

# PLASTIC PACKAGE INDUSTRIAL GRADE ULTRA MINIATURE PURE SILICON™ CLOCK OSCILLATOR

ASEMB



Life Size   
3.2 x 2.5 x 0.85mm

ASEMB

Moisture Sensitivity Level – MSL 1



RoHS/RoHS II Compliant

## FEATURES:

- Ultra Miniature Pure Silicon™ Clock Oscillator
- 2nd Generation MEMS Technology with reduced jitter by Discera
- Low Power Consumption <10mA
- Exceptional Stability +/- 10ppm Over Temp. at -40 to +105°C
- Compact QFN Plastic Packaging

## APPLICATIONS:

- CCD Clock for VTR Camera
- Equipment Connected to PCs
- Low Profile Equipment
- Computers and Peripherals
- Lower Cost Crystal Oscillator Replacement
- Portable Electronics (MP3 Players, Games)
- Consumer Electronics such as TV's, DVR's, etc.
- Vibrant, Shock-Prone & Humid Environments for Industrial Equipment
- Demanding Military & Automotive Electronics

**MEMS  
Technology!**

## STANDARD SPECIFICATIONS:

### Common Key Electrical Specifications

| Parameters                      | Minimum                                                                     | Typical | Maximum       | Units | Notes       |
|---------------------------------|-----------------------------------------------------------------------------|---------|---------------|-------|-------------|
| Frequency Range:                | 1.0                                                                         |         | 150           | MHz   |             |
| Operating Temperature:          | 0                                                                           |         | +70           | °C    | See options |
| Storage Temperature:            | -55                                                                         |         | +150          | °C    |             |
| Overall Frequency Stability*:   | -50                                                                         |         | +50           | ppm   | See options |
| Supply Voltage (Vdd):           | +1.8 ~ +3.3                                                                 |         |               | V     |             |
| Output Load:                    |                                                                             |         | 15, 25, or 40 | pF    | See options |
|                                 | 10                                                                          |         |               | kΩ    |             |
| Symmetry:                       | 45                                                                          |         | 55            | %     | @1/2Vdd     |
| Startup Time:                   |                                                                             | 1.5     | 3.0           | ms    |             |
| Disable Time:                   |                                                                             | 20      | 100           | ns    |             |
| Disable Stand-by Current:       |                                                                             |         | 15            | uA    |             |
| Tri-state Function (Stand-by) : | "1" (VIH ≥ 0.7 * Vdd) or Open: Oscillation<br>"0" (VIL < 0.25 * Vdd) : Hi Z |         |               | V     |             |
| Aging:                          | -5.0                                                                        |         | +5.0          | ppm   | First year  |

### Key Electrical Specifications – Vdd = 1.8V

| Parameters                   | Minimum             | Typical             | Maximum             | Units | Notes               |
|------------------------------|---------------------|---------------------|---------------------|-------|---------------------|
| Supply Current<br>(no load): | 1.0 to 39.9999MHz   | 5                   | 15                  | mA    | CL=0pF              |
|                              | 40.0 to 79.9999MHz  | 6                   | 15                  | mA    | RL=∞                |
|                              | 80.0 to 124.9999MHz | 7                   | 15                  | mA    | T=25°C              |
|                              | 125.0 to 150MHz     | 8                   | 15                  | mA    | (Standard CL: 15pF) |
|                              | 1.0 to 39.9999MHz   | 6                   | 15                  | mA    | CL=0pF              |
|                              | 40.0 to 79.9999MHz  | 7                   | 15                  | mA    | RL=∞                |
|                              | 80.0 to 124.9999MHz | 8                   | 15                  | mA    | T=25°C              |
|                              | 125.0 to 150MHz     | 9                   | 15                  | mA    | (CL option: 25pF)   |
|                              | 1.0 to 39.9999MHz   | 7                   | 15                  | mA    | CL=0pF              |
|                              | 40.0 to 79.9999MHz  | 8                   | 15                  | mA    | RL=∞                |
|                              | 80.0 to 124.9999MHz | 9                   | 15                  | mA    | T=25°C              |
|                              | 125.0 to 150MHz     | 10                  | 15                  | mA    | (CL option: 40pF)   |
| Output Voltage:              | V <sub>OH</sub>     | 0.8*V <sub>dd</sub> |                     | V     |                     |
|                              | V <sub>OL</sub>     |                     | 0.2*V <sub>dd</sub> | V     | CL=15, 25, 40pF     |
| Rise Time:<br>Fall Time:     | Tr                  | 1.8                 | 3.0                 | ns    | CL=15pF; T=25°C     |
|                              | Tf                  | 1.0                 | 3.0                 | ns    | 20%/80%*VDD         |
|                              | Tr                  | 1.5                 | 3.0                 | ns    | CL=25pF; T=25°C     |
|                              | Tf                  | 1.2                 | 3.0                 | ns    | 20%/80%*VDD         |
|                              | Tr                  | 1.4                 | 3.0                 | ns    | CL=40pF; T=25°C     |
|                              | Tf                  | 1.1                 | 3.0                 | ns    | 20%/80%*VDD         |
| Cycle to Cycle Jitter:       |                     | 60                  |                     | ps    | F=100MHz            |
| Period Jitter RMS:           |                     | 10                  |                     | ps    | F=100MHz            |

ABRACON IS  
ISO9001:2008  
CERTIFIED



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RoHS/RoHS II Compliant

## Key Electrical Specifications – $V_{dd} = 2.5V$

| Parameters                   |                     | Minimum        | Typical | Maximum        | Units | Notes                                           |
|------------------------------|---------------------|----------------|---------|----------------|-------|-------------------------------------------------|
| Supply Current<br>(no load): | 1.0 to 39.9999MHz   |                | 6       | 15             | mA    | CL=0pF<br>RL=∞<br>T=25°C<br>(Standard CL: 15pF) |
|                              | 40.0 to 79.9999MHz  |                | 7       | 15             | mA    |                                                 |
|                              | 80.0 to 124.9999MHz |                | 8       | 15             | mA    |                                                 |
|                              | 125.0 to 150MHz     |                | 9       | 15             | mA    |                                                 |
|                              | 1.0 to 39.9999MHz   |                | 7       | 15             | mA    | CL=0pF<br>RL=∞<br>T=25°C<br>(CL option: 25pF)   |
|                              | 40.0 to 79.9999MHz  |                | 8       | 15             | mA    |                                                 |
|                              | 80.0 to 124.9999MHz |                | 9       | 15             | mA    |                                                 |
|                              | 125.0 to 150MHz     |                | 10      | 15             | mA    |                                                 |
|                              | 1.0 to 39.9999MHz   |                | 8       | 16             | mA    | CL=0pF<br>RL=∞<br>T=25°C<br>(CL option: 40pF)   |
|                              | 40.0 to 79.9999MHz  |                | 9       | 16             | mA    |                                                 |
|                              | 80.0 to 124.9999MHz |                | 10      | 16             | mA    |                                                 |
|                              | 125.0 to 150MHz     |                | 11      | 16             | mA    |                                                 |
| Output Voltage:              | $V_{OH}$            | $0.8 * V_{dd}$ |         |                | V     | CL=15, 25pF                                     |
|                              | $V_{OL}$            |                |         | $0.2 * V_{dd}$ | V     |                                                 |
|                              | $V_{OH}$            | $0.9 * V_{dd}$ |         |                | V     | CL=40pF                                         |
|                              | $V_{OL}$            |                |         | $0.1 * V_{dd}$ | V     |                                                 |
| Rise Time:<br>Fall Time:     | $T_r$               |                | 1.0     | 2.0            | ns    | CL=15pF; T=25°C<br>20%/80%*VDD                  |
|                              | $T_f$               |                | 0.9     | 2.0            | ns    |                                                 |
|                              | $T_r$               |                | 1.1     | 2.0            | ns    | CL=25pF; T=25°C<br>20%/80%*VDD                  |
|                              | $T_f$               |                | 0.9     | 2.0            | ns    |                                                 |
|                              | $T_r$               |                | 1.0     | 2.0            | ns    | CL=40pF; T=25°C<br>20%/80%*VDD                  |
|                              | $T_f$               |                | 0.9     | 2.0            | ns    |                                                 |
| Cycle to Cycle Jitter:       |                     |                | 50      |                | ps    | F=100MHz                                        |
| Period Jitter RMS:           |                     |                | 5       |                | ps    | F=100MHz                                        |

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## Key Electrical Specifications – $V_{dd} = 3.3V$

| Parameter                    |                     | Minimum        | Typical | Maximum        | Units | Notes               |
|------------------------------|---------------------|----------------|---------|----------------|-------|---------------------|
| Supply Current<br>(no load): | 1.0 to 39.9999MHz   |                | 7       | 15             | mA    | CL=0pF              |
|                              | 40.0 to 79.9999MHz  |                | 8       | 15             | mA    | RL=∞                |
|                              | 80.0 to 124.9999MHz |                | 9       | 15             | mA    | T=25°C              |
|                              | 125.0 to 150MHz     |                | 10      | 15             | mA    | (Standard CL: 15pF) |
|                              | 1.0 to 39.9999MHz   |                | 8       | 16             | mA    | CL=0pF              |
|                              | 40.0 to 79.9999MHz  |                | 9       | 16             | mA    | RL=∞                |
|                              | 80.0 to 124.9999MHz |                | 10      | 16             | mA    | T=25°C              |
|                              | 125.0 to 150MHz     |                | 11      | 16             | mA    | (CL option: 25pF)   |
|                              | 1.0 to 39.9999MHz   |                | 8       | 16             | mA    | CL=0pF              |
|                              | 40.0 to 79.9999MHz  |                | 9       | 16             | mA    | RL=∞                |
|                              | 80.0 to 124.9999MHz |                | 10      | 16             | mA    | T=25°C              |
|                              | 125.0 to 150MHz     |                | 11      | 16             | mA    | (CL option: 40pF)   |
| Output Voltage:              | $V_{OH}$            | $0.8 * V_{dd}$ |         |                | V     |                     |
|                              | $V_{OL}$            |                |         | $0.2 * V_{dd}$ | V     | CL=15pF             |
|                              | $V_{OH}$            | $0.9 * V_{dd}$ |         |                | V     |                     |
|                              | $V_{OL}$            |                |         | $0.1 * V_{dd}$ | V     | CL=25, 40pF         |
| Rise Time:<br>Fall Time:     | Tr                  |                | 1.0     | 2.0            | ns    | CL=15pF; T=25°C     |
|                              | Tf                  |                | 0.9     | 2.0            | ns    | 20%/80%*VDD         |
|                              | Tr                  |                | 1.0     | 2.0            | ns    | CL=25pF; T=25°C     |
|                              | Tf                  |                | 0.9     | 2.0            | ns    | 20%/80%*VDD         |
|                              | Tr                  |                | 0.8     | 2.0            | ns    | CL=40pF; T=25°C     |
|                              | Tf                  |                | 0.8     | 2.0            | ns    | 20%/80%*VDD         |
| Cycle to Cycle Jitter:       |                     |                | 50      |                | ps    | F=100MHz            |
| Period Jitter RMS:           |                     |                | 5       |                | ps    | F=100MHz            |

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## Absolute Maximum Ratings

| Item            | Minimum | Maximum              | Unit | Condition |
|-----------------|---------|----------------------|------|-----------|
| Supply Voltage  | -0.3    | +4.0                 | V    |           |
| Input Voltage   | -0.3    | V <sub>dd</sub> +0.3 | V    |           |
| Junction Temp.  |         | +150                 | °C   |           |
| Storage Temp.   | -55     | +150                 | °C   |           |
| Soldering Temp. |         | +260                 | °C   | 40sec max |
| ESD             |         |                      | V    |           |
| HBM             |         | 4,000                |      |           |
| MM              |         | 200                  |      |           |
| CDM             |         | 1,500                |      |           |

## OPTIONS AND PART IDENTIFICATION: (Left Blank if Standard)

### Programmed Orders (Quantity > 1,000pcs)

ASEMB -  MHz -  -  -

| Frequency in MHz                                        |
|---------------------------------------------------------|
| e.g. 14.3181 MHz<br>(Maximum 4 digits<br>after decimal) |

| Operating Temp.    |
|--------------------|
| Blank: 0°C ~ +70°C |
| E: -20°C ~ +70°C   |
| L: -40°C ~ +85°C   |
| X: -40°C ~ +105°C  |

| Overall Freq. Stability |
|-------------------------|
| C: ±50ppm (STD)         |
| Y: ±10ppm               |
| R: ±25 ppm              |

| Output Load |
|-------------|
| Blank: 15pF |
| 25: 25pF    |
| 40: 40pF    |

| Packaging             |
|-----------------------|
| Blank*: 110pcs / Tube |
| T: 1,000pcs / reel    |
| T3: 3,000pcs / reel   |
| T5: 5,000pcs / reel   |

\* For Quick turn-around programmable orders < 1000pcs: Due to the immediate availability of stock and the qty of the order, the parts may be delivered as BULK: Cut Tape, Loose parts in Antistatic Bag or in Tube(s). The MOQ per the series will still apply for Tube packaging.

### Un-Programmed Orders

Blank un-programmed oscillators and our low cost portable programmer are available for quick turn engineering requirements. Please call ABRACON or visit MEMSpeed Pro site <http://www.abracon.com/memspeedpro/memspeedpro.html> for more information.

ASEMB - BLANK -  -  -  -

| Operating Temp.    |
|--------------------|
| Blank: 0°C ~ +70°C |
| E: -20°C ~ +70°C   |
| L: -40°C ~ +85°C   |
| X: -40°C ~ +105°C  |

| Overall Freq. Stability |
|-------------------------|
| C: ±50ppm (STD)         |
| Y: ±10ppm               |
| R: ±25 ppm              |

| Output Load |
|-------------|
| Blank: 15pF |
| 25: 25pF    |
| 40: 40pF    |

| Packaging            |
|----------------------|
| Blank: 110pcs / Tube |
| T: 1,000pcs / reel   |
| T3: 3,000pcs / reel  |
| T5: 5,000pcs / reel  |

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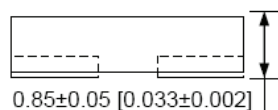
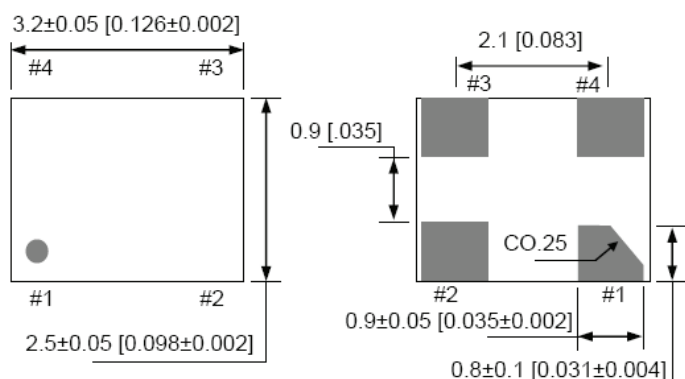
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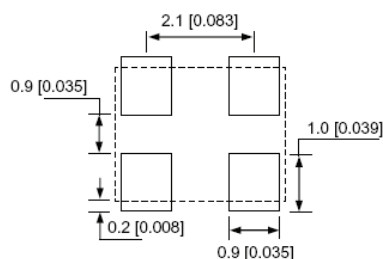
RoHS/RoHS II Compliant

## OUTLINE DIMENSIONS:



| No. | Pin Terminal |
|-----|--------------|
| 1   | Standby      |
| 2   | GND          |
| 3   | Output       |
| 4   | VDD          |

### Recommended Land Pattern

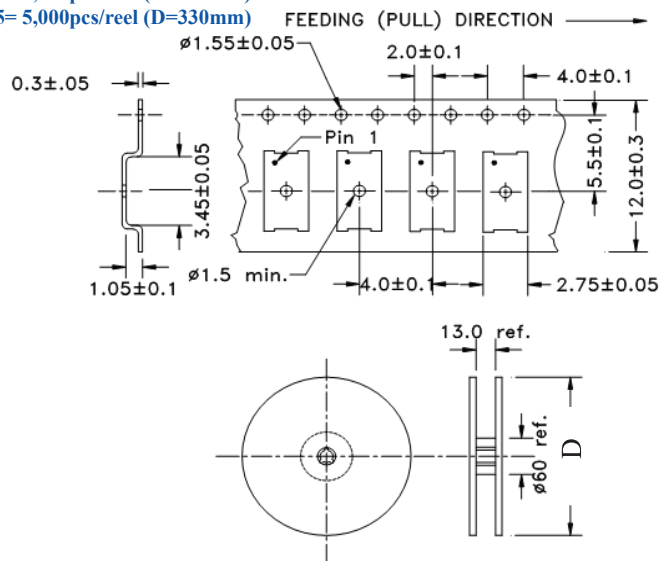


Note: Recommend using an approximately 0.01uF bypass capacitor between PIN 2 and 4.

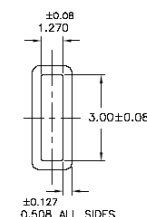
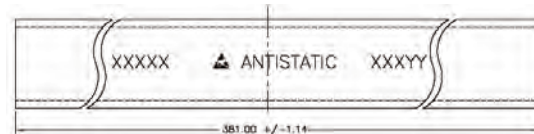
Dimensions: mm (inches)

## TAPE AND REEL:

T= 1,000pcs/reel (D=180mm)  
T3= 3,000pcs/reel (D=180mm)  
T5= 5,000pcs/reel (D=330mm)



Tube: 110 pcs/tube

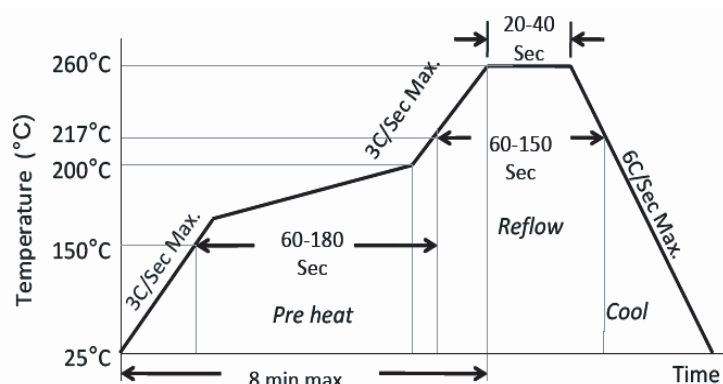


Unit orientation in tube:



Dimensions: mm

## REFLOW PROFILE:



|                                   |              |
|-----------------------------------|--------------|
| Ramp-Up Rate (200°C to Peak Temp) | 3°C/Sec Max. |
| Preheat Time 150°C to 200°C       | 60-180 Sec   |
| Time maintained above 217°C       | 60-150 Sec   |
| Peak Temperature                  | 255-260°C    |
| Time within 5°C of actual Peak    | 20-40 Sec    |
| Ramp-Down Rate                    | 6°C/Sec Max. |
| Time 25°C to Peak Temperature     | 8 min Max.   |



Need a test socket for the ASEMB Series? To view compatible **PRECISION TEST SOCK** for these parts, [click here](#). PN: AXS-3225-04

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