

## Frequency Mixer

## HJK-ED11277/1

Level 20 (LO Power + 20 dBm)

### Important Note

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



Please click "Back", and then click "Contact Us" for Applications support.

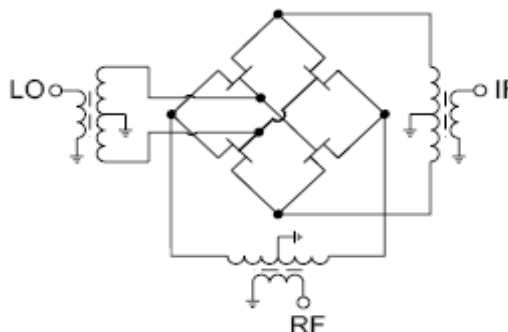
CASE STYLE : TTT167

| ELECTRICAL SPECIFICATIONS 50Ω @ +25°C |                                        |      |      |      |       |
|---------------------------------------|----------------------------------------|------|------|------|-------|
| Parameter                             |                                        | Min. | Typ. | Max. | Units |
| Frequency                             | LO (f <sub>L</sub> to f <sub>U</sub> ) | 703  |      | 2135 | MHz   |
|                                       | RF (f <sub>L</sub> to f <sub>U</sub> ) | 703  |      | 2135 | MHz   |
|                                       | IF                                     | 87   |      | 870  | MHz   |
| Conversion Loss                       | Total Range                            |      | 7.25 |      | dB    |
| LO-RF Isolation                       |                                        |      | 39   |      | dB    |
| LO-IF Isolation                       |                                        |      | 37   |      | dB    |
| Input IP3                             |                                        |      | +28  |      | dBm   |
| 1 dB Compression                      |                                        |      | +15  |      | dBm   |

| MAXIMUM RATINGS       |                 |
|-----------------------|-----------------|
| Operating Temperature | -20°C to 85°C   |
| Storage Temperature   | -55°C to +100°C |

| PIN CONNECTIONS |       |
|-----------------|-------|
| LO              | 2     |
| RF              | 1     |
| IF              | 3     |
| GROUND          | 4,5,6 |

### Electrical Schematics



## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=85MHz<br>(dB) |       |       |
|---------------------|-------------|-------------------------------------------------------|-------|-------|
|                     |             | @LO (dBm)                                             |       |       |
|                     |             | +19                                                   | +20   | +21   |
| 400.1               | 485.1       | 10.90                                                 | 10.87 | 10.84 |
| 460.1               | 545.1       | 9.48                                                  | 9.42  | 9.38  |
| 520.1               | 605.1       | 8.38                                                  | 8.31  | 8.25  |
| 580.1               | 665.1       | 7.76                                                  | 7.70  | 7.64  |
| 640.1               | 725.1       | 7.36                                                  | 7.31  | 7.27  |
| 700.1               | 785.1       | 7.09                                                  | 7.05  | 7.02  |
| 760.1               | 845.1       | 7.07                                                  | 7.03  | 7.01  |
| 820.1               | 905.1       | 7.00                                                  | 6.98  | 6.94  |
| 880.1               | 965.1       | 7.00                                                  | 6.97  | 6.94  |
| 940.1               | 1025.1      | 7.06                                                  | 7.02  | 7.00  |
| 1000.1              | 1085.1      | 7.02                                                  | 6.97  | 6.94  |
| 1060.1              | 1145.1      | 6.98                                                  | 6.94  | 6.91  |
| 1120.1              | 1205.1      | 7.01                                                  | 6.97  | 6.94  |
| 1180.1              | 1265.1      | 7.11                                                  | 7.07  | 7.03  |
| 1240.1              | 1325.1      | 7.08                                                  | 7.03  | 6.99  |
| 1300.1              | 1385.1      | 7.04                                                  | 6.98  | 6.94  |
| 1360.1              | 1445.1      | 6.95                                                  | 6.89  | 6.85  |
| 1420.1              | 1505.1      | 6.76                                                  | 6.69  | 6.65  |
| 1480.1              | 1565.1      | 6.67                                                  | 6.60  | 6.54  |
| 1540.1              | 1625.1      | 6.53                                                  | 6.46  | 6.41  |
| 1600.1              | 1685.1      | 6.42                                                  | 6.36  | 6.30  |
| 1660.1              | 1745.1      | 6.45                                                  | 6.38  | 6.33  |
| 1720.1              | 1805.1      | 6.46                                                  | 6.40  | 6.35  |
| 1780.1              | 1865.1      | 6.55                                                  | 6.49  | 6.44  |
| 1840.1              | 1925.1      | 6.67                                                  | 6.62  | 6.58  |
| 1900.1              | 1985.1      | 6.89                                                  | 6.85  | 6.81  |
| 1940.1              | 2025.1      | 7.03                                                  | 6.99  | 6.96  |
| 2000.1              | 2085.1      | 7.28                                                  | 7.24  | 7.22  |
| 2040.1              | 2125.1      | 7.44                                                  | 7.41  | 7.39  |
| 2100.1              | 2185.1      | 7.68                                                  | 7.66  | 7.65  |
| 2140.1              | 2225.1      | 7.85                                                  | 7.84  | 7.83  |
| 2200.1              | 2285.1      | 8.04                                                  | 8.03  | 8.02  |
| 2240.1              | 2325.1      | 8.35                                                  | 8.34  | 8.34  |
| 2300.1              | 2385.1      | 8.52                                                  | 8.51  | 8.51  |
| 2340.1              | 2425.1      | 8.88                                                  | 8.87  | 8.86  |
| 2400.1              | 2485.1      | 9.00                                                  | 8.98  | 8.98  |
| 2440.1              | 2525.1      | 9.42                                                  | 9.40  | 9.39  |
| 2500.1              | 2585.1      | 9.56                                                  | 9.53  | 9.52  |
| 2540.1              | 2625.1      | 9.92                                                  | 9.88  | 9.86  |
| 2600.1              | 2685.1      | 9.99                                                  | 9.96  | 9.94  |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       |
|---------------------|-------------|--------------------|-------|-------|
|                     |             | @LO (dBm)          |       |       |
|                     |             | +19                | +20   | +21   |
| 400.1               | 485.1       | 25.70              | 26.15 | 26.70 |
| 460.1               | 545.1       | 25.21              | 25.86 | 26.52 |
| 520.1               | 605.1       | 23.58              | 24.27 | 24.90 |
| 580.1               | 665.1       | 24.12              | 24.94 | 25.70 |
| 640.1               | 725.1       | 23.96              | 24.58 | 25.12 |
| 700.1               | 785.1       | 26.40              | 27.18 | 27.96 |
| 760.1               | 845.1       | 27.91              | 28.74 | 29.54 |
| 820.1               | 905.1       | 29.02              | 29.65 | 30.34 |
| 880.1               | 965.1       | 29.34              | 30.03 | 30.66 |
| 940.1               | 1025.1      | 29.37              | 30.16 | 30.63 |
| 1000.1              | 1085.1      | 29.52              | 30.23 | 30.89 |
| 1060.1              | 1145.1      | 29.55              | 30.32 | 30.95 |
| 1120.1              | 1205.1      | 29.89              | 30.75 | 31.39 |
| 1180.1              | 1265.1      | 29.50              | 30.11 | 30.86 |
| 1240.1              | 1325.1      | 27.42              | 28.04 | 28.90 |
| 1300.1              | 1385.1      | 26.52              | 27.12 | 28.07 |
| 1360.1              | 1445.1      | 25.95              | 26.58 | 27.33 |
| 1420.1              | 1505.1      | 25.67              | 26.20 | 26.90 |
| 1480.1              | 1565.1      | 25.82              | 26.26 | 26.85 |
| 1540.1              | 1625.1      | 25.85              | 26.28 | 26.82 |
| 1600.1              | 1685.1      | 25.90              | 26.44 | 26.91 |
| 1660.1              | 1745.1      | 26.12              | 26.69 | 27.28 |
| 1720.1              | 1805.1      | 26.10              | 26.78 | 27.53 |
| 1780.1              | 1865.1      | 26.15              | 26.87 | 27.60 |
| 1840.1              | 1925.1      | 26.28              | 27.05 | 27.82 |
| 1900.1              | 1985.1      | 26.14              | 26.86 | 27.73 |
| 1940.1              | 2025.1      | 26.28              | 27.00 | 27.83 |
| 2000.1              | 2085.1      | 26.36              | 27.11 | 27.98 |
| 2040.1              | 2125.1      | 26.23              | 27.02 | 27.93 |
| 2100.1              | 2185.1      | 26.36              | 27.06 | 27.90 |
| 2140.1              | 2225.1      | 26.12              | 26.85 | 27.64 |
| 2200.1              | 2285.1      | 26.50              | 27.23 | 28.17 |
| 2240.1              | 2325.1      | 26.43              | 27.35 | 28.28 |
| 2300.1              | 2385.1      | 26.48              | 27.57 | 28.40 |
| 2340.1              | 2425.1      | 26.32              | 27.39 | 28.44 |
| 2400.1              | 2485.1      | 26.75              | 27.63 | 28.74 |
| 2440.1              | 2525.1      | 26.49              | 27.60 | 28.58 |
| 2500.1              | 2585.1      | 26.66              | 27.63 | 28.66 |
| 2540.1              | 2625.1      | 26.71              | 27.61 | 28.51 |
| 2600.1              | 2685.1      | 26.77              | 27.70 | 28.87 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+15dBm<br>(dB) |      |      |
|---------------------|-------------|--------------------------------------|------|------|
|                     |             | @LO (dBm)                            |      |      |
|                     |             | +19                                  | +20  | +21  |
| 400.1               | 485.1       | 0.34                                 | 0.32 | 0.29 |
| 460.1               | 545.1       | 0.52                                 | 0.44 | 0.37 |
| 520.1               | 605.1       | 0.48                                 | 0.41 | 0.35 |
| 580.1               | 665.1       | 0.36                                 | 0.29 | 0.23 |
| 640.1               | 725.1       | 0.44                                 | 0.34 | 0.27 |
| 700.1               | 785.1       | 0.41                                 | 0.33 | 0.27 |
| 760.1               | 845.1       | 0.38                                 | 0.32 | 0.27 |
| 820.1               | 905.1       | 0.34                                 | 0.28 | 0.22 |
| 880.1               | 965.1       | 0.29                                 | 0.24 | 0.20 |
| 940.1               | 1025.1      | 0.27                                 | 0.22 | 0.18 |
| 1000.1              | 1085.1      | 0.25                                 | 0.21 | 0.17 |
| 1060.1              | 1145.1      | 0.25                                 | 0.21 | 0.17 |
| 1120.1              | 1205.1      | 0.24                                 | 0.19 | 0.16 |
| 1180.1              | 1265.1      | 0.20                                 | 0.16 | 0.13 |
| 1240.1              | 1325.1      | 0.20                                 | 0.16 | 0.13 |
| 1300.1              | 1385.1      | 0.18                                 | 0.15 | 0.12 |
| 1360.1              | 1445.1      | 0.17                                 | 0.14 | 0.11 |
| 1420.1              | 1505.1      | 0.19                                 | 0.16 | 0.13 |
| 1480.1              | 1565.1      | 0.20                                 | 0.16 | 0.14 |
| 1540.1              | 1625.1      | 0.22                                 | 0.18 | 0.15 |
| 1600.1              | 1685.1      | 0.25                                 | 0.21 | 0.18 |
| 1660.1              | 1745.1      | 0.26                                 | 0.22 | 0.19 |
| 1720.1              | 1805.1      | 0.29                                 | 0.24 | 0.20 |
| 1780.1              | 1865.1      | 0.32                                 | 0.27 | 0.23 |
| 1840.1              | 1925.1      | 0.34                                 | 0.28 | 0.23 |
| 1900.1              | 1985.1      | 0.37                                 | 0.30 | 0.25 |
| 1940.1              | 2025.1      | 0.40                                 | 0.33 | 0.27 |
| 2000.1              | 2085.1      | 0.41                                 | 0.32 | 0.27 |
| 2040.1              | 2125.1      | 0.42                                 | 0.34 | 0.28 |
| 2100.1              | 2185.1      | 0.42                                 | 0.34 | 0.28 |
| 2140.1              | 2225.1      | 0.48                                 | 0.38 | 0.31 |
| 2200.1              | 2285.1      | 0.48                                 | 0.38 | 0.29 |
| 2240.1              | 2325.1      | 0.52                                 | 0.41 | 0.31 |
| 2300.1              | 2385.1      | 0.53                                 | 0.40 | 0.32 |
| 2340.1              | 2425.1      | 0.58                                 | 0.44 | 0.35 |
| 2400.1              | 2485.1      | 0.54                                 | 0.43 | 0.34 |
| 2440.1              | 2525.1      | 0.57                                 | 0.44 | 0.35 |
| 2500.1              | 2585.1      | 0.55                                 | 0.42 | 0.34 |
| 2540.1              | 2625.1      | 0.56                                 | 0.45 | 0.37 |
| 2600.1              | 2685.1      | 0.56                                 | 0.45 | 0.36 |

# Frequency Mixer

HJK-ED11277/1

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=1520MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=1090MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=1960.1MHz<br>(dB) |
|----------------------|-------------|----------------------------------------------------------------|----------------------|-------------|----------------------------------------------------------------|----------------------|-------------|------------------------------------------------------------------|
|                      |             | @LO (dBm)                                                      |                      |             | @LO (dBm)                                                      |                      |             | @LO (dBm)                                                        |
|                      |             | +20                                                            |                      |             | +20                                                            |                      |             | +20                                                              |
| 919.9                | 600.1       | 9.75                                                           | 10.1                 | 1100.1      | 7.00                                                           | 1350.0               | 610.1       | 10.49                                                            |
| 872.6                | 647.4       | 8.83                                                           | 70.1                 | 1160.1      | 6.92                                                           | 1310.0               | 650.1       | 10.18                                                            |
| 825.4                | 694.6       | 8.14                                                           | 130.1                | 1220.1      | 6.91                                                           | 1270.0               | 690.1       | 9.36                                                             |
| 778.1                | 741.9       | 7.50                                                           | 190.1                | 1280.1      | 7.04                                                           | 1230.0               | 730.1       | 9.01                                                             |
| 730.8                | 789.2       | 7.67                                                           | 250.1                | 1340.1      | 7.07                                                           | 1190.0               | 770.1       | 8.78                                                             |
| 683.6                | 836.4       | 7.32                                                           | 310.1                | 1400.1      | 7.07                                                           | 1150.0               | 810.1       | 8.52                                                             |
| 636.3                | 883.7       | 7.04                                                           | 370.1                | 1460.1      | 7.06                                                           | 1110.0               | 850.1       | 8.36                                                             |
| 589.0                | 931.0       | 6.96                                                           | 430.1                | 1520.1      | 6.98                                                           | 1070.0               | 890.1       | 8.13                                                             |
| 541.8                | 978.2       | 6.84                                                           | 490.1                | 1580.1      | 7.09                                                           | 1030.0               | 930.1       | 7.89                                                             |
| 494.5                | 1025.5      | 6.82                                                           | 550.1                | 1640.1      | 7.15                                                           | 990.0                | 970.1       | 7.47                                                             |
| 447.2                | 1072.8      | 6.84                                                           | 610.1                | 1700.1      | 7.19                                                           | 950.0                | 1010.1      | 7.93                                                             |
| 400.0                | 1120.0      | 6.84                                                           | 670.1                | 1760.1      | 7.28                                                           | 910.0                | 1050.1      | 7.71                                                             |
| 352.7                | 1167.3      | 6.86                                                           | 730.1                | 1820.1      | 7.34                                                           | 870.0                | 1090.1      | 7.50                                                             |
| 305.4                | 1214.6      | 6.81                                                           | 790.1                | 1880.1      | 7.49                                                           | 830.0                | 1130.1      | 7.40                                                             |
| 258.2                | 1261.8      | 6.78                                                           | 850.1                | 1940.1      | 7.55                                                           | 790.0                | 1170.1      | 7.31                                                             |
| 210.9                | 1309.1      | 6.69                                                           | 910.1                | 2000.1      | 7.68                                                           | 750.0                | 1210.1      | 7.21                                                             |
| 163.6                | 1356.4      | 6.65                                                           | 970.1                | 2060.1      | 7.78                                                           | 710.0                | 1250.1      | 7.21                                                             |
| 116.4                | 1403.6      | 6.61                                                           | 1030.1               | 2120.1      | 7.75                                                           | 670.0                | 1290.1      | 7.17                                                             |
| 69.1                 | 1450.9      | 6.52                                                           | 1090.1               | 2180.1      | 7.99                                                           | 630.0                | 1330.1      | 7.15                                                             |
| 21.8                 | 1498.2      | 6.55                                                           | 1150.1               | 2240.1      | 8.12                                                           | 610.0                | 1350.1      | 7.16                                                             |
| 66.4                 | 1586.4      | 6.43                                                           | 1210.1               | 2300.1      | 8.21                                                           | 570.0                | 1390.1      | 7.11                                                             |
| 179.1                | 1699.1      | 6.43                                                           | 1270.1               | 2360.1      | 8.61                                                           | 550.0                | 1410.1      | 7.09                                                             |
| 291.8                | 1811.8      | 6.53                                                           | 1330.1               | 2420.1      | 8.98                                                           | 510.0                | 1450.1      | 7.02                                                             |
| 404.6                | 1924.6      | 6.72                                                           | 1390.1               | 2480.1      | 9.26                                                           | 490.0                | 1470.1      | 7.04                                                             |
| 517.3                | 2037.3      | 7.00                                                           | 1450.1               | 2540.1      | 9.69                                                           | 450.0                | 1510.1      | 7.04                                                             |
| 630.0                | 2150.0      | 7.29                                                           | 1510.1               | 2600.1      | 9.90                                                           | 430.0                | 1530.1      | 6.99                                                             |
| 742.8                | 2262.8      | 7.45                                                           | 1550.1               | 2640.1      | 10.08                                                          | 390.0                | 1570.1      | 7.09                                                             |
| 855.5                | 2375.5      | 7.64                                                           | 1610.1               | 2700.1      | 10.16                                                          | 370.0                | 1590.1      | 7.08                                                             |
| 968.2                | 2488.2      | 7.80                                                           | 1650.1               | 2740.1      | 10.17                                                          | 330.0                | 1630.1      | 7.08                                                             |
| 1081.0               | 2601.0      | 8.37                                                           | 1710.1               | 2800.1      | 10.16                                                          | 310.0                | 1650.1      | 7.10                                                             |
| 1193.7               | 2713.7      | 9.00                                                           | 1750.1               | 2840.1      | 10.11                                                          | 270.0                | 1690.1      | 7.10                                                             |
| 1306.4               | 2826.4      | 9.43                                                           | 1810.1               | 2900.1      | 10.16                                                          | 250.0                | 1710.1      | 7.08                                                             |
| 1419.2               | 2939.2      | 9.75                                                           | 1850.1               | 2940.1      | 10.15                                                          | 210.0                | 1750.1      | 7.05                                                             |
| 1531.9               | 3051.9      | 10.06                                                          | 1910.1               | 3000.1      | 10.20                                                          | 190.0                | 1770.1      | 7.04                                                             |
| 1644.6               | 3164.6      | 10.03                                                          | 1950.1               | 3040.1      | 10.23                                                          | 150.0                | 1810.1      | 6.99                                                             |
| 1757.4               | 3277.4      | 10.02                                                          | 2010.1               | 3100.1      | 10.29                                                          | 130.0                | 1830.1      | 6.93                                                             |
| 1870.1               | 3390.1      | 10.15                                                          | 2050.1               | 3140.1      | 10.34                                                          | 90.0                 | 1870.1      | 6.95                                                             |
| 1982.8               | 3502.8      | 10.26                                                          | 2110.1               | 3200.1      | 10.47                                                          | 70.0                 | 1890.1      | 6.94                                                             |
| 2095.6               | 3615.6      | 10.30                                                          | 2150.1               | 3240.1      | 10.63                                                          | 30.0                 | 1930.1      | 6.92                                                             |
| 2180.1               | 3700.1      | 10.58                                                          | 2210.1               | 3300.1      | 10.84                                                          | 10.0                 | 1950.1      | 6.90                                                             |

# Frequency Mixer

HJK-ED11277/1

## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +19                     | +20   | +21   | +19                     | +20   | +21   |
| 485.1       | 44.51                   | 44.64 | 44.79 | 36.52                   | 36.57 | 36.61 |
| 545.1       | 45.12                   | 45.12 | 45.26 | 37.32                   | 37.35 | 37.43 |
| 605.1       | 44.06                   | 44.10 | 44.11 | 38.37                   | 38.42 | 38.41 |
| 665.1       | 43.81                   | 43.84 | 43.84 | 38.61                   | 38.63 | 38.61 |
| 725.1       | 44.03                   | 44.03 | 44.06 | 38.33                   | 38.30 | 38.29 |
| 785.1       | 44.90                   | 44.93 | 44.90 | 38.10                   | 38.10 | 38.11 |
| 845.1       | 46.72                   | 46.84 | 46.86 | 38.86                   | 38.90 | 38.92 |
| 905.1       | 47.31                   | 47.41 | 47.41 | 39.73                   | 39.74 | 39.77 |
| 965.1       | 46.15                   | 46.19 | 46.27 | 40.14                   | 40.18 | 40.23 |
| 1025.1      | 46.07                   | 46.14 | 46.14 | 40.35                   | 40.42 | 40.41 |
| 1085.1      | 45.07                   | 45.07 | 45.07 | 41.07                   | 41.16 | 41.16 |
| 1145.1      | 43.49                   | 43.44 | 43.38 | 41.09                   | 41.26 | 41.31 |
| 1205.1      | 41.76                   | 41.71 | 41.68 | 40.74                   | 40.95 | 41.02 |
| 1265.1      | 39.75                   | 39.66 | 39.59 | 40.08                   | 40.28 | 40.34 |
| 1325.1      | 39.76                   | 39.74 | 39.70 | 39.14                   | 39.30 | 39.32 |
| 1385.1      | 39.77                   | 39.79 | 39.80 | 39.26                   | 39.42 | 39.47 |
| 1445.1      | 39.12                   | 39.18 | 39.20 | 39.96                   | 40.20 | 40.32 |
| 1505.1      | 38.60                   | 38.67 | 38.68 | 41.04                   | 41.39 | 41.67 |
| 1565.1      | 37.25                   | 37.26 | 37.31 | 43.81                   | 44.35 | 44.96 |
| 1625.1      | 36.72                   | 36.75 | 36.82 | 48.58                   | 49.63 | 50.99 |
| 1685.1      | 35.88                   | 36.00 | 36.11 | 58.28                   | 62.27 | 71.87 |
| 1745.1      | 34.87                   | 34.99 | 35.11 | 53.52                   | 52.39 | 50.98 |
| 1805.1      | 34.78                   | 34.89 | 35.01 | 46.31                   | 46.26 | 46.07 |
| 1865.1      | 34.39                   | 34.49 | 34.59 | 42.50                   | 42.64 | 42.79 |
| 1925.1      | 34.35                   | 34.43 | 34.53 | 40.10                   | 40.21 | 40.40 |
| 1985.1      | 35.56                   | 35.68 | 35.75 | 38.86                   | 38.96 | 39.12 |
| 2025.1      | 36.53                   | 36.59 | 36.69 | 38.78                   | 38.80 | 38.99 |
| 2085.1      | 38.22                   | 38.34 | 38.56 | 38.87                   | 38.99 | 39.27 |
| 2125.1      | 39.14                   | 39.38 | 39.52 | 38.99                   | 39.18 | 39.44 |
| 2185.1      | 40.27                   | 40.46 | 40.76 | 39.03                   | 39.17 | 39.46 |
| 2225.1      | 40.66                   | 41.02 | 41.28 | 38.72                   | 38.90 | 39.09 |
| 2285.1      | 40.86                   | 41.22 | 41.50 | 38.32                   | 38.47 | 38.70 |
| 2325.1      | 40.85                   | 41.23 | 41.38 | 37.82                   | 37.92 | 37.97 |
| 2385.1      | 40.94                   | 41.14 | 41.39 | 37.10                   | 36.97 | 37.20 |
| 2425.1      | 40.83                   | 40.99 | 41.28 | 36.46                   | 36.29 | 36.53 |
| 2485.1      | 40.19                   | 40.44 | 40.56 | 35.30                   | 35.35 | 35.57 |
| 2525.1      | 40.01                   | 40.23 | 40.26 | 34.71                   | 34.72 | 34.78 |
| 2585.1      | 38.95                   | 39.08 | 39.06 | 34.04                   | 34.06 | 34.17 |
| 2625.1      | 38.68                   | 38.78 | 38.80 | 33.80                   | 33.81 | 34.02 |
| 2685.1      | 37.89                   | 37.98 | 37.95 | 33.74                   | 33.83 | 34.01 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +19                     | +20   | +21   |
| 400.1               | 485.1       | 27.60                   | 27.55 | 27.60 |
| 460.1               | 545.1       | 22.61                   | 22.58 | 22.64 |
| 520.1               | 605.1       | 21.56                   | 21.57 | 21.62 |
| 580.1               | 665.1       | 22.55                   | 22.69 | 22.86 |
| 640.1               | 725.1       | 24.71                   | 25.00 | 25.34 |
| 700.1               | 785.1       | 26.39                   | 26.65 | 26.98 |
| 760.1               | 845.1       | 29.99                   | 30.86 | 31.96 |
| 820.1               | 905.1       | 31.78                   | 32.48 | 33.32 |
| 880.1               | 965.1       | 34.85                   | 35.60 | 36.42 |
| 940.1               | 1025.1      | 38.24                   | 38.52 | 38.24 |
| 1000.1              | 1085.1      | 38.89                   | 38.97 | 38.72 |
| 1060.1              | 1145.1      | 39.59                   | 39.15 | 38.53 |
| 1120.1              | 1205.1      | 41.21                   | 40.57 | 39.66 |
| 1180.1              | 1265.1      | 44.43                   | 44.24 | 43.47 |
| 1240.1              | 1325.1      | 46.53                   | 46.72 | 45.91 |
| 1300.1              | 1385.1      | 43.61                   | 43.86 | 43.73 |
| 1360.1              | 1445.1      | 42.13                   | 41.97 | 41.57 |
| 1420.1              | 1505.1      | 42.54                   | 42.30 | 41.56 |
| 1480.1              | 1565.1      | 44.76                   | 44.35 | 43.29 |
| 1540.1              | 1625.1      | 48.51                   | 47.52 | 45.51 |
| 1600.1              | 1685.1      | 54.05                   | 52.49 | 49.54 |
| 1660.1              | 1745.1      | 59.05                   | 54.85 | 51.26 |
| 1720.1              | 1805.1      | 48.42                   | 47.91 | 47.56 |
| 1780.1              | 1865.1      | 44.25                   | 44.13 | 44.40 |
| 1840.1              | 1925.1      | 44.07                   | 43.96 | 44.28 |
| 1900.1              | 1985.1      | 47.36                   | 46.94 | 46.96 |
| 1940.1              | 2025.1      | 48.00                   | 47.26 | 46.47 |
| 2000.1              | 2085.1      | 44.47                   | 44.00 | 43.38 |
| 2040.1              | 2125.1      | 42.79                   | 42.34 | 41.83 |
| 2100.1              | 2185.1      | 41.25                   | 40.88 | 40.47 |
| 2140.1              | 2225.1      | 40.60                   | 40.24 | 39.95 |
| 2200.1              | 2285.1      | 38.66                   | 38.33 | 38.01 |
| 2240.1              | 2325.1      | 37.89                   | 37.59 | 37.30 |
| 2300.1              | 2385.1      | 36.43                   | 36.09 | 35.83 |
| 2340.1              | 2425.1      | 36.22                   | 35.91 | 35.64 |
| 2400.1              | 2485.1      | 35.84                   | 35.58 | 35.38 |
| 2440.1              | 2525.1      | 36.28                   | 36.01 | 35.80 |
| 2500.1              | 2585.1      | 37.01                   | 36.79 | 36.59 |
| 2540.1              | 2625.1      | 38.56                   | 38.47 | 38.30 |
| 2600.1              | 2685.1      | 41.85                   | 42.02 | 42.14 |

# Frequency Mixer

# HJK-ED11277/1

## 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=1950MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|------|------|----------------------|--------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |      |      |                      | @LO (dBm)                      |      |      |
|                     |             | +19             | +20  | +21  |             | +19             | +20  | +21  |                      | +19                            | +20  | +21  |
| 400.1               | 485.1       | 1.84            | 1.85 | 1.86 | 485.1       | 4.80            | 4.80 | 4.79 | 20.0                 | 1.27                           | 1.30 | 1.34 |
| 460.1               | 545.1       | 1.90            | 1.90 | 1.90 | 545.1       | 5.12            | 5.12 | 5.12 | 60.0                 | 1.28                           | 1.31 | 1.34 |
| 520.1               | 605.1       | 2.01            | 2.00 | 2.00 | 605.1       | 5.56            | 5.56 | 5.56 | 100.0                | 1.31                           | 1.34 | 1.37 |
| 580.1               | 665.1       | 2.08            | 2.07 | 2.07 | 665.1       | 5.72            | 5.72 | 5.70 | 140.0                | 1.37                           | 1.40 | 1.42 |
| 640.1               | 725.1       | 2.09            | 2.08 | 2.07 | 725.1       | 5.49            | 5.47 | 5.47 | 180.0                | 1.42                           | 1.45 | 1.48 |
| 700.1               | 785.1       | 2.11            | 2.09 | 2.07 | 785.1       | 5.20            | 5.20 | 5.20 | 240.0                | 1.57                           | 1.60 | 1.62 |
| 760.1               | 845.1       | 2.09            | 2.06 | 2.04 | 845.1       | 4.79            | 4.78 | 4.77 | 280.0                | 1.64                           | 1.67 | 1.70 |
| 820.1               | 905.1       | 2.05            | 2.01 | 1.98 | 905.1       | 4.36            | 4.35 | 4.34 | 340.0                | 1.76                           | 1.79 | 1.81 |
| 880.1               | 965.1       | 2.04            | 1.99 | 1.96 | 965.1       | 3.89            | 3.88 | 3.87 | 380.0                | 1.82                           | 1.85 | 1.88 |
| 940.1               | 1025.1      | 2.02            | 1.97 | 1.93 | 1025.1      | 3.41            | 3.40 | 3.38 | 440.0                | 1.86                           | 1.89 | 1.91 |
| 1000.1              | 1085.1      | 2.03            | 1.98 | 1.94 | 1085.1      | 3.02            | 3.01 | 3.00 | 480.0                | 1.89                           | 1.92 | 1.95 |
| 1060.1              | 1145.1      | 2.06            | 2.01 | 1.96 | 1145.1      | 2.65            | 2.64 | 2.63 | 540.0                | 1.91                           | 1.94 | 1.96 |
| 1120.1              | 1205.1      | 2.10            | 2.05 | 2.01 | 1205.1      | 2.32            | 2.31 | 2.30 | 580.0                | 1.92                           | 1.94 | 1.96 |
| 1180.1              | 1265.1      | 2.17            | 2.12 | 2.08 | 1265.1      | 2.02            | 2.01 | 2.01 | 640.0                | 1.89                           | 1.92 | 1.94 |
| 1240.1              | 1325.1      | 2.18            | 2.13 | 2.09 | 1325.1      | 1.76            | 1.76 | 1.76 | 680.0                | 1.89                           | 1.91 | 1.93 |
| 1300.1              | 1385.1      | 2.10            | 2.05 | 2.01 | 1385.1      | 1.56            | 1.55 | 1.55 | 740.0                | 1.78                           | 1.79 | 1.81 |
| 1360.1              | 1445.1      | 2.01            | 1.97 | 1.93 | 1445.1      | 1.42            | 1.41 | 1.41 | 780.0                | 1.76                           | 1.77 | 1.78 |
| 1420.1              | 1505.1      | 1.92            | 1.88 | 1.84 | 1505.1      | 1.38            | 1.38 | 1.38 | 840.0                | 1.66                           | 1.67 | 1.68 |
| 1480.1              | 1565.1      | 1.77            | 1.73 | 1.69 | 1565.1      | 1.46            | 1.46 | 1.47 | 880.0                | 1.62                           | 1.63 | 1.64 |
| 1540.1              | 1625.1      | 1.60            | 1.56 | 1.52 | 1625.1      | 1.64            | 1.64 | 1.65 | 940.0                | 1.58                           | 1.58 | 1.58 |
| 1600.1              | 1685.1      | 1.42            | 1.39 | 1.36 | 1685.1      | 1.88            | 1.89 | 1.90 | 980.0                | 1.53                           | 1.53 | 1.53 |
| 1660.1              | 1745.1      | 1.25            | 1.22 | 1.20 | 1745.1      | 2.16            | 2.17 | 2.18 | 1040.0               | 1.49                           | 1.48 | 1.48 |
| 1720.1              | 1805.1      | 1.10            | 1.09 | 1.08 | 1805.1      | 2.50            | 2.51 | 2.52 | 1080.0               | 1.43                           | 1.43 | 1.43 |
| 1780.1              | 1865.1      | 1.08            | 1.11 | 1.13 | 1865.1      | 2.81            | 2.82 | 2.83 | 1140.0               | 1.40                           | 1.39 | 1.38 |
| 1840.1              | 1925.1      | 1.24            | 1.27 | 1.29 | 1925.1      | 3.15            | 3.16 | 3.17 | 1180.0               | 1.35                           | 1.34 | 1.33 |
| 1900.1              | 1985.1      | 1.41            | 1.45 | 1.48 | 1985.1      | 3.49            | 3.50 | 3.52 | 1240.0               | 1.37                           | 1.36 | 1.35 |
| 1940.1              | 2025.1      | 1.55            | 1.59 | 1.62 | 2025.1      | 3.65            | 3.65 | 3.65 | 1280.0               | 1.33                           | 1.32 | 1.31 |
| 2000.1              | 2085.1      | 1.77            | 1.81 | 1.84 | 2085.1      | 3.96            | 3.98 | 3.99 | 1340.0               | 1.34                           | 1.33 | 1.31 |
| 2040.1              | 2125.1      | 1.89            | 1.94 | 1.97 | 2125.1      | 4.08            | 4.08 | 4.06 | 1380.0               | 1.34                           | 1.32 | 1.31 |
| 2100.1              | 2185.1      | 2.08            | 2.13 | 2.17 | 2185.1      | 4.32            | 4.33 | 4.34 | 1440.0               | 1.31                           | 1.29 | 1.28 |
| 2140.1              | 2225.1      | 2.17            | 2.22 | 2.27 | 2225.1      | 4.35            | 4.33 | 4.31 | 1480.0               | 1.34                           | 1.32 | 1.30 |
| 2200.1              | 2285.1      | 2.37            | 2.41 | 2.47 | 2285.1      | 4.46            | 4.46 | 4.46 | 1540.0               | 1.31                           | 1.29 | 1.28 |
| 2240.1              | 2325.1      | 2.47            | 2.52 | 2.57 | 2325.1      | 4.38            | 4.36 | 4.33 | 1580.0               | 1.35                           | 1.33 | 1.32 |
| 2300.1              | 2385.1      | 2.65            | 2.71 | 2.75 | 2385.1      | 4.36            | 4.36 | 4.35 | 1640.0               | 1.41                           | 1.39 | 1.38 |
| 2340.1              | 2425.1      | 2.75            | 2.80 | 2.84 | 2425.1      | 4.25            | 4.22 | 4.18 | 1680.0               | 1.45                           | 1.44 | 1.42 |
| 2400.1              | 2485.1      | 2.95            | 3.00 | 3.03 | 2485.1      | 4.17            | 4.16 | 4.15 | 1740.0               | 1.49                           | 1.48 | 1.46 |
| 2440.1              | 2525.1      | 3.06            | 3.11 | 3.14 | 2525.1      | 3.98            | 3.95 | 3.90 | 1780.0               | 1.53                           | 1.51 | 1.50 |
| 2500.1              | 2585.1      | 3.28            | 3.31 | 3.34 | 2585.1      | 3.85            | 3.84 | 3.83 | 1840.0               | 1.53                           | 1.52 | 1.51 |
| 2540.1              | 2625.1      | 3.38            | 3.41 | 3.43 | 2625.1      | 3.66            | 3.63 | 3.60 | 1880.0               | 1.56                           | 1.55 | 1.54 |
| 2600.1              | 2685.1      | 3.57            | 3.59 | 3.60 | 2685.1      | 3.53            | 3.52 | 3.51 | 1940.0               | 1.51                           | 1.53 | 1.54 |

REV. X2

HJK-ED11277/1

101012

Page 4 of 5



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant  
P.O. Box 350166, Brooklyn, New York 11235-0003 (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



## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 14  | 23  | 28  | 14  | 32  | 30  | 32  | 25  | 35  | 55  |
| 1  | -      | 31     | +0  | 40  | 19  | 49  | 28  | 50  | 36  | 51  | 37  | 51  |
| 2  | 61     | 48     | 61  | 56  | 71  | 53  | 77  | 52  | 73  | 58  | 64  | 77  |
| 3  | >90    | >84    | 60  | 82  | 57  | >84 | 64  | >84 | 68  | >84 | 71  | >84 |
| 4  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 5  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 6  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 7  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 8  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 9  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 10 | >90    | >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: 1520 MHz; 0.00 dBm.  
 LO IN: 1605 MHz; +20.00 dBm  
 IF OUT: 85 MHz; -6.21 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |    |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|
| 0  | -      | -      | 23  | 37  | 38  | 22  | 41  | 36  | 45  | 35  | 49 | 58  |
| 1  | -      | 31     | +0  | 39  | 20  | 49  | 29  | 50  | 39  | 51  | 41 | 54  |
| 2  | 41     | 39     | 53  | 46  | 83  | 45  | 68  | 43  | 62  | 51  | 58 | 69  |
| 3  | 83     | 67     | 43  | 69  | 39  | 74  | 46  | 88  | 49  | 77  | 55 | 75  |
| 4  | >90    | 68     | 86  | 67  | 77  | 67  | 83  | 65  | 77  | 63  | 86 | 65  |
| 5  | >90    | 90     | 73  | 91  | 61  | 81  | 57  | 83  | 66  | >94 | 68 | 87  |
| 6  | >90    | 92     | >94 | 81  | >94 | >94 | 88  | 78  | 92  | 81  | 88 | 81  |
| 7  | >90    | 91     | >94 | >94 | 87  | >94 | 75  | 90  | 71  | 93  | 80 | >94 |
| 8  | >90    | 93     | >94 | >94 | >94 | 92  | >94 | 91  | 91  | 86  | 91 | >94 |
| 9  | >90    | >94    | >94 | >94 | >94 | >94 | >94 | >94 | 87  | >94 | 82 | >94 |
| 10 | >90    | >94    | >94 | >94 | >94 | >94 | >94 | >94 | >94 | >94 | 92 | 90  |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9  | 10  |

## LO HARMONICS ORDER

Test conditions:

RF IN: 1520 MHz; 10.00 dBm.  
 LO IN: 1605 MHz; +20.00 dBm  
 IF OUT: 85 MHz; 3.74 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

HJK-ED11277/1

101012

Page 5 of 5



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant  
 P.O. Box 350186, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

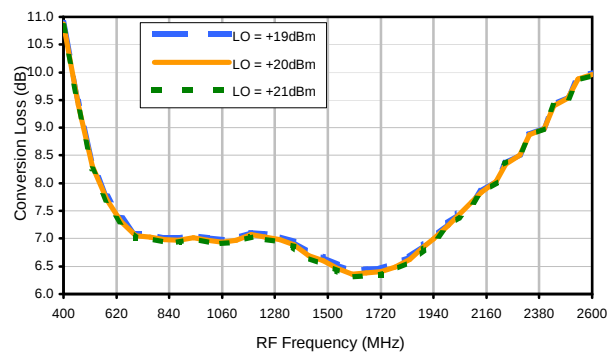


The Design Engineers Search Engine finds the model you need, instantly • For detailed performance specs & shopping online see

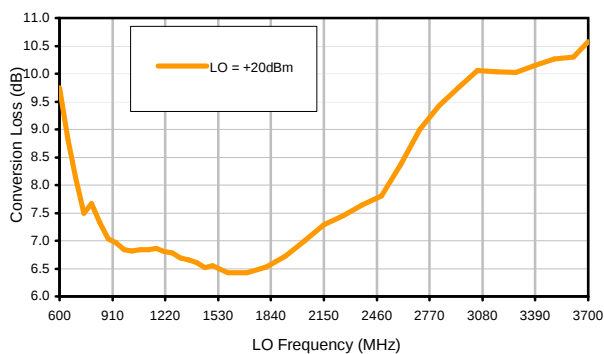


## Typical Performance Curves

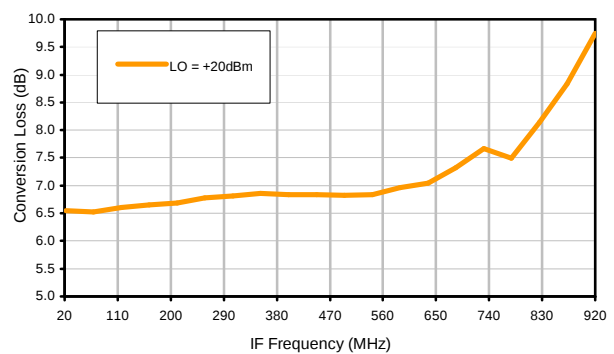
Conversion Loss @ IF=85MHz



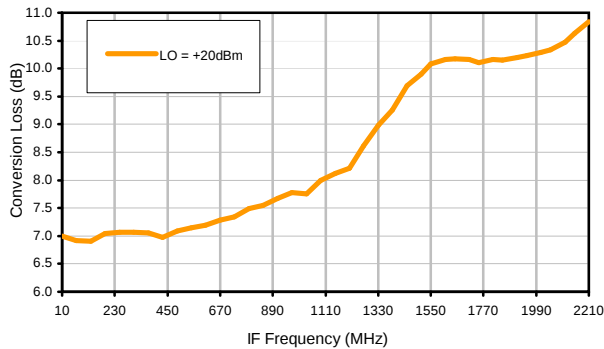
Conversion Loss vs. LO @ RF=1520MHz



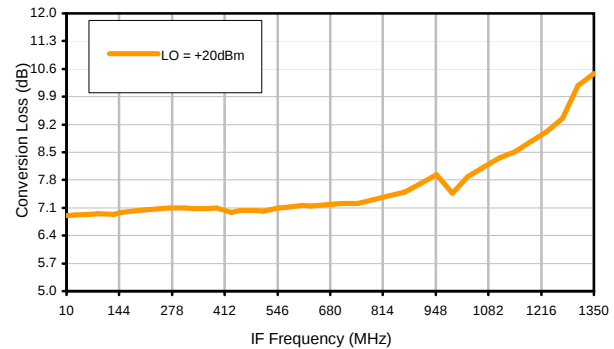
Conversion Loss vs. IF @ RF=1520MHz



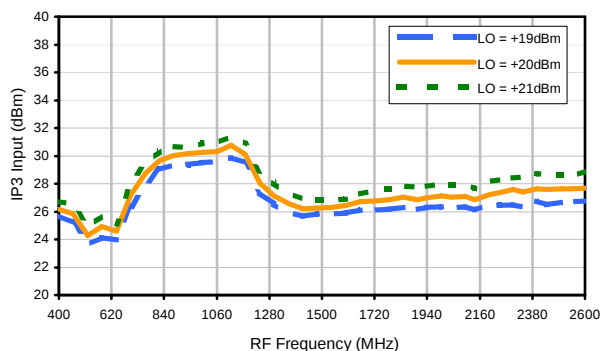
Conversion Loss vs. IF @ RF=1090MHz



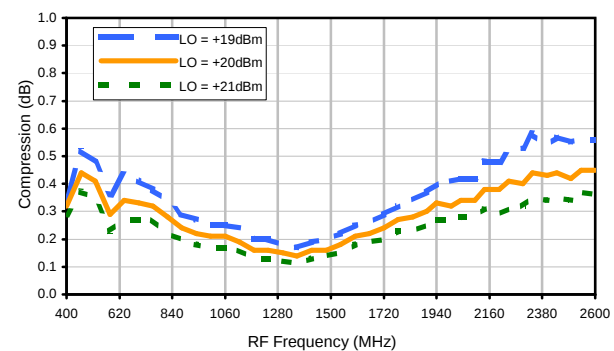
Conversion Loss vs. IF @ RF=1960.1 MHz



IP3 Input

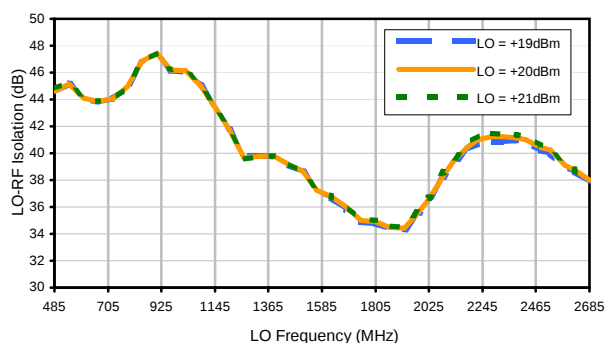


Compression @ RF IN = +15 dBm

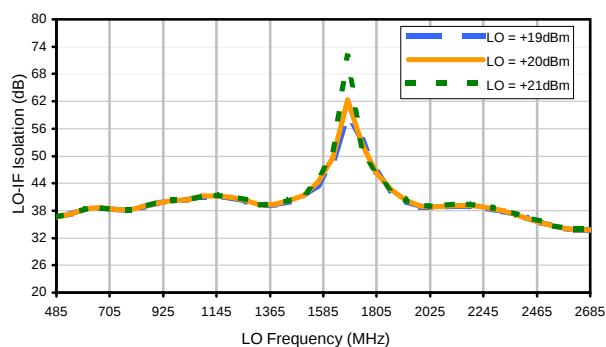


## Typical Performance Curves

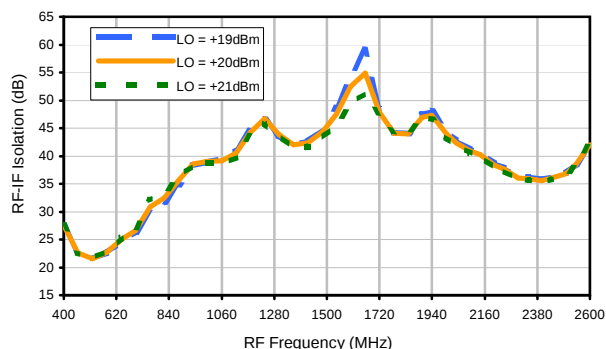
LO-RF Isolation



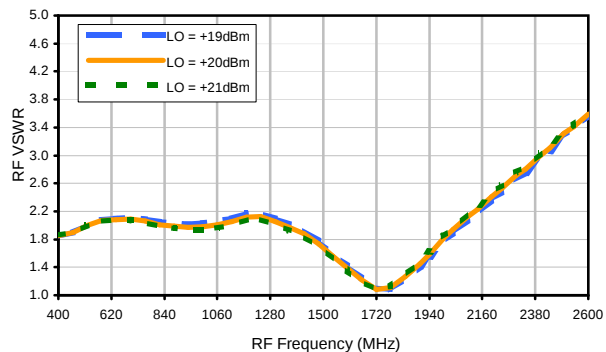
LO-IF Isolation



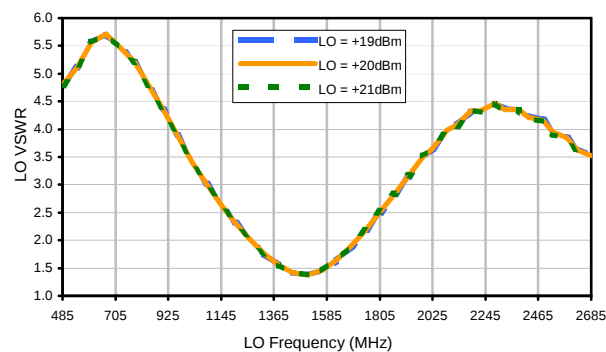
RF-IF Isolation



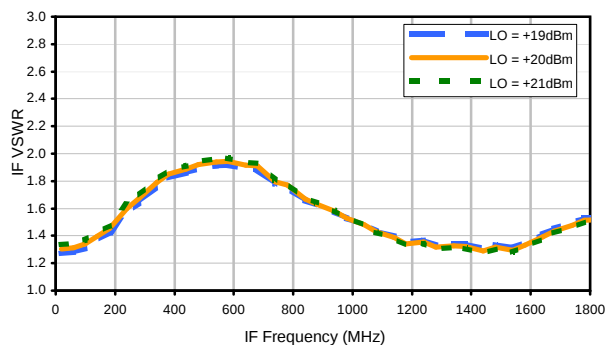
RF VSWR



LO VSWR



IF VSWR



## Harmonics Tables

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0  | -      | -      | 14  | 23  | 28  | 14  | 32  | 30  | 32  | 25  | 35  | 55  |
| 1  | -      | 31     | +0  | 40  | 19  | 49  | 28  | 50  | 36  | 51  | 37  | 51  |
| 2  | 61     | 48     | 61  | 56  | 71  | 53  | 77  | 52  | 73  | 58  | 64  | 77  |
| 3  | >90    | >84    | 60  | 82  | 57  | >84 | 64  | >84 | 68  | >84 | 71  | >84 |
| 4  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 5  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 6  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 7  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 8  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 9  | >90    | >84    | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 | >84 |
| 10 | >90    | >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: 1520 MHz; 0.00 dBm.  
LO IN: 1605 MHz; +20.00 dBm  
IF OUT: 85 MHz; -6.21 dBm

RF HARMONICS ORDER

|    | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |    |     |
|----|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|
| 0  | -      | -      | 23  | 37  | 38  | 22  | 41  | 36  | 45  | 35  | 49 | 58  |
| 1  | -      | 31     | +0  | 39  | 20  | 49  | 29  | 50  | 39  | 51  | 41 | 54  |
| 2  | 41     | 39     | 53  | 46  | 83  | 45  | 68  | 43  | 62  | 51  | 58 | 69  |
| 3  | 83     | 67     | 43  | 69  | 39  | 74  | 46  | 88  | 49  | 77  | 55 | 75  |
| 4  | >90    | 68     | 86  | 67  | 77  | 67  | 83  | 65  | 77  | 63  | 86 | 65  |
| 5  | >90    | 90     | 73  | 91  | 61  | 81  | 57  | 83  | 66  | >94 | 68 | 87  |
| 6  | >90    | 92     | >94 | 81  | >94 | >94 | 88  | 78  | 92  | 81  | 88 | 81  |
| 7  | >90    | 91     | >94 | >94 | 87  | >94 | 75  | 90  | 71  | 93  | 80 | >94 |
| 8  | >90    | 93     | >94 | >94 | >94 | 92  | >94 | 91  | 91  | 86  | 91 | >94 |
| 9  | >90    | >94    | >94 | >94 | >94 | >94 | >94 | >94 | 87  | >94 | 82 | >94 |
| 10 | >90    | >94    | >94 | >94 | >94 | >94 | >94 | >94 | >94 | >94 | 92 | 90  |
|    | RF CAL | 0      | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9  | 10  |

### LO HARMONICS ORDER

Test conditions:

RF IN: 1520 MHz; 10.00 dBm.  
LO IN: 1605 MHz; +20.00 dBm  
IF OUT: 85 MHz; 3.74 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

TTT166  
TTT167



## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

| CASE # | A             | B              | C             | D              | E              | F              | G               | H              | J              | K              | L              | M              | N               |
|--------|---------------|----------------|---------------|----------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| TTT166 | .38<br>(9.65) | .50<br>(12.70) | .15<br>(3.81) | .020<br>(0.51) | .075<br>(1.91) | .250<br>(6.35) | .425<br>(10.80) | .187<br>(4.75) | .050<br>(1.27) | .050<br>(1.27) | .070<br>(1.78) | .270<br>(6.86) | .540<br>(13.72) |
| TTT167 |               |                | .23<br>(5.84) |                |                |                |                 |                |                |                |                |                |                 |

| CASE # | P              | Q              | R               | S              | T               | WT. GRAM |
|--------|----------------|----------------|-----------------|----------------|-----------------|----------|
| TTT166 | .060<br>(1.52) | .095<br>(2.41) | .445<br>(11.30) | .208<br>(5.28) | .415<br>(10.54) | .8       |
| TTT167 |                |                |                 |                |                 | .8       |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .01$ ; 3 Pl.  $\pm .005$

### Note:

- Case material: Plastic.
- Base material: Printed wiring laminate.
- Termination finish:
  - For RoHS Case Styles: 3-5  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate. All models, (+) suffix.
  - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

# Tape & Reel Packaging TR-F12



| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel                    |     |
|----------------|-------------------------|-------------------|-------------------------------------|-----|
| 24             | 12                      | 7                 | Small quantity standards (see note) | 10  |
|                |                         |                   |                                     | 20  |
|                |                         |                   |                                     | 50  |
|                |                         |                   |                                     | 100 |
|                |                         |                   |                                     | 200 |
|                |                         | 13                | Standard                            | 500 |

Note: Please Consult individual model data sheet to determine device per reel availability.

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

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



**Distribution Centers** NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION                 | DATE     | DR  | AUTH |
|-----|---------|-----------------------------|----------|-----|------|
| A   | M86762  | ADDED CONNECTIONS "lp & lq" | 05/23/03 | MMG | WL   |
| B   | M94598  | ADDED CONNECTION "hk"       | 10/08/04 | MMG | HY   |
| C   | M102713 | UPDATED NOTES & DESCRIPTION | 01/14/06 | GF  | IL   |
| D   | M132989 | UPDATED NOTE 2              | 08/24/11 | GF  | DJ   |

**SUGGESTED MOUNTING CONFIGURATION FOR  
TTT166/167 CASE STYLE, "hk"/"lp"/"lq"  
"x"/"ck"/"ec" PIN CONNECTIONS**

**NOTE:**

1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030"  $\pm$  .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. THE USE OF SOLDER MASK OVER THE GROUND AREA UNDER THE UNIT AS SHOWN IS RECOMMENDED TO PREVENT POTENTIAL SHORTING. IF USER CHOOSES TO EXPOSE METAL UNDER THE ENTIRE UNIT GROUND PAD FOR IMPROVED GROUNDING, IT IS RECOMMENDED A SOLDER MASK DAM BE APPLIED AROUND EACH GROUND PAD TO ENSURE FILLET AND CONNECTION AT GROUND PADS.
3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER), SEE NOTE 2.



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS  $\pm$ 3 PL DECIMALS  $\pm$  .005ANGLES  $\pm$ FRACTIONS  $\pm$ 

DRAWN

GF

03/18/03

CHECKED

IL

04/15/03

APPROVED

DJ

04/15/03



**Mini-Circuits®**

13 Neptune Avenue  
Brooklyn NY 11235

PL, hk/lp/lq/x/ck/ec, TTT166/167,  
SYM/HJK/SYAS/SYPD, TB-12

SIZE  
A

CODE IDENT  
15542

DRAWING NO:  
98-PL-079

REV:  
D

FILE: 98PL079

SCALE: 5:1

SHEET: 1 OF 1

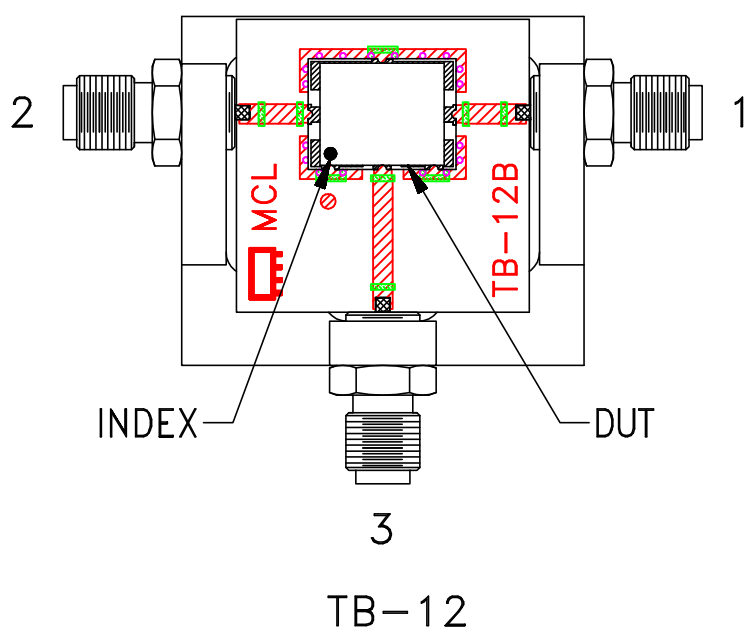
Mini-Circuits®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE, MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

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

# Evaluation Board and Circuit

For Pin Connections Refer to Data Sheet of the DUT



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



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

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