*Engineering Development Model*

# Frequency Mixer ZX05-ED12902/15

## Level 17 (LO Power + 17 dBm)

### Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability.
At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.

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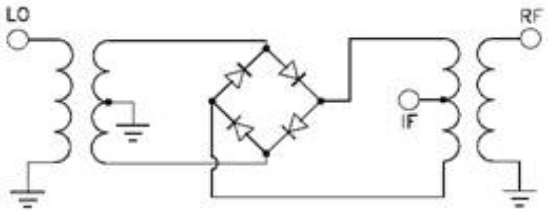
**CASE STYLE : FL905**

| ELECTRICAL SPECIFICATIONS 50Ω @ +25°C | | | | | |
|---|---|---|---|---|---|
| **Parameter** | | **Min.** | **Typ.** | **Max.** | **Units** |
| **Frequency** | **LO** ($f_L$ to $f_U$) | 2300 | | 7600 | MHz |
| | **RF** ($f_L$ to $f_U$) | 2300 | | 7600 | MHz |
| | **IF** | 10 | | 3000 | MHz |
| **Conversion Loss** | **Total Range** | | 6.6 | | dB |
| **LO-RF Isolation** | | | 27 | | dB |
| **LO-IF Isolation** | | | 22 | | dB |
| **Input IP3** | | | +24 | | dBm |
| **1 dB Compressin** | | | +14 | | dBm |

| MAXIMUM RATINGS | |
|---|---|
| **Operating Temperature** | -40°C to +85°C |
| **Storage Temperature** | -55°C to +100°C |

| COAXIAL CONNECTIONS | |
|---|---|
| **LO** | 2 |
| **RF** | 3 |
| **IF** | 1 |

## Electrical Schematics



# Frequency Mixer ZX05-ED12902/15

## *Typical Performance Data*

| RF (IN) (MHz) | LO (MHz) | CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm) | | |
|---|---|---|---|---|
| | | +14 | +17 | +20 |
| 2060.0 | 2090.0 | 19.67 | 11.38 | 8.26 |
| 2220.0 | 2250.0 | 10.82 | 8.31 | 6.88 |
| 2380.0 | 2410.0 | 8.36 | 7.28 | 6.71 |
| 2540.0 | 2570.0 | 7.48 | 6.90 | 6.66 |
| 2700.0 | 2730.0 | 7.60 | 6.93 | 6.62 |
| 2860.0 | 2890.0 | 7.29 | 6.86 | 6.63 |
| 3020.0 | 3050.0 | 7.45 | 6.73 | 6.40 |
| 3180.0 | 3210.0 | 7.37 | 6.81 | 6.47 |
| 3340.0 | 3370.0 | 7.17 | 6.59 | 6.23 |
| 3500.0 | 3530.0 | 7.17 | 6.24 | 5.95 |
| 3660.0 | 3690.0 | 6.59 | 6.07 | 5.88 |
| 3820.0 | 3850.0 | 6.30 | 5.99 | 5.89 |
| 3980.0 | 4010.0 | 6.29 | 6.02 | 5.95 |
| 4140.0 | 4170.0 | 6.43 | 6.08 | 5.97 |
| 4300.0 | 4330.0 | 6.75 | 6.27 | 6.02 |
| 4460.0 | 4490.0 | 6.31 | 5.91 | 5.71 |
| 4620.0 | 4650.0 | 6.27 | 5.94 | 5.78 |
| 4780.0 | 4810.0 | 7.02 | 6.38 | 6.10 |
| 4940.0 | 4970.0 | 8.43 | 7.23 | 6.61 |
| 5100.0 | 5130.0 | 8.47 | 7.32 | 6.73 |
| 5260.0 | 5290.0 | 8.31 | 7.08 | 6.43 |
| 5420.0 | 5450.0 | 8.22 | 7.00 | 6.32 |
| 5580.0 | 5610.0 | 7.70 | 6.62 | 5.96 |
| 5740.0 | 5770.0 | 7.72 | 6.66 | 6.03 |
| 5900.0 | 5930.0 | 7.38 | 6.48 | 6.05 |
| 6060.0 | 6090.0 | 7.30 | 6.33 | 5.87 |
| 6220.0 | 6250.0 | 7.32 | 6.28 | 5.94 |
| 6380.0 | 6410.0 | 7.26 | 6.42 | 6.11 |
| 6540.0 | 6570.0 | 7.13 | 6.37 | 6.13 |
| 6700.0 | 6730.0 | 6.91 | 6.35 | 6.21 |
| 6860.0 | 6890.0 | 6.63 | 6.15 | 6.07 |
| 7020.0 | 7050.0 | 6.75 | 6.19 | 6.04 |
| 7180.0 | 7210.0 | 6.98 | 6.19 | 5.93 |
| 7340.0 | 7370.0 | 7.37 | 6.21 | 5.90 |
| 7500.0 | 7530.0 | 9.70 | 7.54 | 6.70 |
| 7640.0 | 7670.0 | 10.42 | 7.56 | 6.68 |
| 7800.0 | 7830.0 | 11.08 | 7.92 | 6.57 |
| 7940.0 | 7970.0 | 12.23 | 8.53 | 7.07 |
| 8100.0 | 8130.0 | 13.34 | 8.54 | 7.51 |
| 8240.0 | 8270.0 | 14.34 | 9.34 | 8.86 |

| RF (IN) (MHz) | LO (MHz) | IP3 INPUT (dBm) @LO (dBm) | | |
|---|---|---|---|---|
| | | +14 | +17 | +20 |
| 2060.0 | 2090.0 | 4.02 | 11.59 | 18.94 |
| 2220.0 | 2250.0 | 14.50 | 20.21 | 24.59 |
| 2380.0 | 2410.0 | 22.54 | 23.77 | 24.74 |
| 2540.0 | 2570.0 | 26.23 | 22.59 | 22.48 |
| 2700.0 | 2730.0 | 22.51 | 23.08 | 23.01 |
| 2860.0 | 2890.0 | 24.76 | 25.52 | 28.95 |
| 3020.0 | 3050.0 | 25.08 | 27.75 | 31.92 |
| 3180.0 | 3210.0 | 25.79 | 29.00 | 36.76 |
| 3340.0 | 3370.0 | 22.80 | 24.94 | 25.42 |
| 3500.0 | 3530.0 | 21.94 | 19.98 | 24.19 |
| 3660.0 | 3690.0 | 19.49 | 23.24 | 27.44 |
| 3820.0 | 3850.0 | 21.87 | 25.41 | 29.87 |
| 3980.0 | 4010.0 | 23.64 | 29.24 | 30.97 |
| 4140.0 | 4170.0 | 21.30 | 22.51 | 24.25 |
| 4300.0 | 4330.0 | 25.15 | 23.89 | 23.29 |
| 4460.0 | 4490.0 | 24.10 | 26.57 | 27.07 |
| 4620.0 | 4650.0 | 23.05 | 26.19 | 28.13 |
| 4780.0 | 4810.0 | 23.55 | 24.06 | 24.81 |
| 4940.0 | 4970.0 | 23.63 | 27.58 | 25.29 |
| 5100.0 | 5130.0 | 25.16 | 24.81 | 25.40 |
| 5260.0 | 5290.0 | 22.49 | 23.20 | 23.19 |
| 5420.0 | 5450.0 | 21.36 | 22.22 | 22.25 |
| 5580.0 | 5610.0 | 20.97 | 21.60 | 21.53 |
| 5740.0 | 5770.0 | 20.49 | 21.95 | 21.01 |
| 5900.0 | 5930.0 | 21.78 | 24.50 | 21.59 |
| 6060.0 | 6090.0 | 20.93 | 23.88 | 23.01 |
| 6220.0 | 6250.0 | 19.91 | 23.97 | 24.88 |
| 6380.0 | 6410.0 | 21.04 | 25.63 | 26.65 |
| 6540.0 | 6570.0 | 21.47 | 25.96 | 26.32 |
| 6700.0 | 6730.0 | 22.58 | 26.12 | 25.80 |
| 6860.0 | 6890.0 | 22.57 | 24.55 | 24.69 |
| 7020.0 | 7050.0 | 21.70 | 22.43 | 23.17 |
| 7180.0 | 7210.0 | 21.11 | 23.53 | 23.24 |
| 7340.0 | 7370.0 | 22.57 | 25.89 | 26.53 |
| 7500.0 | 7530.0 | 20.57 | 25.64 | 25.02 |
| 7640.0 | 7670.0 | 16.91 | 20.65 | 22.05 |
| 7800.0 | 7830.0 | 17.13 | 18.41 | 20.48 |
| 7940.0 | 7970.0 | 17.61 | 18.01 | 20.20 |
| 8100.0 | 8130.0 | 15.53 | 18.00 | 18.03 |
| 8240.0 | 8270.0 | 15.14 | 15.45 | 14.79 |

| RF (IN) (MHz) | LO (MHz) | COMPRESSION @RF IN=+14dBm (dB) @LO (dBm) | | |
|---|---|---|---|---|
| | | +14 | +17 | +20 |
| 2060.0 | 2090.0 | -6.44 | -0.50 | 1.00 |
| 2220.0 | 2250.0 | 0.02 | 1.33 | 1.37 |
| 2380.0 | 2410.0 | 1.48 | 1.43 | 1.22 |
| 2540.0 | 2570.0 | 1.36 | 1.00 | 0.89 |
| 2700.0 | 2730.0 | 0.77 | 0.55 | 0.61 |
| 2860.0 | 2890.0 | 0.79 | 0.57 | 0.49 |
| 3020.0 | 3050.0 | 0.65 | 0.50 | 0.49 |
| 3180.0 | 3210.0 | 0.50 | 0.36 | 0.34 |
| 3340.0 | 3370.0 | 0.54 | 0.48 | 0.44 |
| 3500.0 | 3530.0 | 0.76 | 0.71 | 0.34 |
| 3660.0 | 3690.0 | 1.34 | 0.54 | 0.23 |
| 3820.0 | 3850.0 | 1.58 | 0.47 | 0.20 |
| 3980.0 | 4010.0 | 1.39 | 0.38 | 0.17 |
| 4140.0 | 4170.0 | 1.27 | 0.47 | 0.23 |
| 4300.0 | 4330.0 | 1.03 | 0.58 | 0.44 |
| 4460.0 | 4490.0 | 0.97 | 0.50 | 0.34 |
| 4620.0 | 4650.0 | 1.28 | 0.61 | 0.31 |
| 4780.0 | 4810.0 | 1.34 | 0.90 | 0.56 |
| 4940.0 | 4970.0 | 0.75 | 0.80 | 0.61 |
| 5100.0 | 5130.0 | 0.32 | 0.62 | 0.56 |
| 5260.0 | 5290.0 | 0.49 | 0.63 | 0.70 |
| 5420.0 | 5450.0 | 0.61 | 0.44 | 0.59 |
| 5580.0 | 5610.0 | 0.99 | 0.57 | 0.69 |
| 5740.0 | 5770.0 | 1.03 | 0.53 | 0.58 |
| 5900.0 | 5930.0 | 1.10 | 0.63 | 0.59 |
| 6060.0 | 6090.0 | 0.73 | 0.52 | 0.60 |
| 6220.0 | 6250.0 | 1.00 | 0.59 | 0.61 |
| 6380.0 | 6410.0 | 0.80 | 0.45 | 0.47 |
| 6540.0 | 6570.0 | 0.87 | 0.56 | 0.61 |
| 6700.0 | 6730.0 | 0.81 | 0.53 | 0.58 |
| 6860.0 | 6890.0 | 1.12 | 0.59 | 0.58 |
| 7020.0 | 7050.0 | 1.04 | 0.61 | 0.52 |
| 7180.0 | 7210.0 | 1.14 | 0.57 | 0.46 |
| 7340.0 | 7370.0 | 1.08 | 0.66 | 0.50 |
| 7500.0 | 7530.0 | 0.23 | 0.69 | 0.82 |
| 7640.0 | 7670.0 | 0.08 | 1.07 | 1.38 |
| 7800.0 | 7830.0 | 0.27 | 1.10 | 1.62 |
| 7940.0 | 7970.0 | 0.08 | 1.33 | 1.45 |
| 8100.0 | 8130.0 | 0.01 | 2.32 | 1.78 |
| 8240.0 | 8270.0 | 0.60 | 3.17 | 1.83 |



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## *Typical Performance Data*

| IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=4950MHz (dB) |
|---|---|---|
| | | @LO (dBm) |
| | | +17 |
| 8950.0 | 4000.0 | 10.36 |
| 8983.6 | 4033.6 | 9.97 |
| 9050.7 | 4100.7 | 9.51 |
| 9084.3 | 4134.3 | 9.00 |
| 9151.4 | 4201.4 | 8.25 |
| 9185.0 | 4235.0 | 7.67 |
| 9252.1 | 4302.1 | 7.13 |
| 9285.7 | 4335.7 | 6.68 |
| 9352.9 | 4402.9 | 6.26 |
| 9386.4 | 4436.4 | 5.97 |
| 9453.6 | 4503.6 | 5.85 |
| 9487.1 | 4537.1 | 5.75 |
| 9554.3 | 4604.3 | 5.93 |
| 9587.9 | 4637.9 | 5.87 |
| 9655.0 | 4705.0 | 6.27 |
| 9688.6 | 4738.6 | 6.33 |
| 9755.7 | 4805.7 | 6.84 |
| 9789.3 | 4839.3 | 6.93 |
| 9856.4 | 4906.4 | 7.59 |
| 9890.0 | 4940.0 | 8.04 |
| 9916.9 | 4966.9 | 8.36 |
| 9923.8 | 4973.8 | 8.42 |
| 9937.6 | 4987.6 | 8.51 |
| 9944.5 | 4994.5 | 8.58 |
| 9958.3 | 5008.3 | 8.78 |
| 9965.2 | 5015.2 | 8.87 |
| 9979.0 | 5029.0 | 9.06 |
| 9985.9 | 5035.9 | 9.17 |
| 9999.7 | 5049.7 | 9.33 |
| 10006.6 | 5056.6 | 9.37 |
| 10020.3 | 5070.3 | 9.42 |
| 10027.2 | 5077.2 | 9.42 |
| 10041.0 | 5091.0 | 9.45 |
| 10047.9 | 5097.9 | 9.51 |
| 10061.7 | 5111.7 | 9.66 |
| 10068.6 | 5118.6 | 9.75 |
| 10082.4 | 5132.4 | 9.84 |
| 10089.3 | 5139.3 | 9.89 |
| 10103.1 | 5153.1 | 9.92 |
| 10110.0 | 5160.0 | 9.86 |

| IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=2289.8999MHz (dB) |
|---|---|---|
| | | @LO (dBm) |
| | | +17 |
| 10.1 | 2300.0 | 8.15 |
| 110.1 | 2400.0 | 7.05 |
| 210.1 | 2500.0 | 7.09 |
| 310.1 | 2600.0 | 6.92 |
| 410.1 | 2700.0 | 6.57 |
| 510.1 | 2800.0 | 6.55 |
| 610.1 | 2900.0 | 6.38 |
| 710.1 | 3000.0 | 6.25 |
| 810.1 | 3100.0 | 6.33 |
| 910.1 | 3200.0 | 6.54 |
| 1010.1 | 3300.0 | 6.96 |
| 1110.1 | 3400.0 | 7.26 |
| 1210.1 | 3500.0 | 7.20 |
| 1310.1 | 3600.0 | 7.00 |
| 1410.1 | 3700.0 | 7.05 |
| 1510.1 | 3800.0 | 7.41 |
| 1610.1 | 3900.0 | 7.41 |
| 1710.1 | 4000.0 | 7.15 |
| 1810.1 | 4100.0 | 7.02 |
| 1910.1 | 4200.0 | 7.10 |
| 2010.1 | 4300.0 | 7.33 |
| 2110.1 | 4400.0 | 7.43 |
| 2210.1 | 4500.0 | 7.30 |
| 2310.1 | 4600.0 | 7.38 |
| 2410.1 | 4700.0 | 7.65 |
| 2510.1 | 4800.0 | 7.90 |
| 2610.1 | 4900.0 | 8.13 |
| 2710.1 | 5000.0 | 8.36 |
| 2810.1 | 5100.0 | 8.38 |
| 2910.1 | 5200.0 | 8.12 |
| 3010.1 | 5300.0 | 7.90 |
| 3110.1 | 5400.0 | 7.75 |
| 3210.1 | 5500.0 | 7.46 |
| 3310.1 | 5600.0 | 7.45 |
| 3410.1 | 5700.0 | 7.23 |
| 3510.1 | 5800.0 | 7.16 |
| 3630.1 | 5920.0 | 7.62 |
| 3730.1 | 6020.0 | 8.21 |
| 3850.1 | 6140.0 | 8.82 |
| 3950.1 | 6240.0 | 9.72 |

| IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=7610.1001MHz (dB) |
|---|---|---|
| | | @LO (dBm) |
| | | +17 |
| 1850.1 | 5760.0 | 9.19 |
| 1810.1 | 5800.0 | 9.09 |
| 1770.1 | 5840.0 | 8.98 |
| 1730.1 | 5880.0 | 8.78 |
| 1690.1 | 5920.0 | 8.77 |
| 1650.1 | 5960.0 | 8.62 |
| 1610.1 | 6000.0 | 8.49 |
| 1570.1 | 6040.0 | 8.44 |
| 1530.1 | 6080.0 | 8.23 |
| 1490.1 | 6120.0 | 8.20 |
| 1450.1 | 6160.0 | 8.02 |
| 1410.1 | 6200.0 | 7.61 |
| 1370.1 | 6240.0 | 7.62 |
| 1310.1 | 6300.0 | 7.39 |
| 1270.1 | 6340.0 | 7.40 |
| 1210.1 | 6400.0 | 7.14 |
| 1170.1 | 6440.0 | 7.09 |
| 1110.1 | 6500.0 | 6.67 |
| 1070.1 | 6540.0 | 6.70 |
| 1010.1 | 6600.0 | 6.49 |
| 970.1 | 6640.0 | 6.38 |
| 910.1 | 6700.0 | 6.18 |
| 870.1 | 6740.0 | 6.06 |
| 810.1 | 6800.0 | 5.82 |
| 770.1 | 6840.0 | 5.70 |
| 710.1 | 6900.0 | 5.57 |
| 670.1 | 6940.0 | 5.58 |
| 610.1 | 7000.0 | 5.68 |
| 570.1 | 7040.0 | 5.68 |
| 510.1 | 7100.0 | 5.81 |
| 470.1 | 7140.0 | 5.81 |
| 410.1 | 7200.0 | 6.04 |
| 370.1 | 7240.0 | 6.35 |
| 310.1 | 7300.0 | 6.87 |
| 270.1 | 7340.0 | 7.04 |
| 210.1 | 7400.0 | 7.13 |
| 170.1 | 7440.0 | 7.11 |
| 110.1 | 7500.0 | 7.15 |
| 70.1 | 7540.0 | 6.92 |
| 10.1 | 7600.0 | 7.68 |




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## *Typical Performance Data*

| LO (MHz) | LO-RF ISOLATION (dB) @LO (dBm) | | | LO-IF ISOLATION (dB) @LO (dBm) | | |
|---|---|---|---|---|---|---|
| | +14 | +17 | +20 | +14 | +17 | +20 |
| 2090.0 | 38.13 | 33.05 | 31.10 | 15.89 | 16.65 | 18.69 |
| 2250.0 | 33.46 | 32.74 | 32.75 | 15.13 | 17.23 | 19.68 |
| 2410.0 | 34.84 | 35.96 | 36.83 | 15.48 | 18.27 | 21.01 |
| 2570.0 | 37.49 | 40.24 | 39.78 | 16.58 | 19.98 | 22.69 |
| 2730.0 | 37.59 | 36.86 | 36.99 | 18.28 | 21.48 | 23.42 |
| 2890.0 | 36.66 | 34.95 | 32.40 | 19.66 | 21.90 | 23.01 |
| 3050.0 | 35.31 | 32.77 | 31.41 | 20.63 | 22.82 | 23.94 |
| 3210.0 | 35.00 | 32.71 | 30.83 | 22.95 | 24.89 | 24.39 |
| 3370.0 | 34.80 | 32.83 | 30.75 | 26.06 | 26.40 | 24.30 |
| 3530.0 | 35.74 | 33.97 | 31.89 | 29.96 | 27.30 | 24.44 |
| 3690.0 | 36.09 | 33.35 | 31.55 | 33.07 | 28.10 | 25.15 |
| 3850.0 | 35.12 | 33.18 | 32.07 | 35.46 | 30.75 | 28.50 |
| 4010.0 | 35.81 | 33.67 | 32.65 | 34.83 | 33.62 | 32.46 |
| 4170.0 | 33.06 | 32.57 | 32.25 | 31.93 | 33.50 | 34.87 |
| 4330.0 | 30.74 | 31.18 | 30.44 | 28.89 | 28.02 | 27.64 |
| 4490.0 | 29.14 | 29.50 | 27.72 | 23.45 | 22.55 | 21.69 |
| 4650.0 | 28.23 | 28.42 | 27.40 | 18.31 | 18.40 | 17.99 |
| 4810.0 | 28.88 | 29.09 | 28.53 | 15.55 | 16.11 | 16.04 |
| 4970.0 | 28.22 | 28.21 | 28.06 | 14.61 | 15.38 | 15.70 |
| 5130.0 | 27.43 | 27.47 | 27.34 | 14.25 | 15.23 | 15.85 |
| 5290.0 | 26.80 | 26.70 | 26.40 | 14.49 | 15.71 | 16.56 |
| 5450.0 | 26.33 | 25.91 | 25.37 | 15.36 | 16.66 | 17.72 |
| 5610.0 | 26.11 | 25.39 | 24.65 | 16.37 | 17.80 | 19.13 |
| 5770.0 | 25.57 | 24.92 | 23.91 | 17.36 | 19.01 | 20.59 |
| 5930.0 | 24.93 | 24.28 | 23.25 | 18.93 | 20.59 | 22.19 |
| 6090.0 | 23.93 | 23.24 | 22.09 | 20.56 | 22.19 | 23.69 |
| 6250.0 | 23.42 | 22.94 | 21.81 | 22.71 | 24.12 | 25.33 |
| 6410.0 | 22.57 | 22.24 | 21.59 | 25.37 | 25.62 | 25.64 |
| 6570.0 | 21.70 | 21.71 | 21.48 | 27.60 | 25.02 | 23.76 |
| 6730.0 | 20.99 | 21.48 | 21.46 | 28.49 | 25.76 | 24.31 |
| 6890.0 | 19.79 | 20.70 | 21.18 | 28.89 | 28.14 | 27.34 |
| 7050.0 | 18.61 | 19.90 | 20.48 | 26.71 | 27.86 | 28.46 |
| 7210.0 | 18.29 | 19.16 | 19.78 | 24.21 | 24.70 | 24.75 |
| 7370.0 | 18.75 | 19.98 | 20.89 | 21.17 | 21.14 | 21.32 |
| 7530.0 | 18.76 | 19.95 | 20.21 | 20.14 | 18.89 | 18.29 |
| 7670.0 | 18.50 | 19.23 | 19.87 | 22.09 | 19.16 | 18.95 |
| 7830.0 | 19.26 | 19.92 | 20.57 | 21.00 | 16.24 | 14.88 |
| 7970.0 | 20.22 | 20.87 | 21.27 | 18.13 | 14.67 | 12.58 |
| 8130.0 | 22.02 | 22.74 | 22.50 | 14.55 | 12.57 | 10.72 |
| 8270.0 | 23.76 | 24.31 | 24.37 | 11.35 | 10.35 | 8.88 |

| RF (IN) (MHz) | LO (MHz) | RF-IF ISOLATION (dB) @LO (dBm) | | |
|---|---|---|---|---|
| | | +14 | +17 | +20 |
| 2060.0 | 2090.0 | 19.46 | 15.41 | 11.93 |
| 2220.0 | 2250.0 | 17.30 | 13.32 | 12.10 |
| 2380.0 | 2410.0 | 16.42 | 14.22 | 13.26 |
| 2540.0 | 2570.0 | 17.65 | 16.27 | 15.49 |
| 2700.0 | 2730.0 | 18.51 | 17.39 | 16.74 |
| 2860.0 | 2890.0 | 18.95 | 18.46 | 18.31 |
| 3020.0 | 3050.0 | 19.24 | 19.23 | 19.63 |
| 3180.0 | 3210.0 | 19.90 | 20.16 | 20.45 |
| 3340.0 | 3370.0 | 19.83 | 19.87 | 20.02 |
| 3500.0 | 3530.0 | 19.52 | 19.73 | 19.53 |
| 3660.0 | 3690.0 | 19.85 | 19.84 | 19.73 |
| 3820.0 | 3850.0 | 19.89 | 19.75 | 19.67 |
| 3980.0 | 4010.0 | 20.15 | 20.05 | 19.99 |
| 4140.0 | 4170.0 | 20.91 | 20.87 | 20.82 |
| 4300.0 | 4330.0 | 25.11 | 24.85 | 24.44 |
| 4460.0 | 4490.0 | 29.27 | 28.68 | 28.35 |
| 4620.0 | 4650.0 | 35.60 | 34.75 | 34.31 |
| 4780.0 | 4810.0 | 36.15 | 35.56 | 35.07 |
| 4940.0 | 4970.0 | 32.72 | 32.06 | 31.56 |
| 5100.0 | 5130.0 | 29.17 | 28.79 | 28.42 |
| 5260.0 | 5290.0 | 26.91 | 26.47 | 26.07 |
| 5420.0 | 5450.0 | 25.49 | 24.99 | 24.61 |
| 5580.0 | 5610.0 | 24.91 | 24.35 | 23.99 |
| 5740.0 | 5770.0 | 25.02 | 24.27 | 23.82 |
| 5900.0 | 5930.0 | 25.47 | 24.38 | 23.61 |
| 6060.0 | 6090.0 | 26.86 | 26.14 | 24.97 |
| 6220.0 | 6250.0 | 25.60 | 24.15 | 23.31 |
| 6380.0 | 6410.0 | 24.20 | 22.32 | 21.40 |
| 6540.0 | 6570.0 | 26.37 | 24.95 | 24.27 |
| 6700.0 | 6730.0 | 29.49 | 28.23 | 27.71 |
| 6860.0 | 6890.0 | 32.86 | 31.39 | 30.42 |
| 7020.0 | 7050.0 | 36.78 | 34.07 | 31.73 |
| 7180.0 | 7210.0 | 44.12 | 38.13 | 35.63 |
| 7340.0 | 7370.0 | 35.91 | 37.52 | 38.85 |
| 7500.0 | 7530.0 | 27.83 | 30.42 | 35.11 |
| 7640.0 | 7670.0 | 29.46 | 32.89 | 31.18 |
| 7800.0 | 7830.0 | 27.46 | 29.59 | 35.38 |
| 7940.0 | 7970.0 | 25.34 | 27.27 | 31.62 |
| 8100.0 | 8130.0 | 23.34 | 26.06 | 26.54 |
| 8240.0 | 8270.0 | 21.63 | 24.01 | 25.89 |



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## *Typical Performance Data*

| RF (IN) (MHz) | LO (MHz) | RF VSWR (:1) @LO (dBm) | | |
|---|---|---|---|---|
| | | +14 | +17 | +20 |
| 2060.0 | 2090.0 | 6.37 | 3.20 | 2.15 |
| 2220.0 | 2250.0 | 3.64 | 2.56 | 2.13 |
| 2380.0 | 2410.0 | 3.22 | 2.73 | 2.49 |
| 2540.0 | 2570.0 | 3.28 | 2.94 | 2.81 |
| 2700.0 | 2730.0 | 3.40 | 2.97 | 2.78 |
| 2860.0 | 2890.0 | 3.43 | 3.13 | 2.87 |
| 3020.0 | 3050.0 | 3.58 | 3.14 | 2.86 |
| 3180.0 | 3210.0 | 3.34 | 2.94 | 2.65 |
| 3340.0 | 3370.0 | 3.33 | 2.84 | 2.44 |
| 3500.0 | 3530.0 | 2.96 | 2.31 | 2.01 |
| 3660.0 | 3690.0 | 2.42 | 2.11 | 1.94 |
| 3820.0 | 3850.0 | 2.26 | 2.03 | 1.89 |
| 3980.0 | 4010.0 | 2.25 | 2.00 | 1.87 |
| 4140.0 | 4170.0 | 2.40 | 2.13 | 1.99 |
| 4300.0 | 4330.0 | 3.01 | 2.66 | 2.40 |
| 4460.0 | 4490.0 | 2.65 | 2.35 | 2.12 |
| 4620.0 | 4650.0 | 2.32 | 2.07 | 1.91 |
| 4780.0 | 4810.0 | 2.77 | 2.45 | 2.27 |
| 4940.0 | 4970.0 | 3.69 | 3.20 | 2.89 |
| 5100.0 | 5130.0 | 3.83 | 3.30 | 2.97 |
| 5260.0 | 5290.0 | 3.89 | 3.31 | 2.87 |
| 5420.0 | 5450.0 | 3.63 | 3.10 | 2.66 |
| 5580.0 | 5610.0 | 3.52 | 3.00 | 2.54 |
| 5740.0 | 5770.0 | 3.31 | 2.84 | 2.40 |
| 5900.0 | 5930.0 | 3.07 | 2.61 | 2.26 |
| 6060.0 | 6090.0 | 3.09 | 2.63 | 2.25 |
| 6220.0 | 6250.0 | 2.94 | 2.48 | 2.21 |
| 6380.0 | 6410.0 | 2.75 | 2.36 | 2.15 |
| 6540.0 | 6570.0 | 2.71 | 2.31 | 2.11 |
| 6700.0 | 6730.0 | 2.45 | 2.13 | 1.98 |
| 6860.0 | 6890.0 | 2.38 | 2.07 | 1.90 |
| 7020.0 | 7050.0 | 2.48 | 2.13 | 1.90 |
| 7180.0 | 7210.0 | 2.38 | 1.96 | 1.69 |
| 7340.0 | 7370.0 | 2.29 | 1.84 | 1.57 |
| 7500.0 | 7530.0 | 2.97 | 2.42 | 2.10 |
| 7640.0 | 7670.0 | 3.18 | 2.44 | 2.13 |
| 7800.0 | 7830.0 | 3.30 | 2.52 | 2.07 |
| 7940.0 | 7970.0 | 3.35 | 2.55 | 2.10 |
| 8100.0 | 8130.0 | 3.65 | 2.59 | 2.27 |
| 8240.0 | 8270.0 | 3.85 | 2.81 | 2.47 |

| LO (MHz) | LO VSWR (:1) @LO (dBm) | | |
|---|---|---|---|
| | +14 | +17 | +20 |
| 2090.0 | 17.22 | 10.19 | 6.03 |
| 2250.0 | 9.33 | 5.12 | 4.38 |
| 2410.0 | 4.60 | 3.07 | 3.08 |
| 2570.0 | 2.87 | 2.13 | 2.43 |
| 2730.0 | 2.27 | 1.77 | 2.14 |
| 2890.0 | 2.20 | 1.71 | 1.94 |
| 3050.0 | 2.34 | 1.76 | 1.95 |
| 3210.0 | 2.32 | 1.85 | 2.05 |
| 3370.0 | 2.45 | 2.08 | 2.23 |
| 3530.0 | 2.72 | 2.24 | 2.32 |
| 3690.0 | 2.46 | 2.04 | 2.33 |
| 3850.0 | 2.05 | 1.92 | 2.33 |
| 4010.0 | 1.67 | 1.89 | 2.53 |
| 4170.0 | 1.34 | 1.83 | 2.53 |
| 4330.0 | 1.24 | 1.85 | 2.58 |
| 4490.0 | 1.36 | 1.97 | 2.77 |
| 4650.0 | 1.55 | 2.00 | 2.66 |
| 4810.0 | 1.96 | 2.23 | 2.79 |
| 4970.0 | 2.29 | 2.36 | 2.82 |
| 5130.0 | 2.82 | 2.63 | 2.86 |
| 5290.0 | 3.47 | 2.94 | 3.00 |
| 5450.0 | 4.02 | 3.05 | 2.85 |
| 5610.0 | 4.66 | 3.25 | 2.88 |
| 5770.0 | 5.02 | 3.13 | 2.58 |
| 5930.0 | 4.84 | 2.85 | 2.23 |
| 6090.0 | 4.07 | 2.36 | 1.79 |
| 6250.0 | 3.56 | 1.97 | 1.38 |
| 6410.0 | 2.64 | 1.54 | 1.05 |
| 6570.0 | 2.07 | 1.24 | 1.22 |
| 6730.0 | 1.58 | 1.04 | 1.48 |
| 6890.0 | 1.43 | 1.29 | 1.74 |
| 7050.0 | 1.81 | 1.72 | 2.06 |
| 7210.0 | 2.46 | 2.25 | 2.45 |
| 7370.0 | 3.19 | 2.72 | 2.81 |
| 7530.0 | 4.21 | 3.22 | 3.01 |
| 7670.0 | 5.14 | 3.79 | 3.32 |
| 7830.0 | 5.52 | 4.24 | 3.48 |
| 7970.0 | 5.58 | 4.38 | 3.58 |
| 8130.0 | 5.27 | 4.20 | 3.56 |
| 8270.0 | 4.80 | 3.97 | 3.39 |

| IF (OUT) (MHz) | IF VSWR @LO=7600MHz (:1) @LO (dBm) | | |
|---|---|---|---|
| | +14 | +17 | +20 |
| 10.0 | 2.53 | 1.45 | 1.11 |
| 110.0 | 2.57 | 1.50 | 1.18 |
| 210.0 | 2.76 | 1.64 | 1.30 |
| 310.0 | 2.98 | 1.83 | 1.48 |
| 410.0 | 3.24 | 2.05 | 1.69 |
| 510.0 | 3.47 | 2.21 | 1.85 |
| 610.0 | 3.79 | 2.41 | 2.02 |
| 710.0 | 4.15 | 2.65 | 2.21 |
| 810.0 | 4.57 | 2.87 | 2.38 |
| 910.0 | 5.03 | 3.14 | 2.60 |
| 1010.0 | 5.47 | 3.43 | 2.82 |
| 1110.0 | 5.95 | 3.65 | 2.98 |
| 1210.0 | 6.49 | 3.94 | 3.20 |
| 1310.0 | 6.81 | 4.15 | 3.36 |
| 1410.0 | 7.00 | 4.25 | 3.45 |
| 1510.0 | 7.34 | 4.45 | 3.63 |
| 1610.0 | 7.47 | 4.52 | 3.67 |
| 1710.0 | 7.73 | 4.59 | 3.70 |
| 1810.0 | 7.97 | 4.68 | 3.76 |
| 1910.0 | 8.23 | 4.70 | 3.76 |
| 1990.0 | 8.55 | 4.79 | 3.81 |
| 2090.0 | 8.51 | 4.77 | 3.80 |
| 2170.0 | 8.16 | 4.64 | 3.73 |
| 2270.0 | 7.94 | 4.54 | 3.70 |
| 2350.0 | 7.47 | 4.33 | 3.54 |
| 2450.0 | 7.08 | 4.20 | 3.47 |
| 2530.0 | 6.58 | 4.09 | 3.42 |
| 2630.0 | 6.17 | 3.92 | 3.31 |
| 2710.0 | 5.93 | 3.81 | 3.24 |
| 2810.0 | 5.54 | 3.62 | 3.13 |
| 2890.0 | 5.34 | 3.48 | 3.04 |
| 2990.0 | 4.77 | 3.26 | 2.90 |
| 3070.0 | 4.59 | 3.22 | 2.94 |
| 3170.0 | 4.19 | 3.10 | 2.92 |
| 3250.0 | 3.95 | 3.08 | 3.01 |
| 3350.0 | 3.62 | 3.05 | 3.12 |
| 3430.0 | 3.09 | 2.95 | 3.14 |
| 3530.0 | 2.80 | 3.11 | 3.47 |
| 3610.0 | 2.60 | 3.28 | 3.79 |
| 3710.0 | 2.59 | 3.76 | 4.45 |



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## *Harmonics Tables*

| RF HARMONICS ORDER | (-dBm) | (-dBc) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | - | - | +10 | 14 | 32 | 26 | --- | --- | --- | --- | --- | --- |
| 1 | - | 24 | +0 | 37 | 17 | 31 | 46 | --- | --- | --- | --- | --- |
| 2 | 65 | 54 | 48 | 60 | 49 | 51 | 70 | 72 | --- | --- | --- | --- |
| 3 | >90 | 66 | 59 | >82 | 60 | 82 | 60 | 72 | 77 | --- | --- | --- |
| 4 | >90 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | --- | --- |
| 5 | --- | --- | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | --- |
| 6 | --- | --- | --- | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 |
| 7 | --- | --- | --- | --- | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 |
| 8 | --- | --- | --- | --- | --- | >82 | >82 | >82 | >82 | >82 | >82 | >82 |
| 9 | --- | --- | --- | --- | --- | --- | >82 | >82 | >82 | >82 | >82 | >82 |
| 10 | --- | --- | --- | --- | --- | --- | --- | >82 | >82 | >82 | >82 | >82 |
| | RF CAL | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**LO HARMONICS ORDER**

**Test conditions:** **RF IN: 4950 MHz; -1.00 dBm.**
**LO IN: 4980 MHz; +17.00 dBm**
**IF OUT: 30 MHz; -8.24 dBm**

| RF HARMONICS ORDER | (-dBm) | (-dBc) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | - | - | +0 | 23 | 38 | 40 | --- | --- | --- | --- | --- | --- |
| 1 | - | 24 | +0 | 38 | 17 | 33 | 51 | --- | --- | --- | --- | --- |
| 2 | 45 | 46 | 39 | 43 | 40 | 43 | 54 | 62 | --- | --- | --- | --- |
| 3 | 64 | 44 | 37 | 65 | 41 | 60 | 43 | 50 | 60 | --- | --- | --- |
| 4 | 78 | 64 | 65 | 52 | 64 | 53 | 70 | 59 | 64 | 75 | --- | --- |
| 5 | --- | --- | 70 | 69 | 56 | 85 | 54 | 88 | 59 | 66 | 77 | --- |
| 6 | --- | --- | --- | 79 | 75 | 66 | >92 | 62 | 85 | 67 | 81 | 89 |
| 7 | --- | --- | --- | --- | >92 | 82 | 70 | 92 | 68 | 90 | 75 | 78 |
| 8 | --- | --- | --- | --- | --- | >92 | 87 | 76 | >92 | 75 | >92 | 80 |
| 9 | --- | --- | --- | --- | --- | --- | >92 | >92 | 83 | >92 | 82 | >92 |
| 10 | --- | --- | --- | --- | --- | --- | --- | >92 | >92 | 87 | >92 | 83 |
| | RF CAL | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**LO HARMONICS ORDER**

**Test conditions:** **RF IN: 4950 MHz; 9.00 dBm.**
**LO IN: 4980 MHz; +17.00 dBm**
**IF OUT: 30 MHz; 1.65 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.**




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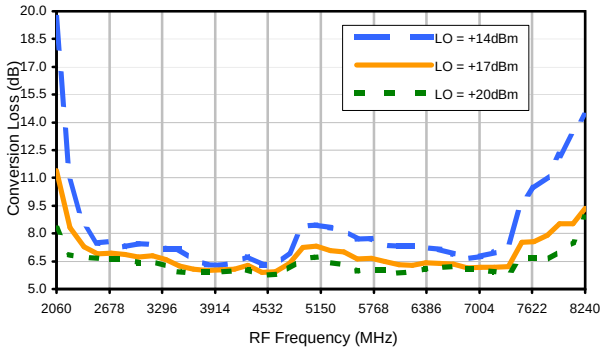
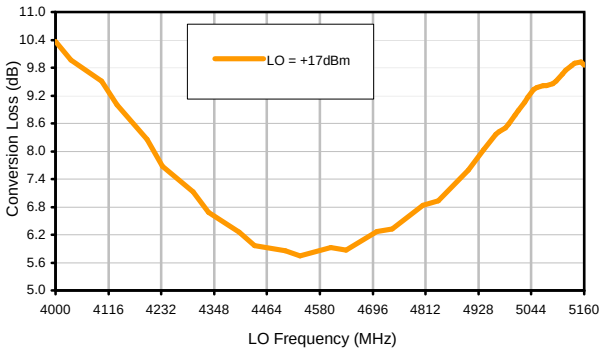
## *Typical Performance Curves*

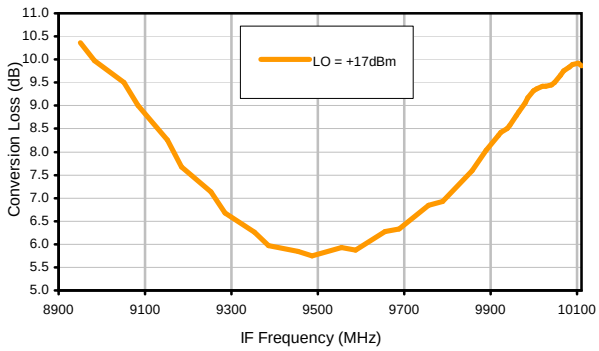
### Conversion Loss @ IF=30MHz



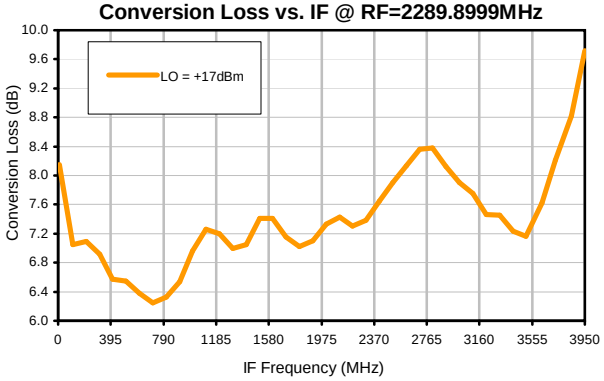

### Conversion Loss vs. LO @ RF=4950MHz



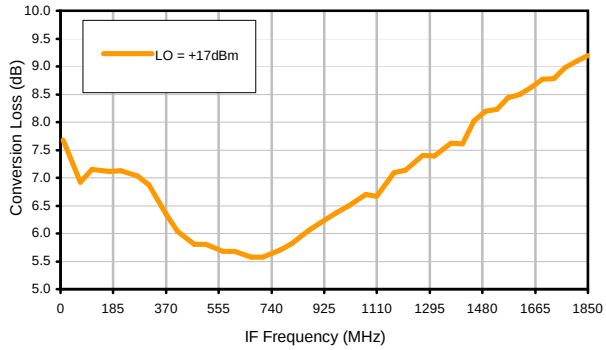

### Conversion Loss vs. IF @ RF=4950MHz



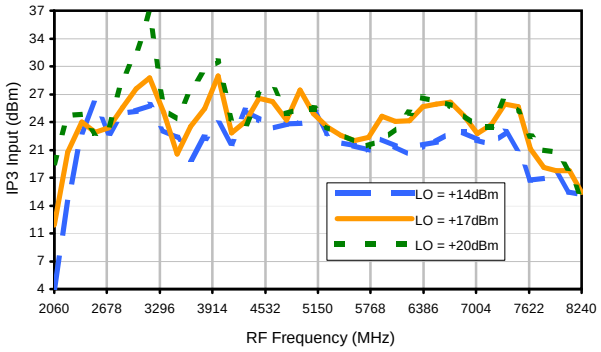

### Conversion Loss vs. IF @ RF=2289.8999MHz



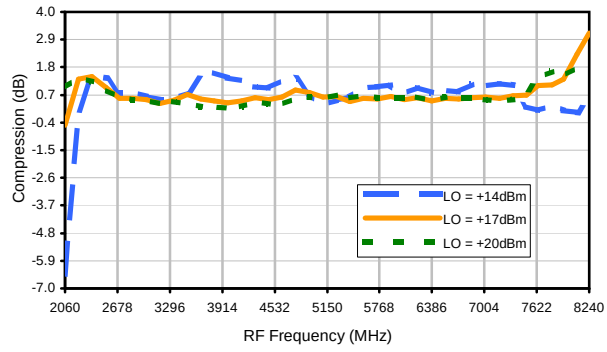

### Conversion Loss vs. IF @ RF=7610.1001MHz




### IP3 Input




### Compression @ RF IN=+14dBm







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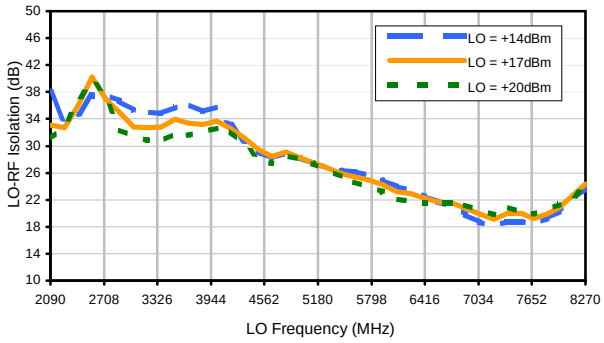
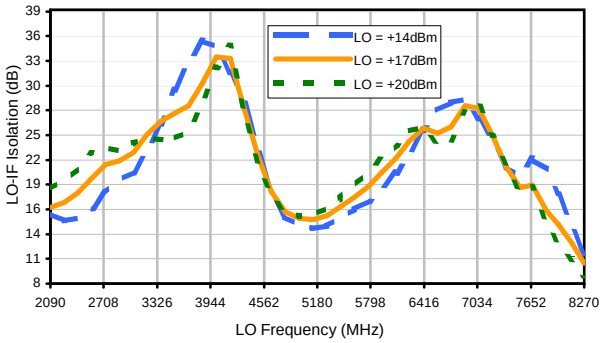
## *Typical Performance Curves*

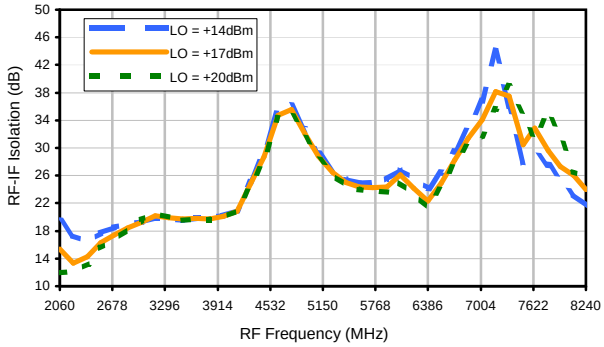
### LO-RF Isolation



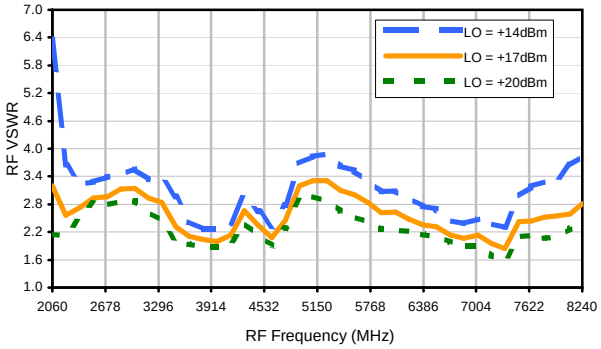

### LO-IF Isolation



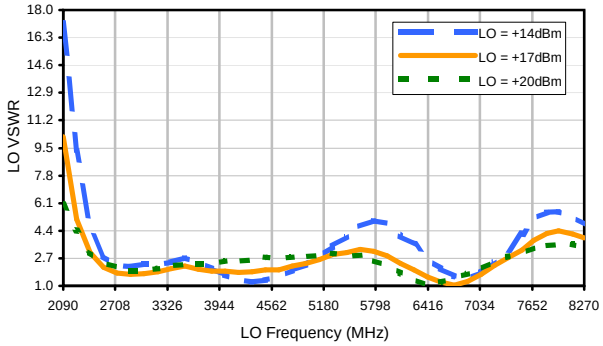

### RF-IF Isolation



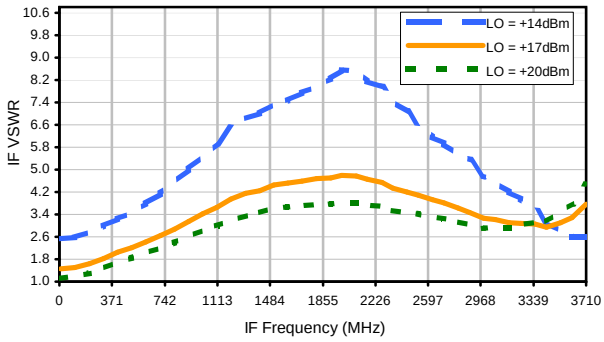

### RF VSWR




### LO VSWR




### IF VSWR







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*Harmonics Tables*

| RF HARMONICS ORDER | (-dBm) | (-dBc) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | - | - | +10 | 14 | 32 | 26 | --- | --- | --- | --- | --- | --- |
| 1 | - | 24 | +0 | 37 | 17 | 31 | 46 | --- | --- | --- | --- | --- |
| 2 | 65 | 54 | 48 | 60 | 49 | 51 | 70 | 72 | --- | --- | --- | --- |
| 3 | >90 | 66 | 59 | >82 | 60 | 82 | 60 | 72 | 77 | --- | --- | --- |
| 4 | >90 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | --- | --- |
| 5 | --- | --- | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | --- |
| 6 | --- | --- | --- | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 |
| 7 | --- | --- | --- | --- | >82 | >82 | >82 | >82 | >82 | >82 | >82 | >82 |
| 8 | --- | --- | --- | --- | --- | >82 | >82 | >82 | >82 | >82 | >82 | >82 |
| 9 | --- | --- | --- | --- | --- | --- | >82 | >82 | >82 | >82 | >82 | >82 |
| 10 | --- | --- | --- | --- | --- | --- | --- | >82 | >82 | >82 | >82 | >82 |
| | RF CAL | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**LO HARMONICS ORDER**

**Test conditions:** **RF IN: 4950 MHz; -1.00 dBm.**
**LO IN: 4980 MHz; +17.00 dBm**
**IF OUT: 30 MHz; -8.24 dBm**

| RF HARMONICS ORDER | (-dBm) | (-dBc) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | - | - | +0 | 23 | 38 | 40 | --- | --- | --- | --- | --- | --- |
| 1 | - | 24 | +0 | 38 | 17 | 33 | 51 | --- | --- | --- | --- | --- |
| 2 | 45 | 46 | 39 | 43 | 40 | 43 | 54 | 62 | --- | --- | --- | --- |
| 3 | 64 | 44 | 37 | 65 | 41 | 60 | 43 | 50 | 60 | --- | --- | --- |
| 4 | 78 | 64 | 65 | 52 | 64 | 53 | 70 | 59 | 64 | 75 | --- | --- |
| 5 | --- | --- | 70 | 69 | 56 | 85 | 54 | 88 | 59 | 66 | 77 | --- |
| 6 | --- | --- | --- | 79 | 75 | 66 | >92 | 62 | 85 | 67 | 81 | 89 |
| 7 | --- | --- | --- | --- | >92 | 82 | 70 | 92 | 68 | 90 | 75 | 78 |
| 8 | --- | --- | --- | --- | --- | >92 | 87 | 76 | >92 | 75 | >92 | 80 |
| 9 | --- | --- | --- | --- | --- | --- | >92 | >92 | 83 | >92 | 82 | >92 |
| 10 | --- | --- | --- | --- | --- | --- | --- | >92 | >92 | 87 | >92 | 83 |
| | RF CAL | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**LO HARMONICS ORDER**

**Test conditions:** **RF IN: 4950 MHz; 9.00 dBm.**
**LO IN: 4980 MHz; +17.00 dBm**
**IF OUT: 30 MHz; 1.65 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.**




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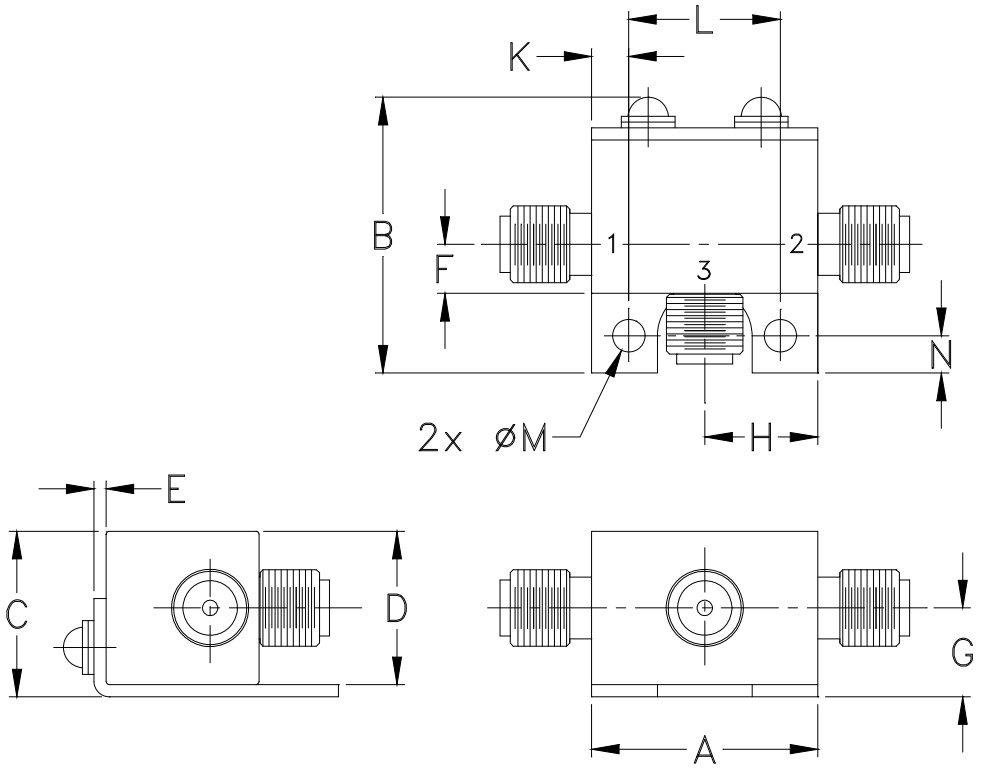
# Case Style FL

**FL905**

## Outline Dimensions




| CASE #. | A | B | C | D | E | F | G | H | J | K | L | M | N | WT, GRAM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FL905 | .74 (18.80) | .90 (22.86) | .54 (13.72) | .50 (12.70) | .04 (1.02) | .16 (4.06) | .29 (7.37) | .37 (9.40) | - - | .122 (3.10) | .496 (12.60) | .106 (2.69) | .122 (3.10) | 20.0 |

**Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015.**
**Tolerance on hole size and interaxes dimensions to be ±.005.**

### Notes:

1. Case material: Brass.
2. Case finish: Nickel plate.


Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
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**Environmental Specifications** **ENV28T5**

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 | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C<br>Ambient Environment | Individual Model Data Sheet |
| Barometric Pressure | 100,000 Feet | MIL-STD-202, Method 105, Condition D |
| Humidity | 90% RH, 65°C<br>Units may require bake-out after humidity to restore full performance. | MIL-STD-202, Method 103 |
| Thermal Shock | -65° to 125°C, 5 cycles | MIL-STD-202, Method 107, Condition B |
| 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 | 100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18) | MIL-STD-202, Method 213, Condition I |


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