

## Voltage Controlled Oscillator

ROS-209-319+

Ultra Low Noise 203 to 209 MHz

## Features

- ultra low phase noise
- linear tuning characteristics
- low pulling
- low pushing
- aqueous washable

## Applications

- wireless communications
- test equipment



CASE STYLE: CK1113

PRICE: \$ 26.95 ea. QTY (5-49)

## +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 (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. | Vcc (volts) | Current (mA) |
|              |             |      |                    |                                                  |      |      |      |        |                   |                       |               |                                 |                             |                 |      |                             |                 |                    |      |      |             |              |
| ROS-209-319+ | 203         | 209  | +8.5               | -108                                             | -133 | -154 | -170 | 1      | 11                | 1.5                   | 365           | 8                               | -90                         | -19             | -12  | 0.02                        | 0.07            | 5                  | 26   |      |             |              |

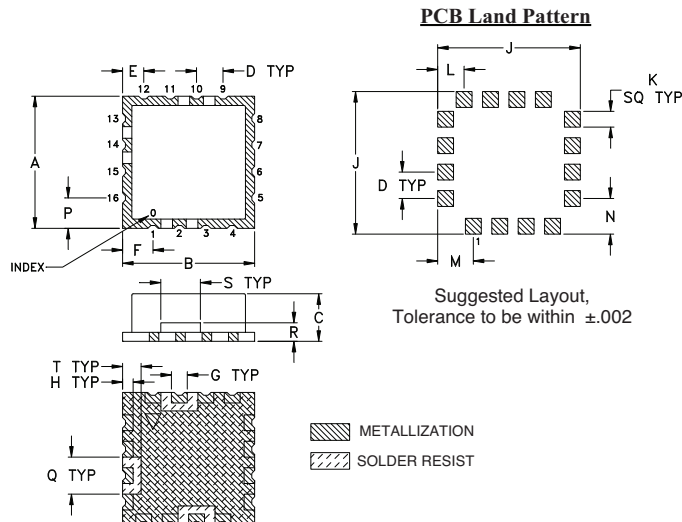
## Pin Connections

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

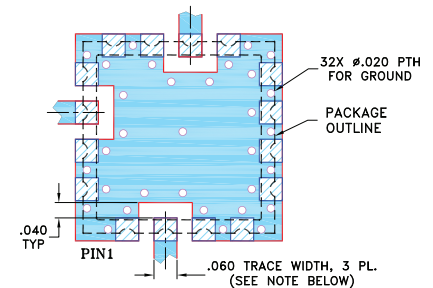
## Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| Operating Temperature                                           | -55°C to 85°C  |
| Storage Temperature                                             | -55°C to 100°C |
| Absolute Max. Supply Voltage (Vcc)                              | 6V             |
| Absolute Max. Tuning Voltage (Vtune)                            | 13V            |
| All specifications                                              | 50 ohm system  |
| Permanent damage may occur if any of these limits are exceeded. |                |

## Outline Drawing



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



## 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

## 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  | .220 | .100 | .080 | .115 | .060 | .040 | .540  | .060 | .100 | .135 | .135 | .115 | .140 | .070 | .150 | .070 | grams |
| 12.70 | 12.70 | 5.59 | 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 | 1.2   |

# Performance Data & Curves\*

# ROS-209-319+

| V<br>TUNE | TUNE<br>SENS<br>(MHz/V) | FREQUENCY<br>(MHz) |       |       | POWER OUTPUT<br>(dBm) |       |       | Icc<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>206 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      | 1.16                    | 200.3              | 199.5 | 199.0 | 8.29                  | 8.60  | 8.21  | 18.93       | -18.5           | -35.7 | -45.8 | 0.06                     | 0.01                   | -108.3                             | -133.8 | -155.3 | -169.8 | 1.0                     | -107.04                                  |
| 0.50      | 1.05                    | 200.9              | 200.1 | 199.5 | 8.29                  | 8.60  | 8.22  | 18.91       | -18.6           | -35.7 | -45.9 | 0.07                     | 0.01                   | -108.7                             | -134.0 | -155.4 | -170.2 | 2.0                     | -115.78                                  |
| 1.00      | 1.04                    | 201.4              | 200.6 | 200.1 | 8.29                  | 8.60  | 8.22  | 18.89       | -18.6           | -35.7 | -46.0 | 0.07                     | 0.01                   | -109.4                             | -133.9 | -155.4 | -170.1 | 3.5                     | -122.29                                  |
| 1.50      | 1.07                    | 201.9              | 201.2 | 200.6 | 8.29                  | 8.60  | 8.23  | 18.87       | -18.6           | -35.7 | -46.1 | 0.07                     | 0.01                   | -108.2                             | -134.0 | -155.6 | -169.7 | 6.0                     | -127.33                                  |
| 2.00      | 1.13                    | 202.5              | 201.7 | 201.1 | 8.29                  | 8.60  | 8.24  | 18.85       | -18.7           | -35.7 | -46.1 | 0.07                     | 0.01                   | -108.4                             | -133.8 | -155.3 | -169.2 | 8.5                     | -131.39                                  |
| 2.50      | 1.21                    | 203.1              | 202.2 | 201.7 | 8.29                  | 8.60  | 8.24  | 18.82       | -18.7           | -35.8 | -46.3 | 0.07                     | 0.01                   | -108.3                             | -134.0 | -155.0 | -171.0 | 10.0                    | -133.28                                  |
| 3.00      | 1.30                    | 203.7              | 202.9 | 202.3 | 8.28                  | 8.60  | 8.25  | 18.79       | -18.8           | -35.8 | -46.4 | 0.07                     | 0.01                   | -108.6                             | -133.6 | -155.2 | -171.5 | 20.8                    | -140.78                                  |
| 3.50      | 1.38                    | 204.3              | 203.5 | 202.9 | 8.28                  | 8.60  | 8.25  | 18.76       | -18.9           | -35.8 | -46.4 | 0.07                     | 0.01                   | -107.9                             | -133.9 | -155.3 | -170.5 | 35.5                    | -145.70                                  |
| 4.00      | 1.46                    | 205.0              | 204.2 | 203.6 | 8.28                  | 8.60  | 8.26  | 18.73       | -18.9           | -35.8 | -46.4 | 0.07                     | 0.02                   | -107.6                             | -133.5 | -155.5 | -169.1 | 60.7                    | -149.73                                  |
| 4.50      | 1.51                    | 205.7              | 204.9 | 204.3 | 8.28                  | 8.60  | 8.26  | 18.71       | -19.0           | -35.8 | -46.4 | 0.07                     | 0.02                   | -107.4                             | -133.5 | -155.2 | -170.5 | 86.7                    | -153.86                                  |
| 5.00      | 1.54                    | 206.5              | 205.7 | 205.1 | 8.27                  | 8.59  | 8.26  | 18.68       | -19.1           | -35.8 | -46.5 | 0.07                     | 0.02                   | -108.3                             | -133.5 | -154.9 | -169.4 | 100.0                   | -154.95                                  |
| 5.50      | 1.56                    | 207.3              | 206.4 | 205.9 | 8.27                  | 8.59  | 8.26  | 18.65       | -19.2           | -35.9 | -46.5 | 0.07                     | 0.02                   | -107.2                             | -133.4 | -154.8 | -169.8 | 148.1                   | -158.11                                  |
| 6.00      | 1.55                    | 208.0              | 207.2 | 206.7 | 8.26                  | 8.59  | 8.26  | 18.63       | -19.3           | -35.9 | -46.5 | 0.07                     | 0.02                   | -107.5                             | -133.3 | -154.7 | -169.9 | 177.0                   | -159.64                                  |
| 6.50      | 1.54                    | 208.8              | 208.0 | 207.4 | 8.25                  | 8.58  | 8.26  | 18.62       | -19.4           | -35.9 | -46.5 | 0.07                     | 0.02                   | -107.1                             | -133.2 | -154.8 | -167.6 | 211.6                   | -161.15                                  |
| 7.00      | 1.51                    | 209.5              | 208.8 | 208.2 | 8.24                  | 8.57  | 8.26  | 18.60       | -19.5           | -35.9 | -46.6 | 0.07                     | 0.02                   | -106.3                             | -132.8 | -154.4 | -171.3 | 302.4                   | -163.77                                  |
| 7.50      | 1.48                    | 210.3              | 209.5 | 209.0 | 8.24                  | 8.56  | 8.25  | 18.60       | -19.6           | -35.9 | -46.6 | 0.07                     | 0.02                   | -106.3                             | -132.7 | -154.6 | -169.5 | 361.5                   | -164.91                                  |
| 8.00      | 1.45                    | 211.0              | 210.3 | 209.7 | 8.23                  | 8.56  | 8.25  | 18.59       | -19.6           | -35.9 | -46.7 | 0.07                     | 0.02                   | -106.5                             | -132.8 | -154.5 | -170.6 | 507.5                   | -167.07                                  |
| 9.00      | 1.38                    | 212.5              | 211.7 | 211.2 | 8.21                  | 8.54  | 8.24  | 18.58       | -19.8           | -35.9 | -46.8 | 0.07                     | 0.02                   | -105.8                             | -132.9 | -154.8 | -169.8 | 606.7                   | -168.38                                  |
| 10.00     | 1.31                    | 213.8              | 213.0 | 212.5 | 8.19                  | 8.52  | 8.22  | 18.58       | -20.0           | -35.9 | -46.9 | 0.07                     | 0.02                   | -107.2                             | -132.4 | -154.0 | -169.8 | 870.0                   | -169.66                                  |
| 11.00     | 1.24                    | 215.1              | 214.3 | 213.8 | 8.17                  | 8.50  | 8.20  | 18.58       | -20.1           | -36.0 | -47.0 | 0.07                     | 0.02                   | -106.1                             | -132.3 | -154.1 | -170.3 | 1000.0                  | -169.75                                  |

\*at 25°C unless mentioned otherwise

