

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

ASDMB



Life Size   
2.5 x 2.0 x 0.85 mm

ASDMB

Moisture Sensitivity Level – MSL 1



RoHS  
Compliant

**MEMS  
TECHNOLOGY**

## 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, +/- 5ppm over -40 to +85°C
- Available in 30kG Shock Resistance Configuration
- 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

## STANDARD 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≥0.75*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                   | mA    | CL=0p               |
|                              | 40.0 to 79.9999MHz  | -----               | 6                   | mA    | RL=∞                |
|                              | 80.0 to 124.9999MHz | -----               | 7                   | mA    | T=25°C              |
|                              | 125.0 to 150MHz     | -----               | 8                   | mA    | (Standard CL: 15pF) |
|                              | 1.0 to 39.9999MHz   | -----               | 6                   | mA    | CL=0p               |
|                              | 40.0 to 79.9999MHz  | -----               | 7                   | mA    | RL=∞                |
|                              | 80.0 to 124.9999MHz | -----               | 8                   | mA    | T=25°C              |
|                              | 125.0 to 150MHz     | -----               | 9                   | mA    | (CL option: 25pF)   |
|                              | 1.0 to 39.9999MHz   | -----               | 7                   | mA    | CL=0p               |
|                              | 40.0 to 79.9999MHz  | -----               | 8                   | mA    | RL=∞                |
|                              | 80.0 to 124.9999MHz | -----               | 9                   | mA    | T=25°C              |
|                              | 125.0 to 150MHz     | -----               | 10                  | mA    | (CL option: 40pF)   |
| Output Voltage:              | V <sub>OH</sub>     | 0.8*V <sub>dd</sub> | -----               | V     | CL=15, 25, 40pF     |
|                              | V <sub>OL</sub>     | -----               | 0.2*V <sub>dd</sub> | V     |                     |
| Rise Time:<br>Fall Time:     | Tr                  | -----               | 1.8                 | ns    | CL=15pF; T=25°C     |
|                              | Tf                  | -----               | 1.0                 | ns    | 20%/80%*VDD         |
|                              | Tr                  | -----               | 1.5                 | ns    | CL=25pF; T=25°C     |
|                              | Tf                  | -----               | 1.2                 | ns    | 20%/80%*VDD         |
|                              | Tr                  | -----               | 1.4                 | ns    | CL=40pF; T=25°C     |
|                              | Tf                  | -----               | 1.1                 | ns    | 20%/80%*VDD         |

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30332 Esperanza, Rancho Santa Margarita, California 92688  
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## Key Electrical Specifications – $V_{dd} = 1.8V$

|                        |       |     |       |    |                  |
|------------------------|-------|-----|-------|----|------------------|
| Cycle to Cycle Jitter: | ----- | 100 | ----- | ps | F=100MHz CL=15pF |
|                        | ----- | 55  | ----- |    | F=100MHz CL=25pF |
|                        | ----- | 55  | ----- |    | F=100MHz CL=40pF |
| Period Jitter RMS:     | ----- | 12  | ----- | ps | F=100MHz CL=15pF |
|                        | ----- | 10  | ----- |    | F=100MHz CL=25pF |
|                        | ----- | 10  | ----- |    | F=100MHz CL=40pF |

## 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=0p<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=0p<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=0p<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 <sub>OH</sub>     | 0.8*V <sub>dd</sub> | -----   | -----               | V     | CL=15, 25pF                                    |
|                              | V <sub>OL</sub>     | -----               | -----   | 0.2*V <sub>dd</sub> | V     |                                                |
|                              | V <sub>OH</sub>     | 0.9*V <sub>dd</sub> | -----   | -----               | V     | CL=40pF                                        |
|                              | V <sub>OL</sub>     | -----               | -----   | 0.1*V <sub>dd</sub> | V     |                                                |
| Rise Time:<br>Fall Time:     | Tr                  | -----               | 1.0     | 2.0                 | ns    | CL=15pF; T=25°C<br>20%/80%*VDD                 |
|                              | Tf                  | -----               | 0.9     | 2.0                 | ns    |                                                |
|                              | Tr                  | -----               | 1.1     | 2.0                 | ns    | CL=25pF; T=25°C<br>20%/80%*VDD                 |
|                              | Tf                  | -----               | 0.9     | 2.0                 | ns    |                                                |
|                              | Tr                  | -----               | 1.0     | 2.0                 | ns    | CL=40pF; T=25°C<br>20%/80%*VDD                 |
|                              | Tf                  | -----               | 0.9     | 2.0                 | ns    |                                                |
| Period Jitter RMS:           |                     | -----               | 6.5     | -----               | ps    | F=100MHz CL=15pF                               |
|                              |                     | -----               | 5       | -----               |       | F=100MHz CL=25pF                               |
|                              |                     | -----               | 5       | -----               |       | F=100MHz CL=40pF                               |
| Cycle to Cycle Jitter:       |                     | -----               | 80      | -----               | ps    | F=100MHz CL=15pF                               |
|                              |                     | -----               | 40      | -----               |       | F=100MHz CL=25pF                               |
|                              |                     | -----               | 40      | -----               |       | F=100MHz CL=40pF                               |



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

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



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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)

ASDMB -  MHz -  -  - 

| Frequency in MHz                                        | Operating Temp.                                                                 | Overall Freq. Stability                                   | Output Load                         | Packaging                                                                                                         |
|---------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| e.g. 14.3181 MHz<br>(Maximum 4 digits<br>after decimal) | Blank: 0°C ~ +70°C<br>E: -20°C ~ +70°C<br>L: -40°C ~ +85°C<br>X: -40°C ~ +105°C | C: ±50ppm (STD)<br>R5*: ±5 ppm<br>Y: ±10ppm<br>R: ±25 ppm | Blank: 15pF<br>25: 25pF<br>40: 40pF | Blank: 140pcs / Tube<br>T: 1,000pcs / reel<br>T3: 3,000pcs / reel<br>T5: 5,000pcs / reel<br>T10: 10,000pcs / reel |

\*R5: ±5ppm stability is available by request. Please contact Abracon for more information.

### .02 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.

ASDMB - BLANK -  - 

| Operating Temp.                                                                 | Overall Freq. Stability                    | Packaging                                                                                                         |
|---------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Blank: 0°C ~ +70°C<br>E: -20°C ~ +70°C<br>L: -40°C ~ +85°C<br>X: -40°C ~ +105°C | C: ±50ppm (STD)<br>Y: ±10ppm<br>R: ±25 ppm | Blank: 140pcs / Tube<br>T: 1,000pcs / reel<br>T3: 3,000pcs / reel<br>T5: 5,000pcs / reel<br>T10: 10,000pcs / reel |

Note: Available 15pF output load only for ASDMB blank MEMS oscillator

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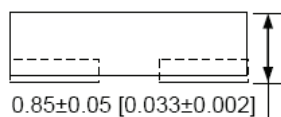
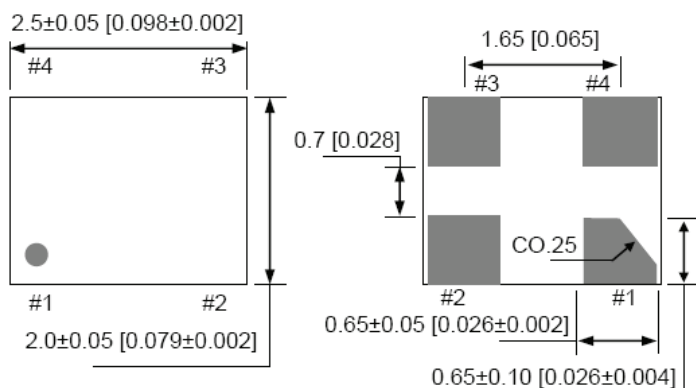
Life Size   
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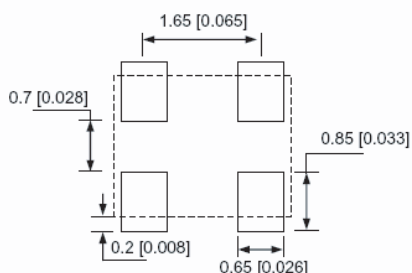
RoHS  
Compliant

## OUTLINE DIMENSIONS:



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

### Recommended Land Pattern

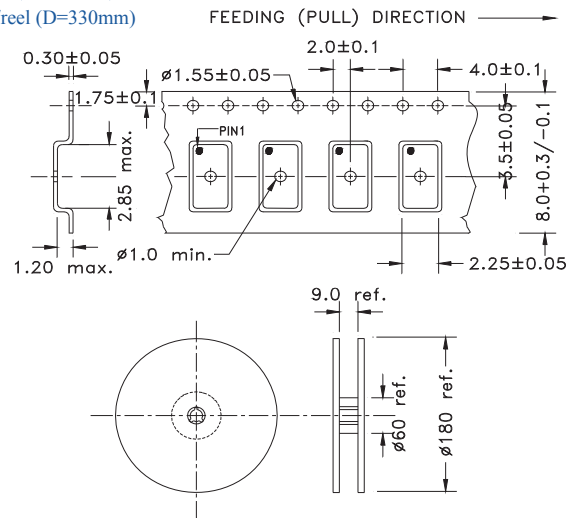


Note: Recommend using an approximately 0.01uF bypass capacitor between PIN 2 and 4.

Dimensions: mm (inches)

## TAPE AND REEL:

T= 1,000pcs/reel (D=180mm)  
T3= 3,000pcs/reel (D=180mm)  
T5= 5,000pcs/reel (D=330mm)  
T10= 10,000pcs/reel (D=330mm)



Tube: 140 pcs/tube

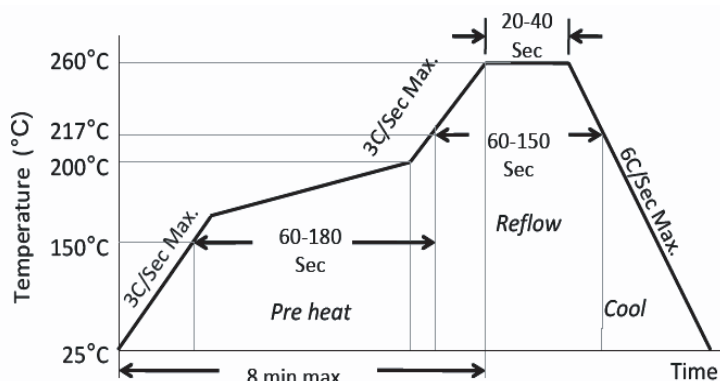


Unit orientation in tube:



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 ASDMB Series? To view compatible **PRECISION TEST SOCKETS** for these parts, [click here](#).

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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

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