

# Voltage Controlled Oscillator

ROS-2170-1319R+

50Ω 1730 to 2170 MHz

## The Big Deal:

- Low Phase Noise
- High Power Output
- Robust design and construction
- Small size .500" x .500" x .180"



*Generic photo used for illustration purposes only*

CASE STYLE: CK605

## Product Overview:

The ROS-2170-1319R+ is a Voltage Controlled Oscillator, designed to operate from 1730 to 2170 MHz for base station applications. The ROS-2170-1319R+ is packaged in a metal case (size of .500" x .500" x .180") to shield against unwanted signals and noise.

## Key Features

| Feature                                             | Advantages                                                                                                                   |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Linear Tuning Sensitivity Ratio: 1.15:1 typ.        | Optimal for loop filter design.                                                                                              |
| Low Phase Noise:<br>-103 dBc/Hz typ at 10kHz offset | Low phase noise improves system EVM (Error Vector Magnitude).                                                                |
| High Power Output, +7.5 dBm typ.                    | Reduces amplification requirements and improves immunity to external noise sources.                                          |
| Good Pushing, 0.3 MHz/V typ.                        | Provides increased immunity against noisy DC lines and improves output frequency stability vs. variations in supply voltage. |
| Small size, .500" x .500" x .180"                   | The small size enables the ROS-2170-1319R+ to be used in compact designs.                                                    |

## Voltage Controlled Oscillator

ROS-2170-1319R+

Linear Tuning 1730 to 2170 MHz

## Features

- low phase noise, -103 dBc/Hz typ. @ 10kHz offset
- linear tuning characteristics
- high power output, +7.5 dBm typ.
- low pushing, 0.3 MHz/V typ.
- aqueous washable

## Applications

- wireless communications
- base station
- WCDMA
- UMTS



Generic photo used for illustration purposes only

CASE STYLE: CK605

## +RoHS Compliant

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

## Electrical Specifications

| MODEL NO.       | FREQ. (MHz) |      | POWER OUTPUT (dBm) | PHASE NOISE dBc/Hz SSB at offset frequencies,kHz |      |      |      | TUNING |                   |                       |               |                                 | NON HARMONIC SPURIOUS (dBc) | HARMONICS (dBc) |      | PULLING pk-pk @12 dB <sub>r</sub> (MHz) | PUSHING (MHz/V) | DC OPERATING POWER |      |      |                         |              |
|-----------------|-------------|------|--------------------|--------------------------------------------------|------|------|------|--------|-------------------|-----------------------|---------------|---------------------------------|-----------------------------|-----------------|------|-----------------------------------------|-----------------|--------------------|------|------|-------------------------|--------------|
|                 | Min.        | Max. |                    | Typ.                                             | 1    | 10   | 100  | 1000   | VOLTAGE RANGE (V) | SENSI- TIVITY (MHz/V) | PORT CAP (pF) | 3 dB MODULATION BANDWIDTH (MHz) |                             | Typ.            | Typ. |                                         |                 | Max.               | Typ. | Typ. | V <sub>cc</sub> (volts) | Current (mA) |
|                 |             |      |                    |                                                  |      |      |      |        |                   |                       |               |                                 |                             |                 |      |                                         |                 |                    |      |      |                         |              |
| ROS-2170-1319R+ | 1730        | 2170 | +7.5               | -76                                              | -103 | -124 | -144 | 0.5    | 12                | 52 - 60               | 50            | 30                              | -90                         | -17             | -    | 4                                       | 0.3             | 12                 | 34   |      |                         |              |

## Pin Connections

|        |                                |
|--------|--------------------------------|
| RF OUT | 10                             |
| VCC    | 14                             |
| V-TUNE | 2                              |
| GROUND | 1,3,4,5,6,7,8,9,11,12,13,15,16 |

## Maximum Ratings

|                                      |                |
|--------------------------------------|----------------|
| Operating Temperature                | -55°C to 85°C  |
| Storage Temperature                  | -55°C to 100°C |
| Absolute Max. Supply Voltage (Vcc)   | 13V            |
| Absolute Max. Tuning Voltage (Vtune) | 14V            |
| All specifications                   | 50 ohm system  |

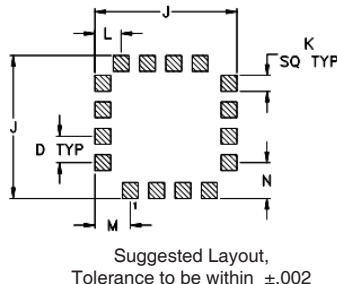
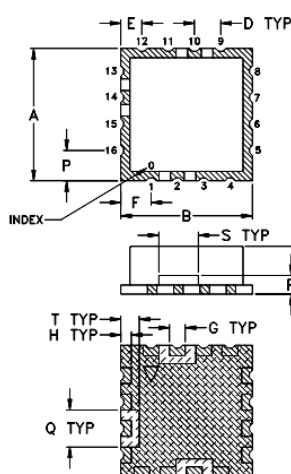
Permanent damage may occur if any of these limits are exceeded.

## Tape &amp; Reel: F37

7" Reels with 10, 20, 50, 100 devices  
13" Reels with 200, 500 devices

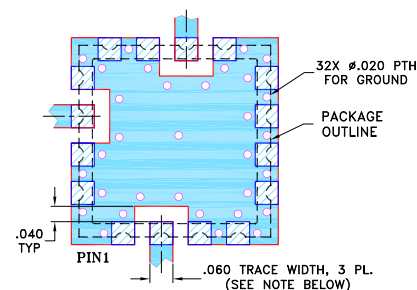
## Environmental Ratings: ENV65

## Outline Drawing



## PCB Land Pattern

Metallization  
Solder Resist

Demo Board MCL P/N: TB-10  
Suggested PCB Layout (PL-012)

## NOTES:

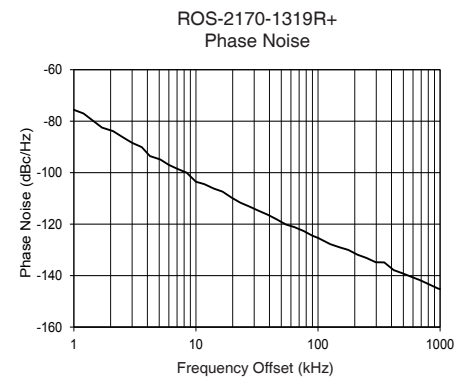
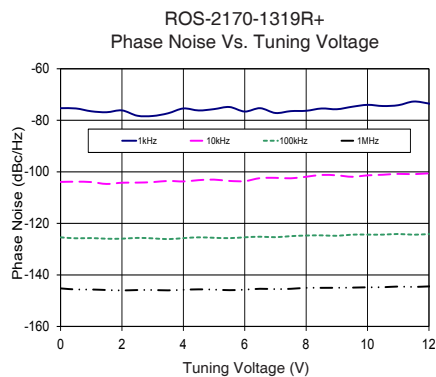
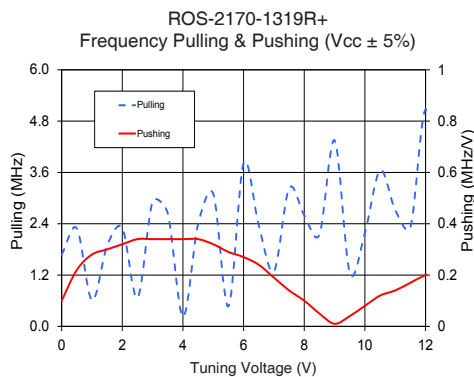
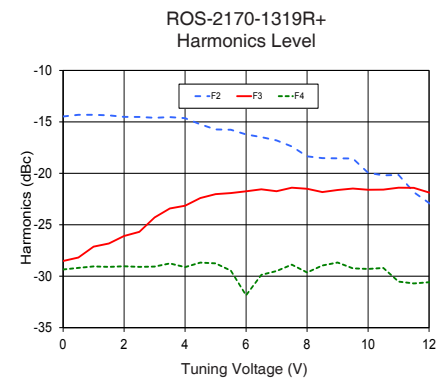
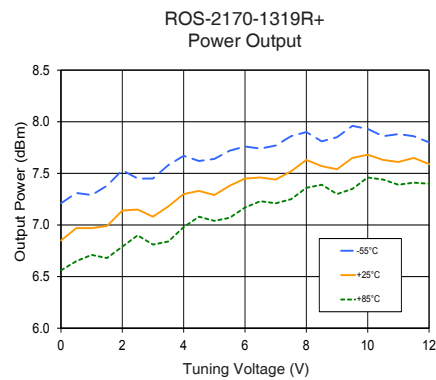
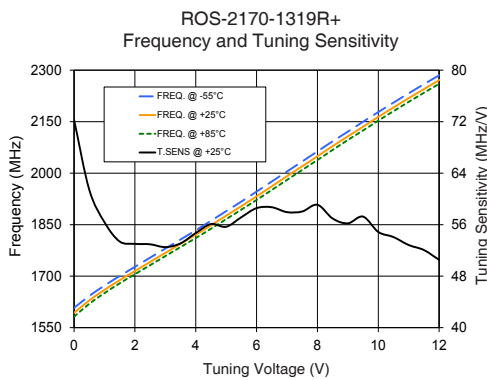
1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
  2. BOTTOM SIDE OF THE BOTTOM IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## Outline Dimensions (inch mm)

| A     | B     | C    | D    | E    | F    | G    | H    | J     | K    | L    | M    | N    | P    | Q    | R    | S    | T    | wt.   |
|-------|-------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|------|------|-------|
| .500  | .500  | .180 | .100 | .080 | .115 | .060 | .040 | .540  | .060 | .100 | .135 | .135 | .115 | .140 | .070 | .150 | .070 | grams |
| 12.70 | 12.70 | 4.57 | 2.54 | 2.03 | 2.92 | 1.52 | 1.02 | 13.72 | 1.52 | 2.54 | 3.43 | 3.43 | 2.92 | 3.56 | 1.78 | 3.81 | 1.78 | 1.0   |

| V<br>TUNE | TUNE<br>SENS<br>(MHz/V) | FREQUENCY<br>(MHz) |        |        | POWER OUTPUT<br>(dBm) |       |       | I <sub>cc</sub><br>(mA) | HARMONICS (dBc) |       |       | FREQ.<br>PUSH<br>(MHz/V) | FREQ.<br>PULL<br>(MHz) | PHASE NOISE (dBc/Hz)<br>at offsets |        |        |        | FREQ<br>OFFSET<br>(kHz) | PHASE<br>NOISE at<br>1950 MHz<br>(dBc/Hz) |
|-----------|-------------------------|--------------------|--------|--------|-----------------------|-------|-------|-------------------------|-----------------|-------|-------|--------------------------|------------------------|------------------------------------|--------|--------|--------|-------------------------|-------------------------------------------|
|           |                         | -55°C              | +25°C  | +85°C  | -55°C                 | +25°C | +85°C |                         | F2              | F3    | F4    |                          |                        | 1kHz                               | 10kHz  | 100kHz | 1MHz   |                         |                                           |
| 0.00      | 72.31                   | 1607.6             | 1593.3 | 1581.9 | 7.21                  | 6.85  | 6.56  | 28.60                   | -14.5           | -28.5 | -29.4 | 0.10                     | 1.68                   | -75.30                             | -103.9 | -125.4 | -145.2 | 1.0                     | -75.58                                    |
| 0.50      | 61.44                   | 1642.3             | 1629.5 | 1619.5 | 7.31                  | 6.97  | 6.65  | 28.63                   | -14.3           | -28.2 | -29.2 | 0.22                     | 2.29                   | -75.40                             | -103.8 | -125.8 | -145.7 | 2.1                     | -83.88                                    |
| 1.00      | 56.39                   | 1672.6             | 1660.2 | 1650.6 | 7.29                  | 6.97  | 6.71  | 28.65                   | -14.3           | -27.1 | -29.1 | 0.28                     | 0.61                   | -76.50                             | -104.0 | -125.7 | -145.7 | 3.6                     | -90.07                                    |
| 1.50      | 53.39                   | 1700.4             | 1688.4 | 1679.1 | 7.38                  | 6.99  | 6.68  | 28.67                   | -14.4           | -26.8 | -29.1 | 0.30                     | 1.89                   | -76.87                             | -104.7 | -126.0 | -145.9 | 6.0                     | -96.97                                    |
| 2.00      | 53.02                   | 1727.2             | 1715.1 | 1705.8 | 7.53                  | 7.14  | 6.79  | 28.67                   | -14.5           | -26.1 | -29.0 | 0.32                     | 2.30                   | -76.16                             | -104.2 | -125.9 | -146.0 | 8.4                     | -100.02                                   |
| 2.50      | 52.95                   | 1753.9             | 1741.6 | 1732.1 | 7.45                  | 7.15  | 6.90  | 28.68                   | -14.5           | -25.7 | -29.1 | 0.34                     | 0.67                   | -78.23                             | -104.2 | -125.6 | -145.9 | 10.0                    | -103.51                                   |
| 3.00      | 52.51                   | 1780.3             | 1768.1 | 1758.6 | 7.45                  | 7.08  | 6.81  | 28.70                   | -14.6           | -24.3 | -29.1 | 0.34                     | 2.92                   | -78.33                             | -104.0 | -125.8 | -145.9 | 23.1                    | -111.64                                   |
| 3.50      | 53.09                   | 1806.7             | 1794.3 | 1784.8 | 7.58                  | 7.18  | 6.84  | 28.71                   | -14.5           | -23.4 | -28.8 | 0.34                     | 2.64                   | -77.29                             | -103.5 | -126.1 | -146.0 | 38.8                    | -116.34                                   |
| 4.00      | 54.70                   | 1833.6             | 1820.9 | 1811.1 | 7.67                  | 7.30  | 6.98  | 28.71                   | -14.6           | -23.2 | -29.1 | 0.34                     | 0.23                   | -75.41                             | -103.7 | -125.7 | -145.8 | 64.0                    | -121.15                                   |
| 4.50      | 56.10                   | 1861.3             | 1848.2 | 1838.1 | 7.62                  | 7.33  | 7.08  | 28.71                   | -15.2           | -22.4 | -28.7 | 0.34                     | 2.40                   | -76.18                             | -103.2 | -125.4 | -145.6 | 89.8                    | -124.47                                   |
| 5.00      | 57.16                   | 1917.3             | 1904.1 | 1893.9 | 7.72                  | 7.38  | 7.07  | 28.73                   | -15.8           | -21.9 | -29.5 | 0.29                     | 0.47                   | -74.84                             | -103.5 | -125.7 | -145.9 | 100.0                   | -125.34                                   |
| 6.00      | 58.57                   | 1946.4             | 1932.7 | 1922.1 | 7.76                  | 7.45  | 7.17  | 28.72                   | -16.2           | -21.8 | -31.9 | 0.27                     | 3.82                   | -76.60                             | -103.6 | -125.4 | -145.7 | 150.8                   | -129.02                                   |
| 7.00      | 57.95                   | 2004.9             | 1991.3 | 1980.5 | 7.77                  | 7.44  | 7.21  | 28.73                   | -16.8           | -21.7 | -29.5 | 0.19                     | 1.29                   | -77.17                             | -102.3 | -125.4 | -145.5 | 177.0                   | -130.02                                   |
| 7.50      | 58.05                   | 2034.1             | 2020.3 | 2009.6 | 7.86                  | 7.52  | 7.25  | 28.73                   | -17.4           | -21.4 | -28.9 | 0.14                     | 3.23                   | -76.44                             | -102.5 | -125.0 | -145.4 | 211.6                   | -131.90                                   |
| 8.50      | 56.96                   | 2092.8             | 2078.9 | 2067.8 | 7.81                  | 7.57  | 7.39  | 28.71                   | -18.5           | -21.8 | -29.0 | 0.05                     | 2.15                   | -75.42                             | -101.2 | -124.7 | -145.0 | 297.1                   | -134.79                                   |
| 9.00      | 56.21                   | 2121.0             | 2107.4 | 2096.8 | 7.85                  | 7.54  | 7.30  | 28.71                   | -18.5           | -21.6 | -28.7 | 0.01                     | 4.35                   | -75.70                             | -101.4 | -124.8 | -145.0 | 348.8                   | -134.86                                   |
| 10.00     | 54.87                   | 2178.0             | 2164.1 | 2153.1 | 7.93                  | 7.68  | 7.46  | 28.66                   | -19.9           | -21.6 | -29.3 | 0.08                     | 2.19                   | -74.00                             | -101.4 | -124.4 | -144.8 | 489.7                   | -139.06                                   |
| 10.50     | 54.08                   | 2205.5             | 2191.5 | 2180.8 | 7.86                  | 7.63  | 7.44  | 28.64                   | -20.2           | -21.6 | -29.2 | 0.12                     | 3.65                   | -74.46                             | -101.1 | -124.4 | -144.8 | 585.4                   | -140.52                                   |
| 11.50     | 52.06                   | 2259.1             | 2245.0 | 2234.3 | 7.86                  | 7.65  | 7.41  | 28.59                   | -21.8           | -21.4 | -30.7 | 0.17                     | 2.32                   | -72.71                             | -100.9 | -124.4 | -144.7 | 964.9                   | -145.05                                   |
| 12.00     | 50.54                   | 2285.0             | 2271.0 | 2260.3 | 7.80                  | 7.59  | 7.40  | 28.57                   | -22.9           | -21.9 | -30.6 | 0.20                     | 5.07                   | -73.50                             | -100.6 | -124.2 | -144.5 | 1000.0                  | -145.26                                   |

\*at 25°C unless mentioned otherwise



## Additional 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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



# Voltage Controlled Oscillator

ROS-2170-1319R+

## Typical Performance Data

| V<br>TUNE | TUNE<br>SENS<br>(MHz/V) | FREQUENCY<br>(MHz) |        |        | POWER OUTPUT<br>(dBm) |       |       | HARMONICS (dBc) |       |       | FREQ.<br>PUSH<br>(MHz/V) | FREQ<br>OFFSET<br>(kHz) | PHASE<br>NOISE<br>(dBc/Hz) |
|-----------|-------------------------|--------------------|--------|--------|-----------------------|-------|-------|-----------------|-------|-------|--------------------------|-------------------------|----------------------------|
|           |                         | -55°C              | +25°C  | +85°C  | -55°C                 | +25°C | +85°C | F2              | F3    | F4    |                          |                         |                            |
| 0.00      | 72.3                    | 1607.6             | 1593.3 | 1581.9 | 7.2                   | 6.9   | 6.6   | -14.5           | -28.5 | -29.4 | 0.1                      | 1                       | -76                        |
| 0.50      | 61.4                    | 1642.3             | 1629.5 | 1619.5 | 7.3                   | 7.0   | 6.7   | -14.3           | -28.2 | -29.2 | 0.2                      | 10                      | -103                       |
| 1.00      | 56.4                    | 1672.6             | 1660.2 | 1650.6 | 7.3                   | 7.0   | 6.7   | -14.3           | -27.1 | -29.1 | 0.3                      | 100                     | -124                       |
| 1.50      | 53.4                    | 1700.4             | 1688.4 | 1679.1 | 7.4                   | 7.0   | 6.7   | -14.4           | -26.8 | -29.1 | 0.3                      | 1000                    | -144                       |
| 2.00      | 53.0                    | 1727.2             | 1715.1 | 1705.8 | 7.5                   | 7.1   | 6.8   | -14.5           | -26.1 | -29.0 | 0.3                      |                         |                            |
| 2.50      | 53.0                    | 1753.9             | 1741.6 | 1732.1 | 7.5                   | 7.2   | 6.9   | -14.5           | -25.7 | -29.1 | 0.3                      |                         |                            |
| 3.00      | 52.5                    | 1780.3             | 1768.1 | 1758.6 | 7.5                   | 7.1   | 6.8   | -14.6           | -24.3 | -29.1 | 0.3                      |                         |                            |
| 3.50      | 53.1                    | 1806.7             | 1794.3 | 1784.8 | 7.6                   | 7.2   | 6.8   | -14.5           | -23.4 | -28.8 | 0.3                      |                         |                            |
| 4.00      | 54.7                    | 1833.6             | 1820.9 | 1811.1 | 7.7                   | 7.3   | 7.0   | -14.6           | -23.2 | -29.1 | 0.3                      |                         |                            |
| 4.50      | 56.1                    | 1861.3             | 1848.2 | 1838.1 | 7.6                   | 7.3   | 7.1   | -15.2           | -22.4 | -28.7 | 0.3                      |                         |                            |
| 5.00      | 55.7                    | 1889.2             | 1876.3 | 1866.1 | 7.6                   | 7.3   | 7.0   | -15.7           | -22.0 | -28.8 | 0.3                      |                         |                            |
| 5.50      | 57.2                    | 1917.3             | 1904.1 | 1893.9 | 7.7                   | 7.4   | 7.1   | -15.8           | -21.9 | -29.5 | 0.3                      |                         |                            |
| 6.00      | 58.6                    | 1946.4             | 1932.7 | 1922.1 | 7.8                   | 7.5   | 7.2   | -16.2           | -21.8 | -31.9 | 0.3                      |                         |                            |
| 6.50      | 58.7                    | 1975.7             | 1962.0 | 1951.2 | 7.7                   | 7.5   | 7.2   | -16.5           | -21.6 | -29.9 | 0.2                      |                         |                            |
| 7.00      | 57.9                    | 2004.9             | 1991.3 | 1980.5 | 7.8                   | 7.4   | 7.2   | -16.8           | -21.7 | -29.5 | 0.2                      |                         |                            |
| 7.50      | 58.0                    | 2034.1             | 2020.3 | 2009.6 | 7.9                   | 7.5   | 7.3   | -17.4           | -21.4 | -28.9 | 0.1                      |                         |                            |
| 8.00      | 59.1                    | 2063.5             | 2049.3 | 2038.5 | 7.9                   | 7.6   | 7.4   | -18.4           | -21.5 | -29.6 | 0.1                      |                         |                            |
| 8.50      | 57.0                    | 2092.8             | 2078.9 | 2067.8 | 7.8                   | 7.6   | 7.4   | -18.5           | -21.8 | -29.0 | 0.1                      |                         |                            |
| 9.00      | 56.2                    | 2121.0             | 2107.4 | 2096.8 | 7.9                   | 7.5   | 7.3   | -18.5           | -21.6 | -28.7 | 0.0                      |                         |                            |
| 9.50      | 57.3                    | 2149.8             | 2135.5 | 2124.6 | 8.0                   | 7.7   | 7.4   | -18.6           | -21.5 | -29.2 | 0.0                      |                         |                            |
| 10.00     | 54.9                    | 2178.0             | 2164.1 | 2153.1 | 7.9                   | 7.7   | 7.5   | -19.9           | -21.6 | -29.3 | 0.1                      |                         |                            |
| 10.50     | 54.1                    | 2205.5             | 2191.5 | 2180.8 | 7.9                   | 7.6   | 7.4   | -20.2           | -21.6 | -29.2 | 0.1                      |                         |                            |
| 11.00     | 52.8                    | 2232.6             | 2218.6 | 2207.8 | 7.9                   | 7.6   | 7.4   | -20.2           | -21.4 | -30.5 | 0.1                      |                         |                            |
| 11.50     | 52.1                    | 2259.1             | 2245.0 | 2234.3 | 7.9                   | 7.7   | 7.4   | -21.8           | -21.4 | -30.7 | 0.2                      |                         |                            |
| 12.00     | 50.5                    | 2285.0             | 2271.0 | 2260.3 | 7.8                   | 7.6   | 7.4   | -22.9           | -21.9 | -30.6 | 0.2                      |                         |                            |
| 12.50     | 49.1                    | 2310.2             | 2296.3 | 2285.7 | 7.8                   | 7.6   | 7.3   | -24.1           | -22.0 | -31.3 | 0.2                      |                         |                            |
| 13.00     | 47.5                    | 2334.8             | 2320.8 | 2310.4 | 7.8                   | 7.6   | 7.3   | -24.3           | -21.2 | -30.5 | 0.3                      |                         |                            |
| 13.50     | 45.9                    | 2358.4             | 2344.6 | 2334.3 | 7.8                   | 7.5   | 7.3   | -24.3           | -21.8 | -29.6 | 0.3                      |                         |                            |
| 14.00     | 45.9                    | 2381.5             | 2367.6 | 2357.3 | 7.8                   | 7.5   | 7.3   | -25.7           | -21.9 | -29.4 | 0.3                      |                         |                            |

### Notes

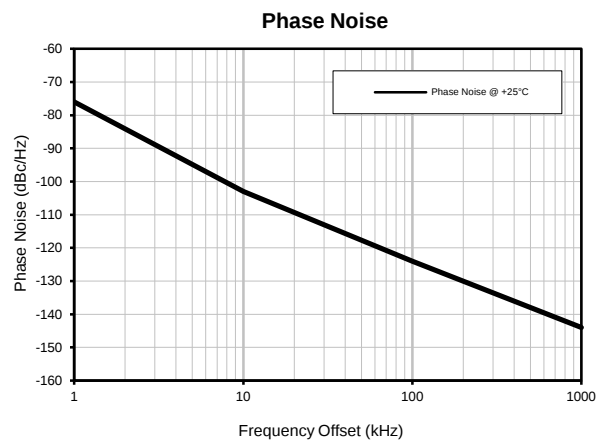
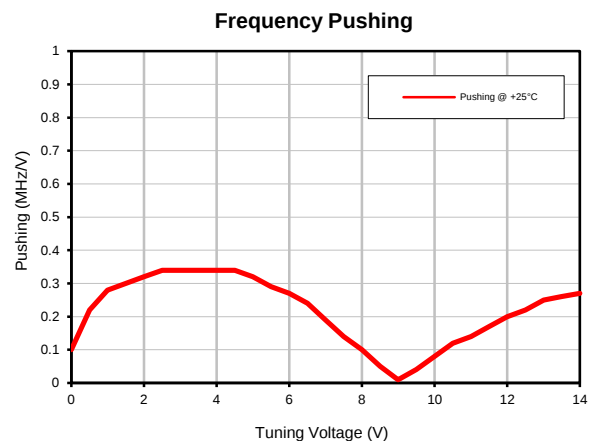
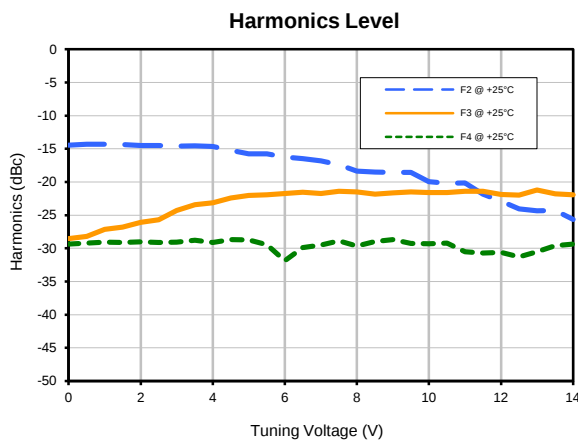
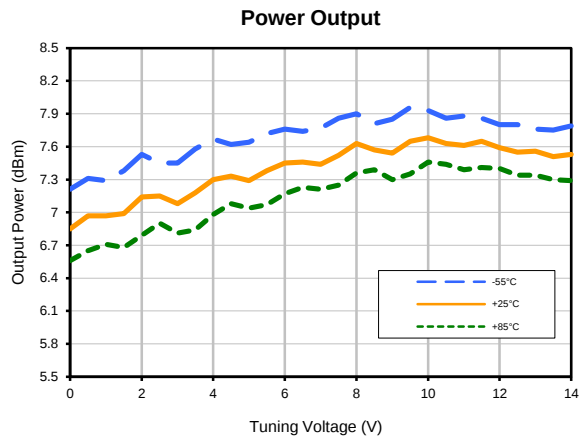
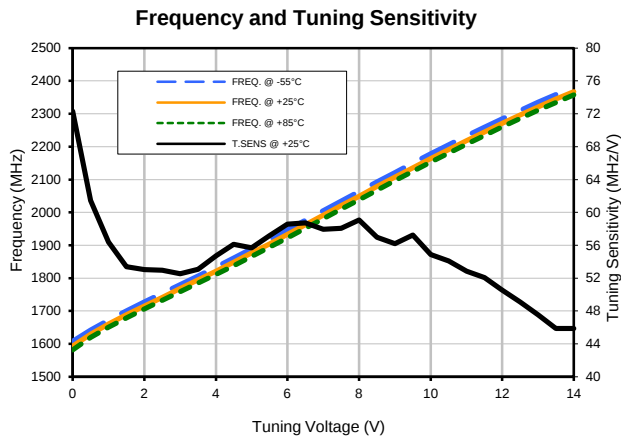
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.  
 B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' 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/MCStore/terms.jsp](http://www.minicircuits.com/MCStore/terms.jsp)



# Voltage Controlled Oscillator

ROS-2170-1319R+

## Typical Performance Data



### 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-Circuits' 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/MCStore/terms.jsp](http://www.minicircuits.com/MCStore/terms.jsp)



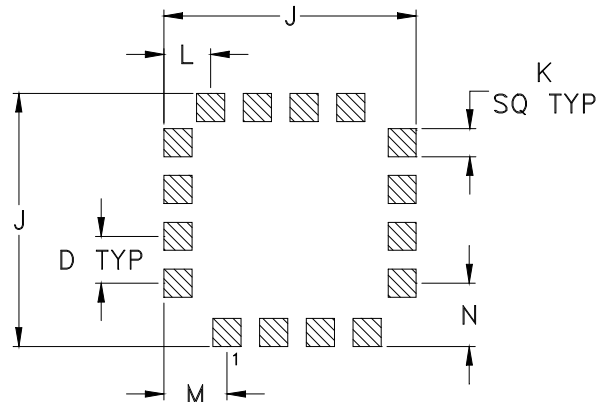
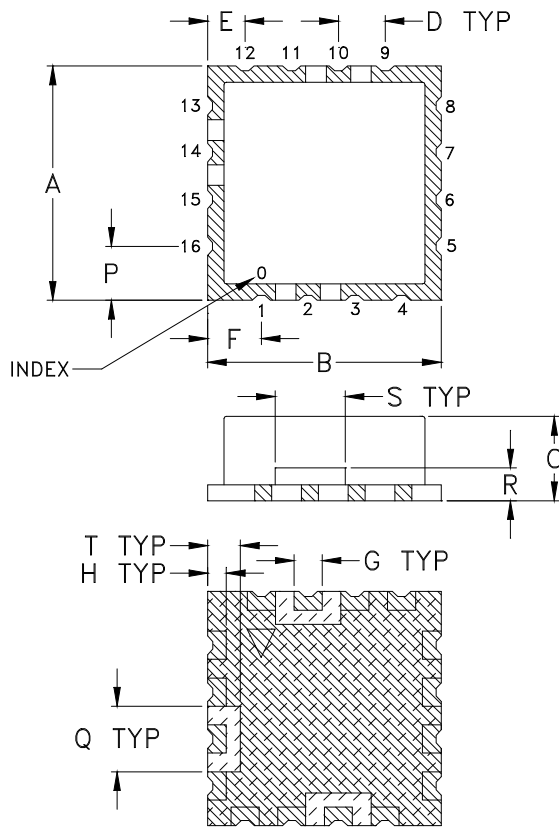
[www.minicircuits.com](http://www.minicircuits.com) P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 [sales@minicircuits.com](mailto:sales@minicircuits.com)

Rev. OR  
ROS-2170-1319R+  
190617  
Page 1 of 1

## Outline Dimensions

CK605

## PCB Land Pattern



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

| CASE # | A               | B               | C              | D              | E              | F              | G              | H              | J               | K              |
|--------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------------|
| CK605  | .500<br>(12.70) | .500<br>(12.70) | .180<br>(4.57) | .100<br>(2.54) | .080<br>(2.03) | .115<br>(2.92) | .060<br>(1.52) | .040<br>(1.02) | .540<br>(13.72) | .060<br>(1.52) |

| CASE # | L              | M              | N              | P              | Q              | R              | S              | T              | WT. GRAM            |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------------|
| CK605  | .100<br>(2.54) | .135<br>(3.43) | .135<br>(3.43) | .115<br>(2.92) | .140<br>(3.56) | .070<br>(1.78) | .150<br>(3.81) | .070<br>(1.78) | 1.2<br>+0.5<br>-0.0 |

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

### Notes:

- Case material: Nickel-Silver alloy.
- Base: 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.



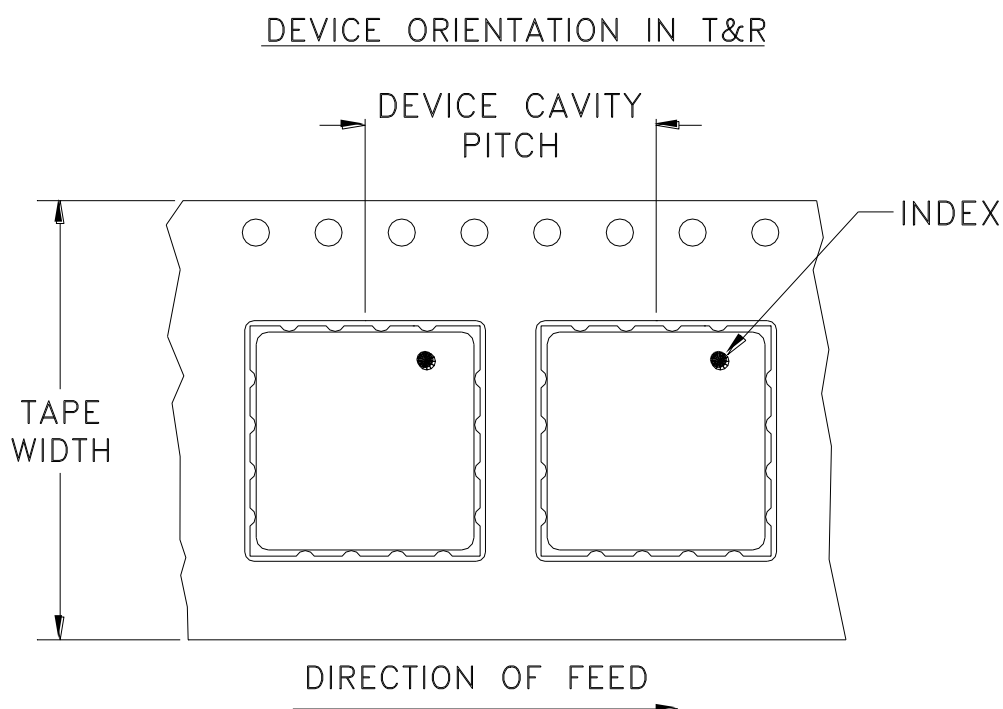
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F37



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel                             |     |
|-------------------|----------------------------|----------------------|----------------------------------------------|-----|
| 24                | 16                         | 7                    | Small<br>quantity<br>standards<br>(see note) | 10  |
|                   |                            |                      |                                              | 20  |
|                   |                            |                      |                                              | 50  |
|                   |                            |                      |                                              | 100 |
|                   |                            | 13                   | Standard                                     | 200 |
|                   |                            |                      |                                              | 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)



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

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

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

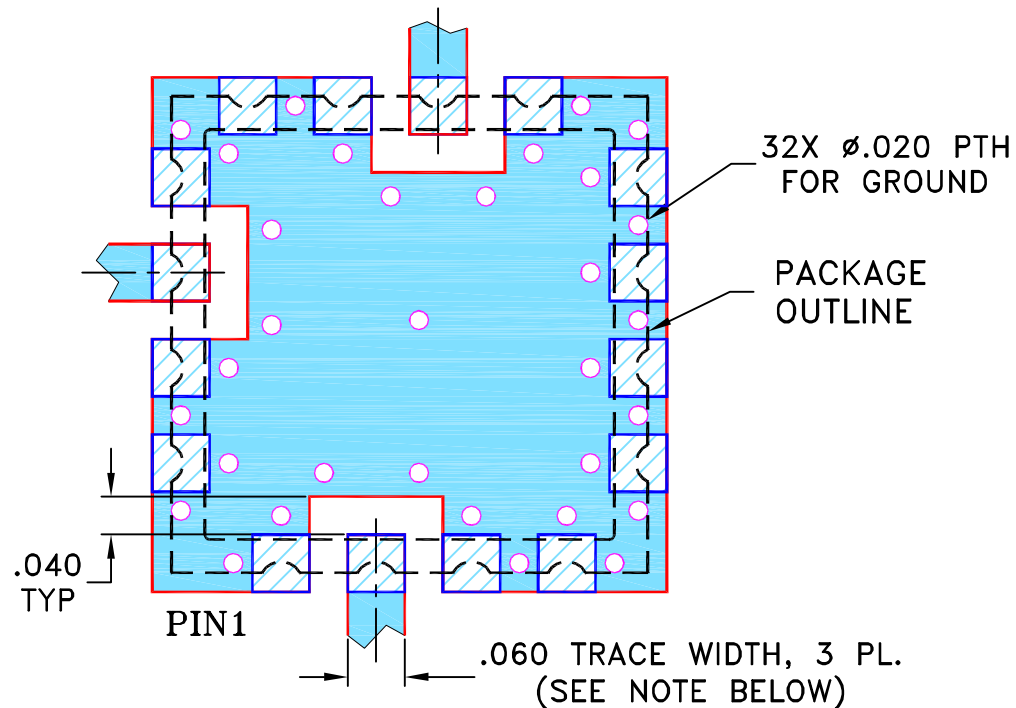
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION               | DATE     | DR  | AUTH |
|-----|---------|---------------------------|----------|-----|------|
| E   | M105563 | ADDED "rl" PIN CONNECTION | 06/02/06 | MMG | DJ   |
| F   | M105640 | CORRECTED NOTE 2          | 06/08/06 | MMG | MM   |
| G   | M124395 | ADDED "RAMP"              | 09/09    | EM  | HH   |
| G   | R77589  | ADDED "RAMP"              | 09/09    | EM  | HH   |

SUGGESTED MOUNTING CONFIGURATION FOR  
CK605 CASE STYLE, "kg/rl/16AM01" PIN CONNECTION

NOTES:

- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .030"  $\pm$  .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE BOTTOM IS CONTINUOUS GROUND PLANE.



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



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

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

DRAWN

AV

08/07/00

CHECKED

SK

08/08/00

APPROVED

DB

08/08/00

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



Mini-Circuits®

13 Neptune Avenue  
Brooklyn NY 11235

PL,kg/rl/16AM01,CK605,ROS/LAVI/RAMP

SIZE  
A

CODE IDENT  
15542

DRAWING NO:  
98-PL-012

REV:  
G

FILE: 98PL012

SCALE: 5:1

SHEET: 1 OF 1



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          | -55° 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 Eutectic Process: 225°C peak<br>Pb-Free Process, 245°C peak                                                                                               | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1                                                        |
| Solderability                  | 10X Magnification                                                                                                                                               | J-STD-002, Para 4.2.5, Test S, 95% Coverage                                                          |
| Vibration (High Frequency)     | 20g peak, 20-2000 Hz, 4 times in each of three axes (total 12)                                                                                                  | MIL-STD-883, Method 2007.3, Condition A                                                              |
| 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                                                                              |