

## Ultra Low Jitter Oscillator

### Features

- Frequency range
- 1MHz~200Mhz @3.3V
- 1MHz~125MHz @1.8V
- Supply voltage 1.65V ~ 3.63V
- Output Clock Tri-State Mode
- CMOS output clock
- Operating temperature -40~125°C
- RoHS compliant & Pb free
- AEC-Q100 compliant (option)
- SMD seam sealing ceramic package
- 2.0mm x1.6mm, 2.5mm x2.0mm, 3.2mm x2.5mm

### Applications

- SATA, SAS, Ethernet, PCI Express, video, wireless.
- Computing, storage, networking, telecom, Industrial control.

**Table1. Electrical Characteristics**

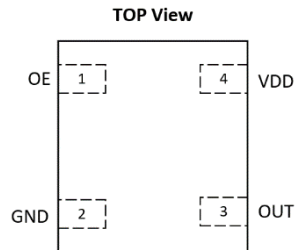
| Parameter                   | Symbol              | Min                  | Typ. | Max. | Unit            | Condition                                                                                            |
|-----------------------------|---------------------|----------------------|------|------|-----------------|------------------------------------------------------------------------------------------------------|
| Output Frequency Range      | F                   | 1                    | -    | 200  | MHz             | V <sub>DD</sub> =3.3V                                                                                |
|                             |                     | 1                    |      | 125  |                 | V <sub>DD</sub> =1.8V                                                                                |
| Frequency Stability         | F <sub>stab</sub>   | -20                  |      | +20  | PPM             | -40~85                                                                                               |
|                             |                     | -30                  |      | +30  |                 | -40~105                                                                                              |
|                             |                     | -100                 |      | +100 |                 | -40~125                                                                                              |
| Operating Temperature Range | T <sub>use</sub>    | -40                  |      | +125 | °C              |                                                                                                      |
| Supply Voltage              | V <sub>DD</sub>     | 1.65                 | 1.8  | 1.95 | V               |                                                                                                      |
|                             |                     | 2.97                 | 3.3  | 3.63 |                 |                                                                                                      |
| Current Consumption         | I <sub>DD</sub>     | -                    |      | 22   | mA              | No load condition, f=110MHz, V <sub>DD</sub> =3.3V                                                   |
| OE mode disable current     | I <sub>od</sub>     |                      |      | 18   | mA              | When OE=GND, output is Pulled Down                                                                   |
| PDB mode standby Current    | I <sub>std</sub>    |                      | 400  |      | uA              | When OE=GND, output is Pulled Down                                                                   |
| Duty Cycle                  | DC                  | 45                   |      | 55   | %               |                                                                                                      |
| Rise/Fall Time              | Tr, Tf              |                      | 1.5  |      | nS              | 15pF load, 10%~90% V <sub>DD</sub> , high drive (V <sub>DD</sub> =3.3V)                              |
| Output Voltage High         | V <sub>OH</sub>     | V <sub>DD</sub> -0.4 | -    | -    | V <sub>DD</sub> | I <sub>OH</sub> =-4mA, I <sub>OL</sub> =4mA, Standard Drive                                          |
| Output Voltage Low          | V <sub>OL</sub>     | -                    | -    | 0.4  | V <sub>DD</sub> |                                                                                                      |
| Input Voltage High          | V <sub>IH</sub>     | 70%                  | -    | -    | V <sub>DD</sub> | Pin1, OE                                                                                             |
| Input Voltage Low           | V <sub>IL</sub>     | -                    | -    | 30%  | V <sub>DD</sub> | Pin1, OE                                                                                             |
| Startup Time                | T <sub>start</sub>  | -                    | 5    | 7    | mS              | Measure from the time V <sub>DD</sub> reaches its rated minimum value.                               |
| OE Enable/Disable Time      | T <sub>oe</sub>     | -                    | -    | 10   | nS              | OE function; Ta=25 °C, 15pFload. Add one clock period to this measurement for a usable clock output. |
| Resume Time                 | T <sub>resume</sub> | -                    | -    | 7    | mS              | In PDB mode, Ta=25 °C, 15pFload                                                                      |
| PK-PK Period Jitter         | T <sub>jitt</sub>   | -                    | 200  | 300  | pS              | F=125MHz, V <sub>DD</sub> = 3.3V                                                                     |
|                             |                     |                      | 220  | 400  | pS              | F=125MHz, V <sub>DD</sub> =1.8V                                                                      |
| RMS Phase Jitter            | T <sub>phj</sub>    | -                    | 0.7  | 1    | pS              | F=125MHz, integration bandwidth=12kHz to 20MHz, V <sub>DD</sub> =3.3V                                |
| First year Aging            | F <sub>aging</sub>  | -1.5                 |      | +1.5 | PPM             | 25 °C                                                                                                |
| 10-year Aging               |                     | -5                   |      | +5   | PPM             |                                                                                                      |

Notes:

1: All electrical specifications in the above table are specified with 15pF output load and for all V<sub>DD</sub> unless otherwise stated.

**Table2. Pin Configuration**

| Pin | Symbol | Functionality |                                                                                                                                    |
|-----|--------|---------------|------------------------------------------------------------------------------------------------------------------------------------|
| 1   | OE     | Output Enable | H or Open, Specified frequency output<br>L: output is high impedance. Only output driver is disabled.                              |
|     |        | PDB mode      | H or Open, Specified frequency output<br>L: output is low. Device goes to sleep mode. Supply current reduces to I <sub>std</sub> . |
| 2   | GND    | Power         | Electrical ground                                                                                                                  |
| 3   | OUT    | Output        | Oscillator output                                                                                                                  |
| 4   | VDD    | Power         | Power supply voltage                                                                                                               |



**Table3. Absolute Maximum**

Attempted operation outside the absolute maximum ratings of the part may cause permanent damage to the part. Actual performance of the IC is only guaranteed within the operational specifications, not at absolute maximum ratings.

| Parameter               | Min. | Max. | Unit |
|-------------------------|------|------|------|
| Storage Temperature     | -60  | 150  | °C   |
| VDD                     | -0.5 | 7    | V    |
| Electrostatic Discharge | -    | 2000 | V    |
| Soldering Temperature   |      | 260  | °C   |
| Junction Temperature    |      | 150  | °C   |

## Phase Noise Plot

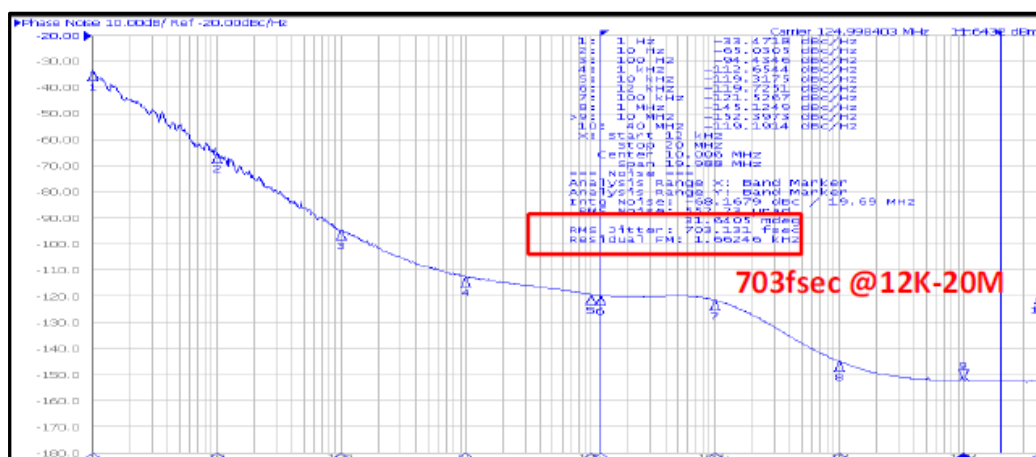


Figure 1. Phase Noise, 125MHz, 3.3V, LVCOMS Output

## Test Circuit and Waveform

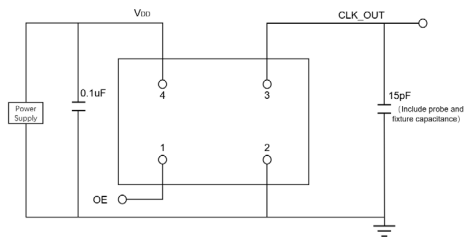


Figure 2. Test Circuit

Notes:

2. Duty Cycle is computed as  $\text{Duty Cycle} = \text{TH} / \text{Period}$ .

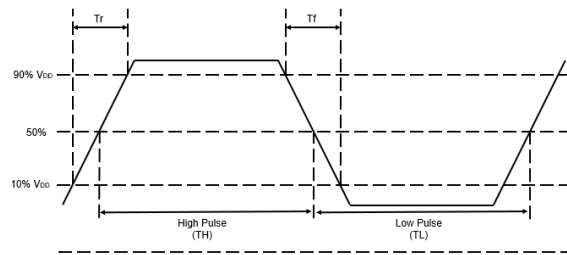
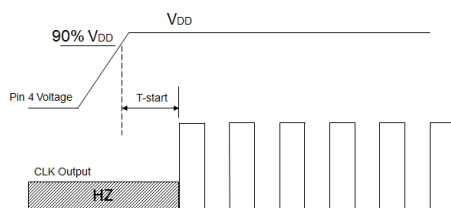


Figure 3. Waveform

## Timing Diagram



T-start: Time to start from power-off

Figure 4. Startup Timing (OE mode)

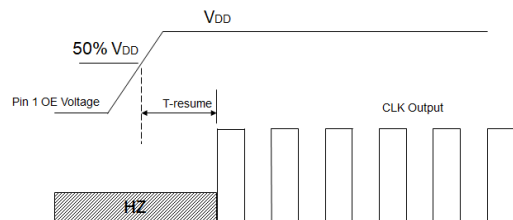
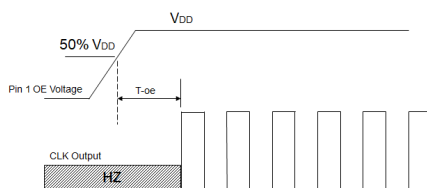
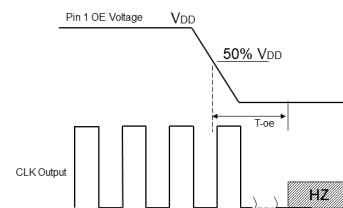


Figure 5. Standby Resume Timing (PDB mode)



T-oe: Time to re-enable the clock output

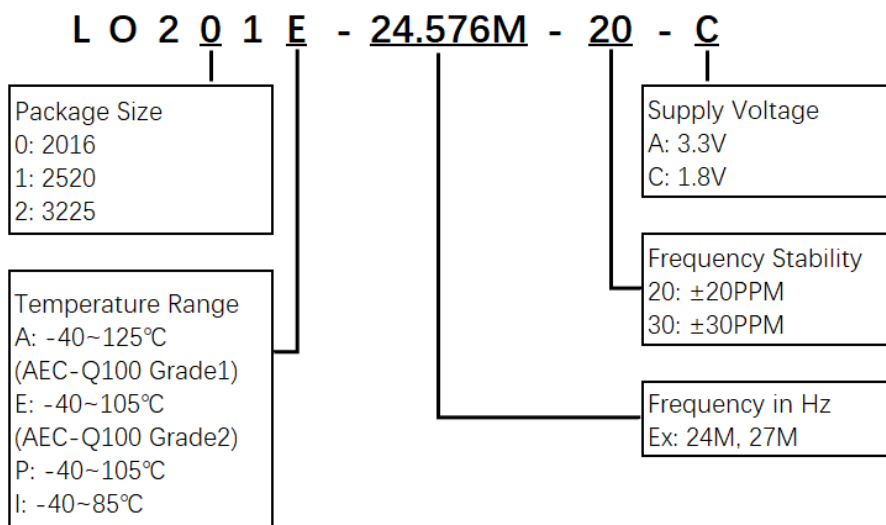
Figure 6. OE Enable Timing



T-oe: Time to re-enable the clock output

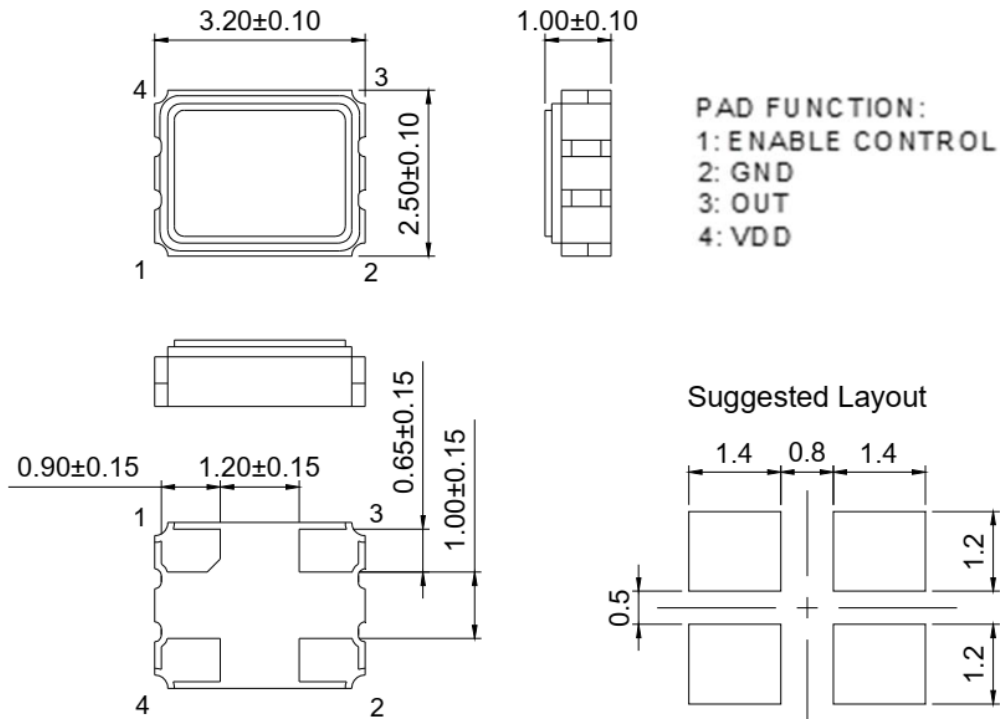
Figure 7. OE Disable Timing

## Ordering Information

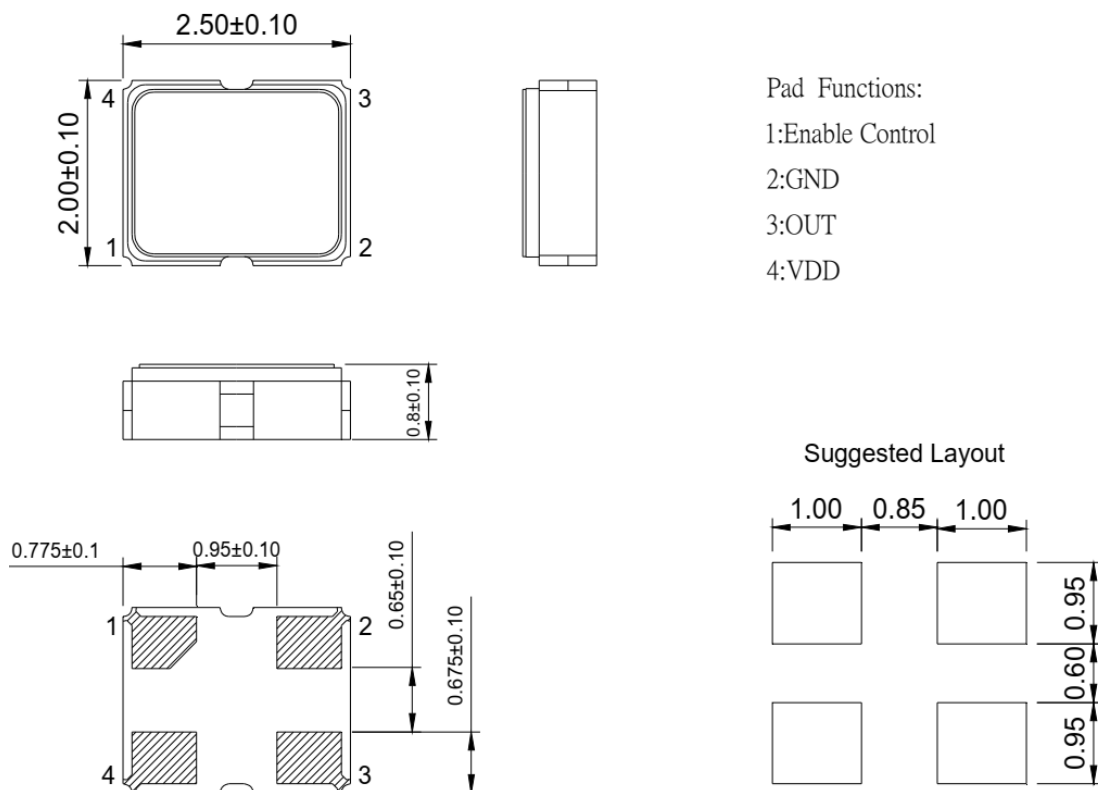


**Dimensions**

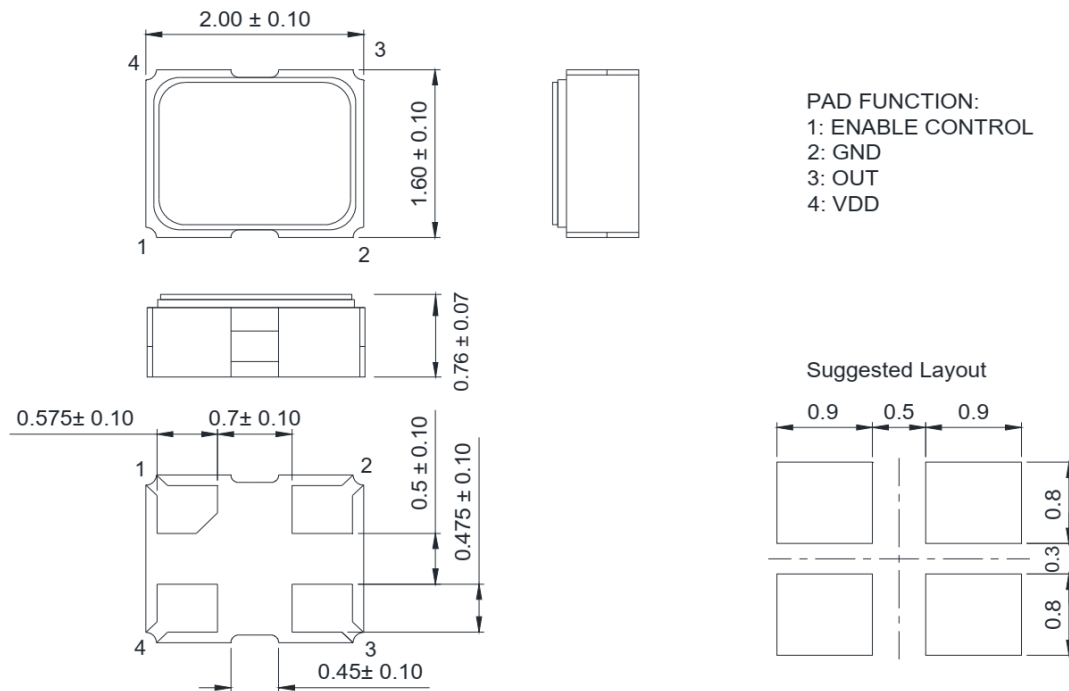
**3225**



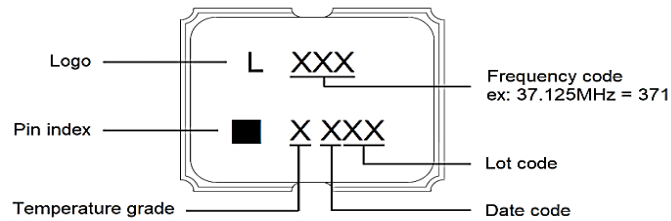
**2520**



**2016**



## Marking



| Temperature Grade | Temperature Range          | Frequency Stability (PPM) |
|-------------------|----------------------------|---------------------------|
| A                 | -40~125℃ (AEC-Q100 Grade1) | ±100                      |
| E                 | -40~105℃ (AEC-Q100 Grade2) | ±30                       |
| P                 | -40~105℃                   | ±30                       |
| I                 | -40~85℃                    | ±20                       |

**Revision History**

| Revision Number | Date of Release | Changes                                      |
|-----------------|-----------------|----------------------------------------------|
| 1.0             | 03/29/2021      | 1) Preliminary datasheet                     |
| 1.1             | 04/29/2021      | 1) Ordering information<br>2) Marking        |
| 1.2             | 05/21/2021      | 1) Add dimensions                            |
| 1.3             | 09/09/2021      | 1) Add temperature range -40~125℃            |
| 1.4             | 10/26/2021      | 1) Add I temperature Grade                   |
| 1.5             | 12/06/2021      | 1) Update the AEC-Q100 Grade 1               |
| 1.6             | 04/28/2023      | 1) Modify the PPM in the marking information |