

## Non-Catalog Model

# Frequency Mixer

# ZP-2LH

Level 10 (LO Power +10 dBm)

### Important Note

This is a non-catalog model and can be manufactured on specific request.  
Pricing and delivery information can be supplied upon request.



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**CASE STYLE : GG60**

| ELECTRICAL SPECIFICATIONS 50Ω @ +25°C |               |      |      |      |       |
|---------------------------------------|---------------|------|------|------|-------|
| Parameter                             |               | Min. | Typ. | Max. | Units |
| Frequency                             | LO (fL to fU) | 50   |      | 1000 | MHz   |
|                                       | RF (fL to fU) | 50   |      | 1000 | MHz   |
|                                       | IF            | 0    |      | 1000 | MHz   |
| Conversion Loss                       | mid band      |      | 5.2  | 7.0  | dB    |
|                                       | Total Range   |      |      | 8.5  | dB    |
| LO-RF Isolation                       | Low Range     | 40   | 58   |      | dB    |
|                                       | Mid Range     | 30   | 44   |      | dB    |
|                                       | Upper Range   | 25   | 39   |      | dB    |
| LO-IF Isolation                       | Low Range     | 35   | 60   |      | dB    |
|                                       | Mid Range     | 25   | 50   |      | dB    |
|                                       | Upper Range   | 20   | 38   |      | dB    |
| 1 dB Comp. Input Power                |               |      | +5   |      | dBm   |

**Notes:** Low Range = 50 to 100 MHz]  
mid band = [2fL to fU/2]

Mid Range = 100 to 500 MHz

Upper Range = [fU/2 to fU]

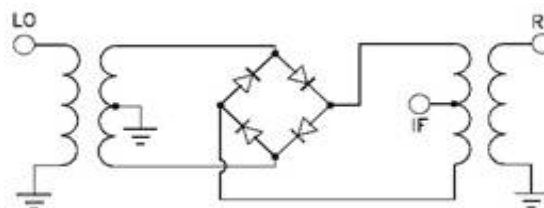
Rugged shielded case.

BNC connectorized. SMA connectorized model name is ZP-2LH-S

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

| PIN CONNECTIONS |   |
|-----------------|---|
| LO              | L |
| RF              | R |
| IF              | X |

### Electrical Schematics



# Frequency Mixer

ZP-2LH

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=30MHz<br>(dB) |      |      |
|---------------------|-------------|-------------------------------------------------------|------|------|
|                     |             | @LO (dBm)                                             |      |      |
|                     |             | +7                                                    | +10  | +13  |
| 10.1                | 40.1        | 5.98                                                  | 5.49 | 5.30 |
| 51.1                | 81.1        | 6.50                                                  | 5.97 | 5.71 |
| 92.0                | 122.0       | 6.49                                                  | 5.93 | 5.68 |
| 133.0               | 163.0       | 6.29                                                  | 5.84 | 5.61 |
| 173.9               | 203.9       | 6.39                                                  | 5.89 | 5.65 |
| 214.9               | 244.9       | 6.25                                                  | 5.76 | 5.59 |
| 255.8               | 285.8       | 6.24                                                  | 5.82 | 5.63 |
| 296.8               | 326.8       | 6.22                                                  | 5.80 | 5.61 |
| 337.7               | 367.7       | 6.21                                                  | 5.80 | 5.63 |
| 378.7               | 408.7       | 6.14                                                  | 5.80 | 5.65 |
| 419.6               | 449.6       | 6.17                                                  | 5.77 | 5.61 |
| 440.1               | 470.1       | 6.13                                                  | 5.76 | 5.58 |
| 481.1               | 511.1       | 6.26                                                  | 5.86 | 5.68 |
| 501.5               | 531.5       | 6.20                                                  | 5.85 | 5.68 |
| 542.5               | 572.5       | 6.31                                                  | 5.93 | 5.73 |
| 563.0               | 593.0       | 6.26                                                  | 5.92 | 5.74 |
| 603.9               | 633.9       | 6.31                                                  | 5.98 | 5.81 |
| 624.4               | 654.4       | 6.31                                                  | 5.96 | 5.83 |
| 665.3               | 695.3       | 6.40                                                  | 6.06 | 5.92 |
| 685.8               | 715.8       | 6.38                                                  | 6.11 | 5.98 |
| 726.8               | 756.8       | 6.45                                                  | 6.19 | 6.05 |
| 747.2               | 777.2       | 6.45                                                  | 6.20 | 6.06 |
| 788.2               | 818.2       | 6.53                                                  | 6.24 | 6.07 |
| 808.7               | 838.7       | 6.63                                                  | 6.26 | 6.10 |
| 849.6               | 879.6       | 6.77                                                  | 6.41 | 6.23 |
| 870.1               | 900.1       | 6.86                                                  | 6.49 | 6.28 |
| 911.1               | 941.1       | 6.94                                                  | 6.50 | 6.26 |
| 931.5               | 961.5       | 7.06                                                  | 6.53 | 6.28 |
| 972.5               | 1002.5      | 7.23                                                  | 6.54 | 6.26 |
| 993.0               | 1023.0      | 7.40                                                  | 6.60 | 6.30 |
| 1033.9              | 1063.9      | 7.74                                                  | 6.83 | 6.41 |
| 1054.4              | 1084.4      | 7.84                                                  | 6.90 | 6.43 |
| 1095.3              | 1125.3      | 8.17                                                  | 7.17 | 6.61 |
| 1115.8              | 1145.8      | 8.43                                                  | 7.36 | 6.73 |
| 1156.8              | 1186.8      | 8.91                                                  | 7.80 | 7.02 |
| 1177.2              | 1207.2      | 9.10                                                  | 8.00 | 7.19 |
| 1218.2              | 1248.2      | 9.65                                                  | 8.53 | 7.62 |
| 1238.7              | 1268.7      | 9.80                                                  | 8.77 | 7.80 |
| 1279.6              | 1309.6      | 10.43                                                 | 9.42 | 8.51 |
| 1300.1              | 1330.1      | 10.75                                                 | 9.84 | 8.93 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       |
|---------------------|-------------|--------------------|-------|-------|
|                     |             | @LO (dBm)          |       |       |
|                     |             | +7                 | +10   | +13   |
| 10.1                | 40.1        | 17.87              | 20.39 | 23.41 |
| 51.1                | 81.1        | 16.16              | 19.48 | 21.09 |
| 92.0                | 122.0       | 15.72              | 17.66 | 19.15 |
| 133.0               | 163.0       | 18.32              | 18.74 | 24.48 |
| 173.9               | 203.9       | 15.98              | 18.10 | 25.21 |
| 214.9               | 244.9       | 16.40              | 23.36 | 22.24 |
| 255.8               | 285.8       | 18.47              | 21.52 | 22.93 |
| 296.8               | 326.8       | 17.60              | 21.74 | 21.05 |
| 337.7               | 367.7       | 22.84              | 19.14 | 22.58 |
| 378.7               | 408.7       | 17.72              | 17.64 | 24.61 |
| 419.6               | 449.6       | 17.65              | 15.73 | 17.57 |
| 440.1               | 470.1       | 16.45              | 17.59 | 19.17 |
| 481.1               | 511.1       | 16.07              | 20.16 | 26.79 |
| 501.5               | 531.5       | 16.59              | 21.41 | 23.28 |
| 542.5               | 572.5       | 17.10              | 17.34 | 21.61 |
| 563.0               | 593.0       | 21.41              | 19.49 | 23.84 |
| 603.9               | 633.9       | 22.36              | 26.86 | 22.94 |
| 624.4               | 654.4       | 18.44              | 26.13 | 29.23 |
| 665.3               | 695.3       | 13.98              | 25.72 | 25.05 |
| 685.8               | 715.8       | 13.47              | 20.77 | 25.97 |
| 726.8               | 756.8       | 11.50              | 14.54 | 20.56 |
| 747.2               | 777.2       | 10.56              | 12.84 | 16.98 |
| 788.2               | 818.2       | 9.82               | 11.25 | 13.80 |
| 808.7               | 838.7       | 10.19              | 11.64 | 13.72 |
| 849.6               | 879.6       | 11.65              | 13.09 | 14.96 |
| 870.1               | 900.1       | 12.54              | 15.00 | 16.37 |
| 911.1               | 941.1       | 13.17              | 18.08 | 21.22 |
| 931.5               | 961.5       | 14.39              | 24.49 | 28.07 |
| 972.5               | 1002.5      | 12.70              | 26.53 | 21.32 |
| 993.0               | 1023.0      | 11.04              | 23.81 | 20.02 |
| 1033.9              | 1063.9      | 9.62               | 19.59 | 19.91 |
| 1054.4              | 1084.4      | 9.50               | 18.83 | 19.64 |
| 1095.3              | 1125.3      | 9.90               | 15.48 | 23.52 |
| 1115.8              | 1145.8      | 10.04              | 14.99 | 22.67 |
| 1156.8              | 1186.8      | 10.79              | 15.47 | 30.29 |
| 1177.2              | 1207.2      | 11.00              | 15.06 | 22.47 |
| 1218.2              | 1248.2      | 11.70              | 14.83 | 22.40 |
| 1238.7              | 1268.7      | 12.22              | 14.94 | 20.83 |
| 1279.6              | 1309.6      | 12.71              | 14.85 | 18.86 |
| 1300.1              | 1330.1      | 13.75              | 15.39 | 19.39 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+5dBm<br>(dB) |      |      |
|---------------------|-------------|-------------------------------------|------|------|
|                     |             | @LO (dBm)                           |      |      |
|                     |             | +7                                  | +10  | +13  |
| 10.1                | 40.1        | 0.80                                | 0.56 | 0.41 |
| 51.1                | 81.1        | 0.71                                | 0.44 | 0.36 |
| 92.0                | 122.0       | 0.70                                | 0.42 | 0.33 |
| 133.0               | 163.0       | 0.63                                | 0.45 | 0.33 |
| 173.9               | 203.9       | 0.64                                | 0.46 | 0.32 |
| 214.9               | 244.9       | 0.68                                | 0.44 | 0.31 |
| 255.8               | 285.8       | 0.72                                | 0.47 | 0.32 |
| 296.8               | 326.8       | 0.72                                | 0.47 | 0.32 |
| 337.7               | 367.7       | 0.75                                | 0.44 | 0.31 |
| 378.7               | 408.7       | 0.76                                | 0.45 | 0.30 |
| 419.6               | 449.6       | 0.70                                | 0.47 | 0.33 |
| 440.1               | 470.1       | 0.73                                | 0.45 | 0.31 |
| 481.1               | 511.1       | 0.65                                | 0.41 | 0.29 |
| 501.5               | 531.5       | 0.71                                | 0.41 | 0.30 |
| 542.5               | 572.5       | 0.71                                | 0.44 | 0.30 |
| 563.0               | 593.0       | 0.77                                | 0.44 | 0.32 |
| 603.9               | 633.9       | 0.77                                | 0.46 | 0.32 |
| 624.4               | 654.4       | 0.86                                | 0.50 | 0.33 |
| 665.3               | 695.3       | 0.91                                | 0.57 | 0.35 |
| 685.8               | 715.8       | 0.91                                | 0.56 | 0.34 |
| 726.8               | 756.8       | 1.06                                | 0.65 | 0.43 |
| 747.2               | 777.2       | 1.10                                | 0.66 | 0.44 |
| 788.2               | 818.2       | 1.17                                | 0.78 | 0.57 |
| 808.7               | 838.7       | 1.14                                | 0.77 | 0.56 |
| 849.6               | 879.6       | 1.23                                | 0.84 | 0.62 |
| 870.1               | 900.1       | 1.22                                | 0.82 | 0.61 |
| 911.1               | 941.1       | 1.36                                | 0.94 | 0.69 |
| 931.5               | 961.5       | 1.38                                | 0.95 | 0.70 |
| 972.5               | 1002.5      | 1.38                                | 1.05 | 0.76 |
| 993.0               | 1023.0      | 1.38                                | 1.07 | 0.75 |
| 1033.9              | 1063.9      | 1.31                                | 1.12 | 0.82 |
| 1054.4              | 1084.4      | 1.24                                | 1.10 | 0.82 |
| 1095.3              | 1125.3      | 1.07                                | 1.04 | 0.81 |
| 1115.8              | 1145.8      | 1.00                                | 1.01 | 0.83 |
| 1156.8              | 1186.8      | 0.81                                | 0.93 | 0.86 |
| 1177.2              | 1207.2      | 0.72                                | 0.88 | 0.89 |
| 1218.2              | 1248.2      | 0.49                                | 0.73 | 0.89 |
| 1238.7              | 1268.7      | 0.42                                | 0.68 | 0.92 |
| 1279.6              | 1309.6      | 0.21                                | 0.50 | 0.81 |
| 1300.1              | 1330.1      | 0.11                                | 0.39 | 0.72 |

REV. X2

ZP-2LH

100818

Page 1 of 5



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# Frequency Mixer

ZP-2LH

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=500.1MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=50.1MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=1000.1MHz<br>(dB) |
|----------------------|-------------|-----------------------------------------------------------------|----------------------|-------------|----------------------------------------------------------------|----------------------|-------------|------------------------------------------------------------------|
|                      |             | @LO (dBm)                                                       |                      |             | @LO (dBm)                                                      |                      |             | @LO (dBm)                                                        |
|                      |             | +10                                                             |                      |             | +10                                                            |                      |             | +10                                                              |
| 400.0                | 100.1       | 5.95                                                            | 10.0                 | 60.1        | 6.12                                                           | 950.0                | 50.1        | 7.40                                                             |
| 390.3                | 109.9       | 5.91                                                            | 30.0                 | 80.1        | 5.99                                                           | 930.0                | 70.1        | 7.54                                                             |
| 380.5                | 119.6       | 5.88                                                            | 50.0                 | 100.1       | 5.94                                                           | 910.0                | 90.1        | 7.55                                                             |
| 370.8                | 129.4       | 5.87                                                            | 70.0                 | 120.1       | 5.95                                                           | 890.0                | 110.1       | 7.39                                                             |
| 361.0                | 139.1       | 5.83                                                            | 90.0                 | 140.1       | 6.00                                                           | 870.0                | 130.1       | 7.29                                                             |
| 351.3                | 148.9       | 5.78                                                            | 110.0                | 160.1       | 5.95                                                           | 850.0                | 150.1       | 7.36                                                             |
| 341.5                | 158.6       | 5.80                                                            | 130.0                | 180.1       | 6.04                                                           | 830.0                | 170.1       | 7.38                                                             |
| 331.8                | 168.4       | 5.83                                                            | 150.0                | 200.1       | 5.98                                                           | 810.0                | 190.1       | 7.30                                                             |
| 322.0                | 178.1       | 5.78                                                            | 170.0                | 220.1       | 6.00                                                           | 790.0                | 210.1       | 7.28                                                             |
| 312.3                | 187.9       | 5.80                                                            | 190.0                | 240.1       | 5.97                                                           | 770.0                | 230.1       | 7.21                                                             |
| 302.5                | 197.6       | 5.78                                                            | 210.0                | 260.1       | 6.03                                                           | 750.0                | 250.1       | 7.20                                                             |
| 292.8                | 207.4       | 5.74                                                            | 230.0                | 280.1       | 6.10                                                           | 730.0                | 270.1       | 7.27                                                             |
| 283.0                | 217.1       | 5.72                                                            | 250.0                | 300.1       | 6.03                                                           | 710.0                | 290.1       | 7.24                                                             |
| 273.3                | 226.9       | 5.72                                                            | 270.0                | 320.1       | 6.01                                                           | 690.0                | 310.1       | 7.24                                                             |
| 263.5                | 236.6       | 5.75                                                            | 290.0                | 340.1       | 6.04                                                           | 670.0                | 330.1       | 7.20                                                             |
| 253.8                | 246.4       | 5.72                                                            | 310.0                | 360.1       | 6.10                                                           | 650.0                | 350.1       | 7.23                                                             |
| 244.0                | 256.1       | 5.73                                                            | 330.0                | 380.1       | 6.06                                                           | 630.0                | 370.1       | 7.28                                                             |
| 234.3                | 265.9       | 5.78                                                            | 350.0                | 400.1       | 6.05                                                           | 610.0                | 390.1       | 7.26                                                             |
| 224.5                | 275.6       | 5.78                                                            | 370.0                | 420.1       | 6.07                                                           | 590.0                | 410.1       | 7.21                                                             |
| 214.8                | 285.4       | 5.76                                                            | 390.0                | 440.1       | 5.97                                                           | 570.0                | 430.1       | 7.16                                                             |
| 205.0                | 295.1       | 5.81                                                            | 410.0                | 460.1       | 6.03                                                           | 550.0                | 450.1       | 7.19                                                             |
| 195.3                | 304.9       | 5.79                                                            | 430.0                | 480.1       | 6.09                                                           | 530.0                | 470.1       | 7.14                                                             |
| 185.5                | 314.6       | 5.76                                                            | 450.0                | 500.1       | 6.07                                                           | 510.0                | 490.1       | 7.12                                                             |
| 175.8                | 324.4       | 5.77                                                            | 470.0                | 520.1       | 6.02                                                           | 490.0                | 510.1       | 7.12                                                             |
| 166.0                | 334.1       | 5.78                                                            | 510.0                | 560.1       | 6.09                                                           | 450.0                | 550.1       | 7.17                                                             |
| 156.3                | 343.9       | 5.78                                                            | 530.0                | 580.1       | 6.12                                                           | 430.0                | 570.1       | 7.12                                                             |
| 146.5                | 353.6       | 5.76                                                            | 570.0                | 620.1       | 6.20                                                           | 390.0                | 610.1       | 7.00                                                             |
| 136.8                | 363.4       | 5.78                                                            | 590.0                | 640.1       | 6.23                                                           | 370.0                | 630.1       | 6.96                                                             |
| 127.0                | 373.1       | 5.82                                                            | 630.0                | 680.1       | 6.34                                                           | 330.0                | 670.1       | 6.85                                                             |
| 117.3                | 382.9       | 5.77                                                            | 650.0                | 700.1       | 6.30                                                           | 310.0                | 690.1       | 6.89                                                             |
| 107.5                | 392.6       | 5.78                                                            | 690.0                | 740.1       | 6.19                                                           | 270.0                | 730.1       | 6.85                                                             |
| 97.8                 | 402.4       | 5.81                                                            | 710.0                | 760.1       | 6.22                                                           | 250.0                | 750.1       | 6.90                                                             |
| 88.0                 | 412.1       | 5.80                                                            | 750.0                | 800.1       | 6.14                                                           | 210.0                | 790.1       | 7.05                                                             |
| 78.3                 | 421.9       | 5.77                                                            | 770.0                | 820.1       | 6.07                                                           | 190.0                | 810.1       | 7.06                                                             |
| 68.5                 | 431.6       | 5.83                                                            | 810.0                | 860.1       | 6.05                                                           | 150.0                | 850.1       | 7.05                                                             |
| 58.8                 | 441.4       | 5.85                                                            | 830.0                | 880.1       | 6.03                                                           | 130.0                | 870.1       | 6.99                                                             |
| 49.0                 | 451.1       | 5.85                                                            | 870.0                | 920.1       | 5.91                                                           | 90.0                 | 910.1       | 6.86                                                             |
| 39.3                 | 460.9       | 5.84                                                            | 890.0                | 940.1       | 5.91                                                           | 70.0                 | 930.1       | 6.82                                                             |
| 19.8                 | 480.4       | 5.91                                                            | 930.0                | 980.1       | 5.84                                                           | 30.0                 | 970.1       | 6.73                                                             |
| 10.0                 | 490.1       | 6.08                                                            | 950.0                | 1000.1      | 5.84                                                           | 10.0                 | 990.1       | 6.86                                                             |

REV. X2

ZP-2LH

100818

Page 2 of 5



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## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +7                      | +10   | +13   | +7                      | +10   | +13   |
| 10.1        | 68.52                   | 71.56 | 74.73 | 55.59                   | 58.82 | 60.04 |
| 51.1        | 59.61                   | 61.65 | 63.09 | 56.07                   | 56.19 | 54.64 |
| 92.0        | 54.96                   | 56.54 | 57.96 | 53.07                   | 51.62 | 50.26 |
| 133.0       | 52.11                   | 53.74 | 55.42 | 50.15                   | 48.42 | 47.15 |
| 173.9       | 49.78                   | 51.51 | 53.11 | 48.65                   | 46.70 | 45.44 |
| 214.9       | 48.19                   | 49.98 | 51.72 | 46.91                   | 45.08 | 44.12 |
| 255.8       | 46.89                   | 48.88 | 50.46 | 45.65                   | 44.18 | 42.88 |
| 296.8       | 45.77                   | 47.71 | 49.36 | 44.41                   | 42.90 | 41.90 |
| 337.7       | 45.08                   | 46.91 | 48.32 | 42.91                   | 41.44 | 40.21 |
| 378.7       | 44.31                   | 46.51 | 48.11 | 41.36                   | 40.19 | 39.20 |
| 419.6       | 43.54                   | 45.79 | 47.34 | 39.86                   | 39.12 | 38.08 |
| 440.1       | 43.03                   | 45.14 | 46.47 | 38.59                   | 37.94 | 37.27 |
| 481.1       | 42.03                   | 43.83 | 45.45 | 37.48                   | 36.71 | 36.40 |
| 501.5       | 41.65                   | 43.31 | 45.06 | 36.68                   | 35.79 | 35.54 |
| 542.5       | 41.17                   | 42.61 | 44.18 | 35.67                   | 34.97 | 34.29 |
| 563.0       | 40.98                   | 42.36 | 43.76 | 35.03                   | 34.55 | 33.98 |
| 603.9       | 40.76                   | 42.61 | 44.20 | 34.42                   | 34.13 | 33.75 |
| 624.4       | 40.78                   | 42.64 | 44.20 | 33.87                   | 33.63 | 33.37 |
| 665.3       | 40.79                   | 42.58 | 43.80 | 33.01                   | 32.81 | 32.78 |
| 685.8       | 40.88                   | 42.84 | 44.17 | 32.70                   | 32.31 | 32.12 |
| 726.8       | 40.73                   | 42.50 | 43.81 | 31.83                   | 31.58 | 30.92 |
| 747.2       | 40.32                   | 41.76 | 42.82 | 31.36                   | 31.23 | 30.60 |
| 788.2       | 39.74                   | 40.89 | 41.83 | 30.51                   | 30.68 | 30.09 |
| 808.7       | 39.45                   | 40.64 | 41.56 | 30.01                   | 30.26 | 29.85 |
| 849.6       | 39.27                   | 40.68 | 41.63 | 29.05                   | 29.51 | 29.37 |
| 870.1       | 38.71                   | 40.36 | 41.36 | 28.66                   | 29.33 | 29.29 |
| 911.1       | 37.86                   | 39.58 | 40.79 | 27.70                   | 28.59 | 28.93 |
| 931.5       | 37.26                   | 39.05 | 40.22 | 27.29                   | 28.28 | 28.68 |
| 972.5       | 36.24                   | 38.08 | 39.50 | 26.36                   | 27.28 | 28.01 |
| 993.0       | 35.61                   | 37.58 | 39.18 | 26.03                   | 26.95 | 27.72 |
| 1033.9      | 34.98                   | 36.99 | 38.77 | 25.13                   | 25.81 | 26.74 |
| 1054.4      | 34.37                   | 36.49 | 38.49 | 24.95                   | 25.44 | 26.34 |
| 1095.3      | 33.82                   | 36.00 | 38.28 | 24.56                   | 24.79 | 25.49 |
| 1115.8      | 33.54                   | 35.80 | 38.20 | 24.31                   | 24.60 | 25.15 |
| 1156.8      | 33.07                   | 35.37 | 38.03 | 23.86                   | 24.24 | 24.74 |
| 1177.2      | 32.93                   | 35.22 | 37.95 | 23.75                   | 24.16 | 24.63 |
| 1218.2      | 32.65                   | 35.06 | 37.99 | 23.28                   | 23.82 | 24.30 |
| 1238.7      | 32.41                   | 34.90 | 37.94 | 23.15                   | 23.80 | 24.20 |
| 1279.6      | 32.16                   | 34.83 | 38.13 | 22.84                   | 23.63 | 24.09 |
| 1300.1      | 32.08                   | 34.78 | 38.18 | 22.81                   | 23.62 | 24.18 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +7                      | +10   | +13   |
| 10.1                | 40.1        | 49.43                   | 47.24 | 48.79 |
| 51.1                | 81.1        | 37.79                   | 37.92 | 37.54 |
| 92.0                | 122.0       | 33.01                   | 33.00 | 33.10 |
| 133.0               | 163.0       | 30.27                   | 30.43 | 30.64 |
| 173.9               | 203.9       | 28.55                   | 28.92 | 29.05 |
| 214.9               | 244.9       | 27.33                   | 27.73 | 27.98 |
| 255.8               | 285.8       | 26.92                   | 27.26 | 27.50 |
| 296.8               | 326.8       | 27.01                   | 27.40 | 27.44 |
| 337.7               | 367.7       | 26.95                   | 27.81 | 28.10 |
| 378.7               | 408.7       | 27.15                   | 28.08 | 28.71 |
| 419.6               | 449.6       | 27.76                   | 28.32 | 28.79 |
| 440.1               | 470.1       | 28.65                   | 29.18 | 29.26 |
| 481.1               | 511.1       | 30.02                   | 29.99 | 30.10 |
| 501.5               | 531.5       | 30.79                   | 30.80 | 30.98 |
| 542.5               | 572.5       | 29.75                   | 30.20 | 31.05 |
| 563.0               | 593.0       | 28.10                   | 29.06 | 29.82 |
| 603.9               | 633.9       | 25.04                   | 25.57 | 26.15 |
| 624.4               | 654.4       | 23.48                   | 23.57 | 24.10 |
| 665.3               | 695.3       | 21.65                   | 21.40 | 21.46 |
| 685.8               | 715.8       | 20.74                   | 20.49 | 20.44 |
| 726.8               | 756.8       | 19.49                   | 19.14 | 18.92 |
| 747.2               | 777.2       | 19.13                   | 18.73 | 18.41 |
| 788.2               | 818.2       | 18.35                   | 17.94 | 17.56 |
| 808.7               | 838.7       | 18.11                   | 17.63 | 17.34 |
| 849.6               | 879.6       | 17.52                   | 17.05 | 16.71 |
| 870.1               | 900.1       | 17.22                   | 16.75 | 16.44 |
| 911.1               | 941.1       | 16.88                   | 16.46 | 16.19 |
| 931.5               | 961.5       | 16.69                   | 16.33 | 16.09 |
| 972.5               | 1002.5      | 16.45                   | 16.24 | 16.16 |
| 993.0               | 1023.0      | 16.28                   | 16.16 | 16.13 |
| 1033.9              | 1063.9      | 16.02                   | 15.96 | 16.01 |
| 1054.4              | 1084.4      | 15.94                   | 15.91 | 15.95 |
| 1095.3              | 1125.3      | 15.69                   | 15.75 | 15.85 |
| 1115.8              | 1145.8      | 15.57                   | 15.72 | 15.80 |
| 1156.8              | 1186.8      | 15.25                   | 15.49 | 15.68 |
| 1177.2              | 1207.2      | 15.13                   | 15.49 | 15.66 |
| 1218.2              | 1248.2      | 14.84                   | 15.24 | 15.47 |
| 1238.7              | 1268.7      | 14.66                   | 15.09 | 15.34 |
| 1279.6              | 1309.6      | 14.38                   | 14.79 | 15.02 |
| 1300.1              | 1330.1      | 14.15                   | 14.58 | 14.79 |

# Frequency Mixer

ZP-2LH

## 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=1000.1MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|------|------|----------------------|----------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |      |      |                      | @LO (dBm)                        |      |      |
|                     |             | +7              | +10  | +13  |             | +7              | +10  | +13  |                      | +7                               | +10  | +13  |
| 10.1                | 40.1        | 1.13            | 1.06 | 1.09 | 10.1        | 1.51            | 2.10 | 2.95 | 10.0                 | 1.99                             | 1.58 | 1.38 |
| 51.1                | 81.1        | 1.15            | 1.03 | 1.05 | 51.1        | 1.57            | 2.37 | 3.44 | 30.2                 | 1.87                             | 1.47 | 1.30 |
| 92.0                | 122.0       | 1.15            | 1.06 | 1.08 | 92.0        | 1.49            | 2.19 | 3.14 | 50.4                 | 1.79                             | 1.41 | 1.25 |
| 133.0               | 163.0       | 1.15            | 1.09 | 1.12 | 133.0       | 1.53            | 2.30 | 3.31 | 70.6                 | 1.85                             | 1.47 | 1.31 |
| 173.9               | 203.9       | 1.20            | 1.13 | 1.15 | 173.9       | 1.50            | 2.19 | 3.11 | 90.8                 | 1.88                             | 1.51 | 1.36 |
| 214.9               | 244.9       | 1.21            | 1.17 | 1.20 | 214.9       | 1.52            | 2.22 | 3.16 | 111.0                | 1.92                             | 1.52 | 1.37 |
| 255.8               | 285.8       | 1.24            | 1.21 | 1.23 | 255.8       | 1.52            | 2.24 | 3.18 | 131.2                | 1.97                             | 1.56 | 1.41 |
| 296.8               | 326.8       | 1.29            | 1.25 | 1.26 | 296.8       | 1.50            | 2.18 | 3.07 | 151.4                | 1.92                             | 1.54 | 1.40 |
| 337.7               | 367.7       | 1.30            | 1.27 | 1.29 | 337.7       | 1.56            | 2.27 | 3.20 | 171.6                | 1.88                             | 1.52 | 1.39 |
| 378.7               | 408.7       | 1.31            | 1.29 | 1.31 | 378.7       | 1.54            | 2.23 | 3.12 | 191.8                | 1.96                             | 1.58 | 1.45 |
| 419.6               | 449.6       | 1.33            | 1.30 | 1.31 | 419.6       | 1.56            | 2.25 | 3.15 | 212.0                | 2.02                             | 1.64 | 1.51 |
| 440.1               | 470.1       | 1.36            | 1.33 | 1.34 | 440.1       | 1.58            | 2.27 | 3.17 | 232.2                | 1.95                             | 1.59 | 1.47 |
| 481.1               | 511.1       | 1.39            | 1.36 | 1.37 | 481.1       | 1.59            | 2.23 | 3.09 | 252.4                | 1.92                             | 1.57 | 1.46 |
| 501.5               | 531.5       | 1.41            | 1.40 | 1.41 | 501.5       | 1.60            | 2.25 | 3.11 | 272.7                | 2.00                             | 1.65 | 1.54 |
| 542.5               | 572.5       | 1.46            | 1.44 | 1.45 | 542.5       | 1.65            | 2.31 | 3.17 | 292.9                | 2.02                             | 1.68 | 1.59 |
| 563.0               | 593.0       | 1.47            | 1.46 | 1.47 | 563.0       | 1.65            | 2.32 | 3.19 | 313.1                | 2.01                             | 1.66 | 1.57 |
| 603.9               | 633.9       | 1.49            | 1.49 | 1.51 | 603.9       | 1.69            | 2.31 | 3.16 | 333.3                | 2.03                             | 1.68 | 1.59 |
| 624.4               | 654.4       | 1.49            | 1.50 | 1.52 | 624.4       | 1.71            | 2.35 | 3.19 | 353.5                | 2.06                             | 1.73 | 1.64 |
| 665.3               | 695.3       | 1.48            | 1.49 | 1.52 | 665.3       | 1.74            | 2.34 | 3.14 | 373.7                | 2.04                             | 1.72 | 1.65 |
| 685.8               | 715.8       | 1.48            | 1.49 | 1.51 | 685.8       | 1.75            | 2.34 | 3.14 | 393.9                | 2.04                             | 1.72 | 1.64 |
| 726.8               | 756.8       | 1.45            | 1.45 | 1.47 | 726.8       | 1.80            | 2.41 | 3.22 | 434.3                | 2.08                             | 1.78 | 1.72 |
| 747.2               | 777.2       | 1.44            | 1.43 | 1.45 | 747.2       | 1.83            | 2.44 | 3.28 | 454.5                | 2.05                             | 1.75 | 1.69 |
| 788.2               | 818.2       | 1.46            | 1.43 | 1.44 | 788.2       | 1.84            | 2.40 | 3.19 | 494.9                | 2.13                             | 1.83 | 1.77 |
| 808.7               | 838.7       | 1.48            | 1.45 | 1.45 | 808.7       | 1.87            | 2.44 | 3.23 | 515.1                | 2.09                             | 1.79 | 1.75 |
| 849.6               | 879.6       | 1.52            | 1.48 | 1.48 | 849.6       | 1.92            | 2.46 | 3.22 | 555.5                | 2.18                             | 1.86 | 1.81 |
| 870.1               | 900.1       | 1.55            | 1.51 | 1.50 | 870.1       | 1.93            | 2.45 | 3.20 | 575.7                | 2.17                             | 1.86 | 1.82 |
| 911.1               | 941.1       | 1.64            | 1.59 | 1.58 | 911.1       | 1.96            | 2.46 | 3.19 | 616.1                | 2.16                             | 1.83 | 1.78 |
| 931.5               | 961.5       | 1.71            | 1.66 | 1.64 | 931.5       | 1.99            | 2.50 | 3.24 | 636.3                | 2.19                             | 1.87 | 1.83 |
| 972.5               | 1002.5      | 1.87            | 1.80 | 1.77 | 972.5       | 2.04            | 2.49 | 3.18 | 676.7                | 2.20                             | 1.85 | 1.79 |
| 993.0               | 1023.0      | 1.96            | 1.87 | 1.84 | 993.0       | 2.07            | 2.51 | 3.20 | 696.9                | 2.21                             | 1.86 | 1.80 |
| 1033.9              | 1063.9      | 2.17            | 2.05 | 1.99 | 1033.9      | 2.14            | 2.61 | 3.27 | 737.3                | 2.15                             | 1.81 | 1.76 |
| 1054.4              | 1084.4      | 2.25            | 2.11 | 2.04 | 1054.4      | 2.15            | 2.62 | 3.30 | 757.6                | 2.25                             | 1.88 | 1.81 |
| 1095.3              | 1125.3      | 2.46            | 2.29 | 2.20 | 1095.3      | 2.18            | 2.66 | 3.33 | 798.0                | 2.18                             | 1.81 | 1.73 |
| 1115.8              | 1145.8      | 2.56            | 2.39 | 2.28 | 1115.8      | 2.19            | 2.69 | 3.35 | 818.2                | 2.16                             | 1.79 | 1.70 |
| 1156.8              | 1186.8      | 2.78            | 2.60 | 2.45 | 1156.8      | 2.24            | 2.73 | 3.40 | 858.6                | 2.22                             | 1.85 | 1.75 |
| 1177.2              | 1207.2      | 2.89            | 2.70 | 2.54 | 1177.2      | 2.26            | 2.74 | 3.41 | 878.8                | 2.24                             | 1.84 | 1.72 |
| 1218.2              | 1248.2      | 3.13            | 2.93 | 2.75 | 1218.2      | 2.28            | 2.75 | 3.41 | 919.2                | 2.17                             | 1.80 | 1.67 |
| 1238.7              | 1268.7      | 3.22            | 3.04 | 2.85 | 1238.7      | 2.30            | 2.76 | 3.42 | 939.4                | 2.14                             | 1.78 | 1.66 |
| 1279.6              | 1309.6      | 3.43            | 3.26 | 3.08 | 1279.6      | 2.33            | 2.79 | 3.45 | 979.8                | 2.32                             | 1.92 | 1.76 |
| 1300.1              | 1330.1      | 3.51            | 3.36 | 3.18 | 1300.1      | 2.34            | 2.78 | 3.43 | 1000.0               | 2.35                             | 2.15 | 2.20 |

REV. X2

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100818

Page 4 of 5



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## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 19  | 35  | 25  | 43  | 45  | 47  | 55  | 62  | 63  | 71  |
| 1  | -      | 25     | +0  | 28  | 11  | 32  | 22  | 40  | 43  | 36  | 54  | 55  |
| 2  | 90     | 67     | 43  | 63  | 43  | 67  | 43  | 56  | 64  | 73  | 70  | 59  |
| 3  | >100   | 57     | 52  | 67  | 53  | 58  | 43  | 56  | 53  | 57  | 56  | 47  |
| 4  | >100   | 74     | 71  | 83  | 66  | 73  | 64  | 74  | 59  | 78  | 78  | 70  |
| 5  | >100   | 74     | 65  | 69  | 63  | 67  | 57  | 65  | 55  | 64  | 60  | 82  |
| 6  | >100   | >94    | 86  | 86  | 81  | 85  | 85  | 85  | 78  | 84  | 76  | 85  |
| 7  | >100   | 81     | 89  | 91  | 79  | 93  | 78  | 83  | 80  | 80  | >94 | 83  |
| 8  | >100   | >94    | >94 | >94 | >94 | 91  | 93  | 90  | 91  | 87  | 92  | 93  |
| 9  | >100   | >94    | >94 | >94 | >94 | >94 | 91  | >94 | 89  | >94 | >94 | >94 |
| 10 | >100   | >94    | >94 | >94 | >94 | >94 | >94 | >94 | >94 | >94 | >94 | >94 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions: RF IN: 500.1 MHz; 0.00 dBm.  
LO IN: 530.01 MHz; +10.00 dBm  
IF OUT: 29.91 MHz; -6.04 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 9   | 25  | 13  | 30  | 33  | 38  | 43  | 40  | 42  | 58  |
| 1  | -      | 25     | +0  | 29  | 11  | 30  | 21  | 37  | 40  | 31  | 48  | 50  |
| 2  | 98     | 84     | 51  | 75  | 51  | 77  | 50  | 66  | 72  | 72  | 74  | 60  |
| 3  | >100   | 73     | 71  | 74  | 66  | 73  | 61  | 70  | 69  | 79  | 73  | 72  |
| 4  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 5  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 6  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 7  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 8  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 9  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 10 | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions: RF IN: 500.1 MHz; -10.00 dBm.  
LO IN: 530.01 MHz; +10.00 dBm  
IF OUT: 29.91 MHz; -16.02 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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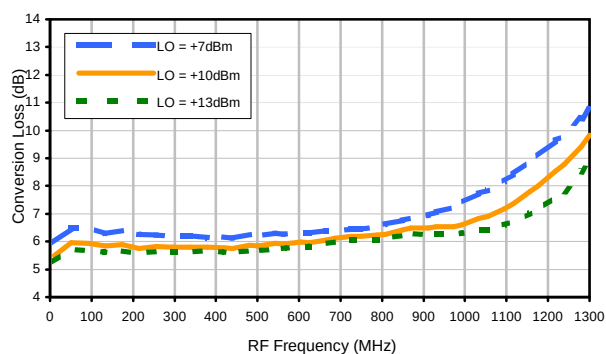
REV. X2  
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100818  
Page 5 of 5

# Frequency Mixer

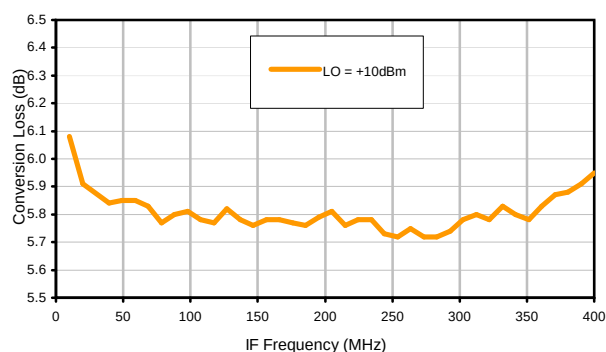
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## Typical Performance Curves

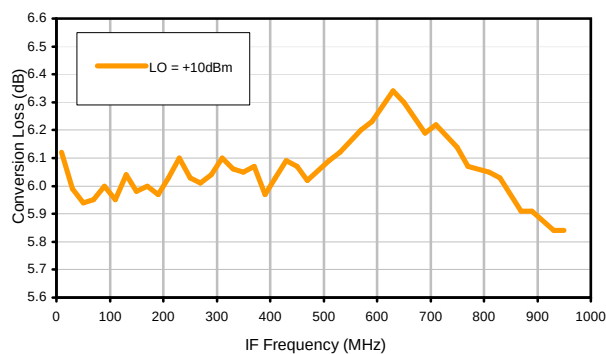
Conversion Loss @ IF=30MHz



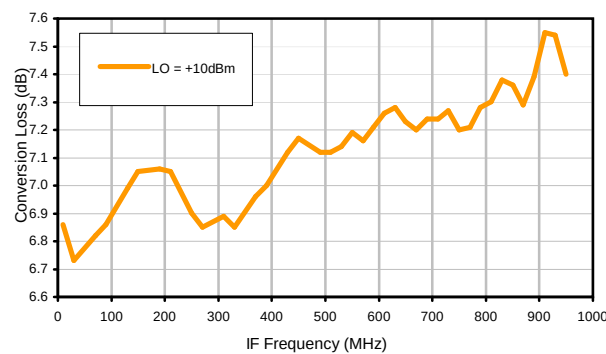
Conversion Loss vs. IF @ RF=500.1MHz



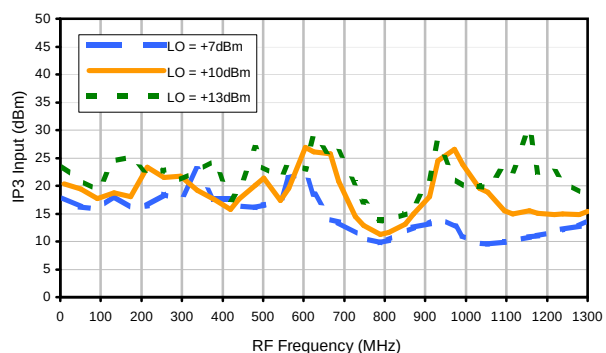
Conversion Loss vs. IF @ RF=50.1MHz



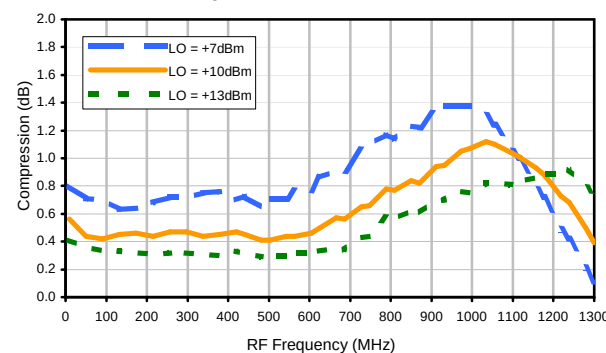
Conversion Loss vs. IF @ RF=1000.1MHz



IP3 Input



Compression @ RF IN=+5dBm



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100818

Page 1 of 3

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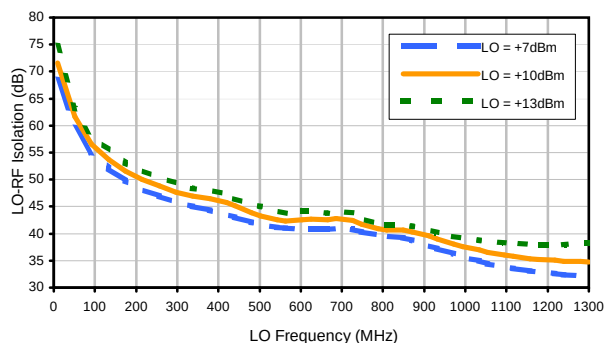
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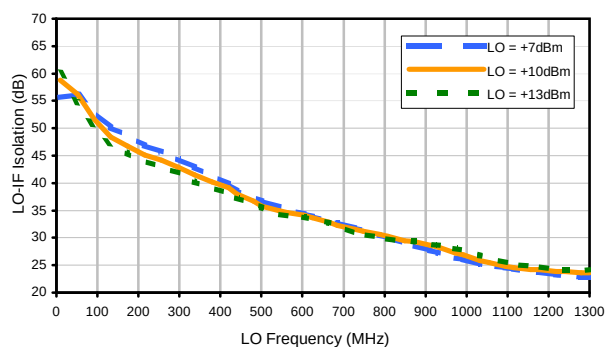


## Typical Performance Curves

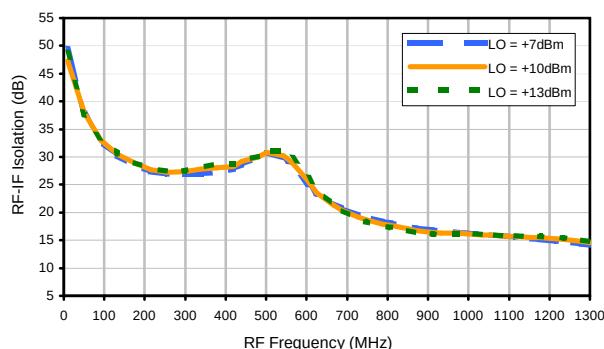
LO-RF Isolation



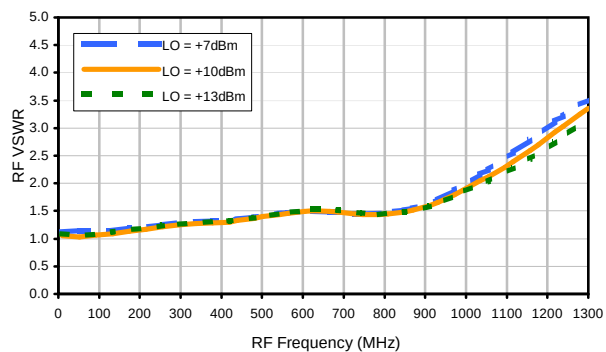
LO-IF Isolation



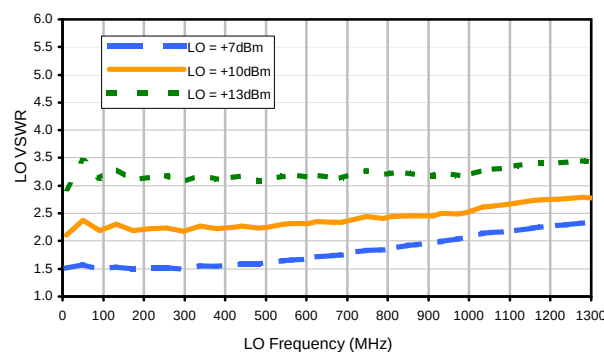
RF-IF Isolation



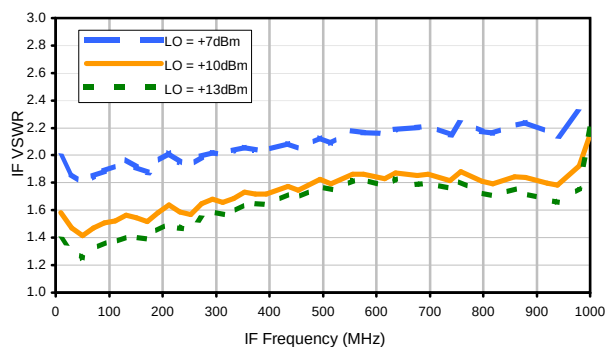
RF VSWR



LO VSWR



IF VSWR



REV. X2

ZP-2LH

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Page 2 of 3



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## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 19  | 35  | 25  | 43  | 45  | 47  | 55  | 62  | 63  | 71  |
| 1  | -      | 25     | +0  | 28  | 11  | 32  | 22  | 40  | 43  | 36  | 54  | 55  |
| 2  | 90     | 67     | 43  | 63  | 43  | 67  | 43  | 56  | 64  | 73  | 70  | 59  |
| 3  | >100   | 57     | 52  | 67  | 53  | 58  | 43  | 56  | 53  | 57  | 56  | 47  |
| 4  | >100   | 74     | 71  | 83  | 66  | 73  | 64  | 74  | 59  | 78  | 78  | 70  |
| 5  | >100   | 74     | 65  | 69  | 63  | 67  | 57  | 65  | 55  | 64  | 60  | 82  |
| 6  | >100   | >94    | 86  | 86  | 81  | 85  | 85  | 85  | 78  | 84  | 76  | 85  |
| 7  | >100   | 81     | 89  | 91  | 79  | 93  | 78  | 83  | 80  | 80  | >94 | 83  |
| 8  | >100   | >94    | >94 | >94 | >94 | 91  | 93  | 90  | 91  | 87  | 92  | 93  |
| 9  | >100   | >94    | >94 | >94 | >94 | >94 | 91  | >94 | 89  | >94 | >94 | >94 |
| 10 | >100   | >94    | >94 | >94 | >94 | >94 | >94 | >94 | >94 | >94 | >94 | >94 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; 0.00 dBm.

LO IN: 530.01 MHz; +10.00 dBm

IF OUT: 29.91 MHz; -6.04 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 9   | 25  | 13  | 30  | 33  | 38  | 43  | 40  | 42  | 58  |
| 1  | -      | 25     | +0  | 29  | 11  | 30  | 21  | 37  | 40  | 31  | 48  | 50  |
| 2  | 98     | 84     | 51  | 75  | 51  | 77  | 50  | 66  | 72  | 72  | 74  | 60  |
| 3  | >100   | 73     | 71  | 74  | 66  | 73  | 61  | 70  | 69  | 79  | 73  | 72  |
| 4  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 5  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 6  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 7  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 8  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 9  | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 10 | >100   | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -10.00 dBm.

LO IN: 530.01 MHz; +10.00 dBm

IF OUT: 29.91 MHz; -16.02 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.

REV. X2

ZP-2LH

100818

Page 3 of 3



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant

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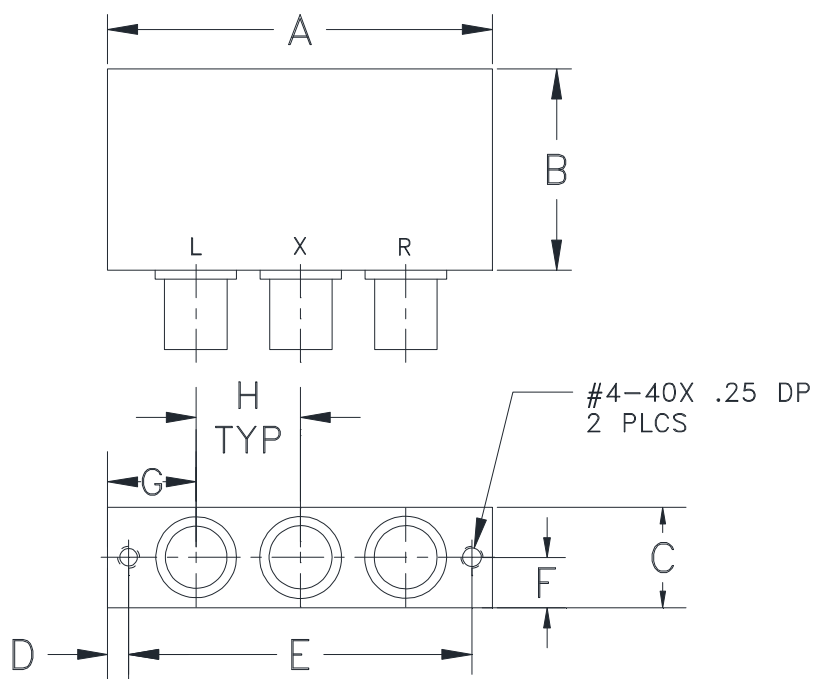


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## Outline Dimensions

**GG60**



| CASE #. | A               | B               | C              | D              | E                | F             | G              | H              | WT.<br>GRAM |
|---------|-----------------|-----------------|----------------|----------------|------------------|---------------|----------------|----------------|-------------|
| GG60    | 2.31<br>(58.67) | 1.20<br>(30.48) | .60<br>(15.24) | .125<br>(3.18) | 2.062<br>(52.37) | .30<br>(7.62) | .53<br>(13.46) | .63<br>(16.00) | 75.0        |

**Dimensions are in inches (mm). Tolerances: 2Pl.  $\pm .03$ ; 3Pl.  $\pm .015$**

### Notes:

- Case material: Aluminum alloy.
- Case finish:

For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.



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