



OX-502

### Features

- 6-Pin SMD package
- Fast warm-up
- Frequency Range, 10 MHz to 40 MHz
- Standard freq: 10, 12.8, 20, 24.576, 25, 30.72 MHz
- High Reliability (based on fully intergrated Design)
- Low Power

### Applications

- Base stations 5G & 4 G)
- Test equipment
- Small Cell
- Military communication equipment
- Stratum 3
- SyncE; 1588

## Performance Specifications

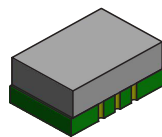
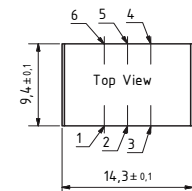
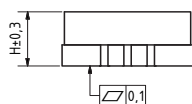
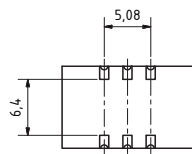
| Frequency Stabilities <sup>1</sup> 10 to 40 MHz          |      |         |      |         |  |                      |
|--|------|---------|------|---------|--|----------------------|
| Parameter  | Min  | Typical | Max  | Units   | Condition  | Options <sup>5</sup> |
| vs. operating temperature range<br>(referenced to +25°C) | -20  |         | +20  | ppb     | -40 to +85°C   |                      |
|  | -10  |         | +10  | ppb     | -40 to +85°C   |                      |
|  | -20  |         | +20  | ppb     | -40 to +95°C   |                      |
| slope  | -2   |         | +2   | ppb/°C  | @ Temp stab. +-10ppb   |                      |
| Initial tolerance  | -0.5 |         | +0.5 | ppm     | at time of shipment, nominal EFC   |                      |
| vs. supply voltage change                                | -10  |         | +10  | ppb     | V <sub>c</sub> ±5% static  |                      |
| vs. load change  | -10  |         | +10  | ppb     | Load ±5% static  |                      |
| vs. aging / day  | -5   | ±2      | +5   | ppb     | after 30 days of operation   |                      |
| vs. aging / year   | 500  |         | +500 | ppb     | after 30 days of operation   |                      |
| vs. aging / 10 years                                     | -3   |         | 3    | ppm     | after 30 days of operation   |                      |
| Holdover drift   |      |         | 5    | ppb     | over 24 hours, constant temperature (<±1°C) ;<br>after 30 days continous operation   |                      |
| Start up time  |      |         | 200  | msec    |  |                      |
| Warm-up time   |      |         | 3    | minutes | to ±20ppb of final frequency (1 hour reading)<br>@ +25°C   |                      |
| Loop bandwidth for wander<br>generation compliance       | 3    |         |      | mHz     | MTIE compliant with GR-1244 Fig 5-5<br>TDEV compliant with GR- 1244 Fig 5-4 ;<br>measurement setup: oscillator stabilized 24<br>hours at Constant Temperature (±1°C, still<br>air), data collected over 100,000 seconds at 1<br>second intervals (-3dB cutoff, 1st order high<br>pass loop filter) |                      |

## Performance Specifications

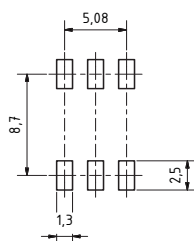
| Supply Voltage (Vs)        |                            |         |       |        |                            |         |
|----------------------------|----------------------------|---------|-------|--------|----------------------------|---------|
| Parameter                  | Min                        | Typical | Max   | Units  | Condition                  |         |
| Supply voltage (standard)  | 3.135                      | 3.3     | 3.465 | VDC    |                            |         |
| Power consumption          |                            | 1.3     | 1.5   | Watts  | during warm-up             |         |
|                            |                            | 0.4     | 0.5   | Watts  | steady state @ +25°C       |         |
| RF Output                  |                            |         |       |        |                            |         |
| Signal [standard]          | LVHCMOS                    |         |       |        |                            |         |
| Load                       |                            | 15      |       | pF     |                            |         |
| Signal Level (Vol)         |                            |         | 0.4   | VDC    | with Vs=3.3V and 15pF Load |         |
| Signal Level (Voh)         | 2.97                       | 3.3     |       | VDC    | with Vs=3.3V and 15pF Load |         |
| Duty Cycle                 | 45                         |         | 55    | %      | @ (Voh-Vol)/2              |         |
| Ron                        |                            | 26.5    |       | Ω      |                            |         |
| Roff                       |                            | 22      |       | Ω      |                            |         |
| Frequency Tuning (EFC)     |                            |         |       |        |                            |         |
| Tuning Range               | Fixed OCXO; No adjust      |         |       |        | Opti-<br>on <sup>5</sup>   |         |
| Tuning Range               | ±3                         |         | ±8    | ppb    |                            |         |
| Linearity                  | 10%                        |         |       |        |                            |         |
| Tuning Slope               | Positive                   |         |       |        |                            |         |
| Control Voltage Range      | 0.0                        | 1.4     | 2.8   | VDC    |                            |         |
| Additional Parameters      |                            |         |       |        |                            |         |
| Phase Noise <sup>3</sup>   |                            | -99     | -90   | dBc/Hz | 10 Hz                      | @ 20MHz |
|                            |                            | -125    | -120  | dBc/Hz | 100 Hz                     |         |
|                            |                            | -145    | -140  | dBc/Hz | 1 kHz                      |         |
|                            |                            | -155    | -150  | dBc/Hz | 10 kHz                     |         |
|                            |                            | -160    | -155  | dBc/Hz | 100kHz                     |         |
| Weight                     |                            |         | 1.0   | g      |                            |         |
| Processing & Packing       | Handling & Processing Note |         |       |        |                            |         |
| Absolute Maximum Ratings   |                            |         |       |        |                            |         |
| Supply voltage (Vs)        |                            |         | 3.8   | V      | with Vs=3.3 VDC            |         |
| Output Load                |                            |         | 50    | pF     |                            |         |
| Operable Temperature Range | -40                        |         | +95   | °C     |                            |         |
| Storage Temperature Range  | -40                        |         | +125  | °C     |                            |         |

## Outline Drawing / Enclosure

G367



land pattern  
recommendation



OX-502

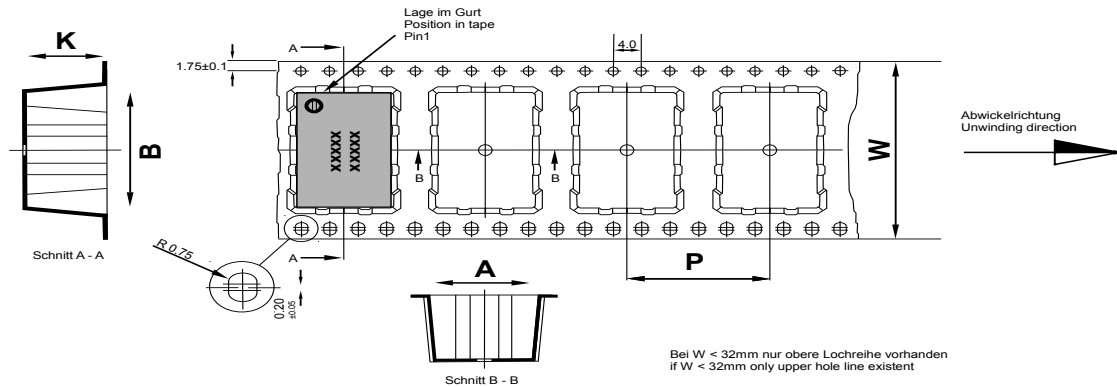
|            |                |
|------------|----------------|
| Height "H" | cover material |
| 6.2        | plastic        |

Pin Connections

|   |                                     |
|---|-------------------------------------|
| 1 | I.C (Do not connect) / EFC (option) |
| 2 | N.C                                 |
| 3 | Ground (Case)                       |
| 4 | RF Output                           |
| 5 | N.C                                 |
| 6 | Supply Voltage Input                |

Dimensions in mm

# Standard Shipping Method (OX-502)



|  |  |
|--|--|
| Maßangaben in mm:<br>A, B und K Maße von Bauelement abhängig<br>Fertigungstoleranzen entsprechen der DIN IEC 286-3 | Dimension in mm:<br>A, B und K are dependent upon component dimensions<br>production tolerance complying DIN IEC 286-3 |
|--|--|

All dimensions in millimeters unless otherwise stated

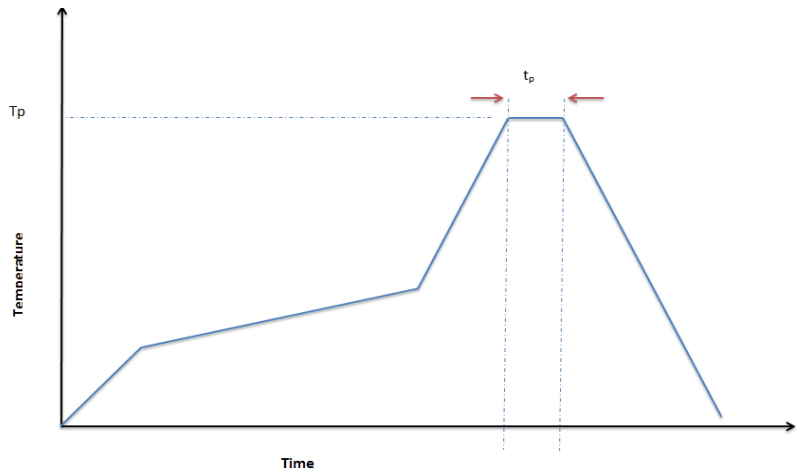
| Enclosure Type  | Tape Width W (mm) | Quantity per meter | Quantity per reel | Dimension P |
|-----------------|-------------------|--------------------|-------------------|-------------|
| OX-502 (6.2 mm) | 24                | 83.3               | 400               | 12          |

## Reflow Profile

TP: max 250°C (@ solder joint, customer board level)  
 Tp: max: 10...40 sec

Additional Information:  
 This SMD oscillator has been designed for pick and place reflow soldering

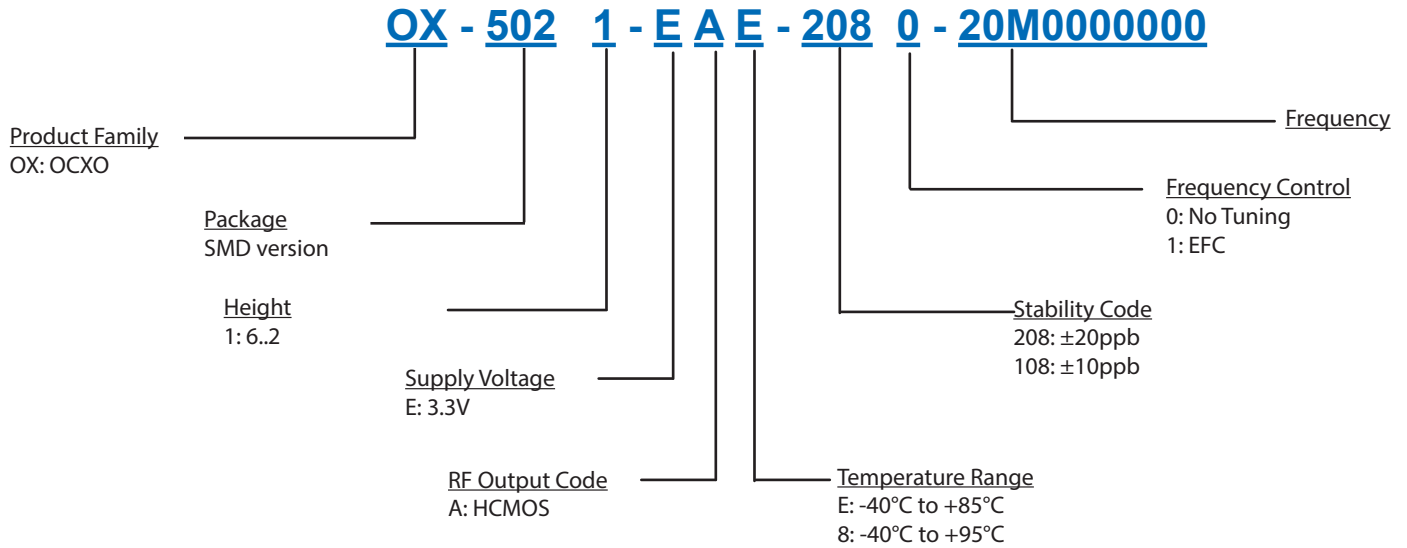
SMD oscillators must be on the top side of the PCB during the reflow process.



## Additional Environmental Conditions

| Parameter                      | Description  |
|--------------------------------|--|
| Temperature Cycling            | JESD22-A104-D Cond.G - 500cycles -40/+125C;cycle time 30min  |
| Vibration, Sine                | MIL-STD-883 Meth 2007 Cond A - 20g 20-2000Hz 4x in each 3 axis 4min sweep time   |
| Mechanical Shock               | MIL-STD-202 Meth 213B Cond. F - 1500g 0,5ms 6 shocks in each direction   |
| Solderability                  | J-STD-002C Cond. A, Trough hole device; Cond.B, SMD ( correspond to MIL-STD-883 Meth 2003) - 255C (diving Time 5 0,5sec.) Dip&Look with 8h damp pre-treatment: solder wetting >95% |
| Solvent resistance             | MIL-STD-883 Meth 2003) - 255C (diving Time 5 0,5sec.) Dip&Look with  |
| ESD                            | 8h damp pre-treatment: solder wetting >95%   |
| Moisture Sensit.               | JESD22-A113-B - only if > MSL 1  |
| RoHS compliance                | 100% RoHS 6 compliant  |
| Washable                       | non-washable device  |
| High temp operating life(HTOL) | MIL-STD-202 Meth108A Cond C - 1000h @ 105C power on  |
| Low temp operating life(LTOL)  | IEC 60068-2-1 Cond. Ae - 1000h @ -40C power on   |

## Ordering Information



**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.

## Contact Information

**USA:**

100 Watts Street  
Mt Holly Springs, PA 17065  
Tel: 1.717.486.3411  
Fax: 1.717.486.5920

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Tel: +49 (0) 7268.801.0  
Fax: +49 (0) 7268.801.281



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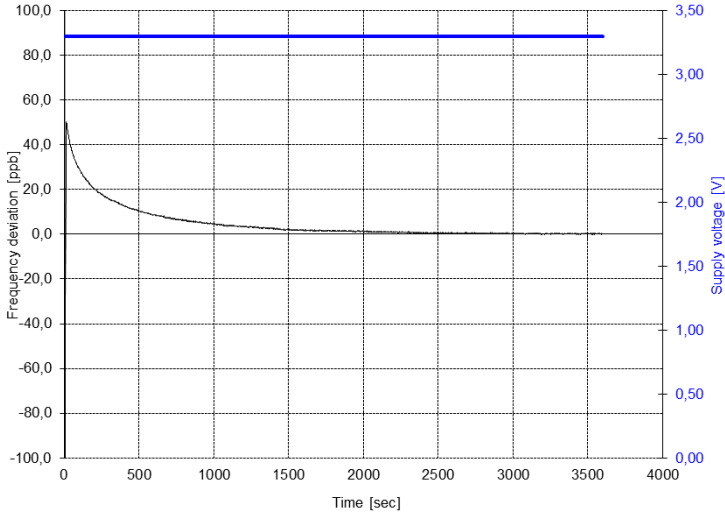
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# typical performance data

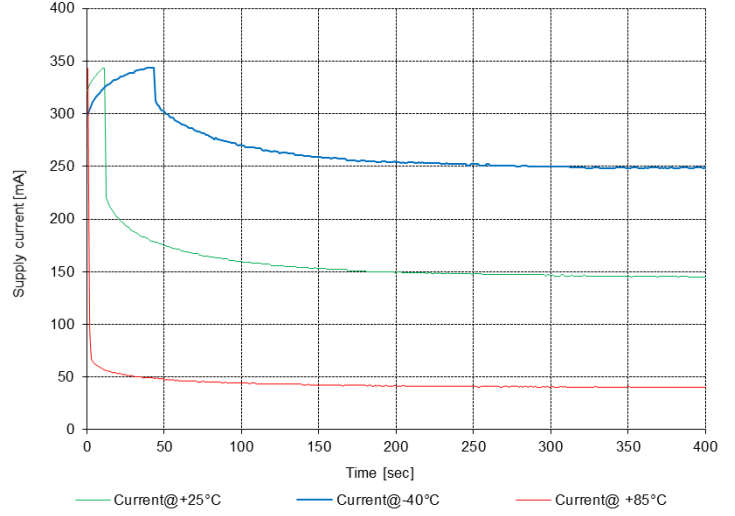
## typical warm up (frequency vs. time)

@ OX-5021-EAE-1080-20M000



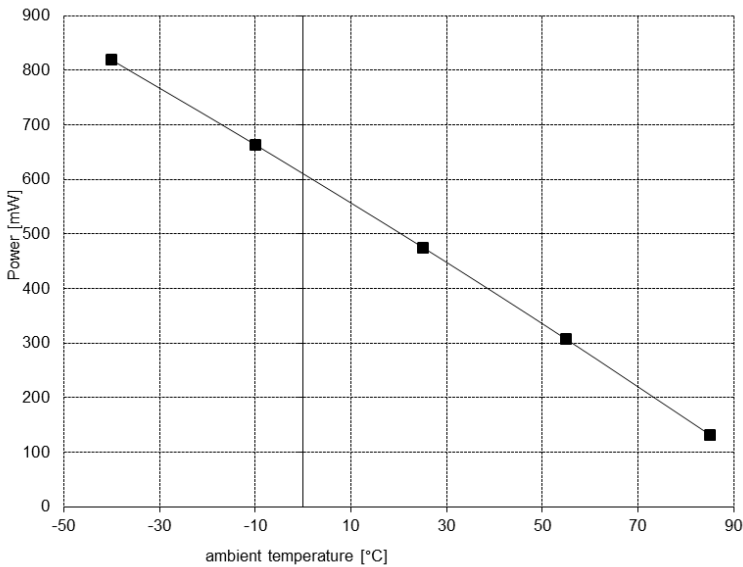
## typical current consumption during power on

@ OX-5021-EAE-1080-20M000



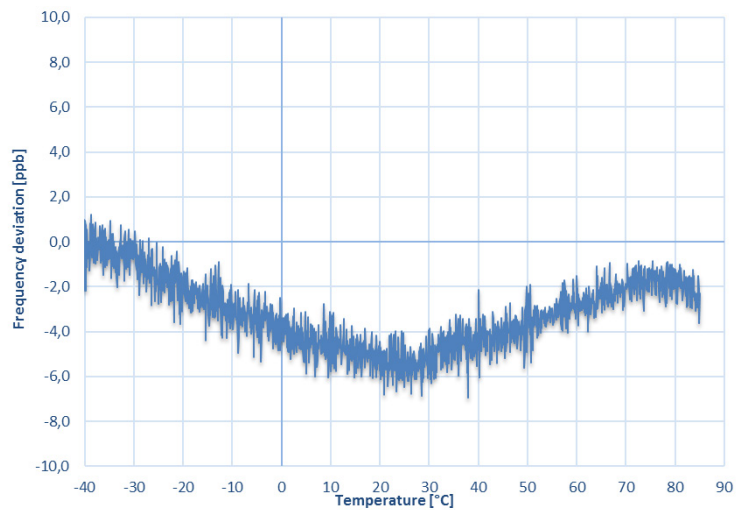
## typical power consumption vs. operating temperature

@ OX-5021-EAE-1080-20M000



## typical frequency vs. temperature stability

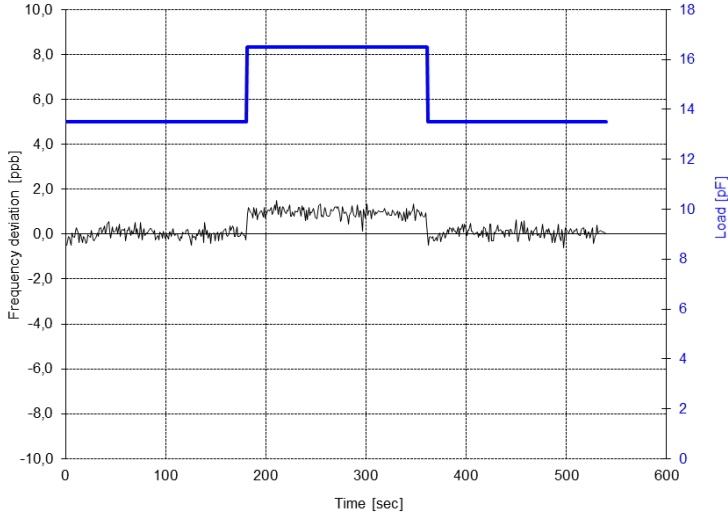
@ OX-5021-EAE-1080-20M000



# typical performance data

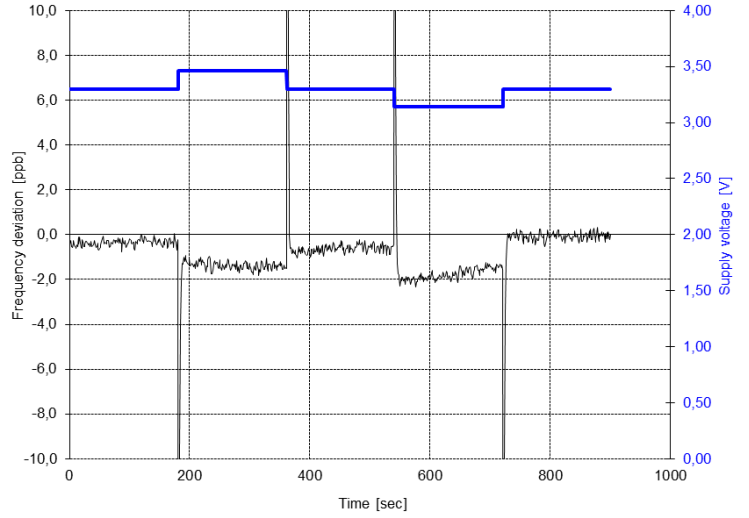
## typical frequency vs. load change

@ OX-5021-EAE-1080-20M000



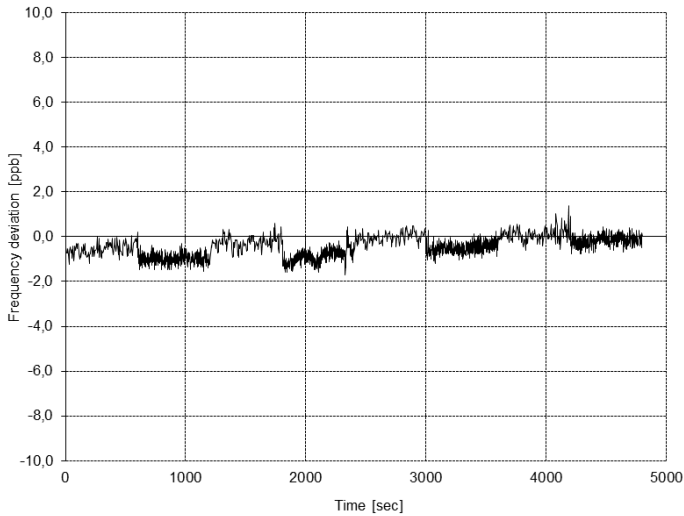
## typical frequency vs. supply voltage

@ OX-5021-EAE-1080-20M000



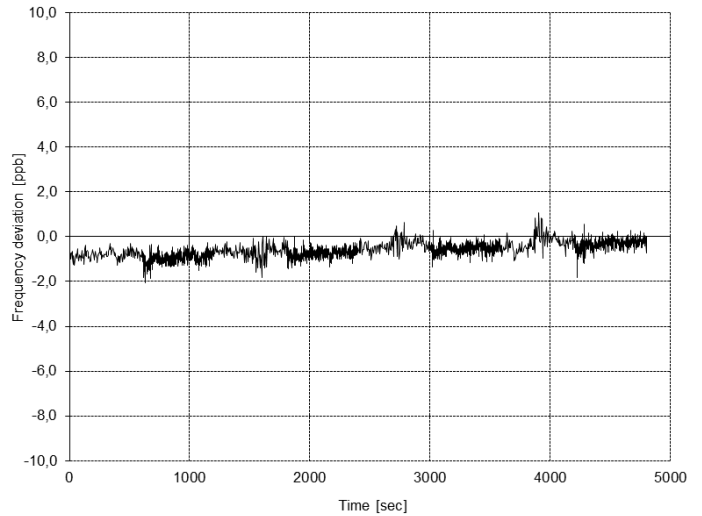
## typical frequency. vs cycled airflow without additional cover

@ OX-5021-EAE-1080-20M000



## typical frequency. vs cycled airflow with additional cover

@ OX-5021-EAE-1080-20M000



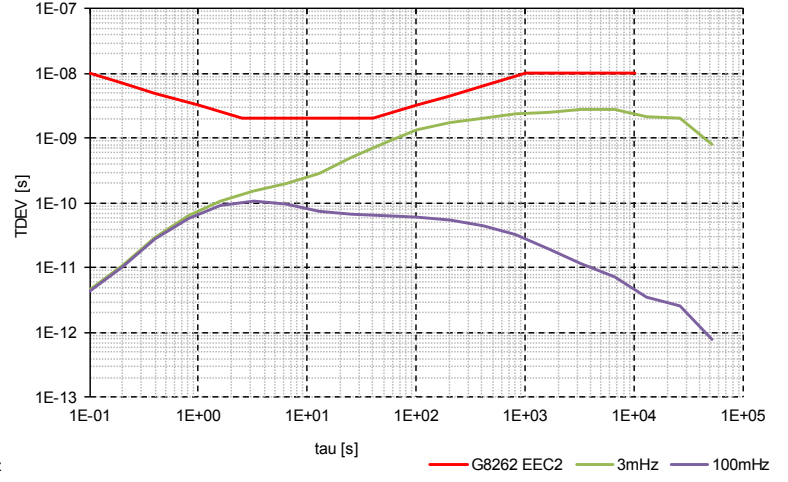
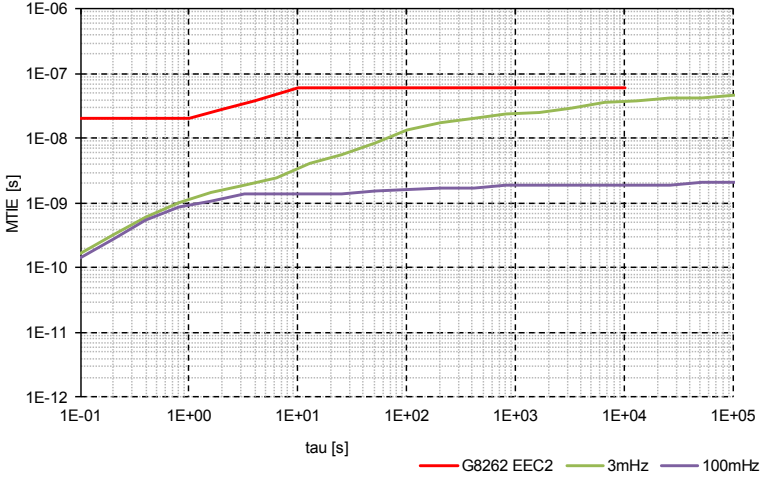
# typical performance data

**typical MTIE @ 3mHz loop Bandwidth**

@ OX-5021-EAE-1080-20M000

**typical TDEV @ 3mHz loop Bandwidth**

@ OX-5021-EAE-1080-20M000



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