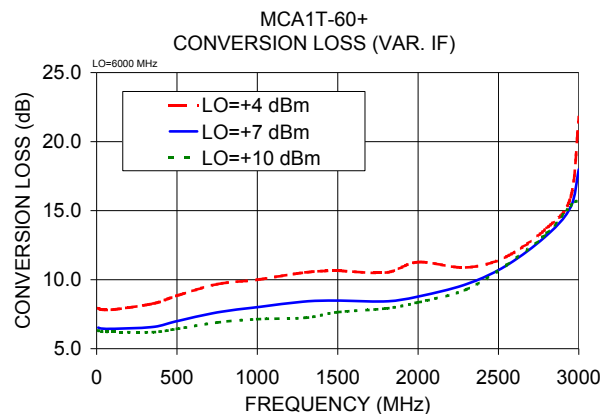
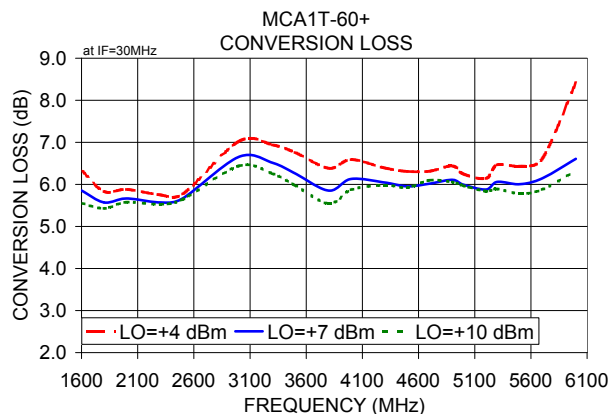
### +RoHS Compliant

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



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REV. B  
M151777  
MCA1T-60+  
DJ/RS/CP/AM  
160816



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# Frequency Mixer

# MCA1T-60+

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=30MHz<br>(dB) |       |      |
|---------------------|-------------|-------------------------------------------------------|-------|------|
|                     |             | @LO (dBm)                                             |       |      |
|                     |             | +4                                                    | +7    | +10  |
| 1500.1              | 1530.1      | 7.98                                                  | 6.89  | 6.68 |
| 1680.1              | 1710.1      | 6.39                                                  | 5.98  | 5.73 |
| 1860.1              | 1890.1      | 5.80                                                  | 5.56  | 5.42 |
| 2040.1              | 2070.1      | 5.73                                                  | 5.50  | 5.39 |
| 2220.1              | 2250.1      | 5.53                                                  | 5.35  | 5.32 |
| 2400.1              | 2430.1      | 5.52                                                  | 5.37  | 5.33 |
| 2580.1              | 2610.1      | 5.54                                                  | 5.46  | 5.46 |
| 2760.1              | 2790.1      | 5.78                                                  | 5.58  | 5.48 |
| 2940.1              | 2970.1      | 6.71                                                  | 6.34  | 6.13 |
| 3120.1              | 3150.1      | 7.25                                                  | 6.86  | 6.64 |
| 3300.1              | 3330.1      | 7.70                                                  | 7.25  | 6.98 |
| 3480.1              | 3510.1      | 7.98                                                  | 7.44  | 7.15 |
| 3660.1              | 3690.1      | 7.73                                                  | 7.12  | 6.81 |
| 3840.1              | 3870.1      | 7.73                                                  | 6.94  | 6.55 |
| 4020.1              | 4050.1      | 7.71                                                  | 7.01  | 6.62 |
| 4200.1              | 4230.1      | 7.19                                                  | 6.46  | 6.23 |
| 4380.1              | 4410.1      | 6.77                                                  | 5.91  | 5.77 |
| 4560.1              | 4590.1      | 6.44                                                  | 5.66  | 5.57 |
| 4740.1              | 4770.1      | 6.92                                                  | 6.11  | 5.95 |
| 4920.1              | 4950.1      | 6.22                                                  | 5.74  | 5.68 |
| 5100.1              | 5130.1      | 5.92                                                  | 5.63  | 5.60 |
| 5280.1              | 5310.1      | 6.19                                                  | 5.87  | 5.77 |
| 5460.1              | 5490.1      | 6.49                                                  | 6.10  | 5.91 |
| 5640.1              | 5670.1      | 7.09                                                  | 6.61  | 6.34 |
| 5820.1              | 5850.1      | 8.23                                                  | 7.15  | 6.87 |
| 6000.1              | 6030.1      | 9.84                                                  | 7.81  | 7.09 |
| 6180.1              | 6210.1      | 10.85                                                 | 8.52  | 7.67 |
| 6360.1              | 6390.1      | 13.27                                                 | 9.18  | 7.67 |
| 6540.1              | 6570.1      | 15.37                                                 | 11.67 | 9.22 |
| 6720.1              | 6750.1      | 8.73                                                  | 8.14  | 7.89 |
| 6900.1              | 6930.1      | 9.26                                                  | 8.41  | 8.19 |
| 7080.1              | 7110.1      | 10.34                                                 | 9.11  | 8.84 |
| 7280.1              | 7310.1      | 10.10                                                 | 9.19  | 8.95 |
| 7460.1              | 7490.1      | 9.63                                                  | 9.00  | 8.80 |
| 7660.1              | 7690.1      | 9.41                                                  | 9.01  | 8.85 |
| 7840.1              | 7870.1      | 9.50                                                  | 9.07  | 8.87 |
| 8040.1              | 8070.1      | 9.65                                                  | 9.14  | 8.92 |
| 8220.1              | 8250.1      | 9.43                                                  | 8.66  | 8.34 |
| 8420.1              | 8450.1      | 9.63                                                  | 8.12  | 7.68 |
| 8600.1              | 8630.1      | 21.47                                                 | 12.79 | 8.96 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       |
|---------------------|-------------|--------------------|-------|-------|
|                     |             | @LO (dBm)          |       |       |
|                     |             | +4                 | +7    | +10   |
| 1500.1              | 1530.1      | 6.96               | 8.69  | 6.55  |
| 1680.1              | 1710.1      | 9.49               | 8.89  | 8.24  |
| 1860.1              | 1890.1      | 11.50              | 10.44 | 10.14 |
| 2040.1              | 2070.1      | 11.14              | 9.93  | 9.04  |
| 2220.1              | 2250.1      | 10.55              | 11.64 | 12.96 |
| 2400.1              | 2430.1      | 10.32              | 12.25 | 13.92 |
| 2580.1              | 2610.1      | 15.30              | 18.27 | 19.91 |
| 2760.1              | 2790.1      | 15.12              | 16.59 | 16.68 |
| 2940.1              | 2970.1      | 15.64              | 17.06 | 16.75 |
| 3120.1              | 3150.1      | 12.36              | 13.54 | 15.99 |
| 3300.1              | 3330.1      | 13.50              | 13.95 | 14.85 |
| 3480.1              | 3510.1      | 9.87               | 11.55 | 12.43 |
| 3660.1              | 3690.1      | 9.86               | 10.96 | 11.25 |
| 3840.1              | 3870.1      | 7.71               | 9.70  | 10.87 |
| 4020.1              | 4050.1      | 6.66               | 8.18  | 10.13 |
| 4200.1              | 4230.1      | 5.10               | 10.93 | 13.21 |
| 4380.1              | 4410.1      | 5.67               | 7.85  | 10.93 |
| 4560.1              | 4590.1      | 9.06               | 9.01  | 12.38 |
| 4740.1              | 4770.1      | 11.12              | 10.32 | 11.27 |
| 4920.1              | 4950.1      | 7.71               | 8.67  | 10.01 |
| 5100.1              | 5130.1      | 10.18              | 10.13 | 11.61 |
| 5280.1              | 5310.1      | 12.45              | 11.40 | 12.46 |
| 5460.1              | 5490.1      | 10.51              | 10.07 | 10.88 |
| 5640.1              | 5670.1      | 8.03               | 7.85  | 8.29  |
| 5820.1              | 5850.1      | 7.52               | 11.15 | 11.41 |
| 6000.1              | 6030.1      | 0.79               | 6.72  | 11.57 |
| 6180.1              | 6210.1      | 2.04               | 2.88  | 5.61  |
| 6360.1              | 6390.1      | 8.23               | 3.41  | 4.98  |
| 6540.1              | 6570.1      | 3.03               | 9.01  | 9.40  |
| 6720.1              | 6750.1      | 13.35              | 16.11 | 14.81 |
| 6900.1              | 6930.1      | 17.02              | 17.79 | 17.95 |
| 7080.1              | 7110.1      | 17.98              | 17.74 | 18.05 |
| 7280.1              | 7310.1      | 12.33              | 15.14 | 16.81 |
| 7460.1              | 7490.1      | 11.21              | 14.09 | 15.79 |
| 7660.1              | 7690.1      | 12.33              | 14.42 | 15.78 |
| 7840.1              | 7870.1      | 12.85              | 15.00 | 16.26 |
| 8040.1              | 8070.1      | 11.46              | 14.42 | 15.48 |
| 8220.1              | 8250.1      | 8.53               | 11.66 | 13.92 |
| 8420.1              | 8450.1      | 6.75               | 9.30  | 12.01 |
| 8600.1              | 8630.1      | -4.58              | 4.66  | 8.74  |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+1dBm<br>(dB) |       |      |
|---------------------|-------------|-------------------------------------|-------|------|
|                     |             | @LO (dBm)                           |       |      |
|                     |             | +4                                  | +7    | +10  |
| 1500.1              | 1530.1      | 1.99                                | 2.00  | 1.88 |
| 1680.1              | 1710.1      | 2.05                                | 1.75  | 1.50 |
| 1860.1              | 1890.1      | 1.67                                | 1.43  | 1.28 |
| 2040.1              | 2070.1      | 1.47                                | 1.27  | 1.14 |
| 2220.1              | 2250.1      | 1.34                                | 1.06  | 0.89 |
| 2400.1              | 2430.1      | 1.27                                | 0.99  | 0.82 |
| 2580.1              | 2610.1      | 0.85                                | 0.57  | 0.45 |
| 2760.1              | 2790.1      | 1.21                                | 0.97  | 0.77 |
| 2940.1              | 2970.1      | 1.19                                | 0.95  | 0.79 |
| 3120.1              | 3150.1      | 0.72                                | 0.57  | 0.46 |
| 3300.1              | 3330.1      | 0.53                                | 0.41  | 0.34 |
| 3480.1              | 3510.1      | 0.51                                | 0.41  | 0.35 |
| 3660.1              | 3690.1      | 0.75                                | 0.54  | 0.45 |
| 3840.1              | 3870.1      | 1.01                                | 0.58  | 0.49 |
| 4020.1              | 4050.1      | 1.09                                | 0.68  | 0.56 |
| 4200.1              | 4230.1      | 1.23                                | 0.86  | 0.63 |
| 4380.1              | 4410.1      | 1.15                                | 0.72  | 0.54 |
| 4560.1              | 4590.1      | 1.09                                | 0.64  | 0.38 |
| 4740.1              | 4770.1      | 1.18                                | 1.01  | 0.75 |
| 4920.1              | 4950.1      | 1.24                                | 1.00  | 0.86 |
| 5100.1              | 5130.1      | 1.08                                | 0.81  | 0.69 |
| 5280.1              | 5310.1      | 1.02                                | 0.78  | 0.62 |
| 5460.1              | 5490.1      | 1.10                                | 0.90  | 0.78 |
| 5640.1              | 5670.1      | 1.36                                | 1.08  | 1.01 |
| 5820.1              | 5850.1      | 1.55                                | 1.07  | 0.82 |
| 6000.1              | 6030.1      | 2.08                                | 1.63  | 1.04 |
| 6180.1              | 6210.1      | 3.71                                | 3.56  | 2.25 |
| 6360.1              | 6390.1      | 4.43                                | 5.77  | 4.73 |
| 6540.1              | 6570.1      | -1.52                               | 0.33  | 1.07 |
| 6720.1              | 6750.1      | 0.60                                | 0.42  | 0.39 |
| 6900.1              | 6930.1      | 0.42                                | 0.27  | 0.26 |
| 7080.1              | 7110.1      | 0.29                                | 0.25  | 0.22 |
| 7280.1              | 7310.1      | 0.55                                | 0.30  | 0.23 |
| 7460.1              | 7490.1      | 0.75                                | 0.34  | 0.26 |
| 7660.1              | 7690.1      | 0.64                                | 0.35  | 0.28 |
| 7840.1              | 7870.1      | 0.70                                | 0.38  | 0.32 |
| 8040.1              | 8070.1      | 0.83                                | 0.47  | 0.42 |
| 8220.1              | 8250.1      | 1.22                                | 0.62  | 0.47 |
| 8420.1              | 8450.1      | 1.35                                | 1.04  | 0.54 |
| 8600.1              | 8630.1      | -5.86                               | -0.09 | 1.43 |

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=3800MHz<br>(dB) |
|----------------------|-------------|----------------------------------------------------------------|
|                      |             | @LO (dBm)                                                      |
|                      |             | +7                                                             |
| 2199.9               | 1600.1      | 9.69                                                           |
| 2079.4               | 1720.6      | 9.17                                                           |
| 1958.8               | 1841.2      | 8.31                                                           |
| 1838.3               | 1961.7      | 8.05                                                           |
| 1717.7               | 2082.3      | 8.50                                                           |
| 1597.2               | 2202.8      | 8.05                                                           |
| 1476.6               | 2323.4      | 9.07                                                           |
| 1356.1               | 2443.9      | 9.48                                                           |
| 1235.5               | 2564.5      | 9.06                                                           |
| 1115.0               | 2685.0      | 8.87                                                           |
| 994.5                | 2805.5      | 9.21                                                           |
| 873.9                | 2926.1      | 8.70                                                           |
| 753.4                | 3046.6      | 8.12                                                           |
| 652.9                | 3147.1      | 7.46                                                           |
| 532.4                | 3267.6      | 7.01                                                           |
| 431.9                | 3368.1      | 6.78                                                           |
| 311.4                | 3488.6      | 6.80                                                           |
| 210.9                | 3589.1      | 6.60                                                           |
| 90.4                 | 3709.6      | 6.88                                                           |
| 10.0                 | 3810.0      | 7.26                                                           |
| 129.5                | 3929.5      | 7.13                                                           |
| 229.0                | 4029.0      | 7.40                                                           |
| 348.5                | 4148.5      | 7.70                                                           |
| 448.0                | 4248.0      | 7.41                                                           |
| 567.5                | 4367.5      | 7.52                                                           |
| 667.0                | 4467.0      | 7.57                                                           |
| 786.5                | 4586.5      | 7.71                                                           |
| 886.0                | 4686.0      | 7.60                                                           |
| 1005.5               | 4805.5      | 7.83                                                           |
| 1105.1               | 4905.1      | 7.80                                                           |
| 1224.5               | 5024.5      | 8.05                                                           |
| 1324.1               | 5124.1      | 8.02                                                           |
| 1443.5               | 5243.5      | 8.35                                                           |
| 1543.1               | 5343.1      | 8.30                                                           |
| 1662.5               | 5462.5      | 8.47                                                           |
| 1762.1               | 5562.1      | 8.79                                                           |
| 1881.5               | 5681.5      | 9.47                                                           |
| 1981.1               | 5781.1      | 10.05                                                          |
| 2100.6               | 5900.6      | 10.55                                                          |
| 2200.1               | 6000.1      | 11.13                                                          |

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=1590MHz<br>(dB) |
|----------------------|-------------|----------------------------------------------------------------|
|                      |             | @LO (dBm)                                                      |
|                      |             | +7                                                             |
| 10.1                 | 1600.1      | 6.73                                                           |
| 70.1                 | 1660.1      | 6.25                                                           |
| 130.1                | 1720.1      | 6.02                                                           |
| 190.1                | 1780.1      | 5.85                                                           |
| 270.1                | 1860.1      | 5.74                                                           |
| 330.1                | 1920.1      | 5.63                                                           |
| 410.1                | 2000.1      | 5.58                                                           |
| 470.1                | 2060.1      | 5.62                                                           |
| 550.1                | 2140.1      | 5.91                                                           |
| 610.1                | 2200.1      | 6.02                                                           |
| 690.1                | 2280.1      | 6.08                                                           |
| 750.1                | 2340.1      | 6.22                                                           |
| 830.1                | 2420.1      | 6.45                                                           |
| 890.1                | 2480.1      | 6.50                                                           |
| 970.1                | 2560.1      | 6.46                                                           |
| 1030.1               | 2620.1      | 6.58                                                           |
| 1110.1               | 2700.1      | 6.54                                                           |
| 1170.1               | 2760.1      | 6.35                                                           |
| 1250.1               | 2840.1      | 6.28                                                           |
| 1310.1               | 2900.1      | 6.17                                                           |
| 1390.1               | 2980.1      | 6.22                                                           |
| 1450.1               | 3040.1      | 6.45                                                           |
| 1530.1               | 3120.1      | 6.58                                                           |
| 1590.1               | 3180.1      | 6.77                                                           |
| 1670.1               | 3260.1      | 6.82                                                           |
| 1730.1               | 3320.1      | 6.89                                                           |
| 1810.1               | 3400.1      | 7.10                                                           |
| 1870.1               | 3460.1      | 7.33                                                           |
| 1950.1               | 3540.1      | 7.18                                                           |
| 2010.1               | 3600.1      | 7.34                                                           |
| 2090.1               | 3680.1      | 6.97                                                           |
| 2150.1               | 3740.1      | 6.80                                                           |
| 2230.1               | 3820.1      | 6.77                                                           |
| 2290.1               | 3880.1      | 6.93                                                           |
| 2370.1               | 3960.1      | 7.44                                                           |
| 2430.1               | 4020.1      | 7.72                                                           |
| 2510.1               | 4100.1      | 8.17                                                           |
| 2570.1               | 4160.1      | 8.86                                                           |
| 2650.1               | 4240.1      | 9.79                                                           |
| 2710.1               | 4300.1      | 10.63                                                          |

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=6010.1MHz<br>(dB) |
|----------------------|-------------|------------------------------------------------------------------|
|                      |             | @LO (dBm)                                                        |
|                      |             | +7                                                               |
| 2610.0               | 3400.1      | 11.24                                                            |
| 2550.0               | 3460.1      | 10.57                                                            |
| 2490.0               | 3520.1      | 10.18                                                            |
| 2430.0               | 3580.1      | 10.01                                                            |
| 2370.0               | 3640.1      | 9.94                                                             |
| 2310.0               | 3700.1      | 9.66                                                             |
| 2250.0               | 3760.1      | 9.58                                                             |
| 2190.0               | 3820.1      | 9.47                                                             |
| 2130.0               | 3880.1      | 9.38                                                             |
| 2070.0               | 3940.1      | 9.33                                                             |
| 2010.0               | 4000.1      | 9.42                                                             |
| 1950.0               | 4060.1      | 9.52                                                             |
| 1890.0               | 4120.1      | 9.40                                                             |
| 1830.0               | 4180.1      | 9.17                                                             |
| 1750.0               | 4260.1      | 9.23                                                             |
| 1690.0               | 4320.1      | 9.20                                                             |
| 1610.0               | 4400.1      | 9.30                                                             |
| 1550.0               | 4460.1      | 9.46                                                             |
| 1470.0               | 4540.1      | 9.31                                                             |
| 1410.0               | 4600.1      | 9.15                                                             |
| 1330.0               | 4680.1      | 8.85                                                             |
| 1270.0               | 4740.1      | 8.64                                                             |
| 1190.0               | 4820.1      | 8.19                                                             |
| 1130.0               | 4880.1      | 7.97                                                             |
| 1050.0               | 4960.1      | 7.97                                                             |
| 990.0                | 5020.1      | 7.71                                                             |
| 910.0                | 5100.1      | 7.67                                                             |
| 850.0                | 5160.1      | 7.57                                                             |
| 770.0                | 5240.1      | 7.63                                                             |
| 710.0                | 5300.1      | 7.72                                                             |
| 630.0                | 5380.1      | 7.77                                                             |
| 570.0                | 5440.1      | 7.82                                                             |
| 490.0                | 5520.1      | 7.57                                                             |
| 430.0                | 5580.1      | 7.54                                                             |
| 350.0                | 5660.1      | 7.57                                                             |
| 290.0                | 5720.1      | 7.80                                                             |
| 210.0                | 5800.1      | 7.60                                                             |
| 150.0                | 5860.1      | 7.58                                                             |
| 70.0                 | 5940.1      | 7.57                                                             |
| 10.0                 | 6000.1      | 8.17                                                             |

## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +4                      | +7    | +10   | +4                      | +7    | +10   |
| 1530.1      | 35.75                   | 33.84 | 35.00 | 16.30                   | 18.51 | 20.46 |
| 1710.1      | 33.20                   | 32.50 | 31.87 | 17.36                   | 19.59 | 21.52 |
| 1890.1      | 43.11                   | 41.51 | 39.92 | 19.41                   | 21.31 | 22.22 |
| 2070.1      | 38.68                   | 36.41 | 34.68 | 19.04                   | 19.49 | 19.27 |
| 2250.1      | 33.84                   | 32.27 | 31.03 | 18.99                   | 18.01 | 17.22 |
| 2430.1      | 31.50                   | 30.17 | 28.82 | 17.95                   | 16.86 | 15.80 |
| 2610.1      | 32.22                   | 30.52 | 29.47 | 18.05                   | 16.61 | 15.74 |
| 2790.1      | 35.69                   | 34.93 | 34.16 | 17.90                   | 16.97 | 16.16 |
| 2970.1      | 34.15                   | 33.92 | 33.95 | 16.97                   | 16.44 | 16.17 |
| 3150.1      | 32.90                   | 32.74 | 32.40 | 16.50                   | 17.19 | 17.39 |
| 3330.1      | 34.84                   | 34.41 | 34.35 | 16.13                   | 17.50 | 18.84 |
| 3510.1      | 35.43                   | 34.36 | 33.79 | 15.20                   | 16.96 | 18.79 |
| 3690.1      | 39.91                   | 35.97 | 33.41 | 14.59                   | 15.51 | 16.19 |
| 3870.1      | 46.91                   | 37.98 | 34.16 | 16.41                   | 15.57 | 14.95 |
| 4050.1      | 58.90                   | 42.41 | 35.67 | 19.80                   | 17.44 | 15.58 |
| 4230.1      | 42.06                   | 48.27 | 38.71 | 22.71                   | 18.81 | 16.56 |
| 4410.1      | 36.01                   | 37.82 | 35.16 | 24.78                   | 21.10 | 18.12 |
| 4590.1      | 33.71                   | 33.20 | 30.38 | 24.45                   | 21.33 | 18.91 |
| 4770.1      | 30.40                   | 31.11 | 30.39 | 23.73                   | 21.44 | 19.72 |
| 4950.1      | 26.12                   | 25.99 | 25.73 | 22.69                   | 21.67 | 21.22 |
| 5130.1      | 23.42                   | 23.46 | 23.42 | 21.00                   | 21.23 | 21.99 |
| 5310.1      | 21.87                   | 22.63 | 23.16 | 20.04                   | 21.54 | 22.99 |
| 5490.1      | 22.14                   | 22.81 | 23.39 | 18.44                   | 20.33 | 22.39 |
| 5670.1      | 23.02                   | 23.96 | 24.69 | 14.25                   | 16.21 | 18.52 |
| 5850.1      | 23.29                   | 24.05 | 24.82 | 13.32                   | 15.36 | 17.64 |
| 6030.1      | 23.40                   | 24.62 | 25.49 | 13.40                   | 15.26 | 17.03 |
| 6210.1      | 22.70                   | 23.80 | 25.21 | 12.50                   | 14.11 | 15.78 |
| 6390.1      | 21.42                   | 22.36 | 23.16 | 10.30                   | 11.43 | 12.58 |
| 6570.1      | 19.52                   | 19.90 | 20.23 | 7.26                    | 8.11  | 9.07  |
| 6750.1      | 21.71                   | 21.44 | 20.81 | 10.91                   | 12.60 | 14.12 |
| 6930.1      | 24.58                   | 22.80 | 21.38 | 16.38                   | 17.44 | 18.31 |
| 7110.1      | 24.30                   | 23.18 | 21.75 | 21.95                   | 22.50 | 22.15 |
| 7310.1      | 24.04                   | 23.60 | 22.68 | 28.78                   | 27.29 | 24.99 |
| 7490.1      | 22.25                   | 22.71 | 23.11 | 31.85                   | 27.59 | 25.46 |
| 7690.1      | 20.73                   | 21.97 | 23.27 | 26.04                   | 25.01 | 24.40 |
| 7870.1      | 19.40                   | 20.84 | 22.30 | 21.86                   | 22.21 | 22.38 |
| 8070.1      | 17.42                   | 18.83 | 20.24 | 18.79                   | 19.43 | 19.77 |
| 8250.1      | 16.34                   | 17.88 | 19.33 | 16.31                   | 16.87 | 17.10 |
| 8450.1      | 16.14                   | 17.86 | 19.37 | 13.19                   | 13.62 | 13.45 |
| 8630.1      | 18.94                   | 19.62 | 20.94 | 12.48                   | 12.67 | 12.68 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +4                      | +7    | +10   |
| 1500.1              | 1530.1      | 12.62                   | 10.84 | 10.76 |
| 1680.1              | 1710.1      | 14.39                   | 13.25 | 12.49 |
| 1860.1              | 1890.1      | 19.56                   | 18.60 | 17.80 |
| 2040.1              | 2070.1      | 23.19                   | 22.68 | 21.95 |
| 2220.1              | 2250.1      | 22.55                   | 20.89 | 19.64 |
| 2400.1              | 2430.1      | 18.90                   | 18.00 | 17.27 |
| 2580.1              | 2610.1      | 15.79                   | 15.25 | 14.92 |
| 2760.1              | 2790.1      | 17.38                   | 17.06 | 16.79 |
| 2940.1              | 2970.1      | 20.69                   | 20.40 | 20.06 |
| 3120.1              | 3150.1      | 19.06                   | 18.96 | 18.81 |
| 3300.1              | 3330.1      | 19.90                   | 19.94 | 19.97 |
| 3480.1              | 3510.1      | 23.34                   | 23.37 | 23.43 |
| 3660.1              | 3690.1      | 27.32                   | 26.68 | 26.29 |
| 3840.1              | 3870.1      | 16.60                   | 16.20 | 15.89 |
| 4020.1              | 4050.1      | 14.13                   | 13.91 | 13.66 |
| 4200.1              | 4230.1      | 14.04                   | 13.72 | 13.40 |
| 4380.1              | 4410.1      | 14.13                   | 14.04 | 13.89 |
| 4560.1              | 4590.1      | 14.69                   | 14.68 | 14.58 |
| 4740.1              | 4770.1      | 15.59                   | 15.57 | 15.58 |
| 4920.1              | 4950.1      | 15.50                   | 15.44 | 15.47 |
| 5100.1              | 5130.1      | 16.09                   | 15.82 | 15.79 |
| 5280.1              | 5310.1      | 15.65                   | 14.98 | 14.49 |
| 5460.1              | 5490.1      | 19.36                   | 18.62 | 18.12 |
| 5640.1              | 5670.1      | 27.94                   | 27.09 | 26.12 |
| 5820.1              | 5850.1      | 22.75                   | 22.31 | 22.24 |
| 6000.1              | 6030.1      | 20.44                   | 21.90 | 21.34 |
| 6180.1              | 6210.1      | 18.51                   | 19.87 | 21.18 |
| 6360.1              | 6390.1      | 17.50                   | 18.70 | 19.50 |
| 6540.1              | 6570.1      | 16.58                   | 16.57 | 16.70 |
| 6720.1              | 6750.1      | 16.03                   | 16.16 | 16.33 |
| 6900.1              | 6930.1      | 14.95                   | 15.24 | 15.48 |
| 7080.1              | 7110.1      | 14.14                   | 14.51 | 14.58 |
| 7280.1              | 7310.1      | 12.58                   | 12.83 | 12.88 |
| 7460.1              | 7490.1      | 10.81                   | 10.82 | 10.85 |
| 7660.1              | 7690.1      | 9.03                    | 9.07  | 9.10  |
| 7840.1              | 7870.1      | 7.72                    | 7.79  | 7.79  |
| 8040.1              | 8070.1      | 7.32                    | 7.50  | 7.63  |
| 8220.1              | 8250.1      | 8.55                    | 8.88  | 9.14  |
| 8420.1              | 8450.1      | 12.12                   | 12.87 | 13.35 |
| 8600.1              | 8630.1      | 13.74                   | 14.85 | 16.27 |

# Frequency Mixer

# MCA1T-60+

## 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=6000MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|------|-------|----------------------|--------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |      |       |                      | @LO (dBm)                      |      |      |
|                     |             | +4              | +7   | +10  |             | +4              | +7   | +10   |                      | +4                             | +7   | +10  |
| 1500.1              | 1530.1      | 2.14            | 1.78 | 1.71 | 1530.1      | 5.72            | 5.58 | 6.30  | 10.1                 | 2.04                           | 1.19 | 1.07 |
| 1680.1              | 1710.1      | 2.18            | 2.04 | 1.95 | 1710.1      | 3.42            | 4.02 | 4.93  | 90.1                 | 2.07                           | 1.24 | 1.14 |
| 1860.1              | 1890.1      | 2.33            | 2.24 | 2.19 | 1890.1      | 2.22            | 2.95 | 3.82  | 170.1                | 2.16                           | 1.35 | 1.24 |
| 2040.1              | 2070.1      | 2.43            | 2.30 | 2.23 | 2070.1      | 1.80            | 2.46 | 3.20  | 250.1                | 2.30                           | 1.47 | 1.35 |
| 2220.1              | 2250.1      | 2.36            | 2.22 | 2.14 | 2250.1      | 1.46            | 2.01 | 2.64  | 330.1                | 2.50                           | 1.63 | 1.49 |
| 2400.1              | 2430.1      | 2.31            | 2.20 | 2.13 | 2430.1      | 1.31            | 1.80 | 2.37  | 410.1                | 2.75                           | 1.85 | 1.69 |
| 2580.1              | 2610.1      | 2.05            | 1.94 | 1.88 | 2610.1      | 1.24            | 1.74 | 2.32  | 490.1                | 3.02                           | 2.07 | 1.89 |
| 2760.1              | 2790.1      | 2.51            | 2.32 | 2.16 | 2790.1      | 1.36            | 1.89 | 2.50  | 570.1                | 3.27                           | 2.25 | 2.04 |
| 2940.1              | 2970.1      | 3.72            | 3.48 | 3.30 | 2970.1      | 1.60            | 2.17 | 2.84  | 650.1                | 3.56                           | 2.43 | 2.17 |
| 3120.1              | 3150.1      | 3.96            | 3.73 | 3.54 | 3150.1      | 2.00            | 2.60 | 3.35  | 730.1                | 3.87                           | 2.61 | 2.27 |
| 3300.1              | 3330.1      | 4.05            | 3.79 | 3.58 | 3330.1      | 2.48            | 3.10 | 3.86  | 810.1                | 4.21                           | 2.78 | 2.37 |
| 3480.1              | 3510.1      | 4.13            | 3.82 | 3.61 | 3510.1      | 3.16            | 3.59 | 4.25  | 890.1                | 4.52                           | 2.97 | 2.49 |
| 3660.1              | 3690.1      | 4.06            | 3.59 | 3.29 | 3690.1      | 4.05            | 4.13 | 4.60  | 970.1                | 4.67                           | 3.08 | 2.54 |
| 3840.1              | 3870.1      | 3.76            | 3.26 | 2.92 | 3870.1      | 5.12            | 4.78 | 4.91  | 1050.1               | 4.79                           | 3.14 | 2.57 |
| 4020.1              | 4050.1      | 3.37            | 2.98 | 2.70 | 4050.1      | 5.81            | 4.95 | 4.87  | 1130.1               | 4.83                           | 3.17 | 2.57 |
| 4200.1              | 4230.1      | 2.72            | 2.22 | 2.02 | 4230.1      | 6.37            | 4.57 | 4.25  | 1210.1               | 4.86                           | 3.18 | 2.57 |
| 4380.1              | 4410.1      | 2.45            | 1.81 | 1.60 | 4410.1      | 7.73            | 5.02 | 4.04  | 1290.1               | 4.78                           | 3.13 | 2.51 |
| 4560.1              | 4590.1      | 1.97            | 1.41 | 1.19 | 4590.1      | 6.81            | 4.26 | 3.14  | 1370.1               | 4.73                           | 3.14 | 2.52 |
| 4740.1              | 4770.1      | 1.97            | 1.56 | 1.37 | 4770.1      | 5.04            | 3.01 | 2.06  | 1450.1               | 4.84                           | 3.18 | 2.52 |
| 4920.1              | 4950.1      | 1.74            | 1.48 | 1.39 | 4950.1      | 2.97            | 1.84 | 1.27  | 1530.1               | 4.99                           | 3.26 | 2.55 |
| 5100.1              | 5130.1      | 1.70            | 1.59 | 1.59 | 5130.1      | 1.60            | 1.27 | 1.48  | 1610.1               | 4.92                           | 3.21 | 2.48 |
| 5280.1              | 5310.1      | 1.79            | 1.67 | 1.61 | 5310.1      | 1.21            | 1.65 | 2.18  | 1690.1               | 5.02                           | 3.19 | 2.45 |
| 5460.1              | 5490.1      | 2.19            | 2.07 | 2.01 | 5490.1      | 2.01            | 2.46 | 3.05  | 1770.1               | 5.23                           | 3.24 | 2.52 |
| 5640.1              | 5670.1      | 2.57            | 2.44 | 2.37 | 5670.1      | 3.49            | 3.66 | 4.23  | 1850.1               | 5.51                           | 3.29 | 2.60 |
| 5820.1              | 5850.1      | 3.06            | 2.92 | 2.89 | 5850.1      | 6.37            | 5.79 | 5.77  | 1930.1               | 5.61                           | 3.27 | 2.66 |
| 6000.1              | 6030.1      | 4.10            | 3.34 | 3.23 | 6030.1      | 8.68            | 8.64 | 8.01  | 2010.1               | 5.33                           | 3.20 | 2.72 |
| 6180.1              | 6210.1      | 4.64            | 3.93 | 3.50 | 6210.1      | 9.69            | 9.85 | 10.07 | 2090.1               | 5.09                           | 3.21 | 2.89 |
| 6360.1              | 6390.1      | 5.14            | 3.88 | 3.30 | 6390.1      | 7.76            | 7.73 | 8.27  | 2170.1               | 4.82                           | 3.31 | 3.15 |
| 6540.1              | 6570.1      | 4.95            | 3.86 | 3.48 | 6570.1      | 3.25            | 3.37 | 3.59  | 2250.1               | 4.38                           | 3.37 | 3.38 |
| 6720.1              | 6750.1      | 3.75            | 3.54 | 3.40 | 6750.1      | 2.82            | 2.55 | 2.52  | 2310.1               | 3.95                           | 3.35 | 3.49 |
| 6900.1              | 6930.1      | 3.48            | 3.17 | 3.03 | 6930.1      | 5.25            | 3.43 | 2.45  | 2390.1               | 3.64                           | 3.52 | 3.82 |
| 7080.1              | 7110.1      | 3.09            | 2.78 | 2.65 | 7110.1      | 6.66            | 4.18 | 2.84  | 2450.1               | 3.40                           | 3.61 | 4.00 |
| 7280.1              | 7310.1      | 3.35            | 3.09 | 2.95 | 7310.1      | 6.32            | 4.35 | 3.61  | 2530.1               | 3.02                           | 3.65 | 4.15 |
| 7460.1              | 7490.1      | 3.26            | 3.07 | 2.97 | 7490.1      | 5.00            | 4.33 | 4.38  | 2590.1               | 2.95                           | 3.85 | 4.43 |
| 7660.1              | 7690.1      | 2.81            | 2.72 | 2.66 | 7690.1      | 3.98            | 4.40 | 5.03  | 2670.1               | 2.86                           | 4.00 | 4.61 |
| 7840.1              | 7870.1      | 2.28            | 2.21 | 2.16 | 7870.1      | 3.81            | 4.56 | 5.34  | 2730.1               | 2.86                           | 4.14 | 4.78 |
| 8040.1              | 8070.1      | 1.99            | 1.95 | 1.90 | 8070.1      | 3.93            | 4.55 | 5.16  | 2810.1               | 3.19                           | 4.61 | 5.31 |
| 8220.1              | 8250.1      | 1.95            | 1.87 | 1.82 | 8250.1      | 3.78            | 4.06 | 4.37  | 2870.1               | 3.64                           | 5.00 | 5.68 |
| 8420.1              | 8450.1      | 1.89            | 1.71 | 1.65 | 8450.1      | 2.46            | 2.39 | 2.39  | 2950.1               | 4.39                           | 5.63 | 6.24 |
| 8600.1              | 8630.1      | 2.23            | 1.93 | 1.70 | 8630.1      | 1.87            | 1.88 | 1.85  | 3010.1               | 5.23                           | 6.49 | 7.14 |

## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | +13 | 20  | 20  | 39  | 15  | 45  | --- | --- | --- | --- |
| 1      | -      | 10     | +0  | 28  | 20  | 42  | 35  | 50  | 45  | --- | --- | --- |
| 2      | >90    | 52     | 46  | 51  | 46  | 53  | 66  | 53  | 48  | 67  | --- | --- |
| 3      | >90    | 65     | 59  | >69 | 63  | 62  | >69 | >69 | >69 | >69 | >69 | --- |
| 4      | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 5      | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 6      | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 7      | ---    | ---    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 8      | ---    | ---    | --- | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 9      | ---    | ---    | --- | --- | >69 | 65  | >69 | >69 | >69 | >69 | >69 | >69 |
| 10     | ---    | ---    | --- | --- | --- | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

Test conditions:

RF IN: 3800 MHz; -14.00 dBm.

LO IN: 3830 MHz; +7.00 dBm

IF OUT: 30 MHz; -20.98 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | +3  | 30  | 31  | 49  | 30  | 66  | --- | --- | --- | --- |
| 1      | -      | 10     | +0  | 32  | 19  | 48  | 38  | 51  | 54  | --- | --- | --- |
| 2      | 74     | 41     | 37  | 41  | 39  | 46  | 57  | 50  | 45  | >79 | --- | --- |
| 3      | >90    | 46     | 40  | 54  | 43  | 45  | 56  | 55  | 57  | 63  | 64  | --- |
| 4      | >90    | 62     | 72  | 66  | 58  | 62  | 56  | 59  | >79 | 62  | 63  | >79 |
| 5      | >90    | >79    | 78  | 72  | 68  | >79 | 57  | 63  | 64  | 71  | 72  | 70  |
| 6      | 90     | >79    | 77  | >79 | >79 | >79 | 75  | >79 | 73  | 75  | >79 | 78  |
| 7      | ---    | ---    | >79 | >79 | >79 | >79 | >79 | >79 | 72  | 76  | 77  | >79 |
| 8      | ---    | ---    | --- | >79 | 77  | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 9      | ---    | ---    | --- | --- | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 10     | ---    | ---    | --- | --- | --- | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

## LO HARMONICS ORDER

Test conditions:

RF IN: 3800 MHz; -4.00 dBm.

LO IN: 3830 MHz; +7.00 dBm

IF OUT: 30 MHz; -10.95 dBm

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

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

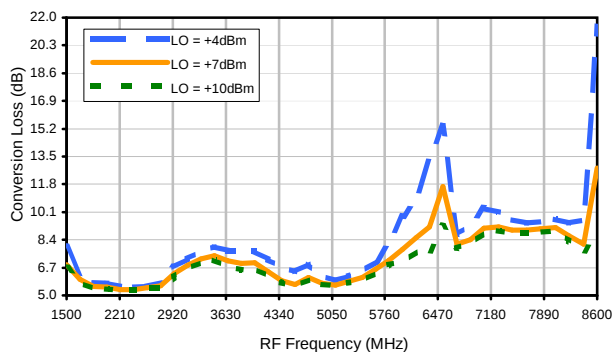
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

# Frequency Mixer

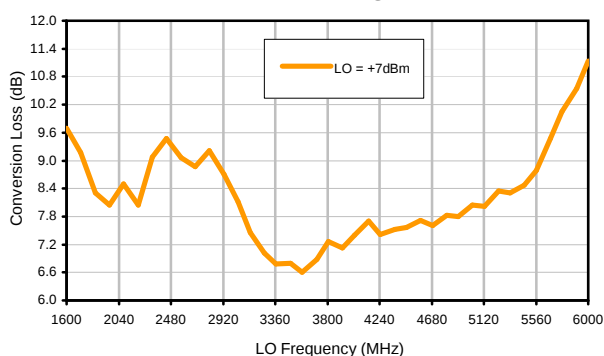
MCA1T-60+

## Typical Performance Curves

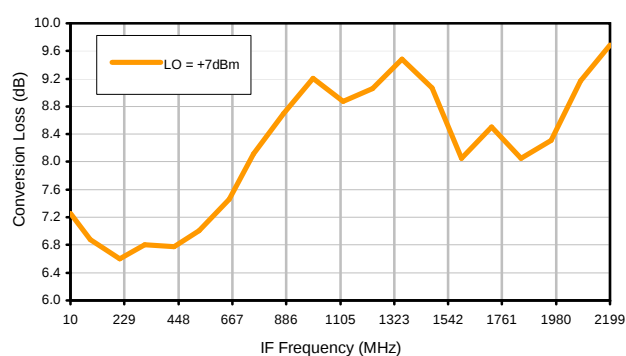
Conversion Loss @ IF=30MHz



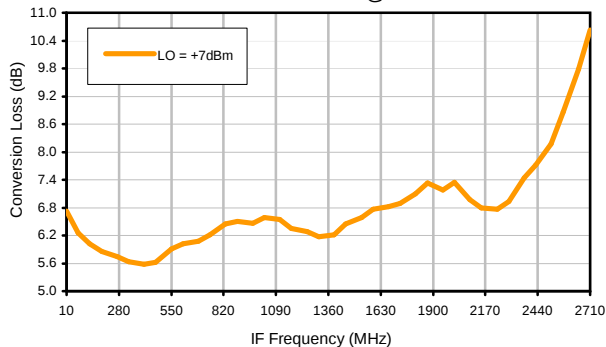
Conversion Loss vs. LO @ RF=3800MHz



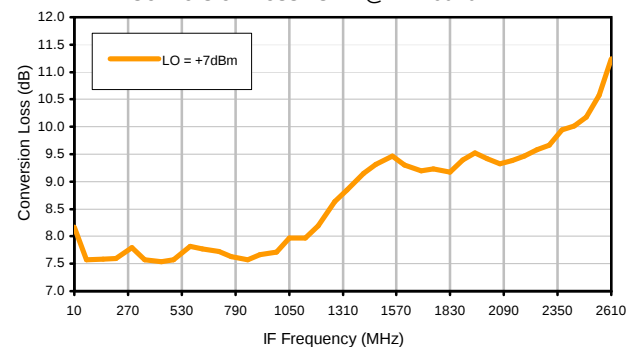
Conversion Loss vs. IF @ RF=3800MHz



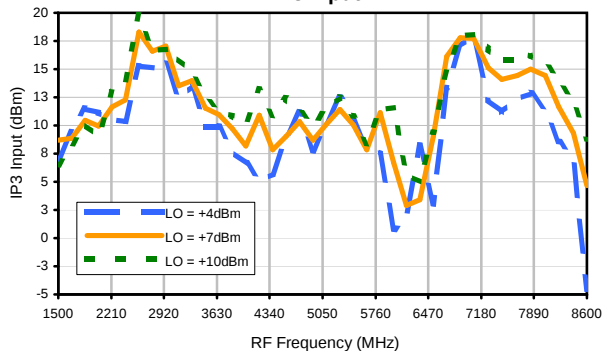
Conversion Loss vs. IF @ RF=1590MHz



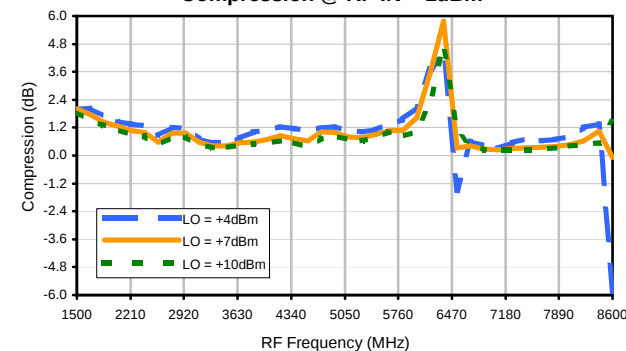
Conversion Loss vs. IF @ RF=6010.1MHz



IP3 Input

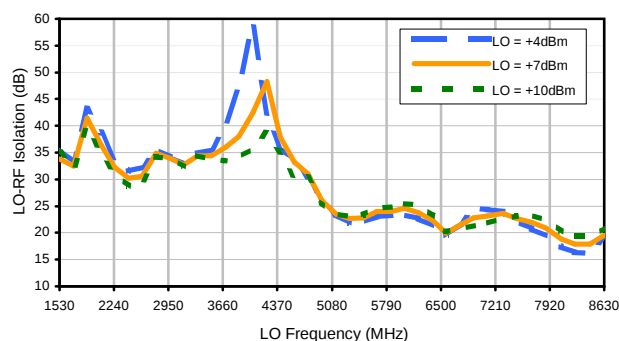


Compression @ RF IN=+1dBm

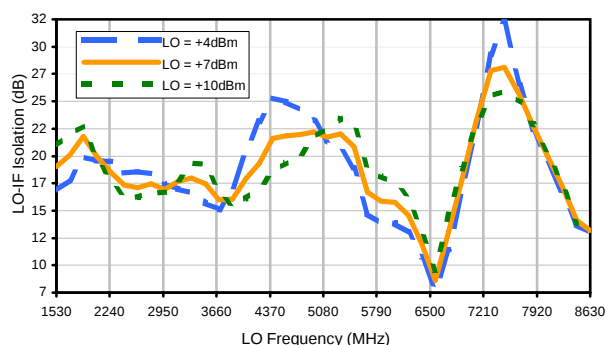


## Typical Performance Curves

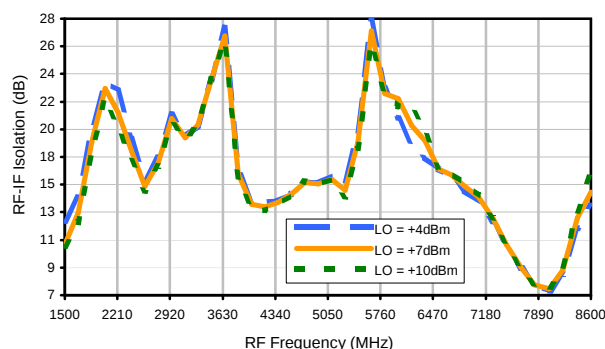
LO-RF Isolation



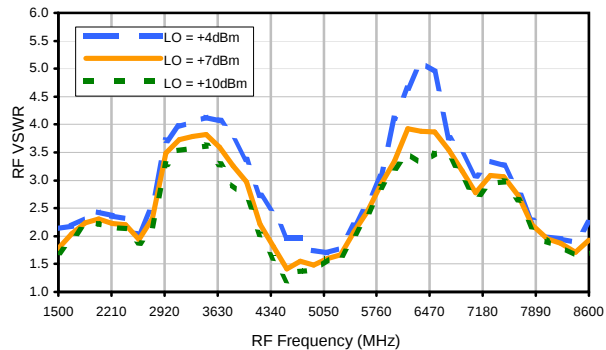
LO-IF Isolation



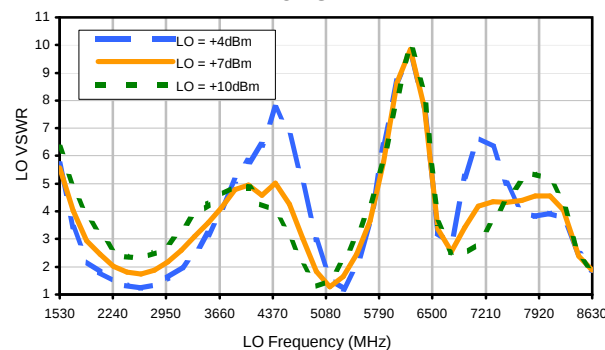
RF-IF Isolation



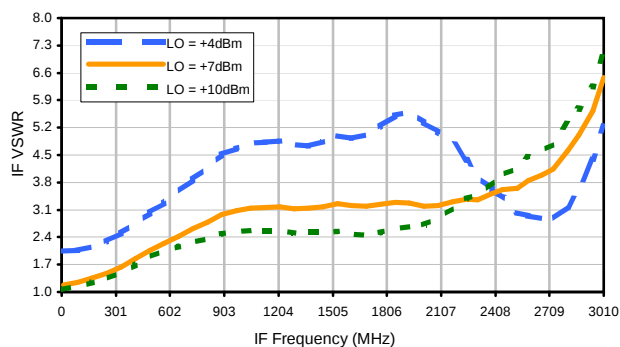
RF VSWR



LO VSWR



IF VSWR



## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | +13 | 20  | 20  | 39  | 15  | 45  | --- | --- | --- | --- |
| 1      | -      | 10     | +0  | 28  | 20  | 42  | 35  | 50  | 45  | --- | --- | --- |
| 2      | >90    | 52     | 46  | 51  | 46  | 53  | 66  | 53  | 48  | 67  | --- | --- |
| 3      | >90    | 65     | 59  | >69 | 63  | 62  | >69 | >69 | >69 | >69 | >69 | --- |
| 4      | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 5      | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 6      | >90    | >69    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 7      | ---    | ---    | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 8      | ---    | ---    | --- | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| 9      | ---    | ---    | --- | --- | >69 | 65  | >69 | >69 | >69 | >69 | >69 | >69 |
| 10     | ---    | ---    | --- | --- | --- | >69 | >69 | >69 | >69 | >69 | >69 | >69 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

Test conditions:

RF IN: 3800 MHz; -14.00 dBm.

LO IN: 3830 MHz; +7.00 dBm

IF OUT: 30 MHz; -20.98 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | +3  | 30  | 31  | 49  | 30  | 66  | --- | --- | --- | --- |
| 1      | -      | 10     | +0  | 32  | 19  | 48  | 38  | 51  | 54  | --- | --- | --- |
| 2      | 74     | 41     | 37  | 41  | 39  | 46  | 57  | 50  | 45  | >79 | --- | --- |
| 3      | >90    | 46     | 40  | 54  | 43  | 45  | 56  | 55  | 57  | 63  | 64  | --- |
| 4      | >90    | 62     | 72  | 66  | 58  | 62  | 56  | 59  | >79 | 62  | 63  | >79 |
| 5      | >90    | >79    | 78  | 72  | 68  | >79 | 57  | 63  | 64  | 71  | 72  | 70  |
| 6      | 90     | >79    | 77  | >79 | >79 | >79 | 75  | >79 | 73  | 75  | >79 | 78  |
| 7      | ---    | ---    | >79 | >79 | >79 | >79 | >79 | >79 | 72  | 76  | 77  | >79 |
| 8      | ---    | ---    | --- | >79 | 77  | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 9      | ---    | ---    | --- | --- | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 10     | ---    | ---    | --- | --- | --- | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

## LO HARMONICS ORDER

Test conditions:

RF IN: 3800 MHz; -4.00 dBm.

LO IN: 3830 MHz; +7.00 dBm

IF OUT: 30 MHz; -10.95 dBm

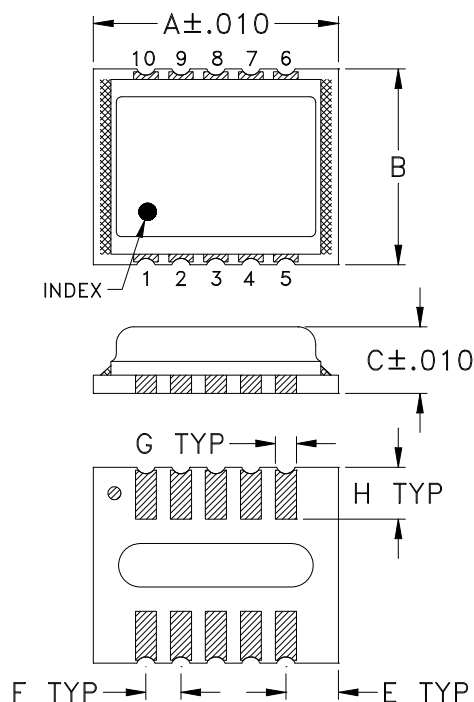
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.

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

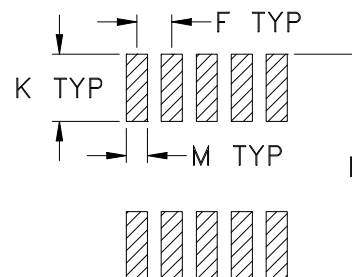
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

**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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# Tape & Reel Packaging TR-F34



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

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

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

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



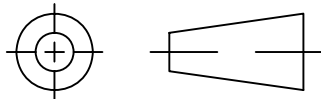
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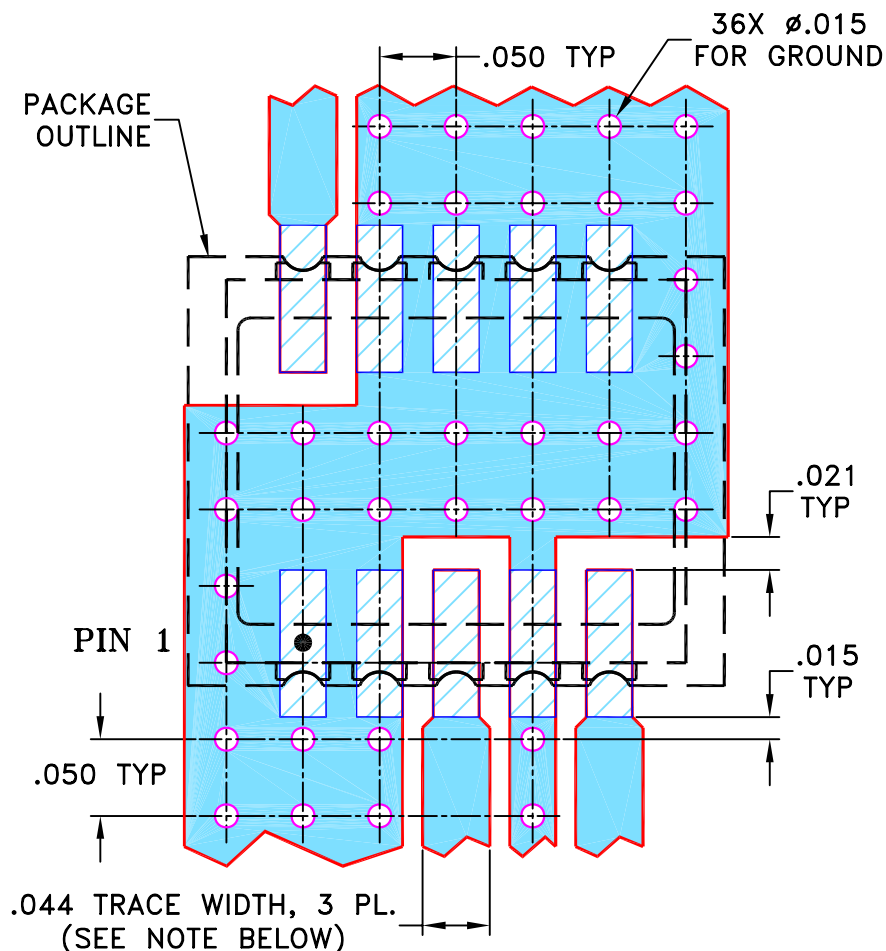
## THIRD ANGLE PROJECTION



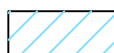
## REVISIONS

| REV | ECN No. | DESCRIPTION | DATE     | DR | AUTH |
|-----|---------|-------------|----------|----|------|
| OR  | 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

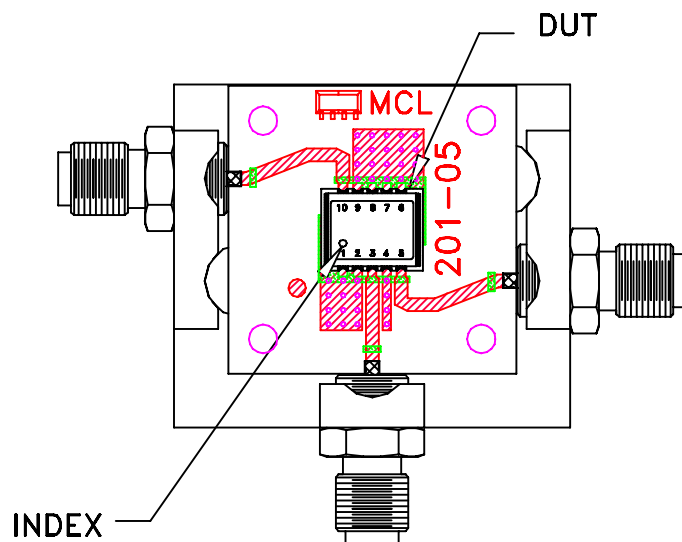
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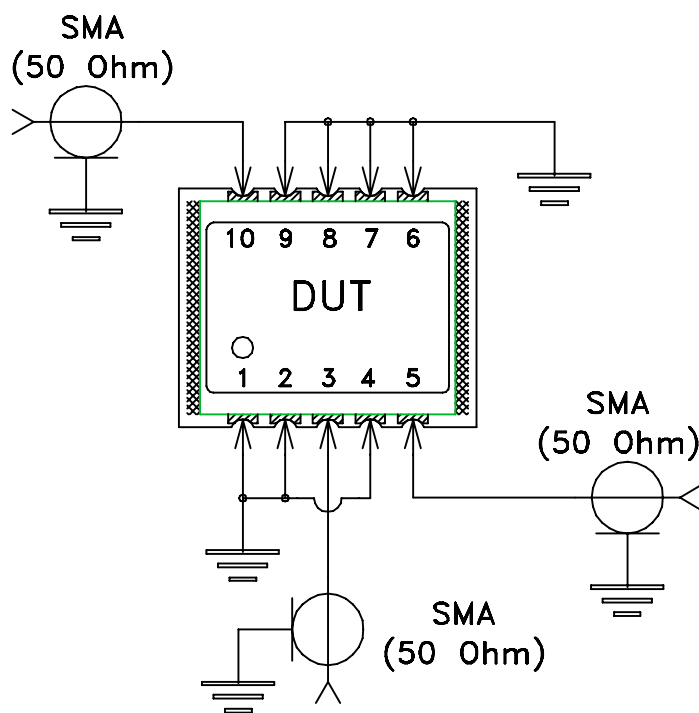
ASHEETA1.DWG REV:A DATE:01/12/95

# 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                               |