

# OY Type Ultra Low Power 2.5 x 2.0mm SMD CMOS Output Crystal Oscillator

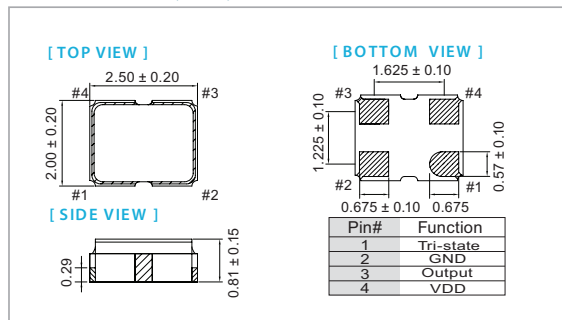
## FEATURE

- Ultra Low Power Supply Voltage: 0.9V, 1.2V, 1.5V Supply Options
- Singled-end Output: CMOS
- Frequency Support from 1MHz to 50MHz
- Low Noise Typical: 0.3ps at 12kHz to 20MHz Frequency Offsets
- Temperature Range: -40 to 85°C Operation
- Pb-free/RoHS Compliant

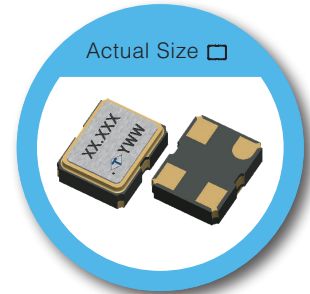
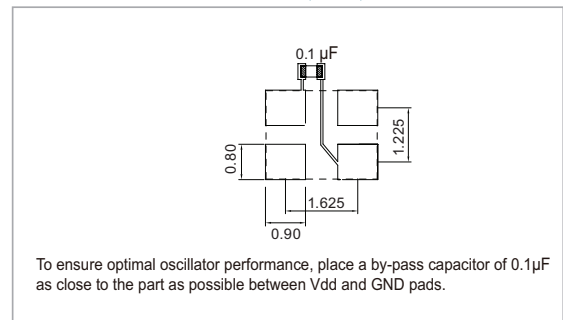
## TYPICAL APPLICATION

- IoT
- Game Console
- Smartphone
- Wearable Device
- Digital Camera
- Digital Consumer Electronics

## DIMENSION (mm)



## SOLDER PAD LAYOUT (mm)



**RoHS Compliant**

## ELECTRICAL SPECIFICATION

| Parameter   | 0.9V   |                     | 1.2V                |                     | 1.5V                |                     | Unit                |      |   |
|---|--|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------|---|
|   | Min.   | Max.                | Min.                | Max.                | Min.                | Max.                |                     |      |   |
| <b>Supply Voltage Variation (V<sub>DD</sub>)</b>    | V <sub>DD</sub> -5%                                  | V <sub>DD</sub> +5% | V <sub>DD</sub> -5% | V <sub>DD</sub> +5% | V <sub>DD</sub> -5% | V <sub>DD</sub> +5% | V                   |      |   |
| <b>Frequency Range</b>                              | 1  | 50                  | 1                   | 50                  | 1                   | 50                  | MHz                 |      |   |
| <b>Supply Current</b>                               | <b>At 15pF Load</b>                                  |                     | -                   | 1.5                 | -                   | 2                   | 3                   | mA   |   |
|   | <b>No Load Condition, 1MHz ≤ Fo &lt; 10MHz</b>       |                     | -                   | 0.9                 | -                   | 1                   | 1.2                 | mA   |   |
|   | <b>No Load Condition, 10MHz ≤ Fo &lt; 20MHz</b>      |                     | -                   | 1                   | -                   | 1.2                 | 1.2                 | mA   |   |
|   | <b>No Load Condition, 20MHz ≤ Fo &lt; 50MHz</b>      |                     | -                   | 1.2                 | -                   | 1.5                 | 1.5                 | mA   |   |
| <b>Duty Cycle</b>                                   | 45   | 55                  | 45                  | 55                  | 45                  | 55                  | %                   |      |   |
| <b>Output Level</b>                                 | <b>Output High</b>                                   | 90% V <sub>DD</sub> | -                   | 90% V <sub>DD</sub> | -                   | 90% V <sub>DD</sub> | V                   |      |   |
|   | <b>Output Low</b>                                    | -                   | 10% V <sub>DD</sub> | -                   | 10% V <sub>DD</sub> | -                   | 10% V <sub>DD</sub> | V    |   |
| <b>Transition Time: Rise / Fall Time*</b>           | <b>1MHz ≤ Fo &lt; 10MHz</b>                          | -                   | 4                   | -                   | 3                   | -                   | 3                   | nSec |   |
|   | <b>10MHz ≤ Fo &lt; 20MHz</b>                         | -                   | 3                   | -                   | 3                   | -                   | 3                   | nSec |   |
|   | <b>20MHz ≤ Fo &lt; 50MHz</b>                         | -                   | 2                   | -                   | 2                   | -                   | 2                   | nSec |   |
| <b>Startup Time</b>                                 | -  | 4                   | -                   | 4                   | -                   | 4                   | mSec                |      |   |
| <b>Tri-State (Input to Pin 1)</b>                   | <b>Enable (High Voltage or Floating)</b>             | 0.7xV <sub>DD</sub> | -                   | 0.7xV <sub>DD</sub> | -                   | 0.7xV <sub>DD</sub> | V                   |      |   |
|   | <b>Disable (Low Voltage or GND)</b>                  | -                   | 0.3xV <sub>DD</sub> | -                   | 0.3xV <sub>DD</sub> | -                   | 0.3xV <sub>DD</sub> | V    |   |
| <b>Output Loading</b>                               | 15   |                     | 15                  |                     | 15                  |                     | pF                  |      |   |
| <b>Stand by Current</b>                             | -  | 100                 | -                   | 100                 | -                   | 100                 | µA                  |      |   |
| <b>Aging (@ 25°C, 1<sup>st</sup> Year)</b>          | -  | ±3                  | -                   | ±3                  | -                   | ±3                  | ppm                 |      |   |
| <b>Storage Temp. Range</b>                          | -55  | +125                | -55                 | +125                | -55                 | +125                | °C                  |      |   |
| <b>Phase Noise</b>                                  | <b>Typ.</b>  | <b>Max.</b>         | <b>Typ.</b>         | <b>Max.</b>         | <b>Typ.</b>         | <b>Max.</b>         | dBc/Hz              |      |   |
|   | <b>At V<sub>DD</sub>=1.2V, F<sub>out</sub>=24MHz</b> | <b>1kHz offset</b>  | -130                | -                   | -133                | -                   |                     | -135 | - |
|   | <b>10kHz offset</b>                                  | -140                | -                   | -143                | -                   | -143                |                     | -    |   |
|   | <b>100kHz offset</b>                                 | -148                | -                   | -150                | -                   | -150                |                     | -    |   |
|   | <b>1MHz offset</b>                                   | -152                | -                   | -155                | -                   | -155                |                     | -    |   |
| <b>Period Jitter (Pk-Pk)</b>                        | -  | 40                  | -                   | 40                  | -                   | 40                  | pSec                |      |   |
| <b>RMS Phase Jitter (Integrated 12kHz to 20MHz)</b> | -  | 1                   | -                   | 1                   | -                   | 1                   | pSec                |      |   |

Standard frequencies are frequencies which the crystal has been designed and does not imply a stock position  
 \*Transition times are measured between 10% and 90% of V<sub>DD</sub>, within output load of 15pF

## FREQ. STABILITY vs. TEMP. RANGE

| Temp.( °C) | ppm |     |
|------------|-----|-----|
|            | ±25 | ±50 |
| -10~+60    | ○   | ○   |
| -20~+70    | ○   | ○   |
| -40~+85    | △   | ○   |

\* O: Available △:Conditional X: Not available

\*Inclusive of calibration @ 25°C, operating temperature range, input voltage variation, load variation, aging (1<sup>st</sup> year), shock, and vibration load variation

**Note: not all combination of options are available. Other specifications may be available upon request.**

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