

# **MOI-2000 CMOS Clock Oscillator**

### **General Description**

The MOI-2000 clock oscillator is a CMOS integrated circuit that can replace ceramic resonators or crystal oscillators in microcontroller based systems that do not require precise accuracy. The patented temperature compensated oscillator can operate at  $\pm$  0.5% total frequency accuracy over the temperature and voltage range without using ceramic resonators, quartz crystals or other external components for frequency determination.

### Features

- No external frequency reference required
- ± 0.5% total frequency tolerance over all conditions
- Fast and reliable oscillation startup
- Very low current consumption
- CMOS compatible square-wave output
- Shock and vibration resistant to 80kG
- Die size is 1.4mm x 1.7mm
- Available bare chip for hybrid and Chip on Board (COB)
- Industrial and automotive temperature ranges

| Specification | ۱ |
|---------------|---|
|---------------|---|

| Parameter                        | Symbol                         | MOI-2000                             | MOI-2000LP | Condition                              |
|----------------------------------|--------------------------------|--------------------------------------|------------|--|
| Frequency Range <sup>1</sup>     | f <sub>O</sub>                 | 2.000MHz ~                           |            |  |
|                                  |                                | 3.000MHz                             | 2.000MHz   |  |
|                                  |                                | 6.000MHz                             | 4.000MHz   |  |
|                                  |                                | 12.000MHz                            | 8.000MHz   |  |
| Operating Voltage                | V <sub>DD</sub>                | 5V ± 5%                              | 3.3V ± 5%  |  |
|                                  |                                |                                      | 2.85V ± 5% |  |
| Frequency Tolerance <sup>2</sup> | ∆f/f <sub>O</sub>              | ± 0.5%<br>± 1.0%<br>± 1.0%<br>± 1.5% |            | 0°C ~ +70°C                            |
|                                  |                                |                                      |            | -40°C ~ +85°C                          |
|                                  |                                |                                      |            | -55°C ~ +125°C                         |
|                                  |                                |                                      |            | -40°C ~ +150°C                         |
| Current Consumption              | I <sub>OP</sub>                | 1.6mA Typ                            | 0.7mA Typ  | No load                                |
| Duty Cycle                       | t <sub>w</sub> /t              | 40% ~ 60%                            |            | 50% V <sub>DD</sub>                    |
| Output Rise/Fall Time            | t <sub>R</sub> /t <sub>F</sub> | 14ns Max                             |            | 20% ~ 80% V <sub>DD</sub><br>12pF Load |
| Output Current                   | Ι <sub>Ο</sub>                 | 3.0mA Max                            |            |  |
| Supply Voltage                   | V <sub>DD</sub>                | 0V ~ 6V Max                          |            |  |
| Oscillation Startup Time         | t <sub>osc</sub>               | 50μs Max                             |            |  |

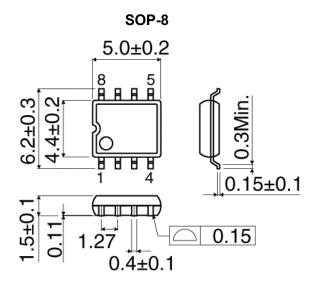
Note 1: Please contact MOI for standard frequencies.

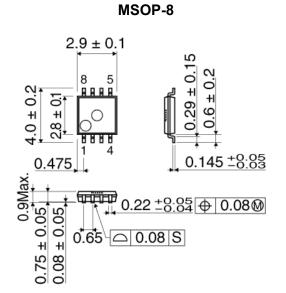
Note 2: Includes initial frequency tolerance, tolerance over temperature, tolerance over voltage, and long-term tolerance.

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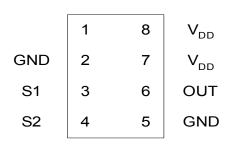


## **MOI-2000 Package Description**



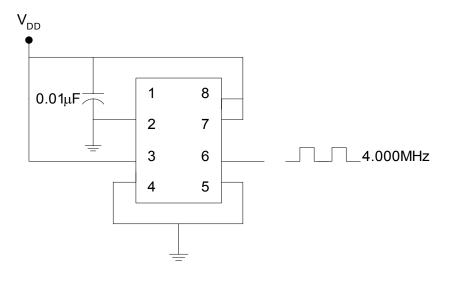


### **Pin Assignment**



| S1              | S2       | Out                |
|-----------------|----------|--------------------|
| GND             | GND      | 8.000MHz/12.000MHz |
| $V_{DD}$        | GND      | 4.000MHz/6.000MHz  |
| V <sub>DD</sub> | $V_{DD}$ | 2.000MHz/3.000MHz  |

# **Application Example**



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### MOI-2000 Part Numbering Guide

| Seires  | Voltage   | Tolerance  | Frequency                        | Temperature<br>Range   | Package                         |
|---------|---|--|----------------------------------|--|---------------------------------|
| MOI2000 | 3: 2.85V - 3.15V<br>33: 3.15V - 3.45V<br>5: 4.75V - 5.25V | K: ± 2.5%<br>L: ± 1.5%<br>M: ± 1.0%<br>P: ± 0.5% | 8.00: 8.00MHz<br>12.00: 12.00MHz | A: -40°C ~ +150°C<br>C: 0°C ~ +70°C<br>I: -40°C ~ +85°C<br>M: -55°C ~ +125°C | D: Die<br>M: MSOP-8<br>S: SOP-8 |

Example: MOI200033K8.00CM

### Handling Precautions

All device pins have limited ESD protection. Normal precautions should be taken to guard against ESD damage.

### Warranty

Micro Oscillator, Inc. does not assume any liability arising out of the application or use of any product or circuit described herein. Our products are not authorized for use as components in devices used for life support or other critical application where failure can cause death or bodily injury. In the case of this product being defective in manufacturing, labeling, packaging or shipping, it will be replaced with a satisfactory IC or the purchase price refunded.

### Patented

U.S.A., patent # 5,241,286.