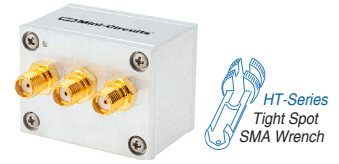


# Coaxial Frequency Mixer

Level 17 (LO Power +17 dBm) 0.5 to 500 MHz

## ZLW-1H



Generic photo used for illustration purposes only

CASE STYLE: M21  
 Connectors Model  
**SMA ZLW-1H**  
**BRACKET (OPTION "B")**  
**BRACKET (OPTION "BR")**

### Maximum Ratings

|                       |                |
|-----------------------|----------------|
| Operating Temperature | -55°C to 100°C |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 200mW          |
| IF Current            | 40mA           |

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

### Coaxial Connections

|    |   |
|----|---|
| LO | 1 |
| RF | 3 |
| IF | 2 |

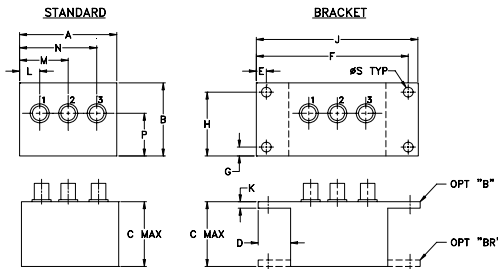
### Features

- low conversion loss, 6.13 dB typ.
- high L-R isolation, 45 dB typ., L-I, 40 dB typ.
- rugged shielded case

### Applications

- VHF/UHF
- defense & federal communications
- instrumentations

### Outline Drawing



### Outline Dimensions (inch/mm)

| A     | B     | C     | D     | E    | F     | G    | H     |
|-------|-------|-------|-------|------|-------|------|-------|
| 1.50  | 1.13  | 1.00  | .50   | .155 | 2.345 | .138 | .987  |
| 38.10 | 28.70 | 25.40 | 12.70 | 3.94 | 59.56 | 3.51 | 25.07 |

| J     | K    | L    | M     | N     | P     | S    | wt    |
|-------|------|------|-------|-------|-------|------|-------|
| 2.50  | .10  | .31  | .75   | 1.19  | .66   | .150 | grams |
| 63.50 | 2.54 | 7.87 | 19.05 | 30.23 | 16.76 | 3.81 | 40.0  |

### Electrical Specifications

| FREQUENCY (MHz) |        | CONVERSION LOSS (dB) |          |             |      | LO-RF ISOLATION (dB) |      |      |      |      |      | LO-IF ISOLATION (dB) |      |      |      |      |      |
|-----------------|--------|----------------------|----------|-------------|------|----------------------|------|------|------|------|------|----------------------|------|------|------|------|------|
| LO/RF           | IF     | Mid-Band m           |          | Total Range |      | L                    |      | M    |      | U    |      | L                    |      | M    |      | U    |      |
| $f_L-f_U$       |        | $\bar{X}$            | $\sigma$ | Max.        | Max. | Typ.                 | Min. | Typ. | Min. | Typ. | Min. | Typ.                 | Min. | Typ. | Min. | Typ. | Min. |
| 0.5-500         | DC-500 | 6.13                 | 0.08     | 7.5         | 8.5  | 55                   | 45   | 45   | 30   | 35   | 25   | 45                   | 35   | 40   | 30   | 30   | 20   |

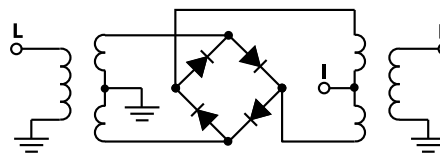
1 dB COMP.: +10 dBm typ.

L = low range [ $f_L$  to  $10 f_L$ ] M = mid range [ $10 f_L$  to  $f_U/2$ ] U = upper range [ $f_U/2$  to  $f_U$ ]  
 m = mid band [ $2f_L$  to  $f_U/2$ ]

### 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 +17dBm            | LO +17dBm          | LO +17dBm          | LO +17dBm         | LO +17dBm         |
| 0.50            | 30.50  | 7.38                 | 64.73              | 58.33              | 1.26              | 2.93              |
| 2.00            | 32.00  | 6.29                 | 62.80              | 57.04              | 1.13              | 2.80              |
| 10.00           | 40.00  | 5.89                 | 58.80              | 53.94              | 1.08              | 2.61              |
| 20.00           | 50.00  | 5.93                 | 51.76              | 47.62              | 1.09              | 2.57              |
| 50.00           | 80.00  | 5.91                 | 48.13              | 44.45              | 1.10              | 2.57              |
| 81.07           | 51.07  | 5.84                 | 43.91              | 40.75              | 1.12              | 2.72              |
| 100.00          | 70.00  | 5.82                 | 42.51              | 39.43              | 1.12              | 2.57              |
| 129.40          | 99.40  | 5.85                 | 41.76              | 38.65              | 1.14              | 2.45              |
| 161.63          | 131.63 | 5.90                 | 39.94              | 37.09              | 1.16              | 2.59              |
| 193.86          | 163.86 | 5.98                 | 38.70              | 35.65              | 1.17              | 2.39              |
| 226.08          | 196.08 | 6.10                 | 38.27              | 35.36              | 1.18              | 2.34              |
| 258.31          | 228.31 | 6.01                 | 37.16              | 34.23              | 1.24              | 2.56              |
| 274.42          | 244.42 | 5.97                 | 36.62              | 33.23              | 1.26              | 2.43              |
| 306.65          | 276.65 | 6.07                 | 35.81              | 32.42              | 1.26              | 2.47              |
| 338.87          | 308.87 | 6.16                 | 34.78              | 30.96              | 1.33              | 2.54              |
| 371.10          | 341.10 | 6.34                 | 33.92              | 29.51              | 1.34              | 2.45              |
| 403.33          | 373.33 | 6.42                 | 33.83              | 28.51              | 1.36              | 2.59              |
| 435.55          | 405.55 | 6.60                 | 34.53              | 28.16              | 1.39              | 2.55              |
| 467.78          | 437.78 | 6.76                 | 35.55              | 28.51              | 1.40              | 2.52              |
| 500.00          | 470.00 | 6.85                 | 34.97              | 28.71              | 1.42              | 2.52              |

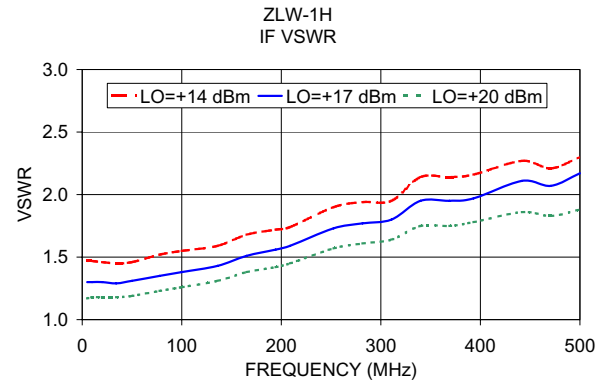
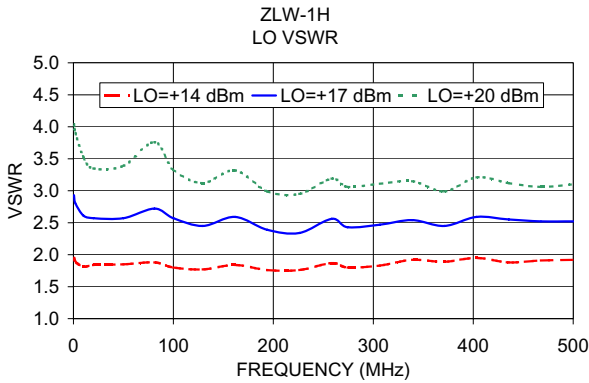
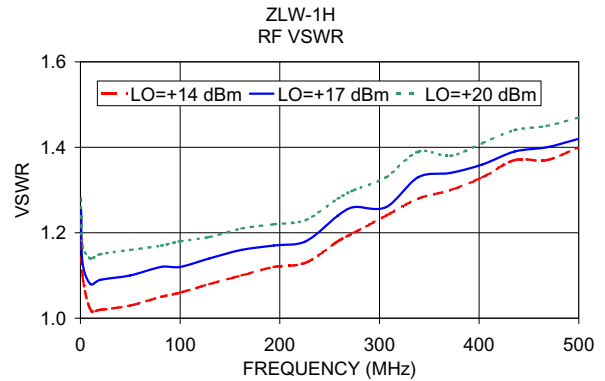
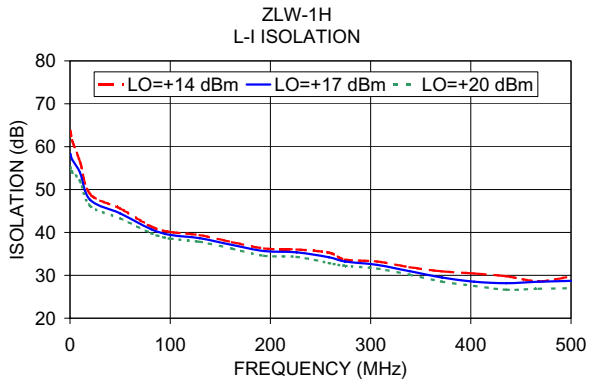
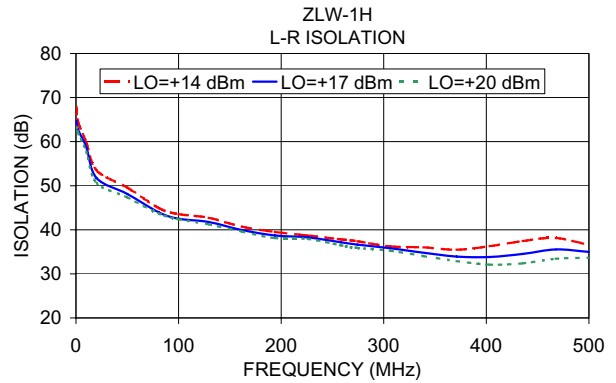
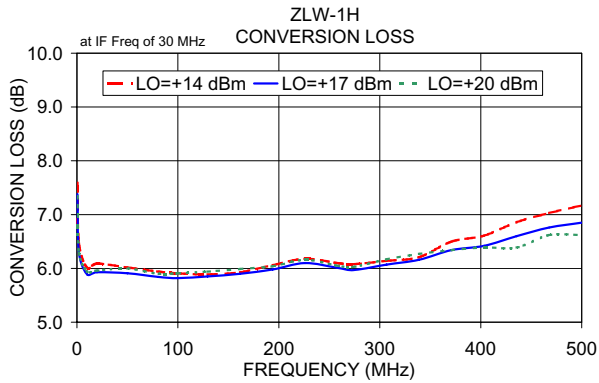
### Electrical Schematic



### Notes

- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/WCLStore/terms.jsp](http://www.minicircuits.com/WCLStore/terms.jsp)





**Notes**

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/WCLStore/terms.jsp](http://www.minicircuits.com/WCLStore/terms.jsp)



# Frequency Mixer

# ZLW-1H

## Typical Performance Data

| RF (IN) (MHz) | LO (MHz) | CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) |       |       |
|---------------|----------|--|-------|-------|
|               |          | @LO (dBm)                                    |       |       |
|               |          | +14  | +17   | +20   |
| 10.1          | 40.1     | 5.41   | 5.19  | 5.09  |
| 40.1          | 70.1     | 5.59   | 5.36  | 5.18  |
| 70.1          | 100.1    | 5.55   | 5.30  | 5.23  |
| 100.1         | 130.1    | 5.65   | 5.45  | 5.39  |
| 130.1         | 160.1    | 5.60   | 5.40  | 5.35  |
| 160.1         | 190.1    | 5.54   | 5.40  | 5.36  |
| 190.1         | 220.1    | 5.56   | 5.46  | 5.42  |
| 220.1         | 250.1    | 5.55   | 5.42  | 5.38  |
| 250.1         | 280.1    | 5.55   | 5.44  | 5.41  |
| 280.1         | 310.1    | 5.58   | 5.50  | 5.48  |
| 310.1         | 340.1    | 5.64   | 5.50  | 5.45  |
| 340.1         | 370.1    | 5.76   | 5.59  | 5.50  |
| 370.1         | 400.1    | 5.77   | 5.65  | 5.58  |
| 400.1         | 430.1    | 5.77   | 5.66  | 5.62  |
| 430.1         | 460.1    | 5.81   | 5.69  | 5.65  |
| 460.1         | 490.1    | 5.99   | 5.88  | 5.85  |
| 490.1         | 520.1    | 6.18   | 6.04  | 5.96  |
| 520.1         | 550.1    | 6.44   | 6.27  | 6.13  |
| 550.1         | 580.1    | 6.52   | 6.29  | 6.07  |
| 580.1         | 610.1    | 6.78   | 6.42  | 6.13  |
| 610.1         | 640.1    | 6.94   | 6.43  | 6.14  |
| 640.1         | 670.1    | 6.86   | 6.30  | 6.01  |
| 670.1         | 700.1    | 7.09   | 6.43  | 6.10  |
| 700.1         | 730.1    | 7.38   | 6.47  | 6.07  |
| 730.1         | 760.1    | 7.51   | 6.44  | 5.99  |
| 760.1         | 790.1    | 8.11   | 6.80  | 6.17  |
| 800.1         | 830.1    | 8.63   | 7.44  | 6.52  |
| 830.1         | 860.1    | 8.53   | 7.62  | 6.80  |
| 870.1         | 900.1    | 8.76   | 8.15  | 7.50  |
| 900.1         | 930.1    | 8.66   | 8.18  | 7.74  |
| 940.1         | 970.1    | 8.56   | 8.12  | 7.76  |
| 970.1         | 1000.1   | 8.39   | 7.96  | 7.63  |
| 1010.1        | 1040.1   | 8.44   | 8.00  | 7.70  |
| 1040.1        | 1070.1   | 8.62   | 8.19  | 7.87  |
| 1080.1        | 1110.1   | 9.07   | 8.61  | 8.31  |
| 1110.1        | 1140.1   | 9.21   | 8.75  | 8.45  |
| 1150.1        | 1180.1   | 9.72   | 9.25  | 8.95  |
| 1180.1        | 1210.1   | 10.19  | 9.74  | 9.43  |
| 1220.1        | 1250.1   | 10.68  | 10.31 | 9.99  |
| 1250.1        | 1280.1   | 10.98  | 10.69 | 10.42 |

| RF (IN) (MHz) | LO (MHz) | IP3 INPUT (dBm) |       |       |
|---------------|----------|-----------------|-------|-------|
|               |          | @LO (dBm)       |       |       |
|               |          | +14             | +17   | +20   |
| 10.1          | 40.1     | 22.56           | 23.22 | 23.52 |
| 40.1          | 70.1     | 21.95           | 22.69 | 25.77 |
| 70.1          | 100.1    | 21.80           | 23.12 | 22.29 |
| 100.1         | 130.1    | 29.14           | 20.21 | 23.25 |
| 130.1         | 160.1    | 20.18           | 19.86 | 22.53 |
| 160.1         | 190.1    | 18.34           | 20.44 | 22.19 |
| 190.1         | 220.1    | 19.23           | 21.19 | 22.43 |
| 220.1         | 250.1    | 18.62           | 20.74 | 22.03 |
| 250.1         | 280.1    | 17.78           | 19.40 | 20.88 |
| 280.1         | 310.1    | 16.96           | 17.77 | 19.27 |
| 310.1         | 340.1    | 17.24           | 18.70 | 21.35 |
| 340.1         | 370.1    | 17.90           | 19.78 | 23.08 |
| 370.1         | 400.1    | 19.66           | 20.45 | 22.16 |
| 400.1         | 430.1    | 18.19           | 19.20 | 21.21 |
| 430.1         | 460.1    | 17.45           | 18.62 | 20.24 |
| 460.1         | 490.1    | 14.46           | 16.79 | 19.41 |
| 490.1         | 520.1    | 12.59           | 14.27 | 16.99 |
| 520.1         | 550.1    | 11.92           | 12.85 | 14.84 |
| 550.1         | 580.1    | 11.41           | 12.56 | 14.60 |
| 580.1         | 610.1    | 11.64           | 13.46 | 16.04 |
| 610.1         | 640.1    | 12.62           | 15.34 | 18.27 |
| 640.1         | 670.1    | 14.65           | 18.55 | 22.44 |
| 670.1         | 700.1    | 17.33           | 22.28 | 22.49 |
| 700.1         | 730.1    | 16.54           | 21.20 | 20.24 |
| 730.1         | 760.1    | 15.45           | 20.55 | 19.46 |
| 760.1         | 790.1    | 13.01           | 19.08 | 19.07 |
| 800.1         | 830.1    | 12.10           | 15.71 | 20.31 |
| 830.1         | 860.1    | 13.49           | 16.22 | 21.53 |
| 870.1         | 900.1    | 14.68           | 16.46 | 20.24 |
| 900.1         | 930.1    | 15.71           | 17.24 | 19.66 |
| 940.1         | 970.1    | 17.59           | 19.64 | 21.80 |
| 970.1         | 1000.1   | 21.63           | 24.58 | 29.01 |
| 1010.1        | 1040.1   | 20.76           | 22.50 | 24.74 |
| 1040.1        | 1070.1   | 19.53           | 22.14 | 24.36 |
| 1080.1        | 1110.1   | 19.02           | 22.33 | 24.59 |
| 1110.1        | 1140.1   | 18.73           | 21.35 | 24.27 |
| 1150.1        | 1180.1   | 19.69           | 21.62 | 24.48 |
| 1180.1        | 1210.1   | 20.41           | 22.62 | 25.15 |
| 1220.1        | 1250.1   | 21.35           | 24.79 | 26.65 |
| 1250.1        | 1280.1   | 21.66           | 26.26 | 28.50 |

| RF (IN) (MHz) | LO (MHz) | COMPRESSION @RF IN=+10dBm (dB) |      |      |
|---------------|----------|--------------------------------|------|------|
|               |          | @LO (dBm)                      |      |      |
|               |          | +14                            | +17  | +20  |
| 10.1          | 40.1     | 0.74                           | 0.37 | 0.19 |
| 40.1          | 70.1     | 0.50                           | 0.29 | 0.14 |
| 70.1          | 100.1    | 0.58                           | 0.33 | 0.16 |
| 100.1         | 130.1    | 0.55                           | 0.30 | 0.16 |
| 130.1         | 160.1    | 0.51                           | 0.28 | 0.15 |
| 160.1         | 190.1    | 0.50                           | 0.25 | 0.15 |
| 190.1         | 220.1    | 0.49                           | 0.26 | 0.16 |
| 220.1         | 250.1    | 0.45                           | 0.24 | 0.16 |
| 250.1         | 280.1    | 0.42                           | 0.26 | 0.17 |
| 280.1         | 310.1    | 0.48                           | 0.32 | 0.23 |
| 310.1         | 340.1    | 0.43                           | 0.28 | 0.20 |
| 340.1         | 370.1    | 0.41                           | 0.29 | 0.21 |
| 370.1         | 400.1    | 0.61                           | 0.44 | 0.32 |
| 400.1         | 430.1    | 0.71                           | 0.45 | 0.29 |
| 430.1         | 460.1    | 0.90                           | 0.60 | 0.38 |
| 460.1         | 490.1    | 1.10                           | 0.74 | 0.45 |
| 490.1         | 520.1    | 1.18                           | 0.78 | 0.47 |
| 520.1         | 550.1    | 1.22                           | 0.87 | 0.58 |
| 550.1         | 580.1    | 1.36                           | 1.02 | 0.74 |
| 580.1         | 610.1    | 1.34                           | 0.98 | 0.76 |
| 610.1         | 640.1    | 1.37                           | 1.03 | 0.80 |
| 640.1         | 670.1    | 1.54                           | 1.17 | 0.89 |
| 670.1         | 700.1    | 1.54                           | 1.15 | 0.82 |
| 700.1         | 730.1    | 1.45                           | 1.20 | 0.90 |
| 730.1         | 760.1    | 1.42                           | 1.38 | 1.01 |
| 760.1         | 790.1    | 0.91                           | 1.17 | 0.92 |
| 800.1         | 830.1    | 0.55                           | 0.78 | 0.87 |
| 830.1         | 860.1    | 0.66                           | 0.72 | 0.76 |
| 870.1         | 900.1    | 0.55                           | 0.47 | 0.47 |
| 900.1         | 930.1    | 0.50                           | 0.39 | 0.32 |
| 940.1         | 970.1    | 0.51                           | 0.41 | 0.35 |
| 970.1         | 1000.1   | 0.64                           | 0.53 | 0.43 |
| 1010.1        | 1040.1   | 0.80                           | 0.67 | 0.55 |
| 1040.1        | 1070.1   | 0.86                           | 0.70 | 0.56 |
| 1080.1        | 1110.1   | 0.86                           | 0.68 | 0.52 |
| 1110.1        | 1140.1   | 0.86                           | 0.66 | 0.49 |
| 1150.1        | 1180.1   | 0.76                           | 0.55 | 0.39 |
| 1180.1        | 1210.1   | 0.65                           | 0.40 | 0.28 |
| 1220.1        | 1250.1   | 0.62                           | 0.32 | 0.22 |
| 1250.1        | 1280.1   | 0.67                           | 0.30 | 0.20 |

# Frequency Mixer

# ZLW-1H

## Typical Performance Data

| IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=250.1MHz (dB) | IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB) | IF (OUT) (MHz) | LO (MHz) | CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (dB) |
|----------------|----------|--|----------------|----------|---|----------------|----------|--|
|                |          | @LO (dBm)  |                |          | @LO (dBm)   |                |          | @LO (dBm)  |
|                |          | +17  |                |          | +17   |                |          | +17  |
| 240.0          | 10.1     | 5.69   | 10.0           | 20.1     | 5.34  | 490.0          | 10.1     | 6.29   |
| 235.0          | 15.1     | 5.74   | 50.0           | 60.1     | 5.17  | 480.0          | 20.1     | 6.19   |
| 230.0          | 20.1     | 5.74   | 90.0           | 100.1    | 5.02  | 470.0          | 30.1     | 6.15   |
| 225.0          | 25.1     | 5.63   | 130.0          | 140.1    | 5.17  | 460.0          | 40.1     | 6.05   |
| 220.0          | 30.1     | 5.62   | 170.0          | 180.1    | 5.16  | 450.0          | 50.1     | 6.15   |
| 215.0          | 35.1     | 5.59   | 210.0          | 220.1    | 5.12  | 440.0          | 60.1     | 6.01   |
| 210.0          | 40.1     | 5.58   | 250.0          | 260.1    | 5.27  | 430.0          | 70.1     | 5.93   |
| 205.0          | 45.1     | 5.58   | 290.0          | 300.1    | 5.49  | 420.0          | 80.1     | 5.89   |
| 200.0          | 50.1     | 5.51   | 330.0          | 340.1    | 5.32  | 410.0          | 90.1     | 5.80   |
| 195.0          | 55.1     | 5.47   | 370.0          | 380.1    | 5.42  | 400.0          | 100.1    | 5.84   |
| 190.0          | 60.1     | 5.49   | 410.0          | 420.1    | 5.70  | 390.0          | 110.1    | 5.77   |
| 185.0          | 65.1     | 5.53   | 450.0          | 460.1    | 5.98  | 380.0          | 120.1    | 5.86   |
| 180.0          | 70.1     | 5.48   | 490.0          | 500.1    | 5.99  | 370.0          | 130.1    | 5.80   |
| 175.0          | 75.1     | 5.41   | 510.0          | 520.1    | 5.95  | 360.0          | 140.1    | 5.86   |
| 170.0          | 80.1     | 5.42   | 550.0          | 560.1    | 5.89  | 350.0          | 150.1    | 5.87   |
| 165.0          | 85.1     | 5.41   | 570.0          | 580.1    | 5.85  | 340.0          | 160.1    | 5.84   |
| 160.0          | 90.1     | 5.41   | 610.0          | 620.1    | 5.77  | 330.0          | 170.1    | 5.87   |
| 155.0          | 95.1     | 5.36   | 630.0          | 640.1    | 5.61  | 320.0          | 180.1    | 5.84   |
| 150.0          | 100.1    | 5.32   | 670.0          | 680.1    | 5.64  | 310.0          | 190.1    | 5.90   |
| 145.0          | 105.1    | 5.34   | 690.0          | 700.1    | 5.63  | 300.0          | 200.1    | 5.84   |
| 140.0          | 110.1    | 5.39   | 730.0          | 740.1    | 5.73  | 290.0          | 210.1    | 5.86   |
| 135.0          | 115.1    | 5.40   | 750.0          | 760.1    | 5.68  | 280.0          | 220.1    | 5.86   |
| 130.0          | 120.1    | 5.34   | 790.0          | 800.1    | 5.87  | 260.0          | 240.1    | 5.92   |
| 125.0          | 125.1    | 5.23   | 810.0          | 820.1    | 5.96  | 250.0          | 250.1    | 5.88   |
| 120.0          | 130.1    | 5.36   | 850.0          | 860.1    | 5.84  | 230.0          | 270.1    | 5.72   |
| 115.0          | 135.1    | 5.37   | 870.0          | 880.1    | 5.91  | 220.0          | 280.1    | 5.77   |
| 105.0          | 145.1    | 5.32   | 910.0          | 920.1    | 6.02  | 200.0          | 300.1    | 5.89   |
| 100.0          | 150.1    | 5.33   | 930.0          | 940.1    | 6.07  | 190.0          | 310.1    | 5.90   |
| 90.0           | 160.1    | 5.37   | 970.0          | 980.1    | 6.34  | 170.0          | 330.1    | 5.90   |
| 85.0           | 165.1    | 5.34   | 990.0          | 1000.1   | 6.50  | 160.0          | 340.1    | 5.80   |
| 75.0           | 175.1    | 5.33   | 1030.0         | 1040.1   | 6.79  | 140.0          | 360.1    | 5.91   |
| 70.0           | 180.1    | 5.35   | 1050.0         | 1060.1   | 7.15  | 130.0          | 370.1    | 5.89   |
| 60.0           | 190.1    | 5.34   | 1090.0         | 1100.1   | 7.51  | 110.0          | 390.1    | 5.87   |
| 55.0           | 195.1    | 5.34   | 1110.0         | 1120.1   | 7.96  | 100.0          | 400.1    | 5.92   |
| 45.0           | 205.1    | 5.38   | 1150.0         | 1160.1   | 8.51  | 80.0           | 420.1    | 5.90   |
| 40.0           | 210.1    | 5.38   | 1170.0         | 1180.1   | 8.80  | 70.0           | 430.1    | 5.90   |
| 30.0           | 220.1    | 5.35   | 1210.0         | 1220.1   | 9.57  | 50.0           | 450.1    | 5.96   |
| 25.0           | 225.1    | 5.31   | 1230.0         | 1240.1   | 9.95  | 40.0           | 460.1    | 5.95   |
| 15.0           | 235.1    | 5.33   | 1270.0         | 1280.1   | 10.76   | 20.0           | 480.1    | 5.91   |
| 10.0           | 240.1    | 5.39   | 1290.0         | 1300.1   | 11.17   | 10.0           | 490.1    | 6.06   |

# Frequency Mixer

# ZLW-1H

## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +14                     | +17   | +20   | +14                     | +17   | +20   |
| 40.1        | 81.15                   | 80.39 | 75.34 | 63.78                   | 65.11 | 66.67 |
| 70.1        | 82.00                   | 78.57 | 74.01 | 58.86                   | 60.13 | 61.11 |
| 100.1       | 79.51                   | 77.34 | 70.64 | 55.47                   | 56.92 | 60.13 |
| 130.1       | 77.54                   | 76.25 | 68.55 | 52.46                   | 55.82 | 58.12 |
| 160.1       | 74.56                   | 75.87 | 67.77 | 50.74                   | 53.91 | 55.57 |
| 190.1       | 73.44                   | 71.63 | 64.90 | 50.39                   | 52.89 | 53.80 |
| 220.1       | 70.73                   | 73.86 | 65.32 | 49.38                   | 51.15 | 51.87 |
| 250.1       | 66.78                   | 76.19 | 65.72 | 49.13                   | 50.22 | 50.27 |
| 280.1       | 69.37                   | 68.63 | 61.89 | 48.53                   | 49.01 | 48.61 |
| 310.1       | 69.30                   | 71.01 | 63.58 | 47.15                   | 47.44 | 47.20 |
| 340.1       | 62.25                   | 84.47 | 65.85 | 46.86                   | 46.83 | 46.08 |
| 370.1       | 58.32                   | 68.02 | 66.76 | 46.16                   | 46.08 | 45.24 |
| 400.1       | 57.49                   | 64.61 | 68.23 | 44.58                   | 44.35 | 43.63 |
| 430.1       | 58.39                   | 69.13 | 59.86 | 42.34                   | 41.88 | 41.25 |
| 460.1       | 58.78                   | 70.64 | 58.94 | 40.76                   | 39.99 | 39.51 |
| 490.1       | 58.47                   | 70.11 | 65.85 | 40.50                   | 39.24 | 38.43 |
| 520.1       | 62.17                   | 65.22 | 57.82 | 40.29                   | 39.08 | 38.12 |
| 550.1       | 67.96                   | 61.91 | 56.03 | 39.57                   | 38.63 | 37.39 |
| 580.1       | 63.02                   | 72.78 | 68.07 | 38.71                   | 37.55 | 36.10 |
| 610.1       | 61.89                   | 64.29 | 60.93 | 38.05                   | 36.30 | 34.64 |
| 640.1       | 57.80                   | 62.69 | 75.34 | 37.41                   | 35.07 | 33.70 |
| 670.1       | 51.73                   | 54.13 | 57.03 | 36.76                   | 34.52 | 33.07 |
| 700.1       | 52.85                   | 63.53 | 59.14 | 35.12                   | 33.88 | 32.40 |
| 730.1       | 49.85                   | 54.73 | 62.88 | 33.13                   | 32.47 | 31.29 |
| 760.1       | 48.48                   | 53.73 | 64.07 | 31.43                   | 31.16 | 30.38 |
| 790.1       | 51.43                   | 60.49 | 52.21 | 31.17                   | 30.39 | 29.48 |
| 830.1       | 53.20                   | 59.13 | 49.37 | 30.57                   | 29.61 | 28.49 |
| 860.1       | 50.77                   | 60.25 | 56.69 | 30.08                   | 29.01 | 27.90 |
| 900.1       | 53.21                   | 60.05 | 49.12 | 29.48                   | 28.41 | 27.12 |
| 930.1       | 76.14                   | 48.43 | 41.97 | 29.09                   | 27.96 | 26.47 |
| 970.1       | 67.50                   | 48.54 | 42.98 | 28.16                   | 26.75 | 25.03 |
| 1000.1      | 63.48                   | 47.70 | 42.19 | 27.54                   | 26.06 | 24.00 |
| 1040.1      | 53.81                   | 42.97 | 38.87 | 26.49                   | 24.64 | 22.90 |
| 1070.1      | 48.43                   | 40.40 | 37.13 | 25.65                   | 23.77 | 22.26 |
| 1110.1      | 44.41                   | 38.66 | 36.40 | 24.46                   | 22.65 | 21.52 |
| 1140.1      | 42.83                   | 38.27 | 36.48 | 23.47                   | 22.07 | 21.17 |
| 1180.1      | 38.72                   | 35.87 | 34.45 | 22.66                   | 21.61 | 21.00 |
| 1210.1      | 36.64                   | 34.56 | 33.41 | 22.11                   | 21.20 | 20.65 |
| 1250.1      | 35.42                   | 33.90 | 33.05 | 21.58                   | 20.87 | 20.37 |
| 1280.1      | 34.23                   | 33.10 | 32.36 | 21.21                   | 20.73 | 20.29 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +14                     | +17   | +20   |
| 10.1                | 40.1        | 47.85                   | 47.73 | 47.42 |
| 40.1                | 70.1        | 37.48                   | 37.66 | 37.61 |
| 70.1                | 100.1       | 33.58                   | 33.60 | 33.72 |
| 100.1               | 130.1       | 31.41                   | 31.60 | 31.73 |
| 130.1               | 160.1       | 30.14                   | 30.26 | 30.31 |
| 160.1               | 190.1       | 28.98                   | 29.19 | 29.35 |
| 190.1               | 220.1       | 28.68                   | 28.77 | 28.88 |
| 220.1               | 250.1       | 28.93                   | 29.08 | 29.06 |
| 250.1               | 280.1       | 29.12                   | 29.61 | 30.06 |
| 280.1               | 310.1       | 29.01                   | 29.36 | 29.66 |
| 310.1               | 340.1       | 29.07                   | 29.13 | 29.16 |
| 340.1               | 370.1       | 28.49                   | 28.59 | 28.79 |
| 370.1               | 400.1       | 27.66                   | 28.09 | 28.72 |
| 400.1               | 430.1       | 27.19                   | 28.11 | 28.98 |
| 430.1               | 460.1       | 25.67                   | 26.22 | 26.62 |
| 460.1               | 490.1       | 23.69                   | 23.77 | 23.82 |
| 490.1               | 520.1       | 22.26                   | 22.09 | 21.94 |
| 520.1               | 550.1       | 21.23                   | 21.01 | 20.76 |
| 550.1               | 580.1       | 20.16                   | 19.94 | 19.72 |
| 580.1               | 610.1       | 19.53                   | 19.10 | 18.77 |
| 610.1               | 640.1       | 19.06                   | 18.60 | 18.30 |
| 640.1               | 670.1       | 18.71                   | 18.31 | 18.10 |
| 670.1               | 700.1       | 18.71                   | 18.35 | 18.16 |
| 700.1               | 730.1       | 18.90                   | 18.56 | 18.46 |
| 730.1               | 760.1       | 18.78                   | 18.39 | 18.25 |
| 760.1               | 790.1       | 18.41                   | 18.07 | 17.86 |
| 800.1               | 830.1       | 17.37                   | 17.09 | 16.84 |
| 830.1               | 860.1       | 16.71                   | 16.37 | 16.10 |
| 870.1               | 900.1       | 15.90                   | 15.65 | 15.41 |
| 900.1               | 930.1       | 15.42                   | 15.20 | 15.00 |
| 940.1               | 970.1       | 14.68                   | 14.48 | 14.26 |
| 970.1               | 1000.1      | 14.02                   | 13.83 | 13.68 |
| 1010.1              | 1040.1      | 13.09                   | 12.97 | 12.84 |
| 1040.1              | 1070.1      | 12.46                   | 12.40 | 12.23 |
| 1080.1              | 1110.1      | 11.67                   | 11.62 | 11.49 |
| 1110.1              | 1140.1      | 11.08                   | 11.03 | 10.92 |
| 1150.1              | 1180.1      | 10.38                   | 10.23 | 10.13 |
| 1180.1              | 1210.1      | 9.83                    | 9.71  | 9.62  |
| 1220.1              | 1250.1      | 9.31                    | 9.13  | 9.02  |
| 1250.1              | 1280.1      | 9.00                    | 8.81  | 8.71  |

# Frequency Mixer

# ZLW-1H

## Typical Performance Data

| RF (IN)<br>(MHz) | LO<br>(MHz) | RF VSWR<br>(:1) |      |      | LO<br>(MHz) | LO VSWR<br>(:1) |      |      | IF (OUT)<br>(MHz) | IF VSWR<br>@LO=500.1MHz<br>(:1) |      |      |
|------------------|-------------|-----------------|------|------|-------------|-----------------|------|------|-------------------|---------------------------------|------|------|
|                  |             | @LO (dBm)       |      |      |             | @LO (dBm)       |      |      |                   | @LO (dBm)                       |      |      |
|                  |             | +14             | +17  | +20  |             | +14             | +17  | +20  |                   | +14                             | +17  | +20  |
| 10.1             | 40.1        | 1.10            | 1.04 | 1.13 | 40.1        | 1.10            | 1.40 | 1.94 | 10.1              | 1.71                            | 1.45 | 1.27 |
| 40.1             | 70.1        | 1.21            | 1.12 | 1.07 | 70.1        | 1.18            | 1.33 | 1.77 | 20.1              | 1.68                            | 1.43 | 1.24 |
| 70.1             | 100.1       | 1.21            | 1.07 | 1.06 | 100.1       | 1.23            | 1.40 | 1.87 | 30.1              | 1.70                            | 1.43 | 1.25 |
| 100.1            | 130.1       | 1.12            | 1.05 | 1.09 | 130.1       | 1.25            | 1.42 | 1.86 | 40.1              | 1.73                            | 1.46 | 1.28 |
| 130.1            | 160.1       | 1.12            | 1.10 | 1.13 | 160.1       | 1.29            | 1.41 | 1.83 | 50.1              | 1.75                            | 1.48 | 1.30 |
| 160.1            | 190.1       | 1.10            | 1.10 | 1.13 | 190.1       | 1.31            | 1.47 | 1.92 | 60.1              | 1.72                            | 1.46 | 1.28 |
| 190.1            | 220.1       | 1.06            | 1.09 | 1.12 | 220.1       | 1.31            | 1.47 | 1.88 | 70.1              | 1.70                            | 1.44 | 1.26 |
| 220.1            | 250.1       | 1.08            | 1.14 | 1.18 | 250.1       | 1.35            | 1.51 | 1.94 | 80.1              | 1.74                            | 1.47 | 1.30 |
| 250.1            | 280.1       | 1.07            | 1.13 | 1.17 | 280.1       | 1.37            | 1.58 | 2.03 | 90.1              | 1.78                            | 1.51 | 1.34 |
| 280.1            | 310.1       | 1.05            | 1.11 | 1.14 | 310.1       | 1.39            | 1.60 | 2.01 | 100.1             | 1.79                            | 1.53 | 1.36 |
| 310.1            | 340.1       | 1.04            | 1.10 | 1.15 | 340.1       | 1.42            | 1.68 | 2.14 | 110.1             | 1.77                            | 1.51 | 1.34 |
| 340.1            | 370.1       | 1.04            | 1.10 | 1.15 | 370.1       | 1.45            | 1.71 | 2.15 | 120.1             | 1.77                            | 1.50 | 1.32 |
| 370.1            | 400.1       | 1.07            | 1.13 | 1.18 | 400.1       | 1.49            | 1.77 | 2.22 | 130.1             | 1.80                            | 1.53 | 1.35 |
| 400.1            | 430.1       | 1.12            | 1.20 | 1.25 | 430.1       | 1.54            | 1.91 | 2.43 | 140.1             | 1.82                            | 1.56 | 1.38 |
| 430.1            | 460.1       | 1.13            | 1.20 | 1.24 | 460.1       | 1.56            | 1.90 | 2.36 | 150.1             | 1.84                            | 1.57 | 1.40 |
| 460.1            | 490.1       | 1.16            | 1.21 | 1.24 | 490.1       | 1.61            | 1.98 | 2.49 | 160.1             | 1.83                            | 1.57 | 1.39 |
| 490.1            | 520.1       | 1.18            | 1.20 | 1.21 | 520.1       | 1.70            | 2.13 | 2.69 | 170.1             | 1.84                            | 1.57 | 1.40 |
| 520.1            | 550.1       | 1.21            | 1.20 | 1.19 | 550.1       | 1.78            | 2.24 | 2.82 | 180.1             | 1.89                            | 1.63 | 1.45 |
| 550.1            | 580.1       | 1.28            | 1.26 | 1.23 | 580.1       | 1.88            | 2.39 | 3.00 | 190.1             | 1.95                            | 1.68 | 1.51 |
| 580.1            | 610.1       | 1.31            | 1.27 | 1.23 | 610.1       | 1.94            | 2.48 | 3.11 | 200.1             | 1.95                            | 1.68 | 1.51 |
| 610.1            | 640.1       | 1.37            | 1.31 | 1.26 | 640.1       | 2.00            | 2.57 | 3.22 | 210.1             | 1.93                            | 1.66 | 1.48 |
| 640.1            | 670.1       | 1.43            | 1.35 | 1.30 | 670.1       | 2.08            | 2.69 | 3.38 | 220.1             | 1.93                            | 1.66 | 1.49 |
| 670.1            | 700.1       | 1.49            | 1.41 | 1.35 | 700.1       | 2.14            | 2.78 | 3.50 | 240.1             | 2.05                            | 1.77 | 1.59 |
| 700.1            | 730.1       | 1.62            | 1.50 | 1.44 | 730.1       | 2.24            | 2.89 | 3.62 | 250.1             | 2.05                            | 1.77 | 1.59 |
| 730.1            | 760.1       | 1.71            | 1.57 | 1.49 | 760.1       | 2.38            | 3.06 | 3.82 | 270.1             | 2.08                            | 1.80 | 1.62 |
| 760.1            | 790.1       | 1.80            | 1.64 | 1.54 | 790.1       | 2.51            | 3.20 | 3.99 | 280.1             | 2.15                            | 1.87 | 1.69 |
| 800.1            | 830.1       | 2.02            | 1.85 | 1.71 | 830.1       | 2.69            | 3.42 | 4.23 | 300.1             | 2.18                            | 1.89 | 1.71 |
| 830.1            | 860.1       | 2.03            | 1.91 | 1.80 | 860.1       | 2.86            | 3.63 | 4.45 | 310.1             | 2.17                            | 1.88 | 1.70 |
| 870.1            | 900.1       | 2.14            | 2.08 | 2.01 | 900.1       | 3.03            | 3.84 | 4.72 | 330.1             | 2.29                            | 1.99 | 1.80 |
| 900.1            | 930.1       | 2.15            | 2.12 | 2.08 | 930.1       | 3.20            | 4.05 | 4.93 | 340.1             | 2.32                            | 2.02 | 1.83 |
| 940.1            | 970.1       | 2.18            | 2.16 | 2.14 | 970.1       | 3.38            | 4.27 | 5.19 | 360.1             | 2.34                            | 2.04 | 1.86 |
| 970.1            | 1000.1      | 2.24            | 2.22 | 2.20 | 1000.1      | 3.50            | 4.42 | 5.38 | 370.1             | 2.40                            | 2.10 | 1.91 |
| 1010.1           | 1040.1      | 2.38            | 2.35 | 2.33 | 1040.1      | 3.72            | 4.64 | 5.59 | 390.1             | 2.45                            | 2.14 | 1.94 |
| 1040.1           | 1070.1      | 2.50            | 2.46 | 2.42 | 1070.1      | 3.80            | 4.74 | 5.72 | 400.1             | 2.44                            | 2.12 | 1.93 |
| 1080.1           | 1110.1      | 2.78            | 2.71 | 2.66 | 1110.1      | 3.98            | 4.93 | 5.97 | 420.1             | 2.56                            | 2.24 | 2.04 |
| 1110.1           | 1140.1      | 2.92            | 2.85 | 2.80 | 1140.1      | 4.15            | 5.10 | 6.11 | 430.1             | 2.61                            | 2.29 | 2.08 |
| 1150.1           | 1180.1      | 3.24            | 3.16 | 3.10 | 1180.1      | 4.29            | 5.23 | 6.30 | 450.1             | 2.58                            | 2.26 | 2.06 |
| 1180.1           | 1210.1      | 3.50            | 3.41 | 3.35 | 1210.1      | 4.53            | 5.49 | 6.56 | 460.1             | 2.62                            | 2.30 | 2.10 |
| 1220.1           | 1250.1      | 3.65            | 3.60 | 3.55 | 1250.1      | 4.87            | 5.77 | 6.76 | 480.1             | 2.75                            | 2.41 | 2.19 |
| 1250.1           | 1280.1      | 3.93            | 3.87 | 3.82 | 1280.1      | 5.12            | 5.97 | 7.00 | 490.1             | 2.73                            | 2.39 | 2.17 |

## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -     | 22  | 34  | 29  | 32  | 19  | 38  | 20  | 43  | 29  | 64  |
| 1  | -      | 24    | +0  | 30  | 12  | 39  | 16  | 34  | 39  | 42  | 50  | 45  |
| 2  | 64     | 77    | 57  | 73  | 59  | 75  | 60  | 73  | 59  | 74  | 58  | 74  |
| 3  | >90    | 77    | 58  | >79 | 58  | >79 | 57  | >79 | 58  | 74  | 75  | 73  |
| 4  | >90    | >79   | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 5  | >90    | >79   | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 6  | >90    | >79   | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 7  | >90    | >79   | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 8  | >90    | >79   | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 9  | >90    | >79   | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 10 | >90    | >79   | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
|    | RF CAL | 0     | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; -5.00 dBm.  
 LO IN: 280.1 MHz; +17.00 dBm  
 IF OUT: 30 MHz; -10.41 dBm

RF HARMONICS ORDER

|    | (-dBm) | (dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -     | 30  | 44  | 41  | 42  | 30  | 50  | 31  | 54  | 43  | 68  |
| 1  | -      | 24    | +0  | 30  | 12  | 41  | 17  | 37  | 39  | 48  | 45  | 52  |
| 2  | 44     | 66    | 50  | 69  | 53  | 72  | 55  | 66  | 51  | 69  | 50  | 71  |
| 3  | 70     | 56    | 44  | 62  | 44  | 63  | 43  | 62  | 43  | 55  | 66  | 59  |
| 4  | >90    | 82    | 72  | 81  | 69  | 81  | 69  | 87  | 69  | 86  | 73  | 81  |
| 5  | >90    | 78    | 58  | 84  | 58  | 78  | 57  | 78  | 57  | 76  | 58  | 77  |
| 6  | >90    | >88   | 86  | 86  | 86  | >88 | 83  | 85  | 84  | >88 | 80  | >88 |
| 7  | >90    | >88   | 86  | >88 | 73  | >88 | 74  | 86  | 72  | 86  | 72  | >88 |
| 8  | >90    | >88   | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 |
| 9  | >90    | >88   | >88 | >88 | >88 | >88 | >88 | >88 | 82  | >88 | 81  | >88 |
| 10 | >90    | >88   | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 |
|    | RF CAL | 0     | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; 5.00 dBm.  
 LO IN: 280.1 MHz; +17.00 dBm  
 IF OUT: 30 MHz; -0.6 dBm

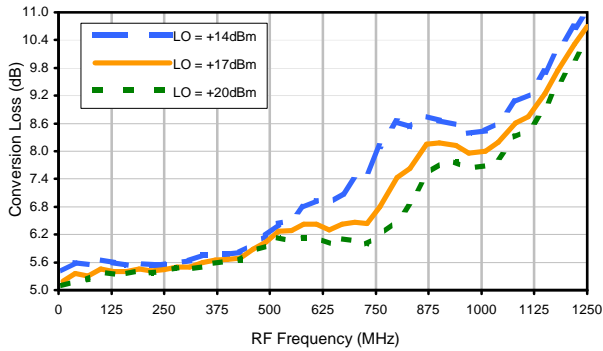
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
 2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
 3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

# Frequency Mixer

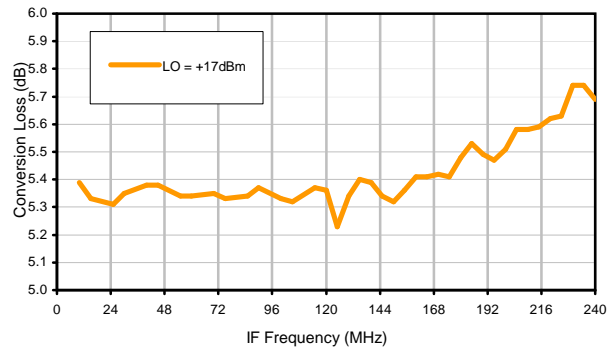
# ZLW-1H

## Typical Performance Curves

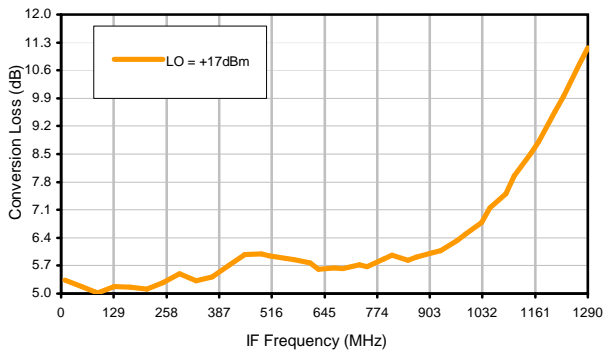
### Conversion Loss @ IF=30MHz



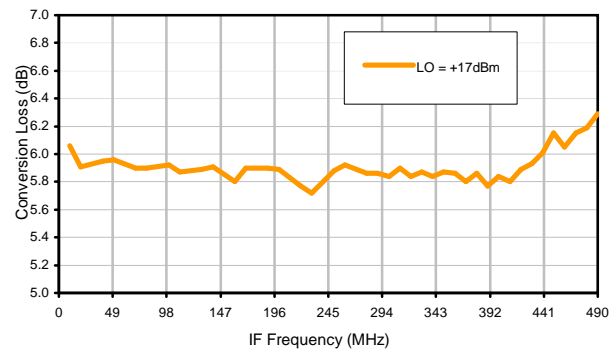
### Conversion Loss vs. IF @ RF=250.1MHz



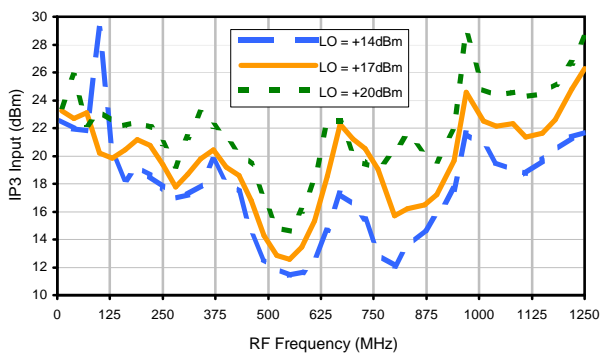
### Conversion Loss vs. IF @ RF=10.1MHz



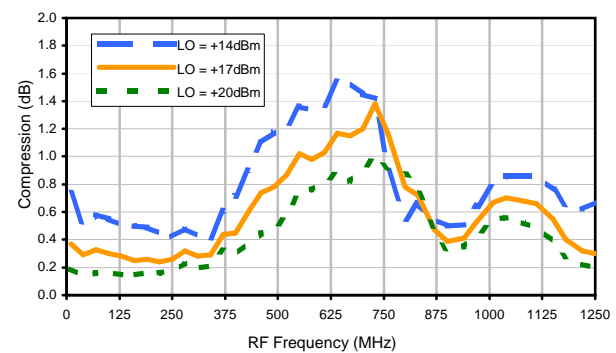
### Conversion Loss vs. IF @ RF=500.1MHz



### IP3 Input



### Compression @ RF IN=+10dBm



REV. X2  
ZLW-1H  
101011  
Page 1 of 3



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant  
P.O. Box 350166, Brooklyn, New York 11235-0006 (718) 934-4500 Fax (718) 332-4661



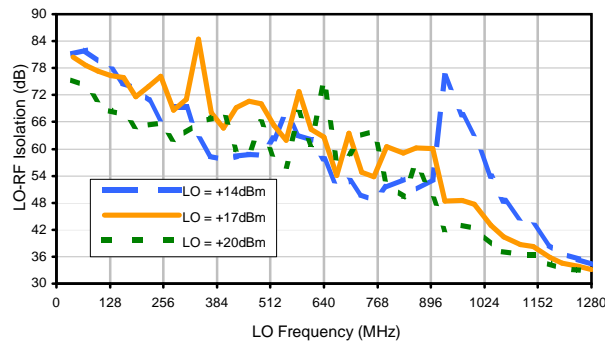
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



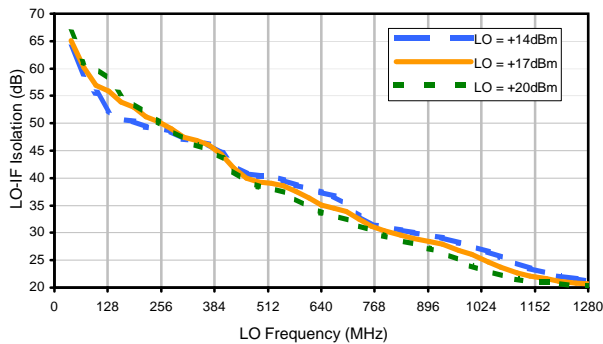


## Typical Performance Curves

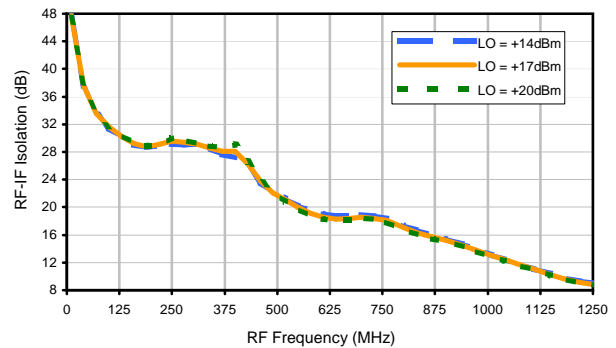
LO-RF Isolation



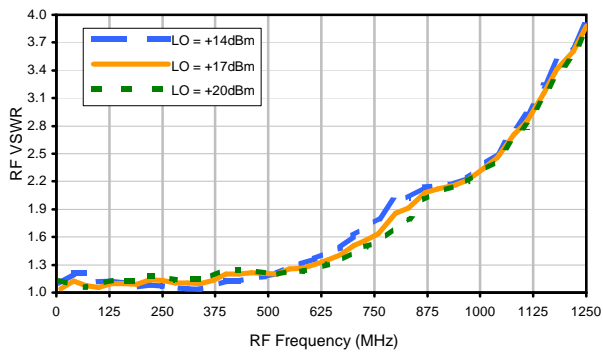
LO-IF Isolation



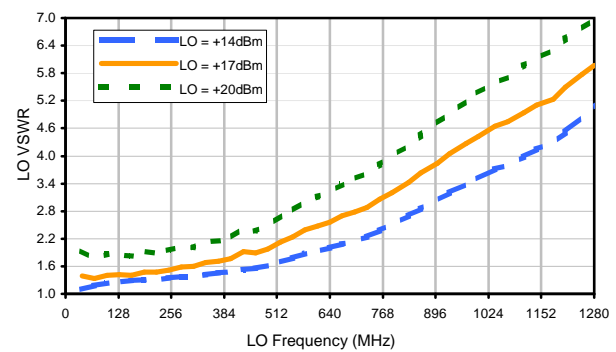
RF-IF Isolation



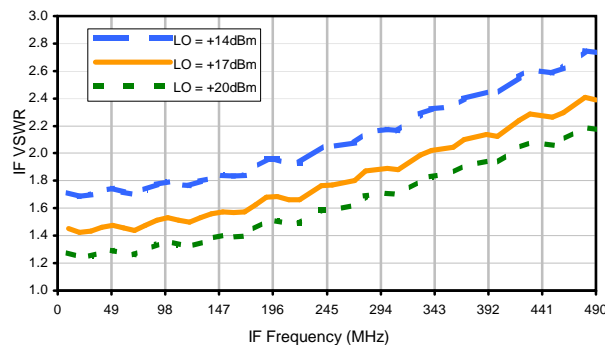
RF VSWR



LO VSWR



IF VSWR



## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 22  | 34  | 29  | 32  | 19  | 38  | 20  | 43  | 29  | 64  |
| 1  | -      | 24     | +0  | 30  | 12  | 39  | 16  | 34  | 39  | 42  | 50  | 45  |
| 2  | 64     | 77     | 57  | 73  | 59  | 75  | 60  | 73  | 59  | 74  | 58  | 74  |
| 3  | >90    | 77     | 58  | >79 | 58  | >79 | 57  | >79 | 58  | 74  | 75  | 73  |
| 4  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 5  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 6  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 7  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 8  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 9  | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 10 | >90    | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; -5.00 dBm.  
 LO IN: 280.1 MHz; +17.00 dBm  
 IF OUT: 30 MHz; -10.41 dBm

RF HARMONICS ORDER

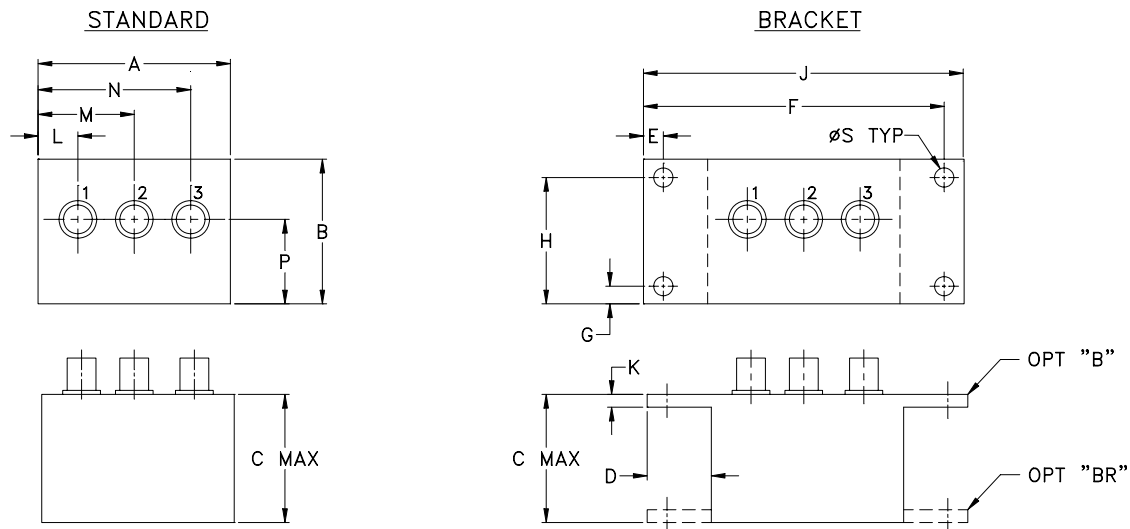
|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 30  | 44  | 41  | 42  | 30  | 50  | 31  | 54  | 43  | 68  |
| 1  | -      | 24     | +0  | 30  | 12  | 41  | 17  | 37  | 39  | 48  | 45  | 52  |
| 2  | 44     | 66     | 50  | 69  | 53  | 72  | 55  | 66  | 51  | 69  | 50  | 71  |
| 3  | 70     | 56     | 44  | 62  | 44  | 63  | 43  | 62  | 43  | 55  | 66  | 59  |
| 4  | >90    | 82     | 72  | 81  | 69  | 81  | 69  | 87  | 69  | 86  | 73  | 81  |
| 5  | >90    | 78     | 58  | 84  | 58  | 78  | 57  | 78  | 57  | 76  | 58  | 77  |
| 6  | >90    | >88    | 86  | 86  | 86  | >88 | 83  | 85  | 84  | >88 | 80  | >88 |
| 7  | >90    | >88    | 86  | >88 | 73  | >88 | 74  | 86  | 72  | 86  | 72  | >88 |
| 8  | >90    | >88    | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 |
| 9  | >90    | >88    | >88 | >88 | >88 | >88 | >88 | >88 | 82  | >88 | 81  | >88 |
| 10 | >90    | >88    | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 | >88 |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |

### LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; 5.00 dBm.  
 LO IN: 280.1 MHz; +17.00 dBm  
 IF OUT: 30 MHz; -0.6 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.

## Outline Dimensions



| CASE# | A               | B               | C               | D              | E              | F                | G              | H                | J               | K             | L              | M               | N               |
|-------|-----------------|-----------------|-----------------|----------------|----------------|------------------|----------------|------------------|-----------------|---------------|----------------|-----------------|-----------------|
| M21   | 1.50<br>(38.10) | 1.13<br>(28.70) | 1.00<br>(25.40) | .50<br>(12.70) | .155<br>(3.94) | 2.345<br>(59.56) | .138<br>(3.51) | .987<br>(25.07)  | 2.50<br>(63.50) | .10<br>(2.54) | .31<br>(7.87)  | .75<br>(19.05)  | 1.19<br>(30.23) |
| M22   | 2.25<br>(57.15) | 1.38<br>(35.05) | 1.24<br>(31.50) |                | .150<br>(3.81) | 3.100<br>(78.74) |                | 1.238<br>(31.45) | 3.25<br>(82.55) |               | .40<br>(10.16) | 1.15<br>(29.21) | 1.86<br>(47.24) |
| M23   | 2.25<br>(57.15) | 1.38<br>(35.05) | 1.24<br>(31.50) |                | .150<br>(3.81) | 3.100<br>(78.74) |                | 1.238<br>(31.45) | 3.25<br>(82.55) |               | .63<br>(16.00) | 1.06<br>(26.92) | 1.63<br>(41.40) |

| CASE# | P              | Q  | R  | S              | WT. GRAMS |
|-------|----------------|----|----|----------------|-----------|
| M21   | .66<br>(16.76) | -- | -- | .150<br>(3.81) | 40.0      |
| M22   | .64<br>(16.26) | -- | -- |                | 74.0      |
| M23   | .69<br>(17.53) | -- | -- |                | 70.0      |

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

### Notes:

- Case material: Aluminum alloy.
- Case finish:
  - For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
  - For Non-RoHS Case Styles: Yellow hexavalent chrome based conversion coating.  
Due to transition from non-RoHS to RoHS, models will be supplied with either case style finish until the non-RoHS case inventory is depleted.
- Mounting bracket available on request. For bracket mounted on connector end add suffix B to part number and add \$5.00 to unit cost. For bracket mounted on the rear, add suffix BR to part number and add \$1.50 to unit cost.



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.

| <b>Specification</b>       | <b>Test/Inspection Condition</b>   | <b>Reference/Spec</b>                |
|----------------------------|--|--------------------------------------|
| Operating Temperature      | -55° to 100°C<br>Ambient Environment   | 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 |