

Helping Customers Innovate, Improve & Grow



**OX-202**

## Description

The OX-202 is part of a series of oscillators specifically designed to support Timing Over Packet applications, in particular 1588-2008 based frequency and phase reference systems. The OX-202 is stratum 3E compliant.

## Features

- Available in three standard frequencies (10MHz, 12.8MHz and 20MHz)
- Excellent temperature stability
- Superior long term stability
- Optimized to support Timing Over Packet applications
- Stratum 3E compliant according to GR1244

## Applications

- SETS clock support
- Wireless Base Stations
- Edge and Core Routers

## Performance Specifications

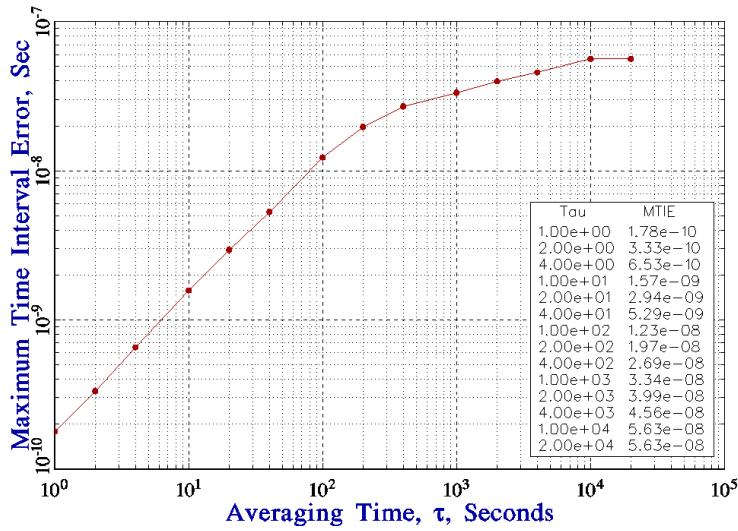
| Frequency Stability <sup>1</sup>        |     |     |       |            |                                                                                                                           |
|-----------------------------------------|-----|-----|-------|------------|---------------------------------------------------------------------------------------------------------------------------|
| Parameter                               | Min | Typ | Max   | Units      | Notes                                                                                                                     |
| Over all stability (df/f <sub>0</sub> ) |     |     | ±2.6  | ppm        | Free run accuracy (20 years)                                                                                              |
| Drift                                   |     |     | ±1    | ppb        | Over 24 hours and ±3.0°C                                                                                                  |
| Temperature stability (df/f)            |     |     | 10    | ppb pk -pk | -40 to 85°C                                                                                                               |
| Initial Tolerance (df/f <sub>0</sub> )  |     |     | ±0.5  | ppm        | @25°C                                                                                                                     |
| vs. supply voltage change (df/f)        |     |     | ±2    | ppb        | static; 3.3V ± 1%                                                                                                         |
| vs. load change (df/f)                  |     |     | ±5    | ppb        | static; Load ± 5%                                                                                                         |
| vs. aging / daily (df/f)                |     |     | ±0.75 | ppb        | after 7 days; @25°C                                                                                                       |
| vs. aging / month (df/f)                |     |     | ±25   | ppb        | after 7 days; @25°C                                                                                                       |
| vs. aging / year (df/f)                 |     |     | ±100  | ppb        | after 7 days; @25°C                                                                                                       |
| vs. aging / 20 years (df/f)             |     |     | ±2.0  | ppm        | after 7 days; @25°C                                                                                                       |
| Phase Stability                         |     |     |       |            |                                                                                                                           |
| Parameter                               | Min | Typ | Max   | Units      | Notes                                                                                                                     |
| Jitter                                  |     |     | 1     | ps rms     | @12kHz to 20MHz                                                                                                           |
| MTIE 1s                                 |     | 0.2 |       | ns         | Wander Generation per GR1244, system performance when locked through a 1mHz loop bandwidth, see typical performance data. |
| MTIE 10s                                |     | 1.6 |       | ns         |                                                                                                                           |
| MTIE 100s                               |     | 12  |       | ns         |                                                                                                                           |
| MTIE 1000s                              |     | 34  |       | ns         |                                                                                                                           |

## Performance Specifications

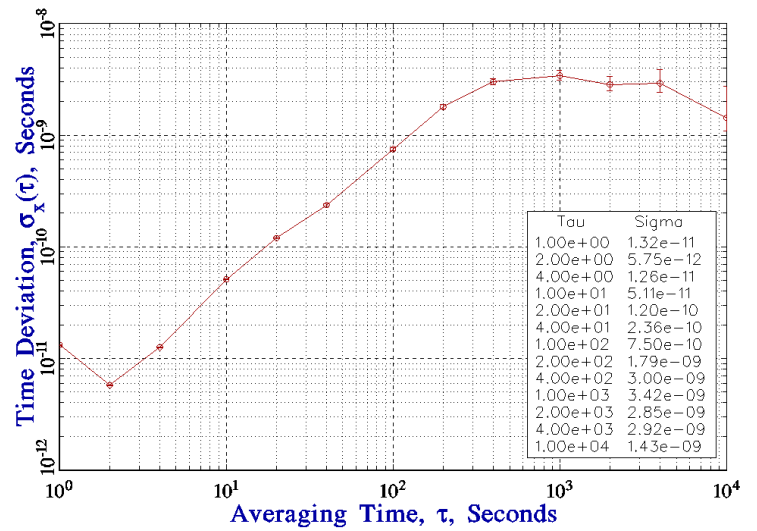
| Phase Stability (continued)      |                                        |      |      |         |                                                                                                                           |
|----------------------------------|----------------------------------------|------|------|---------|---------------------------------------------------------------------------------------------------------------------------|
| Parameter                        | Min                                    | Typ  | Max  | Units   | Notes                                                                                                                     |
| TDEV 1s                          |                                        | 0.01 |      | ns      | Wander Generation per GR1244, system performance when locked through a 1mHz loop bandwidth, see typical performance data. |
| TDEV 10s                         |                                        | 0.05 |      | ns      |                                                                                                                           |
| TDEV 100s                        |                                        | 0.8  |      | ns      |                                                                                                                           |
| TDEV 1000s                       |                                        | 3.5  |      | ns      |                                                                                                                           |
| Phase Noise                      |                                        |      |      |         |                                                                                                                           |
| Parameter                        | Min                                    | Typ  | Max  | Units   | Notes                                                                                                                     |
| Phase Noise at 1 Hz Offset       |                                        |      | -85  | dBc/Hz  |                                                                                                                           |
| Phase Noise at 10 Hz Offset      |                                        |      | -115 | dBc/Hz  |                                                                                                                           |
| Phase Noise at 100 Hz Offset     |                                        |      | -135 | dBc/Hz  |                                                                                                                           |
| Phase Noise 1 kHz Offset         |                                        |      | -145 | dBc/Hz  |                                                                                                                           |
| Phase Noise at 10 kHz Offset     |                                        |      | -150 | dBc/Hz  |                                                                                                                           |
| Phase Noise at 100kHz Offset     |                                        |      | -150 | dBc/Hz  |                                                                                                                           |
| RF Output                        |                                        |      |      |         |                                                                                                                           |
| Signal                           | HCMOS                                  |      |      |         |                                                                                                                           |
| Load                             | 15                                     |      |      | pF      | ±10%                                                                                                                      |
| Rise Time                        | <10                                    |      |      | ns      | @ 10% to 90% V <sub>out</sub>                                                                                             |
| Fall Time                        | <10                                    |      |      | ns      | @90% to 10% V <sub>out</sub>                                                                                              |
| Duty Cycle                       | 45/55                                  |      |      | %       | @ 50% V <sub>out</sub>                                                                                                    |
| V Low                            | 0.4                                    |      |      | V       | With V <sub>s</sub> 3.0V and 15pF load                                                                                    |
| V High                           | 2.4                                    |      |      | V       | With V <sub>s</sub> 3.0V and 15pF load                                                                                    |
| V Low                            | 0.5                                    |      |      | V       | With V <sub>s</sub> 5.0V and 15pF load                                                                                    |
| V High                           | 3.5                                    |      |      | V       | With V <sub>s</sub> 5.0V and 15pF load                                                                                    |
| Supply                           |                                        |      |      |         |                                                                                                                           |
| Supply Voltage (V <sub>s</sub> ) | 3.3, 5.0                               |      |      | V       | ±10%                                                                                                                      |
| Power consumption                | <1.5                                   |      |      | W       | Steady state, @ V <sub>s</sub> = 3.3V, 25°C                                                                               |
| Power consumption                | <3.3                                   |      |      | W       | During warm up, @ V <sub>s</sub> = 3.3V, 25°C                                                                             |
| Additional Parameters            |                                        |      |      |         |                                                                                                                           |
| Warm Up Time                     | 3                                      |      |      | minutes | @25°C to final frequency (1 Hour) within ±0.1ppm                                                                          |
| ROHS                             | ROHS 6 compliant                       |      |      |         |                                                                                                                           |
| Washable                         | Washable device (hermetically sealed). |      |      |         |                                                                                                                           |
| Absolute Maximum Ratings         |                                        |      |      |         |                                                                                                                           |
|                                  | Min                                    |      |      | Max     | Units                                                                                                                     |
| Operating temperature range      | -40                                    |      |      | 85      | °C                                                                                                                        |
| Storage temperature range        | -50                                    |      |      | 90      | °C                                                                                                                        |

## Typical Performance

### FREQUENCY STABILITY

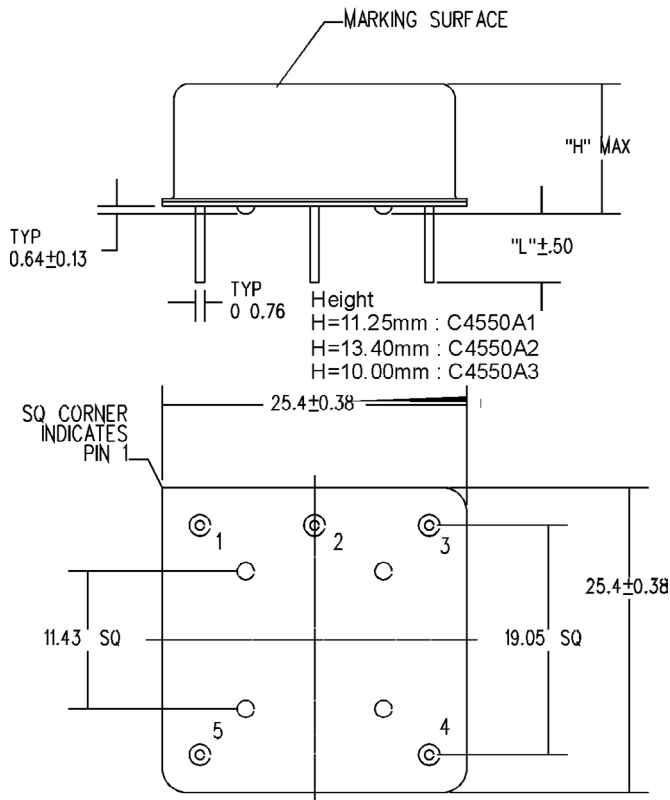


### TIME STABILITY



Wander Generation per GR1244, system performance when locked through a 1MHz loop bandwidth.

## Outline Drawing / Enclosure



Dimensions in mm

| Height Codes |            |                |
|--------------|------------|----------------|
| Code         | Height "H" | Pin Length "L" |
| 2            | 13.4       | 6.35           |

| Pin Assignment |                                |
|----------------|--------------------------------|
| Pin            | Connection                     |
| 1              | RF Out                         |
| 2              | Ground (case)                  |
| 3              | NC                             |
| 4              | NC                             |
| 5              | Supply Voltage Input ( $V_G$ ) |

## Ordering Information

### OX - 202 2 - E A E - 108 0 - 10M0000000

Product Family  
OX: OCXO

Package  
25.8 x 25.8 mm THT

Height  
2: 13.4 mm

Supply Voltage  
D: +5.0V  
E: +3.3V

RF Output Code  
A: HCMOS

Frequency

Frequency Control  
0: Fixed Frequency

Stability Code  
108: 10ppb pk-pk

Temperature Range  
E: -40°C to +85°C  
J: -20°C to +70°C

#### Notes:

1. Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
2. Unless other stated all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, temperature (25°C).
3. Phase noise degrades with increasing output frequency.
4. Subject to technical modification.
5. Contact factory for availability.



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