*Surface Mount*

# Frequency Mixer

## MBA-25L+

Level 4 (LO Power +4 dBm) 2000 to 3000 MHz

*Generic photo used for illustration purposes only*

CASE STYLE: SM2

***+RoHS Compliant***

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

### Maximum Ratings

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

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

### Pin Connections

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

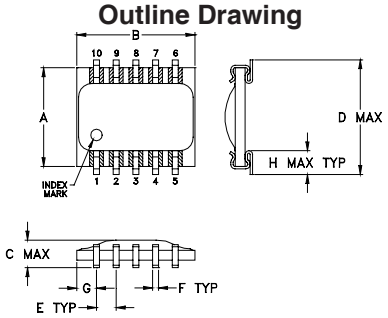
### Features

- excellent temperature stability
- excellent performance repeatability
- leads with strain relief
- very low cost
- ultra low height, 0.07”
- aqueous washable
- protected by US Patent 5,534,830

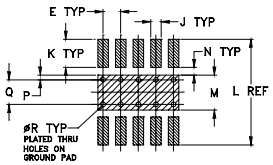
### Applications

- PCN/PCS/wideband CDMA
- satellite communication
- PCMCIA

### Outline Drawing




**PCB Land Pattern**

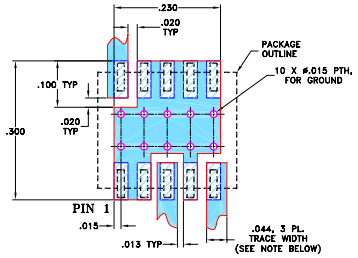



Suggested Layout,
Tolerance to be within ±.002
ADJACENT GROUND PINS SHALL BE CONNECTED TO EACH OTHER AND TO GROUND PAD

### Outline Dimensions ( inch / mm )

| A | B | C | D | E | F | G | H | |
|---|---|---|---|---|---|---|---|---|
| .250 | .300 | .095 | .290 | .050 | .015 | .050 | .060 | |
| 6.35 | 7.62 | 2.41 | 7.37 | 1.27 | 0.38 | 1.27 | 1.52 | |
| J | K | L | M | N | P | Q | R | wt |
| .030 | .080 | .300 | .100 | .020 | .015 | .070 | .014 | grams |
| 0.76 | 2.03 | 7.62 | 2.54 | 0.51 | 0.38 | 1.78 | 0.36 | 0.3 |

***Demo Board MCL P/N: TB-99***
***Suggested PCB Layout (PL-066)***




NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.020" ± 0.0015". 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

### Electrical Specifications

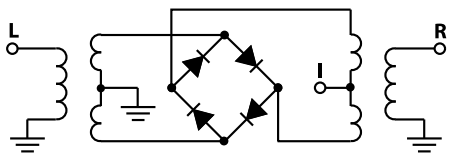
| FREQUENCY (MHz) | | CONVERSION LOSS (dB) | | | LO-RF ISOLATION (dB) | | LO-IF ISOLATION (dB) | | IP3 at center band (dBm) |
|---|---|---|---|---|---|---|---|---|---|
| LO/RF | IF | | | | | | | | |
| $f_L$-$f_U$ | | $\overline{X}$ | σ | Max. | Typ. | Min. | Typ. | Min. | Typ. |
| 2000-3000 | DC-600 | 6.2 | 0.15 | 8.6 | 28 | 18 | 15 | 7 | 10 |

1 dB COMP.: 0 dBm typ.

### 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 |
| 2000.00 | 2030.00 | 6.98 | 26.60 | 11.00 | 2.84 | 1.80 |
| 2030.00 | 2060.00 | 6.83 | 27.10 | 11.30 | 2.68 | 1.80 |
| 2100.00 | 2130.00 | 6.63 | 28.20 | 12.70 | 2.30 | 1.66 |
| 2162.50 | 2192.50 | 6.42 | 28.20 | 13.70 | 2.14 | 1.58 |
| 2200.00 | 2230.00 | 6.51 | 28.00 | 14.20 | 2.04 | 1.60 |
| 2300.00 | 2330.00 | 6.37 | 26.50 | 15.30 | 1.84 | 1.54 |
| 2400.00 | 2430.00 | 6.34 | 24.70 | 16.90 | 1.65 | 1.52 |
| 2427.50 | 2457.50 | 6.30 | 24.30 | 17.40 | 1.58 | 1.50 |
| 2500.00 | 2530.00 | 6.33 | 22.60 | 18.60 | 1.41 | 1.43 |
| 2560.00 | 2590.00 | 6.16 | 22.40 | 19.30 | 1.27 | 1.38 |
| 2600.00 | 2630.00 | 6.20 | 22.10 | 19.40 | 1.17 | 1.33 |
| 2692.50 | 2722.50 | 6.33 | 22.10 | 19.30 | 1.07 | 1.33 |
| 2700.00 | 2730.00 | 6.27 | 22.10 | 19.30 | 1.08 | 1.33 |
| 2800.00 | 2830.00 | 6.41 | 22.10 | 19.20 | 1.24 | 1.28 |
| 2825.00 | 2855.00 | 6.38 | 22.10 | 19.30 | 1.30 | 1.27 |
| 2900.00 | 2930.00 | 6.35 | 22.60 | 19.00 | 1.43 | 1.20 |
| 2957.50 | 2987.50 | 6.36 | 23.40 | 18.50 | 1.53 | 1.14 |
| 3000.00 | 3030.00 | 6.35 | 23.80 | 18.00 | 1.57 | 1.11 |
| 3090.00 | 3120.00 | 6.47 | 24.60 | 16.60 | 1.71 | 1.04 |
| 3200.00 | 3230.00 | 6.66 | 25.20 | 14.80 | 1.82 | 1.07 |

### Electrical Schematic




Notes

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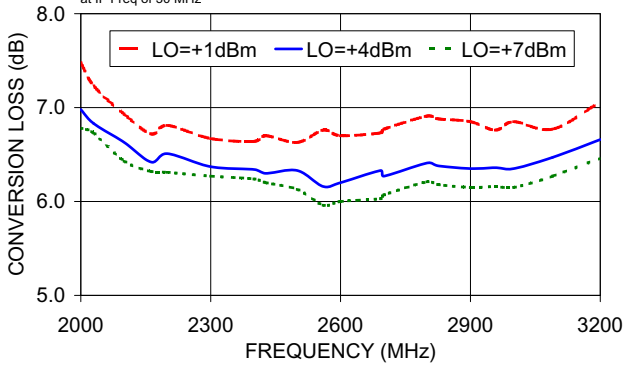
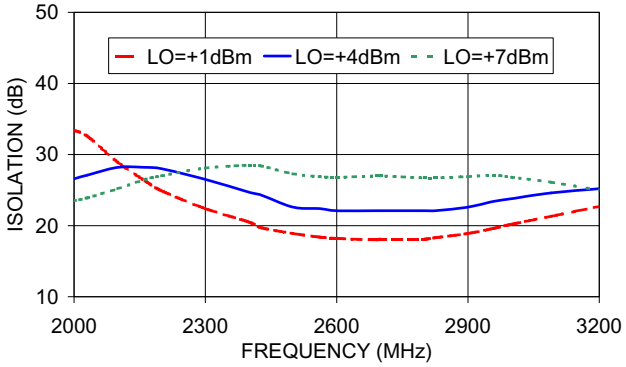
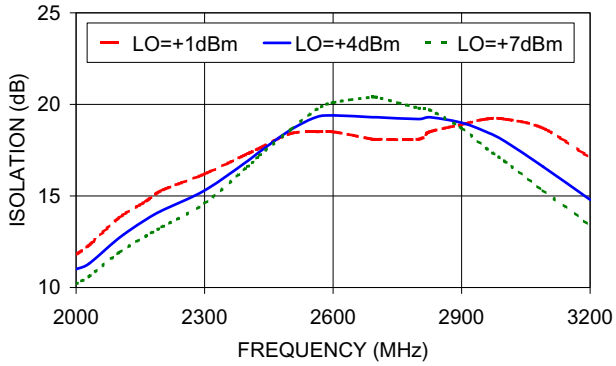
MBA-25L+
CONVERSION LOSS
at IF Freq of 30 MHz



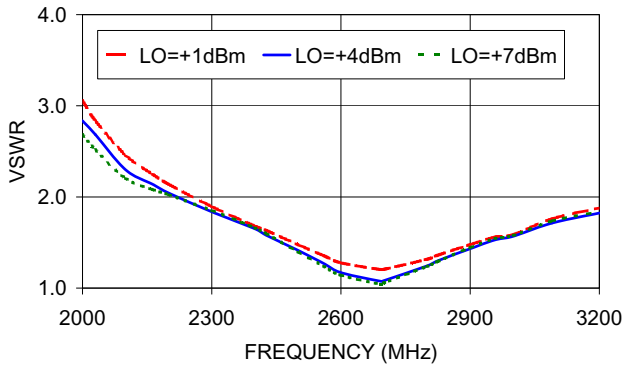

MBA-25L+
L-R ISOLATION



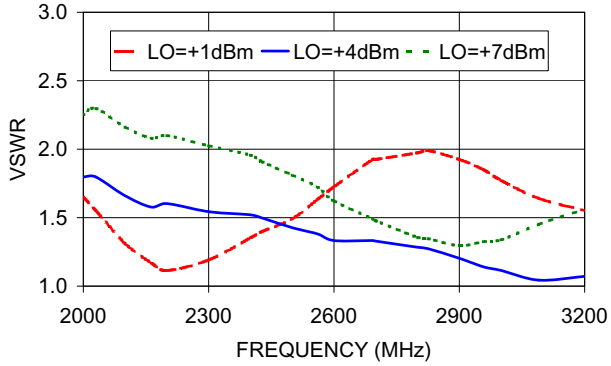

MBA-25L+
L-I ISOLATION




MBA-25L+
RF VSWR




MBA-25L+
LO VSWR

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# Frequency Mixer MBA-25L+

## *Typical Performance Data*

| RF (IN) (MHz) | LO (MHz) | CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm) | | |
|---|---|---|---|---|
| | | +1 | +4 | +7 |
| 1560.0 | 1590.0 | 13.66 | 10.55 | 9.30 |
| 1680.0 | 1710.0 | 12.22 | 9.65 | 8.83 |
| 1800.0 | 1830.0 | 11.25 | 9.00 | 8.26 |
| 1920.0 | 1950.0 | 10.00 | 8.28 | 7.70 |
| 2040.0 | 2070.0 | 9.25 | 8.01 | 7.51 |
| 2160.0 | 2190.0 | 8.79 | 7.74 | 7.26 |
| 2280.0 | 2310.0 | 8.20 | 7.49 | 7.19 |
| 2400.0 | 2430.0 | 7.65 | 7.11 | 6.89 |
| 2520.0 | 2550.0 | 7.62 | 7.19 | 7.01 |
| 2640.0 | 2670.0 | 7.61 | 7.25 | 7.13 |
| 2760.0 | 2790.0 | 7.54 | 7.23 | 7.09 |
| 2880.0 | 2910.0 | 7.60 | 7.15 | 6.91 |
| 3000.0 | 3030.0 | 7.78 | 7.16 | 6.80 |
| 3120.0 | 3150.0 | 8.03 | 7.33 | 6.95 |
| 3240.0 | 3270.0 | 8.48 | 7.68 | 7.26 |
| 3360.0 | 3390.0 | 8.00 | 7.36 | 7.02 |
| 3480.0 | 3510.0 | 7.82 | 7.18 | 6.85 |
| 3600.0 | 3630.0 | 7.62 | 7.00 | 6.70 |
| 3720.0 | 3750.0 | 7.49 | 6.89 | 6.61 |
| 3840.0 | 3870.0 | 7.46 | 7.02 | 6.78 |
| 3960.0 | 3990.0 | 7.45 | 7.04 | 6.84 |
| 4080.0 | 4110.0 | 7.33 | 6.93 | 6.72 |
| 4200.0 | 4230.0 | 7.20 | 6.83 | 6.60 |
| 4320.0 | 4350.0 | 7.21 | 6.89 | 6.68 |
| 4440.0 | 4470.0 | 7.08 | 6.84 | 6.73 |
| 4560.0 | 4590.0 | 6.80 | 6.48 | 6.34 |
| 4680.0 | 4710.0 | 6.51 | 6.13 | 5.94 |
| 4800.0 | 4830.0 | 6.44 | 5.92 | 5.69 |
| 4920.0 | 4950.0 | 6.64 | 5.90 | 5.57 |
| 5040.0 | 5070.0 | 7.00 | 5.92 | 5.43 |
| 5160.0 | 5190.0 | 7.09 | 5.98 | 5.41 |
| 5280.0 | 5310.0 | 7.24 | 6.10 | 5.51 |
| 5400.0 | 5430.0 | 7.68 | 6.47 | 5.84 |
| 5500.0 | 5530.0 | 7.95 | 6.82 | 6.18 |
| 5620.0 | 5650.0 | 8.56 | 7.43 | 6.88 |
| 5720.0 | 5750.0 | 8.84 | 7.75 | 7.45 |
| 5840.0 | 5870.0 | 9.06 | 8.14 | 7.96 |
| 5940.0 | 5970.0 | 9.76 | 8.72 | 8.36 |
| 6060.0 | 6090.0 | 10.56 | 9.51 | 9.05 |
| 6160.0 | 6190.0 | 11.15 | 10.12 | 9.70 |

| RF (IN) (MHz) | LO (MHz) | IP3 INPUT (dBm) @LO (dBm) | | |
|---|---|---|---|---|
| | | +1 | +4 | +7 |
| 1560.0 | 1590.0 | 9.86 | 12.28 | 16.05 |
| 1680.0 | 1710.0 | 10.12 | 17.54 | 11.15 |
| 1800.0 | 1830.0 | 8.94 | 14.76 | 11.70 |
| 1920.0 | 1950.0 | 8.18 | 10.28 | 11.55 |
| 2040.0 | 2070.0 | 4.99 | 7.27 | 10.12 |
| 2160.0 | 2190.0 | 4.51 | 6.49 | 10.10 |
| 2280.0 | 2310.0 | 6.33 | 8.49 | 10.10 |
| 2400.0 | 2430.0 | 9.25 | 11.47 | 11.10 |
| 2520.0 | 2550.0 | 14.01 | 11.93 | 10.14 |
| 2640.0 | 2670.0 | 16.54 | 11.30 | 9.79 |
| 2760.0 | 2790.0 | 15.33 | 12.51 | 11.14 |
| 2880.0 | 2910.0 | 15.04 | 10.63 | 13.00 |
| 3000.0 | 3030.0 | 10.86 | 13.46 | 16.24 |
| 3120.0 | 3150.0 | 7.35 | 6.94 | 7.16 |
| 3240.0 | 3270.0 | 8.66 | 11.71 | 13.42 |
| 3360.0 | 3390.0 | 4.93 | 5.77 | 6.31 |
| 3480.0 | 3510.0 | 4.76 | 6.01 | 7.04 |
| 3600.0 | 3630.0 | 5.62 | 6.93 | 7.83 |
| 3720.0 | 3750.0 | 6.25 | 7.36 | 8.43 |
| 3840.0 | 3870.0 | 6.87 | 7.33 | 8.17 |
| 3960.0 | 3990.0 | 8.00 | 8.60 | 9.27 |
| 4080.0 | 4110.0 | 8.97 | 9.25 | 9.93 |
| 4200.0 | 4230.0 | 9.28 | 9.21 | 10.04 |
| 4320.0 | 4350.0 | 8.35 | 8.59 | 9.83 |
| 4440.0 | 4470.0 | 7.21 | 7.78 | 8.54 |
| 4560.0 | 4590.0 | 6.08 | 6.91 | 7.97 |
| 4680.0 | 4710.0 | 6.64 | 7.62 | 8.79 |
| 4800.0 | 4830.0 | 6.49 | 8.37 | 9.94 |
| 4920.0 | 4950.0 | 5.96 | 8.45 | 10.30 |
| 5040.0 | 5070.0 | 5.29 | 7.82 | 9.47 |
| 5160.0 | 5190.0 | 5.07 | 8.26 | 9.81 |
| 5280.0 | 5310.0 | 4.81 | 7.89 | 8.82 |
| 5400.0 | 5430.0 | 4.20 | 7.39 | 8.28 |
| 5500.0 | 5530.0 | 3.52 | 6.26 | 7.29 |
| 5620.0 | 5650.0 | 3.04 | 4.54 | 5.74 |
| 5720.0 | 5750.0 | 2.79 | 4.57 | 5.58 |
| 5840.0 | 5870.0 | 2.27 | 5.14 | 6.92 |
| 5940.0 | 5970.0 | 2.62 | 7.52 | 7.74 |
| 6060.0 | 6090.0 | 4.39 | 10.71 | 9.46 |
| 6160.0 | 6190.0 | 8.59 | 11.41 | 11.52 |

| RF (IN) (MHz) | LO (MHz) | COMPRESSION @RF IN=0dBm (dB) @LO (dBm) | | |
|---|---|---|---|---|
| | | +1 | +4 | +7 |
| 1560.0 | 1590.0 | -0.43 | 0.15 | 0.13 |
| 1680.0 | 1710.0 | -0.12 | 0.18 | 0.11 |
| 1800.0 | 1830.0 | -0.11 | 0.29 | 0.19 |
| 1920.0 | 1950.0 | 0.26 | 0.37 | 0.25 |
| 2040.0 | 2070.0 | 0.33 | 0.27 | 0.18 |
| 2160.0 | 2190.0 | 0.40 | 0.25 | 0.15 |
| 2280.0 | 2310.0 | 0.60 | 0.24 | 0.08 |
| 2400.0 | 2430.0 | 0.67 | 0.23 | 0.08 |
| 2520.0 | 2550.0 | 0.50 | 0.06 | -0.08 |
| 2640.0 | 2670.0 | 0.50 | 0.06 | -0.08 |
| 2760.0 | 2790.0 | 0.63 | 0.20 | 0.06 |
| 2880.0 | 2910.0 | 0.75 | 0.38 | 0.21 |
| 3000.0 | 3030.0 | 0.80 | 0.60 | 0.53 |
| 3120.0 | 3150.0 | 1.23 | 1.00 | 0.85 |
| 3240.0 | 3270.0 | 1.07 | 0.84 | 0.71 |
| 3360.0 | 3390.0 | 1.32 | 1.02 | 0.86 |
| 3480.0 | 3510.0 | 1.17 | 0.89 | 0.77 |
| 3600.0 | 3630.0 | 1.11 | 0.77 | 0.60 |
| 3720.0 | 3750.0 | 1.05 | 0.77 | 0.62 |
| 3840.0 | 3870.0 | 0.87 | 0.59 | 0.43 |
| 3960.0 | 3990.0 | 0.77 | 0.45 | 0.32 |
| 4080.0 | 4110.0 | 0.75 | 0.42 | 0.29 |
| 4200.0 | 4230.0 | 0.78 | 0.44 | 0.28 |
| 4320.0 | 4350.0 | 0.97 | 0.56 | 0.42 |
| 4440.0 | 4470.0 | 1.10 | 0.63 | 0.42 |
| 4560.0 | 4590.0 | 1.27 | 0.81 | 0.59 |
| 4680.0 | 4710.0 | 1.49 | 1.03 | 0.81 |
| 4800.0 | 4830.0 | 1.83 | 1.30 | 1.07 |
| 4920.0 | 4950.0 | 1.96 | 1.56 | 1.38 |
| 5040.0 | 5070.0 | 1.85 | 1.70 | 1.65 |
| 5160.0 | 5190.0 | 1.98 | 1.82 | 1.90 |
| 5280.0 | 5310.0 | 2.00 | 1.83 | 2.02 |
| 5400.0 | 5430.0 | 1.98 | 1.83 | 2.05 |
| 5500.0 | 5530.0 | 1.98 | 1.76 | 2.06 |
| 5620.0 | 5650.0 | 1.97 | 1.60 | 1.85 |
| 5720.0 | 5750.0 | 1.86 | 1.52 | 1.61 |
| 5840.0 | 5870.0 | 1.68 | 1.34 | 1.27 |
| 5940.0 | 5970.0 | 1.29 | 1.11 | 1.17 |
| 6060.0 | 6090.0 | 1.03 | 0.94 | 0.94 |
| 6160.0 | 6190.0 | 1.09 | 0.86 | 0.76 |

## *Typical Performance Data*

| IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=2500MHz (dB) |
|---|---|---|
| | | @LO (dBm) |
| | | +4 |
| 1000.0 | 1500.0 | 9.34 |
| 945.0 | 1555.0 | 8.19 |
| 890.0 | 1610.0 | 7.25 |
| 835.0 | 1665.0 | 6.97 |
| 780.0 | 1720.0 | 6.45 |
| 725.0 | 1775.0 | 6.43 |
| 670.0 | 1830.0 | 6.45 |
| 615.0 | 1885.0 | 6.47 |
| 560.0 | 1940.0 | 6.45 |
| 505.0 | 1995.0 | 6.24 |
| 450.0 | 2050.0 | 6.05 |
| 395.0 | 2105.0 | 5.86 |
| 340.0 | 2160.0 | 5.85 |
| 285.0 | 2215.0 | 6.03 |
| 230.0 | 2270.0 | 6.15 |
| 175.0 | 2325.0 | 6.39 |
| 120.0 | 2380.0 | 6.58 |
| 65.0 | 2435.0 | 6.74 |
| 10.0 | 2490.0 | 7.45 |
| 53.3 | 2553.3 | 7.16 |
| 118.2 | 2618.2 | 7.19 |
| 183.1 | 2683.1 | 7.15 |
| 248.0 | 2748.0 | 7.09 |
| 312.9 | 2812.9 | 7.17 |
| 377.8 | 2877.8 | 7.30 |
| 442.7 | 2942.7 | 7.11 |
| 486.0 | 2986.0 | 7.16 |
| 550.9 | 3050.9 | 7.24 |
| 594.2 | 3094.2 | 7.38 |
| 659.1 | 3159.1 | 7.45 |
| 702.4 | 3202.4 | 7.45 |
| 767.3 | 3267.3 | 7.46 |
| 810.5 | 3310.5 | 7.42 |
| 875.5 | 3375.5 | 7.67 |
| 918.7 | 3418.7 | 7.88 |
| 983.6 | 3483.6 | 8.39 |
| 1026.9 | 3526.9 | 8.77 |
| 1091.8 | 3591.8 | 9.48 |
| 1135.1 | 3635.1 | 9.93 |
| 1200.0 | 3700.0 | 10.84 |

| IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1989.9MHz (dB) |
|---|---|---|
| | | @LO (dBm) |
| | | +4 |
| 10.1 | 2000.0 | 8.39 |
| 50.1 | 2040.0 | 8.36 |
| 90.1 | 2080.0 | 8.46 |
| 130.1 | 2120.0 | 8.67 |
| 170.1 | 2160.0 | 8.71 |
| 190.1 | 2180.0 | 8.71 |
| 230.1 | 2220.0 | 8.95 |
| 250.1 | 2240.0 | 8.93 |
| 290.1 | 2280.0 | 8.87 |
| 310.1 | 2300.0 | 8.91 |
| 350.1 | 2340.0 | 8.95 |
| 370.1 | 2360.0 | 8.81 |
| 410.1 | 2400.0 | 8.89 |
| 430.1 | 2420.0 | 8.77 |
| 470.1 | 2460.0 | 8.72 |
| 490.1 | 2480.0 | 8.84 |
| 530.1 | 2520.0 | 8.82 |
| 550.1 | 2540.0 | 8.87 |
| 590.1 | 2580.0 | 8.92 |
| 610.1 | 2600.0 | 8.91 |
| 650.1 | 2640.0 | 9.03 |
| 670.1 | 2660.0 | 9.02 |
| 710.1 | 2700.0 | 9.09 |
| 730.1 | 2720.0 | 9.25 |
| 770.1 | 2760.0 | 9.25 |
| 790.1 | 2780.0 | 9.31 |
| 830.1 | 2820.0 | 9.36 |
| 850.1 | 2840.0 | 9.24 |
| 890.1 | 2880.0 | 9.33 |
| 910.1 | 2900.0 | 9.44 |
| 950.1 | 2940.0 | 9.51 |
| 970.1 | 2960.0 | 9.68 |
| 1010.1 | 3000.0 | 9.80 |
| 1030.1 | 3020.0 | 9.84 |
| 1070.1 | 3060.0 | 10.05 |
| 1090.1 | 3080.0 | 9.98 |
| 1130.1 | 3120.0 | 10.13 |
| 1150.1 | 3140.0 | 10.21 |
| 1190.1 | 3180.0 | 10.45 |
| 1210.1 | 3200.0 | 10.59 |

| IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=3010.1MHz (dB) |
|---|---|---|
| | | @LO (dBm) |
| | | +4 |
| 1410.1 | 1600.0 | 9.94 |
| 1370.1 | 1640.0 | 9.28 |
| 1330.1 | 1680.0 | 8.70 |
| 1290.1 | 1720.0 | 8.10 |
| 1250.1 | 1760.0 | 7.66 |
| 1210.1 | 1800.0 | 7.31 |
| 1170.1 | 1840.0 | 7.02 |
| 1130.1 | 1880.0 | 6.73 |
| 1090.1 | 1920.0 | 6.54 |
| 1050.1 | 1960.0 | 6.40 |
| 1010.1 | 2000.0 | 6.31 |
| 970.1 | 2040.0 | 6.36 |
| 930.1 | 2080.0 | 6.41 |
| 890.1 | 2120.0 | 6.58 |
| 850.1 | 2160.0 | 6.61 |
| 810.1 | 2200.0 | 6.66 |
| 770.1 | 2240.0 | 6.55 |
| 730.1 | 2280.0 | 6.36 |
| 690.1 | 2320.0 | 6.23 |
| 650.1 | 2360.0 | 6.14 |
| 610.1 | 2400.0 | 6.12 |
| 570.1 | 2440.0 | 6.15 |
| 530.1 | 2480.0 | 6.30 |
| 490.1 | 2520.0 | 6.34 |
| 450.1 | 2560.0 | 6.53 |
| 430.1 | 2580.0 | 6.52 |
| 390.1 | 2620.0 | 6.74 |
| 370.1 | 2640.0 | 6.88 |
| 330.1 | 2680.0 | 7.08 |
| 310.1 | 2700.0 | 7.17 |
| 270.1 | 2740.0 | 7.36 |
| 250.1 | 2760.0 | 7.39 |
| 210.1 | 2800.0 | 7.36 |
| 190.1 | 2820.0 | 7.31 |
| 150.1 | 2860.0 | 7.23 |
| 130.1 | 2880.0 | 7.18 |
| 90.1 | 2920.0 | 7.17 |
| 70.1 | 2940.0 | 7.28 |
| 30.1 | 2980.0 | 7.21 |
| 10.1 | 3000.0 | 7.51 |

## *Typical Performance Data*

| LO (MHz) | LO-RF ISOLATION (dB) @LO (dBm) | | | LO-IF ISOLATION (dB) @LO (dBm) | | |
|---|---|---|---|---|---|---|
| | +1 | +4 | +7 | +1 | +4 | +7 |
| 1590.0 | 37.72 | 36.48 | 35.91 | 8.90 | 8.55 | 9.08 |
| 1710.0 | 44.94 | 33.92 | 32.73 | 7.96 | 8.38 | 9.23 |
| 1830.0 | 35.38 | 32.50 | 30.03 | 7.84 | 8.67 | 9.37 |
| 1950.0 | 35.99 | 32.45 | 29.40 | 8.44 | 9.28 | 9.85 |
| 2070.0 | 39.46 | 32.53 | 28.82 | 9.42 | 10.09 | 10.41 |
| 2190.0 | 39.87 | 32.57 | 27.85 | 10.48 | 11.04 | 11.13 |
| 2310.0 | 40.54 | 33.05 | 27.00 | 11.52 | 12.02 | 12.10 |
| 2430.0 | 36.77 | 34.31 | 26.96 | 13.03 | 13.46 | 13.28 |
| 2550.0 | 31.96 | 40.90 | 29.07 | 15.33 | 15.64 | 15.27 |
| 2670.0 | 27.70 | 39.90 | 35.44 | 17.76 | 18.04 | 17.52 |
| 2790.0 | 24.40 | 30.74 | 41.75 | 20.47 | 20.40 | 19.61 |
| 2910.0 | 22.47 | 26.93 | 35.22 | 23.31 | 23.19 | 22.10 |
| 3030.0 | 21.05 | 25.09 | 31.99 | 25.98 | 26.45 | 25.71 |
| 3150.0 | 19.61 | 22.96 | 28.38 | 27.78 | 29.33 | 30.41 |
| 3270.0 | 19.42 | 22.20 | 26.57 | 27.29 | 29.18 | 32.45 |
| 3390.0 | 20.62 | 23.26 | 27.44 | 25.07 | 26.13 | 27.90 |
| 3510.0 | 21.65 | 24.89 | 30.85 | 22.30 | 22.91 | 24.17 |
| 3630.0 | 22.64 | 26.20 | 32.96 | 19.82 | 20.00 | 20.75 |
| 3750.0 | 23.77 | 27.45 | 33.09 | 17.84 | 18.09 | 18.62 |
| 3870.0 | 24.90 | 28.59 | 32.63 | 15.94 | 16.30 | 16.98 |
| 3990.0 | 25.49 | 28.96 | 31.45 | 14.42 | 14.83 | 15.65 |
| 4110.0 | 25.38 | 28.06 | 29.66 | 13.14 | 13.73 | 14.49 |
| 4230.0 | 24.81 | 26.34 | 27.73 | 12.21 | 12.53 | 13.34 |
| 4350.0 | 23.82 | 24.49 | 25.24 | 11.64 | 12.04 | 12.64 |
| 4470.0 | 23.70 | 24.02 | 23.64 | 11.74 | 12.39 | 12.78 |
| 4590.0 | 23.36 | 23.23 | 22.37 | 11.42 | 12.21 | 12.72 |
| 4710.0 | 22.96 | 22.85 | 21.66 | 10.81 | 11.84 | 12.52 |
| 4830.0 | 21.72 | 22.16 | 21.34 | 9.93 | 11.02 | 11.89 |
| 4950.0 | 20.98 | 21.54 | 20.85 | 9.45 | 10.27 | 11.21 |
| 5070.0 | 19.83 | 20.78 | 20.22 | 8.81 | 9.64 | 10.54 |
| 5190.0 | 19.50 | 20.29 | 19.95 | 8.60 | 9.17 | 10.06 |
| 5310.0 | 19.20 | 20.02 | 19.78 | 8.30 | 8.74 | 9.59 |
| 5430.0 | 19.06 | 19.98 | 19.90 | 7.94 | 8.34 | 9.10 |
| 5530.0 | 18.98 | 20.04 | 20.00 | 7.63 | 7.96 | 8.73 |
| 5650.0 | 18.68 | 20.12 | 20.50 | 7.36 | 7.54 | 8.23 |
| 5750.0 | 18.81 | 20.18 | 20.98 | 7.16 | 7.41 | 8.11 |
| 5870.0 | 17.85 | 18.87 | 19.46 | 6.73 | 7.26 | 8.18 |
| 5970.0 | 17.78 | 18.26 | 18.61 | 6.56 | 7.40 | 8.55 |
| 6090.0 | 17.09 | 17.25 | 17.65 | 6.45 | 7.83 | 9.10 |
| 6190.0 | 16.22 | 16.23 | 17.00 | 6.68 | 8.10 | 9.50 |

| RF (IN) (MHz) | LO (MHz) | RF-IF ISOLATION (dB) @LO (dBm) | | |
|---|---|---|---|---|
| | | +1 | +4 | +7 |
| 1560.0 | 1590.0 | 22.92 | 26.37 | 27.04 |
| 1680.0 | 1710.0 | 27.45 | 25.54 | 23.86 |
| 1800.0 | 1830.0 | 25.05 | 22.74 | 21.50 |
| 1920.0 | 1950.0 | 20.92 | 20.18 | 19.79 |
| 2040.0 | 2070.0 | 17.71 | 17.88 | 17.88 |
| 2160.0 | 2190.0 | 15.70 | 16.14 | 16.39 |
| 2280.0 | 2310.0 | 14.28 | 14.59 | 14.91 |
| 2400.0 | 2430.0 | 13.46 | 13.97 | 14.37 |
| 2520.0 | 2550.0 | 13.17 | 13.82 | 14.17 |
| 2640.0 | 2670.0 | 13.00 | 13.93 | 14.32 |
| 2760.0 | 2790.0 | 13.24 | 14.12 | 14.56 |
| 2880.0 | 2910.0 | 12.95 | 13.77 | 14.25 |
| 3000.0 | 3030.0 | 12.60 | 13.63 | 14.32 |
| 3120.0 | 3150.0 | 12.41 | 13.57 | 14.34 |
| 3240.0 | 3270.0 | 12.05 | 13.20 | 14.00 |
| 3360.0 | 3390.0 | 12.55 | 13.55 | 14.34 |
| 3480.0 | 3510.0 | 13.14 | 14.16 | 15.01 |
| 3600.0 | 3630.0 | 13.83 | 14.82 | 15.50 |
| 3720.0 | 3750.0 | 14.37 | 15.33 | 16.01 |
| 3840.0 | 3870.0 | 14.83 | 15.62 | 16.26 |
| 3960.0 | 3990.0 | 15.18 | 15.83 | 16.29 |
| 4080.0 | 4110.0 | 15.20 | 15.68 | 16.00 |
| 4200.0 | 4230.0 | 15.42 | 15.55 | 15.56 |
| 4320.0 | 4350.0 | 15.82 | 15.66 | 15.11 |
| 4440.0 | 4470.0 | 15.12 | 14.59 | 13.84 |
| 4560.0 | 4590.0 | 14.90 | 14.18 | 13.49 |
| 4680.0 | 4710.0 | 15.07 | 14.23 | 13.46 |
| 4800.0 | 4830.0 | 15.16 | 14.37 | 13.48 |
| 4920.0 | 4950.0 | 15.02 | 14.34 | 13.61 |
| 5040.0 | 5070.0 | 14.91 | 14.35 | 14.03 |
| 5160.0 | 5190.0 | 15.06 | 14.47 | 14.10 |
| 5280.0 | 5310.0 | 14.79 | 14.14 | 13.90 |
| 5400.0 | 5430.0 | 15.20 | 14.42 | 13.95 |
| 5500.0 | 5530.0 | 15.40 | 14.57 | 13.53 |
| 5620.0 | 5650.0 | 15.99 | 15.02 | 12.89 |
| 5720.0 | 5750.0 | 16.30 | 14.57 | 11.52 |
| 5840.0 | 5870.0 | 16.51 | 13.16 | 9.89 |
| 5940.0 | 5970.0 | 15.67 | 11.25 | 8.93 |
| 6060.0 | 6090.0 | 12.79 | 9.15 | 7.66 |
| 6160.0 | 6190.0 | 10.63 | 7.90 | 6.98 |

## *Typical Performance Data*

| RF (IN) (MHz) | LO (MHz) | RF VSWR (:1) @LO (dBm) | | |
|---|---|---|---|---|
| | | +1 | +4 | +7 |
| 1560.0 | 1590.0 | 12.01 | 8.86 | 7.44 |
| 1680.0 | 1710.0 | 9.23 | 7.25 | 6.32 |
| 1800.0 | 1830.0 | 7.87 | 6.30 | 5.42 |
| 1920.0 | 1950.0 | 6.32 | 5.22 | 4.61 |
| 2040.0 | 2070.0 | 4.95 | 4.32 | 3.90 |
| 2160.0 | 2190.0 | 3.95 | 3.50 | 3.24 |
| 2280.0 | 2310.0 | 3.29 | 2.95 | 2.80 |
| 2400.0 | 2430.0 | 2.77 | 2.61 | 2.56 |
| 2520.0 | 2550.0 | 2.44 | 2.42 | 2.49 |
| 2640.0 | 2670.0 | 2.20 | 2.27 | 2.37 |
| 2760.0 | 2790.0 | 1.99 | 2.05 | 2.13 |
| 2880.0 | 2910.0 | 1.78 | 1.77 | 1.80 |
| 3000.0 | 3030.0 | 1.55 | 1.49 | 1.48 |
| 3120.0 | 3150.0 | 1.45 | 1.37 | 1.33 |
| 3240.0 | 3270.0 | 1.57 | 1.46 | 1.40 |
| 3360.0 | 3390.0 | 1.77 | 1.68 | 1.62 |
| 3480.0 | 3510.0 | 1.97 | 1.86 | 1.81 |
| 3600.0 | 3630.0 | 2.11 | 2.00 | 1.91 |
| 3720.0 | 3750.0 | 2.25 | 2.14 | 2.06 |
| 3840.0 | 3870.0 | 2.40 | 2.28 | 2.20 |
| 3960.0 | 3990.0 | 2.44 | 2.31 | 2.22 |
| 4080.0 | 4110.0 | 2.46 | 2.32 | 2.21 |
| 4200.0 | 4230.0 | 2.51 | 2.34 | 2.21 |
| 4320.0 | 4350.0 | 2.54 | 2.41 | 2.31 |
| 4440.0 | 4470.0 | 2.36 | 2.23 | 2.16 |
| 4560.0 | 4590.0 | 2.17 | 2.01 | 1.93 |
| 4680.0 | 4710.0 | 1.94 | 1.77 | 1.66 |
| 4800.0 | 4830.0 | 1.81 | 1.61 | 1.50 |
| 4920.0 | 4950.0 | 1.71 | 1.47 | 1.37 |
| 5040.0 | 5070.0 | 1.68 | 1.41 | 1.29 |
| 5160.0 | 5190.0 | 1.68 | 1.45 | 1.36 |
| 5280.0 | 5310.0 | 1.74 | 1.54 | 1.45 |
| 5400.0 | 5430.0 | 1.92 | 1.73 | 1.61 |
| 5500.0 | 5530.0 | 2.06 | 1.88 | 1.72 |
| 5620.0 | 5650.0 | 2.37 | 2.16 | 1.94 |
| 5720.0 | 5750.0 | 2.49 | 2.22 | 1.96 |
| 5840.0 | 5870.0 | 2.70 | 2.31 | 2.06 |
| 5940.0 | 5970.0 | 2.80 | 2.30 | 2.09 |
| 6060.0 | 6090.0 | 2.63 | 2.24 | 2.12 |
| 6160.0 | 6190.0 | 2.39 | 2.18 | 2.12 |

| LO (MHz) | LO VSWR (:1) @LO (dBm) | | |
|---|---|---|---|
| | +1 | +4 | +7 |
| 1590.0 | 7.60 | 5.36 | 3.86 |
| 1710.0 | 5.34 | 3.76 | 3.11 |
| 1830.0 | 4.24 | 3.00 | 2.74 |
| 1950.0 | 3.34 | 2.53 | 2.50 |
| 2070.0 | 2.67 | 2.25 | 2.39 |
| 2190.0 | 2.28 | 2.05 | 2.33 |
| 2310.0 | 2.06 | 1.84 | 2.16 |
| 2430.0 | 1.74 | 1.60 | 2.00 |
| 2550.0 | 1.47 | 1.42 | 1.90 |
| 2670.0 | 1.35 | 1.28 | 1.82 |
| 2790.0 | 1.35 | 1.18 | 1.71 |
| 2910.0 | 1.42 | 1.10 | 1.59 |
| 3030.0 | 1.55 | 1.05 | 1.50 |
| 3150.0 | 1.71 | 1.05 | 1.43 |
| 3270.0 | 1.86 | 1.12 | 1.36 |
| 3390.0 | 1.85 | 1.14 | 1.35 |
| 3510.0 | 1.81 | 1.15 | 1.41 |
| 3630.0 | 1.73 | 1.17 | 1.51 |
| 3750.0 | 1.57 | 1.22 | 1.64 |
| 3870.0 | 1.38 | 1.32 | 1.80 |
| 3990.0 | 1.25 | 1.44 | 1.98 |
| 4110.0 | 1.12 | 1.56 | 2.17 |
| 4230.0 | 1.20 | 1.70 | 2.33 |
| 4350.0 | 1.32 | 1.84 | 2.47 |
| 4470.0 | 1.49 | 2.00 | 2.66 |
| 4590.0 | 1.72 | 2.16 | 2.79 |
| 4710.0 | 2.02 | 2.32 | 2.87 |
| 4830.0 | 2.36 | 2.47 | 2.93 |
| 4950.0 | 2.77 | 2.69 | 2.96 |
| 5070.0 | 3.27 | 3.00 | 3.18 |
| 5190.0 | 3.63 | 3.20 | 3.26 |
| 5310.0 | 3.86 | 3.26 | 3.27 |
| 5430.0 | 4.20 | 3.44 | 3.18 |
| 5530.0 | 4.35 | 3.45 | 3.08 |
| 5650.0 | 4.52 | 3.39 | 2.95 |
| 5750.0 | 4.33 | 3.30 | 2.82 |
| 5870.0 | 3.97 | 2.95 | 2.51 |
| 5970.0 | 3.81 | 2.82 | 2.30 |
| 6090.0 | 3.61 | 2.66 | 2.06 |
| 6190.0 | 3.56 | 2.48 | 1.87 |

| IF (OUT) (MHz) | IF VSWR @LO=3000MHz (:1) @LO (dBm) | | |
|---|---|---|---|
| | +1 | +4 | +7 |
| 10.0 | 1.21 | 1.03 | 1.18 |
| 30.0 | 1.22 | 1.03 | 1.16 |
| 50.0 | 1.24 | 1.06 | 1.16 |
| 70.0 | 1.25 | 1.11 | 1.20 |
| 90.0 | 1.26 | 1.12 | 1.21 |
| 110.0 | 1.27 | 1.12 | 1.20 |
| 130.0 | 1.31 | 1.15 | 1.20 |
| 150.0 | 1.36 | 1.20 | 1.23 |
| 170.0 | 1.38 | 1.23 | 1.26 |
| 190.0 | 1.40 | 1.24 | 1.28 |
| 210.0 | 1.44 | 1.27 | 1.28 |
| 230.0 | 1.49 | 1.31 | 1.30 |
| 250.0 | 1.54 | 1.36 | 1.35 |
| 270.0 | 1.58 | 1.40 | 1.39 |
| 290.0 | 1.62 | 1.43 | 1.40 |
| 310.0 | 1.64 | 1.44 | 1.40 |
| 330.0 | 1.72 | 1.52 | 1.46 |
| 350.0 | 1.78 | 1.58 | 1.51 |
| 390.0 | 1.85 | 1.63 | 1.56 |
| 410.0 | 1.92 | 1.68 | 1.59 |
| 450.0 | 2.04 | 1.80 | 1.70 |
| 470.0 | 2.08 | 1.85 | 1.74 |
| 510.0 | 2.17 | 1.91 | 1.79 |
| 530.0 | 2.23 | 1.99 | 1.87 |
| 570.0 | 2.28 | 2.03 | 1.91 |
| 590.0 | 2.32 | 2.07 | 1.94 |
| 630.0 | 2.39 | 2.14 | 2.01 |
| 650.0 | 2.42 | 2.18 | 2.05 |
| 690.0 | 2.47 | 2.22 | 2.08 |
| 710.0 | 2.48 | 2.23 | 2.10 |
| 750.0 | 2.58 | 2.32 | 2.17 |
| 770.0 | 2.58 | 2.32 | 2.16 |
| 810.0 | 2.68 | 2.39 | 2.23 |
| 830.0 | 2.69 | 2.40 | 2.23 |
| 870.0 | 2.78 | 2.46 | 2.28 |
| 890.0 | 2.80 | 2.46 | 2.26 |
| 930.0 | 2.93 | 2.56 | 2.35 |
| 950.0 | 2.96 | 2.57 | 2.35 |
| 990.0 | 3.03 | 2.60 | 2.36 |
| 1010.0 | 3.13 | 2.67 | 2.40 |

*Harmonics Tables*

| RF HARMONICS ORDER | (-dBm) | (-dBc) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | - | - | +11 | 1 | 4 | 26 | 25 | 22 | 27 | 43 | 47 | --- |
| 1 | - | 7 | +0 | 16 | 12 | 37 | 36 | 38 | 36 | 46 | 50 | 50 |
| 2 | >90 | 39 | 49 | 37 | 46 | 43 | 44 | 50 | 54 | 50 | 55 | >68 |
| 3 | >90 | >68 | >68 | 62 | 61 | 58 | 57 | 65 | >68 | >68 | 67 | >68 |
| 4 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 5 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 6 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 7 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 8 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 9 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 10 | --- | --- | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| | RF CAL | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**LO HARMONICS ORDER**

**Test conditions:** **RF IN: 2500 MHz; -15.00 dBm.**
**LO IN: 2530 MHz; +4.00 dBm**
**IF OUT: 30 MHz; -22.16 dBm**

| RF HARMONICS ORDER | (-dBm) | (-dBc) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | - | - | +1 | 12 | 16 | 35 | 36 | 39 | 45 | 57 | 69 | --- |
| 1 | - | 7 | +0 | 17 | 13 | 36 | 38 | 45 | 39 | 58 | 58 | 59 |
| 2 | 71 | 28 | 38 | 26 | 36 | 34 | 36 | 46 | 47 | 42 | 53 | 62 |
| 3 | >90 | 49 | 51 | 42 | 45 | 39 | 38 | 50 | 60 | 56 | 56 | 62 |
| 4 | >90 | 65 | 57 | 52 | 63 | 55 | 64 | 55 | 62 | 56 | 68 | 72 |
| 5 | >90 | >78 | 70 | >78 | 63 | 72 | 54 | 61 | 55 | 65 | 66 | 67 |
| 6 | >90 | 71 | >78 | >78 | 72 | 70 | 75 | 63 | 73 | 65 | 73 | 71 |
| 7 | >90 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | 71 | 75 | 69 | 75 |
| 8 | >90 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | 78 |
| 9 | >90 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 |
| 10 | --- | --- | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 |
| | RF CAL | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**LO HARMONICS ORDER**

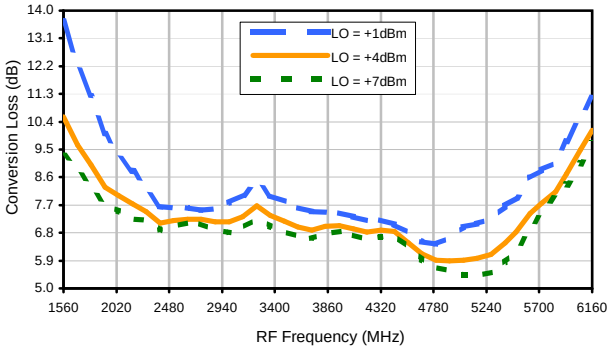
**Test conditions:** **RF IN: 2500 MHz; -5.00 dBm.**
**LO IN: 2530 MHz; +4.00 dBm**
**IF OUT: 30 MHz; -12.17 dBm**

**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.**

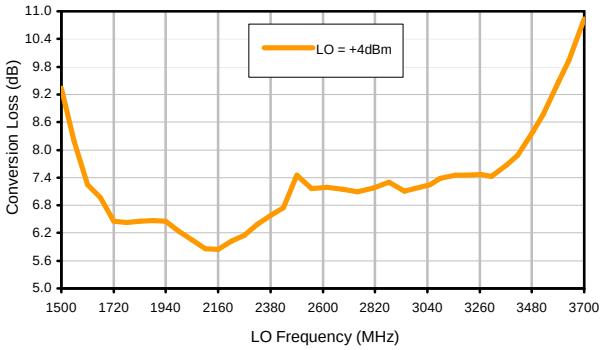
# Frequency Mixer MBA-25L+

## *Typical Performance Curves*

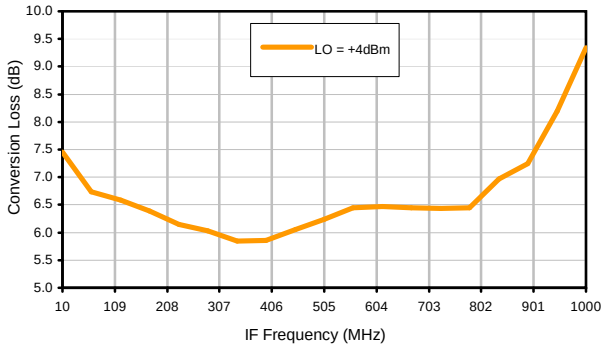
**Conversion Loss @ IF=30MHz**



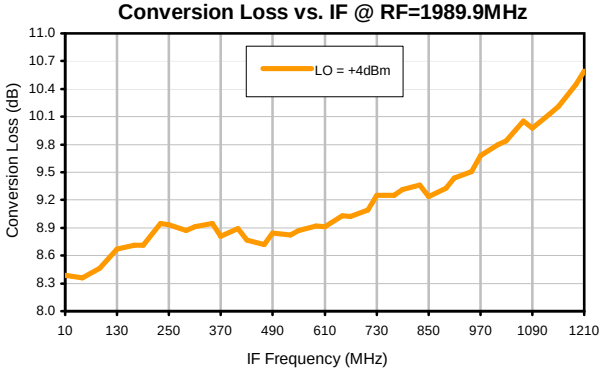

**Conversion Loss vs. LO @ RF=2500MHz**



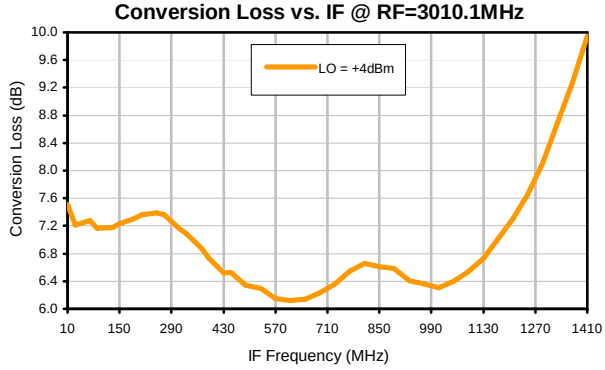

**Conversion Loss vs. IF @ RF=2500MHz**



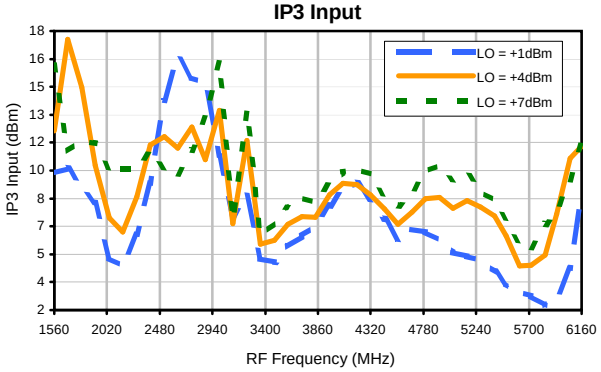

**Conversion Loss vs. IF @ RF=1989.9MHz**



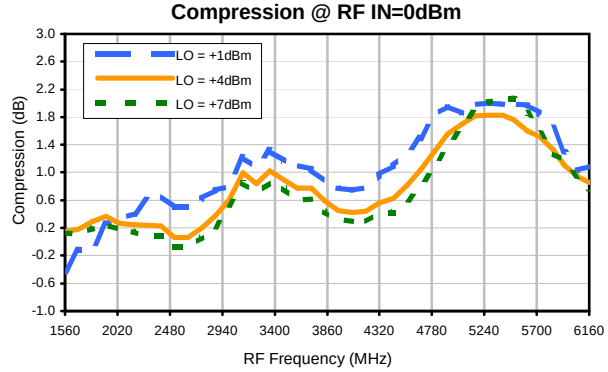

**Conversion Loss vs. IF @ RF=3010.1MHz**




**IP3 Input**

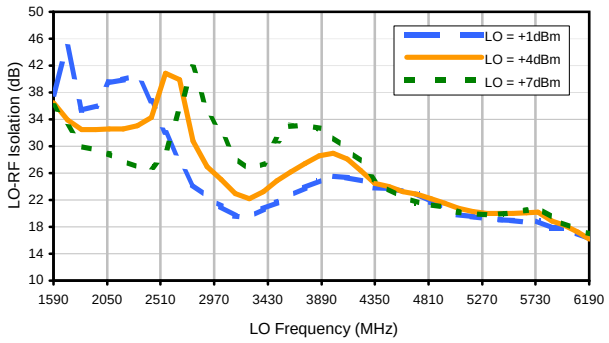



**Compression @ RF IN=0dBm**

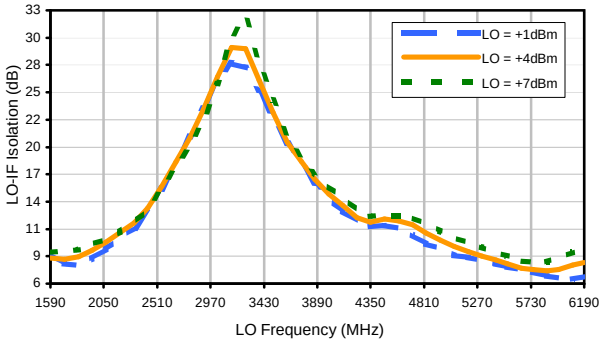


## *Typical Performance Curves*

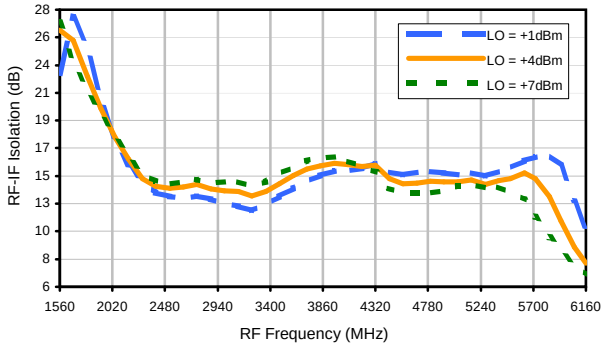
### LO-RF Isolation



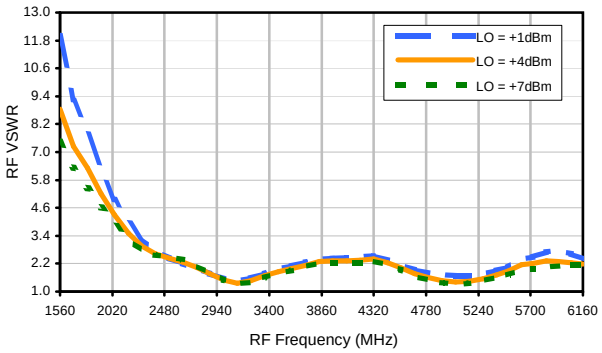

### LO-IF Isolation



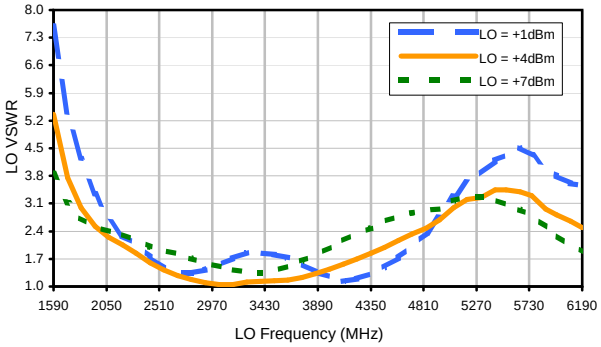

### RF-IF Isolation



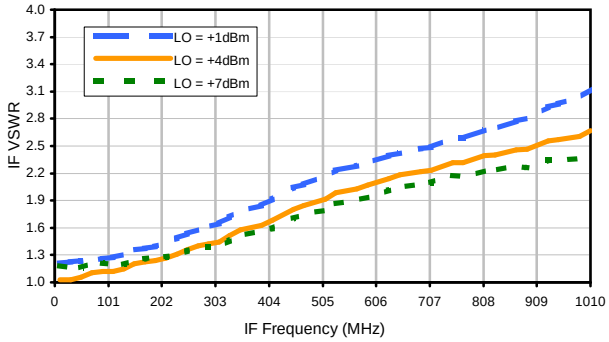

### RF VSWR




### LO VSWR




### IF VSWR



*Harmonics Tables*

| RF HARMONICS ORDER | (-dBm) | (-dBc) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | - | - | +11 | 1 | 4 | 26 | 25 | 22 | 27 | 43 | 47 | --- |
| 1 | - | 7 | +0 | 16 | 12 | 37 | 36 | 38 | 36 | 46 | 50 | 50 |
| 2 | >90 | 39 | 49 | 37 | 46 | 43 | 44 | 50 | 54 | 50 | 55 | >68 |
| 3 | >90 | >68 | >68 | 62 | 61 | 58 | 57 | 65 | >68 | >68 | 67 | >68 |
| 4 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 5 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 6 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 7 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 8 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 9 | >90 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| 10 | --- | --- | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 | >68 |
| | RF CAL | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**LO HARMONICS ORDER**

**Test conditions:** RF IN: 2500 MHz; -15.00 dBm.
LO IN: 2530 MHz; +4.00 dBm
IF OUT: 30 MHz; -22.16 dBm

| RF HARMONICS ORDER | (-dBm) | (-dBc) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | - | - | +1 | 12 | 16 | 35 | 36 | 39 | 45 | 57 | 69 | --- |
| 1 | - | 7 | +0 | 17 | 13 | 36 | 38 | 45 | 39 | 58 | 58 | 59 |
| 2 | 71 | 28 | 38 | 26 | 36 | 34 | 36 | 46 | 47 | 42 | 53 | 62 |
| 3 | >90 | 49 | 51 | 42 | 45 | 39 | 38 | 50 | 60 | 56 | 56 | 62 |
| 4 | >90 | 65 | 57 | 52 | 63 | 55 | 64 | 55 | 62 | 56 | 68 | 72 |
| 5 | >90 | >78 | 70 | >78 | 63 | 72 | 54 | 61 | 55 | 65 | 66 | 67 |
| 6 | >90 | 71 | >78 | >78 | 72 | 70 | 75 | 63 | 73 | 65 | 73 | 71 |
| 7 | >90 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | 71 | 75 | 69 | 75 |
| 8 | >90 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | 78 |
| 9 | >90 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 |
| 10 | --- | --- | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 | >78 |
| | RF CAL | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**LO HARMONICS ORDER**

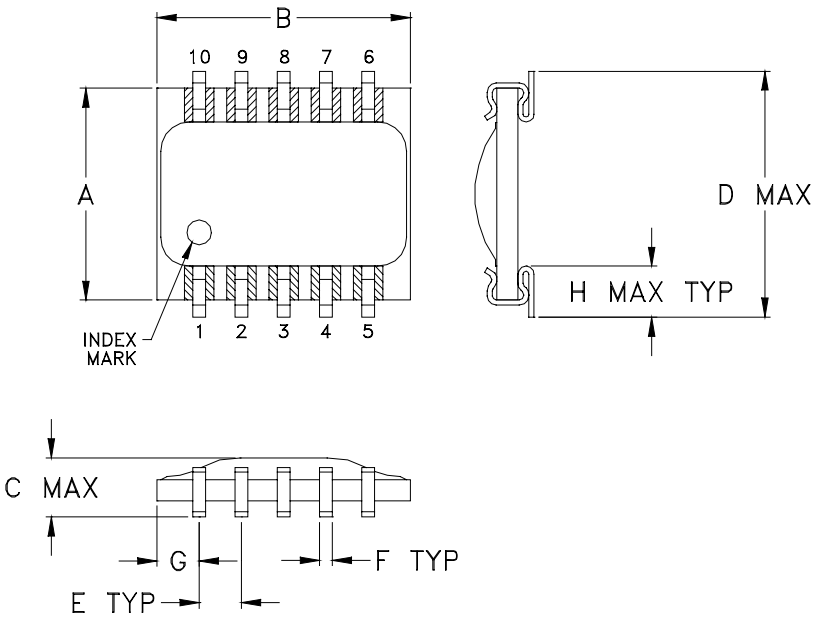
**Test conditions:** RF IN: 2500 MHz; -5.00 dBm.
LO IN: 2530 MHz; +4.00 dBm
IF OUT: 30 MHz; -12.17 dBm

**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.

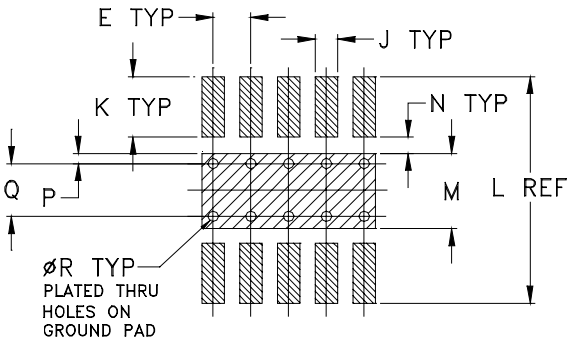
# Case Style SM2

**SM2**

## Outline Dimensions




## PCB Land Pattern




Suggested Layout,
Tolerance to be within ±.002

ADJACENT GROUND PINS SHALL BE CONNECTED TO EACH OTHER AND TO GROUND PAD

| CASE # | A | B | C | D | E | F | G | H | J | K | L | M | N | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SM2 | .250 (6.35) | .300 (7.62) | .095 (2.41) | .290 (7.37) | .050 (1.27) | .015 (0.38) | .050 (1.27) | .060 (1.52) | .030 (0.76) | .080 (2.03) | .300 (7.62) | .100 (2.54) | .020 (0.51) | .015 (0.38) |

| CASE # | Q | R | WT. GRAM |
|---|---|---|---|
| SM2 | .070 (1.78) | .014 (0.36) | .3 |

**Dimensions are in inches (mm). Tolerances: ± .005**

**Notes:**

1. Case material: Plastic encapsulation on Ceramic base.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.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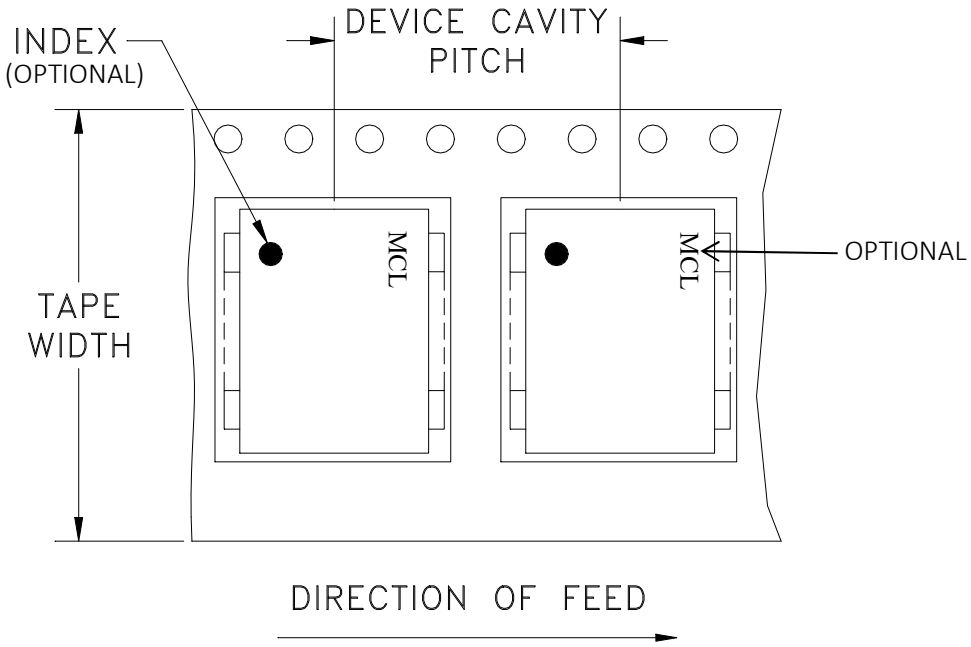
# Tape & Reel Packaging TR-F34

DEVICE ORIENTATION IN T&R




| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel see note | |
|---|---|---|---|---|
| 16 | 12 | 7 | Small quantity standard (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

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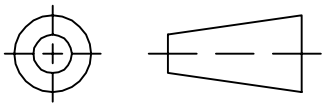
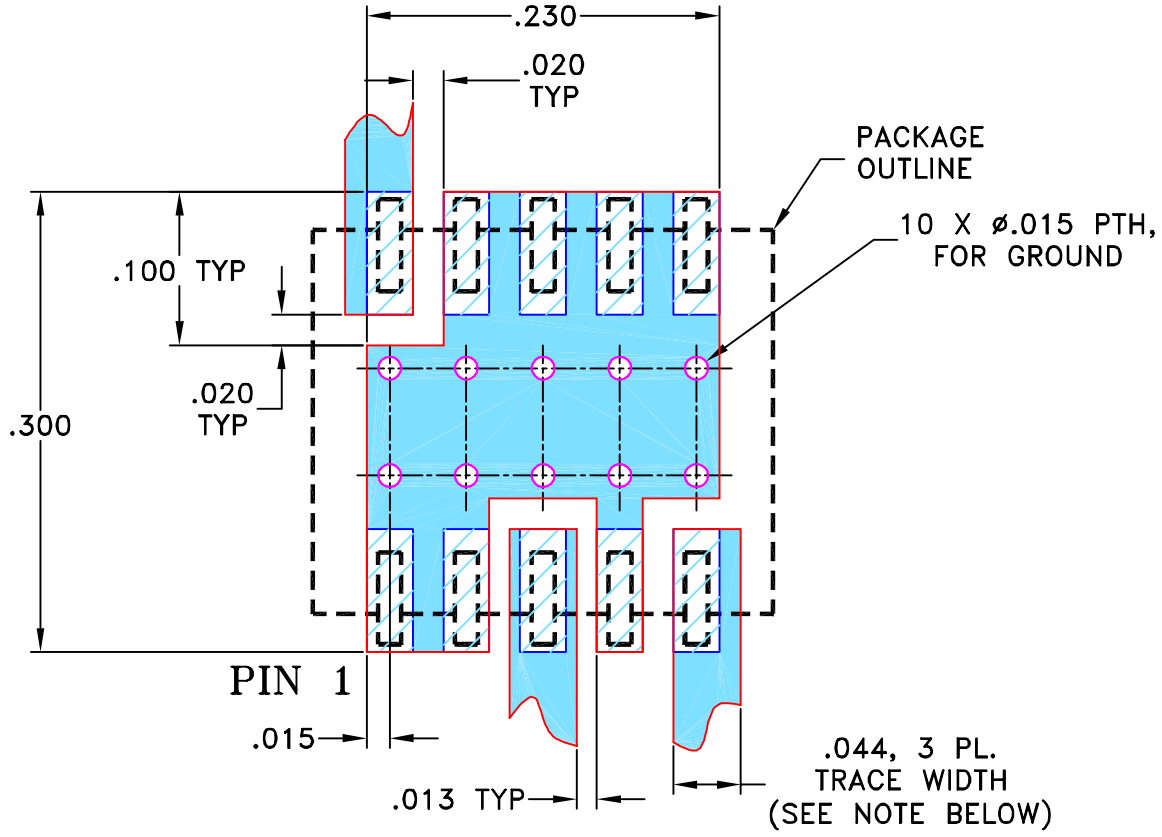
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|---|---|---|---|---|---|
| OR | M82272 | NEW RELEASE | 08/02/02 | GF | DJ |
| A | M102713 | UPDATED NOTES, ADDED "...WITH SMOBC" | 01/16/06 | GT | IL |
| | | | | | |
| | | | | | |

# SUGGESTED MOUNTING CONFIGURATION FOR SM2 CASE STYLE, "ld" PIN CONNECTION




NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.020" ± 0.0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

| UNLESS OTHERWISE SPECIFIED | | INITIALS | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES | DRAWN | GF | 07/18/02 |
| TOLERANCES ON: | CHECKED | WL | 08/02/02 |
| 2 PL DECIMALS ± | APPROVED | DJ | 08/02/02 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |

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

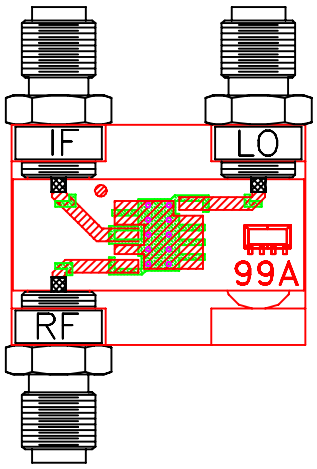
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, ld, SM2, MBA, TB-99

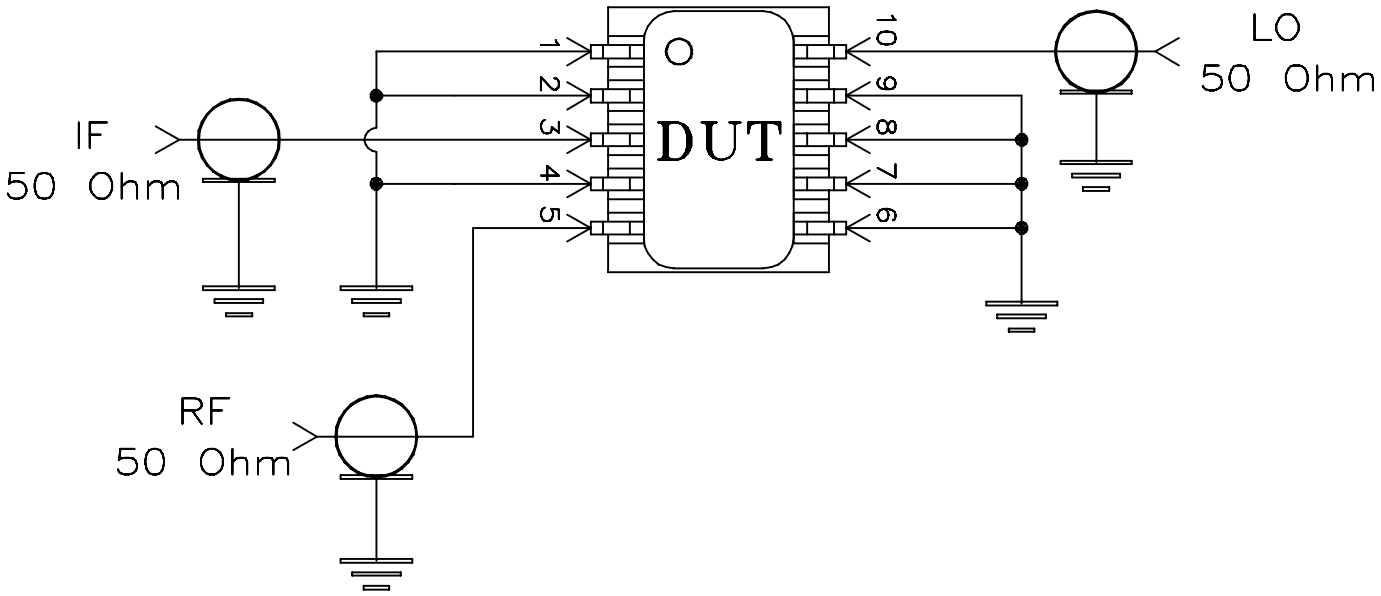
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-066 | A |

| FILE: | SCALE: | SHEET: |
|---|---|---|
| 98PL066 | 8:1 | 1 OF 1 |

# Evaluation Board and Circuit




TB-99




Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

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# Environmental Specifications ENV02T1

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

| Specification | Test/Inspection Condition | Reference/Spec |
|---|---|---|
| Operating Temperature | -40° to 85°C<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C<br>Ambient Environment | Individual Model Data Sheet |
| Humidity | 90 to 95% RH, 240 hours, 50°C | MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours |
| Thermal Shock | -55° to 100°C, 100 cycles | MIL-STD-202, Method 107, Condition A-3, except +100°C |
| Solder Reflow Heat | Sn-Pb Eutetic Process: 225°C peak<br>Pb-Free Process 245° - 250°C peak | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1 |
| Solderability | 10X Magnification | J-STD-002, 95% Coverage |
| Vibration (High Frequency) | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36) | MIL-STD-202, Method 204, Condition D |
| Mechanical Shock | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes | MIL-STD-202, Method 213, Condition A |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215 |