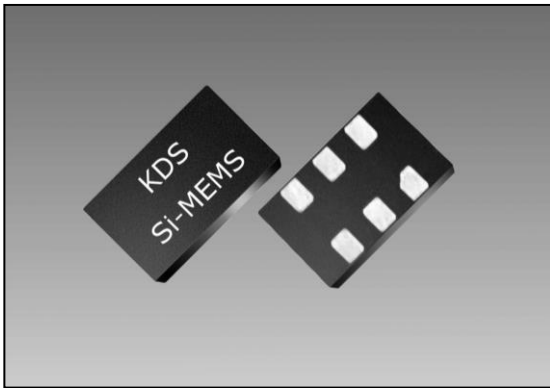


# Voltage Controlled MEMS Oscillator

## MO3822

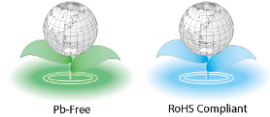


### ■ Features

- Any frequency between 220MHz and 625MHz with 6 decimal places
- Industry-standard packages: 3.2 x 2.5, 5.0 x 3.2, and 7.0 x 5.0 mm
- Widest pull range options from  $\pm 25$  to  $\pm 1600 \times 10^{-6}$
- $< 1$  ps RMS phase jitter (random) over 12 kHz to 20 MHz bandwidth
- For frequencies lower than 220MHz, refer to MO3821 datasheet

### ■ Applications

- Ideal for SONET, Video, Instrumentation, Satellite applications
- Telecom, networking, broadband



### ■ Standard Specification

| Item                                     | Symbol               | Min.   | Typ.         | Max.              | Unit             | Condition  |
|--|----------------------|--|--------------|-------------------|------------------|--|
| Output Frequency Range                   | f                    | 220  | –            | 625               | MHz              |  |
| Supply Voltage                           | Vdd                  | +2.25<br>+2.97   | +2.5<br>+3.3 | +2.75<br>+3.63    | V                |  |
| Operating Temperature Range              | T <sub>use</sub>     | -20<br>-40   | –<br>–       | +70<br>+85        | °C               | Extended Commercial<br>Industrial  |
| Frequency Stability                      | F <sub>stab</sub>    | -10<br>-25<br>-50  | –<br>–<br>–  | +10<br>+25<br>+50 | $\times 10^{-6}$ | Inclusive of Initial tolerance, operating temperature, rated power, supply voltage and load change.                              |
| First Year Aging                         | F <sub>aging1</sub>  | -1.0   | –            | +1.0              | $\times 10^{-6}$ | T <sub>A</sub> = +25°C   |
| 10-year Aging                            | F <sub>aging10</sub> | -5.0   | –            | +5.0              | $\times 10^{-6}$ | T <sub>A</sub> = +25°C   |
| Startup Time                             | T <sub>start</sub>   | –  | –            | 10                | ms               |  |
| Duty Cycle                               | DC                   | 45<br>40   | –<br>–       | 55<br>60          | %                | f = 220 to 312.5 MHz and f = 525 to 625 MHz<br>f = 420 to 500 MHz  |
| Pull Range                               | PR                   | $\pm 25, \pm 50, \pm 100, \pm 150, \pm 200, \pm 400, \pm 800, \pm 1600,$ |              |                   | $\times 10^{-6}$ | See the Absolute Pull Range and APR table on datasheet   |
| Upper Control Voltage                    | VC <sub>U</sub>      | +2.25<br>+3.0  | –<br>–       | +2.3<br>+3.1      | V                | Vdd = +2.5V, Voltage at which maximum deviation is guaranteed.<br>Vdd = +3.3V, Voltage at which maximum deviation is guaranteed. |
| Lower Control Voltage                    | VC <sub>L</sub>      | –  | –            | +0.1              | V                | Voltage at which minimum deviation is guaranteed.  |
| Linearity                                | L <sub>in</sub>      | –  | 0.2          | 1                 | %                |  |
| Frequency Change Polarity                | –                    | Positive slope   |              |                   | –                |  |
| <b>LVPECL, DC and AC Characteristics</b> |                      |  |              |                   |                  |  |
| Current Consumption                      | I <sub>dd</sub>      | –  | +61          | +69               | mA               | Excluding Load Termination Current, Vdd = +3.3V or +2.5V   |
| OE Disable Supply Current                | I <sub>oe</sub>      | –  | –            | +35               | mA               | OE = GND   |
| Output Low Voltage                       | V <sub>OL</sub>      | Vdd - 1.9  | –            | Vdd - 1.5         | V                |  |
| Output High Voltage                      | V <sub>OH</sub>      | Vdd - 1.1  | –            | Vdd - 0.7         | V                |  |
| Output Differential Voltage Swing        | V <sub>Swing</sub>   | +600   | +800         | +1000             | mV               |  |
| Rise/Fall Time                           | Tr, Tf               | 100  | 300          | 500               | ps               | 20% to 80%   |
| OE Enable/Disable Time                   | T <sub>oe</sub>      | –  | –            | 105               | ns               | f = 220 MHz - For other frequencies, T <sub>oe</sub> = 100ns + 3 period  |
| RMS Period Jitter                        | T <sub>jitt</sub>    | –  | 1.0          | 1.7               | ps               | f = 100 MHz, Vdd = +3.3V or +2.5V  |
|  |                      | –  | 1.0          | 1.7               |                  | f = 156.25 MHz, Vdd = +3.3V or +2.5V   |
|  |                      | –  | 1.0          | 1.7               |                  | f = 212.5 MHz, Vdd = +3.3V or +2.5V  |
| RMS Phase Jitter (random)                | T <sub>phj</sub>     | –  | 0.5          | 0.75              | ps               | f = 156.25 MHz, Integration bandwidth = 12 kHz to 20 MHz, all Vdds   |
| <b>LVDS, DC and AC Characteristics</b>   |                      |  |              |                   |                  |  |
| Current Consumption                      | I <sub>dd</sub>      | –  | +47          | +55               | mA               | Excluding Load Termination Current, Vdd = +3.3V or +2.5V   |
| OE Disable Current                       | I <sub>oe</sub>      | –  | –            | +35               | mA               | OE = Low   |
| Differential Output Voltage              | V <sub>OD</sub>      | +200   | +350         | +500              | mV               |  |
| V <sub>OD</sub> Magnitude Change         | $\Delta V_{OD}$      | –  | –            | +50               | mV               |  |
| Offset Voltage                           | V <sub>OS</sub>      | +1.125   | +1.2         | +1.375            | V                |  |
| V <sub>OS</sub> Magnitude Change         | $\Delta V_{OS}$      | –  | –            | +50               | mV               |  |
| Rise/Fall Time                           | Tr, Tf               | 360  | 495          | 600               | ps               | 20% to 80%   |
| OE Enable/Disable Time                   | T <sub>oe</sub>      | –  | –            | 105               | ns               | f = 220MHz - For other frequencies, T <sub>oe</sub> = 100ns + 3 period   |
| RMS Period Jitter                        | T <sub>jitt</sub>    | –  | 1.2          | 1.7               | ps               | f = 100 MHz, Vdd = +3.3V or +2.5V  |
|  |                      | –  | 1.2          | 1.7               |                  | f = 156.25 MHz, Vdd = +3.3V or +2.5V   |
|  |                      | –  | 1.2          | 1.7               |                  | f = 212.5 MHz, Vdd = +3.3V or +2.5V  |
| RMS Phase Jitter (random)                | T <sub>phj</sub>     | –  | 0.5          | 0.75              | ps               | f = 156.25 MHz, Integration bandwidth = 12 kHz to 20 MHz, all Vdds   |

Consult our sales representative for other specifications.

## MO3822

### ■ Dimensions and Patterns

| Package Size – Dimensions (Unit: mm) <sup>[1]</sup>  | Recommended Land Pattern (Unit: mm) <sup>[2]</sup> |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
|--|--|------------|----|-----|----|-------|----|-----|----|---------|----|---------|----|-----|--|
| <p><b>3.2 x 2.5x 0.75 mm</b></p> <p>3.2±0.05</p> <p>2.5±0.05</p> <p>0.75±0.05</p> <p>2.20</p> <p>0.9±</p> <p>0.7</p> <p>0.6</p> <p>Pin Connections</p> <table border="1"> <tr><th>Pin No.</th><th>Connection</th></tr> <tr><td>#1</td><td>Vin</td></tr> <tr><td>#2</td><td>NC/OE</td></tr> <tr><td>#3</td><td>GND</td></tr> <tr><td>#4</td><td>Output+</td></tr> <tr><td>#5</td><td>Output-</td></tr> <tr><td>#6</td><td>Vdd</td></tr> </table>    | Pin No.  | Connection | #1 | Vin | #2 | NC/OE | #3 | GND | #4 | Output+ | #5 | Output- | #6 | Vdd | <p>2.25</p> <p>1.6</p> <p>0.65</p> <p>1.05</p> <p>1.00</p> |
| Pin No.  | Connection   |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #1   | Vin  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #2   | NC/OE  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #3   | GND  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #4   | Output+  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #5   | Output-  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #6   | Vdd  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| <p><b>5.0 x 3.2 x 0.75 mm</b></p> <p>5.0±0.10</p> <p>3.2±0.10</p> <p>0.75±0.05</p> <p>2.54</p> <p>1.20</p> <p>0.90</p> <p>0.64</p> <p>Pin Connections</p> <table border="1"> <tr><th>Pin No.</th><th>Connection</th></tr> <tr><td>#1</td><td>Vin</td></tr> <tr><td>#2</td><td>NC/OE</td></tr> <tr><td>#3</td><td>GND</td></tr> <tr><td>#4</td><td>Output+</td></tr> <tr><td>#5</td><td>Output-</td></tr> <tr><td>#6</td><td>Vdd</td></tr> </table> | Pin No.  | Connection | #1 | Vin | #2 | NC/OE | #3 | GND | #4 | Output+ | #5 | Output- | #6 | Vdd | <p>2.54</p> <p>2.20</p> <p>0.90</p>                        |
| Pin No.  | Connection   |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #1   | Vin  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #2   | NC/OE  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #3   | GND  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #4   | Output+  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #5   | Output-  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #6   | Vdd  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| <p><b>7.0 x 5.0x 0.90 mm</b></p> <p>7.0±0.10</p> <p>5.0±0.10</p> <p>0.90±0.10</p> <p>5.08</p> <p>2.60</p> <p>1.10</p> <p>1.40</p> <p>Pin Connections</p> <table border="1"> <tr><th>Pin No.</th><th>Connection</th></tr> <tr><td>#1</td><td>Vin</td></tr> <tr><td>#2</td><td>NC/OE</td></tr> <tr><td>#3</td><td>GND</td></tr> <tr><td>#4</td><td>Output+</td></tr> <tr><td>#5</td><td>Output-</td></tr> <tr><td>#6</td><td>Vdd</td></tr> </table>  | Pin No.  | Connection | #1 | Vin | #2 | NC/OE | #3 | GND | #4 | Output+ | #5 | Output- | #6 | Vdd | <p>5.08</p> <p>3.80</p> <p>1.60</p>                        |
| Pin No.  | Connection   |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #1   | Vin  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #2   | NC/OE  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #3   | GND  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #4   | Output+  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #5   | Output-  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |
| #6   | Vdd  |            |    |     |    |       |    |     |    |         |    |         |    |     |  |

#### Notes:

1. Top marking: Y denotes manufacturing origin and XXXX denotes manufacturing lot number. The value of "Y" will depend on the assembly location of the device.
2. A capacitor of value 0.1  $\mu$ F between Vdd and GND is recommended.