

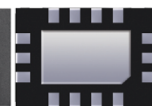
# LOW JITTER PIN CONFIGURABLE DUAL LVDS OUTPUT ULTRA MINIATURE PURE SILICON™ CLOCK OSCILLATOR

**ASEMDLV**



RoHS/RoHS II compliant

ASEMDLV



Life Size   
3.2 x 2.5 x 0.85 mm

**Moisture Sensitivity Level – MSL 1**

## FEATURES:

- Ultra Miniature Pure Silicon™ Clock Oscillator
- Pin Configurable LVDS Dual output
- Low Jitter (Period Jitter RMS 3ps typical)
- Low Integrated Phase Jitter 2ps max
- Tight Stability +/-10ppm -40 to +85C
- Excellent Shock & Vibration Immunity

## APPLICATIONS:

- Consumer Electronics
- Storage Area Networks
- SATA, SAS, Fibre Channel
- Passive Optical Networks
- EPON, 10G-EPON, GPON, 10G-PON
- Ethernet
- 1G, 10GBASE-T/KR/LR/SR, and FCoE
- PCI Express

Low Jitter  
Pin Configurable  
LVDS Dual Output  
3G MEMS

## STANDARD SPECIFICATIONS:

### Pre-programmed Output Frequency Configuration

| Ordering Info             | Freq (MHz)        | Freq Select Bits [FS2, FS1, FS0] – Default is [111] |        |     |     |     |     |     |            |
|---------------------------|-------------------|-----------------------------------------------------|--------|-----|-----|-----|-----|-----|------------|
|                           |                   | 000                                                 | 001    | 010 | 011 | 100 | 101 | 110 | 111        |
| Frequency Configuration 1 | f <sub>OUT1</sub> | 148.5                                               | 156.25 | 150 | 125 | 125 | 100 | 100 | <b>400</b> |
|                           | f <sub>OUT2</sub> | 74.25                                               | 125    | 125 | 25  | 50  | 50  | 75  | <b>200</b> |
| Custom Configuration      | f <sub>OUT1</sub> | Contact Abracon for customized configurations       |        |     |     |     |     |     |            |
|                           | f <sub>OUT2</sub> |                                                     |        |     |     |     |     |     |            |

Frequency select bits [FS2, FS1, FS0] are weakly tied high so if left **floated**, the default setting will be [111] and the device will output the associated frequency highlighted in **Bold**. If other frequency combinations are required, please contact Abracon for customized configuration. Please see the configurable frequency range in the section 2.0

### Key Electrical Specifications

| Parameters                           | Minimum                                                              | Typical | Maximum | Units | Notes                             |
|--------------------------------------|----------------------------------------------------------------------|---------|---------|-------|-----------------------------------|
| Configurable frequency range         | 2.3                                                                  |         | 460     | MHz   | Commercial, Industrial temp range |
| Operating Temperature                | -20                                                                  |         | +70     | °C    | See options                       |
| Storage Temperature                  | -55                                                                  |         | +150    | °C    |                                   |
| Overall Frequency Stability*1        | -50                                                                  |         | +50     | ppm   | See options                       |
| Supply Voltage (Vdd)                 | +2.25                                                                |         | +3.6    | V     |                                   |
| Startup Time                         |                                                                      |         | 5       | ms    |                                   |
| Enable Time                          |                                                                      |         | 20      | ns    |                                   |
| Disable Time                         |                                                                      |         | 5       | ns    |                                   |
| Disable Current                      |                                                                      | 21      | 23      | mA    |                                   |
| Tri-state Function (Standby/Disable) | "1" (VIH≥0.75*Vdd) or Open: Oscillation<br>"0" (VIL<0.25*Vdd) : Hi Z |         |         | V     | 40kΩ pull-up resistor embedded    |
| Aging                                | -5.0                                                                 |         | +5.0    | ppm   | First year                        |
| Supply Current (I <sub>dd</sub> )    |                                                                      | 38      |         | mA    | RL=100Ω, F01=F02=156.25MHz        |
| Output Offset Voltage                | 1.125                                                                |         | 1.40    | V     | RL=100 Ω, Differential            |
| Delta Offset Voltage                 |                                                                      |         | 50      | mV    |                                   |
| Peak to Peak Output Swing            |                                                                      | 350     |         | mV    | Single-Ended                      |
| Rise Time                            | Tr                                                                   | 200     | 350     | ps    | RL=100 Ω, CL=2pF                  |
| Fall Time                            | Tf                                                                   | 200     | 350     | ps    | 20% to 80%                        |
| Duty Cycle                           | 48                                                                   |         | 52      | %     | Differential                      |

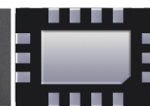
\*1. Frequency stability includes frequency variations due to initial tolerance, temp. and power supply voltage

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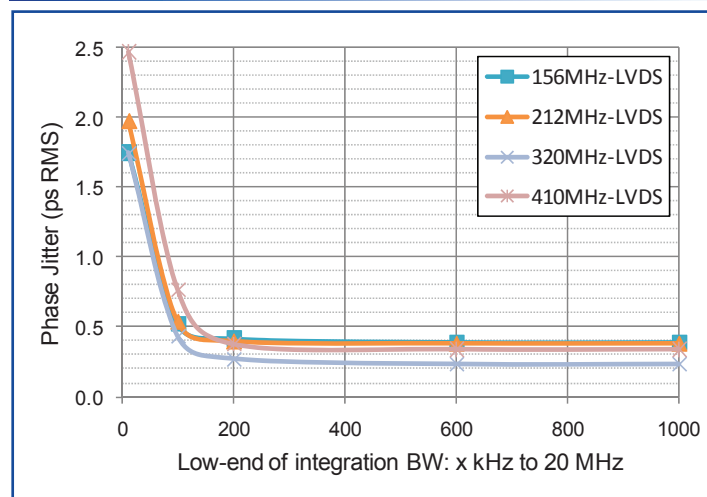
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**ASEMDLV****RoHS/RoHS II compliant****ASEMDLV****Life Size**  
3.2 x 2.5 x 0.85 mm

## Key Electrical Specifications (continued)

| Parameters                           | Minimum | Typical | Maximum | Units | Notes                         |
|--------------------------------------|---------|---------|---------|-------|-------------------------------|
| Period Jitter RMS ( $J_{PER}$ )      |         | 2.5     |         | ps    | F01=F02= 156.25MHz            |
| Integrated Phase Jitter ( $J_{PH}$ ) |         | 0.28    | 2       | ps    | 200kHz ~ 20MHz,<br>@156.25MHz |
|                                      |         | 0.40    | 2       |       | 100kHz ~ 20MHz,<br>@156.25MHz |
|                                      |         | 1.70    | 2       |       | 12kHz ~ 20MHz,<br>@156.25MHz  |

## PHASE JITTER



## ABSOLUTE MAXIMUM RATINGS

| Item            | Minimum | Maximum      | Unit | Condition |
|-----------------|---------|--------------|------|-----------|
| Supply Voltage  | -0.3    | +4.0         | V    |           |
| Input Voltage   | -0.3    | $V_{DD}+0.3$ | V    |           |
| Junction Temp.  |         | +150         | °C   |           |
| Storage Temp.   | -55     | +150         | °C   |           |
| Soldering Temp. |         | +260         | °C   | 40sec max |
| ESD             |         |              | V    |           |
| HBM             |         | 4,000        |      |           |
| MM              |         | 400          |      |           |
| CDM             |         | 1,500        |      |           |

## OPTIONS AND PART IDENTIFICATION: (left blank if standard)

ASEMDLV -  -  - 

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

| Overall Freq. Stability |
|-------------------------|
| Blank: ±50ppm           |
| R: ±25 ppm              |

| Packaging                      |
|--------------------------------|
| Blank*: Tube (110pcs / Tube)   |
| T: Tape & Reel (1kpcs / reel)  |
| T3: Tape & Reel (3kpcs / reel) |
| T5: Tape & Reel (5kpcs / reel) |

\* 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.

| Frequency Combination  | Freq (MHz) | Freq Select Bits [FS2, FS1, FS0] – Default is [111] |        |     |     |     |     |     |     |
|------------------------|------------|-----------------------------------------------------|--------|-----|-----|-----|-----|-----|-----|
|                        |            | 000                                                 | 001    | 010 | 011 | 100 | 101 | 110 | 111 |
| Standard Configuration | $f_{OUT1}$ | 148.5                                               | 156.25 | 150 | 125 | 125 | 100 | 100 | 400 |
|                        | $f_{OUT2}$ | 74.25                                               | 125    | 125 | 25  | 50  | 50  | 75  | 200 |
| Custom Configuration   | $f_{OUT1}$ | Contact Abracon for customized configurations       |        |     |     |     |     |     |     |
|                        | $f_{OUT2}$ |                                                     |        |     |     |     |     |     |     |

Default condition: Frequency select bits [FS2, FS1, FS0] are all left floated. FS2, FS1, FS0 are pulled high [111]  
Frequency combination and default frequency is customized upon request. Please contact Abracon for the frequency combinations.

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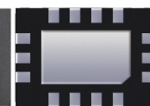
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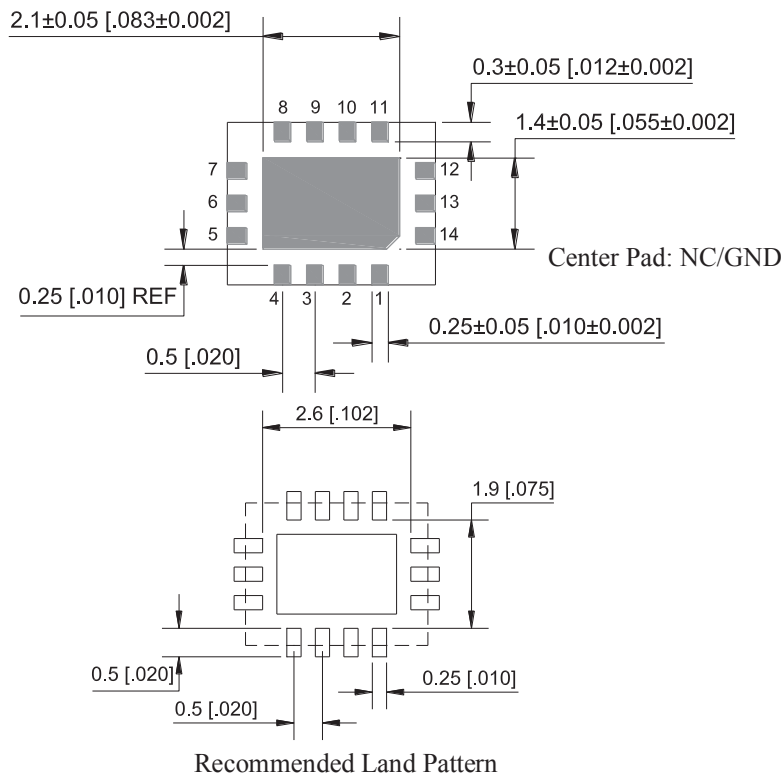
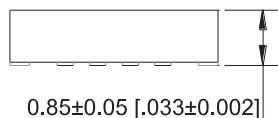
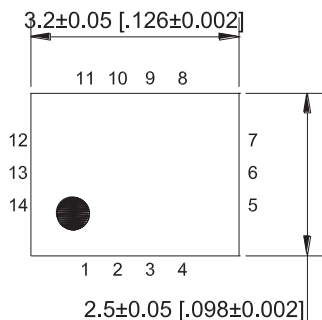
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## MECHANICAL DIMENSIONS



Recommended Land Pattern

| Pin No. | Pin Name  | Pin Type | Description                                                      |
|---------|-----------|----------|------------------------------------------------------------------|
| 1       | Enable    | I        | Enables outputs when high and disables (tri-state) them when low |
| 2       | NC        | NA       | Leave unconnected or grounded                                    |
| 3       | NC        | NA       | Leave unconnected or grounded                                    |
| 4       | GND       | Power    | Ground                                                           |
| 5       | FS0       | I        | Least significant bit for frequency selection                    |
| 6       | FS1       | I        | Middle bit for frequency selection                               |
| 7       | FS2       | I        | Most significant bit for frequency selection                     |
| 8       | Output1+  | O        | Positive LVDS Output 1                                           |
| 9       | Output1-  | O        | Negative LVDS Output 1                                           |
| 10      | Output 2- | O        | Negative LVDS Output 2                                           |
| 11      | Output 2+ | O        | Positive LVDS Output 2                                           |
| 12      | VDD2      | Power    | Power Supply 2 for LVDS Output 2                                 |
| 13      | VDD       | Power    | Power Supply                                                     |
| 14      | NC        | NA       | Leave unconnected or grounded                                    |

Dimensions: mm (inches)

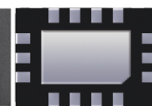
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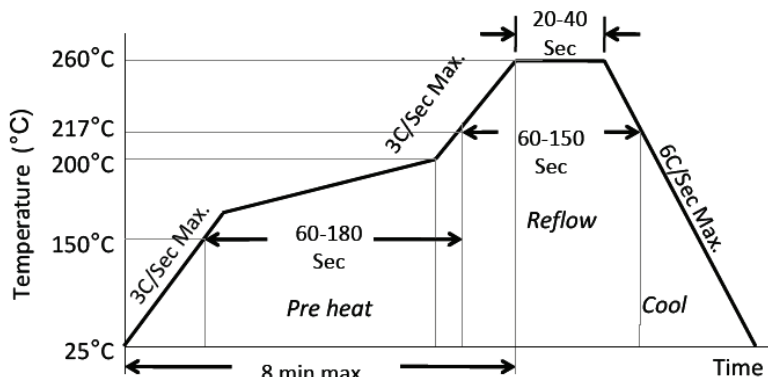
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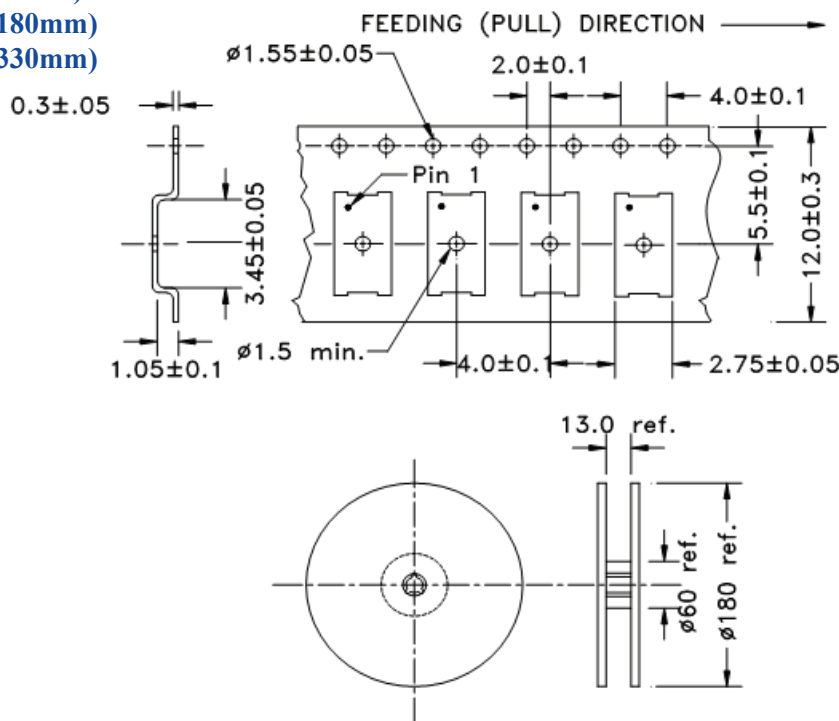
## REFLOW PROFILE



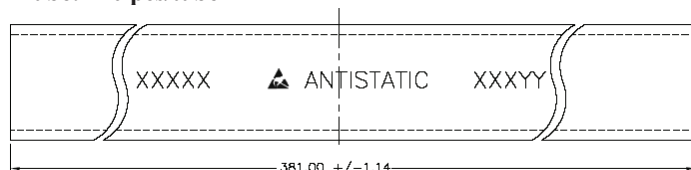
|                                   |              |
|-----------------------------------|--------------|
| Ramp-Up Rate (200°C to Peak Temp) | 3°C/Sec Max. |
| Preheat Time 150°C to 200°C       | 60-180 Sec   |
| Time maintained above 217°C       | 60-150 Sec   |
| Peak Temperature                  | 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.   |

## TAPE & 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

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